THIRD BIENNIAL UPDATE REPORT OF THE REPUBLIC OF MOLDOVA

DEVELOPED TO BE REPORTED TO THE UNITED NATIONAL FRAMEWORK CONVENTION IN CLIMATE CHANGE

June, 2021

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Chisinau
30 June 2021

CZU 551.583:502/504(478)(047)
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The Third Biennial Update Report of the Republic of Moldova to the United Nations Framework Convention on Climate Change was developed within the Project "Republic of Moldova: Preparation of the Third Biennial Update Report to the United Nations Framework Convention on Climate Change", implemented by the Public Institution „Environmental Projects Implementation Unit" and the United Nations Environment Program, with the financial support of the Global Environment Facility.

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Title:	Third Biennial Update Report of the Republic of Moldova developed to be reported to the United Nations Framework Convention on Climate Change
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Internet Version:	This document is available at: <http://www.clima.md> and <http://www.am.gov.md>
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CIP Code of the National Book Chamber
Third Biennial Update Report of the Republic of Moldova: Developed to be reported to the United National Framework Convention in Climate Change : 30 June 2021 / Public Institution "Environmental Projects Implementation Unit", Environment Agency of the Republic of Moldova, United Nations Environment Programme ; coordinators: Suzanne Lekoyiet, Raisa Leon ; editorial group: Marius Taranu [et al.] ; translators: Elena Bivol, Svetlana Chirita. – Chişinău : S. n., 2021 (Bons Offices SRL). – 298 p. : fig., tab.

Referinţe bibliogr.: p. 224-247 (695 tit.). – With the financial support of the Global Environment Facility. – 15 ex.

ISBN 978-9975-87-891-3.
551.583:502/504(478)(047)
T22

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ISBN 978-9975-87-891-3.

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FOREWORD

There is no doubt that climate change phenomenon can endanger sustainable development of humanity. It can cause various negative impacts related to raising the level of the planet's oceans, increasing the frequency of natural disasters (floods, droughts, heat waves, hurricanes, tornadoes, etc.), increased vulnerability of natural and artificial ecosystems to new climate conditions, etc. This requires that nations of the planet take action aimed both at reducing the intensity of this process and at mitigating possible consequences of the phenomenon.

The Third Biennial Update Report (BUR3) of the Republic of Moldova prepared to be reported to the United Nations Framework Convention on Climate Change (UNFCCC) was compiled with financial assistance provided by the Global Environment Facility (GEF) through the project "Republic of Moldova: Preparation of the Third Biennial Update Report to the United Nations Framework Convention on Climate Change", initiated on 28 January 2019 and completed on 31 December 2021; managed by the United Nations Environment Program and implemented by the Public Institution "Environmental Projects Implementation Unit" of the Ministry of Agriculture, Regional Development and Environment of the Republic of Moldova.

As compared to the Second Biennial Update Report (BUR2) of the Republic of Moldova to the UNFCCC (2019), BUR3 presents an updated review of the state of the art in the Republic of Moldova for the main issues regulated by the Convention.

These relate to assessment of the trend of greenhouse gas emissions at national and sectoral level, presentation of climate change mitigation measures undertaken at national level, support and capacity needs for reducing greenhouse gas emissions at national and sectoral level on a larger scale.

It is important to note that these assessments can also be used to update the mitigation targets set in the Updated National Determined Contribution of the Republic of Moldova (2020), prepared in accordance with Decisions 1/CP.19 and 1/CP.20 of the Paris Agreement (2015) – legal instrument with legal force applicable in relation to all Signatory Parties to the Convention, in accordance with the objective of maintaining global warming at a projected growth below 2°C by 2100 as compared to the pre-industrial period.

The Paris Agreement was signed by the Prime Minister of the Republic of Moldova in New York on 21 September 2016, being subsequently ratified by the Parliament by Law no. 78 of 04.05.2017 on ratification of the Paris Agreement, while GHG emission reduction targets set in the National Determined Contribution of the Republic of Moldova, were officially approved at national level by Government Decision no. 1470 of 30.12.2016 on approval of the Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation.

In accordance with the Updated National Determined Contribution (2020), the Republic of Moldova has committed to reach by 2030 the unconditional target of reducing GHG emissions by 70% as compared to the level recorded in the reference year (1990). The reduction commitment could be conditionally increased to about 88%, in line with this global agreement, which addresses important issues such as provision of low-cost financial resources, technology transfer and technical cooperation, access to all of them as appropriate to the challenges of global climate change.

GHG reduction targets have been set within an emissions budget, covering the period from 1 January 2021 to 31 December 2030.

The development of the BUR3, respectively, the implementation of the Low Emission Development Strategy (LEDS) of the Republic of Moldova until 2030 and of the Action Plan for its implementation, is an essential contribution of our country to solving the climate change problem both nationally and globally.

Veaceslav DERMENJI
Director of the Environment Agency of the Republic of Moldova

LIST OF ACRONYMS, ABBREVIATIONS AND MEASURING UNITS

AFOLU	Agriculture, Forestry and Other Land Uses
AGEPI	Agency for Intellectual Property
AIPA	Agency for Interventions and Payments in Agriculture
AITT	Agency for Innovation and Technology Transfer
AMP	External Assistance Management Platform
ANACEC	National Agency for Quality Assurance in Education and Research
ANRE	National Agency for Energy Regulation
AR4	IPCC Forth Assessment Report
AR5	IPCC Fifth Assessment Report
Art.	Article
a.s.	active substance
ATU	Autonomous Territorial Unit
ATULBD	Autonomous Territorial Units on the Left Bank of Dniester River
bil.	billion
BMZ	German Federal Ministry for Economic Cooperation and Development
BUR	Biennial Update Report
°C	Degree Centigrade
¢	Cents
CCO	Climate Change Office
CDD	Cooling Degree Days
CDM	Clean Development Mechanism
CE	Council of Europe
CEF	Country-Specific Emission Factor
CERs	Certified Emission Reductions
CFC	Chlorofluorocarbons
CHP	Combined Heat Power Plant
CH_4	Methane
C.I.F.	Cost, Insurance and Freight
CIS	Commonwealth of Independent States
cm	Centimeter
CO	Carbon monoxide
CO_2	Carbon dioxide
COP or CP	Conference of the Parties
CORINAIR	Atmospheric emissions inventory in Europe, prepared by the European Environment Agency with the support of the UN European Economic Commission
CPA	Cooperation and Partnership Agreement with the European Union
CS	Country Specific
CSC	Carbon Storage and Capture Technology
D	Default
dal	dekaliter
DFID	United Kingdom Department for International Development
dm	decimeter
DNA	Designated National Authority
DOC	Degradable Organic Carbon
DOC_F	Fraction of dissimilated DOC
EaPIC	Eastern Partnership Integration and Cooperation
EB	Energy Balance
EBRD	European Bank for Reconstruction and Development
ECOPact	Green Concrete
ECT	Energy Community Treaty
EDN	Electricity Distribution Network
EEA	European Environment Agency
EEC	European Economic Community
EEF	Energy Efficiency Fund
EF	Emission Factor
EIB	European Investment Bank
EMEP	European Monitoring and Evaluation Program
EnMS	Energy Management System
ENPARD	European Neighborhood Programme for Agriculture and Regional Development
ENPEP	Energy and Power Evaluation Program
ENTSO-E	European Network of Transmission System Operators for Electricity
E5P	Eastern Europe Energy Efficiency and Environmental Partnership
EPIU	Environmental Projects Implementation Unit
ESCO	Energy Service Company
EU	European Union
EU ETS	European Union Emission Trading Scheme
EUR	Euro
eq.	Equivalent
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
FES	Emission Factor in the National Energy and Power System
FEZ	Free Economic Zone
FIDA	Rural Program for Inclusive Economic and Climate Resilience
F.O.B.	Free on Board
FOD	First Order Decay Method
FSV	Facilitative Sharing of Views
g	grams
g.c.c.	Grams of conventional fuel
Gcal	Gigacalory
GCF	Green Climate Fund
GD	Government Decision
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GEFFM	Green Economic and Financial Facility for Moldova
GHG	Greenhouse gases

GIZ	German Agency for International Cooperation (German: Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH)
GJ	Gigajoule (1GJ = 10^9 joules)
GOST	Regional standardization system administered by the Euro-Asian Council for Standardization, Metrology and Certification within the Commonwealth of Independent States
GSP	Small Grant Program
Gt	Gigatone (10^9 tons)
GWP	Global Warming Potential
h	hour
ha	hectare
HDD	Heat Degree Days
HFCs	Hydrofluorocarbons
hl	hectoliter
HP	Heating Plant
HPP	Hydro Power Plant
IAEA	International Atomic Energy Agency
IBRD	International Bank for Reconstruction and Development
ICA	International Consultation and Analysis
ICAS	Forestry Research and Management Institute
ICSID	International Center for the Settlement of Investment Disputes
IDA	International Development Association
IE	Included Elsewhere
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IMF	International Monetary Fund
IMPACT	Model for emission calculation, a component of the ENPEP package of models
INDC	Intended Nationally Determined Contributions
JSC	Joint Stock Company
kg	kilogram
kg c.e.	kilogram coal equivalent
km	kilometer
kPa	kilopascal
kt	kiloton
kt c.e.	kiloton of coal equivalent
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
l	liter
L	Level
LEAP	Long range Energy Alternatives Planning System
LEDS	Low Emission Development Strategy
LECB	Low Emission Capacity Building Program
LEDS	Low Emission Development Strategy
LNG	Liquefied Natural Gas;
LPA	Local Public Authorities
LTD	Limited Responsibility Company
LULUCF	Land Use, Land-Use Change and Forestry
m	meter
m^2	square meter
m^3	cubic meter
MAC-P	The project "Competitive Agriculture in Moldova"
MAED	Model for Analysis of the Energy Demand
MARCAL	Market Allocation Model
MARDE	Ministry of Agriculture, Regional Development and Environment
MCDA	Multicriteria Decision Analysis
MC-EnC	Ministerial Council of the Energy Community
MD	Republic of Moldova
MDG	Millennium Development Goals
MDL	Moldovan Lei
MEI	Ministry of Economy and Infrastructure
MF	Ministry of Finance
MFAEI	Ministry of Foreign Affairs and European Integration
MIA	Ministry of Internal Affairs
MIGA	Multilateral Investment Guarantee Agency
mil.	million
ml	milliliter
MJ	Megajoule (10^6 joule)
mm	millimeter
MoD	Ministry of Defense
MoECR	Ministry of Education, Culture and Research
MoJ	Ministry of Justice
MOP	Meeting of the Parties to the Kyoto Protocol
MoREFF	Moldovan Residential Energy Efficiency Financing Facility
MoSEFF	Moldovan Sustainable Energy Financing Facility
MRV	Monitoring, Reporting and Verification
MS%	The share of different manure management systems
MSW	Municipal Solid Waste
MTPP	Moldovan Thermal Power Plant in Dnestrovsk
Mt	Megaton (10^6 ton)
MW	Megawatt (10^6 watt)
NA	Not Applicable
NAER (ANRE)	National Agency for Energy Regulations
NAFS (ANSA)	National Agency for Food Safety
NAMA	Nationally Appropriate Mitigation Actions
NAPEE	National Action Plan in Energy Efficiency
NARD	National Agency for Research and Development
NATO	North Atlantic Treaty Organization
NBM	National Bank of Moldova
NBS	National Bureau for Statistics
NCs	National Communications
NDC	Nationally Determined Contribution
NE	Not Estimated
NECP	National Energy and Climate Plan
NEET	Persons Not in Employment, Education or Training
NFARD	National Fund for Agriculture and Rural Development
NFRD	National Fund for Regional Development
NGO	Non-Governmental Organization
NIF	Neighborhood Investment Facility
NIR	National Inventory Report
NIS	National Inventory System
NMRS	National Monitoring and Reporting System
NMVOC	non methane volatile organic compounds
NO	Not Occurring
N_2O	Nitrous oxide
No.	Number
ODA	Official Development Assistance
ODIMM	Organization for Small and Medium Enterprises Sector Development
ODS	Ozone Depleting Substances
OECD	Organization for Economic Cooperation and Development
OPL	Overhead Power Line
OSCE	Organization for Security and Cooperation in Europe

PSCM	Project „Soil Conservation in Moldova"
PDCFSM	Project „Development of Community Forest Sector in Moldova"
PDD	Project Design Document
PET	Polyethylene terephthalate
PFC	Perfluorocarbons
PI "EPIU"	Public Institution "Environmental Projects Implementation Unit"
PJ	Petajoule (10^{15} joule)
ppb	Parts per billion by volume
ppm	Parts per million by volume
PPP	Purchasing Power Parity
ppt	Parts per trillion by volume
Q	Quintal
QA	Quality Assurance
QC	Quality Control
R^2	Coefficient of determination
RDI	R&D and innovation
RES	Renewable Energy Source
RETScren	Clean Energy Management Software
RM	Republic of Moldova
SA	Sensitivity Analysis
SACET	Central Heat Supply Systems
SAR	IPCC Second Assessment Report
SAUM	State Agricultural University of Moldova
SF_6	Sulphur Hexafluoride
SGP	Small Grants Program
SHS	State Hydrometeorological Service
SIDA	Swedish International Development Cooperation Agency
SLCS	Soil Conservation Works System
SOE	State Owned Enterprise
SME	Small and Medium-Sized Enterprises
SO_2	Sulphur dioxide
STARS	EU project "Support for Modernization of the Energy Sector in the Republic of Moldova"
STP	Science and Technology Park
t	ton
T1	Tier 1
T2	Tier 2
t.c.e.	ton of coal equivalent
TIMES	The Integrated MARKAL EFOM System - it is a bottom-up model generator that uses linear-programming to produce a least-cost energy system
TJ	Terajoule (10^{12} joule)
TNA	Technology Needs Assessment
TTE	Team of Technical Experts
TUM	Technical University of Moldova
UCTE	Union for the Coordination of Electricity Transports (fr .: Union pour la Coordination du Transport de l'Electricité)
UN	United Nation Organization
UNDAF	United Nations Development Action Framework
UNECE	United Nations Economic Commission for Europe
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USA	Untired States of America
US AID	United States Agency for International Development
US EPA	United States Environment Protection Agency
US$	US Dollars
USSR	Union of Soviet Socialist Republics
VAT	Value Added Tax
WAM	With Additional Measures Scenario
WASP	Wien Automatic System Planning
WB	World Bank
WEM	With Existing Measures Scenario
WPPP	Wind and Photovoltaic Power Plants
°	Degrees
´	Seconds
%	Percent
‰	Promile

CONTENTS

EXECUTIVE SUMMARY

ES.1. Introduction

ES.1.1. Convention's Ultimate Objective

The ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC) is aimed to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. To-date 196 countries are Parties to the Convention. Republic of Moldova signed the UNFCCC on June 12, 1992 and it was ratified by the Parliament on March 16, 1995.

Article 4, paragraph 1(a) and Article 12, paragraph 1(a) of the UNFCCC stipulate that each Party has to make available to the Conference of the Parties (COP) a "*national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be agreed upon by the Conference of the Parties; also a general description of steps taken or envisaged by the Party to implement the Convention; and any other information that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, material relevant for calculations of global emission trends*".

ES.1.2. Reporting under the Convention

The main mechanism for making this information available is National Communications. COP 2 (Geneva, 1996) adopted the Guidelines on national communications for non-Annex I Parties (Decision 10/CP 2). In conformity with the respective Guidelines, in 1998-2000, under the *UNDP-GEF Project "Enabling Activities for the preparation of the First National Communication under the UNFCCC",* Republic of Moldova developed its FNC to UNFCCC (including a national GHG inventory for a time series from 1990 through 1998), submitted to the COP 6 (Hague, 2000).

The COP 8 (New Delhi, 2002) adopted new Guidelines on national communications for non-Annex I Parties (Decision 17/CP 8). In conformity with these Guidelines, in 2005-2009 under the *UNEP-GEF Project "Enabling Activities for the preparation of the Second National Communication under the UNFCCC",* Republic of Moldova developed its SNC under the UNFCCC (2010), in 2010-2014, the Third National Communication under the UNFCCC (2014), in 2014-2018, the Fourth National Communication under the UNFCCC (2018); while in 2019-2022, respectively the Fifth National Communication under the UNFCCC.

The COP 3 (Kyoto, 1997) adopted the Kyoto Protocol, representing an instrument setting binding targets for the Parties under Convention, by committing industrialized countries and economies in transition included in Annex I to Convention, to reduce total emissions of direct GHG by at least 5 per cent, against 1990 levels over the five-year period 2008-2012. The Republic of Moldova ratified the Kyoto Protocol on February 13, 2003. As a non-Annex I Party, the Republic of Moldova had no commitments to reduce GHG emissions under the first commitment period of the Kyoto Protocol.

In January 2010, the Republic of Moldova associated itself with the Copenhagen Accord and submitted an emissions reduction target that is specified in Annex II of this Agreement "National Appropriate Mitigation Actions in Developing Countries". The target of mitigation actions for Republic of Moldova under this Agreement is "*to reduce, to not less than 25% compared to the base year (1990), the total national level of greenhouse gas emissions by 2020, by implementing economic mechanisms focused on global climate change mitigation, in accordance with the principles and provisions of the Convention*". This target is presented without indicating specific national appropriate mitigation actions, identified and quantified, and without further clarification of the necessary support to achieve it. Simultaneously, it is recognized that achieving this target will require significant financial, technological and capacity-building support, which can be provided through the UNFCCC mechanisms.

At COP 18 (Doha, 2012), the Doha Amendment to the Kyoto Protocol was approved. The amendment includes new commitments for countries included in Annex I to the Kyoto Protocol during the second commitment period (1 January 2013-31 December 2020); a revised

list of greenhouse gases to be reported by Annex I countries during the second commitment period; and a series of amendments to several articles of the Kyoto Protocol that specifically address certain issues related to the first commitment period that were to be revised to remain valid during the second commitment period as well. According to the Doha Amendment to the Kyoto Protocol, industrially developed countries are to reduce their greenhouse gas emissions by at least 18% in the second commitment period as compared to the base year (1990). As of 28 October 2020[1], 147 countries have ratified the Doha Amendment to the Kyoto Protocol, the vast majority of which are countries not included in Annex I to the UNFCCC and the Kyoto Protocol. The Doha Amendment entered into force on 31 December 2020.

At COP 19 (Warsaw, 2013), the Parties agreed to communicate their intended nationally determined contributions (INDC) (Decision 1/CP.19), in order to include them in the new Climate Agreement 2015 to be considered and adopted by the COP 21 in 2015, in Paris. The new climate agreement establishes a new commitment period (1st of January 2021 – 31st of December 2030) for reducing the GHG emissions. Also, COP 19 adopted *General guidelines for domestic measurement, reporting and verification of domestically supported nationally appropriate mitigation actions by developing country Parties* (Decision 21/CP.19). This document provides a solid foundation for the new Climate Agreement 2015.

At COP 20 (Lima, 2014) the Parties agreed over *Lima Call for Climate Action* and were repeatedly invited (Decision 1/CP.20) to communicate to the Secretariat their intended nationally determined contributions towards achieving the objective of the Convention as set out in its Article 2. In order to facilitate clarity, transparency and understanding, the INDC may include, as appropriate, inter alia: (i) quantifiable information on the reference point; (ii) time frames and/or periods for implementation; (iii) scope and coverage; (iv) planning processes; (v) assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals; and (vi) how the Party considers that its national circumstances, and how it contributes towards achieving the objective of the Convention as set out in its Article 2.

According to *Lima Call for Climate Action*, countries were invited to communicate their intended nationally determined contributions by March 31, 2015, the deadline for the presentation being September 30, 2015. The request to the Secretariat was to prepare by 1st of November 2015 a synthesis report on the aggregate effect of the INDC communicated by Parties.

The Republic of Moldova was fully committed to the UNFCCC negotiation process towards adopting at COP 21 the Paris Agreement – a document with legal force under the Convention, applicable to all Parties, in line with keeping global warming below 2°C by 2100 compared to the preindustrial era.

The Paris Agreement was signed by the Prime Minister of the Republic of Moldova in New York on September 21, 2016 and was subsequently ratified by the Parliament through Law No. 78 from 04.05.2017 for the ratification of the Paris Agreement (Official Monitor No. 162-170 from 26.05.2017).

On 25 September 2015, the Republic of Moldova officially declared its Intended Nationally Determined Contribution and associated information to facilitate clarity, transparency and understanding in relation to the provisions of Decisions 1/CP.19 and 1/CP.20. Accordingly, the Republic of Moldova has committed to achieve by 2030 the unconditional target of reducing GHG emissions by 64-67% compared to the level recorded in the reference year (1990) and to make every effort to reduce GHG emissions by 67% as compared to 1990. The reduction commitment could be conditionally increased to around 78%, according to the global agreement, which addresses important issues such as the provision of low-cost financial resources, technology transfer and technical cooperation, access to all of these to an extent appropriate to the challenges of global climate change. GHG emission reduction targets have been set in an emissions budget, covering the period from 1 January 2021 to 31 December 2030. GHG emission reduction targets, set in the Intended Nationally Determined Contribution of the Republic of Moldova, were subsequently officially approved at national level by Government Decision no. 1470 of 30.12.2016 on approval of the Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation.

On 4th March 2020, the Republic of Moldova presented to the UNFCCC Secretariat the Updated Nationally Determined Contribution[2]. According to this, the Republic of Moldova is committed to achieve by 2030 more ambitious targets of reducing GHG emissions. Thus, the unconditional target is to increase GHG reduction from 64-67% to 70% as compared to the level recorded in the reference year (1990), and the conditional target is to increase accordingly from 78% to about 88% as compared to the level recorded in 1990. The new targets for reducing GHG emissions are to be introduced in the Low Emission Development Programme by 2030 and the Action Plan for its implementation; to be considered and approved by the Government by end of 2021 year.

[1] <https://unfccc.int/process/the-kyoto-protocol/the-doha-amendment>

[2] <https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>

ES.2. National Circumstances Relevant to the Greenhouse Gas Emissions and Removals

ES.2.1. Institutional Arrangements

On behalf of the Government, the Ministry of Agriculture, Regional Development and Environment (MARDE) is responsible for implementation of international environmental treaties to which the Republic of Moldova is a Party (including UNFCCC). MARDE representatives also hold the position of UNFCCC Focal Point.

In accordance with Government Decision no. 444 of 01.07.2020 on establishment of the mechanism for coordinating activities in the field of climate change, the *National Commission on Climate Change* was established. The nominal composition of the *National Commission* is approved by the Government and the Commission consists of 17 members – 10 representatives of central and local public authorities and 7 representatives of educational and scientific institutions, of non-governmental organizations and the private sector. The Commission is an inter-institutional body set up for the purpose of coordinating and promoting the measures and actions necessary for uniform application of the UNFCCC and the Paris Agreement provisions on the territory of the Republic of Moldova.

The Environment Agency, established in accordance with Government Decision no. 549 of 13.06.2018, was designated as the competent authority responsible for ensuring the operation of the *National Monitoring and Reporting System (NMRS) of greenhouse gas emissions and other information relevant to climate change*, established by Government Decision no. 1277 of 26.12.2018.

The Public Institution "Environmental Projects Implementation Unit" (PI "EPIU"), established by Government Decision no. 1249 of 19.12.2018, has the mission to provide support to MARDE and the organizational entities in its area of competence, in order to efficiently implement projects for external and internal financial and technical assistance in the field of environmental protection and use of natural resources.

The Climate Change Office of the PI "EPIU" has responsibility for the activities associated with preparation of national communications, biennial update reports, national inventory reports and national GHG inventories, following the delegation of these responsibilities by the Environment Agency, through Letter no. 3471 of 25.09.2019.

ES.2.2. Administrative-Territorial Organization, Population Profile and Demographic Situation

Administrative-territorial organization. The territory of the Republic of Moldova is administratively organized in 32 districts (Anenii Noi, Basarabeasca, Briceni, Cahul, Cantemir, Calarasi, Causeni, Cimislia, Criuleni, Donduseni, Drochia, Dubasari, Edinet, Falesti, Floresti, Glodeni, Hincesti, Ialoveni, Leova, Nisporeni, Ocnita, Orhei, Rezina, Rascani, Sangerei, Soroca, Straseni, Soldanesti, Stefan Voda, Taraclia, Telenesti, Ungheni), five municipalities – Chisinau, Balti, Comrat, Tiraspol and Bender (Tighina) and two autonomous territorial units (ATU): ATU Gagauzia and ATU on the Left Bank of the Dniester River.

Population. As of 01.01.2019, the population of the Republic of Moldova was 3.148 million inhabitants, its density being about 93 inhabitants / km^2. Over the period 1990-2019, the number of inhabitants decreased by about 27.9% or by 1.215 million inhabitants. This decrease is determined by the negative natural balance and the negative balance of external migration. Population is distributed by sex as follows: women predominate - 52.7%, as compared to only 47.3% male population. The population is mainly concentrated in rural areas, the country's 1,614 rural settlements amounting to 55% of total population, on average, about 1,400 inhabitants per settlement. The urban population is 45%, on the average 27 thousand inhabitants per settlement. According to the latest population census (2014) (performed separately for the territory on the left and right banks of the Dniester River), Moldovans / Romanians accounted for 73.1%, Ukrainians - 8.8%, Russians - 7.6%, Gagauz - 4.0%, Bulgarians - 1.9 %, Roma - 0.3%, other ethnic groups - 0.7% and the population that did not declare ethnicity - 3.5%.

Demographic situation. Over the 1990-2019 period, demographic processes were marked by negative dynamics, manifested by instability of demographic indicators and phenomena such as: reduced birth rate, increased mortality, demographic ageing, depopulation and others. In 2019, the birth rate, of 12.0‰, has shown a sharp decrease, as compared to 1990 (17.7‰), having got well below the mortality rate - 13.7‰, which was increasing as compared to 1990 (9.7‰); infant mortality was 8.7‰ (19.0‰ in 1990); life expectancy at birth indicator was about 70.9 years (68.0 years in 1990), 66.8 years in men (63.9 years in 1990) and 75.1 years in women (71.9 years in 1990).

ES.2.3. Geographic Profile and Natural Resources

Geographic position. The Republic of Moldova is located in the central part of Europe, in the northwest of the Balkans, on a territory of 33.846 thousand km^2. To the north, east and south it borders with Ukraine, and to the west – it is separated from Romania by the Prut River. The Republic of Moldova is part of the group of countries of the Black Sea basin - its southern border extends closely to the Black Sea, the exit to the sea opening through the estuary of the Dniester River and the Danube River.

Relief. The relief of the Republic of Moldova is represented by hills and plains, plateaus generally occupying the central part of the country. The absolute altitudes are between 429 m (Balanesti Hill) and 4 m in the Dniester River meadow (Palanca village).

Land and soil cover. The Republic of Moldova has unique land resources, which are distinguished by predominance of chernozem soils (~ 75%) with high productivity potential, a very high degree of land usage (> 75%) and a rugged terrain (over 80% of cropland is located on slopes).

Water resources. The hydrographic network occupies about 2.7% of the country's territory and it has a total length of about 16 thousand km. The main rivers are the Dniester and the Prut, on a small portion in the south the country has access to the Danube River. The density of the hydrographic network on the average for the country is 0.48 km/km^2, ranging from 0.84 km/km^2 in the north of the country to 0.12 km/km^2 on the left bank of the Dniester River. There are about 60 natural lakes and over 4.475 thousand artificial ponds on the territory of the country. There are also about 5,000 artesian wells, about 179,000 surface wells and about 3,000 springs on the territory of the Republic of Moldova, which provide for 1.8 million m^3/day of confirmed reserves.

Biological resources. The flora of the RM currently comprises about 5,638 plant species (upper – 2,014 species, lower – 3,624 species). According to the floristic composition, the richest are the forest ecosystems (over 850 species), steppe ecosystems (over 600 species), meadow ecosystems (about 650 species), the petrophytes (about 250 species), aquatic and marsh ecosystems (about 160 species). The fauna of the Republic of Moldova is relatively rich and varied. More than 15 thousand species of animals live in the country, including 461 species of vertebrates and over 14 thousand species of invertebrates. Among the vertebrates there are 70 species of mammals, 281 species of birds, 14 species of reptiles, 14 species of amphibians and 82 species of fish. Among vertebrate animals the most numerous is the class of birds - 281 species and subspecies, and among invertebrates – insects with over 12 thousand species. There are five scientific reserves in the Republic of Moldova (Codrii, Iagorlac, Padurea Domneasca, Plaiul Fagului, Prutul de Jos) with a total area of 19.2 thousand ha.

Mineral resources. On the territory of the country useful mineral resources are explored from about 415 deposits, the most important being: limestone, granite, bentonite and sandy clays, diatomite, gypsum and chalk. Most mineral resources are mined through quarries and only some varieties of limestone - through galleries.

ES.2.4. Climate Profile

The climate of the Republic of Moldova is temperate continental, characterized by relatively mild winters and little snow, with long, hot summers and low humidity. The country is located in the region of interference of Atlantic air masses of Western Europe, continental-excessive of the northeast and Mediterranean - of the southwest. In respect to territorial distribution of climate elements over the 1991-2019 period, several distinct trends were registered: (i) temperature increase in a southerly direction, from an average annual value of 8.1°C in the north to 10.9°C in the south; (ii) zonal distribution of average annual rainfall with decreasing values from north to south: from the average annual value of 613-618 mm in the north to 550-516 mm in the south; and (iii) increase by about 100 mm in values of average multiannual precipitation in the plateau regions, as compared to neighboring plains. Over the last 132 years, the Republic of Moldova has experienced changes in average values of temperature and precipitation. The country had become warmer, with an average temperature increase of more than 1.2°C, while increase in precipitation was only 51.3 mm.

ES.2.5. Economic Profile

Gross Domestic Product. In 2019, the share of industry in GDP was 11.1%, that of agriculture - 10.1%, transport and communications - 4.9%, the construction sector - 8.7%, trade - 15.7%, financial activities - 3.4%, other sectors - 30.1%, net taxes on product and import - 13.1%.

The country's economy was in decline even before 1991, but the separation from the USSR had accelerated the process. GDP has been steadily declining since 1990 and up to and including 1999, when it reached 34% of its 1990 level. The only exception was the year 1997 when, due to excellent agricultural production conditioned by favorable climate factors, there was a slight increase, of 1.6%, as compared to previous year. There were a number of reasons for the economic collapse: the Republic of Moldova was fully integrated into the economic system of the USSR and, with independence, subsidies and transfers from the central government have ceased; the end of the Soviet era with well-established trade links led to creation of barriers to movement of goods and barriers to emerging markets; the lack of energy resources and own raw materials made the country's economy highly dependent on the rest of the former USSR; there were also multiple domestic issues, such as transition from a centralized economy to a market economy, loss of industries located in the Transnistria area, frequent droughts and civil conflict. The considerable growth of GDP since 2000 shows that the economy is on the right track, although in 2019 the GDP was only 81.3% of the 1990 one (Fig. ES-1).

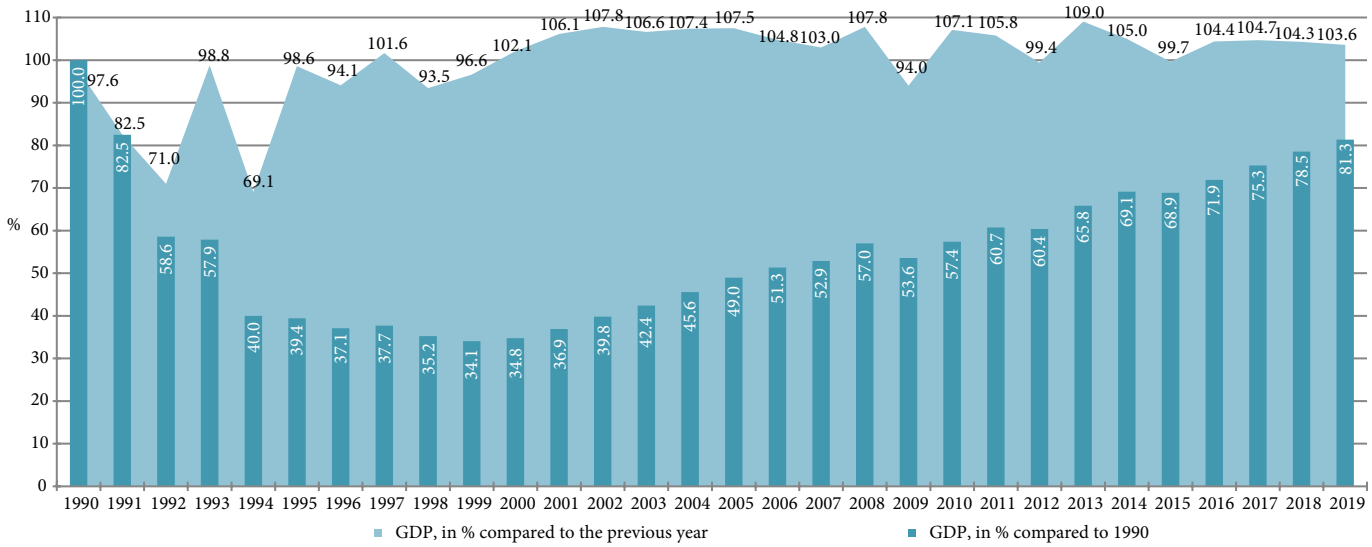


Figure ES-1: Gross domestic product of the Republic of Moldova over the period 1990-2019, in %, as compared to 1990 and, respectively, to previous year.

Trade balance deficit. Moldova's spending on imports by far exceeds the country's export earnings, causing a very serious trade deficit problem. This deficit rose from 23.7% of GDP in 2000 to 25.6% of GDP in 2019. This reflects the country's dependence on import of energy resources and increasing demand for imported products. The increase in imports is boosted by massive inflows of remittances from abroad, which are channeled into domestic consumption.

Money transfers and remittances. In 2019, the net inflows of foreign currency from Moldovans working abroad amounted to about 1.91 billion US dollars or about 16% of GDP. Money transfers from abroad, especially remittances from people working in other countries, are of great importance for the economy of the Republic of Moldova. Globally, the Republic of Moldova is among the leaders in terms of the share of remittances in the GDP.

Investments. Investments are of major importance in the process of economic growth of the Republic of Moldova. They have increased significantly as compared to previous years. In 2019, about 31.253 billion lei were invested in the national economy, the equivalent of about 1.778 billion US dollars (14.9% of GDP). At the same time, in 2019, foreign direct investment (FDI) attracted to the national economy (net inflows) amounted to US$ 501.6 million (4.2% of GDP), well below the level of 2008, when foreign direct investment attracted to the national economy amounted to US$ 726.6 million (12.0% of GDP). The international investment position of the Republic of Moldova as of 31.12.2019 is still a net debtor and the debt amounted to -5.084 billion US dollars, the negative balance having increased as compared to the end of 2018 by 21.1%. During 2019, the official reserve assets were reconsolidated; thus, as of 31.12.2019, their stock has increased by 2.2% as compared to the 2018 yearend and it amounted to 3.060 billion US dollars. The gross external debt of the Republic of Moldova as of 31.12.2019 was 7.546 billion US dollars, a 1.1% increase as compared to the beginning of the year.

Social area. In 2020, the average gross nominal revenues of the national economy amounted to 8.107 thousand lei having increased as compared to 2019 in nominal value by 10.2% (7.356 thousand lei). The average size of the monthly pension established on 1 January 2020 was 1.843 thousand lei, a 54.6% increase as compared to the last five years. The number of pensioners registered with the social protection authorities as of 1 January 2020 was 696 thousand people. In 2020, the number of the unemployed, as defined by the International Labor Organization (ILO) was 33.1 thousand people. The unemployment rate (the proportion of the unemployed in the active population according to the ILO definition) registered in 2020 was 3.8%, a 5.1% decrease as compared to 2019.

ES.2.6. Current State of the National Economy

Industry. The volume of industrial production manufactured in 2019 amounted to only about 67.4% as compared to the level of 1990 (Fig. ES-2). During the 1990-2019 period, the evolution of the industrial sector was accompanied by fluctuations, the best results being registered in the years 2001, 2003 and 2011, and the worst ones, respectively in the years 1992, 1994, 1998, 1999, 2006, 2007, 2009 and 2012. The situation in the industrial sector is mainly determined by the activity of enterprises in the manufacturing industry, which accounted for about 84.0% of the total production obtained by large enterprises with main industrial activities. In the processing industry, the most representative activity is in the food and beverage

industry (production, processing and preservation of meat and meat products, fruits and vegetables; production of dairy products; milling products; livestock feed; bread and bakery products, sugar, production of confectionery and sugar-based products; manufacture of distilled alcoholic beverages, wine, beer, etc.) as well as production of other non-metallic mineral products (manufacture of glass and glassware; bricks and burnt clay tiles; manufacture of cement; lime; plaster; elements of cement, plaster and concrete).

Energy. The total energy consumption in the country in 2019 was only about 27.9% as compared to 1990 (Fig. ES-2) (electricity consumption was about 48.3%, and heat consumption, respectively, only about 16.4%). The main power generation units in the Republic of Moldova include CTEM from Dnestrovsk with an installed capacity of 2520 MW (available power of about 950 MW); CHP-1 in Chisinau with an installed electric power of 46 MW (available power of about 40 MW) and an installed heat power of 455 MW; CHP-2 in Chisinau with an installed electric power of 240 MW (available power of about 210 MW) and an installed thermal power of 1425 MW; CET-Nord from Balti with an installed electric power of 28.5 MW (available power of about 24 MW) and an installed heat power of 610 MW; CHPs of sugar factories with a total installed capacity of 98 MW (available power of about 20 MW), HPP in Dubasari with an installed capacity of 48 MW (available power of about 30 MW) and HPP in Costesti with an installed capacity of 16 MW (available power of about 10 MW). During 2019, the total amount of electricity produced from renewable sources (photovoltaic, wind, biogas and hydro power plants) was about 67.430 GWh. The respective amount of electricity produced increased by about 30.5%, as compared to the level of 2018 (51.665 GWh), and, respectively about 35.3 times as compared to 2013 (1.908 GWh).

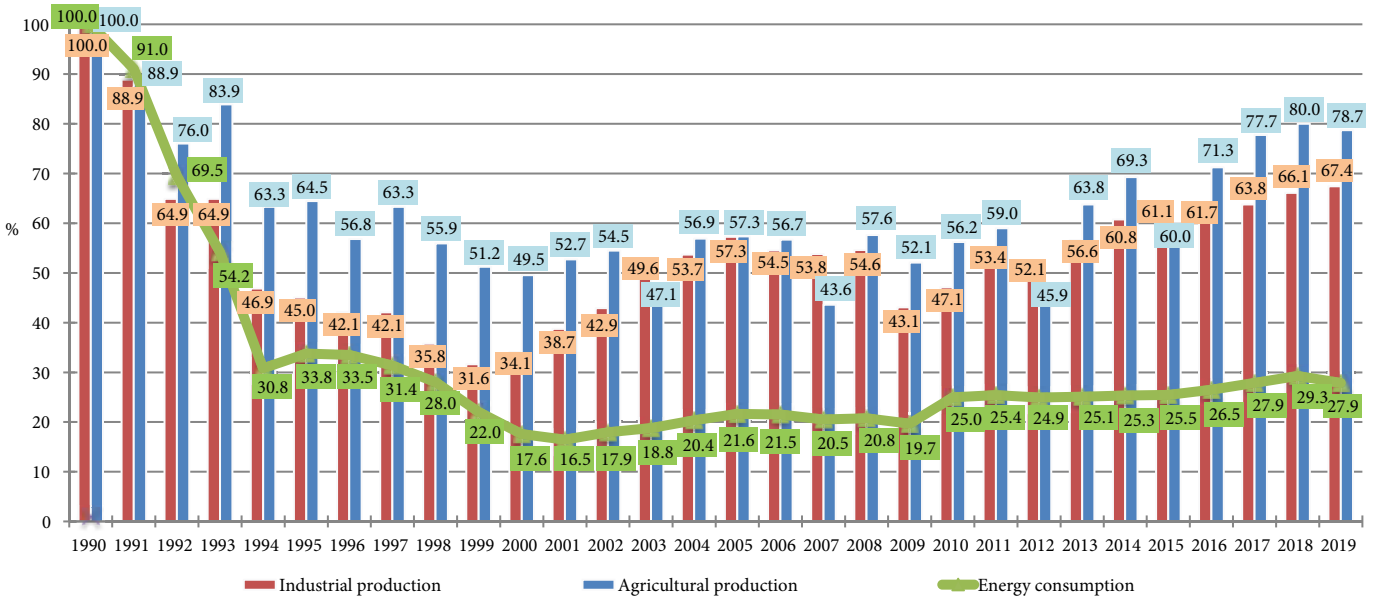


Figure ES-2: Evolution of main economic indicators of the Republic of Moldova over the 1990-2019 period, in % as compared to 1990.

Agriculture. The volume of agricultural production in all categories of enterprises in 2019 was only about 78.7% as compared to 1990 (Fig. ES-2). During the years 1991-2019 the evolution of agricultural production was accompanied by fluctuations, the best results being registered in 1993, 1997, 2004, 2008, 2010, 2011, 2013, 2014 and 2017, and the worst, respectively, in the years 1992, 1994, 1996, 1998, 2003, 2007, 2012, 2015 and 2019, being caused in most cases by unfavorable climatic conditions (in 2003, 2007, 2012, 2015 and 2019 droughts were registered in the Republic of Moldova, some of them very severe). Over the 1990-2019 period, the sown areas of certain agricultural crops were significantly reduced (the areas sown with tobacco decreased over the period by 99.1%, those sown with fodder plants - by 90.6%, sugar beet - by 81.2%, potatoes - by 54.5%, oats - by 53.7%, winter and spring barley - by 47.4%, vegetables - by 44.6%, legumes - by 40.9%, winter rye - by 33.3%, pumpkins - by 19.2%, etc.). A decrease was also registered in average production per hectare (for annual grasses for green fodder - by 63.5%, for sugar beet – by 74.4%, for vegetables - by 47.9%, for winter and spring wheat - by 33.2%, for roots for fodder - by 32.1%, for tobacco - by 19.2%, for winter and spring barley - by 18.9%, for oats - by 10.6% and for legumes - by 1.4%). In addition, during the same period, the areas sown with some crops have significantly increased: sunflower (by 205.7%), corn for grains (by 101.5%), winter and spring wheat (by 52.9%) and soybeans (by 43.7%). An increase was also recorded in average production per hectare for such crops as: soybeans (by 89.4%), pumpkins (by 69.1%), winter rye (by 47.5%), sugar beet (by 36.2%), potatoes (by 35.4%), corn for silage and green meal (by 31.3%),

corn for grain (by 26.9%), sunflower (by 18.7%) and rape (by 2.9%). In comparison with 1990, the amount of chemical and organic fertilizers applied to the soil had considerably reduced: in 2019 an amount of 113.1 thousand tons of chemical fertilizers and 84 thousand tons of organic fertilizers were applied or 51.3% and 99.1% less, respectively, as compared to 1990 (232.4 thousand tons of chemical fertilizers and 9.74 million tons of organic fertilizer). As compared to 1990 (situation as of the yearend), the number of livestock has decreased considerably: cattle - by 86.7% (1,060.7 thousand in 1990, 141.2 thousand in 2019), sheep - by 56.9% (1,244.8 thousand in 1990), 536.1 thousand in 2019), pigs - by 76.8% (1,850.1 thousand in 1990, 428.4 thousand in 2019) and birds of all categories - by 54.9% (24.625 million in 1990, 11.115 million in 2019), horses - by 43.9 % (47.2 thousand in 1990, 26.5 thousand in 2019) and donkeys - by 17.6% (1.7 thousand in 1990, 1.4 thousand in 2019); at the same time, the number of goats increased by 311.6% (37.1 thousand in 1990, 152.7 thousand in 2019), rabbits - by 16.5% (283.0 thousand in 1990, 329.7 thousand in 2019).

Transport. The transport sector of the Republic of Moldova includes: moto vehicle transport, railway transport, air transport and river transport. The network of public roads has a total length of about 9.4 thousand km (of which with rigid cover - 9.1 thousand km). The road network is sufficiently well developed (the density of public roads is about 322 km/1000 km^2, while that of public roads with rigid cover - about 306 km/1000 km^2). Over the recent years, large-scale repair and restoration works have been carried out on the national road network. During the reporting period, in the Republic of Moldova there was an intense increase in the number of motor vehicles. Rail transport has been active for over 140 years. The length of railways is about 1.15 thousand km, and the density of communication roads per 1000 km^2 is about 34 km. River transport in the Republic of Moldova is developing and increasing both in number of ships and in number of ports. The length of waterways of general use is currently about 476 km (including 410 km on the right side of the Dniester River, respectively 66 km on the left side of the Dniester River). There are four airports in the country: in Chisinau, Balti, Cahul and Marculesti. Of these, only the Chisinau airport operates regular passenger routes. The airports of Cahul and Marculesti are in a certification process. Balti Airport is certified; however, it only serves irregular routes. As compared to 1990, a significant reduction was registered both in the quantity of goods transported by vehicles (from 331.1 million tons in 1990 to 49.0 million tons in 2019) and in the length of distances of transported goods (from 21,648 million tons-km in 1990 to 6,508 million tons-km in 2019). During the same period, the number of transported passengers has also decreased significantly (from 757.7 million passengers in 1990 to 276.5 million passengers in 2019). A decrease was also found in the distance covered by passengers (from 10,102 million passengers-km in 1990 to 6,693 million. passenger-km in 2019).

Dwellings. As of 31 December 2019, the housing stock of the Republic of Moldova amounted to 88.5 million m^2 (an 0.8% increase as compared to previous year, respectively, an 13.6% increase as compared to 1990). Over the 1990-2019 period, the indicative energy consumption per m^2 of total area has decreased in the residential sector of the Republic of Moldova from about 26.0 kg c.c. / m^2 in 1990 to about 20.5 kg c.c. / m^2 in 2019. Over the 1990-2019 period the country has made progress in connecting households to gas pipelines. This has led to a considerable reduction in consumption of solid and liquid fuels in favor of natural gas consumption, and after 2010 also in favor of renewable energy sources (especially biomass). The length of natural gas networks has increased about 12.9 times in the Republic of Moldova over the 1990-2019 period (from 1.873 thousand km in 1990 to 24.208 thousand km in 2019), including about 6.8 times in urban communities (from 1.072 thousand km in 1990 to 7.284 thousand km in 2019) and 21.1 times in rural communities (from 0.801 thousand km in 1990 to 16.924 thousand km in 2019). In the same context, the total number of apartments (houses) supplied with mains gas increased during that period in the Republic of Moldova about 1.7 times in urban communities (from 281.8 thousand in 1990 to 489.6 thousand in 2019) and about 11.0 times in rural communities (from 21.5 thousand in 1990 to 235.7 thousand in 2019).

ES.3. National Greenhouse Gas Inventory

ES.3.1. Republic of Moldova's Contribution to Global Warming

The historical responsibility of the Republic of Moldova for greenhouse gas emissions is low. In 2019, the Republic of Moldova emitted about 13.8 Mt CO_2 equivalent (without the contribution of LULUCF sector) and 14.1 Mt CO_2 equivalent (with contribution of LULUCF sector), which is less than 0.03% of total global emissions. Total and net emissions per capita were practically twice lower than the global average (4.4 t CO_2 equivalent per capita as compared to 6.4 t CO_2 equivalent per capita, and respectively, 4.5 t CO_2 equivalent per capita compared to 6.8 t CO_2 equivalent per capita). Over the 1990-2019 period, the dynamics of total direct greenhouse gas emissions (without LULUCF), expressed in CO_2 equivalent, showed a decreasing trend in the Republic of Moldova, reducing by about 69.5%: from 45.35 Mt CO_2 equivalent in 1990

to 13.81 Mt CO_2 equivalent in 2019, the net greenhouse gas emissions (with LULUCF) decreased over the same period by about 67.9%: from 43.96 Mt CO_2 equivalent in 1990 to 14.11 Mt CO_2 equivalent in 2019.

ES.3.2. Institutional Arrangements

The Ministry of Agriculture, Regional Development and Environment (MARDE) of the Republic of Moldova is the state authority responsible for developing and promoting state policies and strategies in agriculture, food production, food security, regional and rural development, spatial planning, environmental protection and climate change and natural resources.

In accordance with Government Decision no. 549 of 13.06.2018 on establishment, organization and operation of the Environmental Agency, it was assigned competencies in the field of protection of atmospheric air and climate change. At the same time, in accordance with the Government Decision no. 1277 of 26.12.2018 on establishment and operation of the National Monitoring and Reporting System (NMRS) of greenhouse gas emissions and other information relevant to climate change, the Environmental Agency has been designated as *competent authority* responsible for ensuring NMRS operation for greenhouse gas emissions and other information relevant to climate change, provided that the operation of NMRS is carried out at the expense and within the funds approved in the state budget of institutions which are parties to the system, as well as other sources provided by the law, including from external financing (*activities carried out on the basis of technical assistance and capacity building projects*).

The Environmental Agency has requested by Letter no. 3471 of 25.09.2019 to the Climate Change Office within Public Institution "Environmental Projects Implementation Unit" (IP "EPIU") that Climate Change Office reviews and identifies possibilities for providing the necessary support for implementation of tasks in the field of climate change for organizing the entire development process of the Third Biennial Update Report of the Republic of Moldova to UNFCCC, respectively of the Fifth National Communication of the Republic of Moldova to UNFCCC, in accordance with the rules, procedures and decisions of the Conference of Parties to UNFCCC.

ES.3.3. Methodological Issues

The national inventory is structured so as to meet reporting requirements to UNFCCC and it is divided into five core sectors, each sector being further disaggregated by source category. Direct greenhouse gas emissions (CO_2, CH_4, N_2O, HFC, PFC and SF_6) (no NF_3 emissions have been recorded so far) have been estimated by applying the methodologies available in the 2006 IPCC Guidelines for inventory of national greenhouse gas emissions. Indirect greenhouse gas emissions (NOx, CO, NMVOCs and SO_2) were estimated by applying the methodologies available in the EEA/EMEP Air Pollutant Emission Inventory Guidebook (2019).

ES.3.4. Key Categories

In order to prioritize the country's efforts to improve inventory quality, in accordance with the recommendations of the 2006 IPCC Guidelines, the key categories for the period 1990-2019 were identified, without LULUCF, by applying Tier 1 approach, 21 key categories by level (L) and 20 key categories by trend (T) were found. By using Tier 2 approach, 19 key categories by level (L) and 17 key categories by trend (T) were found; with LULUCF, by applying Tier 1 approach 28 key categories by level (L) and 26 key categories by trend (T) were found, respectively, by applying Tier 2 approach, 26 key categories by level (L) and 22 key categories by trend (T) were found.

ES.3.5. Quality Assurance and Quality Control

The basic activities carried out in the Republic of Moldova for quality assurance and quality control included detailed specific procedures and typical quality verification and control forms, by applying Tier 1 approach, general procedures, and by applying Tier 2 approach, specific procedures, for individual source categories, as well as a technical review (audit) performed by personnel not directly involved in the process of compilation and development of the national inventory; checking the quality of activity data, including by comparing data sets obtained from different sources; planning and coordinating the inventory process at inter-institutional level; as well as continuous documentation of the national inventory development process. The Climate Change Office of the Public Institution "Environmental Project Implementation Unit" (PI "EPIU") has all the documentation used to compile it.

ES.3.6. Recalculations

A review and recalculation of GHG emissions and CO_2 removals was performed for each calendar year included in the national GHG inventory for the period 1990-2016, which is part of the Second Biennial Update Report of the Republic of Moldova to UNFCCC (2019). These activities were carried out in the framework of a continuous process of improving the quality of the national GHG inventory (including by taking into account

updated activity data, methodology approaches available in the 2006 IPCC Guidelines, emission factors and correction of identified errors). As compared to the results recorded in the BUR2 of the Republic of Moldova to the UNFCCC (2019), the changes undertaken in the process of compiling this inventory resulted in a trend of increasing total direct GHG emissions in 1990, 1994 and 1996, the increase ranging from minimum + 0.2% in 1996 to maximum + 1.0% in 1990, and, respectively, in a trend of reducing total direct GHG emissions for the years 1991-1993, 1995 and 1997-2016, ranging from a minimum of -0.2% in 1995 up to a maximum of -12.1% in 2009. Regarding net direct GHG emissions included in the BUR2 of the Republic of Moldova to the UNFCCC (2019), the changes undertaken in the process of compiling this inventory resulted in a slight increase in net direct GHG emissions in 1990 and 1994-1996, ranging from a minimum of +0.4% in 1995 to a maximum of +1.3% in 1990, respectively, in a trend towards decrease of net direct GHG emissions in 1991-1993 and 1997- 2016, ranging from a minimum of -0.8% in 1998 up to a maximum of -13.0% in 2009.

ES.3.7. Uncertainty Assessment

The assessment of GHG emissions was performed in the Republic of Moldova with maximum possible accuracy; however, the results obtained have a certain degree of uncertainty. Some emission assessments, such as CO_2 emissions from fossil fuel combustion, or CO_2 emissions from cement production, are considered to have a minimal uncertainty, while in case of other categories of sources, due to the relatively low quality of activity data, whereby default emission factors were used, uncertainty is higher. The emissions uncertainty is also high because of the insufficiently clear vision of the emissions generation process. The general uncertainty of the national inventory of the Republic of Moldova for the period 1990-2019, found by applying a Tier 1 approach, is ± 6.62% uncertainty by level, and, respectively ± 2.14% uncertainty by trend.

ES.3.8. Completeness Assessment

The national inventory of the Republic of Moldova is, for the most part, a complete inventory of the following direct GHGs - CO_2, CH_4, N_2O, HFC, PFC and SF_6. Indirect GHGs were also included in the national inventory, as follows: CO, NO_x, NMVOCs and SO_2. Despite the effort to include in the inventory all existing categories of sources and sinks, some gaps still remain in the inventory, most of which are determined by the lack of activity data for assessment of the respective GHG emissions or removals.

ES.3.9. Reporting direct greenhouse gas emissions

Carbon dioxide contributes the most to total direct GHG emissions in the Republic of Moldova (Fig. ES-3).

Over the period 1990-2019, total carbon dioxide emissions (without LULUCF) have decreased by about 74.6% (from about 37.0 Mt in 1990 to 9.4 Mt in 2019). CH_4 and N_2O emissions have decreased by about 50.1% (from about 5.2 Mt CO_2 equivalent in 1990 to 2.6 Mt CO_2 equivalent in 2019) and by 49.1%, respectively, from about 3.1 Mt CO_2 equivalent in 1990 to 1.6 Mt CO_2 equivalent in 2019) (Tab. ES-1). The dynamics of F-gas emissions shows a stable increasing trend for the recent years, even if their share in the structure of total emissions is still insignificant so far.

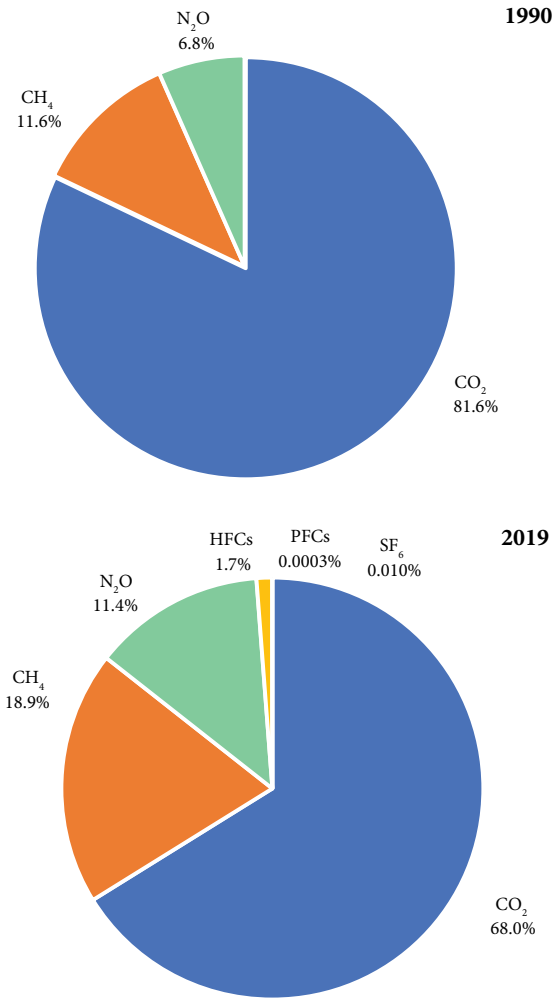


Figure ES-3: Share of direct GHGs in structure of total GHG emissions in the RM in 1990 and 2019.

Energy sector is the most important source of total national direct GHG emissions, its share varying during the period 1990-2019 between 81.4% and 67.5%. Other relevant sources of direct greenhouse gas emissions are represented by Agriculture, Waste and Industrial Processes and Product Use (IPPU) sectors (Fig. ES-4).

Table ES-1: Direct GHG emission trends in the RM over the period 1990-2019, Mt CO_2 equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CO_2 (without LULUCF)	37.0207	31.3644	24.1653	18.0878	15.0571	11.9418	11.8048	10.7263	9.2847	7.2566
CO_2 (with LULUCF)	35.4599	28.7250	22.1121	15.9931	13.0157	9.9265	9.3340	8.6068	7.1339	5.3876
CH_4 (without LULUCF)	5.2414	4.9009	4.6720	4.3560	4.2697	4.0389	3.9809	3.5856	3.4459	3.3372
CH_4 (with LULUCF)	5.2441	4.9033	4.6742	4.3590	4.2713	4.0411	3.9824	3.5883	3.4484	3.3396
N_2O (without LULUCF)	3.0866	2.8603	2.4326	2.0797	1.8478	1.7848	1.7660	1.5630	1.4955	1.3532
N_2O (with LULUCF)	3.2569	3.0442	2.6373	2.3022	2.0844	2.0363	2.0282	1.8351	1.7798	1.6471
HFCs	NO	NO	NO	NO	NO	0.0010	0.0017	0.0023	0.0031	0.0040
PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
SF_6	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total (without LULUCF)	**45.3487**	**39.1255**	**31.2699**	**24.5235**	**21.1746**	**17.7666**	**17.5533**	**15.8773**	**14.2292**	**11.9511**
Total (with LULUCF)	**43.9609**	**36.6725**	**29.4236**	**22.6543**	**19.3714**	**16.0050**	**15.3463**	**14.0326**	**12.3653**	**10.3782**
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
CO_2 (without LULUCF)	6.5133	7.1455	6.9116	7.5787	8.0989	8.4374	7.7735	8.1595	8.5354	8.5708
CO_2 (with LULUCF)	4.3622	5.3489	5.0282	5.7677	6.1184	6.7547	5.9716	6.1651	6.8531	7.2844
CH_4 (without LULUCF)	3.2594	3.2429	3.3177	3.2259	3.1935	3.2081	3.0796	2.9079	2.8936	2.8165
CH_4 with LULUCF)	3.2603	3.2442	3.3180	3.2259	3.1937	3.2084	3.0799	2.9094	2.8944	2.8168
N_2O (without LULUCF)	1.2613	1.3412	1.4007	1.2565	1.3226	1.3571	1.3296	1.1093	1.2095	1.2144
N_2O (with LULUCF)	1.5576	1.6377	1.6977	1.5509	1.6127	1.6436	1.6122	1.3873	1.4815	1.4798
HFCs	0.0051	0.0069	0.0091	0.0122	0.0160	0.0225	0.0332	0.0448	0.0574	0.0675
PFCs	NO	NO	NO	NO	NO	NO	0.0000	0.0000	0.0000	0.0000
SF_6	NO	NO	NO	0.0000	0.0000	0.0000	0.0003	0.0004	0.0005	0.0005
Total (without LULUCF)	**11.0391**	**11.7365**	**11.6392**	**12.0733**	**12.6310**	**13.0252**	**12.2163**	**12.2220**	**12.6964**	**12.6698**
Total (with LULUCF)	**9.1852**	**10.2376**	**10.0530**	**10.5567**	**10.9408**	**11.6293**	**10.6973**	**10.5071**	**11.2869**	**11.6491**
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
CO_2 (without LULUCF)	9.1281	9.5230	9.1163	8.8718	8.7605	9.0465	9.1156	8.6129	9.2479	9.3923
CO_2 (with LULUCF)	7.9158	8.3749	7.9549	7.8562	8.1091	7.9520	8.2785	7.7268	8.5222	9.5261
CH_4 (without LULUCF)	2.8291	2.8775	2.8168	2.7334	2.7714	2.7227	2.7984	2.9254	2.9258	2.6158
CH_4 (with LULUCF)	2.8292	2.8777	2.8180	2.7343	2.7716	2.7233	2.7987	2.9259	2.9260	2.6162
N_2O (without LULUCF)	1.2973	1.2681	1.2010	1.3293	1.5184	1.2755	1.4251	1.5225	1.5382	1.5705
N_2O (with LULUCF)	1.5555	1.5200	1.4344	1.5465	1.7209	1.4658	1.6044	1.6943	1.7036	1.7321
HFCs	0.0779	0.0901	0.1000	0.1084	0.1216	0.1539	0.1632	0.1825	0.1945	0.2299
PFCs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SF_6	0.0007	0.0007	0.0008	0.0010	0.0011	0.0011	0.0011	0.0011	0.0013	0.0014
Total (without LULUCF)	**13.3331**	**13.7595**	**13.2349**	**13.0439**	**13.1730**	**13.1996**	**13.5035**	**13.2445**	**13.9078**	**13.8100**
Total (with LULUCF)	**12.3792**	**12.8635**	**12.3081**	**12.2463**	**12.7241**	**12.2961**	**12.8459**	**12.5307**	**13.3477**	**14.1058**

Abbreviations: NA – Not Applicable; NO – Not Occurring.

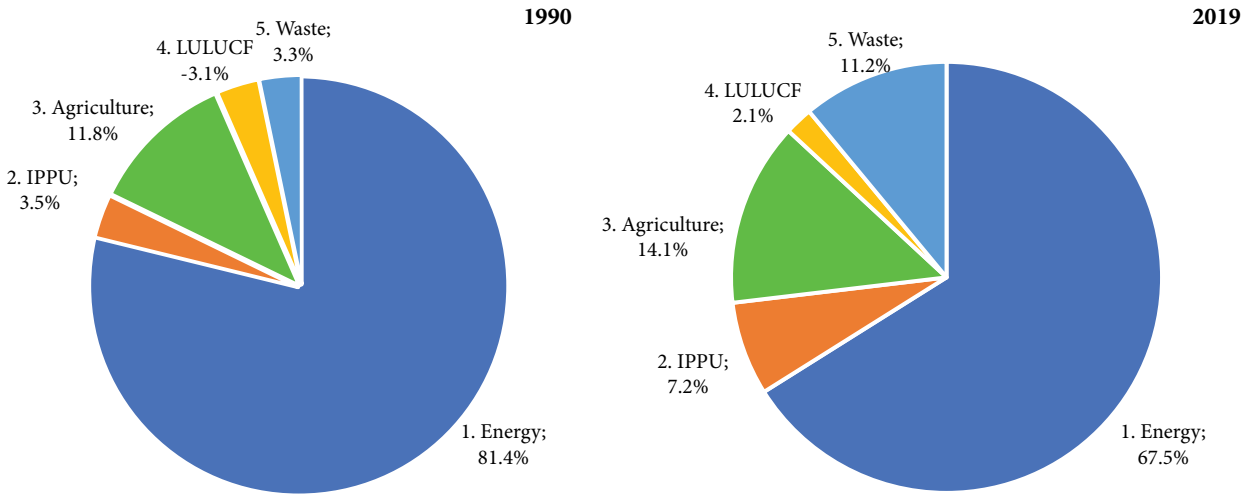


Figure ES-4: Sectoral Breakdown of the Republic of Moldova's Total GHG Emissions in 1990 and 2019.

Throughout the reporting period, except for 2019, the LULUCF sector was a net source of carbon removals. Along with reduction of national direct greenhouse gas emissions, the relevance of this sector in the structure of national net greenhouse gas emissions showed a similar trend: in 1990 about 3.1% of total national GHG emissions were removed, while in 2019 the sector has already contributed 2.1% of total national GHG emissions.

Over the 1990-2019 period, total GHG emissions tended to decrease, so that emissions from the energy sector decreased by about 74.7%, those from the IPPU sector - by about 38.1%, from the agriculture sector - by 63.6%, from the LULUCF sector - by 121.3%, and those from the waste sector have increased by 2.5% (Tab. ES-2).

Table ES-2: Direct Greenhouse Gas Emissions in the Republic of Moldova by Sector within 1990-2019 period, Mt CO_2 equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1. Energy	36.8953	31.2043	24.3515	18.1696	15.2946	12.3097	12.2798	11.0094	9.5700	7.5571
2. Industrial processes and product use	1.6037	1.4098	0.8216	0.7371	0.5562	0.4562	0.4163	0.4544	0.3782	0.3419
3. Agriculture	5.3355	4.9634	4.5461	4.0067	3.7312	3.4103	3.2641	2.8258	2.7171	2.4927
4. LULUCF	-1.3878	-2.4531	-1.8464	-1.8691	-1.8032	-1.7616	-2.2070	-1.8447	-1.8639	-1.5728
5. Waste	1.5142	1.5480	1.5508	1.6101	1.5925	1.5904	1.5931	1.5876	1.5639	1.5594
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
1. Energy	6.8761	7.4994	7.2925	7.9740	8.4757	8.7644	7.9199	8.0885	8.3876	8.8010
2. Industrial processes and product use	0.3144	0.3186	0.3688	0.3971	0.4707	0.5713	0.6775	0.9361	1.0242	0.5295
3. Agriculture	2.3121	2.4080	2.4778	2.2347	2.2340	2.2403	2.1819	1.7714	1.8428	1.8844
4. LULUCF	-1.8539	-1.4988	-1.5862	-1.5166	-1.6902	-1.3960	-1.5190	-1.7149	-1.4094	-1.0207
5. Waste	1.5364	1.5105	1.5001	1.4674	1.4506	1.4492	1.4370	1.4260	1.4417	1.4548
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
1. Energy	9.3278	9.7144	9.2874	8.9802	8.8830	9.1825	9.3349	8.8995	9.4093	9.3217
2. Industrial processes and product use	0.5600	0.6649	0.6829	0.7326	0.7605	0.7628	0.7480	0.7768	0.9592	0.9922
3. Agriculture	1.9667	1.8915	1.7906	1.9148	2.1240	1.8484	1.9875	2.0379	1.9930	1.9435
4. LULUCF	-0.9539	-0.8960	-0.9268	-0.7976	-0.4489	-0.9035	-0.6576	-0.7138	-0.5601	0.2958
5. Waste	1.4786	1.4887	1.4741	1.4163	1.4055	1.4059	1.4331	1.5303	1.5463	1.5526

ES.3.10. Reporting Ozone and Aerosol Precursors Emissions

Photochemically active gases, such as carbon monoxide (CO), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOCs), are not considered greenhouse gases, but they indirectly contribute to the greenhouse effect in the atmosphere. All these gases are considered ozone precursors in the atmosphere, influencing the formation and disintegration of ozone in the atmosphere. They are mainly found in exhaust gases from vehicles, but they also result from burning of fossil fuels in stationary sources, from use of solvents and other household products, etc. Thus, emissions from the following ozone and aerosol precursor gases: NOx, CO, NMVOCs and SO_2 were included in the national greenhouse gas inventory of the Republic of Moldova.

Over the 1990-2019 period, total emissions of nitrogen oxides decreased by about 79.5%: from 89.65 kt in 1990 to 18.35 kt in 2019, total carbon monoxide emissions decreased by about 48.0%: from 276.33 kt in 1990, to 143.72 kt in 2019, emissions of non-methane volatile organic compounds decreased by about 34.9%: from 138.79 kt in 1990 to 90.32 kt in 2019, and sulphur dioxide emissions decreased by about 96.5%: from 150.10 kt in 1990 to 5.24 kt in 2019 (Tab. ES-3).

Table ES-3: Ozone and Aerosol Precursors (NO_x, CO and NMVOC) and SO_2 Emission Trends in the RM within 1990-2019 period, kt

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
NO_x	89.6454	73.8289	55.1200	76.0499	35.0342	29.0746	27.1974	24.2386	20.4127	14.6476
CO	276.3349	204.1325	130.2957	65.5835	73.0763	62.6580	75.8546	69.5933	53.7625	41.7150
NMVOC	138.7872	111.8032	87.9944	69.2095	50.6096	47.3142	45.8441	31.2793	27.4305	23.2289
SO_2	150.0997	124.8723	92.0640	72.3599	57.3452	31.7701	31.9482	16.7211	12.4779	5.8630
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
NO_x	13.1615	14.3963	14.7933	15.0274	16.1240	17.1389	15.9969	17.0241	24.4397	15.5890
CO	39.4335	38.4124	44.7257	53.9554	51.2589	53.1523	53.7269	48.2494	50.4998	48.7510
NMVOC	22.7982	24.5445	27.0803	28.0904	39.7519	42.3738	47.7740	47.5842	41.0900	35.6733
SO_2	4.4903	3.9993	4.8266	6.3041	5.4639	5.1702	5.3193	4.0356	5.6582	5.1965
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
NO_x	16.6163	17.0452	16.4326	15.9387	15.4756	16.1663	16.4033	16.3541	18.0524	18.3535
CO	49.8489	53.6658	51.0761	52.7260	78.5976	84.4305	87.4851	110.2489	159.4791	143.7154
NMVOC	40.1884	43.3979	44.8018	43.9545	56.3898	54.3331	55.5414	65.0590	96.4462	90.3206
SO_2	4.5204	5.5519	4.6501	13.2050	4.3062	5.0062	4.2279	5.0951	4.5109	5.2391

ES.4. Climate Change Mitigation Policies and Measures

ES.4.1. Quantitative Emission Reduction Targets at National Level

The Republic of Moldova reported to the Convention its Intended Nationally Determined Contribution (INDC) on September 25, 2015. Following the Decision 1/CP.21, on March 4, 2020 the country reported the updated NDC to the UNFCCC, registered on March 4, 2020[3].

In the updated NDC (2020), the Republic of Moldova intends to achieve more ambitious goals than in the INDC (2015). The new, unconditional target, which covers the entire economy of the country, provides for the reduction of GHG emissions by 70% in 2030 compared to 1990, instead of 64-67% undertaken in the INDC.

Regarding the conditional target, instead of the 78% undertaken in the INDC, the reduction commitment expressed above could be increased to 88% as compared to 1990 level, provided that external support is obtained, including in form of low-cost

[3] <https://www4.unfccc.int/sites/ndcstaging/Pages/LatestSubmissions.aspx>

financial resources, technology transfer and technical cooperation, etc.

Along with establishment of more ambitious targets for reducing GHG emissions in the updated NDC, the Republic of Moldova has proposed to develop and approve by the end of 2021 the Low Emission Development Program of the Republic of Moldova until 2030 and the Action Plan for its implementation (LEDP 2030), which will serve as guidance and officially approved document for achieving the targets included in the updated NDC (2020). According to it, the aim is to achieve the following sectoral and intermediate targets for reducing GHG emissions compared to the level of the 1990 reference year (Table ES-4).

Table ES-4: GHG reduction targets by sector, %[4]

Sectors	Until 2025		Until 2030	
	unconditional	conditional	unconditional	conditional
Energy	83	87	81	87
Transport	56	58	52	55
Buildings	76	78	74	77
Industry	34	37	27	31
Agriculture	48	50	44	47
LULUCF	-33	195	10	391
Waste	16	19	14	18
TOTAL	**71**	**83**	**70**	**88**

LEDP 2030 will allow the Republic of Moldova to adjust its development path towards a low-carbon economy and achieve sustainable green development, based on the country's socio-economic and development priorities, set out in the draft National Development Strategy "Moldova 2030"[5]

ES.4.2. Activities Related to Nationally Appropriate Mitigation Actions

In order to achieve the general and specific targets of the LEDP 2030, for each sector examined (energy, transport, buildings, industry, agriculture, LULUCF and waste), national appropriate mitigation actions (technologies and/or measures) have been identified (NAMAs), prioritized with the participation of all stakeholders. The largest contribution to achieving the NDC's conditional target is expected to be made through the financial mechanisms of the Paris Agreement, including the Green Climate Fund (GCF). In this regard, the development of the Country Program of the Republic of Moldova for engaging with the Green Climate Fund for the years 2019-2024 was completed and presented to GCF in 2019.

ES.4.3. Clean Development Mechanism of the Kyoto Protocol

To date, ten CDM project launch requests have been registered, eight of which have been registered by the CDM Executive Committee[6], all until 2012. Only two of these are still ongoing.

ES.4.4. Economic Instruments

In the 2019-2020 years, legislative changes were made in order to stimulate imports of new transportation means with a shorter life time (less polluting) and, respectively, to discourage the purchase of old means of transport (with greater or increased level of pollution). For example, starting with 2020 year, imports of vehicles equipped with electric motor were exempted from VAT.

ES.4.5. Climate Change Mitigation Policies and Measures at Sectoral Level

Climate change mitigation policies and measures are reflected in the strategies, programs and action plans presented in the chapters of respective sectors, and only their key elements are disclosed below.

Energy

The basic document outlining the policies in the energy sector is the Energy Strategy of the Republic of Moldova until 2030. It was approved in 2013, and it comprises specific targets only till 2020. Compared to 2010, the following planned objectives have been met by 2020: reducing energy intensity; reducing losses in transmission and distribution networks; reducing energy consumption in buildings. The use of renewable sources relative to total gross domestic consumption exceeded the planned 20% level. At the same time, the target to reach the 10% share of annual electricity production from renewable energy sources was met at 2.6%. No information is available on the level of biofuel use in the transport sector. Notwithstanding the latter, the reduction of greenhouse gas emissions by 2019, compared to the reference year 1990, was 67.9%, compared to the planned 25% by 2020.

Industry

Over the last twenty years, a number of policies related to monitoring and reduction of GHG emissions in the industrial sector have been approved and are being developed. These include policies to promote energy efficiency and the "green" economy, which also have an impact on the industrial sector and which have recently been identified in a new regulation "The program promoting "green" economy in the Republic of Moldova for years 2018-2020 and the Action Plan for its implementation", GD no.160/2018. The "Zero net carbon emissions science-based goal" commitment, signed by the LafargeHolcim Group on September 21, 2020 at the Climate Conference[7] in New York, and Kigali Amendment to the Montreal Protocol for the Progressive Reduction of the Use of Hydrofluorocarbons

[4] According to LEDP 2030.
[5] Government Decision no. 377 of 10.06.2020 on approval of the draft law for the approval of the National Development Strategy "Moldova 2030" published in the Official Gazette no. 153-158 art. 508 on 26.06-2020. <https://www.legis.md/cautare/getResults?doc_id=121920&lang=ro>
[6] <https://cdm.unfccc.int/Projects/projsearch.html> (click "Database for PAs and PoAs").
[7] <https://www.lafarge.md/ro/lafargeholcim-semneaza-angajântul-net-zero-emisii-de-carbon-cu-obiective-bazate-pe-stiinta>

Worldwide, signed on 15.10.2016[8] , etc. also aim at GHG emissions reduction in this sector.

Agriculture

In 2020, the policies approved in the Republic of Moldova and explicitly geared towards reducing greenhouse gas emissions in agricultural sector (covering crop growing, soil resources, and animal husbandry) were the Environmental Protection Strategy for 2014 -2023 and the Action Plan for its implementation, the Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation.

The emphasis in the agricultural sector will be put on reducing nitrogen mineralization in soils, i.e. promoting sustainable agriculture, including by using green manure in parallel with the implementation of the conservation agriculture tillage system, based on "No-Till" and "Mini-Till" technologies, increasing the share of organic fertilizers in soil, leaving the main crop residues in the field to form the mulch, etc. Aiming at achieving the goal to raise livestock productivity, programs and strategies improving the genetic pool of livestock and poultry are being implemented. At the same time, animal manure will be used to produce biogas for energy purposes and increase soil fertility, which will also help reduce GHG emissions. These policies are reflected in the strategies, programs and action plans presented in the respective chapter.

Forestry

The Forestry Code[9] (no. 887/1996, last updated in 2017) is the basic document that regulates the relations of forest use, land and water protection, as well as use and conservation of the plant and animal kingdom within the forestry fund. Another important document related to the LULUCF Sector is the Land Code[10] (no. 828/1991, last updated in 2020) which regulates land relations, establishes the modalities for allocation and changing land destination and land use categories, and regulates the regime for land ownership, land protection and improvement.

Policies used to develop mitigation scenarios in the forestry sector are aimed at expanding the afforested areas to up to 15% of the country's territory by 2030, with subsequent increase in wood mass remaining after harvesting; diminishing the fire-prone areas; gradual expansion of forest protection belts, trees and shrub groves, orchards and vineyards, improving the quality of plantations. However, grasslands areas are not expected to increase. Moreover, they will follow a downward trend, as the number of livestock is continuously reducing.

Waste

In the Republic of Moldova, the legal framework related to environmental protection is being updated in line with the National Action Plan for the implementation of the Moldova-EU Association Agreement. GHG emissions mitigation measures in the waste sector include: development of regional waste disposal infrastructure by construction of regional solid waste disposal sites and transfer stations in accordance with the Waste Management Strategy for the Republic of Moldova for 2013-2027, and application EU and national standards; extending the current system of primary collection and storage from urban to rural waste; improving the water supply and sanitation infrastructure.

ES.5. GHG Emissions Projections and Overall Impacts of Climate Change Mitigation Policies and Measures

ES.5.1. Methods and Tools Used to Access the Mitigation Potential

Within the BUR3 of the Republic of Moldova to the UNFCCC, the GHG emissions projections were developed for the years 2020, 2025, 2030 and 2035 and made under two scenarios: (1) with existing measures scenario (WEM) and (2) with additional measures scenario (WAM). The need to develop the business as usual scenario (BAU) has been dropped due to the fact that when identifying the mitigation targets in the context of the Nationally Determined Contribution (NDC), the RM has chosen the emissions target relative to the 1990 reference year. Thus, GHG emissions in the WEM and WAM are compared to emissions recorded in 1990, and not to emissions under the BAU scenario.

The scenarios were generated for the following sectors: energy, industrial processes, agriculture, land use, land use change and forestry, as well as for the waste sector. Aggregate emissions, as well as the following direct GHG were considered under the above scenarios: CO_2, CH_4, N_2O and F-gases.

To assess the GHG mitigation potential, the 2006 IPCC Guidelines and computerized tools developed by national experts were used employing the top-down and bottom-up methodological approach. To simulate the evolution of GHG emissions and removals in the LULUCF sector the LULUCF Matrix for the period 1970-2019, extended for the period 2020-2035, was used, and the WASP calculation tool was used to develop the electricity sources scenarios.

ES.5.2. Projections of Direct GHG Emissions

As a result of the promotion of GHG emission mitigation policies and measures, described in Chapter 3 and

[8] Kigali amendment to the Montreal Protocol for the progressive reduction of the use of hydrofluorocarbons worldwide, <http://conf.montreal-protocol.org/meeting/oewg/oewg-39/presession/briefingnotes/ratification_kigali.pdf>, < https://europa.eu/capacity4dev/unep/document/full-text-kigali-amendment-pt-1>

[9] Forestry code no.887/1996, Published: 16-01-1997 in the Official Gazette no. 4-5 art. 36. Version in force since 27.10.2017. <https://www.legis.md/cautare/getResults?doc_id=118482&lang=ro>

[10] Land Code no.828/1991. Published: 04-09-2001 in the Official Gazette no. 107 art. 817, Amended LP96 of 11.06.20, OM161-164 / 03.07.20 art.311; in force 03.08.2020, <https://www.legis.md/cautare/getResults?doc_id=122075&lang=ro>

used in the WEM and WAM concepts, the impacts were calculated for sectors defined by the IPCC, expressed as CO_2 equivalent of GHG emissions. The obtained results cover the entire country, including the Autonomous Territorial Units on the Left Bank of Dniester River (ATULBD) and are shown in Figure ES-5.

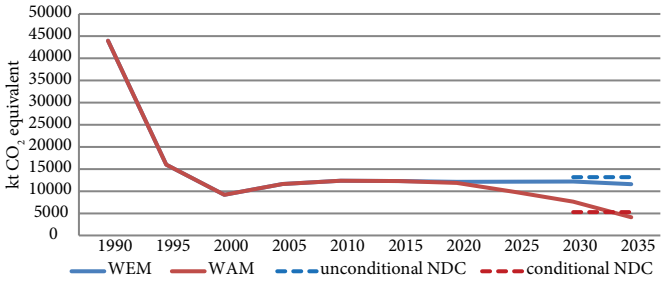


Figure ES-5: Total net GHG emissions in the Republic of Moldova within 1990-2035.

As can be seen in Figure ES-5, GHG emissions under the WEM are lower than the commitments made by the Republic of Moldova through the updated NDC in 2020. Thus, by 2030 they are expected to be lower than in 1990 by 72.2%, compared to 70% according to the unconditional updated NDC. By 2035, net GHG emissions will continue to decrease, reaching a 73.6% reduction compared to 1990. Regarding the WAM, the reductions in GHG emissions by 2030 will be lower than those set up in the updated conditional NDC, for sector-specific reasons.

Figure ES-6 shows the evolution of the net individual GHG emissions, according to the WEM and WAM scenarios, compared to the level of emissions reported in 1990.

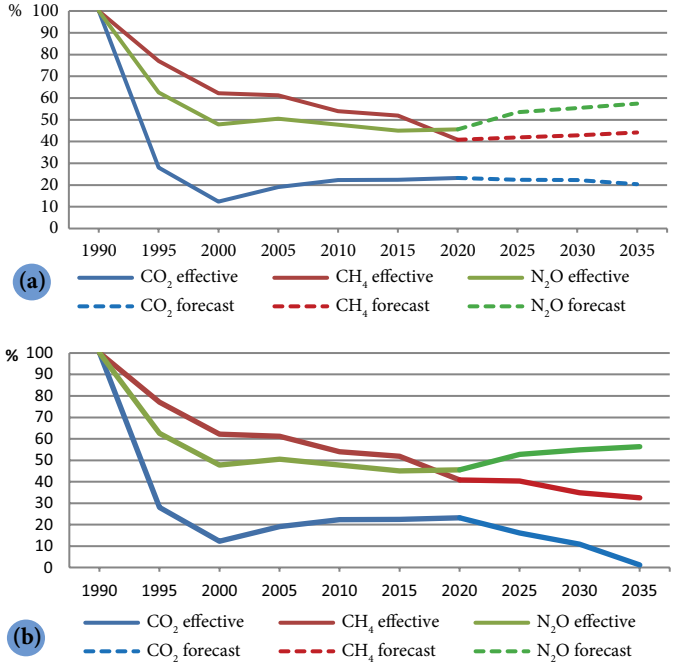


Figure ES-6: GHG emissions under WEM (a) and WAM (b), by gas types, compared to 1990, %.

The amount of CO_2 and CH_4 emissions tends to decrease compared to 2015, while N_2O emissions, conversely, tend to increase in the post 2015 period. The identified evolution is due to the gradual increase of livestock and poultry numbers by 2035, as well as carbon loss through the mineralization as a result of land use change and changes in the soil management practices over time by 2035.

ES.5.3. Comparison of GHG Emissions Projections Reported in BUR2 and BUR3

Table ES-5 shows the prospects for GHG emissions, without LULUCF, related to BUR2 and BUR3. Both WEM and WAM show a decrease in GHG emissions in BUR3 compared to BUR2. Such a change is mainly due to the overestimation of the electricity demand projections in BUR2.

Table ES-5: Comparison of BUR2 and BUR3 GHG emissions projections

		2020	2025	2030
Total emissions under WEM, BUR3 (without LULUCF)	kt CO_2 equivalent	12 440	12 639	12 829
Total emissions under WEM, BUR2 (without LULUCF)	kt CO_2 equivalent	13 334	13 472	14 506
BUR3-BUR2 difference reported to BUR2, WEM	%	-6.7	-6.2	-11.6
Total emissions under WAM, BUR3 (without LULUCF)	kt CO_2 equivalent	12 195	11 996	11 697
Total emissions under WAM, BUR2 (without LULUCF)	kt CO_2 equivalent	12 307	12 074	12 488
BUR3-BUR2 difference relative to BUR2, WAM	%	-0.9	-0.6	-6.3

ES.5.4. Projections of Direct GHG Emissions by Sector

Energy Sector

The energy sector, distinguished by the most important contribution to GHG emissions in the Republic of Moldova (67.5%, 2019), will significantly contribute to meeting the country's commitments to reduce GHG emissions. Thus, by 2035 GHG emissions under the WM and WAM scenarios will be 21.8% and 20.4% respectively, relative to 1990.

Industrial Processes and Product Use Sector

In 2019, sector 2 "Industrial Processes and Product Use" (IPPU) contributed about 7.2% of total GHG emissions, of which 76.7% accounted for CO_2, and 23.3% were F-gases. By 2035, GHG emissions will account for about 76.4% of the direct GHG emissions reported in the reference year (1990) under the WEM scenario, and 70.2% under the WAM scenario, respectively.

Agriculture Sector

In the animal husbandry sector (enteric fermentation and manure management) GHG emission mitigation measures are based both on improving the livestock and poultry structure, as well as on gradual increase in the share of large farms, characteristic of the '90s of the 20th century. With regard to GHG emissions reduction

in the "Agricultural Soil" category, the emphasis will be put on reducing soil mineralization, i.e. promoting sustainable agriculture, including by using green manure in parallel with the implementation of soil conservation "No-Till" and "Mini-Till" technologies, increasing the share of organic fertilizers in the soil, keeping crop residues in the field to form mulch, etc. Compared to the reference year 1990, in 2035 the level of GHG emissions under the WEM and WAM scenarios will be 38.3% and 37.3%, respectively.

Land Use, Land Use Change and Forestry Sector

The policies underlying the mitigation scenarios (WEM and WAM) for the LULUCF sector are targeted to: increasing the forest land area to 15% of the country's territory, with subsequent increase of the amount of wood mass; reducing the areas prone to forest fires; diminishing the fire-prone areas; gradual expansion of forest protection belts, trees and shrub groves, orchards and vineyards, improving the quality of plantations, etc. By 2035, CO_2 equivalent reductions under the WAM scenario will exceed those under the WEM scenario by about 6 times. However, to achieve this performance, donor support is required.

Comparison of Projections for GHG Emissions and Removals Made in BUR2 and BUR3 for the LULUCF Sector

Compared to BUR2, BUR3 shows a 61.9% decrease in CO_2 removals under the WEM and a 46.2% under the WAM scenarios, by 2030. The main reasons for such evolution under the WEM scenario are associated with the delay or chronic non-fulfillment of the state commitments set out in various policy documents aimed at this sector development.

Waste Sector

CH_4 and N_2O emissions are monitored within the waste sector, as well as the CO_2 emissions which are not exceeding 1% of the total GHG emissions attributed to this sector. CH_4 emissions are generated by the solid waste deposit sites, and from wastewater treatment, while N_2O emissions come from wastewater treatment. Relative to the level of emissions reported in the reference year, in 2035, the level of GHG emissions from the waste sector will be 100% under the WEM scenario and 62.6% under the WAM scenario.

International Transport

Of the two types of international transport, water-born and air-born, only the air-born transport is relevant for the Republic of Moldova (international water-born transport is not registered in the Republic of Moldova). Estimates of total national aggregate GHG emissions do not take into account the projections for the international air transport. It is estimated that relative to 2020 emissions from international air transport will increase by about 42% by 2030 and by 61% by 2035.

ES.6. Financial, Technical and Capacity Needs and Constraints

ES.6.1. GHG Emissions Mitigation Constraints

Energy Sector

The Republic of Moldova has made progress in creating the regulatory framework for the electricity and natural gas sectors, but not all approved regulations are implemented. The low payment capacity of consumers and the relatively high cost of capital in the Republic of Moldova continue to be the most important barriers to the construction of new electricity generation and transmission capacities required to ensure energy security and performance of power plants. There are significant delays in implementation of renewable energy sources, required by the country's policies.

Transport Sector

In recent years, the number of cars in the country has increased considerably, the largest share accounting for second-hand cars, as a consequence of the weak purchasing power of the population, who can not afford buying new cars. The "Rabla" project proposed by MARDE aiming at modernizing the car fleet by replacing old vehicles with new ones has not started yet, and the total cost of the project is unknown. As far as the demand for cutting edge vehicles is concerned, pre-operational costs for electric vehicles remain high. Unsatisfactory urban planning, as well as inadequate institutional mechanisms for managing transport demand in urban areas are also among the constraints in this sector.

Buildings Sector

To date, the long-term sectoral strategy for the renovation of the national real estate fund (for residential and public buildings) has not been developed and approved, and the legal/regulatory framework for the residential sector is being developed. The following constraints are also worth mentioning: poor financing of institutions for energy efficiency, including the wages of the staff; poor motivation of the population for implementation of energy efficiency measures and implementation of RES; technical and moral tear and wear of energy production equipment; emigration of workforce and research staff.

Industry Sector

The following constraints can be distinguished in the industry sector: insufficiency of policies promoting energy efficiency; lack of funds for development and preparation of industrial energy efficiency projects; obsolete standards (GOST type); lack of energy service companies (ESCOs) that would take on the role of helping small and medium-sized enterprises to find and finance efficiency improvements; The Law on Fluorinated Greenhouse Gases has not yet been

approved and no other regulations are yet amended to effectively transpose Regulation (EU) no. 517/2014.

Agriculture Sector

The following constraints are attributed to the agricultural sector: low budget allocations; underdeveloped insurance market; excessive fragmentation of agricultural land; conservation agriculture based on 'no-till' and 'mini-till' technologies is underdeveloped; the gradual depletion of phosphorus and potassium reserves in the soil and the insufficient use of organic fertilizers on arable land; lack of a special legal framework for soil and a sustainable animal manure management system; reduced opportunities to purchase breeding animals and high-performance equipment; insignificant development of value chain segments of high value-added agricultural products, etc.

Forestry Sector

Among the main barriers and constraints related to the sector are: reduced state, private and local budget; inadequate management at various levels; the land fund is fragmented into small owners, what complicates the process of consolidation and implementation of afforestation measures; a large part of natural forest stands are regenerated from shoots, which have a low regeneration and climate change adaptation capacity; lack of coordination and collaboration between forestry regulatory, research and management institutions and institutions specific to adjacent economic sectors, with a negative impact on the synergy; the high level of rural poverty disadvantages the increase of necessary forest and pastoral resources; the lack of a National Forest Inventory, and data collection process does not fully comply with international requirements, etc.

Waste Sector

Waste management in terms of waste collection and disposal infrastructure is still underdeveloped in the Republic of Moldova; there is no infrastructure for planning, organizing and implementing an integrated waste management system at all levels (national and regional); lack of capacities of all kinds for water supply and sanitation; the awareness of population and businesses is low; waste composting infrastructure is poorly developed; lack of separate collection facilities for biodegradable waste from households, etc.

ES.6.2. Capacity Building Needs in GHG Emissions Mitigation

The capacity building needs for GHG emissions mitigation are identified in the paper along the four dimensions: conducting climate studies and research and assessments; formulation of climate strategies and policies; implementation of climate strategies and policies; negotiating climate issues internationally, mainly to attract funds.

ES.6.3. Financial Needs in the Context of Low Carbon Emissions Development

The technical and capacity development needs of the Republic of Moldova are currently estimated at 1530 thousand US dollars, those related to technology transfer at 675 thousand US dollars, and implementation of NAMA aimed at achieving the nationally determined contribution requires 4.9 billion US dollars, in compliance with the LEDS 2030. Investments needed to implement measures and technologies that reduce GHG emissions and which, at the same time, will ensure the sustainability of the national economy development with its own forces amount to about 3.3 billion US dollars, according to LEDS 2030.

ES.6.4. Technical Assistance Needs in the Context of Low Carbon Emission Development

Based on the GD no. 377 of 25.04.2018 on Regulation of the institutional framework and external assistance coordination and management mechanism, the Government ensures better coordination and synergy in the process of programming, implementation, monitoring and evaluation of external assistance by establishing a broad consultative process and dialogue between the Government, the private sector and civil society. The necessary technical assistance is determined by each individual sector. As it is complex by nature, and, as a rule - without precise indications for GHG reduction, it is difficult to identify the assistance from the External Assistance Management Platform[11], where all external assistance is registered, including technical assistance negotiated and received by the Republic of Moldova.

ES.7. Domestic System for Monitoring, Reporting and Verification

The domestic system for monitoring, reporting and verification of the of LEDS and NAMA implementation progress in the Republic of Moldova is regulated by the GD 1277/2018[12] on the establishment and operation of the National System for Monitoring and Reporting on Greenhouse Gas Emissions and Other Information Relevant to Climate Change, as well as the GD 444/2020[13] on the establishment of a mechanism for coordination of climate change activities.

ES.8. Other Information Considered Relevant for the Convention

ES.8.1. Integrating Climate Change Mitigation into Social, Economic and Environmental Policies

[11] <http://amp.gov.md/portal/activities?search=&da=&ba=&psec=&loc=>

[12] Official Gazette no. 38-47 of 08.02.2019. Government Decision no. 1277 of 26.12.2018 on the establishment and operation of the National System for Monitoring and Reporting of Greenhouse Gas Emissions and Other Information Relevant to Climate Change. <https://www.legis.md/cautare/getResults?doc_id=112485&lang=ro>

[13] Official Gazette of the Republic of Moldova no. 188-192 / 635 of 24.07.2020, Government Decision no. 444 of 01.07.2020, on the establishment of the mechanism for coordinating activities in the field of climate change.

Aiming at commitments made under the Republic of Moldova - EU Association Agreement, as well as the updated NDC (2020), a series of normative acts have already been approved. The climate change mitigation aspects continue to be reflected in a range of the country's policies still under development or as drafts prepared for public debate.

ES.8.2. Activities Related to Technology Transfer to Mitigate Climate Change

IPCC identifies three major dimensions needed to ensure the efficiency of technology transfer: capacity building; enabling business environment; technology transfer mechanisms. In this context the following should be mentioned:

- Since 2011 up to date 10 industrial parks have been established;
- In the World Bank's (2020) Doing Business Report, in 2017 the RM ranked 44th among 190 countries;
- Enabling legal framework has been developed for the long- and medium-term SME development;
- On February 20, 2018, new amendments to the Code of Science and Innovation of the RM aiming at the national system of science and innovation reform, came into force. The new amendments provide for the research institutions of the ASM to become subordinated to the Ministry of Education, Culture and Research;
- The total official development assistance commitments for the Republic of Moldova amounted to 5,387.86 million Euro, of which 3,829.41 million Euros were already disbursed by 22.03.2021;
- Since accession of the Republic of Moldova to GEF the country received a non-reimbursable financial support amounting to US$ 222 million US dollars, as well as 1,017 million US dollars in co-financing, including 29 projects related to "climate change combating";
- The financial resources allocated by the Green Climate Fund, to which the Republic of Moldova is also a part amounted to 111.4 million US dollars as grants and 586.4 million US dollars as loans;
- Among the multilateral development banks, the World Bank and the European Bank for Construction and Development have been particularly prominent in promoting sustainable development and environmental projects in the Republic of Moldova;
- To date, a number of CDM projects have been initiated in the Republic of Moldova. Implementation of these projects is expected to achieve GHG emission reductions equivalent to about 1.4 million tons of CO_2 annually.

ES.8.3. Gender-Related Activities in the Context of Climate Change Mitigation

The Nexus between Gender and Climate Change Mitigation Issues

Internationally and nationally it is recognized that climate change adaptation and mitigation is essential for the protection of well-being and the achievement of continuous progress in sustainable development. Climate change affects all members of society, but its impact may be different on men and women. Respectively, it is important to understand and capitalize on gender issues when considering climate change adaptation and/or mitigation measures, including GHG emissions reduction, given the different roles and responsibilities, consumption patterns of women and men in society.

Women and men have different life and work experiences, perceive and identify differently the risks related to health, activity and life in the context of climate change. The capacities to reduce vulnerability and risks are determined by several factors: poverty, social class, education, age, ethnicity and gender norms/relations, etc. Given that climate change has a stronger impact on marginalized groups, women and girls are most at risk, with higher rates of morbidity, mortality and economic impact, due to their reduced resilience to climate risks.

Incorporating Gender Perspective in Climate Change Mitigation Measures by Sectors

In the context of climate change, gender mainstreaming in climate change policies and actions, low-emission development should be achieved taking into account the following key issues:

- considering men and women as users of resources (energy, water, land, transport, etc.) with different levels of responsibility and understanding their importance in the context of climate change;
- access of men and women to resources (energy, land, water, forests, etc.) and their derivative products and services in the context of climate change and low-emission development;
- involving men and women as providers of resource-based services in the context of climate change and low-emission development;
- participation of men and women as labor force in various sectors affected by climate change, which contribute to reducing greenhouse gas emissions;
- participation of men and women in decision-making and consultation processes in the context of climate change and low-emission development.

It is important that the process of planning and implementing low-emission adaptation and development should involve all stakeholders, especially those representing vulnerable groups. Respectively, given that women's and men's groups are not homogeneous, participation involves intersectionality: addressing the needs of women and men in connection with other variables, such as age, place of residence, disability, socio-economic status, family status, etc.

INTRODUCTION

The Republic of Moldova (Moldova) has become a Party to the United Nations Framework Convention on Climate Change (UNFCCC) on 16 March 1995, while on 13 February 2003 the country ratified the Kyoto Protocol, recognizing the importance of the complex issue of climate change for the fate of humankind.

As a developing country Party to the Convention, the Republic of Moldova is committed to promoting the principles of sustainable development, to contributing to achievement of final goals of the Convention and to assisting the Parties included in Annex I to fulfil the commitments of quantified limitation and reduction of greenhouse gas emissions.

In this context, the following areas are of concern for the country: greenhouse gas (GHG) inventory; identification and implementation of measures to mitigate greenhouse gas emissions; identification and implementation of climate change adaptation measures; transfer of environmentally friendly technologies; improving the national observation system and environmental monitoring networks; improving information systems for data collection, processing and storage; developing, maintaining and updating databases associated with climate change; as well as various capacity building activities, education, awareness building and training of society, the young generation in climate change issues.

The Third Biennial Update Report (BUR3) of the Republic of Moldova to the UNFCCC reflects the degree to which the provisions of the Convention are complied with at the national level, the update having been carried out for the year 2019, to the extent allowed by availability of statistical data.

The report is based on the results obtained within the GEF/UNEP Project "*Republic of Moldova: Preparation of Third Biennial Update Report to the United National Framework Convention on Climate Change*", initiated in January 2019 and completed in December 2021, implemented by the Public Institution "Environmental Projects Implementation Unit" (PI "EPIU") of the Ministry of Agriculture, Regional Development and Environment (MARDE) and the United Nations Environment Program (UNEP), with financial support provided by the Global Environment Facility (GEF).

The report outlines a series of actions in the areas mentioned above, showing directions for future work and laying the foundations for effective partnerships.

The widespread dissemination of information related to the climate change phenomenon has contributed to a wider awareness in the population, the scientific community and decision makers of the Republic of Moldova.

Thus, it can be stated that the process of developing BUR3 has strengthened the country's potential for promoting and implementing strategies, policies, action plans and programs focused on mitigating the effects caused by these changes.

It is also worthwhile to specify the need for continuity in this direction, which would not only make it possible for the Republic of Moldova to engage in global efforts to mitigate climate change, but would also involve in this activity the scientific and technical potential of the country, qualified professionals in the process of adapting the economic, social and environmental components to the new climate conditions at national level.

The Republic of Moldova has been fully committed to the UNFCCC negotiation processes for adoption of the Paris Agreement at the COP 21. The Agreement has full legal force in accordance with the provisions of the UNFCCC, applicable in relation to all Parties, and it is consistent with the target of maintaining global warming by 2100 at a projected growth below 2°C as compared to the pre-industrial period.

The Paris Agreement was signed by the Prime Minister of the Republic of Moldova in New York on 21 September 2016, and it was subsequently ratified by the Parliament by Law no. 78 of 04.05.2017 on ratification of the Paris Agreement.

On 25 September 2015, the Republic of Moldova has officially submitted its Intended Nationally Determined

Contribution[14] and provided associated information to facilitate clarity, transparency and understanding in relation to the stipulations of decisions 1/CP.19 and 1/CP.20.

Accordingly, the Republic of Moldova has committed to reaching by 2030 the unconditional target for reducing GHG emissions by 64-67% compared to the level recorded in the reference year (1990), and the country will make every effort to reduce GHG emissions by 67% as compared to 1990. The reduction commitment could be conditionally increased to around 78%, in line with the global agreement, which addresses important issues such as provision of low-cost financial resources, technology transfer and technical cooperation, access to all of these to an extent appropriate to the challenges of global climate change. GHG reduction targets have been set in an emissions budget, covering the period from 1 January 2021 to 31 December 2030.

The GHG emission reduction targets, set in the Intended Nationally Determined Contribution of the Republic of Moldova, were subsequently officially approved at the national level by Government Decision no. 1470 of 30.12.2016 on approval of the Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation.

On 4 March 2020, the Republic of Moldova has submitted to the UNFCCC Secretariat the updated version of its Nationally Determined Contribution[15]. Accordingly, the Republic of Moldova is committed to achieving more ambitious GHG reduction targets by 2030. Thus, the unconditional target is to be increased from 64-67% to 70% compared to the level recorded in the reference year (1990), and the conditional target is to be increased accordingly from 78% to about 88% compared to the level recorded in 1990. The new GHG emission reduction targets are to be introduced in the Low Emission Development Programme by 2030 and the Action Plan for its implementation; to be considered and approved by the Government by end of 2021 year.

[14] <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Moldova/1/INDC_Republic_of_Moldova_25.09.2015.pdf>

[15] <https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>

CHAPTER 1. NATIONAL CIRCUMSTANCES RELEVANT TO THE GREENHOUSE GAS EMISSIONS AND REMOVALS

1.1. Institutional Arrangements

1.1.1. Government Institutions

The Republic of Moldova declared its independence on 27 August 1991, although it continued to be part of the Soviet Union until the official dissolution of the USSR in December 1991. The new constitution was approved by referendum and ratified by the Parliament on 28 July 1994, according to which the Republic of Moldova is a neutral country. The Constitution guarantees the right to vote to all citizens over the age of 18 and provides for various civil rights and freedoms.

The President is the head of the state and he/she is directly elected for a four-year term (he/she can hold the position for maximally two consecutive terms). The President may dissolve Parliament. The Constitution provides that the President may be charged with criminal or constitutional offenses.

The President appoints the Prime Minister and, upon his/her recommendation, the Cabinet of Ministers. The Prime Minister and the Cabinet must be approved by the Parliament. The current government was inaugurated on 14 November 2019 and it resigned on 31 December 2020. The government that has resigned is now an interim one operating till early parliamentary elections scheduled for 11 July 2021.

The Government consists of 9 ministries, as follows:

1. Ministry of Economy and Infrastructure;
2. Ministry of Finance;
3. Ministry of Justice;
4. Ministry of Internal Affairs;
5. Ministry of Foreign Affairs and European Integration;
6. Ministry of Defense;
7. Ministry of Education, Culture and Research;
8. Ministry of Health, Labor and Social Protection;
9. Ministry of Agriculture, Regional Development and Environment.

The supreme legislative body is a unicameral Parliament. It includes 101 parliament members who are directly elected for four years. The Parliament has two ordinary sessions per year, but may also convene in extraordinary sessions. In addition to adoption of laws and performance of other basic legislative functions, the Parliament may declare a state of emergency, martial law or a state of war.

The judiciary includes three supreme courts: the Supreme Court of Justice, the Court of Appeal and the Constitutional Court, the supreme authority on constitutional matters which issues decisions that cannot be appealed. Courts and tribunals exercise justice at the local level. The President appoints the judges of the Supreme Court of Justice and the Court of Appeal, upon the recommendation by the Superior Council of Magistracy.

The Superior Council of Magistracy, composed of 11 magistrates and elected for a five-year term has competence for appointment, transfer and promotion of judges. The Council consists of the Minister of Justice, the President of the Supreme Court of Justice, the President of the Court of Appeal, the President of the Economic Court and the Prosecutor General, three members being selected by the Supreme Court of Justice and three other members - elected by Parliament from among accredited university professors.

1.1.2. Institutional Arrangements Relevant for Continuous Reporting of NCs and BURs to UNFCCC

The Ministry of Agriculture, Regional Development and Environment (MARDE) of the Republic of Moldova is the state authority responsible for developing and promoting state policies and strategies in agriculture, food production, food security, regional and rural development, spatial planning, environmental protection, climate change and natural resources.

On behalf of the Government of the Republic of Moldova, the Ministry is responsible for implementation

of international environmental treaties to which the country is party (including the United Nations Framework Convention on Climate Change, signed by the Republic of Moldova on 12 June 1992, ratified by Parliament on 16 March 1995, as well as the Kyoto Protocol, ratified by the Republic of Moldova on 13 February 2003, the official date of accession being 22 April 2003). Ministry representatives also serve as the Focal Point of the United Nations Framework Convention on Climate Change.

The *National Commission on Climate Change* was established in accordance with Government Decision no. 444 of 01.07.2020 on the establishment of the mechanism for coordinating activities in the field of climate change.

The nominal composition of the National Commission is approved by the Government and consists of 17 members - 10 representatives of central and local public authorities and 7 representatives of educational and scientific institutions, of non-governmental organizations and the private sector, as follows:

- Minister of Agriculture, Regional Development and Environment, President of the National Commission;
- State Secretary of the Ministry of Agriculture, Regional Development and Environment (in the field of environmental protection and natural resources), Vice President of the National Commission;
- Deputy Prime Minister, Minister of Finance;
- Minister of Economy and Infrastructure;
- Minister of Health, Labor and Social Protection;
- Minister of Education, Culture and Research;
- Governor (Baskan) of the Autonomous Territorial Unit (ATU) Gagauzia;
- One representative of the Congress of Local Authorities of Moldova;
- Director of the State Hydrometeorological Service;
- Director of Moldsilva Agency;
- One representative of universities (appointed by the Council of Rectors of the Republic of Moldova);
- One representative of organizations working in the fields of research and innovation (appointed by the Board of Directors of Research Institutes);
- Two representatives of environmental non-governmental organizations (appointed by the National Council of Environmental NGOs);
- A representative of non-governmental organizations working for promotion and protection of women's rights (appointed by the National Council for Participation);
- Two representatives of the private sector (appointed by the Chamber of Commerce and Industry of the Republic of Moldova).

The Commission is an inter-institutional body, without legal personality, established for the purpose of coordinating and promoting the measures and actions necessary for uniform application of provisions of the UNFCCC and the Paris Agreement on the territory of the Republic of Moldova.

The National Commission provides the institutional coordination framework for monitoring, reporting and verification, as well as facilitating the integration of climate change issues into national and sectoral programs and plans, and it aims to coordinate, at national level, the process of implementing UNFCCC provisions and other international treaties in the field of climate change to which the Republic of Moldova is a party, to prepare national reports in the field of climate change, as well as to exercise competences and ensure reaching objectives, within the limits of competences established by the regulation on its activity.

The Commission has the following competences:

1) to promote and coordinate the instruments for implementing climate change policy in the Republic of Moldova;
2) to coordinate the integration of climate change mitigation and adaptation issues into national and sectoral policy documents;
3) to review and approve reports on implementation of climate change strategies;
4) to review and approve methodologies, operational manuals, guidelines and eligibility criteria of projects on climate change adaptation and climate change mitigation;
5) to monitor implementation of projects and programs in the field of climate change at national and sectoral level in the context of sustainable development of the country;
6) to monitor implementation of national and sectoral climate change adaptation plans;
7) to review climate change projects and programs and to recommend their funding by development partners and international funds in the field, in line with national and sectoral sustainable development priorities;
8) to facilitate the process of international collaboration in the field of climate change;
9) to coordinate reports related to implementation of the provisions of international treaties in its area of competence to which the Republic of Moldova is a party;

10) to create technical committees of experts to assist the National Commission in exercising its authority, within the limits of its competence;
11) to develop, in order to prevent and overcome the negative effects related to climate change, proposals and recommendations to be included in strategies and programs in the respective field;
12) to evaluate the results of the implementation of National Commission's recommendations and to submit proposals for improvement of government policies in the field of climate change in accordance with commitments undertaken in Republic of Moldova - European Union Association Agreement;
13) to inform the public about the activity of the National Commission.

The National Commission has the right to:

1) engage in its activity specialists from central public authorities, public and private sector institutions, as well as independent experts;
2) take decisions on climate change issues;
3) request information regarding progress of planning and implementation of activities in the field of climate change from central public authorities;
4) request from beneficiaries of projects in the field of climate change, implemented on the territory of the Republic of Moldova, reports on implementation of measures for adaptation and mitigation of climate change effects;
5) establish collaboration relations with local public authorities, international entities and bodies in its field of competence.

The members of the National Commission have the obligation to:

1) attend meetings of the Commission and to consider items on their agendas;
2) participate by vote in adoption of decisions of the Commission;
3) ensure transparency in the process of selection and promotion of projects and programs in the field of climate change in the public, private and civil society sectors;
4) ensure the confidentiality of information containing personal data.

The National Commission has the following working bodies:

1) Secretariat, represented by:
   a. The department responsible for climate change within the Ministry of Agriculture, Regional Development and Environment, which ensures the organization and protocol of meetings of the National Commission and supervises implementation of its decisions;
   b. Public Institution "Environmental Project Implementation Unit" (PI "EPIU"), which ensures collaboration with experts of technical committees, management of the database of monitoring indicators, development of the annual report on progress made in the field of climate change, representation of the National Commission in court in case of disputes;
2) Technical committees for climate change adaptation and mitigation.

The President of the National Commission has the following competences:

1) to lead the activity of the National Commission, to convene and chair its meetings;
2) to invite to the meetings of the National Commission, as the case may be, leaders and specialists from central and local public authorities, other institutions, as well as independent experts;
3) to represent the National Commission in relations with third parties, with other national and international authorities and organizations, within the limits of its competences, and it is responsible for the activities related to the National Commission;
4) to sign decisions of the National Commission, Minutes of the meetings of the National Commission, other documents related to the activity of the National Commission;
5) to delegate to the Vice President of the National Commission some of his/her competences, as needed;
6) to perform other duties in accordance with the Regulation on the activity of the Commission.

The Vice President of the National Commission has the following competences:

1) to collaborate, in accordance with national legislation, with specialized institutions abroad in the field of climate change and to inform the members of the National Commission about trends and decisions adopted;
2) to propose for approval to the National Commission the list of experts of technical committees;
3) to coordinate and monitor the activity of technical committees;
4) to chair the meetings of the National Commission based on the decision of the President, in the absence of the President of the National Commission;

5) to put second signature on Minutes of the meetings of the National Commission;
6) to organize and direct the activity of the Secretariat of the National Commission and he/she is responsible for the efficiency of its activity;
7) to exercise other tasks, within the limits of his/her competences.

The Secretariat of the National Commission has the following competences:

1) to develop and submit for approval by the President the agenda of meetings of the National Commission;
2) to organize meetings of the National Commission;
3) to provide to members of the National Commission and experts of technical committees the documents and materials that are subject of meetings;
4) to carry out orders of the President of the National Commission;
5) to draws up Minutes of meetings of the National Commission and other internal acts of the National Commission;
6) to share relevant documents and information with stakeholders;
7) to collect sectoral climate change mitigation and adaptation reports and prepare an annual report on progress on climate change;
8) to monitor management of the database of indicators for monitoring and assessing adaptation to climate change and appropriate mitigation actions at national level;
9) to supervise implementation of decisions of the National Commission;
10) to organize the procedure for competitive selection of experts for technical committees;
11) to inform the National Commission about implementation of its previous decisions;
12) to inform the public about the activity of the National Commission;
13) to perform other tasks established during the meetings of the National Commission.

In carrying out its duties, the National Commission is assisted in its work by Technical Committees. The Technical Committees are set up and operate on the basis of the decision of the National Commission and the Regulation on establishment and operation of Technical Committees, approved by the National Commission. The technical committees are composed of experts with expertise in the following areas: agriculture, energy, transport, industry, water resources, waste, forestry, health, and related sectors: gender equality, finance, climate projections, vulnerability, green development. The list of experts on technical committees is drawn up on the basis of the results of the competition organized by the National Commission. The Secretariat of the National Commission publishes on the official website of the Ministry of Agriculture, Regional Development and Environment the terms of reference and the conditions of the competition.

The Technical Committees shall perform the following tasks:

1) to ensure technical evaluation of concept notes and project proposals submitted by applicants for funding;
2) to ensure technical evaluation of projects and programs for climate change adaptation and mitigation in the stage of their completion.

The experts of technical committees are responsible for:

1) objective and impartial evaluation of concept notes and of project proposals submitted for evaluation;
2) objective and impartial evaluation of periodic reports on progress of implementation of climate change adaptation and mitigation projects and programs;
3) presentation at the meetings of the National Commission of opinions on evaluated documents;
4) ensuring confidentiality of information containing personal data.

The work remuneration of experts of technical committees is done through service provision contracts, concluded with PI "EPIU", from the budgetary allocations planned for the purpose or from external sources.

The National Commission meets in sessions whenever necessary, but not less than once per semester. In order to exercise its competences, the National Commission shall take decisions. Meetings of the National Commission shall be convened by its President or upon request by the Vice President. Upon request of at least one third of the total number of permanent members of the National Commission, extraordinary meetings shall be convened. Materials relating to matters subject to review by the National Commission shall be submitted to the Secretariat at least 15 days before the date of the meeting. The invitation to attend the meeting and the materials related to issues to be addressed shall be sent to the members of the National Commission by the Secretariat at least 10 days before the date of the meeting - in case of ordinary meetings and at least 3 days before the meeting - in case of extraordinary meetings. The invitation to participate in the meeting

of the National Commission shall indicate the date, time, place and agenda, with the annexed materials proposed for consideration.

The President of the National Commission may invite to the meeting other representatives of central and local public authorities, international and national donor organizations, non-governmental organizations and civil society, experts and other stakeholders, who may contribute to the quality of debates on issues included on the agenda of the respective meeting. Invited persons participate in the meeting of the National Commission and in the debate of the subjects without no right to vote.

Meetings are deliberative if at least 2/3 of the members of the National Commission participate in them. In the event of unavailability, the permanent member of the National Commission may appoint another person from the respective institution to represent him/her in the meeting of the National Commission, including with the right to vote. The appointment is made on the basis of a power of attorney, which is submitted to the President of the National Commission before the beginning of the meeting. The document confirming the person's powers of attorney shall be attached to the Minutes of the meeting.

Decisions on the discussed issues shall be adopted by 3/4 of votes of the members of the National Commission present at the meeting. The members of the National Commission have the right to propose for examination at the meeting issues within the competence of the National Commission, to participate in the adoption of decisions. The members of the National Commission may propose amendments and additions to the agenda in writing, in advance, as well as during the meeting. Amendments shall be accepted by a majority of the members of the National Commission present at the meeting. Members of the National Commission who do not agree with the decision adopted shall have the right to a separate opinion, which shall be recorded in the Minutes of the meeting.

The Minutes of the National Commission meeting shall be drawn up by the Secretariat within 3 days from the date of the meeting and shall be signed by the President of the National Commission. A copy of it shall be sent to the members of the National Commission within 3 days. The keeping and archiving of the Minutes, as well as other documents referring to the activity of the National Commission shall be done by the Secretariat of the National Commission, in the manner established by the legislation on official documents.

The agenda, decisions, reports and other documents regarding the activity of the National Commission, intended to be made public, are placed on the official website of the Ministry of Agriculture, Regional Development and Environment. The meetings of the National Commission shall be public and may be attended by representatives of all stakeholders.

In accordance with Government Decision no. 549 of 13.06.2018 on establishment, organization and functioning of the Environmental Agency[16], it was assigned the following competencies *in the field of atmospheric air protection and climate change*: implementation of the provisions of policy documents and international environmental treaties to which Moldova is party in the field of atmospheric air quality and ozone layer protection, *in the field of reducing greenhouse gas emissions and adaptation to climate change*, development and submission to MARDE of information on their achievement; participation in the work of the *National Commission on Climate Change*; ensuring the implementation of the *system for monitoring, reporting and verifying greenhouse gas emissions; carrying out the process of collecting, aggregating, validating and processing the data and information necessary for development of inventories and reports on emissions of air pollutants and greenhouse gases*; providing MARDE technical support for development of *national communications and biennial update reports*, according to the provisions of the UNFCCC.

At the same time, in accordance with Government Decision no. 1277 of 26.12.2018 on establishment and operation of the National Monitoring and Reporting System (NMRS) on greenhouse gas emissions and other information relevant to climate change, the Environmental Agency has been designated as the *competent authority* responsible for ensuring the operation of the NMRS on greenhouse gas emissions and other information relevant to climate change, provided that the operation of NMRS is carried out at the expense and within the resources approved in the state budget of the institutions party to the system, as well as other sources provided by law, including from external financing *(activities carried out on the basis of technical assistance and capacity building projects)*.

In the above context, it is important to mention that, in accordance with Government Decision no. 1249 of 19.12.2018 on organization and operation of the Public Institution "Environmental Projects Implementation Unit" (PI "EPIU")[17], the latter has the mission to support MARDE and organizational units in its area of competence, in the purpose of efficient implementation of financial and technical assistance projects, external and internal, in the field of environmental protection and use of natural resources (protection of atmospheric air, ozone layer and climate change; waste and

[16] <https://www.legis.md/cautare/getResults?doc_id=119162&lang=ro>
[17] <https://www.legis.md/cautare/getResults?doc_id=113696&lang=ro>.

chemical management; prevention of environmental pollution; water resources management; biosecurity, biodiversity conservation and management of natural areas protected by the state), in accordance with the provisions of regulatory documents, on implementation of the requirements of international conventions to which the Republic of Moldova is party and alignment with international standards in the field of environmental protection, while tasks of PI "EPIU" consist in: efficient implementation of projects in its area of competence in accordance with established objectives; supervision and verification of quality of provided services, submission of works and provision of goods within established deadlines; management of financial resources allocated to projects in the area of its competence, in accordance with the assistance agreements and the approved budget; provision of support to the founder in development of project proposals in its field of competence; elaboration and presentation of progress reports in project implementation and use of funds for projects.

The management body of the PI "EPIU" includes the Director of the institution (executive body) and, respectively, a Supervisory Committee - a high level collegiate body which leads and supervises the activity of the institution. The committee consists of 5 members and it is appointed for a 4-year term. The nominal composition of the Committee members is established by Order of the MARDE, with mandatory inclusion of at least one representative each from State Chancellery, Ministry of Finance, and Ministry of Agriculture, Regional Development and Environment and civil society in the areas of competence of PI "EPIU". The position of Chairperson of the Committee is exercised by the Secretary of State for Protection of the Environment and Mineral Resources of the MARDE who chairs the meetings of the Committee and exercises other established duties. In the absence of the Chairperson of the Committee, the meeting shall be chaired by one of the members, elected by the members attending the meeting.

The National Monitoring and Reporting System (NMRS) for reporting greenhouse gas emissions and other information relevant to climate change to the UNFCCC, approved by GD no. 1277 of 26.12.2018, includes, as integral parts, two subsystems:

1. The national inventory system, which provides the institutional, legal and procedural framework established for estimating anthropogenic emissions by sources and removal by sinks by all greenhouse gases compiled in the national GHG emission inventory, and for reporting and archiving inventory information, in accordance with decisions taken under the UNFCCC and the Paris Agreement;
2. The national system for policies, measures and projections, which provides the institutional, legal and procedural framework for assessing progress in implementing climate change mitigation policies, for making projections of anthropogenic emissions by sources or removal of greenhouse gas emissions by sinks.

By implementation of the NMRS appropriate collection, processing of data and information is done which is necessary for: (1) development and reporting of the national inventory and projections of anthropogenic emissions by sources or removal by sinks of greenhouse gases and (2) assessment and reporting: progress in implementing mitigation policies; vulnerability to climate change, impact of climate change and progress in implementing adaptation actions; and aggregate financial and technological support provided by industrially developed countries, listed in Annex I to the UNFCCC, for implementation of climate change mitigation and adaptation actions, technical assistance projects and climate change capacity building.

In the context of GD No. 1277 of 26.12.2018, the NMRS aims to ensure transparent, accurate, consistent and comprehensive monitoring and reporting of greenhouse gases to the UNFCCC Secretariat, through planned reporting tools, including actions taken to adapt to the consequences of climate change, respectively, to ensure evaluation, reporting and verification of information on national progress in meeting the commitments under the UNFCCC, the Paris Agreement and the decisions taken in accordance with them.

Regarding the National Inventory System (NIS), it is designed and managed in such a way as to assure adherence to transparency, consistency, comparability, completeness principles in preparation of the national inventory of greenhouse gas emissions, in accordance with the provisions of the 2006 IPCC Guidelines on development of national greenhouse gas inventories.

The Environmental Agency, as *competent authority*, in direct collaboration with responsible authorities and institutions that are part of the NMRS and with the support of the Central Authority for Natural Resources and Environment (MARDE), manages the organization and operation of the NIS, by periodically improving the institutional, legal and procedural framework, in accordance with the national and international legal framework.

Within the NIS, the competent authority shall develop every second year the national greenhouse gas emissions inventory. The data of the national inventory shall be presented according to the format set out in Table 1 of Annex No. 1 to GD no. 1277 of 26.12.2018.

In case of direct greenhouse gas emissions, the national inventory is compiled in accordance with the 2006 IPCC Guidelines, through the reporting software recommended by the UNFCCC, while in case of indirect greenhouse gas emissions, the national inventory is compiled in accordance with the updated editions of the EEA/EMEP Air Pollutant Emission Inventory Guidebook, the technical guideline for inventory of national emissions, published and regularly updated by the European Environment Agency under the European Monitoring and Assessment Program.

Based on the National Inventory of Greenhouse Gas Emissions, the competent authority shall be responsible for compiling, every two years, the National Inventory Report (NIR), in Romanian and in English, using the structure set out in the relevant decisions of the Conferences of Parties signatories to the UNFCCC, namely: (1) introduction; (2) trends in GHG emissions; (3) energy sector; (4) industrial processes and product use sector; (5) agriculture sector; (6) LULUCF sector; (7) waste sector; (8) recalculations and planned improvements; (9) references; and (10) annexes.

The competent authority shall publish every two years on its official website (<http://mediu.gov.md/>) the National Inventory Report (NIR), as well as the national inventory of greenhouse gas emissions in table format. The summation tables shall show the trends of greenhouse gas emissions by gas and by sector.

The competent authority ensures the quality of national inventories by implementing the planning, preparation and management stages, which include collection of activity data, appropriate selection of estimation methods and emission factors, estimation of anthropogenic greenhouse gas emissions, implementation of uncertainty analysis, activities for quality assurance and quality control, as well as data verification procedures included in the national inventory.

The Central Authority for Natural Resources and Environment (MARDE), through the competent authority (Environmental Agency) shall:

1) continuously monitor and improve the National Reporting System on Policies, Measures and Projections regarding anthropogenic emissions by sources and removal of GHGs by sinks;
2) ensure timeliness, transparency, accuracy, consistency, comparability and completeness of reported information on policies and measures, as well as projections of anthropogenic emissions from sources or removal of GHGs by sinks, and, if necessary, use and application of data, methods and models, as well as implementation of quality assurance and quality control activities and sensitivity analysis.
3) establish the structure, format and procedure for reporting to the UNFCCC the information provided in the National System for Policies, Measures and Projections.

The competent authority shall submit to the central authority for natural resources and environment by 15 December of the year in which the report is made (year X), and every two years thereafter the following:

1) description of the National Reporting System on Policies, Measures and Projections related to anthropogenic emissions from sources and removal of greenhouse gases by sinks;
2) progress made in implementing the Low Emission Development Strategy and the Nationally Determined Contribution;
3) information on policies and measures / groups of measures that limit / reduce emissions from sources or increase removal of GHGs by sinks, structured by sectors and by gases or groups of gases (i.e., HFCs and PFCs), as provided in Annex No. 3 to GD no. 1277 of 26.12.2018. Such information includes:
   a) name of mitigation policy or measure;
   b) objective of policy or measure and its brief description;
   c) type of policy instrument (economic, fiscal, voluntary, regulatory, other);
   d) status of implementation of the policy and measure/ group of measures (planned, approved, on-going, carried out);
   e) year of initiating the process of implementing the policy and measure/ group of measures;
   f) organizations / institutions responsible for implementation of policy and measure/ group of measures;
   g) indicators for monitoring and evaluating progress over time, when used;
   h) affected sector (energy, transport, industry/ industrial processes and product use, agriculture, land use, land use change and forestry, waste / waste management, other sectors and subsectors, as appropriate);
   i) affected greenhouse gases (CO_2, CH_4, N_2O, HFC, PFC, SF_6, NF_3);
   j) mitigation impact or quantitative estimation of the effects on emissions from sources and removal of greenhouse gases by sinks, when available, broken down into: results of ex ante evaluations of the effects of each policy and measure / group of climate change mitigation policies and measures (provided for a succession of four years ending with 0 or 5,

immediately after the reporting year) and the results of ex post evaluations of the effects of each policy and measures/ groups of policies and measures on climate mitigation;

k) estimate of costs and benefits, including non-GHG benefits (reduction of other pollutants or benefits related to human health) expected from policies and measures, as well as assessing costs and benefits of implementing policies and measures when available;

l) all references to evaluations and related technical reports referred to in point 26, when available;

4) contribution to achieving the goals of the Kyoto Protocol by implementation of Clean Development Mechanism projects.

The information on policies and measures is a component/ chapter of the Biennial Update Report and National Communication and it is submitted by the Central Authority for Natural Resources and Environment (MARDE) to the UNFCCC Secretariat by 31 December of the reporting year.

The competent authority (Environment Agency) shall make available to the public, in electronic form, any relevant assessment of costs and effects of national policies and measures, when available, as well as any relevant information on implementation of policies and measures that limit or reduce emissions from sources and increase removal of greenhouse gases by sinks, including any existing technical reports that support such assessments. The assessments are to include descriptions of models and methodology approaches used, related definitions and assumptions.

The competent authority (Environmental Agency) shall communicate to the Central Authority for Natural Resources and the Environment (MARDE), by 15 December of the reporting year (year X), and every two years thereafter, the national anthropogenic emission projections from sources and removal of greenhouse gas by sinks, by gas or group of gases (i.e., HFCs and PFCs) and by activity sector. Such projections shall include quantitative estimates for the following four years ending with 0 or 5, immediately after the reporting year.

National projections shall comprise any policies and measures adopted at the national level and shall include:

1) projections without mitigation measures, projections with mitigation measures and projections with additional measures, when available;
2) total greenhouse gas projections and estimates for individual greenhouse gases;
3) impact of policies and measures as set out in point 24 of Annex no. 1 to GD no. 1277 of 26.12.2018;
4) results of the sensitivity analysis, performed for projections;
5) relevant references to assessments and technical reports underlying the projections as set out in point 29 of Annex no. 1 to GD no. 1277 of 26.12.2018.

The competent authority shall disseminate to the public, in electronic format, national projections of emissions from sources and removal of greenhouse gases by sinks, including relevant technical reports underlying such projections. The projections shall include a description of used models and methodology approaches, related definitions and assumptions.

In order to ensure transparency in reporting the information on used models or methodology approaches in the process of projections development, the competent authority shall submit:

1) projection model used for each type of greenhouse gas and sector;
2) type and basic characteristics of model used (top-down, bottom-up approach, calculation or expert judgement);
3) a short description of the model, the purpose of its development, its adaptation to the needs of performed study, strengths and weaknesses of the respective model.

In order to ensure transparency of reporting information on work assumptions and basic variables used in developing the projection, the competent authority shall describe:

1) anticipated rate of GDP increase or decrease;
2) projection of population number;
3) anticipated rate of increase or decrease of taxes and duties;
4) forecast of international fuel price;
5) other relevant data.

The information on national projections is a component/ chapter of the Biennial Update Report and National Communication and it shall be submitted by the Central Authority for Natural Resources and Environment (MARDE) to the UNFCCC Secretariat by 31 December of the reporting year.

The competent authority (Environmental Agency) shall communicate to the Central Authority for Natural Resources and Environment (MARDE) by 15 December of the reporting year (year X), and every four years thereafter, in accordance with the UNFCCC, updated information on:

1) climate models, climate projections and scenarios, which are believed to be relevant for assessing vulnerability to climate change and impact categories of climate change addressed, such as extreme temperatures, droughts, floods and other extreme weather events;
2) key economic, social and / or environmental vulnerabilities or risks associated with the current or anticipated impact of climate change;
3) actual observed impact, respectively, potential or future impact of climate change;
4) national and sectoral policies, strategies and action plans, implemented or planned, to facilitate adaptation to climate change and which would illustrate the medium- and long-term approaches associated with assessing and considering risks and vulnerabilities at national and sectoral level;
5) approaches used in monitoring and evaluating progress, associated with implementation of national and sectoral policies, strategies and action plans in the field of adaptation to climate change, as well as effectiveness of adaptation measures already implemented.

Information on vulnerability to climate change, impact of climate change and adaptation actions are parts / chapters of the National Communication and it shall be submitted by the Central Authority for Natural Resources and Environment to the UNFCCC Secretariat by 31 December of the reporting year.

The competent authority (Environmental Agency) shall communicate to the Central Authority for Natural Resources and Environment (MARDE), by 15 December of the reporting year (year X), and every two years thereafter, general information on the support provided by industrially developed countries, listed in Annex I to the UNFCCC, for fulfilment of commitments to the UNFCCC, including information on financial resources received through:

1) Global Environment Facility, Special Climate Change Fund, Adaptation Fund, Green Climate Fund and the UNFCCC Trust Fund;
2) other multilateral funds in the field of climate change;
3) multilateral financial institutions, including regional development banks;
4) specialized UN entities;
5) contributions received through bilateral, regional or other channels.

The general information on the support provided by developed countries shall be presented in textual and tabular form for the last two calendar or financial years, and it shall include:

1) amount of financial resources received from developed countries (in national currency and the equivalent in US dollars);
2) type of support received (for mitigation, adaptation, intersectoral activities);
3) status (planned or actually disbursed);
4) funding sources (official development assistance, other official financial flows);
5) financial instrument (grant, concessional loan, non-concessional loan, equity financing);
6) sector (energy, industry, transport, buildings, agriculture, forestry, waste management, wastewater treatment, intersectoral).

The competent authority (Environmental Agency) shall submit to the Central Authority for Natural Resources and Environment (MARDE) information based on the "Rio markers" on financial flows provided by developed countries for support in climate change mitigation and adaptation, and methodology information on implementation of the "Rio markers" on climate change, where such information is relevant or applicable under the UNFCCC. This will include:

1) definitions and methodologies used to determine provided support;
2) data on volume of mitigated greenhouse gas emissions, implemented climate change adaptation measures, enhanced capacities and technology transfer performed in accordance with decisions taken by the bodies established by the UNFCCC, the Kyoto Protocol, the Paris Agreement or on the basis of agreements resulting from or succeeding them.

The information on financial and technological support provided by industrially developed countries is a part of the Biennial Update Report and a chapter of the National Communication and it shall be submitted by the Central Authority for Natural Resources and Environment to the UNFCCC Secretariat by 31 December of the reporting year.

The competent authority shall develop the Biennial Update Report every two years and the National Communication - every four years.

The Biennial Update Report shall be prepared in accordance with UNFCCC requirements and shall comprise the following components:

1) Executive Summary;
2) National Circumstances Relevant to the Greenhouse Gas Emissions and Removals;
3) National Inventory of Greenhouse Gas Emissions;
4) Climate Change Mitigation Policies and Measures;
5) Projection of Greenhouse Gas Emissions and the Anticipated Effect of Climate Change Mitigation Policies and Measures;

6) Description of Financial, Technical and Capacity Constraints and Needs;
7) Description of the National System for Monitoring, Reporting and Verification;
8) Other Relevant Information on Reaching the Objectives of the Convention.

The National Communication shall be prepared in accordance with the requirements of the UNFCCC and shall comprise the following components:

1) Executive Summary;
2) National Circumstances Relevant to the Greenhouse Gas Emissions and Removals;
3) National Inventory of Greenhouse Gas Emissions;
4) Climate Change Mitigation Policies and Measures;
5) Projection of Greenhouse Gas Emissions and the Anticipated Effect of Climate Change Mitigation Policies and Measures;
6) Vulnerability Assessment and Climate Change Adaptation Measures;
7) Description of Financial, Technical and Capacity Constraints and Needs;
8) Other Relevant Information on Reaching the Objectives of the Convention.

The Central Authority for Natural Resources and Environment (MARDE) shall submit to the UNFCCC Secretariat by 31 December of the reporting year, the Biennial Update Report - every two years, in accordance with Decisions 1/CP.16 and 2/CP.17, and the National Communication, respectively, every four years, in accordance with Article 12 of the UNFCCC and Decision 17/CP.8.

The competent authority shall publish on its official website the National Communications and Biennial Update Reports of the Republic of Moldova to the UNFCCC in Romanian and in English.

The competent authority shall provide the format of reporting questionnaires to relevant authorities and institutions that are part of the NMRS, as well as to identified respondents who have the information, the emission factors and activity data, necessary to estimate anthropogenic greenhouse gas emissions as set out in Tables 2 - 6 of Annex No. 1 to GD no. 1277 of 26.12.2018.

Data collection and processing necessary for preparation of the national inventory, as provided in Tables 2–6 of Annex no. 1 to GD no. 1277 of 26.12.2018, are obligations of responsible authorities and institutions, under the conditions of their inclusion in the Statistical Works Program, approved annually by the Government.

The competent authority shall use official national data and information, provided by the central statistical body, if differences are found in the information and data obtained for the same indicator.

For the data and information necessary to assess and estimate the level of greenhouse gas emissions not provided for in the Statistical Work Program, the competent authority shall consult with the competent authorities and institutions that are part of the NMRS. The results of consultations shall be recorded in Minutes describing the procedures for developing specific studies and responsibilities for them.

The competent authority shall require that the public authority with competence for the economic security of the state, implements the customs policy and directly conducts the customs activity in the Republic of Moldova, provides the data necessary for preparation of the national inventory, according to Tables 2–6 of Annex no. 1 to GD no. 1277 of 26.12.2018, in compliance with the tariff positions in the Combined Nomenclature of Goods approved by Law no. 172 of 25 July 2014.

The exchange of data between the competent authority and the authorities and institutions that are part of the NMRS shall be carried out free of charge and within the deadlines provided by the relevant Regulation, subject to compliance with the provisions of Chapter VII of Law no. 93/2017 on official statistics.

In order to ensure the accuracy and proper identification of the degree of uncertainty for the activity data and for submitted emission factors, as necessary, the competent authority shall contract consultancy services, studies for development of emission factors, development of specific software and any other studies, analyses and research necessary to ensure the proper operation of the NMRS.

The data to be provided under Tables 2–6 of Annex no. 1 to GD no. 1277 of 26.12.2018 shall be updated by Government Decision upon proposal by the central authority for natural resources and environment, according to the dynamics and evolution of data and information, as well as changes in the institutional framework or changes of any other nature.

The environmental control authority exercises the function of supervision and control on observance of provisions of the Regulation on the establishment and operation of the National Monitoring and Reporting System for greenhouse gas emissions and other information relevant for climate change, in accordance with art. 26 of Law no. 1515/1993 on environmental protection and Law no. 131/2012 on state control over entrepreneurial activity. Failure to comply with the provisions of the Regulation entails disciplinary, contravention or criminal liability according to effective legislation.

In context of the above, it is important to mention that, in accordance with Government Decision no. 1249 of 19.12.2018 on organization and operation of Public Institution "Environmental Projects Implementation Unit" (PI "EPIU"), the latter has the mission to support MARDE and organizational entities in its area of competence, for the purpose of efficient implementation of financial and technical assistance projects, external and internal, in the field of environmental protection and use of natural resources (protection of atmospheric air, ozone layer and climate change; waste and chemical management; prevention of environmental pollution; water resources management, biosecurity, biodiversity conservation and management of natural areas protected by the state), in accordance with the provisions of regulatory documents on implementation of the requirements of international conventions to which the Republic of Moldova is party and in alignment with international standards in the field of environmental protection. The main responsibilities of PI "EPIU" consist in: efficient implementation of projects in its fields of competence in accordance with established objectives; supervision and verification of the quality of provided services, works and goods so that they are provided within the established deadlines; managing the financial resources allocated to projects in its areas of competence, in accordance with the assistance agreements and the approved budget; providing support to the founder in development of project proposals in its area of competence; development and submission of progress reports in project implementation and use of financial resources within projects.

The management body of the PI "EPIU" consists in the Director of the institution (executive area), respectively, a Steering Committee - a superior collegiate body, which leads and supervises the activity of the institution. The committee consists of 5 members and it is appointed for a 4-year period. The nominal composition of the members of the Committee is established by order of MARDE, with mandatory inclusion of at least one representative from each of the following entities: State Chancellery, Ministry of Finance, and Ministry of Agriculture, Regional Development and Environment and civil society in the areas of competence of PI "EPIU". The Committee shall be chaired by the Secretary of State for Protection of the Environment and Mineral Resources of MARDE, who shall chair the meetings of the Committee and exercise other established duties. When the Chairperson of the Committee is absent, the meeting shall be chaired by one of the members, elected by members attending the meeting.

As competent authority responsible for operation of the National Monitoring and Reporting System on greenhouse gas emissions and other information relevant to climate change, the Environmental Agency has requested by Letter no. 3471 of 25.09.2019 that Climate Change Office within the PI "EPIU" examines and identifies opportunities for providing the necessary support for the accomplishment of commitments in the field of climate change by organizing the entire process of developing the Third Biennial Update Report of the Republic of Moldova to UNFCCC, respectively of the Fifth National Communication of the Republic of Moldova to the UNFCCC, in accordance with the rules, procedures and decisions of the Conference of the Parties to the UNFCCC.

Towards this end, the Climate Change Office of the PI "EPIU" was given the right: to request and receive, directly or through the Environmental Agency, information from central public authorities, local public authorities, organizations and institutions, economic operators working in fields holding primary information needed to complete these two national reports; to collect, process and validate the data and information necessary for preparation of national inventories and reports on greenhouse gas emissions; to train specialists from the Environmental Agency in processing of collected data and information in order to develop their capacities in the targeted fields.

It is noteworthy that within MARDE (February 2004 - December 2018), and more recently also within PI "EPIU" (starting in January 2019), the Climate Change Office was responsible for activities related to preparation of National Communications, Biennial Update Reports, National Inventory Reports and national GHG emission inventories. From its establishment and up-to-date, the Climate Change Office has held full responsibility for activities associated with preparation of National Communications, and since 2014 – those of Biennial Update Reports.

Within the Climate Change Office of the PI "EPIU", there are three working groups: "National GHG Inventory", "Climate Modelling, Vulnerability Assessment, Climate Change Impacts and Adaptation Measures" (Fig. 1-1).

The functional responsibilities of the participants in the process are briefly described as follows:

- National experts (employed by a contract system) have responsibilities for the process of collecting activity data, selecting assessment methods, assessment at sectoral level, taking corrective action in response to verification, quality control and quality assurance activities, as well as development of some component parts of the key chapters of NCs, BURs and NIRs.

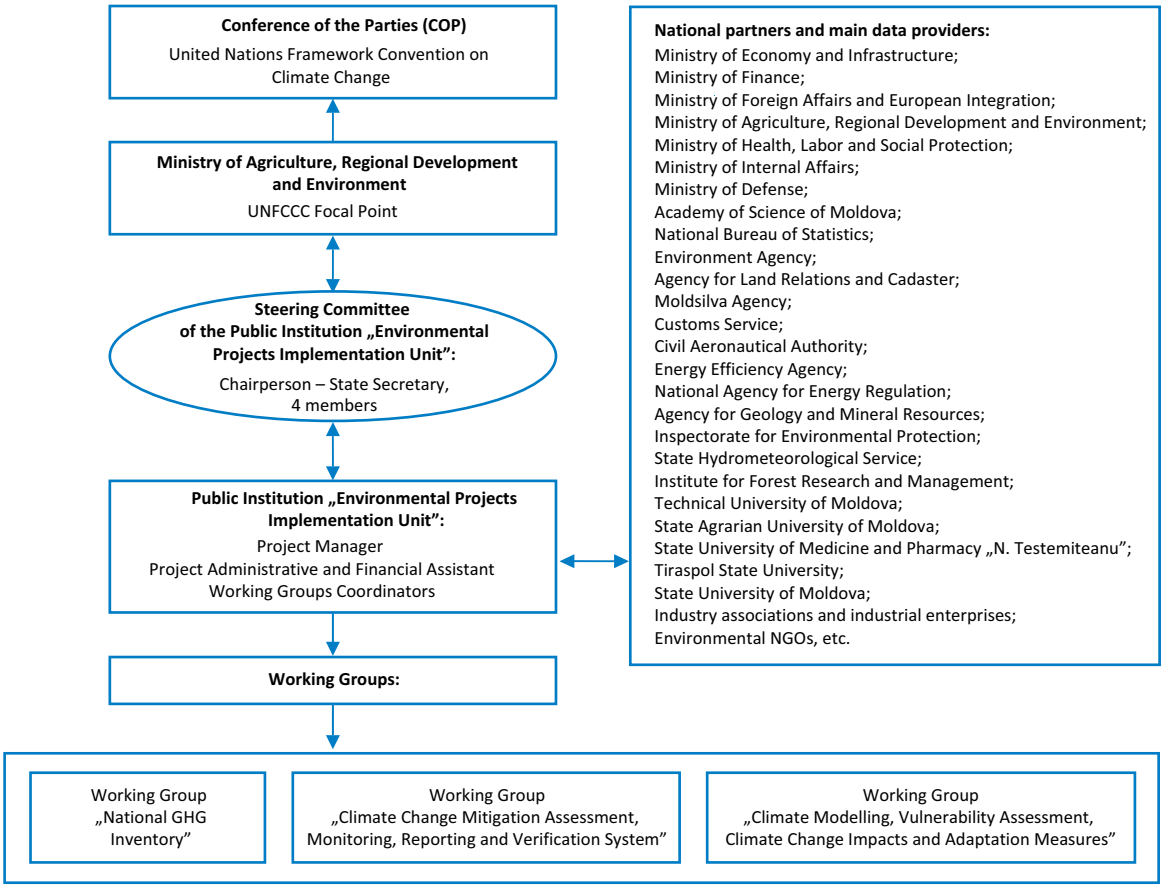


Figure 1-1: Institutional Arrangements Relevant for the Preparation of the National Communications, Biennial Update Reports and National Inventory Reports in the RM.

- Working Group Coordinators responsible for coordinating the process of compiling the key chapters of NCs, BURs and NIRs. They oversee the assessment process at sectoral level, are responsible for interpreting the results obtained by national experts, for coordinating quality control and verification activities, documenting and archiving the materials and putting together reports submitted by national experts.

The information associated with the legal and institutional framework for collecting activity data needed to compile the NC, BUR and national inventory is described in Chapter 2.2 "Institutional arrangements, inventory process" of the BUR3.

1.2. Administrative-Territorial Organization, Population Profile and Demographic Situation

1.2.1. Administrative-Territorial Organization

According to Law no. 764 of 27.12.2001, the territory of the Republic of Moldova is administratively organized in 32 districts, five municipalities and two administrative-territorial units (Fig. 1-2).

Figure 1-2: Administrative-Territorial Map of the Republic of Moldova.

In most districts (Anenii Noi, Basarabeasca, Briceni, Cahul, Cantemir, Calarasi, Causeni, Cimislia, Criuleni, Donduseni, Drochia, Edinet, Falesti, Floresti, Glodeni, Hincesti, Ialoveni, Leova, Nisporeni, Ocnita, Orhei, Rezina, Rascani, Sangerei, Soroca, Straseni, Soldanesti, Stefan Voda, Taraclia, Telenesti, Ungheni) the administrative centre is located in cities and only Dubasari district has its center in Cocieri village. As of 1 January 2019, the number of population in the districts varied from a minimum of 28.0 thousand inhabitants (Basarabeasca district) to a maximum of 124.0 thousand inhabitants (Orhei district).

In the Republic of Moldova, municipalities are urban communities with a special role in the economic, social-cultural, scientific, political and administrative life of the country, with important industrial, commercial enterprises and institutions in the field of education, health care and culture. In most cases, municipalities consist of several communities. For example, Chisinau, which is also the country's capital, has 35 communities, including five sectors, six cities and 12 villages (which include 26 settlements). The other four municipalities are: Balti, Comrat, Tiraspol and Bender (Tighina).

The division of the country's territory into administrative-territorial units aims at promoting realization of the principles of local autonomy, decentralization of public services, elected status of local public authorities, ensuring citizens' access to government authorities and consulting them on local issues of special interest. All local issues are the responsibility of the elected local councils. Prefects and governors of districts and municipalities are appointed by the President of the country, upon proposal of local councils.

There are two territorial-autonomous units (ATUs) in the Republic of Moldova: ATU Gagauzia and Administrative-Territorial Unit on the Left Bank of the Dniester River (ATULD). ATU Gagauzia has an area of about 3,000 km^2 (161.7 thousand inhabitants)[18], and ATULD has an area of about 4,163 km^2 (465.1 thousand inhabitants)[19].

Along with the beginning of the USSR disintegration, the administrative-territorial unit on the left bank of the Dniester River promoted a separatist policy towards the Central Public Authorities. Currently, the area is only partially monitored by constitutional authorities of the Republic of Moldova.

[18] <http://statbank.statistica.md/pxweb/pxweb/ro/20%20Populatia%20si%20procesele%20demografice/20%20Populatia%20si%20procesele%20demografice__POP010/POP010300reg.px/?rxid=-2345d98a-890b-4459-bb1f-9b565f99b3b9>

[19] <http://mer.gospmr.org/gosudarstvennaya-sluzhba-statistiki/informacziya/ezhegodnik-gosudarstvennoj-sluzhby-statistiki.html>

1.2.2. Population Profile

As of 01.01.2019, the population of the Republic of Moldova (including ATULD) was 3,146.8 thousand inhabitants, its density being about 93 inhabitants / km^2 (Tab. 1-1). According to the number of inhabitants, the Republic of Moldova exceeds such European states as Bosnia and Herzegovina, Lithuania or Slovenia.

Over the period 1990-2019, the number of inhabitants has decreased by about 27.9% or by 1,214.8 thousand. This decrease is determined by the negative natural balance and the negative balance of external migration. As a result of this dynamic, the average population density has also decreased, from 129 inhabitants/km^2 in 1990 to 93 inhabitants/km^2 in 2019.

In distribution by sex, female population predominates - 52.7%, as compared to only 47.3% male population. The accentuated disproportion in the gender structure in favor of women places the Republic of Moldova among the top 10 states in the world on this indicator and negatively influences the demographic processes. The population is mainly concentrated in rural areas, the 1,614 rural settlements totaling 55.0% of the total, on the average, with about 1,400 inhabitants per settlement. The urban population amounts to 45.0%. The level of urbanization is one of the lowest in Europe. Urban settlements are of small size, on the average, with 27 thousand inhabitants and only five municipalities and four cities have a population of over 33 thousand inhabitants: Chisinau (832.9 thousand inhabitants), Balti (151.8 thousand inhabitants), Tiraspol (127.7 thousand inhabitants), Bender (Tighina) (83.4 thousand inhabitants), Rabnita (44.0 thousand inhabitants), Cahul (39.4 thousand inhabitants), Ungheni (38.3 thousand inhabitants), Soroca (37.9 thousand inhabitants) and Orhei (34.1 thousand inhabitants).

According to the 2014 census, carried out separately on the right bank of the Dniester River and on the territory of the administrative-territorial units on the left bank of the Dniester River, Moldovans/ Romanians constituted about 73.1% of the country's population (64.5% in 1989), Ukrainians - 8.8% (13.8% in 1989), Russians - 7.6% (13.0% in 1989), Gagauz - 4.0% (3.5% in 1989), Bulgarians - 1.9% (2.2% in 1989), Roma - 0.3% (0.3% in 1989), other ethnic groups - 0.7% (1.3% in 1989) (Tab. 1-2).

Table 1-1: Population present at the beginning of the year in the RM during the 1990-2019 period

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
Total inhabitants, thousand	4,361.6	4,347.9	4,303.5	4,087.4	3,686.8	3,345.4	3,298.9	3,250.6	3,199.4	3,146.8
Male, thousand inhabitants	2,077.8	2,076.7	2,061.0	1,948.1	1,754.5	1,594.1	1,574.7	1,547.5	1,518.2	1,488.3
Female, thousand inhabitants	2,283.8	2,271.2	2,242.5	2,139.4	1,932.3	1,751.3	1,724.2	1,703.0	1,681.2	1,658.6
Male, share, %	47.6	47.8	47.9	47.7	47.6	47.7	47.7	47.6	47.5	47.3
Female, share, %	52.4	52.2	52.1	52.3	52.4	52.3	52.3	52.4	52.5	52.7
Density, inhabitants/km^2	129.2	128.4	127.2	120.8	108.9	98.8	97.5	96.0	94.5	93.0

Source: National Bureau for Statistics of the Republic of Moldova (2020) and the State Statistical Service of the ATULD (2020).

Table 1-2: Distribution of stable population by ethnicity in the Republic of Moldova (according to data of the 2004 and 2014 population censuses)

	Persons		in % of total population		in % of total population that declared ethnicity	
	2004	2014	2004	2014	2004	2014
Total population on the right bank of Dniester River	**3 383 332**	**2 804 801**	**100.0**	**100.0**	**x**	**x**
Population that declared ethnicity, *including:*	**3 369 312**	**2 754 719**	**99.6**	**98.2**	**100.0**	**100.0**
Moldovans	2 564 849	2 068 058	75.8	73.7	76.1	75.1
Ukrainians	282 406	181 035	8.3	6.5	8.4	6.6
Russians	201 218	111 726	5.9	4.0	6.0	4.1
Gagauz	147 500	126 010	4.4	4.5	4.4	4.6
Romanians	73 276	192 800	2.2	6.9	2.2	7.0
Bulgarians	65 662	51 867	1.9	1.8	1.9	1.9
Roma	12 271	9 323	0.4	0.3	0.4	0.3
Other ethnicities	22 130	13 900	0.7	0.5	0.7	0.5
Population that did not declare ethnicity	14 020	50 082	0.4	1.8	x	x
Total population on the left bank of Dniester River	**555 347**	**475 665**	**100.0**	**100.0**	**x**	**x**
Population that declared ethnicity, *including:*	**538 148**	**409 548**	**96.9**	**86.1**	**100.0**	**100.0**
Moldovans	177 382	135 565	31.9	28.5	33.0	33.1
Ukrainians	160 069	108 927	28.8	22.9	29.7	26.6
Russians	168 678	138 419	30.4	29.1	31.3	33.8
Bulgarians	13 858	11 416	2.5	2.4	2.6	2.8
Gagauz	4 096	5 232	0.7	1.1	0.8	1.3
Byelorussians	3 811	2 378	0.7	0.5	0.7	0.6
Germans	2 071		0.4	0.0	0.4	0.0
Jews	1 259		0.2	0.0	0.2	0.0
Transnistrians		952	0.0	0.2	0.0	0.2
Other ethnicities	6 924	6 659	1.2	1.4	1.3	1.6
Population that did not declare ethnicity	17 199	66 117	3.1	13.9	x	x
Total population in the Republic of Moldova	**3 938 679**	**3 280 466**	**100.0**	**100.0**	**x**	**x**
Population that declared ethnicity, *including:*	**3 907 460**	**3 164 267**	**99.2**	**96.5**	**100.0**	**100.0**
Moldovans	2 742 231	2 203 623	69.6	67.2	70.2	69.6
Ukrainians	442 475	289 962	11.2	8.8	11.3	9.2
Russians	369 896	250 145	9.4	7.6	9.5	7.9
Gagauz	151 596	131 242	3.8	4.0	3.9	4.1
Romanians	73 276	192 800	1.9	5.9	1.9	6.1
Bulgarians	79 520	63 283	2.0	1.9	2.0	2.0
Roma	12 271	9 323	0.3	0.3	0.3	0.3
Other ethnicities	32 384	21 511	0.8	0.7	0.8	0.7
Population that did not declare ethnicity	31 219	116 199	0.8	3.5	x	x

1.2.3. Demographic Situation

Over the 1990-2019 period, demographic processes showed a negative trend (Tab. 1-3), manifested by instability of demographic indicators and phenomena such as reduced birth rate, increased mortality, depopulation, demographic ageing and others.

Table 1-3: Evolution of some demographic indicators in the RM over the 1990-2019 period, persons

	Live new-borns	Deceased	Deceased children under one	Natural growth	Marriages	Divorces
1990	77,085	42,427	1,482	34,658	40,809	13,135
1995	56,411	52,969	1,214	3,442	32,775	14,617
2000	36,939	41,224	681	-4,285	21,684	9,707
2005	37,695	44,689	468	-6,994	27,187	14,521
2010	40,474	43,631	476	-3,157	26,483	11,504
2015	40,855	39,848	367	1,007	24,709	11,199
2016	39,961	38,454	355	1,507	21,992	10,605
2017	36,640	36,820	337	-180	20,924	9,312
2018	34,764	37,307	316	-2,543	20,399	10,721
2019	32,022	36,416	278	-4,394	20,301	10,736

Source: National Bureau for Statistics of the Republic of Moldova, Statistical database, <https://statbank.statistica.md/pxweb/pxweb/ro/20%20Populatia%20si%20procesele%20demografice/20%20Populatia%20si%20procesele%20demografice__POPrec__POP010/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>.

For example, in 2019, the birth rate equaling 12.0‰ has shown a sharp decline as compared to 1990 (17.7‰), well below the mortality rate - 13.7‰, which was increasing as compared to 1990 (9.7‰) (Tab. 1-4). Infant mortality continues to be one of the highest in Europe - 8.7‰, down from 1990 levels (19.0‰). In 2019, the natural balance of the population was negative (-1.7‰), having sharply decreased as compared to 1990.

Table 1-4: Rates of natural movement of the population in the RM over the 1990-2019 period, ‰

	Live new-borns	Deceased	Deceased children under one	Natural growth	Marriages	Divorces
1990	17.7	9.7	19.0	8.0	9.4	3.0
1995	13.0	12.2	21.2	0.8	7.5	3.4
2000	10.2	11.3	18.3	-1.1	6.0	2.7
2005	10.5	12.4	12.4	-1.9	7.6	4.0
2010	11.4	12.3	11.7	-0.9	7.4	3.2
2015	14.4	14.1	9.0	0.3	8.7	4.0
2016	14.3	13.7	8.9	0.6	7.8	3.8
2017	13.3	13.4	9.2	-0.1	7.6	3.4
2018	12.8	13.8	9.1	-1.0	7.5	4.0
2019	12.0	13.7	8.7	-1.7	7.6	4.0

Source: National Bureau for Statistics of the Republic of Moldova, Statistical database, <https://statbank.statistica.md/pxweb/pxweb/ro/20%20Populatia%20si%20procesele%20demografice/20%20Populatia%20si%20procesele%20demografice__POPrec__POP010/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>.

One consequence of this evolution is demographic ageing, manifested by increase in average age of the population. Thus, over the 1990-2019 period, the average age of the population of both sexes increased in the Republic of Moldova from 32.0 years in 1990 to 38.8 years in 2019 (in men, the value of the indicator increased from 30.3 to 37.0 years, and in women, respectively, increased from 33.5 to 40.5 years) (Tab. 1-5).

Table 1-5: Average age of the RM population over the 1990-2019 period by sex, years

	Both sexes	Male	Female
1990	32.0	30.3	33.5
1995	32.4	30.7	33.9
2000	33.4	31.8	34.9
2005	34.9	33.2	36.5
2010	36.2	34.6	37.8
2015	37.7	35.9	39.3
2016	37.9	36.1	39.5
2017	38.1	36.4	39.8
2018	38.5	36.7	40.1
2019	38.8	37.0	40.5

Source: National Bureau for Statistics of the Republic of Moldova, Statistical database, <https://statbank.statistica.md/pxweb/pxweb/ro/20%20Populatia%20si%20procesele%20demografice/20%20Populatia%20si%20procesele%20demografice__POPrec__POP010/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>.

Over the 1990-2019 period, there was an insignificant increase of the indicator "life expectancy at birth" in the Republic of Moldova, from 68.0 years in 1990, to 70.9 years in 2019 (in men, this indicator increased from 63.9 years at 66.8 years, and in women, respectively, it increased from 71.9 years to 75.1 years) (Tab. 1-6). As compared to other countries, the values of "life expectancy at birth" indicator are modest, ranking Moldova among the last in Europe for the indicator.

Table 1-6: Life expectancy at birth in the RM during the 1990-2019 period, years

	Both sexes	Male	Female
1990	68.0	63.9	71.9
1995	65.8	61.8	69.7
2000	67.6	63.9	71.2
2005	67.9	63.8	71.7
2010	69.1	65.0	73.4
2015	69.4	65.2	73.7
2016	69.9	65.7	74.2
2017	70.8	66.7	74.9
2018	70.6	66.3	75.0
2019	70.9	66.8	75.1

Source: National Bureau for Statistics of the Republic of Moldova, Statistical database <https://statbank.statistica.md/pxweb/pxweb/ro/20%20Populatia%20si%20procesele%20demografice/20%20Populatia%20si%20procesele%20demografice__POPrec__POP010/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>.

1.3. Geographic Profile and Natural Resources

1.3.1. Geographic Position

The Republic of Moldova is located in the central part of Europe, to the northwest of the Balkans, on a territory of 33,846 thousand km^2. The capital of the country is Chisinau city, documented since 1436, with a population of about 832.9 thousand inhabitants (NBS, 2020). To the north, east and south the country is surrounded by Ukraine, and to the west – it is separated from Romania by the Prut River (Fig. 1-3). The total length of the national border is 1,389 km, including 939 km - with Ukraine, 450 km - with Romania.

Figure 1-3: Map of the Republic of Moldova.

The territory is crossed by the meridi-an 28˚50 'E and the parallel 47˚ N. The extreme points of the Republic of Moldova are located as follows: the northernmost point of the country is the village of Naslavcea (48˚ 21'N 27˚ 35 'E), the southernmost - Giurgiulesti village (45˚ 28 'N 28˚ 12' E), which is also the only community on the Danube bank, the westernmost point is Criva village (48˚ 16 'N 26˚ 30' E), and the easternmost – Palanca village (46˚ 25 'N 30˚ 05' E). The distances between the extreme points are about 350 km between Naslavcea and Giurgiulesti and only 120 km from west to east, on the latitude of Chisinau.

The Republic of Moldova is part of the group of countries of the Black Sea basin. Its southern border extends close to the Black Sea, the exit to the sea opening through the estuary of the Dniester River and the Danube River.

1.3.2. Relief

The area between the Prut and the Dniester rivers is part of the Moldovan Plateau, which stretches from the foothills of the Bucovina Hills and the Moldavian Subcarpathians in the west to the Dniester River in the east. To the left of the Dniester River the south-western side of the Podolia Plateau is situated. In the interior of these major points, in addition to the plateau relief, a hilly and plains relief prevails. The absolute altitudes are between 429 m (Balanesti Hill) and 4 m in the Dniester River meadow (Palanca village).

The relief, among other geoecological, biotic and socio-human elements, has contributed to the formation and evolution of geographical landscapes and ecosystems. The formation of the geoecological complex took place at the end of the Upper Pleistocene and in the first half of the Holocene. The biotic complex (vegetation, animals, soils) were formed over the second half of the Holocene.

1.3.3. Land Resources

The Republic of Moldova has unique land, which is distinguished by: predominance of chernozem soils, with high productivity potential; very high degree of land use (> 75%); and rugged terrain: over 80% of cropland is located on slopes.

As of 1 January 2019, the total land area was 3,384.7 thousand ha (NBS, 2020), including 2,496.4 thousand ha (73.7%) - cropland; of which 1,838.5 thousand ha (54.3%) - arable land, 286.6 thousand ha (8.5%) - perennial plantations; 341.1 thousand ha (10.1%) - hayfields and pastures; 30.2 thousand ha (0.9%) – abandoned formerly agricultural and; 467.2 thousand ha (13.8%) - forests and lands with forest vegetation; 96.5 thousand ha (2.9%) - rivers, lakes, basins and marshes and 323.7 thousand ha (9.6%) - other land (Tab. 1-7).

Table 1-7: Distribution of land by categories in the Republic of Moldova over the 1992-2019 period, thousand ha

	1992	1995	2000	2005	2010	2015	2016	2017	2018	2019
Land – total, including:	**3376.0**	**3385.1**	**3384.4**	**3384.6**	**3384.4**	**3384.6**	**3384.6**	**3384.6**	**3384.6**	**3384.7**
Cropland	2565.9	2556.7	2550.3	2521.6	2501.1	2499.7	2499.6	2499.8	2496.6	2496.4
including:										
Arable land	1736.3	1758.7	1813.8	1840.2	1816.7	1817.4	1822.9	1827.3	1832.3	1838.5
Multiannual plantations	474.8	430.7	352.3	297.8	301.0	291.7	288.9	288.8	290.1	286.6
including:										
orchards	224.5	208.3	170.8	131.9	132.5	134.5	132.5	133.5	132.5	131.2
vineyards	215.8	202.6	168.9	155.5	153.5	137.5	136.2	135.3	135.8	133.1
pastures	350.5	365.2	373.9	370.8	352.1	346.4	345.0	342.8	340.2	339.1
hayfields	4.3	2.1	2.5	2.7	2.2	2.2	2.1	2.1	2.1	2.0
abandoned land	0.0	0.0	7.8	10.1	29.1	42.0	40.6	38.8	31.9	30.2
Forests and land with forest vegetation	421.7	425.3	422.7	439.5	462.8	464.5	465.2	465.3	466.3	467.2
Rivers, lakes, ponds, wetlands	88.7	92.6	95.5	96.8	96.4	96.8	96.7	96.1	96.1	96.5
Other land	299.7	310.5	315.9	326.7	324.3	323.6	323.1	323.4	325.7	324.7

Source: Annual Statistical Reports of the RM for years 2020, 2017, 2016, 2014, 2012, 2008, 2003, 1999 and 1994.

According to the Centralized Cadaster File of the Land Cadaster, as of 1 January 2020 the situation with use of agricultural land (a total of 1.308 million landowners with a total area of 2,091.9 thousand ha) was as follows: 73 state agricultural enterprises with a total area of 179.1 thousand ha (8.6%); 78 scientific research and educational institutions with a total area of 20.9 thousand ha (1.0%); 56 monasteries and religious institutions with a total area of 0.7 thousand ha (0.03%); 134 other enterprises and auxiliary households in state public ownership with a total area of 72.4 thousand ha (3.5%); 48.0 thousand land plots in public property of administrative-territorial units with the total area of 112.6 thousand ha (5.4%); 1,781 agricultural cooperatives with a total area of 77.9 thousand ha (3.7%); 1,034 joint stock companies with a total area of 28.9 thousand ha (1.4%); 36.2 thousand limited liability companies with an area of 791.2 thousand ha (37.8%); 290.0 thousand peasant households (small farmers) with a total area of 480.6 thousand ha (23.0%); 800.5 thousand land plots that are worked independently by private owners with an area of 259.5 thousand ha (12.4%); 35.3 thousand orchard plots with a total area

of 2.8 thousand ha (0.1%) and 94.3 thousand other land plots with a total area of 64.8 thousand ha (3.1%).

The soil cover of the Republic of Moldova is widely varied, consisting of over 745 varieties of soils. The chernozems make up about 73.7% of the country's territory; the grey forest soils (found on territories with prevailing altitude of over 200 m in the Northern Plateau, the Dniester Hills and Codri Hills) occupy about 9.4%, and the brown forest soils (they are found on peaks with altitudes of over 300 m, now or in the past under beech, hornbeam and oak forests), respectively about 0.6%; alluvial soils (found in river meadows on recent alluvial deposits) occupy about 10.2%; and deluvial soils (formed at the base of slopes and valleys by soil particles transported by erosion), respectively - about 3.7%; rendzines (formed on limestone under influence of steppe and forest grass associations) - about 1.0%; chernozomoid soils, muds and peat soils (found fragmentarily in the forest-steppe area) - about 0.7%; vitriol soils (formed mainly in steppe and forest-steppe conditions, under grassy vegetation on heavy clay rocks) - about 0.4%; and solonets and solonceacks - about 0.2% of the country's territory. The extremely high degree of land use in agriculture requires rational use, improvement and protection of soils against erosion, landslides and other irrational human interventions.

1.3.4. Water Resources

Rivers. In the Republic of Moldova there are 3,621 permanent or temporary rivers, rivulets and streams with a length of over 16 thousand km, 90% of which are less than 10 km long, only 9 of them exceeding the length of 100 km.

All rivers pertain to the Black Sea basin and can be grouped as follows: the rivers of the Dniester basin, the rivers of the Prut basin and the southern rivers that flow into the Danube or Black Sea estuaries. Small rivers predominate. Among the largest are the Dniester River (1,352 km including 657 km on the territory of the country with an annual flow of about 10 km^3), the Prut River (976 km, including 695 km on the territory of the country with an annual flow of about 2.4 km^3), Raut (286 km), Cogalnic (243 km, with 125 km on the territory of the country), Bic (155 km), Botna (152 km). The density of the hydrographic network on the average for the country is 0.48 km / km^2, ranging from 0.84 km / km^2 in the north of the country to 0.12 km / km^2 on the left side of the Dniester River.

The main water sources for rivers are snow and rain, with a much smaller share of groundwater. Most precipitation falls in form of rain showers and only 10% of their amount is in form of snow. A high-water level is recorded in spring due to melting snow (40-50% of annual flow). During the summer season due to torrential rains, river levels, especially of small rivers, can rise considerably, sometimes causing catastrophic floods.

Lakes. On the territory of our country there are 4,475 water basins with an area of about 40.2 thousand ha, of which only about 60 are natural lakes. Most of them are lakes in the Prut River meadows (Beleu - 6.26 km^2, Dracele - 2.65 km^2, Rotunda - 2.08 km^2) and in the Dniester River meadow (Salas - 3.72 km^2, Ros - 1.16 km^2, Nistrul Vechi - 1.86 km^2). However, there are over 4,250 water accumulation lakes arranged for various purposes (irrigation, fishing, leisure, industrial and domestic needs, flood protection). Large lakes, including for supply to hydroelectric power plants, were created on the Prut River in collaboration with Romania - Costesti-Stanca (59 km^2), on the Dniester River - Dubasari (67.5 km^2), Cuciurgan (27.3 km^2) and on the Bic River - Ghidighici (6.8 km^2).

Underground Water. A special role in the terrestrial water balance in the Republic of Moldova is played by groundwater. It is actively included in the hydrological cycle as a component of the groundwater flow. The distribution of groundwater resources on the territory of the country[20] is not uniform, most of it being concentrated in the meadows of the Dniester and Prut rivers. In territories located farther from these rivers, water supply to the underground aquifer horizons decreases. Thus, the groundwater resources of the Republic of Moldova include 17 complexes and aquifer horizons of different ages, which have an uneven distribution throughout the country. The more important of them are six aquifer horizons: the groundwater Quaternary (22 million m^3), the Middle Sarmatian (110 million m^3), the Lower Sarmatian + Badian (770 million m^3), the Cretaceous (110 million m^3), the Upper Sarmatian and the Pontic (44 mil. m^3). In most aquifer horizons about 50% of the water has drinking qualities, except for the phreatic water, amounting to about 20-30%. The deep-water reserves amount to a total of 1100 million m^3, and those approved as water suitable for economic needs amount to about 255 thousand m^3 / day.

Approximately 40% of the rural population is supplied with water from underground layers with hydrostatic pressure, about 4,956 wells being monitored (in 2019 only 2,612 wells were used, including for drinking water – 1,672, for technical use - 657, for agricultural use - 46, for industrial use - 220, for spa use - 17). Water supply also comes from the first aquatic layer (without pressure) (from about 178.7 thousand wells, of which 144.9 thousand are managed wells and 3,094 thousand are springs, 2,060 thousand of the latter being managed), which ensures about 1.8 million m^3 / day of confirmed reserves. Of the total amount of groundwater used on the territory of the country only 50% can be used for drinking purposes without prior treatment.

[20] <http://moldova-suverana.md/article/apa-este-dimensiunea-ecologic-fundamental-a-existenei_423>

Mineral Water. Currently, on the territory of the Republic of Moldova, about 50 types of mineral waters are certified in about 170 deposits, of which about half (especially due to the content of fluorine and hydrogen sulphide exceeding ten and eight times respectively the maximum allowable limit) are not used[21]. Of these, about 25 deposits (Varnita-III, Branesti, Purcari, Edinet-II, Micauti, Cotiujeni, Orhei, Balti-III, Ialoveni, etc.), including the deposits of healing mineral waters (spring no. 3 in the village Gura Cainarului) are new deposits, appreciated due to prospecting works carried out over the recent years. Water mineralization is 1.0-10.0 g/dm^3. Healing mineral waters are situated in the south and northeast of the country. They are hydrocarbon and hydrocarbon-sulphate waters with the predominance of sodium and calcium cations. They contain hydrogen sulphide (30.0-80.0 mg/dm^3), iodine (17.0-26.0 mg/dm^3), bromine (132.0-139.0 mg/dm^3) and other chemical elements (lithium, radon, strontium, boron).

Industrial Water. On the territory of the Republic of Moldova industrial groundwater contains rare chemical elements that can be extracted from water. The most common are water deposits with iodine, bromine, strontium, caesium, rubidium, boron and helium. The maximum concentration of these elements in water with mineralization 70-100 g/dm^3 is 60 mg/dm^3 iodine; 360 mg/dm^3 bromine; 380 mg/dm^3 strontium; 1.0 mg/dm^3 caesium; 3 mg/dm^3 rubidium; 15.0 ml/dm^3 helium.

Thermal Water. The thermal water is spread in the Republic of Moldova in the Prut River meadow and in the southern part of the country. The water temperature is 20.0-80.0°C, and the flow is 10-100 m^3/day.

1.3.5. Biologic Resources

Flora. The geographical location, climate and relief have led to formation of a varied and species-rich vegetation - the flora of the Republic of Moldova currently comprising about 5,638 plant species: higher – 2,014 species (vascular plants – 1,856 species, pteridophytes - 25 species, gymnosperms - one species, angiosperms – 1,830 species, respectively bryophytes (mosses) - 158 species); lower – 3,624 species (lichenophytes (lichens) - 124 species and algae – 3,500 species). According to the floristic composition, the forest ecosystems are the richest (over 850 species) followed by steppe ecosystems (over 600 species), grassland (about 650 species), petrophytes (about 250 species), water and marshy ecosystems (about 160 species). There are about 1,200 species of mushrooms (fungi) in the Republic of Moldova, including 836 species of macromycetes.

At landscape level, the country's territory is located in two natural areas: forest-steppe and steppe. The steppe area occupies plains and plateaus of the region located further south of the Codri Plateau and south and east of the Tigheciului Hills. Apart from these regions, the steppe vegetation is also found in the north, in the Cubolta Plain, in the Ciulucurilor Hills and in the Middle Prut Plain.

Currently, most steppe land is used in agriculture; in these conditions the typical steppe vegetation, represented by rafflesia, spear grass, fescue with various other grasses, has been preserved only on small sectors of slopes with old landslides or on the steeper slopes, subject to erosion. Of the total number of steppe species, 18 are included in the Red Book of the Republic of Moldova, of which nine species (*Astragalus dasyanthus Pall., Belevallia sarmatica (Georgi) Woronow, Bulbocodium versicolor (Ker.-Gawl.) Spreng., Colchicum triphyllum G. Kunze, C. Fominii Bordz., Galanthus elwesii Hook. Fil., Ornithogalum amphibolum Zahar., O. oreoides Zahar., Stembergia colchiciflora Waldst. Et Kit.)* are also included in the Red Book of Ukraine (1996) and in the Red List of Higher Plants of Romania (1994).

In the forest-steppe area, on the higher peaks, more frequently in the Codri region, besides the steppe vegetation, there is also forest vegetation. Deciduous forests predominate (97.9%) which are specific to Central Europe (including quercinea - 39.6%, acacia - 36.1%, ash - 4.6%, hornbeam - 2.6%, poplar - 1.6%, etc.), conifers having only a 2.1 % share.

The country's forest ecosystems comprise 45 native tree species, 81 native shrub species and three native liana tree species. Among the most common native species of woody plants found in Moldovan forests are common oak (*Quercus robur*), sessile oak (*Quercus petraea*), downy oak (*Quercus pubescens*), European ash (*Fraxinus excelsior*), European hornbeam (*Carpinus betulus*), common elm (*Ulmus laevis*), sycamore maple (*Acer pseudoplatanus*), common linden (*Tilia cordata*), European birch (*Betula pendula*) and European beech (*Fagus sylvatica*).

Fauna. The fauna of the Republic of Moldova is relatively rich and varied. More than 15.0 thousand species of animals live in the country, including 461 species of vertebrates and over 14 thousand species of invertebrates. Among the vertebrates there are 70 species of mammals, 281 species of birds, 14 species of reptiles, 14 species of amphibians and 82 species of fish. Among the vertebrate animals the most numerous is the class of birds - 281 species and subspecies, and among invertebrates - insects: over 12 thousand species.

[21] <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=352740>

The most common native mammal species are common bat (*Plecotus auritus*), common hedgehog (*Erinaceus europaeus*), European mole (*Talpa europaea*), common shrew (*Sorex araneus*), nyctalus (*Nyctalus noctula*), common squirrel (*Sciurus*), common snipe (*Lepus europaeus*), European snipe (*Citellus citellus*), spotted snipe (*Citellus suslicus*), domestic mouse (*Mus musculus*), gray rat (*Rattus norvegicus*), wood mouse (*Apodemus sylvaticus*), field mouse (*Apodemus flavicollis*), common fox (Vulpes vulpes), deer (*Capreolus capreolus*), wild boar (*Sus scrofa*), badger (*Meles meles*), beech marten (*Martes foina*), European ferret (*Mustela putorius*) and weasel (*Mustela nivalis*). Rare and endangered animals are protected by law (in the Red Book of the Republic of Moldova, 2001 edition, 116 species of animals are included: mammals - 14, birds - 39, reptiles - 8, amphibians - 1, fish - 12, cyclostomes - 1, insects - 37, crustaceans - 1 and molluscs - 3). The most populated by mammals are forest ecosystems - 47 species, followed by grassland - 33 species and agricultural ecosystems - 25 species. Birds populate water ecosystems - 109 species, forest ecosystems - 106 species, agricultural ecosystems - 76 species, steppes and petrophytes - 45 and 23 species, respectively.

In the Republic of Moldova there are five scientific reserves with a total area of 19.4 thousand ha. Two forest reserves - "Codrii" and "Plaiul Fagului" - are located in the centre of the Republic of Moldova; two others - "Prutul de Jos" and "Padurea Domneasca" - are located in the Prut River valley; the fifth reservation - "Iagorlac" from Dubasari district - aims to protect and study the unique aquatic ecosystem of the Dniester River.

1.3.6. Mineral Resources

The underground minerals most frequently used on the territory of the Republic of Moldova are: (1) carbonate rocks of Lower Sarmatian and Badenian - used in the construction industry for building residential and industrial buildings, in cement production, sugar cleaning, road construction, as feed additive, etc.; (2) siliceous rocks (siliceous limestone, diatomite, tripoli) - are used in the food industry, in production of leather, paper, thermal and electrothermal materials, etc.; (3) clay rocks (clay shales, bentonite clays, ordinary clays) - are used for producing cement, keramite, bricks, marble and tiles; (4) sands and gravel (pebbles) - are used for production of glass, concrete, in various branches of construction including roads; (5) sulphate rocks (gypsum) - are used in construction, medicine, pharmaceutical industry; (6) crystalline rocks (gabbro, granites, gabbro-norites) - are used in production of reinforced concrete, road construction; (7) causto-biolites (oil, gas, brown coal) exist in insignificant quantities (Valeni, Victorovca, Vladiceni).

Useful mineral resources are being explored in 415 deposits of non-metallic useful mineral substances, of which only about a third are used. The Republic of Moldova has industrial reserves of about 400 million tons of gypsum, sand for glass, tripoli, diatomite and 1500 million m^3 of crude stone, gravel, limestone, clay, and the extraction of non-metallic mineral substances is carried out in about 900 local quarries. At the same time, 37 mineral deposits are prepared for recovery, 230 reserves are explored, and 21 mineral substances are not expected to be recovered. Of useful mineral substances, carbonate, siliceous and clayey rocks predominate, as well as gravels and sands, sandstone, gypsum, granite, grabbo. Thus, the most commonly used minerals are useful for the construction industry, such as limestone and clay.

Modest hydrocarbon reserves were found in the south of the country, such as oil (Valeni, Cahul), natural gas (Victorovca, Cantemir) and brown coal (Etulia, ATU Gagauzia). According to estimates, oil reserves are about 2.1 million tons and natural gas about 960 million cubic meters. As a result of extraction from the Valeni oil field and the Victorovca natural gas deposit, in 2019 about 5 thousand tons of crude oil and about 88.6 thousand m^3 of natural gas were extracted.

1.4. Climate Profile

The climate of the Republic of Moldova is temperate continental, characterized by relatively mild winters and little snow, with long, hot summers and low humidity. The country is located in the region of interference of Atlantic air masses from Western Europe, continental-excessive interference in the northeast and Mediterranean - in the southwest. The territorial distribution of climatic elements has two distinct trends: (i) zonal distribution of average annual precipitation with decreasing values from north to south; and (ii) an increase of about 100 mm in amounts of average multiannual precipitation in the plateau regions, as compared to surrounding plains.

Over the last 132 years, the Republic of Moldova has experienced changes in average values of temperature and precipitation. The country has become warmer, with an average temperature increase of more than 1.2°C (Fig. 1-4), while increase in precipitation was only 51.3 mm (Fig. 1-5).

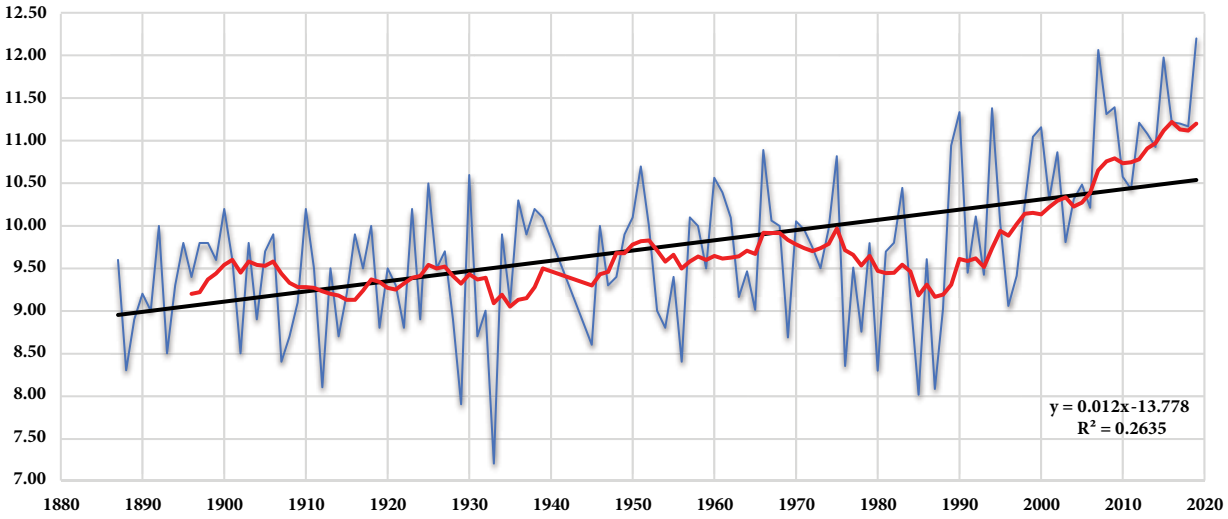


Figure 1-4: Trends of average annual variation in air temperature (°C) for the 1887-2019 years: blue line (course trend), solid black line (linear trend secular course) and red line (average 10-year moving trend) at Chisinau meteorological station, central part of the country.

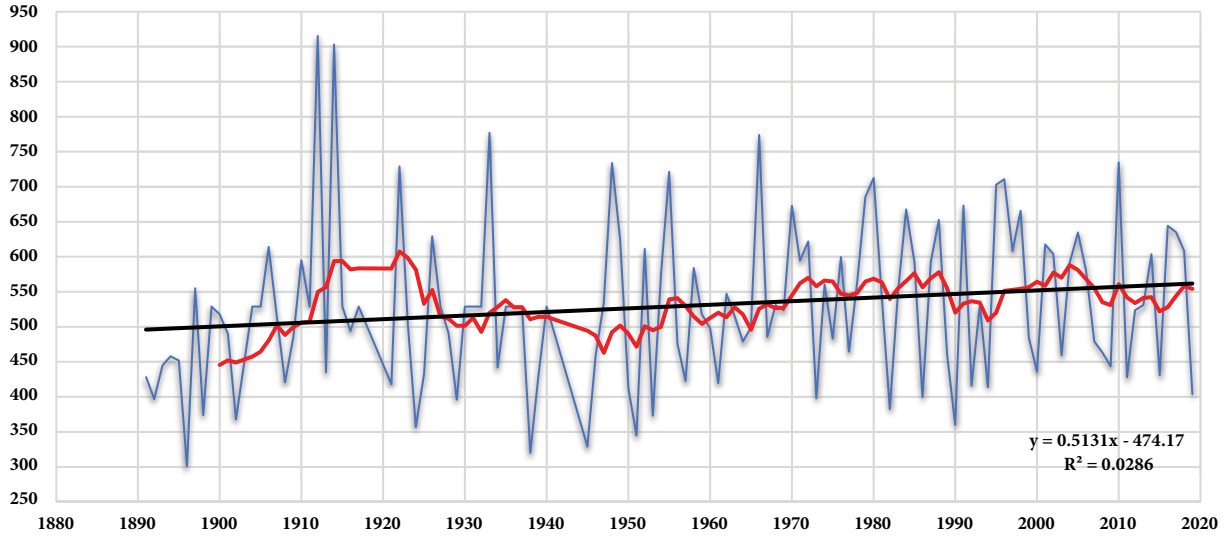


Figure 1-5: Trends of average annual precipitation (mm) for the 1891-2019 years: blue line (actual course trend), solid black line (secular course linear trend) and red line (average 10-year moving trend) at Chisinau meteorological station, central part of the country.

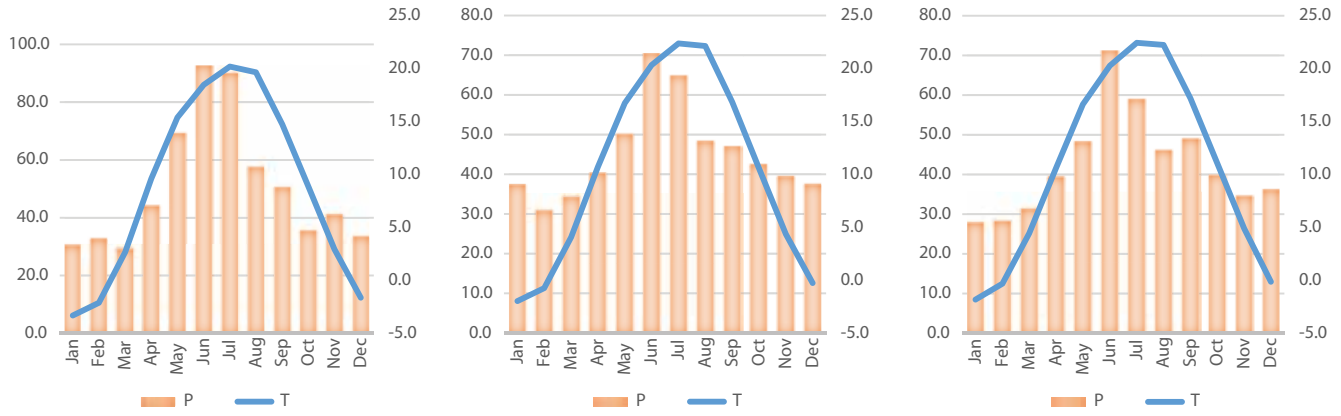
The early eighties are considered to be a "turning point" in the long-term air temperature curve, of which human influence on the atmosphere is most distinctly expressed (IPCC, 2007); this fact was statistically confirmed by both foreign studies (Gil-Alana, 2008[22]) and national ones (Corobov et al., 2013[23]; Taranu, 2014[24], Taranu et al., 2018[25]).

The annual course of mean air temperature in the Republic of Moldova, with maximum in July-August and minimum in January and of total precipitation, with maximum in July and minimum in March, is presented in Fig. 1-6.

To identify climate change, two climate periods (1961-1990 and 1991-2019) were compared. These periods reflect the relatively "normal" regional climate and the climate induced by intensive global warming. The increase in temperature in the southern direction is clearly observed from the average annual value of 7.8°C (north) to 9.8°C (south) over the 1961-1990 period and from 8.1°C (north) to 10.9°C (south) over the 1991-2019 period, followed by a decrease in the amount of annual precipitation, from 613-618 mm to 550-516 mm.

The comparison of mean air temperatures for the two abovementioned periods, both annual (Fig. 1-7) and seasonal (Fig. 1-8, 1-9, 1-10, 1-11, 1-12, 1-13 and 1-14), confirms substantial changes in temperature regime.

[22] Gil-Alana LA (2008), Time trend estimation with breaks in temperature lime series. Climatic Change 89: 325-337.
[23] Corobov R., Mitselea M. (2013), Some characteristics of current climate in the Moldavian part of the Dniester river's basin. Transboundary Dniester River basin management in frames of a new river basin treaty. Proceedings of the International Conference, Chisinau, September 20-21, 2013. P. 167-173.
[24] Taranu L. (2014), An Assessment of Climate Change Impact on the Republic of Moldova's Agriculture Sector: A Research Study Complementing the Vulnerability and Adaptation Chapter of the Third National Communication of the Republic of Moldova under the United Nations Framework Convention on Climate Change. Ed.: Vasile Scorpan, Marius Taranu; Climate Change Office, Ministry of Environment of the Republic of Moldova, United Nations Environment Programme, – Chisinau: S. n., 2014 (I.S. F.E.-P. Central Publishing House), – 260 p.
[25] Țăranu, L., Deveatii, D., Croitoru, C., Mironova,T et al. (2018), Vulnerability Assessment and Climate Change Impacts in the Republic of Moldova. Researches, Studies, Solutions. A Research Study Complimenting the Vulnerability and Climate Change Impacts Chapter of the Fourth National Communication of the Republic of Moldova under the United Nations Framework Convention on Climate Change. Ed.: Vasile Scorpan, Marius Țăranu; Climate Change Office, Min. of Environment of the Rep. of Moldova, United Nations Environment Program, – Ch.: „Bons Office" SRL, 2018 - 352 p.



(A) Briceni - North (B) Chisinau - Centre (C) Cahul- South

Figure 1-6: Diagrams of total monthly precipitation (columns) with superimposed curves of mean monthly temperatures in 1981-2019 period.

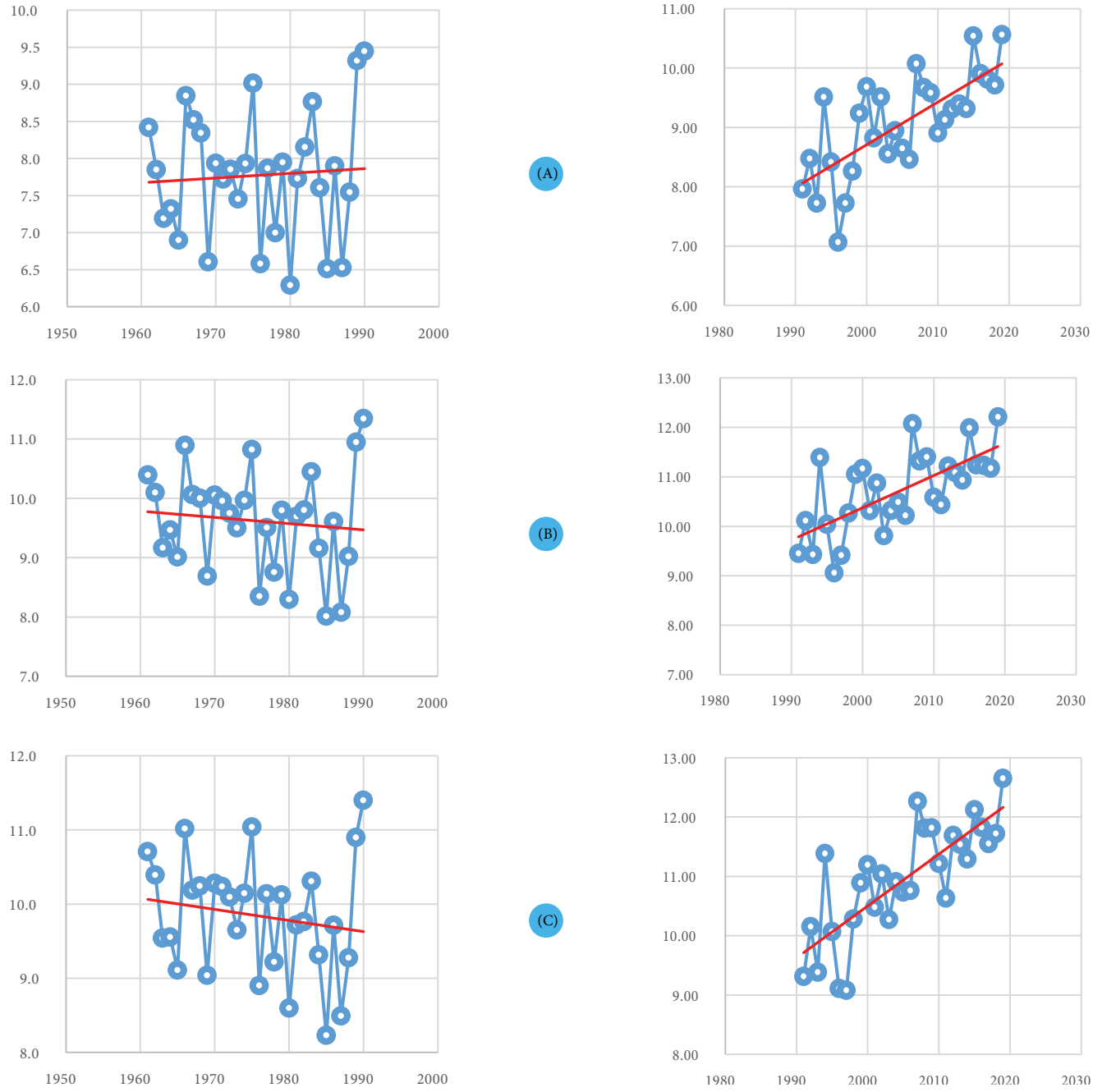


Figure 1-7: Trends in mean annual air temperature for two climatic periods (1961-1990 and 1991-2019): (A) Briceni - North, (B) Chisinau - Centre, (C) Cahul - South.

Undoubtedly, the air temperature has been increasing in the Republic of Moldova during 1991-2019 and this increase is most clearly observed during the warm period of the year, especially in summer, when the mean temperature of T_{avg} increases by 0.7-0.8°C, and the maximum temperature T_{max} increases from +1.0°C per decade (center, south) to +1.3°C per decade (north), with a very high degree of certainty, as compared to the observed trend of decreasing mean temperature T_{avg} by -0.3°C per decade (center, south) and statistically significant decrease of the maximum temperature T_{max}, by -0.5 -0.7°C per decade, over the 1961-1990 period.

The climate is warming to a lesser extent during the winter months, with + 0.4-0.6°C per decade, and this increase is statistically significant in the T_{avg} case for the northern area between 1961-1990 and T_{max}, T_{avg} and T_{min} for the southern area for the 1991-2019 period (Fig. 1-8).

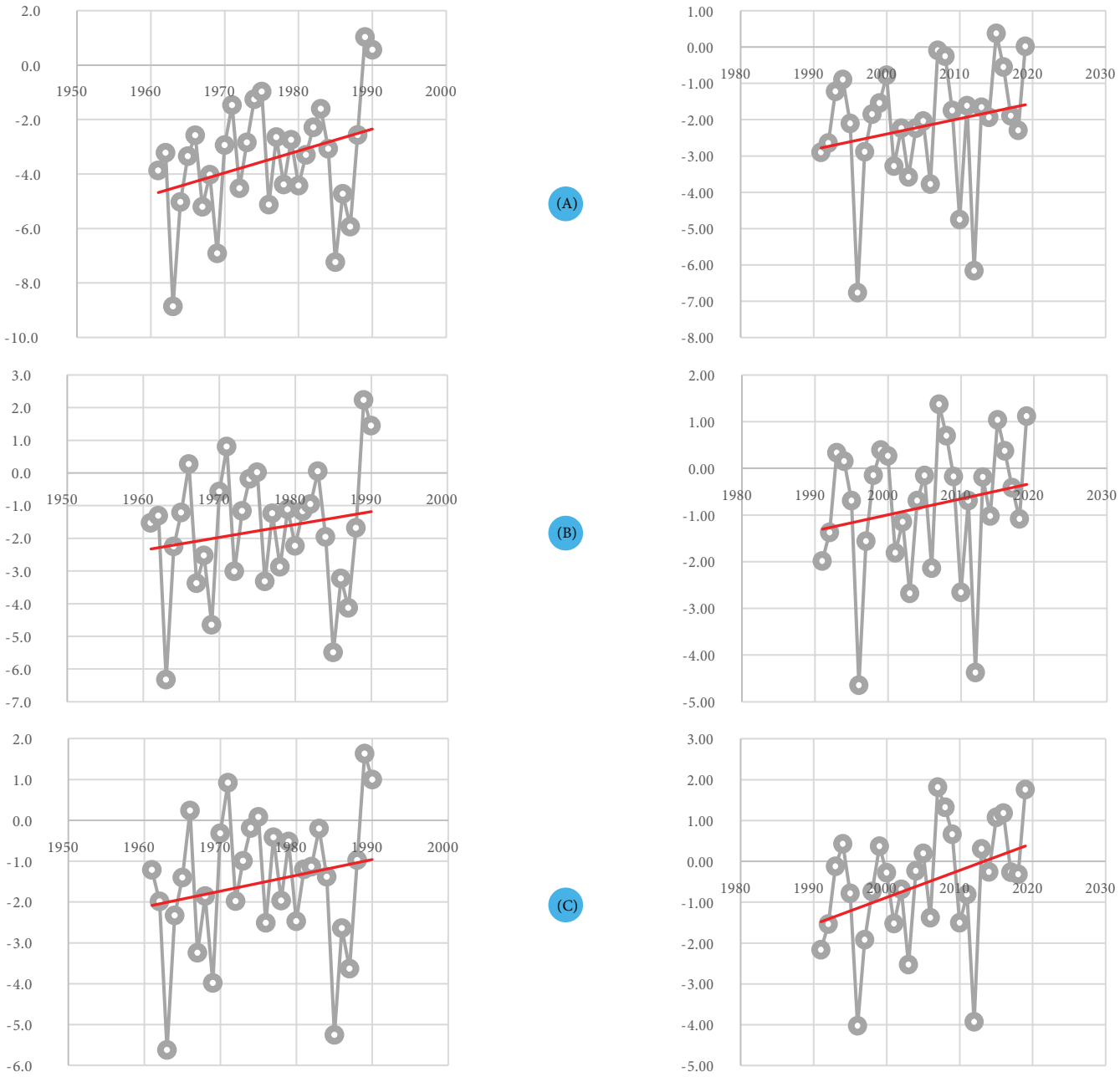


Figure 1-8: Trends in winter mean temperature for two climatic periods (1961-1990 and 1991-2019): (A) Briceni – North, (B) Chisinau – Centre, (C) Cahul – South.

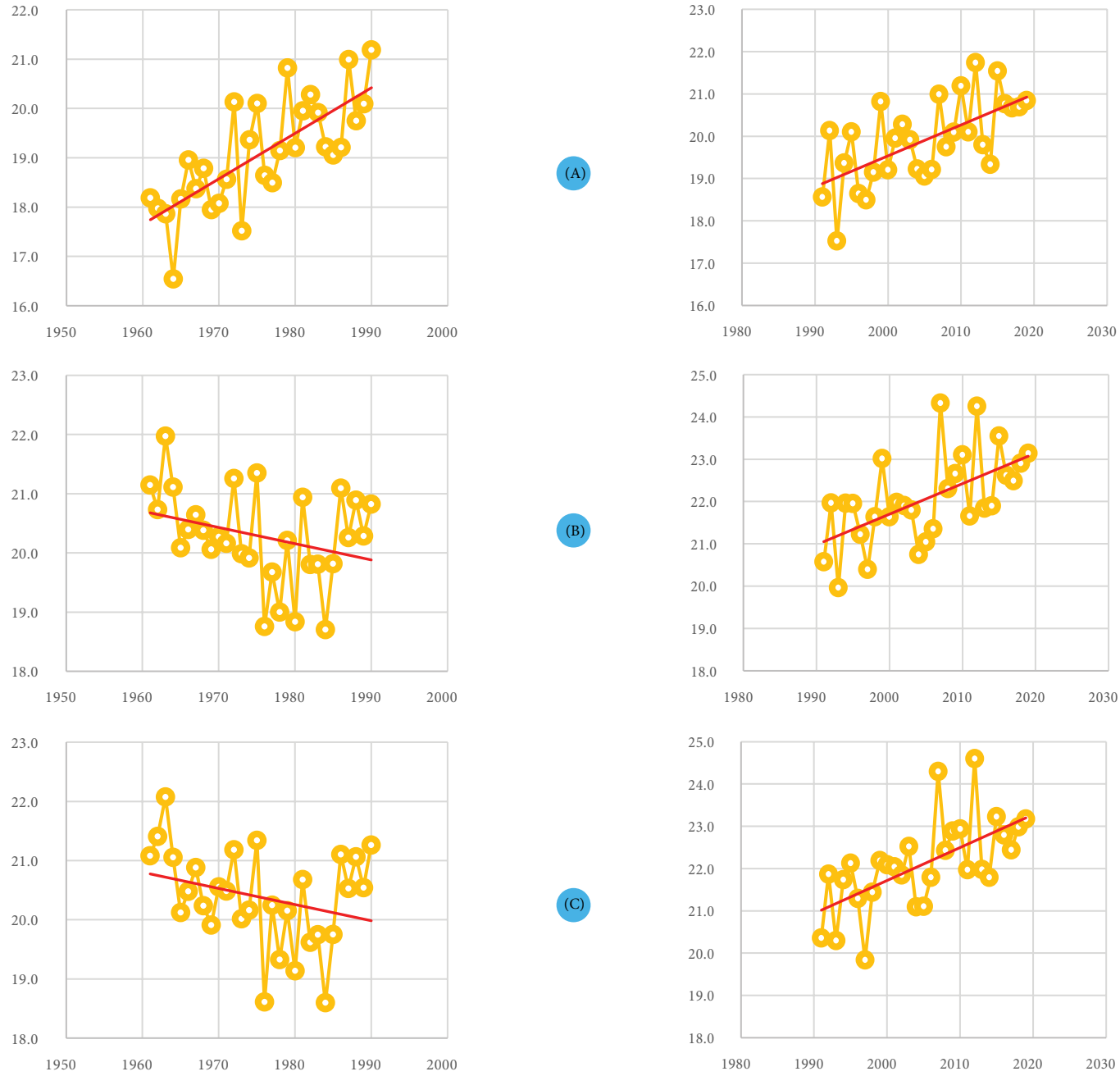
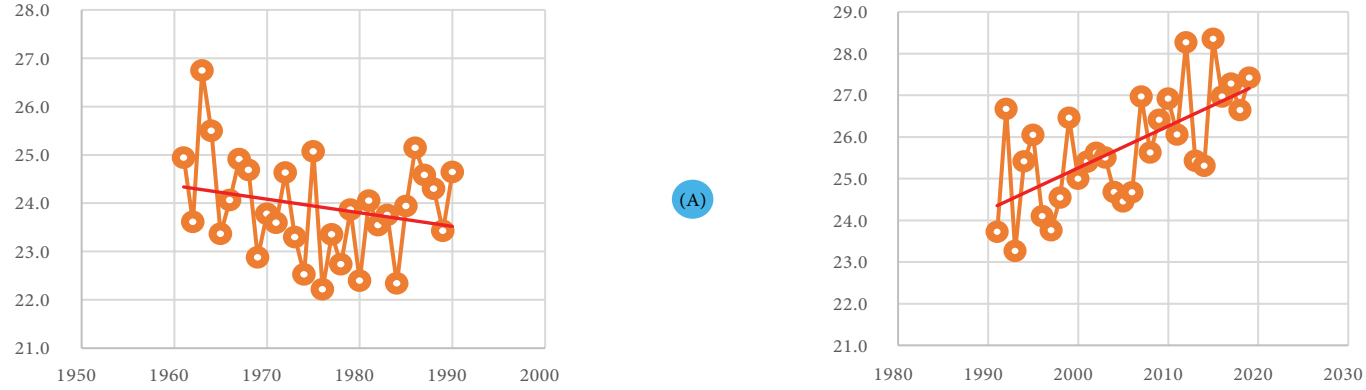


Figure 1-9: Trends in summer mean air temperature for two climatic periods (1961-1990 and 1991-2019): (A) Briceni - North, (B) Chisinau - Centre, (C) Cahul - South.

The largest annual increase in temperature during the summer season for the 1991-2019 period is recorded due to T_{max} by +1.06°C per decade in the southern area, compared to only +0.92°C per decade in the northern area (Fig. 1-10), and compared to the lower increase in T_{min} from + 0.53°C per decade in the northern area to +0.86°C per decade in the southern area.



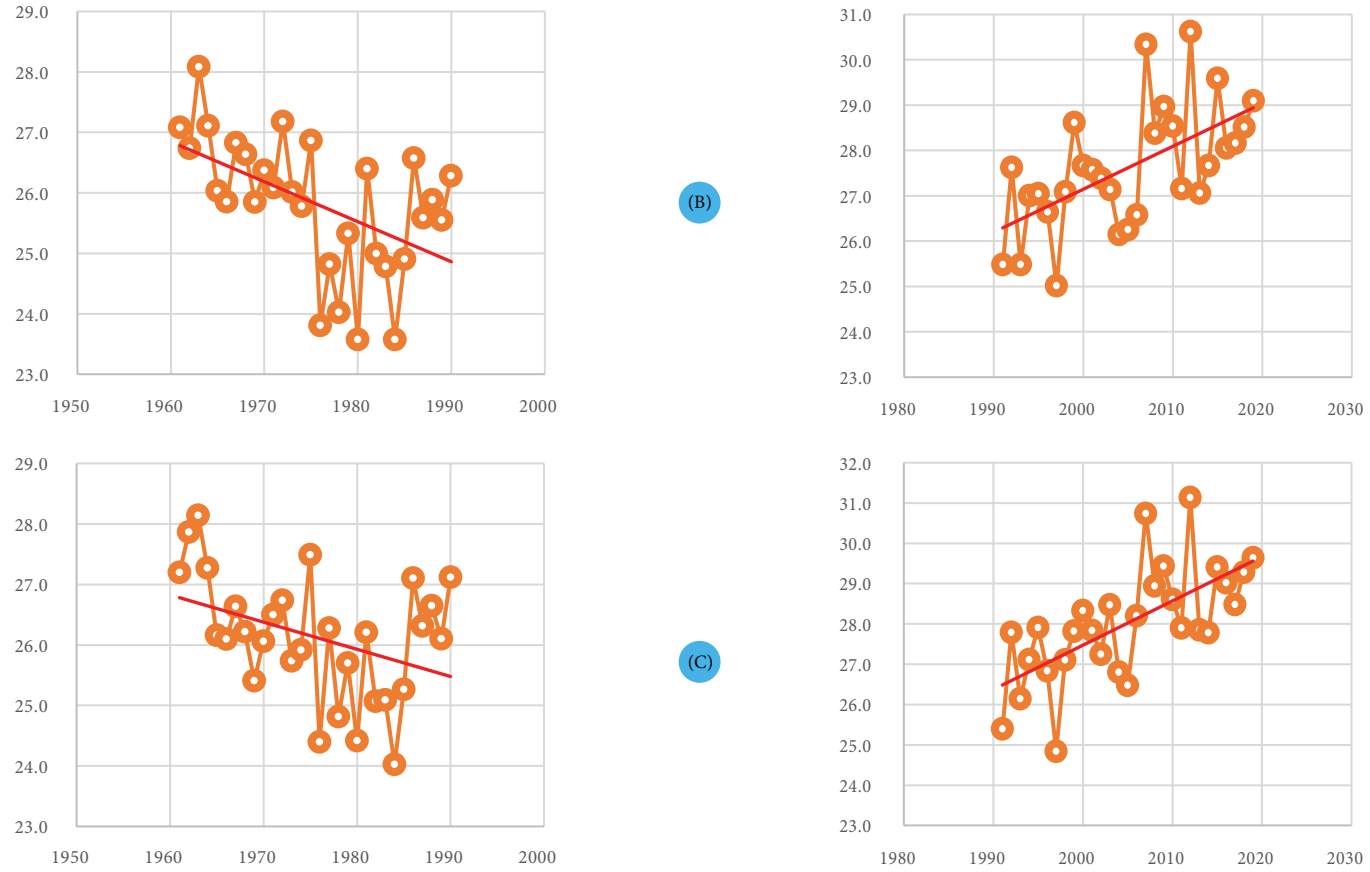
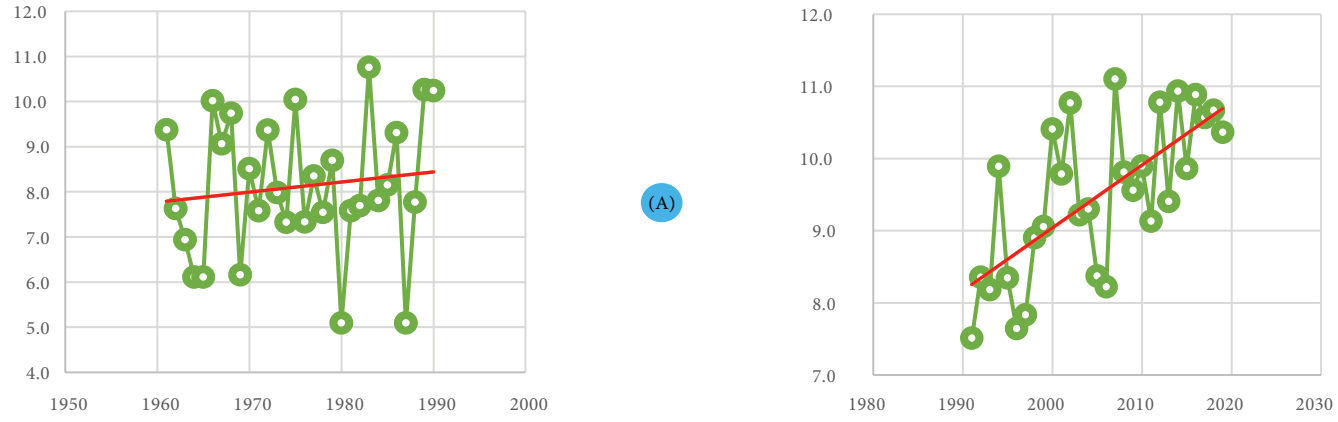


Figure 1-10: Trends in summer max air temperature for two climatic periods (1961-1990 and 1991-2019): (A) Briceni - North, (B) Chisinau - Centre, (C) Cahul - South.

During transition seasons, for the 1991-2019 period, the largest statistically significant increase in temperature is observed for T_{max} in the spring, from +1.1°C (north) to +1.3°C (south) per decade (Figure 1-12), a smaller increase in temperature being observed during autumn, from +0.9°C (center) to +1.2°C (south) per decade, while T_{min} shows an upward trend for the autumn from +0.6°C (north) to +0.9°C (south) per decade, and for spring from +0.6°C (north) to +0.8°C (south) per decade.



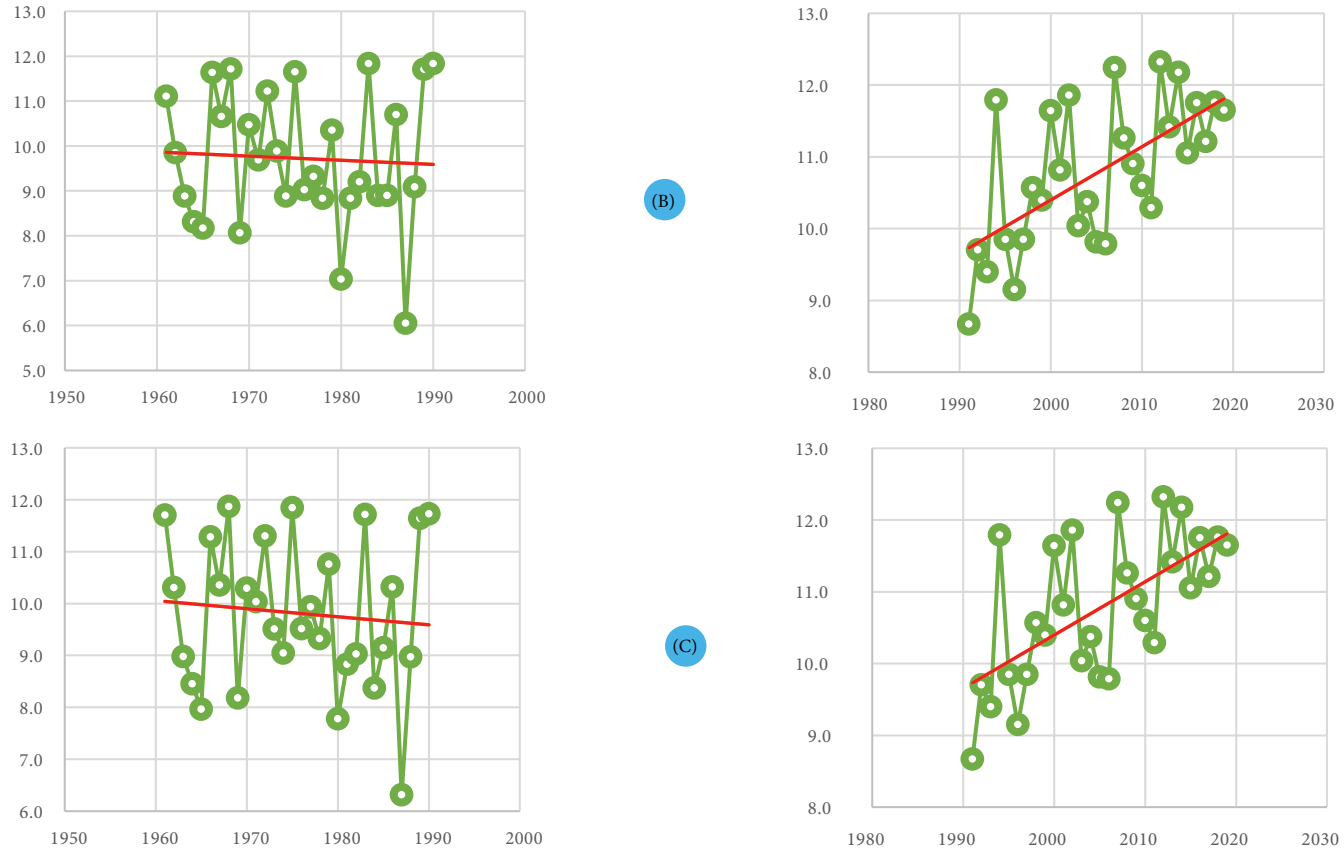


Figure 1-11: Trends in spring mean air temperature T_{avg} for two climatic periods (1961-1990 and 1991-2019): (A) Briceni – North, (B) Chisinau – Centre, (C) Cahul – South.

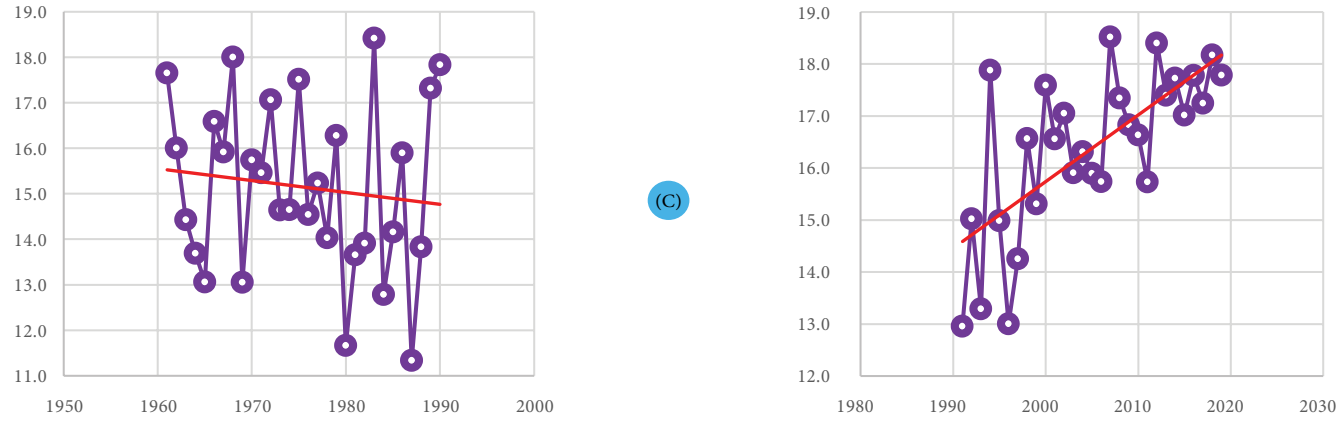


Figure 1-12: Trends in spring max air temperature T_{max} for two climatic periods (1961-1990 and 1991-2019): (A) Briceni – North, (B) Chisinau – Centre, (C) Cahul – South.

Figure 1-13: Trends in autumn mean air temperature T_{avg} for two climatic periods (1961-1990 and 1991-2019): (A) Briceni – North, (B) Chisinau – Centre, (C) Cahul – South.

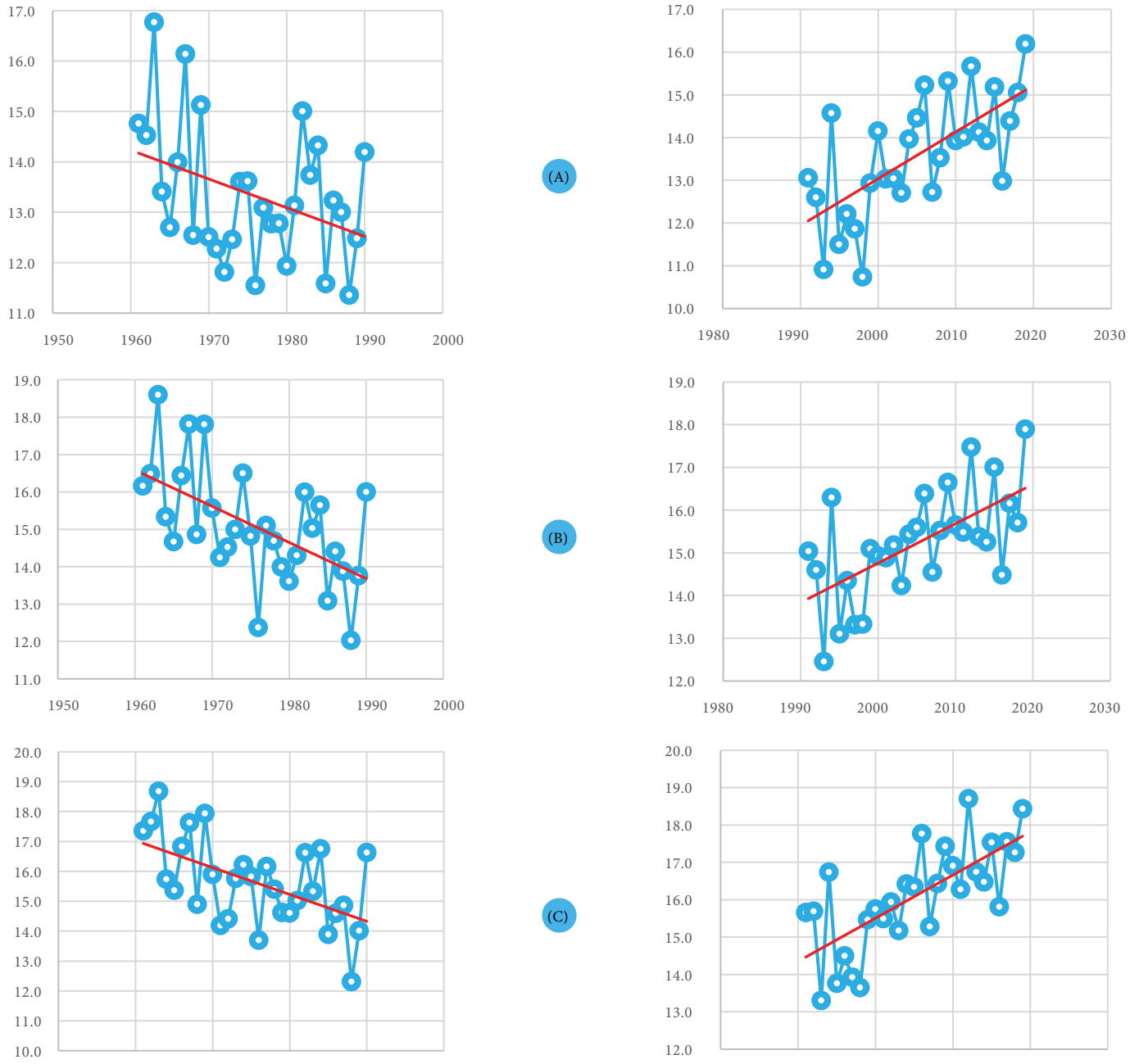
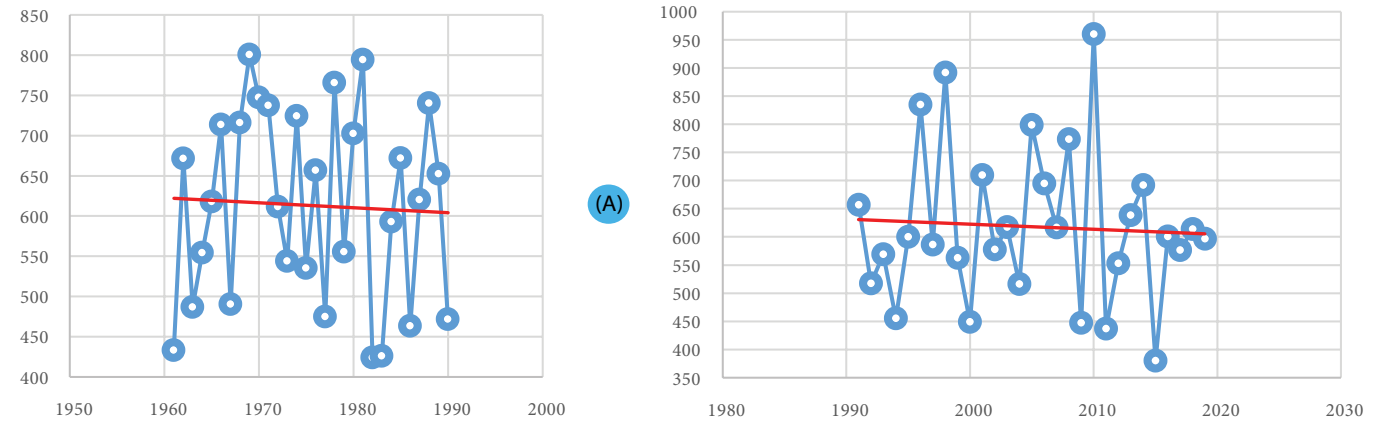


Figure 1-14: Trends in autumn max air temperature T_{max} for two climatic periods (1961-1990 and 1991-2019): (A) Briceni - North, (B) Chisinau - Centre, (C) Cahul - South.

Unlike temperature, no statistically significant changes are found in case of precipitation, only increasing or decreasing trends in annual total precipitation in the analyzed time periods can be observed (Fig. 1-15).



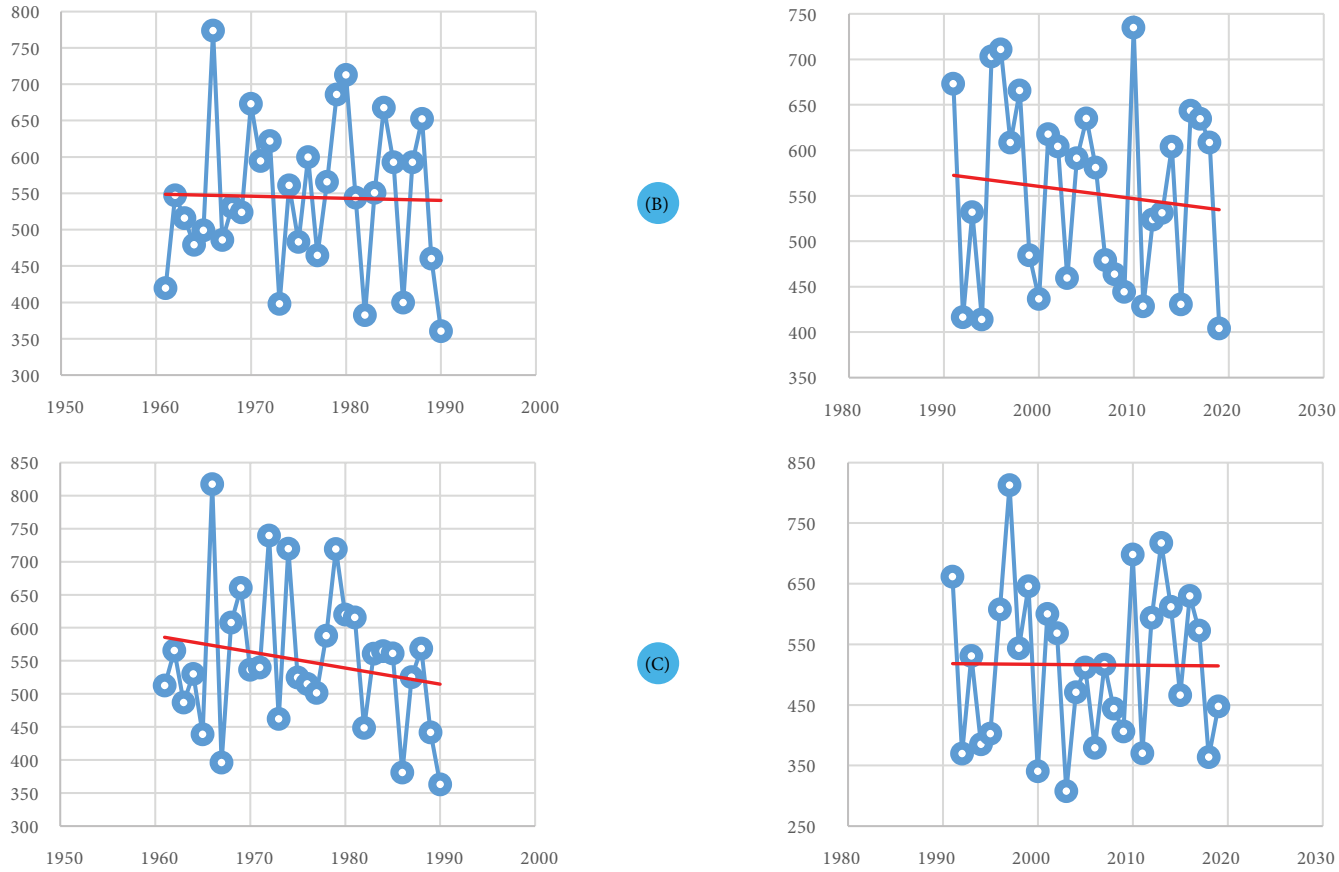


Figure 1-15: Trends in annual total precipitation for two climatic periods (1961-1990 and 1991-2019): (A) Briceni - North, (B) Chisinau - Centre, (C) Cahul - South.

Thus, over the 1991-2019 period, there was a slight downward trend in mean annual precipitation, from -9.2 mm (north) to -13.5 mm (center) per decade, while for winter precipitation, the trend is slightly upward, from +2.6 mm (north) to +11.5 mm (south) per decade; to be compared to the annual trend of decreasing precipitation, from -6.2 mm (north) to -24.5 mm (south) per decade, respectively, and to the decreasing trend in winter precipitation, from -9.0 to -16.3 mm per decade, for the 1961-1990 period. Moreover, a trend of decreasing precipitation from 6.0 mm (north) to 19.2 mm (south) per decade during the summer is observed for the 1991-2019 period, to be compared to the trend of slight increase, from +10.6 mm (north) to +12.7 mm (south) per decade for the 1961-1990 period.

With reference to the observed trends in the number of Cooling Degrees-Days (CDD)[26], a weather-based technical index designed to describe the need for the cooling (air-conditioning) requirements of buildings, respectively, the trends observed in the number of Heat Degrees-Days (HDD)[27], a weather-based technical index designed to describe the need for the heating energy requirements of buildings, calculated by linear regression analysis for two distinct time periods (1961-1990 and 1991-2019), the following patterns have been revealed for the Republic of Moldova's geographical zones, as described below.

A slight decrease in the number of cooling degrees-days (CDD), from -13.4 (north) to -25.4 (south) degrees-days per decade was observed for the period 1961-1990, followed by a significant increasing trend in the number of cooling degrees-days (CDD) for the 1991-2019 period, from +63.5 (North) to +91.8 (South) degrees-days per decade (Fig. 1-16).

A pronounced decreasing trend in the number of heating degrees-days (HDD) was found for the 1991-2019 period, ranging from -158.7 degrees-days per decade in the central area, to -203.9 degrees-days per decade in the northern area, respectively up to -232.25 degrees-days per decade in the southern area, to be compared to the 1961-1990 period, when a decreasing trend was observed only in the northern area, with -52.1 degrees-days per decade (Fig. 1-17).

[26] CDD index: the severity of the heat in a specific time period taking into consideration outdoor temperature and average room temperature (in other words, the need for cooling). The calculation of CDD relies on the base temperature, defined as the highest daily mean air temperature not leading to indoor cooling. The value of the base temperature depends in principle on several factors associated with the building and the surrounding environment. CDD is a measure of the energy demand needed to cool a building calculated as an annual sum of TM - n (where n is a user-defined location-specific base temperature and TM > n), n=180C.

[27] HDD index: the severity of the cold in a specific time period taking into consideration outdoor temperature and average room temperature (in other words, the need for heating). The calculation of HDD relies on the base temperature, defined as the lowest daily mean air temperature not leading to indoor heating. The value of the base temperature depends in principle on several factors associated with the building and the surrounding environment. HDD is a measure of the energy demand needed to heat a building calculated as an annual sum of n - TM (where n is a user-defined location-specific base temperature and TM < n), n=180C.

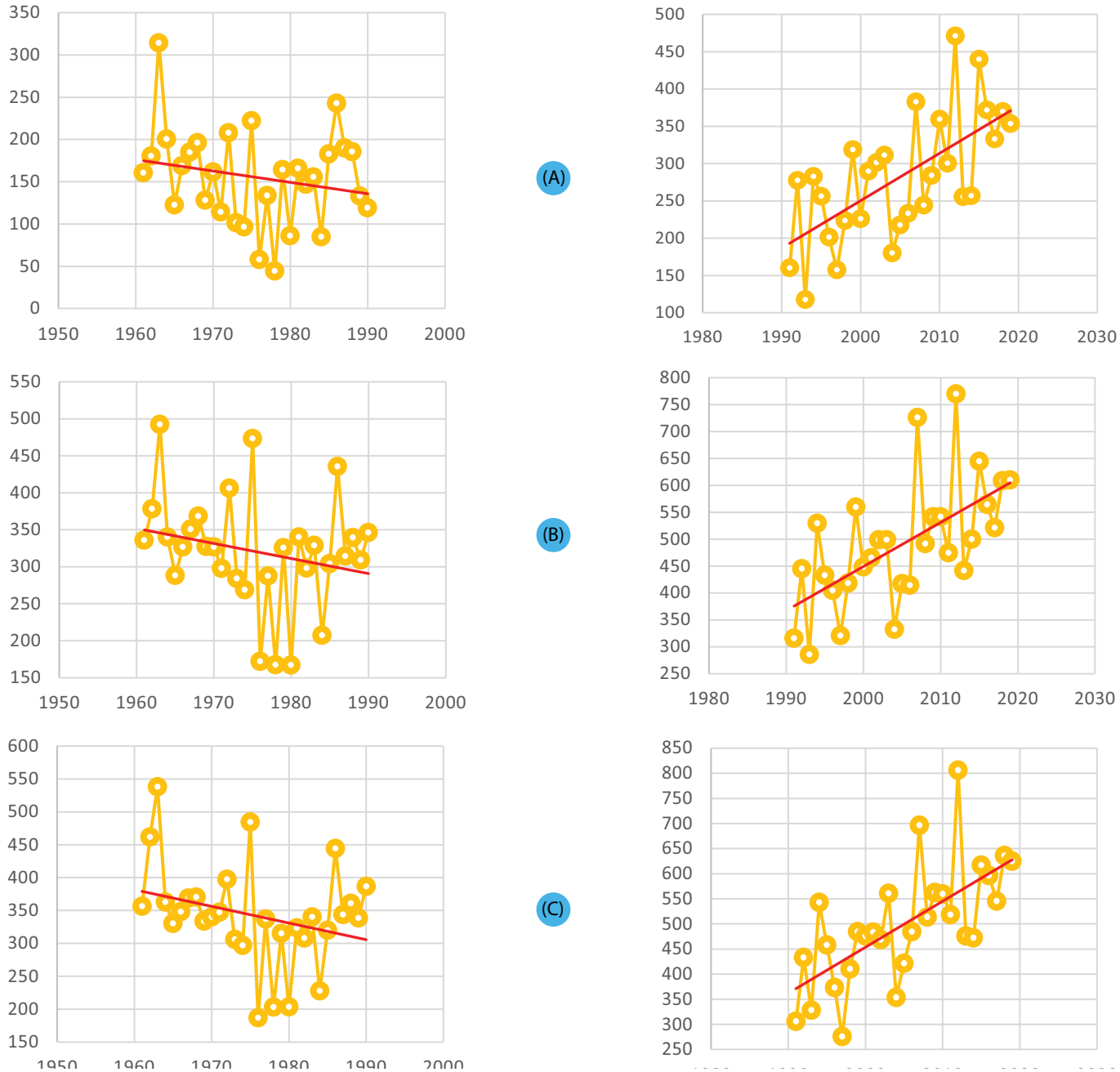
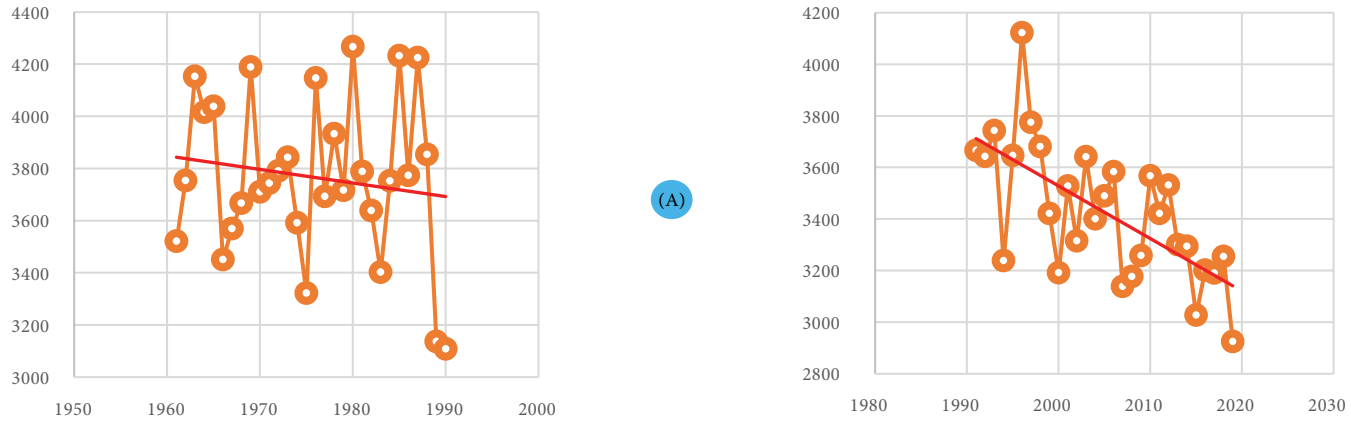


Figure 1-16: Trends in the number of cooling degrees-days (CDD) for two climatic periods (1961-1990 and 1991-2019): (A) Briceni - North, (B) Chisinau - Centre, (C) Cahul - South.



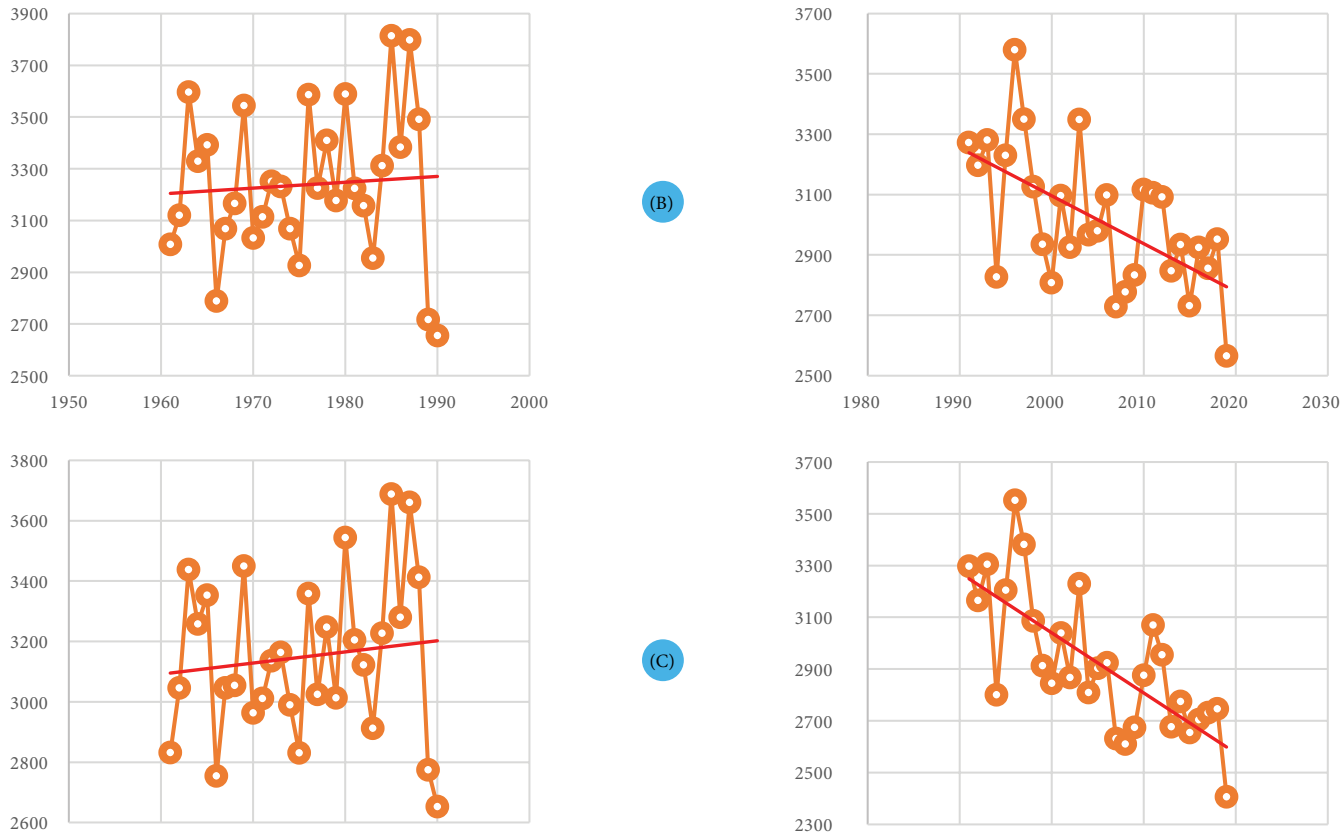


Figure 1-17: Trends in annual heating degree-days (HDD) for two climatic periods (1961-1990 and 1991-2019): (A) Briceni – North, (B) Chisinau – Centre, (C) Cahul – South.

1.5. Economic Profile

After the breakup of the Soviet Union and declaration of independence, the Republic of Moldova was affected by a crisis of unprecedented size, even in comparison with other countries with transition economies. In 1991, the Republic of Moldova pertained to the group of low-income countries, while currently it is one of the lowest income countries in Europe with a gross domestic product (GDP) per capita below the average of the Commonwealth of Independent States (CIS) and Central European Countries. Structurally, its economy is more like that of Central Asia countries than the economy of other states in the western part of the former USSR.

1.5.1. Gross Domestic Product

The secession of the industrialized ATULBD in 1992 left the Republic of Moldova with an undiversified economic base, almost entirely dependent on agricultural and food production. In 1995, the agricultural sector accounted for 29.3% of GDP, and the extractive and processing industry - 22.5% of GDP. In 2019, the share of agriculture decreased to 10.1% of GDP, and that of the extractive and processing industry – to 11.1% of GDP (Tab. 1-8).

Table 1-8: GDP structure in the Republic of Moldova during the 1995-2019 period, %

	1995	2000	2005	2010	2015	2016	2017	2018	2019
Structure (in %)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Gross added value	88.6	87.5	84.0	86.1	87.2	87.6	86.5	86.5	86.9
Goods - total	54.2	41.9	32.2	24.9	27.0	26.8	26.4	25.0	24.1
Agriculture	29.3	25.4	16.4	11.2	11.5	11.4	11.5	10.3	10.1
Extractive and processing industry	22.5	14.1	13.5	10.2	12.2	12.1	11.8	11.4	11.1
Production, distribution and supply of energy, gas, hot water	2.0	1.8	2.0	2.9	2.5	2.5	2.4	2.5	2.2
Water distribution; sanitation	0.5	0.5	0.4	0.7	0.8	0.8	0.8	0.8	0.8
Services - total	36.7	48.0	53.8	61.2	60.2	60.8	60.1	61.5	62.8
Wholesale and retail trade	8.0	12.5	10.4	12.6	13.8	14.3	15.0	15.2	15.7
Transport and storage	2.9	4.5	5.0	4.1	4.6	4.8	4.7	4.9	4.9
Construction	3.5	2.7	3.3	6.7	7.2	6.9	6.9	7.9	8.7
Financial activity	3.7	5.3	4.6	4.0	2.5	3.3	3.2	3.1	3.4
Other sectors	18.6	23.1	30.4	33.9	32.1	31.6	30.3	30.3	30.1
Intermediation services	-2.2	-2.4	-2.0						
Net taxes on product and import	11.4	12.5	16.0	13.9	12.8	12.4	13.5	13.5	13.1

Source: National Institute for Economic Research of the ASM and the Ministry of Economy and Infrastructure (December 2020).

It is noteworthy that the economy was in decline before 1991, but the separation from the USSR hastened the process. GDP has been steadily declining since 1990 and up to 1999 including the year of 1999, when it reached 34% of the level recorded in 1990. The only exception occurred in 1997 when, due to excellent agricultural production, determined by favorable climatic conditions, there was a slight 1.6% increase as compared to the previous year.

There were numerous reasons for the economic collapse.

First, the Republic of Moldova was fully integrated in the Soviet economic system, and independence led, among other things, to cessation of any subsidies or transfers from the centralized government.

Second, the end of the Soviet era with well-established trade links led to many barriers to free movement of goods and to restrictions on access introduced by emerging markets.

Third, the lack of energy resources and raw materials made the country's economy highly dependent on the rest of the former USSR. This dependence has generated shocks in the field of imports, due to rising prices for energy resources in the Russian Federation. Finally, the internal reasons should be mentioned: transition from a centralized economy to a market economy, loss of industries located in the Transnistria area, frequent droughts and civil conflict.

However, the considerable steady increase in GDP since 2000 (except for 2009, when the Republic of Moldova was affected by a regional economic crisis, and in 2012 and 2015, when the Republic of Moldova was affected by severe droughts) shows that the economic recovery took place, although it must be remembered that, according to the latest available data, in 2019 the value of GDP was only 81.3% of that of 1990 (Tab. 1-9).

Table 1-9: GDP in the RM for the 1990-2019 period, billion MDL

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
GDP, billion MDL (real)	13.0	6.5	16.0	37.7	86.3	145.8	160.8	178.9	192.5	210.4
In %, compared to the previous year	97.6	98.6	102.1	107.5	107.1	99.7	104.4	104.7	104.3	103.6
In %, compared to 1990	100.0	39.4	34.8	49.0	57.4	68.9	71.9	75.3	78.5	81.3

Source: National Institute for Economic Research of the ASM and the Ministry of Economy and Infrastructure (December 2020).

Table 1-10: GDP in the RM for the 1990-2019 period, billion 2015 US $

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
GDP, billion 2015 US $	11.250	4.435	3.913	5.508	6.452	7.745	8.087	8.466	8.830	9.135
In %, compared to the previous year	97.6	98.6	102.1	107.5	107.1	99.7	104.4	104.7	104.3	103.6

Source: situation as of 08/01/2021, <https://www.ers.usda.gov/data-products/international-macroeconomic-data-set.aspx#.UXFRIKJTCQo>

Table 1-11: GDP in the RM for the 1995-2019 period, billion US $

	1995	2000	2005	2010	2015	2016	2017	2018	2019
GDP, billion US $ (real)	**1.441**	**1.288**	**2.988**	**6.977**	**7.746**	**8.071**	**9.674**	**11.457**	**11.965**
in %, as compared to previous year	123.7	110.0	115.0	128.3	81.5	104.2	119.9	118.4	104.4
GDP, billion US $ (PPP)	**7.586**	**7.687**	**8.492**	**13.258**	**26.145**	**29.998**	**32.101**	**34.252**	**36.356**
in %, as compared to previous year	69.3	103.7	116.2	131.4	100.7	114.7	107.0	106.7	106.1
GDP calculated per capita, thou. MDL	**1.798**	**4.401**	**10.473**	**24.221**	**51.421**	**57.389**	**64.926**	**71.083**	**78.983**
in %, as compared to previous year	100.7	102.3	107.8	129.1	100.5	105.6	106.5	106.1	105.3
GDP calculated per capita, thou US $	**0.400**	**0.354**	**0.831**	**1.959**	**2.733**	**2.880**	**3.511**	**4.230**	**4.493**
GDP calculated per capita, thou US $ (PPP)	2.105	2.112	2.362	3.722	6.027	6.379	6.803	7.168	13.651

Source: National Institute for Economic Research of the ASM and the Ministry of Economy and Infrastructure (December 2020).

In addition, the substantial cash flow from Moldovans working abroad has somewhat reduced the effect of declining economic activity.

Moldova's spending on imports by far exceeds the country's export earnings, causing a very serious trade deficit (Tab. 1-12). This deficit amounted to 23.7% of GDP in 2000 and it was over 25.6% of GDP in 2019.

1.5.2. Trade Balance Deficit

Table 1-12: Trade balance deficit of the Republic of Moldova for the 1995-2019 period

	1995	2000	2005	2010	2015	2016	2017	2018	2019
GDP, billion US $	1.441	1.288	2.988	6.977	7.746	8.071	9.674	11.457	11.965
Export (C.I.F.), billion US $	0.746	0.471	1.091	1.541	1.967	2.045	2.425	2.706	2.779
in %, as compared to previous year	131.9	101.7	110.7	120.1	84.1	104.0	118.6	111.6	102.7
Import (F.O.B.), billion US $	0.841	0.776	2.292	3.855	3.987	4.020	4.831	5.760	5.842
in %, as compared to previous year	127.5	132.4	129.6	117.6	75.0	100.8	120.2	119.2	101.4
Trade balance deficit, billion US $	-0.095	-0.305	-1.201	-2.314	-2.020	-1.976	-2.406	-3.054	-3.063
Degree of covering IMP with EXP, %	88.7	60.7	47.6	40.0	49.3	50.9	50.2	47.0	47.6
% of GDP: export	51.7	36.6	36.5	22.1	25.4	25.3	25.1	23.6	23.2
import	58.3	60.3	76.7	55.3	51.5	49.8	49.9	50.3	48.8
balance	-6.6	-23.7	-40.2	-33.2	-26.1	-24.5	-24.9	-26.7	-25.6

Source: National Institute for Economic Research of the ASM and the Ministry of Economy and Infrastructure (December 2020).

This reflects the country's dependence on import of energy resources and growth of demand for imported products (Tab. 1-13). Import growth is exacerbated by the massive inflow of remittances from abroad which are channeled towards domestic consumption.

Table 1-13: Structure of import by groups of goods for the 1997-2019 period, %

	1997	2000	2005	2010	2015	2016	2017	2018	2019
Total imports, including:	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Live animals and animal products	1.9	1.4	2.5	2.5	2.5	2.7	2.7	2.5	2.8
Vegetable products	**3.2**	**3.2**	**2.9**	**4.4**	**4.9**	**4.3**	**4.0**	**4.5**	**4.5**
Animal or vegetable fats and oils; processed fats; wax of animal or vegetal origin	0.4	0.3	0.4	0.5	0.5	0.6	0.5	0.4	0.3
Food; alcoholic and nonalcoholic drinks, vinegar; tobacco	**7.5**	**9.2**	**6.4**	**8.0**	**6.8**	**7.6**	**7.3**	**6.1**	**6.3**
Mineral products	**35.3**	**33.0**	**22.0**	**20.9**	**18.4**	**15.7**	**16.0**	**17.5**	**16.1**
Chemical products and from related industries	**9.6**	**9.6**	**10.1**	**10.5**	**12.4**	**12.5**	**11.9**	**11.3**	**11.8**
Plastics, rubber and articles thereof	**3.1**	**3.1**	**6.1**	**5.9**	**6.4**	**6.4**	**6.0**	**6.0**	**6.0**
Raw hides and skins, leather, fur skins and articles thereof	0.3	0.3	3.0	0.7	1.0	1.2	1.3	1.2	1.2
Wood, wood charcoal and articles of wood; cork and articles of cork; articles from straw, wicker-work from vegetal fibers or from twigs	1.7	1.3	1.9	1.9	2.1	2.1	2.2	2.1	2.2
Wood pulp or from other fibrous cellulosic materials; paper, cardboard, recycled from waste and scrap; paper, cardboard (waste and scrap) and articles thereof	4.1	3.6	3.6	2.6	1.9	2.0	1.8	1.8	1.9
Textiles and textile articles	**5.3**	**10.0**	**7.9**	**7.3**	**7.2**	**8.6**	**8.2**	**7.4**	**6.9**
Footwear, headgear, umbrellas; canes; whips and parts used for these; feathers and fluff) and articles thereof; articles from human hair	0.3	0.3	0.5	0.6	0.4	0.7	0.9	0.8	0.9
Articles of stone, gypsum, cement, asbestos, or from similar materials; ceramic, glass and articles from glass	3.9	2.1	2.9	2.6	2.6	2.6	2.5	2.4	2.4
Natural or cultured pearls, precious or semiprecious stones, plated metals or doubled with precious metals and articles thereof; imitation jewelry; coins	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Base metals and articles of base metals	**4.4**	**4.1**	**7.0**	**6.3**	**7.2**	**6.8**	**7.1**	**7.3**	**7.2**
Machinery and mechanical appliances, electrical equipment and parts used for these; equipment for recording and reproducing sounds and images	**12.9**	**12.7**	**13.7**	**14.9**	**15.8**	**16.0**	**16.6**	**17.7**	**18.1**
Vehicles, aircrafts, vessels and associated transport equipment	**3.0**	**2.0**	**5.7**	**6.2**	**4.8**	**5.8**	**6.1**	**6.5**	**6.7**
Optical, photographic or cinematographic instruments and apparatus, medical and surgical apparatus; instruments for watchmaking; musical instruments; parts and accessories for them	1.7	2.5	1.2	1.4	2.0	1.4	1.6	1.7	1.7
Miscellaneous manufactured articles	1.2	1.1	1.9	2.6	2.8	2.9	2.9	2.8	2.9
Art objects or antiques	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0

Source: National Bureau for Statistics. Statistical database (<http://www.statistica.md/category.php?l=ro&idc=336&>)

The range of exported products is relatively small, which require heavier efforts to penetrate Western markets. Exports are dominated by food and alcoholic beverages, textiles and associated products, vegetable products, base metals and products thereof, machinery and apparatus, electrical equipment, etc. In 2019, food and beverages, chemical and related products, textiles and related products, along with machinery, electrical appliances and equipment, other goods and miscellaneous products accounted for about 84.2% of total exports (Tab. 1- 14).

Table 1-14: Export structure by groups of goods for the 1997-2019 period, %

	1997	2000	2005	2010	2015	2016	2017	2018	2019
Total exports, including:	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Live animals and animal products	8.6	4.8	1.6	1.7	1.9	2.0	1.9	1.7	1.4
Vegetable products	**8.6**	**14.0**	**12.1**	**22.1**	**25.5**	**25.9**	**27.3**	**25.4**	**25.9**
Animal or vegetable fats and oils; processed fats; wax of animal or vegetal origin	0.9	0.8	3.5	3.1	3.7	2.7	2.2	2.5	2.5
Food; alcoholic and nonalcoholic drinks, vinegar; tobacco	**54.8**	**42.1**	**36.3**	**20.6**	**15.4**	**15.7**	**15.2**	**13.6**	**13.7**
Mineral products	0.4	0.6	1.8	1.1	0.9	0.7	1.2	1.2	0.9
Chemical products and from related industries	**1.5**	**1.8**	**1.4**	**4.8**	**6.1**	**4.4**	**4.1**	**3.8**	**4.3**
Plastics, rubber and articles thereof	0.6	0.4	1.1	1.7	2.1	1.7	1.4	1.5	1.7
Raw hides and skins, leather, fur skins and articles thereof	1.4	2.8	6.6	1.6	1.3	1.2	0.9	0.8	0.7
Wood, wood charcoal and articles of wood; cork and articles of cork; articles from straw, wicker-work from vegetal fibers or from twigs	0.1	0.2	0.2	0.4	0.4	0.5	0.4	0.7	0.8
Wood pulp or from other fibrous cellulosic materials; paper, cardboard, recycled from waste and scrap; paper, cardboard (waste and scrap) and articles thereof	0.4	0.4	1.1	0.8	0.5	0.6	0.5	0.6	0.6
Textiles and textile articles	**6.7**	**17.7**	**17.8**	**17.4**	**13.9**	**15.0**	**14.3**	**13.6**	**11.7**
Footwear, headgear, umbrellas; canes; whips and parts used for these; feathers and fluff) and articles thereof; articles from human hair	0.6	0.8	2.4	2.0	1.2	1.4	1.4	1.3	1.3
Articles of stone, gypsum, cement, asbestos, or from similar materials; ceramic, glass and articles from glass	1.4	3.1	1.7	2.3	2.1	2.2	1.7	2.1	2.0
Natural or cultured pearls, precious or semiprecious stones, plated metals or doubled with precious metals and articles thereof; imitation jewelry; coins	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Base metals and articles of base metals	1.0	2.5	4.5	3.8	2.2	2.1	2.0	1.7	1.6
Machinery and mechanical appliances, electrical equipment and parts used for these; equipment for recording and reproducing sounds and images	**5.2**	**5.1**	**4.2**	**11.1**	**15.0**	**14.6**	**16.1**	**20.9**	**22.4**
Vehicles, aircrafts, vessels and associated transport equipment	5.9	1.1	1.4	1.4	0.9	1.3	1.7	0.8	1.0
Optical, photographic or cinematographic instruments and apparatus, medical and surgical apparatus; instruments for watchmaking; musical instruments; parts and accessories for them	0.4	0.7	0.7	0.8	1.4	1.4	1.3	1.1	1.3
Miscellaneous manufactured articles	**1.4**	**1.1**	**1.6**	**3.3**	**5.5**	**6.5**	**6.4**	**6.6**	**6.1**
Art objects or antiques	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: National Bureau for Statistics. Statistical database (<http://www.statistica.md/category.php?l=ro&idc=336&>)

1.5.3. Cash Transfers and Remittances

Cash transfers from abroad, especially remittances from people working abroad, are of great importance for the economy of the Republic of Moldova. Globally, the Republic of Moldova is among leaders in terms of the share of remittances in GDP. In 2019, net inflows of foreign currency from Moldovans abroad amounted to about US $ 1.91 billion or about 16.0% of GDP (Tab. 1-15).

Table 1-15: Remittances from citizens working abroad for the 1997-2019 period

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
GDP, billion US $	1,928.7	1,697.9	1,170.8	1,288.4	1,480.7	1,661.8	1,980.9	2,598.2	2,988.2	3,408.1	4,402.5	6,056.3
Remittances, million US $	114.3	122.2	110.4	178.0	242.2	322.6	484.0	701.4	915.1	1,175.8	1,491.3	1,888.0
in %, as compared to previous year	131.3	106.9	90.3	161.2	136.1	133.2	150.0	144.9	130.5	128.5	126.8	126.6
in % of GDP	5.9	7.2	9.4	13.8	16.4	19.4	24.4	27.0	30.6	34.5	33.9	31.2
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**%**
GDP, billion US $	5,437.6	6,976.7	8,415.5	8,708.6	9,493.7	9,508.1	7,746.2	8,071.5	9,674.4	11,456.7	11,965.4	520.4
Remittances, million US $	1,352.4	1,752.8	1,813.1	1,986.4	2,191.5	2,075.9	1,540.1	1,467.2	1,637.9	1,837.6	1,909.6	1,570.7
in %, as compared to previous year	71.6	129.6	103.4	109.6	110.3	94.7	74.2	95.3	111.6	112.2	103.9	-20.8
in % of GDP	24.9	25.1	21.5	22.8	23.1	21.8	19.9	18.2	16.9	16.0	16.0	170.5

Source: World Bank, 2021 (<https://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT?end=2019&start=1990>)

Despite the trade deficit in goods and services, increasing amounts of money from the people working abroad have contributed to reducing the current account deficit of Moldova. The fact that the Republic of Moldova relies heavily on remittances from citizens working abroad is a potentially problematic and unsustainable issue, as the cash flow from abroad stimulates consumption to a greater extent than production, thus increasing imports and inflation, while in case of a rapid decline in the volume of remittances, an immediate negative shock to the economy is possible. Over the recent years, the amounts sent from abroad tend to decrease, as some immigrants settle permanently outside the borders of the Republic of Moldova.

1.5.4. Investment, International Investment Position and Gross External Debt

Investments are of a major importance in the process of economic growth of the Republic of Moldova. They have increased significantly as compared to previous years. In 2019, about 31.253 billion lei were invested in the national economy, the equivalent of about US $ 1.778 billion (14.9% of the GDP) (Tab. 1-16).

Table 1-16: Investments in the national economy during the 1993-2019 period

	1993	1995	2000	2005	2010	2015	2016	2017	2018	2019
Investment, billion MDL	0.171	0.845	1.759	7.797	13.805	21.123	19.664	23.498	27.465	31.253
Investment, billion US $	0.128	0.188	0.141	0.619	1.116	1.123	0.987	1.271	1.635	1.778
in % of GDP	9.4	13.0	11.0	20.7	16.0	14.5	12.2	13.1	14.3	14.9

Source: National Institute for Economic Research of the ASM and the Ministry of Economy and Infrastructure (December 2020).

At the same time, in 2019 Direct Net Foreign Investments (DFI) (net inflows) attracted to the national economy amounted to US $ 501.61 million (4.2% of GDP) (Tab. 1-17), well below the level of 2008, when foreign direct investment attracted to the national economy amounted to US $ 726.61 million (12.0% of GDP).

Table 1-17: Direct Net Foreign Investments (inflows) attracted to the national economy during the 1993-2019 period

	1993	1995	2000	2005	2010	2015	2016	2017	2018	2019
GDP, million US $	1,358.3	1,441.4	1,288.4	2,988.2	6,976.7	7,746.2	8,071.5	9,674.4	11,456.7	11,965.4
Foreign Direct Investment, million US $	14.000	66.910	127.540	190.700	290.230	225.565	88.390	149.520	288.690	501.610
in %, as compared to previous year	82.4	224.0	336.6	126.3	110.8	63.2	39.2	169.2	193.1	173.8
in % of GDP	1.0	4.6	9.9	6.4	4.2	2.9	1.1	1.5	2.5	4.2

Source: World Bank <https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD?locations=MD>

According to preliminary data, the international investment position of the Republic of Moldova, as of 31.12.2019, amounted to - US $ 5.084.65 million, the debt balance deepening compared to the end of 2018 by 21.1%. External financial assets amounted to US $ 5,315.89 million and they had decreased by 4.1% since the beginning of the year, while liabilities – US $ 10,400.54 million have increased by 6.8%. The ratio between the stock of external assets and liabilities was 51.1%, having decreased by 5.8% as compared to 2018[28].

During 2019, the stock of official reserve assets has increased by 2.2% as compared to the stock at the beginning of the year, amounting to US $ 3,059.63 million as of 31.12.2019. The volume of official reserve assets meets all sufficiency criteria: coverage of at least 3 months of imports of goods and services (coverage

[28] National Bank of Moldova, <https://www.bnm.md/ro/content/datoria-externa-la-sfarsitul-anului-2019-date-provizorii>.

of 5.6 months of actual imports); full coverage of short-term external debt by reserves (the coverage was 141.7%).

The stock of direct investment commitments has totaled US $ 4,836.36 million (a 16.2% increase as compared to the beginning of the year), representing 46.5% of total external liabilities. The stock of liabilities in form of loans (except for intragroup ones) has increased by 0.6% as compared to 31.12.2018 and it amounted to US $ 3,438.50 million, which represents 33.1% of total external commitments.

The gross external debt of the Republic of Moldova has increased as compared to the beginning of the year by 1.1% and it had registered US $ 7,545.57 million as of 31.12.2019, which is 63.1% of GDP (-2.1% compared to 31.12.2018). Public and publicly guaranteed external debt accounted for 25.4% of total external debt, amounting to US $ 1,919.15 million (-1.0% since the beginning of the year). Unsecured private external debt amounted to US $ 5,626.42 million, increasing by 1.8% as compared to 31.12.2018.

1.5.5. Social Sphere

In the Republic of Moldova, the average gross nominal monthly earnings per enterprise in the real sector, with 4 or more employees, and in all budgetary institutions, in 2020 amounted to 8,107.5 lei, increasing by 10.2% as compared to 2019 (7,356.1 lei) (Tab. 1-18).

Table 1-18: Average monthly salary and average monthly pension for the 1993-2019 period

	1993	1995	2000	2005	2010	2015	2016	2017	2018	2019
Nominal salary, MDL	**31.2**	**143.2**	**407.9**	**1,318.7**	**2,971.7**	**4,610.9**	**5,084.0**	**5,697.1**	**6,446.4**	**7,356.1**
Nominal salary growth, %	897.3	132.1	133.9	119.5	108.2	111.0	110.1	111.8	112.2	115.4
Real salary growth, %	69.9	101.6	102.1	106.8	100.7	101.2	103.5	104.9	108.9	110.1
Nominal salary, US $	**23.3**	**31.9**	**32.8**	**104.7**	**240.3**	**241.2**	**250.8**	**302.2**	**373.0**	**411.5**
Real salary growth, US $, %		119.5	113.4	117.0	97.2	82.8	104.0	120.5	123.4	110.3
Nominal salary, US $ (PPP)	**185.6**	**167.7**	**195.7**	**297.4**	**456.7**	**532.0**	**555.5**	**585.5**	**632.1**	**1,250.2**
Real salary growth, US $ (PPP), %		66.9	106.8	118.2	98.6	101.6	104.4	105.4	108.0	197.8
Old age pension, MDL	18.8	64.3	85.1	383.4	810.9	1,165.2	1,275.2	1,527.9	1,709.2	1,901.1
Old age pension, US $	**14.0**	**14.3**	**6.9**	**30.4**	**65.6**	**61.9**	**64.0**	**82.6**	**101.7**	**108.1**

Source: National Institute for Economic Research of the ASM and the Ministry of Economy and Infrastructure (December 2020).

In the fourth quarter of 2020, the average gross monthly nominal earnings amounted to 8,859.9 lei, a 9.7% increase compared to the previous quarter and a 13.4% increase compared to the fourth quarter of 2019 (7,813.1 lei). The highest average monthly earnings in the fourth quarter of 2020 were registered in the following sectors: information and communications - 20,310.8 lei; financial and insurance activities - 16,006.0 lei; production and supply of electricity and heat, gas, hot water and air conditioning - 14,385.6 lei. The lowest values of the average monthly earnings were registered in: accommodation and public catering activities - 5,141.8 lei; agriculture, forestry and fishing - 5,553.0 lei; art, recreation and leisure activities - 6,310.0 lei. As compared to the fourth quarter of 2019, in most economic activities increases were recorded in earnings, the most significant of them in: health and social assistance - by 32.9%; education - by 20.1%; public administration and defense; mandatory social insurance - by 19.8%; art, recreation and leisure activities - by 19.6%. Decreases in earnings were registered in the activities: accommodation and catering activities - by 6.7%; transport and storage - by 4.2%.

In the state budget sector in the fourth quarter of 2020 the average monthly salary was 7,949.3 lei (+ 21.1% as compared to the fourth quarter of 2019), and in the economic sector (real) - 9,198.9 lei (+ 11.0% as compared to the fourth quarter of the year 2019).

The real earnings index in 2020 as compared to 2019 (calculated as the ratio between the gross earnings index and the consumer price index) was 106.2%. The real earnings index in the fourth quarter of 2020 as compared to the fourth quarter of 2019 was 112.3%.

The average number of employees in the fourth quarter of 2020 as compared to the fourth quarter of 2019 has decreased by 1.8%. Decreases in the average number of employees were registered in most of the economic activities. The most significant decreases were registered in: accommodation and public catering activities - by 24.5%; transport and storage - by 7.4%; administrative and support service activities and manufacturing - by 6.2% each. The most significant increases in the average number of employees in the fourth quarter of 2020 as compared to the fourth quarter of 2019 were registered in: other services - by 21.7%; construction - by 4.2%; information and communications - by 4.1%.

In 2020, the labor force (active population) of the Republic of Moldova, which includes the employed population plus the unemployed, amounted to 867.3 thousand people, decreasing by 5.7% as compared to 2019 (919.3 thousand) (Tab. 1-19). Within the labor force, the share of men (52.4%) was higher compared to that of women (47.6%), and the share of economically active people in rural areas was higher than the share in urban areas (54.4% and, respectively, 45.6%).

Table 1-19: Evolution of population aged 15 and over in participating in economic activity in the Republic of Moldova during the 2016-2020 period, thousand people

	2016	2017	2018	2019	2020
Labor force (active population)	**1035.3**	**999.7**	**1018.1**	**919.3**	**867.3**
Employed population	**993.7**	**960.8**	**988.5**	**872.4**	**834.2**
Underemployed persons	68.9	63.2	29.3	34.1	41.2
Unemployed according to ILO	**41.6**	**38.9**	**29.6**	**46.9**	**33.1**
Population outside the labor market	**1277.9**	**1267.6**	**1202.1**	**1255.9**	**1283.6**
Persons who do not want to work	1122.6	1108.4	1039.7	1126.3	1177.9
Pensioners	534.2	527.7	503.9	566.2	580.2
Pupils or students	209.2	193.4	176.9	161.1	167.6
Domestic worker/family carer	147.1	145.4	135.7	161.7	166.7
Intending to leave for work abroad/have a job abroad	133.2	162.2	144.3	140.6	151.1
Persons who are abroad for work for less than one year	128.8	140.6	147.4	105.9	90.4
Potential labor force	14.5	9.7	18.4	16.9	9.6
Young NEETs	216.4	151.8	127.1	135.0	120.9
Unemployed	15.8	13.2	9.3	13.6	8.2
Domestic worker/family carer	64.0	62.7	56.4	63.0	55.0
Intending to leave for work abroad/have a job abroad	44.4	53.0	39.1	34.3	34.6
Rate of participation in labor force	**44.8**	**44.1**	**45.9**	**42.3**	**40.3**
Employment rate	**43.0**	**42.4**	**44.5**	**40.1**	**38.8**
Underemployment rate	6.9	6.6	3.0	3.9	4.9

The participation rate in labor force of the population aged 15 and over (the proportion of the workforce aged 15 and over in the total population of the same age category) was 40.3%, a decrease when compared to previous year (in 2019 - 42.3%). This indicator reached higher values among male population - 45.1%, as compared to female population - 36.1%. The respective average rates registered the following values: 46.5% in urban areas and 36.3% in rural areas. In the age category 15-29 this indicator was 31.4%, while in the 15-64 age category - 47.6%. The value of this indicator for working age population according to national legislation (age 16-59 for women and 16-63 for men) was 50.7%. The participation rate of people with disabilities in the labor force was 14.0%, including 13.3% for men, 14.8% for women, 15.6% in urban areas and 13.1% in rural areas.

The employed population was 834.2 thousand people, lower by 4.4% as compared to 2019 (872.4 thousand). As in the case of economically active population, the share of men is higher than that of women (52.1% for men and 47.9% for women), and the share of employed people in rural areas was higher than that of employed people in urban areas (54.7 % for rural and, respectively, 45.3% - for urban). The employment rate of the population aged 15 and over (the proportion of employed persons aged 15 and over compared to the total population in the same age category) was 38.8%, a decrease as compared to previous year (40.1% in 2019).

The employment rate of men (43.1%) was higher as compared to that of women (35.0%). In the distribution by residence area, this indicator was 44.4% in urban areas and 35.1% in rural areas. The employment rate of the working age population (age 16-59 for women and 16-63 years for men) was 48.6%, of the population aged 15-64 - 45.7%, and in the 15- 29 age category this indicator amounted to 29.4%

The analysis of employment rates by age groups reveals the largest gaps in people aged 25-34 both by sex (a 15.2% gap in favor of men) and by area of residence (13.8% higher for urban space). Large gaps in employment rates were recorded between sexes in the 55-64 age group (14.5% higher for men), and between residence areas in the 35-44 age group (11.1% higher for urban). A higher employment rate for women as compared to men was recorded only for people aged 45-54 (by 6.4%). The employment rate of people with disabilities was 13.7%. In the distribution by sex, this indicator showed the following figures: 12.8% for men and 14.7% for women. The employment rate of people with disabilities in urban areas was higher (14.9%) as compared to the rate for disabled people in rural areas (13.0%).

From the distribution of employed persons by economic activity, it results those 175.9 thousand persons or 21.1% of the total employed persons were active in the agricultural sector (in 2019 - 182.8 thousand and, respectively, 21.0%) (Tab. 1-20).

Table 1-20: Evolution of active population in the Republic of Moldova over the 2016-2020 period, thousand persons

	2016	2017	2018	2019	2020
Economic activities - total	**993.7**	**960.8**	**988.5**	**872.4**	**834.2**
Agriculture, forestry and fishing	363.4	341.4	388.6	182.8	**175.9**
Industry	114.6	107.3	108.4	128.0	121.4
Construction	48.3	43.4	45.7	61.4	60.4
Wholesale and retail trade; hospitality and public catering	150.3	154.3	143.3	163.8	148.4
Transport and storage, information and communication	59.7	55.3	54.4	59.9	61.5
Public administration, education, healthcare and social assistance	178.8	182.6	176.0	197.5	193.1
Other activities	78.5	76.5	72.2	78.9	73.5
Employment status					

	2016	2017	2018	2019	2020
Employee	606.2	604.2	589.2	678.4	651.8
Self-employed	333.1	314.2	353.1	153.5	143.4
Unremunerated family carers	48.8	39.2	43.3	36.9	35.9
Employers, members of production cooperatives	5.5	3.2	0.0	3.6	3.0
Statistical zones					
Chisinau municipality	262.9	251.5	247.1	266.8	246.6
Northern statistical zone	292.5	287.3	290.9	260.1	251.1
Central statistical zone	281.5	268.4	294.7	217.7	215.3
Southern statistical zone	156.8	153.6	155.8	127.8	121.2
Type of enterprise					
Formal sector enterprise	664.5	649.4	645.2	722.8	693.3
Informal sector enterprise	164.7	148.1	145.9	146.8	139.5
Household	164.5	163.2	197.3	0.0	1.4
Job type					
Formal job	613.1	605.2	595.9	670.6	647.5
Informal occupation	380.6	355.5	392.6	201.8	186.7

A number of 658.3 thousand people were employed in non-agricultural activities, decreasing by 4.5% as compared to 2019 (689.5 thousand). The share of persons employed in industry was 14.6% (in 2019 - 14.7%), including in the manufacturing industries 11.7% (in 2019 - 12.1%), and in construction 7.2% (in 2019 - 7.0%). The number of persons employed in industry was 121.4 thousand, decreasing as compared to previous year level by 5.2%, while in construction it was 60.4 thousand, having decreased by 1.6% as compared to 2019. In the services sector 476.5 thousand or 57.1% of the total number of employed persons were employed, their number decreasing by 4.7% as compared to 2019 (500.1 thousand or 57.3% of the total number of employed persons in 2019). In the distribution by forms of ownership, 70.2% of the employed population worked in the private sector and 29.8% - in the public sector (in 2019, 70.7% - in the private sector and, respectively, 29.3% - in the public sector).

The number of underemployed people (people who had a job with total number of hours actually worked during the reference period less than 40 hours per week, who wanted and were available to work more hours) was 41.2 thousand, which represents 4.9% of total employed persons, on the increase compared to previous year (3.9% in 2019). Of the total employed, 9.5% stated that they wanted to change the situation in relation to the current job on the grounds that they were not happy with the level of remuneration (inadequate situation in relation to income).

The number of unemployed, estimated according to the definition of the International Labor Organization (ILO), was 33.1 thousand, a decrease compared to the level of 2019 (46.9 thousand) (Tab. 1-19). Unemployment affected men to a greater extent, they accounting for 59.5% of total unemployed; the same was true for people in rural areas - 53.2%. The unemployment rate (the share of ILO unemployed in the labor force) at the country level was 3.8%, a decrease compared to 2019 (5.1%). The unemployment rate for men was 4.3%, and for women - 3.2%; in urban areas - 4.5% and in rural areas - 3.3%. Among people aged 15-24 the unemployment rate was 10.9%, the value of this indicator showing significant gaps by sex (12.3% in women, 9.9% - in men) and by residence medium (14.6% for urban, 7.0% - for rural), while in the 15-29 age category this indicator was 6.2%.

The population outside the labor force aged 15 and over, in 2020, amounted to 1283.6 thousand people or 59.7% of total population of the same age category, increasing by 2.2% as compared to 2019 (1255.9 thousand and, respectively, 57.7% of total population). By gender, the share of women (56.9%) was higher as compared to that of men (43.1%), and the share of inactive people in rural areas was higher than the share in urban areas (64.5% and, respectively, 35.5%).

Among the inactive population, the largest share, over 45.2%, belongs to the category of pensioners. They are followed by the group of pupils and students (13.1%) and the group of family caregivers (housewives) (13.0%). Other inactive people also include people who do not work and are not looking for a job in Moldova, because they already have a job abroad or are planning to work abroad (11.8% compared to 11.2% in 2019). Another group is made up of people (declared by households) as having gone abroad to work or looking for work for less than a year (7.0% or 90.4 thousand), the number of the latter having decreased by 14.6% as compared to 2019 (respectively, 8.4% or 105.8 thousand). The rest consists of other categories of population outside the labor force. People who have a job abroad or intend to go abroad and people who go abroad to work or look for work predominate among men (19.8% and 11.8%, respectively, for men compared to 5.7% and 3.4%, respectively, for women), and family care activities are more widely spread among women (21.9% compared to 1.2% for men).

In 2020, the share of young people who are not part of the employed population, do not study / study in the formal education system and do not participate in any courses or other training outside the formal education system (NEETs - persons Not in Employment, Education or Training) accounted for 17.6% of the total number of young people aged 15-24, 26.0% - among young people aged 15-29 and, respectively, 31.2% among those aged

15-34. In all these age groups, the indicator shows higher values among women as compared to men.

According to the data of the National Social Insurance Chamber, as of 1 January 2020, the number of pensioners was 696.0 thousand people. About 75% of the total pensioners were old age retired (524.5 thousand). Due to the higher share in the elderly population and due to longevity gaps between women and men, women accounted for 70.5% of the total number of age retired persons. People aged 60 and over accounted for a 93.4% share in total number of age pensioners, of which 68.5% were women.

The average size of the old-age pension as of 01.01.2020 was 1,843.0 lei, having increased as compared to previous five years by 54.6%. The average size of old-age pension for men was 2,157.8 lei, to be compared to 1,711.6 lei for women. Thus, the gender gap for old-age pensions amounted to 20.7%, to be compared to 17.8% at the beginning of 2016. The average subsistence minimum for pensioners in 2019 amounted to 1,707.4 lei, having increased by 8.5% as compared to previous year. The subsistence minimum for pensioners differs depending on the residence medium. Thus, for the pensioners from big cities it constituted 1,946.9 lei, to be compared to 1,717.5 lei for those from other cities and 1,623.9 lei for the pensioners in villages.

The average size of old-age pension covered the minimum subsistence level for pensioners in the proportion of 107.9% in 2019, to be compared to 82.9% in 2015. However, the average size of the old-age pension in the agricultural sector covered the value the subsistence minimum in the proportion of only 84.8%, to be compared to the non-agricultural sector - 119.6%. The amount of the minimum age pension as of 01.01.2020 was 1,079.3 lei and it covered the minimum subsistence for retirees in proportion of 63.2%. On the other hand, about 23.4% of old-age retirees were employed at the time when their pension was established.

The number of economically active elderly people (60 years and over) in 2019 was 82.3 thousand, which is 9.0% of total number of active people and 14.7% of total population in the same age group.

1.6. Current State of National Economy

1.6.1. Industry

The volume of industrial production manufactured in 2019 amounted to about 59.3 billion lei (in current prices). In January-December 2019, as compared to the same period of previous year, industrial production (gross series) was 2.0% higher (Tab. 1-21), due to growth in the manufacturing industry (+3.1%). At the same time, a decrease was recorded in the extractive industry (-1.9%) and in the production and supply of electricity and heat, gas, hot water and air conditioning (-4.0%).

Table 1-21: Evolution of the industrial sector in the Republic of Moldova for the 1990-2019 period

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Industry, billion MDL	11.5	22.2	129.8	1.2	3.7	4.3	4.7	5.9	6.0	7.2	8.2	10.4	12.6	16.0	17.6
in %, as compared to previous year		-11.1	-27.0	0.0	-27.8	-3.9	-6.5	0.0	-15.0	-11.6	7.7	13.7	10.8	15.6	8.2
in %, as compared to 1990		88.9	64.9	64.9	46.9	45.0	42.1	42.1	35.8	31.6	34.1	38.7	42.9	49.6	53.7
Industry, billion US $				0.885	0.921	0.949	1.019	1.274	1.113	0.683	0.657	0.810	0.930	1.145	1.427
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Industry, billion MDL	20.8	22.4	26.2	28.5	22.6	28.1	34.2	36.4	39.4	43.5	45.7	47.6	52.7	56.2	59.3
in %, as compared to previous year	6.7	-4.8	-1.3	1.5	-21.1	9.3	13.4	-2.4	8.6	7.3	0.6	0.9	3.4	3.7	2.0
in %, as compared to 1990	57.3	54.5	53.8	54.6	43.1	47.1	53.4	52.1	56.6	60.8	61.1	61.7	63.8	66.1	67.4
Industry, billion US $	1.648	1.704	2.157	2.747	2.038	2.276	2.913	3.002	3.130	3.102	2.426	2.389	2.851	3.345	3.375

Source: National Institute for Economic Research of the ASM and the Ministry of Economy and Infrastructure (December 2020).

During the years 1990-2019, the evolution of the industrial sector was fluctuating, the best results being registered in the years 2001, 2003 and 2011, negative results being recorded, respectively, in the years 1992, 1994, 1998, 1999, 2006, 2007, 2009 and 2012 (Fig. 1-18).

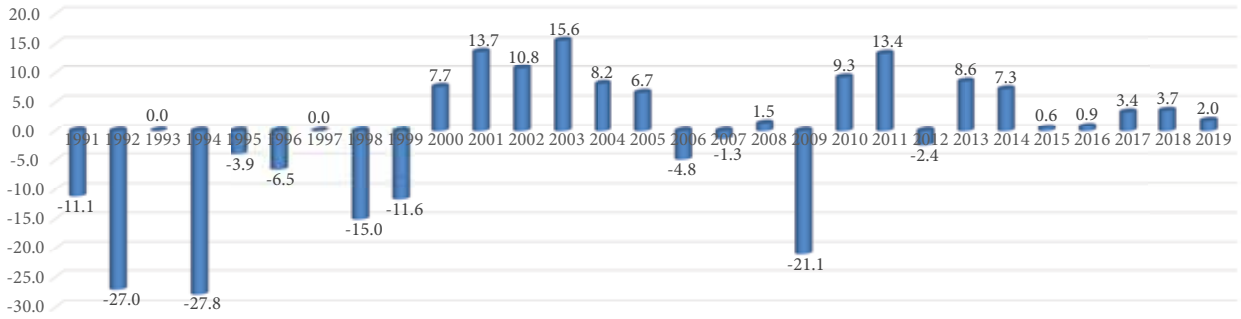


Figure 1-18: Evolution of the industry sector in the RM during the 1991-2019 period, %, as compared to previous year.

Manufacturing Industries

The situation in the industry sector of the economy is mainly determined by the activity of enterprises in the manufacturing industries, which in 2019 accounted for 84.0% of total production value, obtained from enterprises with main industrial activities, included in monthly statistical research. The level of production manufactured by these enterprises increased by 3.1% as compared to 2018. Within the manufacturing industries, the most representative activity is food and beverage industry.

Table 1-22: Production of main industrial products in the manufacturing industries of the Republic of Moldova (right bank of the Dniester River) for the 2005-2019 period

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Meat, thousand tons	5.9	23.7	27.8	31.0	34.5	43.1	44.6	44.2	54.3	60.1	60.5
..Poultry, thousand tons	2.3	12.5	14.0	16.7	21.3	26.6	28.5	29.6	36.2	40.5	40.8
Sausages, thousand tons	14.2	13.2	14.5	15.9	17.2	16.3	17.2	16.4	18.4	19.7	21.2
Canned meat, thousand tons	0.6	1.5	1.3	1.5	0.9	0.7	0.5	0.5	0.5	0.6	0.5
Fruit and vegetable juices, mil litters	25.6	27.1	29.7	46.1	49.1	49.1	39.2	49.7	55.7	63.2	81.8
..Unconcentrated juices	7.2	17.5	16.8	21.1	22.8	21.5	21.5	18.8	20.1	19.0	22.3
..Concentrated juices	14.6	9.7	12.9	25.0	26.2	27.6	17.7	30.9	35.6	44.2	59.5
Canned vegetables and fruits, thousand tons	33.0	29.9	26.3	24.3	25.1	30.4	15.7	16.7	19.6	25.6	17.9
Processed and preserved fruits, thousand tons	18.3	8.0	6.8	4.7	10.7	7.6	7.9	9.4	8.2	12.5	9.4
Chemically unchanged raw oils, thousand tons	83.2	80.7	89.7	93.5	53.9	109.6	109.5	79.9	86.8	106.2	124.6
Margarine, thousand tons	3.4	1.3	1.1	0.8	0.7	c	c	c	c	c	c
Milk and cream with fat content <6%, thousand tons	20.8	65.1	62.9	62.4	65.3	78.7	80.0	86.0	80.0	69.1	61.3
Milk and cream in solid form, thousand tons	4.6	1.2	0.6	0.5	0.4	1.0	1.4	1.7	2.5	2.3	0.9
Butter, thousand tons	3.4	4.2	3.9	3.8	4.2	4.7	4.8	5.9	4.8	3.9	3.9
Fatty cheeses, thousand tons	2.4	1.8	2.1	2.1	2.4	2.4	2.5	2.4	2.9	2.8	2.6
Sour milk, sour milk cream, yogurt, kefir, cream and other fermented products, thousand tons	21.0	25.6	27.3	27.3	30.2	31.5	32.7	32.7	31.1	29.5	29.5
Ice cream and other forms of ice with or without cocoa, mil litters	12.2	12.5	12.4	14.1	15.2	15.6	16.0	16.5	17.0	17.6	16.9
Flour, thousand tons	144.0	108.0	118.2	101.9	117.9	118.4	113.2	103.8	112.0	105.8	120.9
Groats, semolina and agglomerates, thousand tons	3.0	5.6	4.8	3.6	4.4	4.7	5.7	5.3	6.7	6.2	6.6
Fodder ready for livestock feed, thousand tons	48.8	71.6	73.3	94.9	96.3	97.3	79.0	95.4	87.5	85.6	70.8
Bread and bakery products, thousand tons	108.4	129.0	130.0	129.3	132.5	128.4	131.5	129.2	130.1	128.2	130.9
..Fresh bread	105.7	124.3	125.9	124.8	126.8	122.3	124.4	121.7	122.2	120.8	122.8
..Other bakery products	2.7	4.8	4.2	4.5	5.7	6.1	7.2	7.5	7.8	7.5	8.1
Confectionery flour products, thousand tons	19.8	26.9	28.3	30.6	33.9	34.0	33.6	34.4	35.4	36.8	39.1
Crystal sugar, thousand tons	133.5	103.2	88.4	83.4	140.3	177.7	84.5	100.0	129.0	73.9	86.9
Molasses, thousand tons	42.2	36.2	35.8	31.7	53.1	61.1	30.6	39.1	45.1	64.5	34.9
Sugar based confectionery, thousand tons	12.3	12.9	13.0	12.3	13.4	13.7	14.0	14.2	13.8	13.3	12.9
Pasta, thousand tons	7.8	6.3	6.5	5.6	6.3	5.6	5.7	5.0	4.2	3.8	3.8
Mayonnaise and other emulsified sauces, thousand tons	2.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.6	0.6
Divins, mil L 100% alcohol	4.8	1.8	2.4	3.1	3.5	2.8	2.2	1.4	2.3	2.6	2.7
Spirits and liqueurs, mil L 100% alcohol	8.1	2.7	2.7	3.0	3.9	3.7	3.1	3.1	2.8	2.8	2.6
..Vodka, mil L 100% alcohol	4.9	1.3	2.0	2.6	3.4	3.3	2.7	2.6	2.5	2.4	2.3
Sparkling wines, mil dal	1.1	0.6	0.7	0.7	0.6	0.5	0.5	0.6	0.6	0.7	0.7
Natural grape wines, mil. dal	36.3	12.7	12.5	14.1	15.3	13.9	13.4	13.3	16.3	17.0	17.6
Porto, Madeira, Sherry, Tokay wines and others, mil dal	3.2	1.1	1.1	0.5	0.7	0.3	0.4	0.5	0.4	0.2	0.2
Mineral and sparkling waters, mil. dal	9.6	11.6	10.8	10.7	9.5	10.8	11.9	12.6	14.0	15.4	16.6
Non-alcoholic beverages, mil. dal	6.4	6.5	7.2	7.2	6.4	6.4	6.5	4.6	4.8	5.1	5.2
Tobacco cigars and cigarettes or mixtures with tobacco substitutes, billion pcs.	c	c	c	4.7	3.5	2.3	1.8	1.8	1.4	0.7	0.7
Fermented tobacco, thousand tons	8.2	7.3	6.8	5.7	3.5	2.6	1.7	1.1	0.1	0.7	0.5
Fabrics, thousand m^2	116.0	55.0	20.0	10.0	13.0	-	-	-	-	18.3	10.0
Bed linen, tablecloths, toilet and kitchen linen, tons	103.1	144.3	139.5	125.2	283.0	370.1	434.8	444.5	270.9	199.0	209.3
Socks, mil pairs	1.1	1.3	1.5	1.6	1.1	1.6	2.0	2.0	1.7	1.3	1.3
Knitted items, million pcs.	17.0	20.2	17.2	18.6	18.2	16.9	15.2	16.6	23.0	23.6	20.1
Work clothes, mil pcs.	3.8	6.2	6.6	4.8	4.0	3.7	4.1	4.4	5.7	5.5	4.9
Coats, raincoats, jackets, capes, hoodies, blazers and similar articles (excluding knitted or crocheted ones), mil.	0.9	0.6	0.6	0.5	0.7	0.8	0.7	0.8	0.9	0.9	0.8
Suits and suit sets (excluding knitted or crocheted ones), mil pcs.	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Jackets, summer jackets and blazers (excl. knitted or crocheted ones), mil pcs.	0.5	0.5	0.5	0.6	0.5	0.7	0.7	0.5	0.4	0.4	0.3
Long and short pants, overalls and aprons (excluding knitted or crocheted ones), mil pcs.	2.5	1.8	1.6	1.3	1.2	1.3	1.1	1.4	1.7	2.0	1.3
Dresses and sundresses (excluding knitted or crocheted ones), mil pcs.	0.1	0.8	1.0	1.9	1.4	1.2	1.1	1.1	1.2	1.2	1.5
Skirts and trouser-skirts (excluding knitted or crocheted ones), mil pcs.	0.7	0.3	0.3	0.4	1.3	0.6	0.5	0.5	0.2	0.3	0.1
Blouses, shirts and shirt-blouses (excluding knitted and crocheted ones), mil pcs.	2.1	2.7	2.6	4.0	3.1	2.5	2.6	2.9	3.1	2.9	3.0
..Blouses, shirts and shirt blouses (excluding knitted or crocheted ones) for women and girls, mil pcs.	2.0	1.9	1.8	3.3	2.5	2.1	2.2	2.5	2.7	2.6	2.6

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Trunks, suitcases, portmanteaus and similar articles of any material, mil pcs.	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0
Women's bags, of any material, mil pcs.	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1
Shoes, mil. pairs	3.7	2.7	2.8	3.1	2.9	2.9	1.9	2.1	1.9	1.8	1.7
Timber, thousand m^3	21.7	24.8	17.4	18.4	15.7	14.9	15.9	13.6	16.6	17.6	12.7
Wooden window and door blocks, thousand pcs.	16.4	19.1	14.1	13.7	12.5	15.2	11.8	10.1	7.0	8.0	12.1
Parquet panels, thousand m2	98.4	26.3	23.6	15.3	19.7	14.7	10.6	20.0	12.6	9.8	29.9
Wood briquettes and pellets and other vegetable waste, thousand tons	-	-	-	-	-	21.3	20.1	16.0	18.0	26.3	24.3
Boxes and crates of paper or corrugated cardboard, mil m^2	52.3	35.7	29.3	27.8	-	-	-	-	-	-	-
Boxes and crates of corrugated paper or paperboard, thousand tons	-	-	-	-	14.1	11.8	11.7	12.0	13.7	14.4	14.4
Paper and paper articles for household use, thousand tons	1.2	4.6	4.3	4.2	5.1	5.7	6.7	5.5	5.2	5.3	5.4
Labels of paper or paperboard, thousand tons	3.6	1.5	1.5	1.5	1.5	1.6	2.2	2.8	3.0	3.2	3.0
Printing services for newspapers and periodicals appearing at least 4 times a week, million sheets	57.4	33.0	30.6	28.7	-	-	-	-	-	-	-
Printing services for newspapers and periodicals appearing at least 4 times a week, tons	-	-	-	-	501.7	867.8	181.2	379.7	22.5	19.7	18.9
Notebooks, thousand tons	0.6	0.7	0.7	1.0	0.7	0.9	0.7	1.4	1.0	0.9	0.6
Oxygen, mil m^3	1.5	1.8	2.0	0.7	0.5	0.6	0.5	0.3	0.4	0.4	0.4
Carbon dioxide, thousand tons	3.2	1.3	1.4	0.5	c	c	c	c	c	3.5	4.5
Charcoal, whether agglomerated or not (including walnut skin charcoal), thousand tons	-	c	0.6	0.6	0.5	0.4	0.5	0.6	0.5	0.4	0.5
Undenaturated ethyl alcohol with alcoholic strength by volume of no less than 80% vol., mil. dal	0.9	3.4	0.3	0.4	0.4	0.6	1.1	2.8	3.9	3.7	3.3
Varnishes and paints, thousand tons	6.3	12.9	18.0	17.9	12.3	17.7	26.9	32.7	29.6	29.6	29.4
Soaps, thousand tons	0.3	0.5	0.5	0.6	0.6	0.8	1.0	1.0	1.2	1.3	1.5
Washing and cleaning preparations, thousand tons	0.5	0.6	0.7	0.8	1.9	1.4	1.8	2.8	2.2	2.7	3.7
Essential oils, tons	62.5	67.9	50.9	13.1	50.3	47.2	42.4	45.5	71.1	36.8	59.6
Provitamins and vitamins, natural or obtained by synthesis (including natural concentrates), and their derivatives used mainly as vitamins, whether or not mixed together, even in different solutions, thousand tons	0.1	0.3	0.6	0.3	0.3	0.6	0.8	0.6	0.6	0.3	0.1
Medicines containing alkaloids or their derivatives and vitamins, thousand tons	0.3	2.3	1.4	1.7	1.5	1.8	1.7	1.6	1.9	1.6	1.8
Plastic tubes and pipes, thousand tons	0.7	1.7	2.0	2.2	2.0	2.3	2.7	2.9	2.3	2.5	2.5
Boxes, crates, shelves and similar articles of plastics, thousand tons	0.9	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1
Windows, doors, stained glass and their frames made of plastic, mil pcs.	-	0.3	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2
Insulating glass with multiple layers, mil m2	0.0	0.3	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.5
Glass mirrors, thousand m_2	9.8	10.8	11.7	19.5	-	-	-	-	-	-	-
Glass mirrors, thousand pcs.	-	-	-	-	12.6	8.6	13.5	8.2	5.1	33.6	26.4
Bottles and glass vials, mil. pcs.	354.6	246.2	326.3	223.1	272.5	243.7	228.9	218.5	206.0	235.1	215.0
Ceramic bricks for construction, thousand m^3	114.2	77.3	84.8	58.6	73.9	74.2	78.1	71.5	42.6	68.2	75.6
Dry plaster mixtures, thousand tons	131.5	142.3	159.3	188.2	161.5	172.3	194.9	204.4	198.7	186.9	194.3
Prefabricated elements for constructions of cement, concrete or artificial stone, thousand tons	230.7	202.0	184.4	221.0	206.8	240.5	288.5	277.4	396.0	457.5	527.5
Non-refractory concrete ready for pouring, mil tons	0.7	0.7	1.0	1.4	1.6	1.6	1.7	1.5	1.6	1.8	2.1
Castings of grey cast iron, thousand tons	2.2	0.9	1.0	1.0	0.9	0.9	0.7	0.7	0.5	0.8	1.1
Cast steel parts, tons	173.3	59.1	73.3	77.1	85.3	46.4	70.1	36.1	52.6	25.4	19.3
Castings of light non-ferrous metals, tons	7.8	6.1	11.8	11.5	13.8	6.8	10.3	c	c	4.8	2.5
Doors, windows and their frames, thresholds, window sills of ferrous metal, thousand pcs.	1.7	3.1	4.9	3.7	4.0	5.4	4.0	4.6	4.5	4.0	4.6
Doors, windows and their frames, thresholds, sills made of aluminium, thousand pcs.	36.8	64.6	62.7	61.1	35.4	41.3	25.7	21.7	21.3	25.3	25.2
Tanks, cisterns, vats and similar containers of cast iron, iron, steel or aluminium, with capacity exceeding 300 L, tons	266.0	123.0	150.1	85.7	560.7	322.3	711.9	670.6	477.8	779.7	887.0
Metallic fabrics, gratings, nets and wires, of iron or steel wire, thousand tons	-	4.5	3.7	4.0	4.6	5.5	5.1	5.4	6.0	6.7	7.5
Unportable personal computers, thousand pcs.	4.7	5.1	10.7	9.1	7.7	6.3	5.6	5.4	4.3	2.4	1.5
Electrical conductors, with or without connectors, for voltage <= 1000V, mil pcs.	-	c	c	c	3.0	8.7	11.0	10.5	16.6	21.1	21.1
Centrifugal pumps, other pumps for liquids or liquid elevators, thousand pcs	3.7	1.5	2.3	2.2	1.8	1.4	0.9	1.2	1.0	1.1	0.9
Disc ploughs and harrows, thousand pcs.	0.7	0.8	0.6	0.4	0.4	0.3	0.2	0.2	0.3	0.2	0.1
Machines and equipment for industrial preparation of food or beverages, oils, animal or vegetable fats, not included in other categories, thousand pcs.	1.2	0.6	0.6	0.5	0.2	0.6	0.3	0.3	0.5	0.2	0.4
Sets of plugs for spark plugs and other sets of plugs of a kind used in vehicles, thousand tons	-	c	c	c	c	11.6	13.1	12.1	13.2	20.0	27.0
Electricity, produced to be delivered, billion kWh	1.2	1.1	1.0	0.9	0.9	1.0	0.9	0.9	0.9	1.0	0.9
Heating energy, produced to be delivered, mil. Gcal	3.6	2.9	2.7	2.6	2.7	2.5	1.7	1.8	1.7	1.8	1.6

Source: National Bureau for Statistics, <https://statbank.statistica.md/PxWeb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__14%20IND__IND030/IND030100.px/table/tableViewLayout1/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>.

Below aggregated information for the country (right and left bank of the Dniester River) is presented on production of major industrial products with an impact on the evolution of direct and indirect GHG emissions for 1990-2019 period (Table 1-23). As the table shows, with few exceptions, the production of main industrial products registered in the period 1990-2019 shows an obviously decreasing trend.

Table 1-23: Production of main industrial products with impact on evolution of GHG emissions in the Republic of Moldova for the 1990-2019 period

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Cement, kt	2,288.0	1,800.0	1,088.2	960.3	769.1	518.8	494.4	611.8	493.0	462.0
Clincher, kt	1,801.3	1,666.6	879.3	752.5	608.6	459.7	357.3	500.2	397.8	390.4
Lime – commercial, kt	204.3	178.6	87.8	78.0	60.9	38.8	53.9	48.7	38.7	24.2
Lime - self-producers, kt	151.8	80.4	68.7	74.0	52.1	66.3	77.8	60.8	53.7	26.9
Glass jars for sterilizing, mil. conventional pcs.	657.6	693.7	187.4	248.9	152.7	87.4	39.6	86.4	84.2	104.6
Glass bottles and flasks, million pieces	165.5	153.0	138.8	138.2	133.4	184.0	165.2	172.2	189.1	125.2
Bricks, kt	235.5	217.5	118.2	179.7	89.3	59.2	53.2	59.7	55.7	56.8
Polymer film, kt	5.2	4.4	2.6	2.3	1.2	0.7	1.8	1.3	1.2	0.7
Synthetic resins, kt	17.5	14.6	5.8	4.8	1.5	1.4	1.4	1.3	1.2	1.1
Steel, kt	711.9	617.8	599.6	610.8	633.7	656.8	669.1	810.7	718.1	796.1
Laminate, kt	614.2	561.3	547.6	487.2	438.0	357.0	341.0	407.0	588.0	593.0
Asphalt concrete, kt	1,220.3	1,014.8	853.0	678.0	410.0	370.0	335.6	113.7	92.3	66.5
Varnishes and paints, kt	11.7	8.8	6.0	3.1	1.2	0.8	0.7	0.5	0.4	0.7
Rubber articles, kt	46.9	44.3	20.7	4.2	0.9	1.4	1.5	1.4	1.2	0.9
Pharmaceuticals, kt	1.9	1.6	1.1	0.7	0.3	0.3	0.3	0.3	0.5	0.8
Restored tires, thousands of pieces	75.3	73.1	40.1	1.5	4.5	6.6	8.0	9.8	7.1	10.2
Shoes, mil. pairs	23.2	20.8	16.3	13.2	9.5	7.6	6.9	6.2	4.6	3.7
Timber, thousand m^3	265.0	215.0	106.0	55.0	32.0	25.1	21.2	17.2	15.2	21.2
Cigars and cigarettes, bill pcs	9.1	9.2	8.6	8.8	8.0	7.1	9.7	9.5	7.5	8.7
Meat, kt	257.9	218.5	136.0	114.2	85.9	58.4	52.6	50.8	27.3	25.7
Fish and fish products, kt	9.5	5.2	6.5	9.5	2.1	0.0	0.0	0.9	0.8	1.0
Cereals dried in storage-drying facilities, kt	2,169.8	2,539.6	1,725.9	2,374.2	1,241.3	1,581.1	1,264.6	1,692.4	1,339.3	985.8
Sugar, kt	435.8	236.9	192.2	230.2	166.7	218.7	264.5	213.3	194.5	100.5
Flour confectionery, kt	24.3	23.5	12.1	10.1	5.0	5.2	5.2	5.6	9.2	8.4
Bread, kt	601.9	528.3	468.6	431.7	325.2	268.4	252.5	221.9	180.2	147.0
Animal feed ready for use, kt	1,037.3	946.2	867.5	440.2	309.8	333.6	350.4	231.9	221.2	108.6
Raw oils, kt	125.6	117.9	57.3	60.3	50.4	50.7	39.4	35.2	28.7	125.6
Refined oils, kt	57.5	54.0	26.3	27.6	23.1	23.2	18.0	16.1	13.2	57.5
Grape wines, thousands hl	1,630.0	1,430.0	920.0	1,130.0	977.8	996.9	1,458.0	1,941.5	1,239.6	690.1
White grape wines, thousands hl	764.5	670.7	431.5	530.0	458.6	467.5	683.8	910.6	581.4	323.7
Red grape wines, thousands hl	865.5	759.3	488.5	600.0	519.2	529.4	774.2	1,030.9	658.2	366.4
Sparkling wines, thousands hl	80.4	78.3	85.4	88.8	74.2	94.8	141.9	134.5	51.9	67.5
Cognac (divin), thousand hl	139.4	140.2	75.0	74.0	79.3	102.7	45.7	58.6	49.7	48.6
Spirits and liqueurs, thousands hl	55.9	55.6	67.6	139.4	264.7	412.7	335.8	237.0	174.1	87.0
Beer, thousand hl	760.0	660.0	430.0	360.0	285.0	302.9	256.0	262.7	300.1	220.9
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Cement, kt	431.9	402.1	477.0	484.4	667.6	772.8	1,051.1	1,531.0	1,775.9	869.4
Clincher, kt	320.3	321.9	406.8	452.7	525.7	678.7	850.6	1,302.2	1,486.6	641.3
Lime – commercial, kt	15.1	5.3	11.3	2.9	3.1	9.1	10.2	15.1	14.3	4.6
Lime - self-producers, kt	27.2	33.0	40.2	24.7	24.6	28.4	30.4	14.4	24.9	6.8
Glass jars for sterilizing, mil. conventional pcs.	156.2	148.8	137.4	107.4	98.9	103.1	121.3	98.7	80.7	92.2
Glass bottles and flasks, million pieces	260.5	228.3	296.1	281.4	308.0	354.6	321.5	302.7	284.7	201.3
Bricks, kt	52.9	53.1	62.8	68.2	75.9	73.7	70.8	74.9	73.7	51.6
Polymer film, kt	1.7	2.1	3.3	4.2	3.8	4.6	3.9	4.0	3.7	2.9
Synthetic resins, kt	1.1	1.0	0.8	0.7	0.9	1.0	0.8	1.0	1.0	0.8
Steel, kt	908.1	967.1	513.3	886.7	1,013.9	1,049.4	676.0	966.2	886.1	426.8
Laminate, kt	636.0	791.0	381.0	693.0	791.0	890.0	633.0	914.0	818.0	437.5
Asphalt concrete, kt	53.8	67.3	58.9	72.2	229.3	215.1	347.9	365.4	209.4	156.9
Varnishes and paints, kt	2.1	2.9	4.1	3.4	5.1	6.3	8.3	11.0	11.6	11.8
Rubber articles, kt	1.6	1.8	3.1	2.4	2.3	0.1	0.3	0.5	0.2	0.0
Pharmaceuticals, kt	0.5	0.6	0.7	0.5	0.6	0.7	0.8	1.3	3.7	3.8
Restored tires, thousands of pieces	7.0	9.2	4.6	6.0	4.6	3.2	2.8	2.6	2.3	5.8
Shoes, mil. pairs	5.9	4.9	4.9	6.0	6.6	7.5	6.8	6.7	7.1	4.8
Timber, thousand m^3	14.9	16.2	17.1	17.2	24.1	23.1	27.0	31.8	46.5	34.0
Cigars and cigarettes, bill pcs	9.3	9.4	6.3	7.1	7.1	6.2	5.0	5.0	4.0	4.9
Meat, kt	13.4	7.3	11.3	14.9	10.2	6.7	10.2	16.1	12.8	16.3
Fish and fish products, kt	1.9	2.3	2.7	2.7	2.7	3.0	2.5	2.3	4.6	3.7
Cereals dried in storage-drying facilities, kt	899.6	860.2	876.1	618.9	849.2	814.7	678.4	282.6	920.7	658.1
Sugar, kt	105.4	132.6	167.6	107.1	110.9	133.5	149.0	74.0	134.0	38.4
Flour confectionery, kt	8.7	12.8	15.9	18.0	17.9	20.7	21.7	22.3	22.9	23.6
Bread, kt	138.1	133.3	130.8	144.7	145.8	142.0	144.8	154.8	169.8	161.6
Livestock feed ready for use, kt	59.8	31.4	41.4	28.1	46.1	50.8	64.3	46.4	51.0	60.1

Raw oils, kt	117.9	57.3	60.3	50.4	50.7	39.4	35.2	28.7	79.3	83.9
Refined oils, kt	54.0	26.3	27.6	23.1	23.2	18.0	16.1	13.2	34.6	28.4
Grape wines, thousands hl	1,092.2	1,564.2	1,494.0	1,921.8	3,351.4	3,643.5	1,886.8	1,258.1	1,553.0	1,263.1
White grape wines, thousands hl	512.3	733.6	700.7	901.3	1,571.8	1,710.2	983.0	717.9	814.4	600.4
Red grape wines, thousands hl	580.0	830.6	793.3	1,020.5	1,779.6	1,933.3	903.8	540.2	738.6	662.7
Sparkling wines, thousands hl	41.6	58.4	61.3	73.9	93.8	105.1	40.2	54.1	57.3	50.0
Cognac (divin), thousand hl	71.8	95.6	103.8	136.1	142.8	171.1	79.1	82.4	103.7	69.8
Spirits and liqueurs, thousands hl	48.9	59.4	77.9	139.8	212.9	238.8	196.3	172.2	129.1	110.8
Beer, thousand hl	257.9	336.2	462.4	599.1	695.7	777.8	913.3	1,014.6	866.6	781.7
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Cement, kt	861.4	1,018.0	1,051.4	1,095.3	1,086.2	1,122.8	900.2	1,045.9	1,174.9	1,220.2
Clincher, kt	655.6	804.7	832.8	897.6	871.9	830.9	809.0	759.1	958.2	982.1
Lime – commercial, kt	3.4	7.6	7.0	5.6	8.4	8.2	4.1	22.4	24.8	27.9
Lime - self-producers, kt	17.3	14.8	14.0	22.4	23.7	13.0	14.3	16.4	12.6	9.2
Glass jars for sterilizing, mil. conventional pcs.	99.8	107.4	145.2	170.5	212.5	216.5	236.3	198.2	324.9	308.0
Glass bottles and flasks, million pieces	246.2	326.3	223.1	272.5	243.7	228.9	218.5	206.0	235.1	215.0
Bricks, kt	49.0	54.0	43.0	50.4	50.6	46.8	43.9	39.1	38.5	43.3
Polymer film, kt	3.8	4.2	3.8	4.1	4.5	3.6	3.5	3.4	3.7	3.9
Synthetic resins, kt	1.5	1.7	1.8	1.8	1.7	0.9	1.5	1.3	2.1	2.5
Steel, kt	242.4	321.5	317.5	191.2	346.0	431.8	129.6	471.7	505.0	394.3
Laminate, kt	237.7	302.2	360.4	173.1	389.3	318.8	222.5	451.4	497.9	393.1
Asphalt concrete, kt	194.4	219.8	248.2	248.3	360.1	250.4	214.3	273.7	767.0	523.4
Varnishes and paints, kt	12.9	18.0	17.9	12.3	17.7	26.9	32.7	29.6	29.6	29.4
Rubber articles, kt	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1
Pharmaceuticals, kt	5.0	3.3	3.7	3.3	4.1	4.1	3.8	4.4	3.5	3.6
Restored tires, thousands of pieces	6.7	6.9	18.4	17.3	11.9	6.0	7.3	7.4	8.6	8.1
Shoes, mil. pairs	6.2	7.7	7.4	8.3	7.6	5.5	5.2	4.6	4.4	3.9
Timber, thousand m^3	25.6	18.5	19.4	16.8	15.8	16.5	14.3	17.1	18.5	13.4
Cigars and cigarettes, bill pcs	6.3	6.5	4.7	3.5	2.3	1.8	1.8	1.4	0.7	0.7
Meat, kt	24.7	28.5	31.6	35.5	44.1	46.0	45.9	55.9	62.2	62.6
Fish and fish products, kt	1.3	7.6	7.7	8.5	8.8	10.0	8.1	7.8	10.7	10.1
Cereals dried in storage-drying facilities, kt	764.9	803.1	405.4	882.5	955.2	724.7	987.6	1,115.5	1,161.5	1,171.5
Sugar, kt	103.2	88.4	83.4	140.3	177.7	84.5	100.0	129.0	73.9	86.9
Flour confectionery, kt	27.7	29.4	31.3	34.6	34.9	34.3	35.1	36.5	37.9	40.2
Bread, kt	160.4	162.9	161.8	165.5	160.3	161.3	157.6	158.0	156.3	158.1
Livestock feed ready for use, kt	74.4	75.4	96.3	97.8	98.5	80.1	101.7	94.0	89.7	74.8
Raw oils, kt	80.7	89.8	96.8	65.5	113.2	109.5	80.0	86.8	106.3	124.7
Refined oils, kt	26.5	20.9	20.6	14.4	16.2	16.7	25.7	13.7	13.9	11.3
Grape wines, thousands hl	1,285.5	1,260.6	1,422.0	1,551.7	1,409.5	1,356.5	1,345.8	1,652.3	1,717.3	1,787.2
White grape wines, thousands hl	591.7	664.3	679.2	694.3	765.1	622.5	576.2	775.7	774.9	781.5
Red grape wines, thousands hl	693.8	596.3	742.8	857.4	644.3	734.0	768.4	880.8	932.5	979.2
Sparkling wines, thousands hl	55.6	68.6	65.4	60.0	52.2	50.2	63.3	65.2	67.4	67.9
Cognac (divin), thousand hl	74.6	91.2	109.4	118.0	93.9	70.2	50.1	84.0	87.7	91.9
Spirits and liqueurs, thousands hl	127.1	140.2	165.9	196.1	183.4	162.3	162.8	156.9	151.9	143.0
Beer, thousand hl	952.6	1,068.1	1,118.4	1,029.3	984.8	994.5	847.8	866.5	819.5	839.3

Source: Annual Statistical Reports of the RM for years 1988, 1991, 1994, 1999, 2003, 2005, 2007, 2009, 2012, 2015, 2017, 2020; Statistical Reports of ATULBD for 1998, 2000, 2002, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2020; Statistical reports PRODMOLD-A „Production in total natural expression for the country by type of product for the 2005-2019 years".

Energy Industry. In 2019, enterprises in the energy industry accounted for about 9.8% of total production volume obtained by large enterprises with main industrial activities. The enterprises achieved in 2019 a production volume of 5,840.2 billion lei (in current prices), a 4.0% decrease as compared to 2018.

Brief description of the energy and power system of the Republic of Moldova

In the Republic of Moldova, the capacity for power generation includes: Moldovan Thermal Power Plant (MTPP) in the city of Dnestrovsk (located on the left bank of the Dniester River), with a nominal installed capacity of 2520 MW, on natural gas, fuel oil and coal, built during 1964-1982; CHP-2 Chisinau, with a nominal installed capacity of 240 MW electrical capacity (available 210 MW) and 1200 Gcal/h heat capacity, built during 1976-1980; CHP-1 Chisinau, with a nominal installed capacity of 66 MW electrical capacity (available 40 MW) and 254 Gcal/h heat capacity, built during 1951-1961; CHP-Nord Balti, with a nominal installed capacity of 28.5 MW electrical capacity (available 24 MW) and 200 Gcal/h heat capacity, built during 1956-1970; Dubasari HPP on the Dniester River, with a nominal installed capacity of 48 MW (available 30 MW), wear rate 75%, built between 1954-1966; CPP Costesti on the Prut River, with a nominal installed capacity of 16 MW (available 10 MW), wear rate 67%, built in 1978; other power plants, including nine CHPs of sugar factories with a nominal

installed capacity of 97.5 MW on natural gas and fuel oil consumption, built in 1956-1981.

Of the relatively large total nominal capacity (2996.5 MW), only about 346 MW can be used in cogeneration in Chisinau and Balti, while in the hydro base, respectively, only about half of the MTPP capacity is used (especially due to difficult commercial conditions). Most of the country's consumption (approximately 75-78% in 2007-2019) was covered by imports of electricity from Ukraine, respectively, by deliveries from MTPP. It should be noted that during the 1990-2019 period, electricity production decreased by about 63.7% and electricity consumption - by about 51.7% (Tab. 1-24).

Table 1-24: Production and consumption of electricity in the national economy during the 1990-2019 period, billion kWh

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Production	15.690	13.154	11.248	10.376	8.308	6.168	6.240	5.375	4.841	4.110	3.624	4.913	4.408	4.062	4.179
Consumption	11.426	10.839	10.022	8.569	7.306	7.022	6.686	6.133	5.351	4.715	4.510	4.705	5.309	6.452	6.025
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Production	4.225	2.867	3.869	4.026	6.195	6.115	5.802	5.817	4.509	5.380	6.050	5.852	4.963	5.389	5.697
Consumption	5.838	5.485	5.684	5.732	5.302	5.257	5.416	5.468	5.795	5.975	5.455	5.227	5.259	5.463	5.513

Source: Annual Statistical Reports for years 1994, 1999, 2003, 2006, 2009, 2012; 2014, 2017, 2020; ATULD Statistical for years 2000, 2006, 2009, 2010, 2011, 2012, 2014, 2017, 2020.

The power transmission network operator (SoE Moldelectrica) operates the internal transmission network on the right bank of the Dniester River, including 400 kV (203 km), 330 kV (377.34 km), 110 kV (3334.3 km) transmission lines and radial lines of 35 kV (805.29 km) and 6-10 kV. The interconnections include seven 330 kV lines and twelve 110 kV lines with Ukraine, four 110 kV lines with Romania and one 400 kV line with Romania and from there with Bulgaria.

In 2000, the Republic of Moldova has privatized a large part of the distribution sector (approximately 70%), three out of five electricity distribution units, which later merged into enterprise with state capital (ESC) RED „Union Fenosa" JSC (currently - ESC RED „Premier Energy" Ltd), while the other two remained state-owned enterprises: JSC "RED Nord" and JSC "RED North-West" (later merged into S.A. "North Electricity Supply"). On the left bank of the Dniester River the service is provided by JSC "RED Est" and "RED Sud-Est".

Public Electricity Generation

In the energy system of the Republic of Moldova there is only one condensation Thermal Power Plant situated in Dnestrovsk (on the left bank of the Dniester River). The plant is equipped with eight energy groups on coal, with an electric power of 200 MW (in service from 1964-1971, of which only five are currently operational energy groups; during 1999-2007 none was working), 2 energy groups on residual fuel oil and natural gas with an electric power of 210 MW (in service since 1973-1974, both operational) and two energy groups on natural gas, operating on gas-steam combined cycle, with an installed capacity of 250 MW each (in service since 1980, both operational).

The technological processes used by MTPP are based on the classical cycle of steam turbines with condensation and involve combusting fossil fuels for electricity generation, heat production representing only a secondary process. Electricity production by MTTP decreased during 1990-2019 by about 68.7% (Tab. 1-25).

Table 1-25: Power generation by MTTP for the 1990-2019 period, billion kWh

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Power generation	13.569	11.223	9.468	8.626	6.836	4.747	4.560	3.629	3.296	2.687	2.463	3.366	2.942	2.793	2.891
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Power generation	2.701	1.347	2.482	2.622	4.862	4.723	4.255	4.375	3.045	3.868	4.610	4.447	3.557	3.930	4.244

Source: Express Information, Key Performance Indicators for the Industry Sector in the Republic for 2009-2019 (other than Small Industries). State Statistical Service of the ATULBD.

Along with the increase in the delivery price of natural gas from the Russian Federation, MTPP changed its tariff policy, increasing the price of electricity delivered to the Republic of Moldova. Under these conditions, between November 2005 and September 2009, the Republic of Moldova stopped purchasing electricity from MTPP, opting for cheaper electricity imports from Ukraine. In the absence of the load demand, between 09.11.2005 - 11.01.2007 at MTPP only one energy group was used which was operating on a mixed gas-steam cycle using natural gas.

Over the 1995-2019 period, the annual electricity production on the left bank of the Dniester River MTPP in Dnestrovsk and HPP in Dubasari) ranged from 1.7 to 5.2 billion kWh, of which about 40-65% was delivered to the right bank of the Dniester River, respectively, intended for export to the southern regions of Ukraine (Tab. 1-26). The long-term strategy of the Russian company Inter RAO EES, which owns MTPP, is to create operating conditions for the plant with a capacity of at least 1500 MW, exporting energy to countries in the region in the amount of over 6.0 billion kWh annually. In order to carry out the modernization plans of the plant, starting with 2005, the Russian company invested about 100 million US dollars in the refurbishment of MTPP.

Table 1-26: Electricity generation on the territory of the administrative-territorial units on the left bank of Dniester River over the 1995-2019 period

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Electricity produced, billion kWh, including:	4.987	4.840	3.924	3.593	2.973	2.720	3.649	3.228	3.016	3.157	2.996	1.675	2.769
at MTPP Dnestrovsk, billion kWh	4.747	4.560	3.629	3.296	2.687	2.463	3.366	2.942	2.793	2.891	2.701	1.347	2.482
at HPP Dubasari, billion kWh	0.240	0.280	0.295	0.297	0.286	0.257	0.283	0.286	0.223	0.266	0.295	0.296	0.275
Imported electricity, billion kWh	0.000	0.000	0.000	0.000	0.003	0.014	0.000	0.285	0.921	0.812	0.659	0.276	0.000
Electricity consumption, billion kWh	2.878	2.589	2.364	1.929	2.098	2.031	2.183	1.899	2.112	2.124	2.108	1.899	2.134
Exported electricity, billion kWh	2.109	2.250	1.560	1.665	0.878	0.703	1.467	1.615	1.826	1.844	1.547	0.052	0.636
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	%
Electricity produced, billion kWh, including:	2.929	5.164	5.051	4.786	4.885	3.604	4.417	5.111	4.946	4.067	4.435	4.756	-4.6
at MTPP Dnestrovsk, billion kWh	2.622	4.862	4.723	4.255	4.375	3.045	3.868	4.610	4.447	3.557	3.930	4.244	-10.6
at HPP Dubasari, billion kWh	0.307	0.303	0.328	0.280	0.238	0.268	0.261	0.218	0.188	0.237	0.232	0.236	-1.6
Imported electricity, billion kWh	0.000	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002	N/A
Electricity consumption, billion kWh	2.151	1.815	1.670	1.763	1.832	1.644	1.808	1.770	1.605	1.790	1.893	1.901	-33.9
Exported electricity, billion kWh	0.793	3.358	3.391	3.023	3.054	1.962	2.611	3.343	3.343	2.279	2.544	2.857	35.5

Source: Annual Statistical Reports of ATULBD for 2000, 2006, 2009, 2010, 2011, 2012, 2014, 2016, 2017, 2020.

Public Combined Heat and Power Generation

Currently, on the right bank of the Dniester there are three Combined Heat and Power Plants (CHP): in Chisinau municipality the CHP-1 and the CHP-2, and in Balti municipality: the CHP–North. Also, there are some small power plants with cogeneration at sugar plants. The installed capacity of cogeneration power plants on the right bank of the Dniester River is only about 14 per cent of the total installed capacity of power plants in the RM. Of the total nominal installed capacity on the right bank of Dniester River, the largest share has CHP-2 in Chisinau, about 55 per cent of the total, followed by CHP-1 in Chisinau, with a share of about 14 per cent and CHP-North in Balti, with a share of about 7 per cent. Total nominal installed capacity in this region covers only around 30 per cent of the electricity needs.

The total production of electricity on the right bank of the Dniester River has decreased from about 1.901 billion kWh in 1990 to about 0.941 billion kWh in 2019 (Tab. 1-27). In the context of the recent growing trend in electricity consumption, this situation is a negative factor, including in terms of energy security.

Table 1-27: Electricity generation on the right bank of the Dniester River during the 1990-2019 period, billion kWh

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Power production	1.901	1.655	1.581	1.442	1.240	1.181	1.400	1.451	1.248	1.137	0.904	1.263	1.180	1.046	1.022
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Power production	1.229	1.192	1.100	1.097	1.031	1.064	1.016	0.932	0.905	0.963	0.939	0.906	0.896	0.954	0.941

Source: NBS, Energy Balance of the Republic of Moldova for 1990-2019.

Public Heat Generation

There is a big number of Heat Plants (HPs) in the Republic of Moldova, mainly operating on natural gases and residual fuel oil, less on coal and biomass. The amount of fuel consumption is accounted in the Energy Balances of the Republic of Moldova. During the 1990-2019 period, the total amount of heat produced in the Republic of Moldova has decreased by about 82.5%, from 22.212 million Gcal in 1990 to 3.884 million Gcal in 2019 (Tab. 1-28).

Table 1-28: Heat generation and consumption in the Republic of Moldova, including ATULBD, for the 1990-2019 period, million Gcal

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Heat production	22.212	16.896	12.423	10.208	7.507	9.827	9.647	9.000	8.369	6.736	4.986	5.188	5.068	5.158	4.919
Heat consumption	20.983	15.961	11.736	8.703	6.658	8.796	8.528	7.885	7.338	5.896	4.501	4.608	4.469	4.539	4.397
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Heat production	5.324	5.284	4.824	4.803	4.366	4.601	4.419	4.273	4.377	4.064	3.979	4.125	4.084	4.137	3.884
Heat consumption	4.765	4.566	4.199	4.180	3.832	3.988	3.952	3.785	3.861	3.584	3.473	3.628	3.551	3.697	3.441

Source: Energy Balance of the Republic of Moldova for 1990, 1993-2019; Statistical Yearbooks of the ATULBD for 2000, 2006, 2009, 2010, 2011, 2012, 2014, 2016, 2017, 2020.

The continuous decreasing trend of the amount of produced heat is typical both for the territory on the right bank of the Dniester River, for example during the 1995-2019 period the reduction was about 67.5% (from 7,097 million Gcal in 1995 to 2,308 million Gcal in 2019), as well as for the territory on the left bank of the Dniester River, where over the period 1995-2019 the reduction amounted to about 42.3% (from 2.730 million Gcal in 1995 to 1.576 million Gcal in 2019).

Table 1-29 shows data on heat generation on the right bank of the Dniester River. As seen, in 2019 about 65.3% of produced heat was generated by combined cycle heat and power plants (CHPs), respectively another 34.7% by heat plants (HPs) (for comparison, in 1990 the situation was reversed, 32.5% of the heat produced was generated by CHPs, respectively 66.6% by HPs).

Table 1-29: Heat generation in the Republic of Moldova during the 1990-2019 period, since 1993 only for the right bank of the Dniester River, million Gcal

	1990	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Heat, including:	22.212	10.208	7.507	7.097	7.077	6.590	6.120	4.647	3.057	3.298	3.217	3.347	3.147	3.591
From CHPs	7.220	4.657	3.641	3.528	3.659	3.294	3.127	2.534	1.847	2.113	2.128	1.922	1.922	2.140
From HPs	14.802	5.542	3.862	3.568	3.417	3.296	2.991	2.113	1.207	1.183	1.087	1.423	1.423	1.451
From other sources	0.190	0.009	0.003	0.001	0.001	0.000	0.002	0.000	0.003	0.002	0.002	0.002	0.002	-
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Heat, including:	3.552	3.094	3.074	2.638	2.874	2.721	2.596	2.681	2.498	2.397	2.531	2.447	2.544	2.308
From CHPs	2.165	1.855	1.939	1.647	1.874	1.780	1.701	1.655	1.661	1.585	1.650	1.645	1.697	1.508
From HPs	1.358	1.386	1.133	0.990	1.000	0.940	0.895	1.022	0.837	0.812	0.881	0.802	0.847	0.800
From other sources	0.001	0.001	0.002	0.001	-	0.001	-	0.004	-	-	-	-	-	-

Source: Energy Balance of the Republic of Moldova for 1990-2019 period.

Fuel and Energy Balance in the Republic of Moldova

Below is the balance of fuel and energy of the Republic of Moldova for the period 1990-2014 (Tab. 1-30), as available in the Annual Statistical Reports of the Republic of Moldova published during the period 1992-2015 (in more recent publications, the presentation format for of statistical information was changed, so that it was not possible to present the information for the years 2015-2019).

Table 1-30 shows that during the 1990-2014 period the total distributed energy resources decreased by 82% (from 18,225 kt c.e. to 3,263 kt c.e.), the import of energy resources decreased by 83% (from 16,719 kt c.e. to 2,826 kt c.e.), the internal consumption of energy resources has decreased by 80% (from 14,269 kt c.e. to 2,837 kt c.e.), and local energy sources (especially biomass) increased by 527% (from 67 kt c.e. to 420 kt c.e.).

Table 1-30: Fuel and Energy Balance in the Republic of Moldova, 1990-2014, kt of coal equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Resources – total	**18225**	**16547**	**12545**	**10467**	**5110**	**5617**	**5334**	**5180**	**4521**	**3519**	**2837**	**2704**	**2906**
Fuel extraction	67	65	64	49	53	83	85	96	79	80	84	97	93
Hydroelectric power generation	84	113	84	122	15	28	28	28	27	30	19	24	39
Imports	16703	15097	11374	9414	4603	5109	4720	4758	3934	3092	2535	2394	2549
Fuel stocks (at the beginning of the year)	1371	1272	1023	882	439	397	501	298	481	317	199	189	225
Distribution – total, including:	**18225**	**16547**	**12545**	**10467**	**5110**	**5617**	**5334**	**5180**	**4521**	**3519**	**2837**	**2704**	**2906**
Consumed within the country, from which:	14269	13704	10459	8155	4636	5085	5045	4725	4218	3319	2647	2479	2701
to transform it in other types of energy (power and heat)	7724	7570	5607	5925	2680	3156	3001	2735	2521	1937	1337	1158	1145
for technological manufacturing needs and others (including transport and storage losses)	6545	6134	4852	2230	1956	1929	2044	1990	1697	1382	1310	1321	1556
Exports	2449	1820	1716	1881	86	45	1	9	–	1	5	2	1
Fuel stocks (at the end of the year)	1507	1023	370	431	388	487	288	446	303	199	185	223	204
	2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**%**
Resources – total	**3127**	**3398**	**3520**	**3471**	**3374**	**3444**	**3304**	**3434**	**3494**	**3373**	**3420**	**3263**	**-82.1**
Fuel extraction	113	103	101	112	99	110	116	95	113	130	132	420	526.9
Hydroelectric power generation	8	7	10	9	4	10	7	10	9	4	6	5	-94.0
Imports	2795	2996	3123	3082	3025	3006	2820	2960	3075	2918	2977	2826	-83.1
Fuel stocks (at the beginning of the year)	208	281	272	258	223	281	308	324	254	278	265	297	-78.3
Distribution – total, including:	**3127**	**3398**	**3520**	**3471**	**3374**	**3444**	**3304**	**3434**	**3494**	**3373**	**3420**	**3263**	**-82.1**
Consumed within the country, from which:	2826	3065	3257	3242	3090	3128	2960	3157	3201	3068	3091	2837	-80.1
to transform it in other types of energy (power and heat)	971	1107	1202	1166	1095	1091	1025	1055	1025	1008	1025	703	-90.9
for technological manufacturing needs and others (including transport and storage losses)	1855	1958	2055	2076	1995	2037	1935	2102	2176	2060	2066	2134	-67.4
Exports	18	62	5	6	10	7	21	25	19	39	60	43	-98.2
Fuel stocks (at the end of the year)	283	271	258	223	274	309	323	252	274	266	269	280	-81.4

Source: Statistical Yearbooks of the Republic of Moldova for 1994 (page 271), 1999 (page 309), 2003 (page 398), 2006 (page 315), 2007 (page 314), 2008 (page 310), 2009 (page 308), 2010 (page 309), 2014 (page 307-308) and the Energy Balance of the Republic of Moldova for 2014.

At the same time, the data presented in Tab. 1-31 shows that over the 1990-2014 period domestic energy resources increased by about 206% (from about 151 kt c.e. to 462 kt c.e.), the import of liquid fuels decreased by about 84% (from 7,032 kt c.e. to 1,144 kt c.e.), the import of solid fuels decreased by about 96% (from 3,608 kt c.e. to 142 kt c.e.), and the import of gaseous fuels decreased by about 74% (from 4,604 kt c.e. to 1,215 kt c.e.). At the same time, the domestic consumption of energy resources for production of electricity and heat decreased during the period by about 92% (from 8,631 kt c.e. to 703 kt c.e.), the consumption of energy resources in the industry and construction sectors has decreased by about 85% (from 1,054 kt c.e. to 156 kt c.e.), in the agriculture sector - by about 91% (from about 980 kt c.e. to 84 kt c.e), in the transport sector - by about 51% (from 1,753 kt c.e. to 866 kt c.e.), in the trade and community needs sector - by about 67% (from 508 kt c.e. to 169 kt c.e.), and in the residential sector by about 58% (from 2,025 kt c.e. to 859 kt c.e.) .

Table 1-31: The Energy Balance of the RM, 1990-2014, kt coal equivalent

	1990	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Domestic sources	**151**	**148**	**171**	**68**	**111**	**113**	**124**	**106**	**110**	**103**	**121**	**132**
Liquid fuels	–	–	–	–	–	–	–	–	–	–	–	–
Solid fuels	67	64	49	53	83	85	96	79	80	84	97	93
Hydroelectric power	84	84	122	15	28	28	28	27	30	19	24	39
Imports	**16703**	**11374**	**9414**	**4603**	**5109**	**4720**	**4758**	**3934**	**3092**	**2535**	**2394**	**2549**
Liquid fuels	7032	4181	2565	1589	1509	1141	1326	879	577	593	645	694
Natural gas	4604	4157	3728	2149	2186	2391	2436	2181	1818	1268	1401	1395
Solid fuels	3608	1538	1492	664	765	678	427	251	119	94	125	139
Electricity	1458	1498	1629	201	649	510	569	623	578	580	223	321
Exports	**2449**	**1716**	**1881**	**86**	**45**	**1**	**9**	**–**	**1**	**–**	**–**	**1**
Change of stocks	136	653	451	51	90	-213	148	-178	-118	-14	34	-21
Domestic consumption	**15054**	**10459**	**8155**	**4636**	**5085**	**5045**	**4725**	**4218**	**3319**	**2647**	**2479**	**2701**
For electricity and heat generation	8631	5773	5925	2680	3156	3001	2735	2521	1937	1337	1158	1145
For other purposes, including:	6489	4686	2230	1956	1929	2044	1990	1697	1382	1310	1321	1556
industry and construction	1054	690	268	148	164	137	165	150	130	147	157	165
agriculture	980	701	354	336	314	260	247	185	119	98	96	114
transport	1753	1245	704	551	514	509	413	347	259	244	240	353
wholesale and retail trade	508	366	223	149	151	144	120	121	88	79	93	123
sold to population	2025	1314	531	602	613	778	815	697	610	602	610	681
other (including transport and storage losses)	169	370	150	170	173	219	230	197	176	140	125	120
	2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Domestic sources	**124**	**121**	**125**	**131**	**126**	**157**	**176**	**150**	**165**	**177**	**178**	**462**
Liquid fuels	3	11	14	10	23	37	53	45	43	43	40	37
Solid fuels	113	103	101	112	99	110	116	95	113	130	132	420
Hydroelectric power	8	7	10	9	4	10	7	10	9	4	6	5
Imports	**2795**	**2996**	**3123**	**3082**	**3025**	**3006**	**2820**	**2960**	**3075**	**2918**	**2977**	**2826**
Liquid fuels	824	871	891	862	922	953	944	952	1060	967	1016	1144
Natural gas	1517	1548	1721	1716	1585	1511	1395	1476	1450	1387	1331	1215
Solid fuels	238	164	147	150	158	178	120	160	179	162	221	142
Electricity	216	413	364	354	360	364	361	372	386	402	409	410
Exports	**18**	**62**	**5**	**6**	**10**	**7**	**21**	**25**	**19**	**39**	**60**	**43**
Change of stocks	75	-10	-14	-35	51	28	15	-72	20	-12	4	-17
Domestic consumption	**2826**	**3065**	**3257**	**3242**	**3090**	**3128**	**2960**	**3157**	**3201**	**3068**	**3091**	**2837**
For electricity and heat generation	971	1107	1202	1166	1095	1091	1025	1055	1025	1008	1025	703
For other purposes, including:	1855	1958	2055	2076	1995	2037	1935	2102	2176	2060	2066	2134
industry and construction	175	186	230	234	224	207	124	154	172	178	187	156
agriculture	112	101	87	87	74	73	67	69	64	61	67	84
transport	397	364	381	406	466	479	416	515	548	525	723	866
wholesale and retail trade	190	176	171	175	171	173	248	222	227	224	152	169
sold to population	822	938	1004	986	856	906	943	984	1012	914	746	859
other (including transport and storage losses)	159	193	171	188	204	199	137	158	153	158	191	103

Source: Statistical Yearbooks of the Republic of Moldova for 1994 (page 274), 1999 (page 310), 2003 (page 399), 2006 (page 317), 2007 (page 316), 2008 (page 312), 2009 (page 309), 2010 (page 310), 2014 (page 307-308) and The Energy Balance of the Republic of Moldova for 2014.

The Energy Balance of the Republic of Moldova for the 2015-2019 years was published in accordance with the common framework for production, submission, evaluation and dissemination of comparable energy statistics within the Energy Community, as established internationally by Regulation (EC) no. 1099/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics, as subsequently amended, while at national level – in accordance with Decision of the Collegium of the National Bureau for Statistics no. 6/3 of 23 December 2014.

The differences observed when comparing the information presented above in Tab. 1-30 and Tab. 1-31 and those in Tab. 1-32 are due to the fact that data on consumption of biofuels and waste in the residential sector (population) were revised for the 2010-2016 period. The recalculation of activity data was performed with the support of experts from the Energy Community and it was based on the results obtained in the "Research on energy consumption in households", conducted by the National Bureau for Statistics for the reference year 2015.

Table 1-32: The Energy Balance of the RM, 2010-2019, kt coal equivalent

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Primary energy production	**748**	**792**	**850**	**853**	**934**	**934**	**1,010**	**1,100**	**1,137**	**953**
Inputs from other sources (ATULBD)	369	304	298	230	320	405	408	279	312	351
Imports	2,590	2,771	2,620	2,748	2,575	2,522	2,597	2,874	3,013	2,903
Exports	18	20	27	48	31	24	22	48	40	13
Stock variation	72	-20	12	-4	17	-5	-4	10	12	1
Gross Domestic Consumption	**3,761**	**3,827**	**3,753**	**3,779**	**3,815**	**3,832**	**3,989**	**4,195**	**4,410**	**4,193**
Transformations, inputs	707	668	636	623	638	590	604	584	613	556
Transformations, outputs	570	539	512	501	500	474	495	481	493	451

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Not elsewhere specified - transformation	25	24	21	17	23	24	25	25	23	26
Losses	258	239	229	221	218	188	182	185	177	148
Final Consumption	**3,341**	**3,435**	**3,379**	**3,419**	**3,436**	**3,504**	**3,673**	**3,882**	**4,090**	**3,914**
Industry	325	341	343	369	330	305	290	308	357	338
Transports	855	914	817	851	884	943	1,023	1,050	1,083	1,099
Other sectors	2,117	2,139	2,156	2,137	2,151	2,193	2,295	2,454	2,541	2,384
Residential sector (population)	1,631	1,664	1,692	1,675	1,705	1,722	1,797	1,916	1,979	1,817
Commercial and public services	385	378	380	372	354	368	384	384	406	391
Agriculture and forestry	101	97	84	90	92	103	114	154	156	176
Non-energy use	**44**	**41**	**63**	**62**	**71**	**63**	**65**	**70**	**109**	**93**

Source: Annual Statistical Reports of the RM for the year 2017 (p. 278); the Energy Balance of the RM for the year 2019. Statistical collection. Chisinau, 2020, p. 52-53.

If we analyze the structure of gross domestic consumption in the reference year (1990) and in 2019, we notice an obvious decreasing trend in the share of solid fuels (from 23.8% of the total in 1990 to 3.5% of the total in 2019) and liquid fuels (from 41.5% of the total in 1990 to 34.7% of the total in 2019), respectively, an increasing trend in the share of electricity (from 8.5% of the total in 1990 to 10.6% of the total in 2019), gaseous fuels (from 25.9% of the total in 1990 to 29.1% of the total in 2019) and biofuels (from 0.4% in 1990 to 22.1% in 2019) (Tab. 1-33, Figs. 1-19 and 1-20).

Table 1-33: Gross Domestic Consumption by Fuel Type and Energy Resources in the Republic of Moldova within 1990-2019, kt conventional fuel (coal equivalent)

Years	Coal	Natural gas	Oil products	Biofuels	Electricity	Total products
1990	4,311	4,688	7,518	72	1,542	18,131
1995	227	1,436	1,402	71	650	3,786
2000	108	1,121	753	85	580	2,647
2005	155	1,626	1,022	96	358	3,257
2010	166	1,373	1,109	731	382	3,761
2011	171	1,329	1,162	770	395	3,827
2012	165	1,264	1,096	822	406	3,753
2013	215	1,192	1,124	833	415	3,779
2014	137	1,214	1,149	898	417	3,815
2015	146	1,165	1,182	926	413	3,832
2016	107	1,196	1,276	997	413	3,989
2017	149	1,195	1,336	1,090	425	4,195
2018	115	1,300	1,437	1,121	437	4,410
2019	145	1,222	1,455	927	444	4,193
1990-2019, %	**-96.6**	**-73.9**	**-80.6**	**1187.5**	**-71.2**	**-76.9**

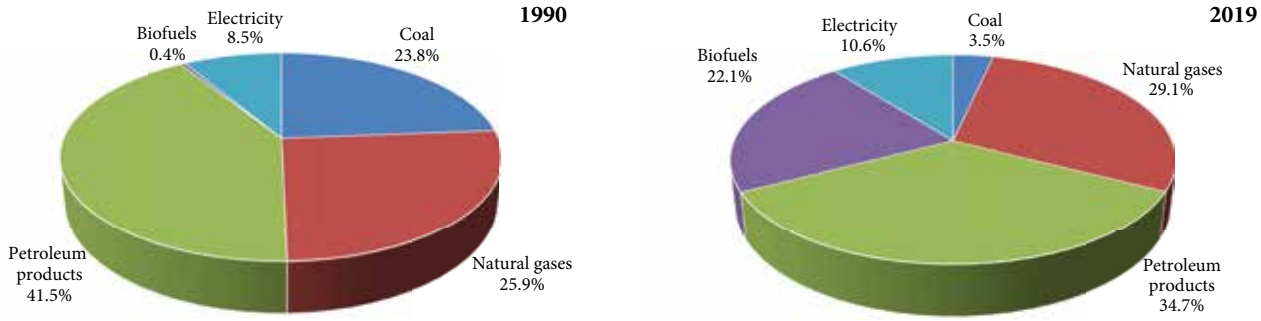


Figure 1-19: Gross Domestic Consumption by Fuel Type and Energy Resources in the Gross Domestic Consumption in the Republic of Moldova in 1990 and 2019, % of the total.

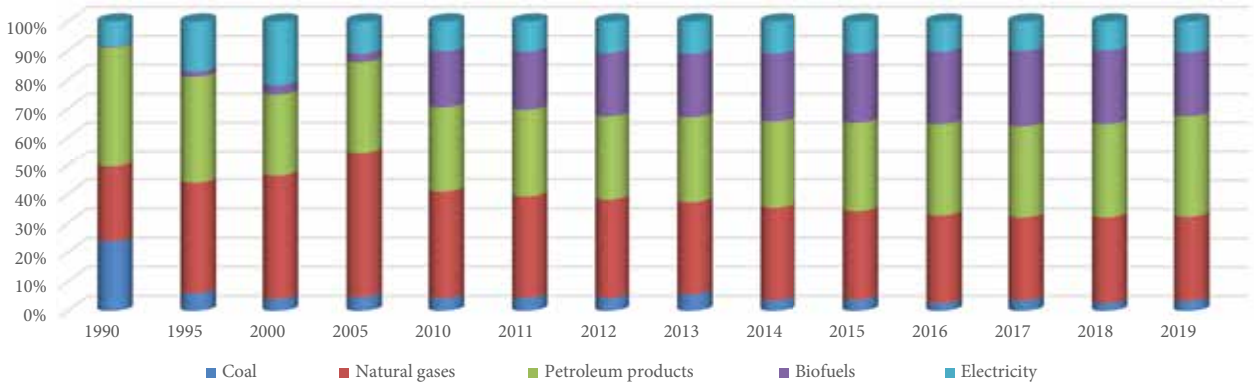


Figure 1-20: Gross Domestic Consumption by Fuel Type and Energy Resources in the Republic of Moldova within 1990-2019, % of the total.

Electricity Generation from Renewable Sources in the Republic of Moldova

In accordance with provisions of the Renewable Energy Law no. 160 of 12.07.2007, the National Agency for Energy Regulation (ANRE) annually approves tariffs for electricity produced from renewable energy sources (RES), calculated by producers in accordance with the methodology developed and approved by ANRE.

Over the 2011-2012 years, only one producer from RES was operational on the electricity market (biogas; installed capacity - 85 kW; 2011 - 0.02 GWh, 2012 - 0.31 GWh), for which ANRE approved the tariff for electricity production on 11.11.2010. During 2018, ANRE adopted 12 decisions on approval of tariffs for electricity production for different types of renewable energy, the summary capacity of their production facilities being 20.66 MW, of which 20.54 MW - capacity of wind installations. All power plants, which belong to producers of electricity from renewable sources, for which tariffs have been approved, are connected to the electricity distribution networks, except for the power plant belonging to enterprise "Luxury Carpets" Ltd, which is connected to the electric transmission network of SoE "Moldelectrica". During 2018, guarantees of origin were issued for total electricity produced from renewable sources in the amount of 51.66 GWh. The respective amount of electricity produced has increased by about 71% as compared to 2017. In 2017, a total of 30.19 GWh of electricity produced from renewable sources was delivered to the electricity networks.

In 2019, the electricity produced from renewable sources by producers for which the support scheme is applied, amounted to 67,430 million kWh (Table 1-34). Out of the total, for 56,350 million kWh of electricity, guarantees of origin were issued by the central supplier. The monthly amount produced cumulatively by the generating installations from RES varied, being largely dependent on climatic conditions. Thus, the month in which the minimum amount of energy generated was registered was June 2019 - about 4.0 million kWh, and the maximum amount was recorded in February 2019 - about 7.3 million kWh. The average monthly quantity generated during 2019 was about 5.6 million kWh.

Table 1-34 shows aggregate data for different types of RES, regarding installed capacity of power plants, quantities of electricity produced from RES and delivered to the electricity networks for which guarantees of origin have been issued to the respective producers during the years 2013-2019.

Table 1-34: Electricity Produced from Renewable Energy Sources within 2013-2019, according to guarantees of origin issued by the system operators in the Republic of Moldova

Renewable energy sources	Installed capacity, kW						
	2013	2014	2015	2016	2017	2018	2019
Photovoltaic energy	105.0	466.0	1,257.0	1,778.0	2,061.4	2,131.4	2,131.4
Biomass (biogas)	405.0	405.0	2,805.0	2,805.0	5,709.0	5,709.0	5,709.0
Wind power	1,100.0	1,100.0	1,130.0	2,330.0	9,190.0	29,330.0	33,720.0
Hydroelectric power					254.0	254.0	254.0
Total, kW	**1,610.0**	**1,971.0**	**5,192.0**	**6,913.0**	**17,214.4**	**37,424.4**	**41,814.4**
Renewable energy sources	**Electricity produced and delivered to electricity networks, thousand kWh**						
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Photovoltaic energy	101.2	377.8	1,091.0	1,311.0	1,509.2	1,457.2	1,437.0
Biomass (biogas)	826.9	1,275.5	14,530.8	14,030.4	21,575.9	27,960.5	28,748.0
Wind power	979.8	1,481.2	1,547.7	2,476.7	7,065.6	21,968.0	36,915.0
Hydroelectric power					38.4	279.0	330.0
Total, thousand kWh	**1,907.9**	**3,134.5**	**17,169.5**	**17,818.1**	**30,189.1**	**51,664.6**	**67,430.0**

Of the total mix of electricity generated from RES, the largest share is held by energy generated using wind potential (54.7% of the total amount of electricity produced from renewable sources), followed by electricity produced from biogas (42.6%), electricity produced from solar energy (2.1%), the smallest share pertaining to energy produced by hydropower installations (0.5%) (electricity generated by hydroelectric sources does not include power generated by Costesti HPP) (Fig. 1-21). The largest amount of power delivered by a single installation that produces electricity from RES comes from the power plant belonging to Joint Enterprise Südzucker Moldova JSC with a capacity of 3.6 MW, generating in 2019 - 20.5 million kWh of electricity.

It should be mentioned that the total installed power of the plants producing power from RES in 2019 was 41,814 MW (Tab. 1-34). In 2019, the number of final consumers who benefited from the net metering mechanism, provided by art. 39 of Law no. 10 of 26.02.2016 on promoting use of energy from renewable sources has increased. Thus, during 2019, 127 final consumers were registered who had renewable energy sources for domestic consumption and who delivered in the electricity network about 470.1 thousand kWh of electricity. The structure of capacities for producing electricity from renewable sources in 2019 for which tariffs were approved by ANRE, by types of renewable energy sources, is presented in Fig. 1-22.

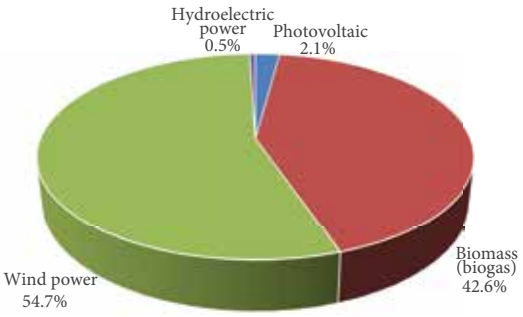


Figure 1-21: The share of each type of RES in the total electricity production of RES in 2019

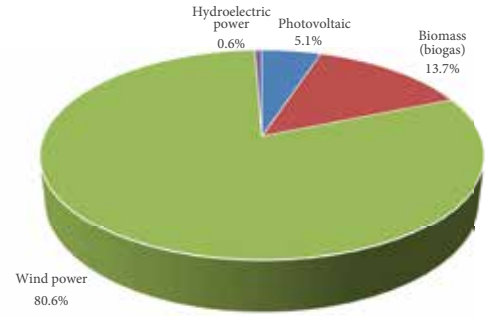


Figure 1-22: Electricity generation installed capacity, the share by types of RES in 2019.

Mining and Quarrying. In 2019, the enterprises in the extractive industry accounted for about 1.7% of total production volume obtained by large enterprises according to main industrial activities. These enterprises achieved a production volume of about 976.4 million lei (in current prices), having increased by 14.7% as compared to 2018 (850.9 million lei) (in current prices).

Below is the evolution of production of main industrial products within the mining and quarrying industry of the Republic of Moldova for the 1990-2019 period (Tab. 1-35). Of note, the monitored statistical indicators and measuring units for the volume of industrial production have been modified since 2005.

Table 1-35: Production of main industrial products in the extractive industry of the Republic of Moldova during the 1990-2019 period

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Limestone for carving or construction, alabaster, thousand m³	468.0	501.0	295.0	180.0	133.0	99.0	79.0	106.1	94.0	68.2
Sand, thousand m³	3 360.0	2 583.0	508.0	331.0	256.0	229.0	218.0	264.8	263.3	282.0
Gravel, pebbles, boulders and flint, thousand m³	7 237.0	6 538.0	3 254.0	1 266.0	965.0	672.0	701.0	838.5	732.5	541.9
Mixtures of sand and gravel, thousand m³	617.0	365.0	29.0	77.0	37.0	37.0	22.0	26.0	16.5	12.1
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Ecausin and other limestone for carving or construction, thousand tons	...	...	...	...	...	474.8	512.6	568.1	522.6	399.1
Limestone for carving or construction, alabaster, thousand m³	63.4	90.8	172.7	137.8	137.7	...	...	...	...	...
Other stones for carving or building, excluding granite or sandstone, thousand tons	...	...	...	...	...	250.3	281.5	254.5	253.5	243.0
Sand, thousand m³	246.3	255.0	376.7	559.7	832.2	...	...	...	...	...
Sand, thousand tons	...	...	...	...	...	1 051.9	940.6	1 482.9	1 511.3	1 071.1
Gravel, pebbles, boulders and flint, thousand m³	536.0	540.8	672.5	770.4	938.7	...	...	...		
Gravel, pebbles, boulders and flint, thousand tons	...	...	...	...	...	1 370.2	1 784.9	1 814.9	2 054.9	1 349.3
Mixtures of sand and gravel, thousand m³	22.4	26.7	36.5	52.3	47.8	...	...	...	...	...
Mixtures of slag and similar industrial waste, whether or not with built-in pebbles, gravel, bricks and flints for use in construction (mixtures of sand and pebbles), thousand tons	...	...	...	...	...	151.6	286.3	273.1	206.3	143.7
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Ecausin and other limestone for carving or construction, thousand tons	346.0	350.4	316.4	286.5	317.1	279.4	188.8	154.4	139.6	144.6
Other stones for carving or building, excluding granite or sandstone, thousand tons	203.6	316.3	441.8	648.2	674.1	638.4	498.5	448.1	569.0	523.4
Sand, thousand tons	1 211.1	1 286.7	1 373.1	1 521.8	1 660.0	1 599.9	1 522.5	1,579.1	1,648.2	1,981.8
Gravel, pebbles, boulders and flint, thousand tons	1 640.3	2 156.4	2 013.5	2 492.5	2 871.1	2 717.1	2 349.0	2,956.9	3,634.1	4,132.7
Mixtures of slag and similar industrial waste, whether or not with built-in pebbles, gravel, bricks and flints for construction use (mixtures of sand and pebbles), thousand tons	258.3	655.7	875.7	1 290.1	1 412.0	1 087.8	1 109.7	1,308.0	1,313.2	1,371.1

Source: National Bureau for Statistics, <http://statbank.statistica.md/pxweb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__14%20IND__IND030/IND030100.px/table/tableViewLayout1/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>.

1.6.2. Agriculture

The volume of agricultural production in 2019 amounted to about 34.6 billion lei (in current prices). The volume of agricultural production as compared to 2018 has decreased by 1.6% (under comparable conditions) (Fig. 1-23). The reduction of overall agricultural production was determined by the decrease of animal production by 6.0%, the plant-based production having shown a slight increase by 0.2%. In 2019, the share of plant production in total agricultural production was 72.6% (in 2018 - 73.7%), while animal production accounted for 27.4% (in 2018 - 26.3%).

During the years 1991-2019, the evolution of agricultural production was fluctuating, the best results being recorded in 1993, 1997, 2004, 2008, 2010, 2011, 2013, 2014 and 2017, and, respectively, the worst - in 1992, 1994, 1996, 1998, 2003, 2007, 2012, 2015 and 2019 (Fig. 1-23, Tab. 1-36).

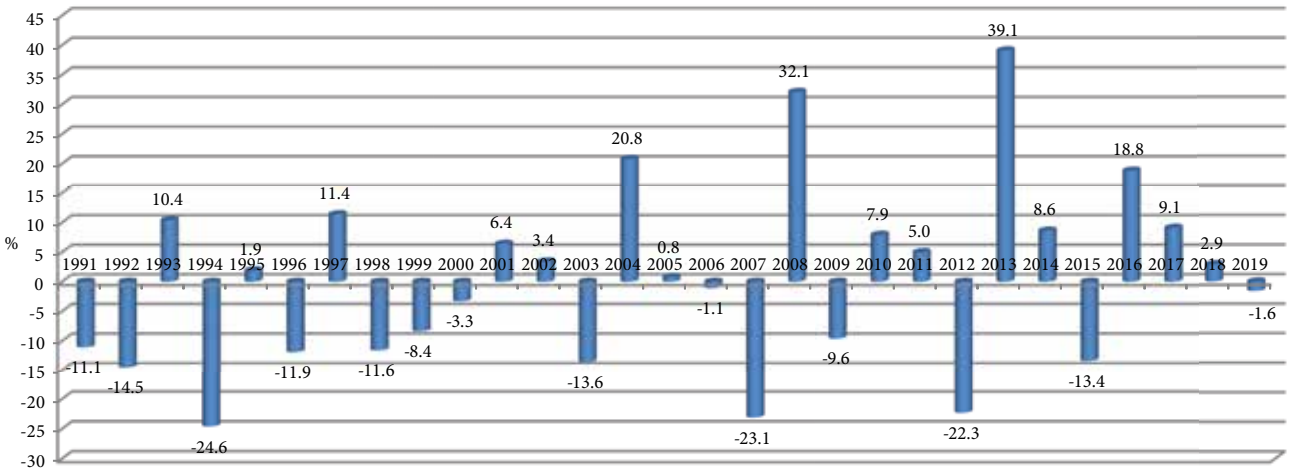


Figure 1-23: Evolution of agricultural production during the 1991-2019 years, in % of previous year.

Table 1-36: Evolution of agricultural production in the Republic of Moldova during 1990-2019

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Agriculture, billion MDL, current prices	6.1	11.3	97.3	1.1	3.2	4.2	4.6	5.1	4.8	6.4	8.3	8.6	9.5	10.4	11.8
in % of previous year		-11.1	-14.5	10.4	-24.6	1.9	-11.9	11.4	-11.6	-8.4	-3.3	6.4	3.4	-13.6	20.8
in % of the year 1990		88.9	76.0	83.9	63.3	64.5	56.8	63.3	55.9	51.2	49.5	52.7	54.5	47.1	56.9
Agriculture, billion US $				0.80	0.79	0.94	1.01	1.10	0.89	0.61	0.66	0.67	0.70	0.74	0.96
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Agriculture, billion MDL, current prices	12.7	13.7	12.8	16.5	13.3	19.9	22.6	19.9	23.8	27.3	27.2	30.4	34.1	32.6	34.6
in % of previous year	0.8	-1.1	-23.1	32.1	-9.6	7.9	5.0	-22.3	39.1	8.6	-13.4	18.8	9.1	2.9	-1.6
in % of the year 1990	57.3	56.7	43.6	57.6	52.1	56.2	59.0	45.9	63.8	69.3	60.0	71.3	77.7	80.0	78.7
Agriculture, billion US $	1.01	1.05	1.06	1.59	1.20	1.61	1.93	1.64	1.89	1.94	1.45	1.52	1.85	1.94	1.97

Source: National Institute for Economic Research of the ASM and the Ministry of Economy and Infrastructure (December 2020).

It should be noted that during the 1990-2019 period the sown areas of certain agricultural crops have significantly decreased in the Republic of Moldova (for example, the areas sown with tobacco decreased over the period by 99.1%, those sown with fodder plants – by 90.6%, sugar beet - 81.2%, potatoes - 54.5%, oats - 53.7%, autumn and spring barley - 47.4%, vegetables - 44.6%, legumes - 40.9%, autumn rye - by 33.3%, pumpkin - by 19.2%, etc.).

There was also a decrease in average yield per hectare (for example, it has decreased in the reference period for perennial grasses for green fodder, silage and fodder - by 83.0%, for annual grasses for green fodder - by 63.5%, for sugar beet - 74.4%, for vegetables - by 47.9%, for autumn and spring wheat - by 33.2%, for fodder roots - by 32.1%, for tobacco - by 19.2%, for autumn and spring barley - by 18.9%, for oats - by 10.6% and for legumes - by 1.4%).

In addition, during the period, a significant increase was recorded in areas sown with sunflower (by 205.7%), corn for grain (by 101.5%), autumn and spring wheat (by 52.9%) and soybeans (by 43.7%). There was also an increase in average production per hectare for such crops as: soybeans (by 89.4%), pumpkins (by 69.1%), autumn rye (by 47.5%), sugar beet (by 36.2%), potatoes (by 35.4%), corn for silage and green fodder (by 31.3%), corn for grains (by 26.9%), sunflower (by 18.7%) and rapeseed (by 2.9%) (Tab. 1- 37, 1-38 and 1-39).

Table 1-37: Areas sown with agricultural crops for the 1990-2019 period, thousand ha

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Sown area - total	**1 733.1**	**1 717.0**	**1 711.1**	**1 779.5**	**1 715.5**	**1 725.4**	**1 717.4**	**1 726.3**	**1 717.6**	**1 663.8**
Cereals and leguminous crops - total	**745.7**	**837.0**	**746.6**	**910.7**	**830.1**	**920.5**	**902.4**	**1 055.5**	**1 039.0**	**1 024.7**
... wheat (winter and spring)	286.7	303.0	281.7	345.9	300.4	393.9	380.9	410.3	405.8	392.1
....winter rye	0.9	0.8	0.7	1.1	1.7	2.7	4.7	3.9	3.7	3.9
... barley (winter and spring)	120.4	134.0	123.0	139.0	147.0	135.0	108.7	129.5	134.0	128.5
...oat	2.1	3.0	3.0	4.0	5.0	5.8	3.7	6.5	6.1	4.9
…millet	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.2
...buckwheat	3.6	6.0	7.0	7.0	8.0	5.5	7.4	7.3	11.1	16.8
... legumes for grain	72.6	77.0	71.2	70.7	65.5	54.0	44.6	46.2	58.8	64.7
... corn for grain	258.0	310.0	259.4	342.6	283.4	321.3	350.0	450.7	416.7	411.7
…sorghum for grain	1.2	3.1	0.5	0.3	1.2	1.1	0.3	0.3	0.2	0.1
... other cereal crops	0.1	0.0	0.0	0.0	17.8	1.0	1.8	0.5	2.2	1.7
Technical crops – total	**295.3**	**277.0**	**275.3**	**262.7**	**263.5**	**284.0**	**333.7**	**300.0**	**344.7**	**355.1**
...sugar beet	81.5	79.9	82.6	83.0	83.0	90.3	83.9	76.3	76.4	65.5
...sunflower	134.1	126.9	130.9	125.5	139.5	163.2	225.1	199.0	234.5	246.0

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
...soy	26.5	24.1	16.6	9.3	5.6	3.6	2.3	2.3	6.3	17.0
...tobacco	32.1	32.5	28.1	31.2	28.4	20.1	16.4	17.3	22.0	18.8
…rape for grain	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
…other technical crops	21.1	13.6	17.1	13.7	7.0	6.6	6.0	5.1	5.2	5.9
Potatoes, vegetables and melons & gourds – total	**131.8**	**141.0**	**143.1**	**156.9**	**140.4**	**142.0**	**130.3**	**135.4**	**127.9**	**131.0**
...potatoes	41.2	46.9	55.3	71.1	62.8	57.1	59.6	62.3	62.0	66.6
…vegetables	71.1	78.0	73.7	73.2	68.1	74.0	61.4	63.5	58.6	56.3
… melons and gourds	9.2	8.0	7.0	6.0	5.0	7.6	6.7	7.9	5.2	6.0
…others	10.3	8.1	7.1	6.6	4.5	3.3	2.6	1.7	2.1	2.1
Fodder plants - total	**560.3**	**462.0**	**546.1**	**449.2**	**481.5**	**379.0**	**351.0**	**235.4**	**206.0**	**153.0**
... roots for fodder	26.4	30.0	29.0	28.0	24.0	24.5	17.6	16.3	15.5	14.3
... corn for silage and green fodder	292.3	200.0	299.3	215.8	265.5	179.0	181.0	98.7	97.1	62.8
… perennial grasses for green fodder, silage and forage	206.3	205.2	182.9	174.9	157.3	144.7	124.0	102.6	75.2	58.3
… annual grasses for green fodder	31.4	26.8	35.0	30.5	34.7	29.3	27.0	16.8	17.3	16.9
…others	3.9	0.0	0.0	0.0	0.0	1.3	1.4	1.0	0.9	0.7
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Sown area - total	**1 701.4**	**1 733.4**	**1 736.2**	**1 593.1**	**1 682.5**	**1 698.1**	**1 546.9**	**1 552.4**	**1 552.0**	**1 593.0**
Cereals and leguminous crops - total	**1 077.4**	**1 172.1**	**1 165.7**	**940.6**	**1 144.6**	**1 131.7**	**953.9**	**989.2**	**1 034.8**	**1 033.8**
... wheat (winter and spring)	423.8	490.0	502.8	213.2	342.4	456.1	316.1	333.6	429.6	395.8
....winter rye	3.8	5.5	3.6	1.3	2.6	3.2	0.7	0.8	1.0	1.9
... barley (winter and spring)	125.0	115.4	133.7	96.1	140.8	147.8	123.2	138.1	139.4	184.7
...oat	4.2	4.8	4.3	4.6	5.9	6.4	4.5	4.4	2.8	2.4
…millet	0.4	0.0	0.1	0.2	0.5	0.2	0.1	0.4	0.3	0.3
...buckwheat	12.1	13.7	5.1	4.9	4.1	3.1	3.8	1.3	0.8	1.0
... legumes for grain	53.6	52.2	59.9	48.3	37.9	43.3	42.2	40.1	28.3	36.1
... corn for grain	454.1	488.7	454.7	567.9	604.1	469.1	461.4	469.2	429.5	407.3
…sorghum for grain	0.4	1.0	0.5	3.1	3.8	0.7	0.4	0.2	0.2	0.2
... other cereal crops	0.0	0.8	0.7	0.8	2.5	1.8	1.4	1.3	2.8	3.8
Technical crops – total	**364.9**	**336.6**	**358.6**	**447.9**	**367.2**	**392.6**	**413.3**	**376.7**	**355.9**	**401.0**
...sugar beet	66.6	63.3	52.0	39.7	34.9	34.4	42.4	34.3	24.7	23.4
...sunflower	256.9	237.8	280.7	381.3	293.0	309.2	299.7	241.1	239.1	249.5
...soy	11.6	11.5	10.2	18.3	28.5	36.9	55.9	50.9	31.0	51.0
...tobacco	23.7	17.2	9.3	5.6	5.8	4.8	3.5	3.1	2.7	2.5
…rape for grain	1.0	1.0	1.0	1.0	0.9	2.4	7.1	41.3	53.5	67.4
…other technical crops	3.9	5.8	4.2	2.0	4.1	4.9	4.7	6.0	4.9	7.2
Potatoes, vegetables and melons & gourds – total	**132.3**	**122.5**	**112.6**	**92.5**	**81.4**	**84.0**	**90.1**	**84.0**	**83.2**	**78.7**
...potatoes	65.4	43.0	45.1	38.6	34.8	36.7	34.8	35.8	31.3	28.5
…vegetables	56.8	69.6	58.7	43.7	38.2	39.8	44.4	39.7	41.7	37.0
… melons and gourds	7.9	7.5	6.5	8.7	7.3	5.2	9.1	7.1	8.8	11.9
…others	2.2	2.4	2.3	1.5	1.1	2.2	1.8	1.4	1.4	1.3
Fodder plants - total	**126.8**	**102.3**	**99.3**	**112.1**	**89.3**	**89.9**	**89.6**	**102.4**	**78.1**	**79.5**
... roots for fodder	11.5	4.5	4.1	4.5	3.7	2.5	3.0	1.9	1.9	1.5
... corn for silage and green fodder	49.7	40.3	35.1	44.5	24.6	18.2	16.1	24.9	10.3	11.3
… perennial grasses for green fodder, silage and forage	53.1	48.4	49.8	50.9	53.6	60.2	63.5	68.4	60.2	61.5
… annual grasses for green fodder	11.3	8.1	8.9	11.3	6.1	8.1	5.8	5.6	4.6	3.5
…others	1.1	0.6	1.1	0.9	1.2	0.9	1.1	1.6	1.1	1.7
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Sown area - total	**1 628.2**	**1 597.3**	**1 653.5**	**1 686.3**	**1 694.3**	**1 693.8**	**1 715.1**	**1 735.8**	**1 749.2**	**1 724.0**
Cereals and leguminous crops - total	**1 020.3**	**991.6**	**1 037.3**	**1 080.0**	**1 055.1**	**1 065.3**	**1 074.2**	**1 050.7**	**1 095.4**	**1 074.7**
... wheat (winter and spring)	380.8	353.2	374.2	432.7	415.0	416.9	454.8	410.5	455.2	438.4
....winter rye	1.6	0.6	1.3	2.0	0.5	0.4	0.6	0.6	0.5	0.6
... barley (winter and spring)	164.9	128.4	114.1	126.9	120.9	104.8	101.4	96.9	77.9	63.3
...oat	3.0	2.2	2.3	2.6	2.1	1.7	1.4	1.7	1.3	1.0
…millet	0.5	0.2	0.2	0.1	0.1	0.1	0.9	0.1	0.1	0.1
...buckwheat	0.2	0.6	0.9	0.3	0.3	0.3	0.5	0.4	0.3	0.3
... legumes for grain	39.5	30.2	25.2	23.5	22.5	24.9	26.3	37.1	46.1	42.9
... corn for grain	425.7	473.8	516.9	488.9	490.3	515.1	485.6	500.9	512.0	519.9
…sorghum for grain	0.2	0.1	0.1	0.1	0.1	0.2	1.4	1.3	1.1	7.3
... other cereal crops	3.5	2.3	1.6	2.0	2.8	0.8	1.3	0.9	0.7	0.7
Technical crops – total	**440.5**	**477.2**	**462.7**	**463.3**	**501.9**	**499.0**	**510.6**	**558.4**	**538.9**	**530.5**
...sugar beet	26.5	25.4	31.2	28.7	28.0	21.9	20.9	23.6	19.8	15.3
...sunflower	288.1	320.9	348.4	348.3	371.0	380.6	416.2	451.0	419.3	410.0
...soy	61.5	61.0	62.5	42.8	56.5	69.7	41.4	35.5	29.4	38.1
...tobacco	4.4	3.8	2.4	1.5	0.9	0.8	0.6	0.5	0.4	0.3
…rape for grain	48.9	53.8	8.2	36.0	38.2	13.3	22.4	36.1	58.2	53.6
…other technical crops	10.4	12.2	10.0	5.9	7.2	12.5	9.0	11.8	11.8	12.9
Potatoes, vegetables and melons & gourds – total	**80.5**	**76.4**	**68.4**	**69.9**	**67.1**	**59.6**	**61.5**	**59.9**	**55.6**	**66.2**
...potatoes	28.0	29.7	25.1	24.1	23.1	22.5	20.9	19.9	19.2	18.7

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
…vegetables	40.6	37.4	34.9	37.0	35.5	29.4	30.5	31.0	30.4	39.4
… melons and gourds	10.6	8.2	7.3	7.8	7.3	6.7	7.9	7.8	5.5	7.4
…others	1.4	1.1	1.1	1.0	1.2	1.1	2.2	1.1	0.5	0.7
Fodder plants - total	**86.8**	**79.7**	**85.1**	**73.2**	**70.0**	**69.9**	**68.6**	**66.7**	**59.3**	**52.5**
... roots for fodder	1.7	1.2	1.4	1.2	1.3	1.3	1.5	1.2	1.0	0.6
... corn for silage and green fodder	10.1	10.4	22.4	8.8	9.3	11.2	8.0	6.8	6.3	5.7
… perennial grasses for green fodder, silage and forage	66.9	61.8	56.7	57.7	54.6	51.6	55.0	54.4	47.9	42.5
… annual grasses for green fodder	6.5	4.8	3.9	4.4	3.9	4.4	2.2	2.6	2.6	2.1
…others	1.6	1.4	0.7	1.1	0.9	1.4	1.8	1.7	1.6	1.6

Source: NBS, Database, section „Sown areas, production and average yield of agricultural crops, 1980-2019: <http://statbank.statistica.md/pxweb/Database/RO/16%20AGR/AGR02/AGR02.asp>; Statistical Yearbooks for ATULBD: 1998 (p. 218), 2002 (p 113), 2005 (p. 101), 2009 (p. 97), 2011 (p. 100), 2014 (p. 94), 2019 (p. 109), 2020 (p. 112).

Table 1-38: Average yield for main agricultural crops in 1990-2019, kt

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Cereals and leguminous crops – total	**2538.6**	**3105.9**	**2099.8**	**3340.2**	**1753.8**	**2638.6**	**1981.2**	**3512.3**	**2751.9**	**2375.0**
... wheat (winter and spring)	1129.0	1056.5	925.8	1392.6	658.8	1154.3	673.7	1152.6	951.9	797.8
… winter rye	1.9	1.6	1.4	2.8	2.7	5.9	9.9	10.9	7.0	6.3
... barley (winter and spring)	417.9	427.0	405.0	481.0	324.9	311.2	136.7	256.9	242.2	203.1
...oat	3.8	5.0	6.8	10.7	7.1	9.8	4.2	10.3	9.5	5.9
…millet	0.1	0.1	0.0	0.1	0.1	0.3	0.2	0.5	0.1	0.0
...buckwheat	1.8	5.0	2.3	5.5	3.5	2.2	3.0	4.8	4.3	6.1
... leguminous crops	97.1	105.7	121.8	121.6	70.2	55.4	31.6	63.2	76.9	61.6
... corn for grain	885.5	1501.2	635.6	1324.5	629.3	948.6	1006.6	1788.0	1272.7	1151.3
… sorghum for grains	1.2	3.1	1.1	1.4	1.1	0.8	0.1	0.5	0.2	0.3
... other cereal crops	0.3	0.7	0.0	0.0	56.1	0.3	0.2	0.0	4.7	6.0
Technical crops – total										
...sugar beet	2374.5	1988.6	1783.4	2048.3	1526.7	1877.9	1682.1	1674.8	1356.8	956.4
...sunflower	252.2	151.4	176.2	173.7	149.2	208.1	284.0	174.3	196.4	291.6
...soybeans	23.8	33.4	7.9	9.3	4.0	3.3	2.5	2.7	6.0	13.7
...tobacco	66.2	62.8	42.4	50.2	41.5	27.1	19.8	23.9	24.6	22.6
…rapeseed for grain	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
Potatoes, vegetables, melons and gourds - total										
...potatoes	295.3	290.6	310.8	726.0	474.7	385.3	344.3	392.6	372.5	330.6
…vegetables	1177.3	989.2	787.5	777.2	598.5	568.8	362.4	393.6	570.8	535.8
…melons and gourds	34.4	35.6	9.3	18.6	12.6	23.3	23.3	30.4	25.9	33.9
Fodder plants - total										
... roots for fodder	1171.8	1416.4	922.5	988.6	547.0	597.0	336.5	310.2	286.4	170.1
... corn for silage and green fodder	4509.0	4979.1	3025.9	3358.7	2285.7	2136.2	1212.0	1065.0	856.5	428.6
… perennial grasses for green fodder, silage and forage	4456.1	6053.5	3401.4	3514.6	2013.8	1704.7	1027.2	855.6	498.5	506.8
… annual grasses for green fodder	288.9	420.7	339.0	339.1	190.7	222.3	143.4	96.7	106.6	53.7
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Cereals and leguminous crops – total	**2070.2**	**2847.5**	**2791.2**	**1654.4**	**3178.0**	**3059.9**	**2371.2**	**932.5**	**3261.6**	**2375.5**
... wheat (winter and spring)	725.0	1180.8	1113.1	102.4	861.2	1048.6	682.3	406.5	1286.5	738.9
… winter rye	5.0	9.3	5.9	0.8	5.1	6.1	1.1	0.8	2.0	3.4
... barley (winter and spring)	152.3	248.4	241.7	74.4	284.1	240.9	214.6	125.7	362.3	290.5
...oat	3.5	6.4	4.7	4.0	10.3	7.6	6.1	1.4	3.9	1.6
…millet	0.1	0.0	0.1	0.1	0.3	0.2	0.0	0.1	0.5	0.7
...buckwheat	8.0	6.4	1.4	1.6	1.2	1.1	0.5	0.4	0.5	0.6
... leguminous crops	30.8	79.1	50.2	30.2	51.0	67.1	68.4	14.4	38.0	32.0
... corn for grain	1050.4	1141.9	1206.3	1440.2	1845.1	1523.4	1327.6	363.2	1484.1	1159.6
… sorghum for grains	0.5	1.1	0.5	4.4	3.4	0.3	0.5	0.1	0.1	0.2
... other cereal crops	3.2	5.7	4.2	0.7	3.7	12.3	15.2	1.1	8.1	5.3
Technical crops – total										
...sugar beet	982.5	1120.6	1157.4	660.3	911.3	996.2	1177.3	612.3	960.7	337.4
...sunflower	305.1	278.3	340.9	421.4	354.8	368.7	396.1	158.7	387.2	310.2
...soybeans	11.6	10.5	12.6	19.4	40.2	66.4	80.2	40.0	58.8	50.1
...tobacco	26.3	16.3	12.4	7.2	7.9	6.7	4.9	3.6	3.9	4.4
…rapeseed for grain	1.1	1.0	1.0	1.2	1.1	3.4	6.9	34.9	100.1	81.6
Potatoes, vegetables, melons and gourds - total										
...potatoes	330.4	388.6	326.0	303.2	321.8	391.1	384.1	200.9	273.7	264.8
…vegetables	396.1	487.4	408.4	371.7	328.7	410.3	490.6	226.6	389.4	322.8
…melons and gourds	31.7	39.3	29.0	72.7	57.3	49.3	92.6	41.2	69.9	102.4
Fodder plants - total										
... roots for fodder	125.0	63.5	67.9	55.7	52.7	41.6	34.9	13.8	26.4	20.0
... corn for silage and green fodder	350.7	316.4	322.8	327.9	219.4	199.6	153.3	104.6	113.0	106.4
… perennial grasses for green fodder, silage and forage	317.4	201.5	173.4	145.4	206.7	183.8	194.9	177.0	364.2	213.4
… annual grasses for green fodder	28.8	19.3	16.0	12.6	12.6	16.3	13.6	7.4	15.3	7.9

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Cereals and leguminous crops – total	**2674.3**	**2794.6**	**1359.0**	**3130.0**	**3341.0**	**2587.0**	**3531.7**	**3813.4**	**3946.8**	**4020.6**
... wheat (winter and spring)	749.5	797.1	496.9	1009.6	1102.6	927.4	1302.4	1258.6	1169.1	1152.3
… winter rye	2.4	1.0	2.6	5.7	1.4	1.0	1.8	2.3	1.7	1.9
... barley (winter and spring)	240.7	218.9	139.3	241.6	244.7	199.1	273.9	265.0	188.2	178.2
...oat	3.1	3.6	2.0	3.8	2.9	1.6	2.8	3.6	1.5	1.6
…millet	0.3	0.1	0.1	0.1	0.2	0.2	1.1	0.1	0.1	0.2
...buckwheat	0.5	0.5	0.3	0.4	0.4	0.2	0.9	0.7	0.3	0.4
... leguminous crops	40.1	33.1	17.3	24.1	32.9	25.1	45.1	75.2	51.5	56.6
... corn for grain	1462.1	1547.2	587.2	1546.5	1642.1	1133.6	1485.5	1871.0	2208.0	2263.7
… sorghum for grains	0.2	0.1	0.1	0.4	0.3	0.2	5.1	4.5	4.6	48.9
... other cereal crops	7.7	4.8	2.1	5.4	8.3	2.8	4.4	4.5	2.2	1.5
Technical crops – total										
...sugar beet	837.6	588.6	587.0	1009.0	1356.2	537.5	664.8	876.3	707.2	607.0
...sunflower	440.2	497.4	339.1	602.2	627.1	562.3	789.4	925.1	898.7	915.3
...soybeans	113.0	80.6	48.9	67.6	111.4	49.2	43.8	48.5	59.7	64.8
...tobacco	7.6	5.4	2.9	2.2	1.4	1.2	0.9	1.0	0.7	0.5
…rapeseed for grain	51.0	67.7	8.1	58.8	90.2	25.6	52.4	89.9	120.8	110.2
Potatoes, vegetables, melons and gourds - total										
...potatoes	286.7	362.9	191.5	244.0	275.7	163.8	220.3	201.7	177.7	181.8
…vegetables	365.8	396.0	251.9	319.1	352.3	266.9	320.6	340.9	301.2	339.4
…melons and gourds	104.9	85.2	52.6	56.6	48.3	56.7	69.3	59.6	49.1	47.0
Fodder plants - total										
... roots for fodder	31.7	23.2	10.6	22.2	26.1	14.6	21.0	21.4	19.8	18.2
... corn for silage and green fodder	143.8	125.2	110.8	166.6	135.7	91.7	139.6	111.7	133.8	116.2
… perennial grasses for green fodder, silage and forage	323.9	238.5	97.6	198.6	275.0	118.5	178.8	172.4	177.9	156.3
… annual grasses for green fodder	10.9	11.3	6.3	9.6	13.4	8.8	9.0	11.3	8.7	6.9

Source: NBS, Database, section „Sown areas, production and average yield of agricultural crops, 1980-2019 <http://statbank.statistica.md/pxweb/Database/RO/16%20AGR/AGR02/AGR02.asp>; Statistical Yearbooks for ATULBD: 1998 (p. 218), 2002 (p. 113), 2005 (p. 101), 2009 (p. 98), 2011 (p. 101), 2014 (p. 95), 2019 (p. 110), 2020 (p. 113).

Table 1-39: Average yield per hectare for main agricultural crops in 1990-2019, tons/ha

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Cereals and leguminous crops	**3.4**	**3.7**	**2.8**	**3.7**	**2.1**	**2.9**	**2.2**	**3.3**	**2.6**	**2.3**
... wheat (winter and spring)	3.9	3.5	3.3	4.0	2.2	2.9	1.8	2.8	2.3	2.0
… winter rye	2.1	2.0	2.0	2.6	1.6	2.2	2.1	2.8	1.9	1.6
... barley (winter and spring)	3.5	3.2	3.3	3.5	2.2	2.3	1.3	2.0	1.8	1.6
...oat	1.8	1.7	2.3	2.7	1.4	1.7	1.1	1.6	1.6	1.2
…millet	1.0	1.0	0.4	1.0	0.6	1.4	0.7	1.6	0.4	0.1
...buckwheat	0.5	0.8	0.3	0.8	0.4	0.4	0.4	0.7	0.4	0.4
... leguminous crops	1.3	1.4	1.7	1.7	1.1	1.0	0.7	1.4	1.3	1.0
... corn for grain	3.4	4.8	2.5	3.9	2.2	3.0	2.9	4.0	3.1	2.8
… sorghum for grains	1.9	2.6	0.9	1.1	0.9	0.7	0.4	1.2	0.8	2.6
... other cereal crops	1.7	1.6	1.3	1.8	2.8	1.7	1.3	2.0	1.7	1.9
Technical crops										
...sugar beet	29.1	24.9	21.6	24.7	18.4	20.8	20.0	22.0	17.8	14.6
...sunflower	1.9	1.2	1.3	1.4	1.1	1.3	1.3	0.9	0.8	1.2
...soy	0.9	1.4	0.5	1.0	0.7	1.0	1.0	1.1	0.9	0.8
...tobacco	2.1	1.9	1.5	1.6	1.5	1.3	1.2	1.4	1.1	1.2
…rapeseed for grain	2.0	2.0	1.6	1.2	1.0	0.8	0.7	1.0	0.9	1.2
Potatoes, vegetables and melons & gourds										
...potatoes	7.2	6.2	5.6	10.2	7.6	6.8	5.8	6.3	6.0	5.0
…vegetables	16.6	12.7	10.7	10.6	8.8	7.7	5.9	6.2	9.7	9.5
… melons and gourds	3.7	4.5	1.3	3.1	2.5	3.1	3.5	3.8	5.0	5.7
Fodder plants										
... roots for fodder	44.4	47.2	31.8	35.3	22.8	24.4	19.1	19.0	18.5	11.9
... corn for silage and green fodder	15.4	24.9	10.1	15.6	8.6	11.9	6.7	10.8	8.8	6.8
… perennial grasses for green fodder, silage and forage	21.6	29.5	18.6	20.1	12.8	11.8	8.3	8.3	6.6	8.7
… annual grasses for green fodder	9.2	15.7	9.7	11.1	5.5	7.6	5.3	5.8	6.2	3.2
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Cereals and leguminous crops	**1.9**	**2.4**	**2.4**	**1.8**	**2.8**	**2.7**	**2.5**	**0.9**	**3.2**	**2.3**
... wheat (winter and spring)	1.7	2.4	2.2	0.5	2.5	2.3	2.2	1.2	3.0	1.9
… winter rye	1.3	1.7	1.6	0.6	2.0	1.9	1.6	1.1	1.9	1.8
... barley (winter and spring)	1.2	2.2	1.8	0.8	2.0	1.6	1.7	0.9	2.6	1.6
...oat	0.8	1.3	1.1	0.9	1.7	1.2	1.3	0.3	1.4	0.7
…millet	0.2	0.8	0.5	0.5	0.7	0.9	0.5	0.1	1.7	2.4
...buckwheat	0.7	0.5	0.3	0.3	0.3	0.4	0.1	0.3	0.6	0.6
... leguminous crops	0.6	1.5	0.8	0.6	1.3	1.6	1.6	0.4	1.3	0.9
... corn for grain	2.3	2.3	2.7	2.5	3.1	3.2	2.9	0.8	3.5	2.8
… sorghum for grains	1.2	1.1	1.0	1.4	0.9	0.4	1.3	0.4	0.5	0.9

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
... other cereal crops	1.2	1.6	1.5	1.3	1.3	1.4	1.3	0.7	2.5	1.5
Technical crops										
...sugar beet	14.8	17.7	22.3	16.6	26.1	29.0	27.8	17.9	38.9	14.4
...sunflower	1.2	1.2	1.2	1.1	1.2	1.2	1.3	0.7	1.6	1.2
...soy	1.0	1.1	1.2	1.1	1.4	1.8	1.4	0.8	1.9	1.0
...tobacco	1.1	0.9	1.3	1.3	1.4	1.4	1.4	1.2	1.4	1.8
…rapeseed for grain	1.0	1.0	1.0	1.0	1.2	1.4	1.0	0.8	1.9	1.2
Potatoes, vegetables and melons & gourds										
...potatoes	5.1	9.0	7.2	7.9	9.2	10.6	11.0	5.6	8.7	9.3
…vegetables	7.0	7.0	7.0	8.5	8.6	10.3	11.0	5.7	9.3	8.7
… melons and gourds	4.0	5.2	4.5	8.4	7.8	9.4	10.2	5.8	7.9	8.6
Fodder plants										
... roots for fodder	10.9	14.0	16.6	12.3	14.2	16.4	11.6	7.4	14.1	13.7
... corn for silage and green fodder	7.1	7.8	9.2	7.4	8.9	11.0	9.6	4.2	11.0	9.4
… perennial grasses for green fodder, silage and forage	6.0	4.2	3.5	2.9	3.9	3.1	3.1	2.6	6.0	3.5
… annual grasses for green fodder	2.6	2.4	1.8	1.1	2.1	2.0	2.3	1.3	3.3	2.2
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Cereals and leguminous crops	**2.6**	**2.8**	**1.3**	**2.9**	**3.2**	**2.4**	**3.3**	**3.6**	**3.6**	**3.7**
... wheat (winter and spring)	2.0	2.3	1.3	2.3	2.7	2.2	2.9	3.1	2.6	2.6
… winter rye	1.5	1.8	2.0	2.8	2.8	2.3	2.9	3.6	3.3	3.1
... barley (winter and spring)	1.5	1.7	1.2	1.9	2.0	1.9	2.7	2.7	2.4	2.8
...oat	1.0	1.6	0.9	1.5	1.4	0.9	2.0	2.1	1.2	1.6
…millet	0.5	0.7	0.6	1.8	2.4	1.3	1.2	1.0	1.5	2.0
...buckwheat	3.2	0.8	0.3	1.3	1.5	0.9	1.9	1.6	1.0	1.3
... leguminous crops	1.0	1.1	0.7	1.0	1.5	1.0	1.7	2.0	1.1	1.3
... corn for grain	3.4	3.3	1.1	3.2	3.3	2.2	3.1	3.7	4.3	4.4
… sorghum for grains	0.9	0.7	0.5	3.0	2.8	0.9	3.7	3.8	4.0	4.0
... other cereal crops	1.6	1.9	1.3	2.1	1.1	1.5	2.0	2.7	3.3	3.3
Technical crops										
...sugar beet	31.6	23.2	18.8	35.2	48.4	24.5	31.8	37.1	35.7	39.7
...sunflower	1.5	1.6	1.0	1.7	1.7	1.5	1.9	2.1	2.1	2.2
...soy	1.9	1.4	0.8	1.6	2.0	0.7	1.1	1.4	2.0	1.7
...tobacco	1.7	1.4	1.2	1.5	1.6	1.5	1.5	2.0	1.8	1.7
…rapeseed for grain	1.0	1.3	1.0	1.6	2.4	1.9	2.3	2.5	2.1	2.1
Potatoes, vegetables and melons & gourds										
...potatoes	10.2	12.2	7.6	10.1	11.9	7.3	10.5	10.1	9.3	9.7
…vegetables	9.0	10.6	7.2	8.6	9.9	9.1	10.5	11.0	9.9	8.6
… melons and gourds	9.9	10.4	7.2	7.3	6.6	8.5	8.8	7.6	8.9	6.3
Fodder plants										
... roots for fodder	18.5	19.0	7.4	18.5	20.1	11.2	14.0	17.8	19.8	30.1
... corn for silage and green fodder	14.2	12.0	5.0	19.0	14.5	8.2	17.4	16.4	21.3	20.3
… perennial grasses for green fodder, silage and forage	4.8	3.9	1.7	3.4	5.0	2.3	3.2	3.2	3.7	3.7
… annual grasses for green fodder	1.7	2.3	1.6	2.2	3.4	2.0	4.0	4.3	3.4	3.4

Source: NBS, Database, section „Sown areas, production and average yield of agricultural crops, 1980-2019 <http://statbank.statistica.md/pxweb/Database/RO/16%20AGR/AGR02/AGR02.asp>; Statistical Yearbooks for ATULBD: 1998 (p. 218), 2002 (p. 113), 2005 (p. 101), 2009 (p. 99), 2011 (p. 102), 2014 (p. 96), 2019 (p. 112), 2020 (p. 115).

Plant Production. The yield of 2019 shows an increase, as compared to 2018, (in natural expression) in the volume of cereals and legumes - by 65.1 kt or 1.9% (of them of corn for grains - by 41.5 kt or by 2.0% and legumes - by 5.3 kt or 11.5%), vegetables - by 22.7 kt (8.0%), sunflower - by 17.3 kt (2.2%), soybeans - by 4.7 kt (8.2%), potatoes - by 2.0 kt (1.2%). At the same time, the sugar beet yield has decreased by 118.7 kt (16.8%), grapes - by 73.3 kt (10.0%), fruits and berries - by 54.6 kt (6.1%), wheat - by 17.9 kt (1.5%), rapeseed - by 8.3 kt (9.7%), barley - by 7.4 kt (4.2%).

In 2019, agricultural enterprises produced the main part of the production volume as follows: sugar beet - 90.9%, rape - 89.6%, tobacco - 80.7%, cereals and leguminous crops (excluding corn) - 77.0%, sunflower - 70.1%, soybeans - 61.5%, while 96.8% of the total volume of melons & gourds, 91.0% of potatoes, 86.7% of vegetables, 74.4% of grapes, 63.8% of corn for grain and 62.3% of fruits, nuts and berries were produced by peasant households (small farmers).

For the yield of 2019, an amount of 84 kg of chemical fertilizers (recalculated to 100% nutrients) were introduced per hectare of sown area, to be compared to 103 kg in 2018. The use of natural fertilizer per hectare was 0.08 tons, to be compared to 0.11 tons in 2018. In 2019, the use of herbicides has decreased (by 48.5%), along with use of fungicides (by 26.9%) and biological plant protection products (by 4.5%) per hectare of agricultural crops.

Over the 1990-2019 period, the use of chemical (in thousands of tons of active substance - a.s.) and natural fertilizer (in kt) has decreased by about 51.3% and 99.1%, respectively (Tab. 1-40).

Table 1-40: Use of chemical fertilizer in the Republic of Moldova for the 1990-2019 period, kt

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Chemical fertilizers - total, kt a.s.	**232.4**	**191.4**	**127.6**	**44.9**	**20.0**	**12.5**	**14.3**	**12.1**	**10.3**	**6.1**
nitrogen	92.1	82.7	61.8	26.4	14.1	10.5	13.2	11.4	10.2	5.9
phosphorus	85.7	75.2	43.4	12.7	8.0	1.4	0.7	0.5	0.1	0.1
potassium	54.6	33.5	22.4	5.8	1.6	0.6	0.3	0.2	0.0	0.0
On the average per 1 hectare of sown area, kg	134.1	111.5	74.6	25.2	11.7	7.2	8.3	7.0	6.0	3.6
Natural fertilizer, kt	**9740.0**	**8600.0**	**5300.0**	**4200.0**	**1620.0**	**1779.2**	**905.7**	**352.9**	**227.3**	**122.1**
On the average per 1 hectare of sown area, kg	5.60	5.10	3.40	2.40	1.10	1.20	0.60	0.20	0.10	0.10
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Chemical fertilizers - total, kt a.s.	**10.3**	**12.8**	**18.4**	**15.4**	**17.5**	**18.0**	**16.6**	**22.4**	**24.7**	**19.9**
nitrogen	10.2	12.7	18.0	14.6	16.1	16.1	13.8	18.8	21.9	17.0
phosphorus	0.1	0.1	0.3	0.6	1.0	1.5	2.0	2.4	1.7	2.0
potassium	0.0	0.0	0.1	0.2	0.4	0.5	0.8	1.1	1.1	0.9
On the average per 1 hectare of sown area, kg	6.1	7.4	10.6	9.7	10.4	10.6	10.7	14.4	15.9	12.5
Natural fertilizer, kt	**83.3**	**98.2**	**54.2**	**47.3**	**42.2**	**44.2**	**10.5**	**7.9**	**8.0**	**6.9**
On the average per 1 hectare of sown area, kg	0.03	0.10	0.02	0.06	0.04	0.04	0.01	0.00	0.00	0.01
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Chemical fertilizers - total, kt a.s.	**25.5**	**30.9**	**44.0**	**54.8**	**84.5**	**52.4**	**58.8**	**81.4**	**94.2**	**113.1**
nitrogen	20.6	25.0	34.1	42.1	61.1	38.7	43.4	55.7	64.3	77.2
phosphorus	3.3	4.1	7.1	9.6	19.4	10.8	11.6	19.2	22.2	25.6
potassium	1.6	1.8	2.8	3.1	4.0	2.9	3.8	6.4	7.8	10.3
On the average per 1 hectare of sown area, kg	15.6	19.3	26.6	32.5	49.9	30.9	34.3	46.9	53.9	65.6
Natural fertilizer, kt	**17.7**	**31.5**	**22.9**	**42.6**	**33.8**	**61.2**	**74.6**	**45.5**	**103.4**	**84.0**
On the average per 1 hectare of sown area, kg	0.02	0.04	0.03	0.05	0.03	0.07	0.08	0.05	0.11	0.08

Source: Annual Statistical Reports of the RM for years 1988 (p. 280), 1994 (p. 239), 1999 (p. 330), 2003 (p. 442), 2006 (p. 352), 2011 (p. 345), 2014 (p. 345) and 2019 (p. 296). Statistical Yearbooks of the ATULBD for 1998 (p. 230), 2000 (p. 107), 2002 (p. 111), 2006 (p. 108), 2009 (p. 107), 2012 (p. 114), 2017 (p. 110), 2019 (p. 108), 2020 (p. 111).

Livestock. In 2019 as compared to previous year in all categories of enterprises the production of cattle and poultry (live mass) has decreased by 6.0%, milk production of all types - by 10.9%, eggs - by 2.2%. During the 1990-2019 period, production of the main animal products has significantly decreased, including sale of animals and birds (live mass) for slaughter - by 70.1%, that of milk - by 77.9%, eggs - by 39.2% and wool - by 42.3% (Tab. 1-41).

Table 1-41: Production of main animal products over the 1990-2019 period

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Cattle and poultry sold for slaughter (in live weight), kt	530.0	433.0	334.0	228.0	193.0	174.0	166.0	161.0	145.0	147.0	123.0	115.0	120.0	118.0	119.0
...cattle	181.0	154.0	121.0	99.0	91.0	70.0	58.0	49.0	37.0	35.0	30.0	26.0	27.0	27.0	27.0
...swine	238.0	189.0	150.0	88.0	66.0	67.0	73.0	76.0	75.0	81.0	63.0	56.0	57.0	55.0	53.0
...sheep and goats	15.0	10.0	8.0	9.0	10.0	11.0	10.0	9.0	8.0	8.0	7.0	6.0	6.0	6.0	6.0
...poultry	92.0	76.0	52.0	30.0	23.0	24.0	24.0	25.0	24.0	21.0	21.0	26.0	28.0	29.0	33.0
...other species	4.0	4.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Milk yield, kt	1,503.0	1,284.0	1,128.0	867.0	805.0	751.0	671.0	597.0	589.0	569.0	555.0	561.0	583.0	570.0	604.0
Eggs, million pcs	1,129.0	1,061.0	813.0	530.0	418.0	477.0	526.0	512.0	539.0	555.0	575.0	618.0	671.0	620.0	668.0
Wool, tons	3,043.0	2,869.0	2,616.0	2,598.0	2,812.0	2,895.0	2,808.0	2,711.0	2,433.0	2,278.0	2,066.0	2,074.0	2,072.0	2,057.0	2,028.0
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Cattle and poultry sold for slaughter (in live weight), kt	121.0	134.0	149.5	108.2	124.5	150.0	159.0	156.0	154.8	164.0	174.5	184.3	157.8	163.3	158.6
...cattle	26.0	25.0	25.3	17.6	18.4	16.9	16.1	15.8	13.8	13.7	14.0	15.8	12.7	13.4	12.7
...swine	51.0	61.0	75.1	44.7	53.8	72.5	81.4	82.2	77.8	82.3	91.6	92.9	79.2	84.0	82.7
...sheep and goats	5.0	5.0	5.0	4.8	4.8	4.7	4.7	4.7	4.4	4.2	4.4	4.2	5.1	4.1	4.2
...poultry	37.0	41.0	42.4	39.5	46.0	54.7	55.2	51.7	57.3	62.2	62.7	69.9	59.3	60.3	57.6
...other species	2.0	2.0	1.7	1.6	1.5	1.5	1.6	1.6	1.5	1.6	1.7	1.7	1.7	1.5	1.4
Milk yield, kt	627.0	595.0	571.4	510.5	538.9	591.2	525.8	489.6	485.9	485.3	479.5	462.1	442.6	373.1	331.7
Eggs, million pcs	762.0	765.0	704.3	562.6	640.3	718.5	705.2	621.9	623.7	645.0	628.8	673.5	707.2	688.7	686.6
Wool, tons	2,079.0	2,170.0	2,146.0	2,021.0	1,996.0	2,067.0	2,043.0	1,843.0	1,899.0	1,947.0	1,899.0	1,709.5	1,850.2	1,917.5	1,755.1

Source: National Bureau for Statistics, Database: <https://statbank.statistica.md/PxWeb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__16%20AGR__AGR030/AGR030200.px/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>.

Over the 1990-2019 period, the livestock population has significantly decreased: cattle - by 86.7% (dairy cows - by 77.2%, other cattle - by 92.3%), pigs - by 76.8%, poultry of all species - by 54.9%, sheep - by 56.9%, horses - by 43.9%, donkeys - by 17.6%. At the same time, the number of goats has increased - by 311.6%, and rabbits - by 16.5% (Tab. 1-42).

Table 1-42: Total Livestock and Poultry in all Households Categories in 1990-2019 (as of the end of the year), thousand heads

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Cattle, total, including:	1060.7	1000.5	970.1	882.6	832.0	729.5	646.3	549.7	532.4	482.4
... Dairy cows	395.2	397.1	403.2	401.8	402.6	380.8	355.4	323.7	318.4	306.9
... Other cattle	665.5	603.4	566.9	480.7	429.4	348.7	290.9	226.0	214.0	175.5
Sheep and goats, total, including:	1281.9	1288.8	1357.2	1437.3	1501.9	1423.0	1372.4	1235.3	1147.2	1055.5
... Sheep	1244.8	1239.3	1294.3	1362.4	1409.8	1326.6	1271.1	1136.3	1046.4	948.9
... Goats	37.1	49.5	62.9	74.9	92.2	96.4	101.3	99.0	100.8	106.6
Horses	47.2	48.4	51.4	54.5	58.2	61.6	63.3	65.4	68.5	72.0
Donkeys	1.7	1.8	2.1	2.2	2.9	3.2	3.1	3.0	3.2	3.4
Swine	1850.1	1753.0	1487.4	1082.3	1046.8	1016.4	950.1	797.5	928.0	751.3
Poultry of all species, total, including:	24625.0	23715.0	17128.0	12809.2	13448.3	13746.4	12364.9	12363.9	13046.0	13730.1
...Chicken	20234.4	19607.1	13271.0	9516.6	9957.4	10200.6	9137.4	9112.0	9557.0	9992.5
... Geese	1335.5	1321.8	1300.4	1378.9	1457.0	1487.4	1357.9	1372.3	1470.0	1581.6
... Ducks	2165.7	1914.7	1736.5	1198.9	1284.8	1293.3	1166.6	1169.5	1264.8	1349.4
... Turkeys	889.3	871.3	820.2	714.8	749.0	765.2	703.0	710.1	754.2	806.6
Rabbits	283.0	250.8	298.5	262.4	237.2	209.3	189.8	176.8	185.9	182.6
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Cattle, total, including:	445.4	453.8	454.7	409.1	359.5	339.8	326.9	253.7	238.4	243.0
... Dairy cows	298.5	300.1	304.8	277.7	249.0	233.1	222.0	181.1	171.9	173.2
... Other cattle	146.9	153.7	149.9	131.5	110.5	106.7	104.9	72.6	66.5	69.8
Sheep and goats, total, including:	962.1	971.8	978.4	958.4	959.8	954.3	962.5	866.4	879.6	929.7
... Sheep	846.3	851.7	843.7	829.2	832.6	827.0	842.6	759.9	767.7	809.4
... Goats	115.8	120.2	134.6	129.2	127.2	127.3	119.9	106.5	111.9	120.3
Horses	76.0	81.6	82.6	81.4	75.8	72.0	69.3	60.5	57.4	56.1
Donkeys	3.8	4.3	4.0	4.3	4.0	3.7	3.6	3.1	3.2	2.9
Swine	492.7	490.8	550.1	476.4	422.3	493.0	568.3	320.8	302.9	403.6
Poultry of all species, total, including:	13624.9	14737.4	15535.3	16195.5	17883.9	22773.6	23017.2	17544.2	18830.6	22986.6
...Chicken	9952.9	10952.8	11484.5	12184.2	13559.0	17195.3	17320.6	14162.0	15464.0	18836.1
... Geese	1550.6	1589.9	1777.4	1780.2	1828.0	2120.3	2111.5	1342.2	1277.2	1497.4
... Ducks	1325.3	1368.2	1423.3	1461.9	1592.6	2394.1	2551.0	1435.5	1501.7	1981.8
... Turkeys	796.2	826.6	850.1	769.3	904.4	1063.9	1034.0	604.5	587.8	671.4
Rabbits	161.3	191.4	190.7	205.4	239.1	278.9	326.0	263.4	248.5	274.5
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Cattle, total, including:	236.4	224.4	210.6	208.0	210.7	204.5	199.9	185.6	162.7	141.2
... Dairy cows	165.8	155.8	145.1	141.3	140.6	137.7	132.3	122.1	106.4	90.2
... Other cattle	70.5	68.6	65.5	66.7	70.1	66.9	67.7	63.5	56.3	51.0
Sheep and goats, total, including:	920.6	846.2	836.9	862.0	887.0	880.8	882.0	853.8	781.2	688.8
... Sheep	793.1	714.2	699.0	717.4	733.5	722.2	714.9	683.6	618.3	536.1
... Goats	127.5	132.0	137.8	144.6	153.4	158.6	167.0	170.3	162.9	152.7
Horses	53.6	50.9	47.5	46.0	42.8	40.2	37.4	34.1	30.4	26.5
Donkeys	2.8	2.5	2.4	2.1	2.2	2.0	3.1	5.0	3.8	1.4
Swine	511.7	471.7	438.4	444.8	504.7	484.5	469.8	439.8	431.6	428.4
Poultry of all species, total, including:	23782.5	19766.7	15897.8	11947.9	12520.0	12590.6	13172.6	13616.4	11456.5	11115.7
...Chicken	19456.4	16194.1	13252.8	10096.2	10438.5	10633.3	11155.0	11542.6	9666.9	9494.4
... Geese	1597.3	1351.6	1028.5	718.7	768.0	746.1	770.6	790.7	683.8	621.3
... Ducks	2010.8	1622.1	1166.9	822.4	986.1	904.1	929.1	956.9	823.6	742.8
... Turkeys	718.1	599.0	449.6	310.6	327.4	307.1	317.8	326.1	282.2	257.1
Rabbits	277.0	277.4	267.0	296.2	326.1	350.2	366.7	376.5	351.5	329.7

Source: NBS, Statistical Annual Report No. 24-agr „Animal Breeding Sector", the number of livestock and poultry in all Households Categories as of 1st of January (annually for 1990-2019 periods). Statistical Yearbooks of the ATULBD for1998 (p. 224), 2002 (p. 118), 2006 (p. 109), 2010 (p.110), 2014 (p.104), 2017 (p.117), 2019 (p.115), 2020 (p.118).

1.6.3. Transport

The transport sector of the Republic of Moldova includes in its structure: road transport, railway transport, air transport and river transport.

Road Transport. The network of public roads with a total length of 9.432 thousand km (of which 9.146 thousand km with rigid cover) (Tab. 1-43 and 1-44) has Chisinau city as main node, the intersection center of the main national and international routes which cross the Republic of Moldova.

Table 1-43: Road length, by road category and type of cover, for the 2000-2019 period, km

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total public roads	**9,378**	**9,433**	**9,461**	**9,462**	**9,464**	**9,467**	**9,467**	**9,337**	**9,343**	**9,344**
.. with rigid cover	8,780	8,835	8,877	8,878	8,880	8,883	8,887	8,791	8,810	8,811
Total national roads	**2,812**	**3,328**	**3,324**	**3,325**	**3,326**	**3,329**	**3,329**	**3,329**	**3,335**	**3,336**
.. with rigid cover	2,810	3,323	3,319	3,320	3,320	3,324	3,324	3,324	3,335	3,336
Total local roads	**6,566**	**6,105**	**6,137**	**6,137**	**6,138**	**6,138**	**6,138**	**6,008**	**6,008**	**6,008**
.. with rigid cover	5,970	5,512	5,558	5,558	5,560	5,559	5,563	5,467	5,475	5,475

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total public roads	**9,344**	**9,352**	**9,352**	**9,352**	**9,360**	**9,373**	**9,386**	**9,378**	**9,446**	**9,432**
.. with rigid cover	8,811	8,827	8,835	8,836	8,861	8,879	8,894	9,042	9,079	9,146
Total national roads	**3,336**	**3,336**	**3,336**	**3,336**	**3,339**	**3,339**	**3,346**	**5,815**	**5,822**	**5,842**
.. with rigid cover	3,336	3,336	3,336	3,336	3,339	3,339	3,346	5,765	5,772	5,798
Total local roads	**6,008**	**6,016**	**6,016**	**6,016**	**6,021**	**6,034**	**6,040**	**3,563**	**3,624**	**3,589**
.. with rigid cover	5,475	5,491	5,499	5,500	5,522	5,539	5,547	3,277	3,307	3,348

Source: National Bureau for Statistics, Database: <https://statbank.statistica.md/pxweb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__19%20TRA__TRA010/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802>.

Table 1-44: Length of communication lines as of the yearend for the 2000-2019 period, km

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
General purpose railway lines	1,139	1,121	1,120	1,111	1,075	1,139	1,154	1,154	1,157	1,157
Public roads	9,378	9,433	9,461	9,462	9,464	9,467	9,467	9,337	9,343	9,344
Trolleybus lines in operation	264	285	285	290	290	290	299	306	306	306
General purpose waterways	558	558	558	558	558	558	558	558	558	558
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
General purpose railway lines	1,157	1,157	1,157	1,157	1,156	1,151	1,151	1,151	1,150	1,150
Public roads	9,344	9,352	9,352	9,352	9,360	9,373	9,386	9,378	9,446	9,432
Trolleybus lines in operation	306	306	306	306	306	306	306	306	306	306
General purpose waterways	558	558	558	558	558	558	561	410	410	410

Source: National Bureau for Statistics, Database: <https://statbank.statistica.md/pxweb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__19%20TRA__TRA010/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802>.

Road transport in the Republic of Moldova is represented by a wide range of vehicle types: cars, buses and minibuses, trucks, special purpose cars (ambulances, fire engines, mobile cranes and others) (Tab. 1-45). The main fuel types consumed are petrol, diesel, liquefied petroleum gas and compressed natural gas.

Table 1-45: Road vehicles existing as of the yearned for the 2004-2019 period, units

	2004	2005	2006	2007	2008	2009	2010	2011
Cars (including taxis)	269,551	292,994	319,311	338,944	366,351	386,365	404,290	426,973
Trucks	73,774	81,798	84,087	94,828	115,967	120,174	131,243	141,696
Buses and minibuses	19,741	19,825	21,056	21,095	21,491	21,346	21,395	21,349
Trailers and semi-trailers	36,929	40,379	43,909	46,903	49,583	51,917	54,127	56,482
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Cars (including taxis)	456,379	487,418	512,561	529,813	546,781	588,119	616,800	648,780
Trucks	151,830	154,163	160,199	164,533	168,618	173,384	179,392	185,669
Buses and minibuses	21,433	21,344	21,359	21,134	20,968	20,944	21,050	21,087
Trailers and semi-trailers	58,827	60,797	63,076	64,953	66,832	69,326	71,454	74,115

Source: National Bureau for Statistics, Database: <https://statbank.statistica.md/pxweb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__19%20TRA__TRA010/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802>.

In 2019, the volume of goods transported by means of road transport amounted to 44.6 million tons of goods and it had increased by 8.6% as compared to 1995 (Tab. 1-46). A number of 100.1 million passengers were transported by bus and minibus, a 19.1% increase as compared to 1995 (Tab. 1-47).

Table 1-46: Goods transportation, by types of public transport, during the 1995-2019 period

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Transported goods, thousand tons													
Transport - total, including:	54,203	45,510	45,521	38,719	28,036	28,918	27,823	31,808	34,319	34,701	36,410	38,250	40,794
railway, million tons	13,146	12,481	12,763	11,096	6,612	8,214	10,551	12,616	14,739	13,310	11,704	11,093	11,847
road transport, million tons	41,036	33,008	32,717	27,608	21,407	20,672	17,167	19,084	19,459	21,271	24,593	27,015	28,780
river, thousand tons	19.7	19.7	39.1	13.1	15.9	30.8	103.7	107.5	120.0	119.7	111.8	141.5	166.5
air, thousand tons	1.6	1.2	1.2	1.5	1.3	1.4	1.7	0.9	0.8	0.7	0.8	1.0	1.0
Turnover of goods, million tons-km													
Transport – total, including:	4,296	3,891	3,968	3,597	2,267	2,605	3,042	4,007	4,598	5,169	5,460	6,242	5,865
railway	3,134	2,897	2,937	2,575	1,191	1,513	1,980	2,748	3,019	3,006	3,053	3,673	3,120
road transport	1,160	993	1,028	1,018	1,073	1,088	1,060	1,257	1,577	2,161	2,405	2,567	2,743
river	0.2	0.2	0.3	0.0	0.2	0.1	0.3	0.3	0.3	0.4	0.4	0.6	0.6
air	2.8	1.5	2.4	3.6	3.3	4.1	2.0	1.3	0.9	1.0	1.0	1.3	1.3
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**%**
Transported goods, thousand tons													
Transport - total, including:	39,794	25,989	27,806	30,718	30,023	35,674	37,143	36,712	36,992	42,928	48,357	48,955	-9.7
railway, million tons	11,006	4,415	3,852	4,554	4,164	5,431	5,008	4,158	3,493	4,794	4,928	4,271	-67.5
road transport, million tons	28,585	21,391	23,825	26,013	25,713	30,080	31,907	32,401	33,363	37,998	43,301	44,553	8.6
river, thousand tons	202.0	182.0	127.2	149.1	144.2	162.6	227.2	152.0	135.6	134.8	127.0	129.6	557.9
air, thousand tons	0.8	0.8	1.3	1.6	1.6	1.3	0.8	0.6	0.5	1.1	1.3	1.6	0.0
Turnover of goods, million tons-km													
Transport – total, including:	5,841	3,774	4,193	4,796	4,916	5,652	5,490	5,182	5,484	5,997	6,303	6,508	51.5
railway	2,873	1,058	959	1,196	960	1,227	1,181	964	790	987	1,012	940	-70.0
road transport	2,966	2,714	3,232	3,597	3,955	4,423	4,307	4,217	4,693	5,008	5,290	5,567	380.1
river	0.8	0.6	0.4	0.5	0.4	0.5	0.8	0.4	0.3	0.3	0.3	0.3	50.0
air	1.2	1.1	1.7	1.7	1.7	1.1	1.0	0.8	0.7	0.8	1.0	1.3	-53.6

Source: National Bureau for Statistics, Database: <https://statbank.statistica.md/PxWeb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__19%20TRA__TRA030/TRA030200.px/table/tableViewLayout1/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802>.

Table 1-47: Passenger transportation by types of public transport during the 1995-2019 period

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Transported passengers, thousand passengers													
Transport – total, including:	410,913	373,543	337,466	384,746	406,104	326,657	211,536	280,641	296,250	306,868	316,439	318,141	319,061
railway	11,721	10,373	10,285	9,412	5,410	4,798	4,779	5,052	5,282	5,111	5,024	5,284	5,591
buses	84,040	77,804	65,628	71,739	65,527	72,440	72,724	83,918	93,396	99,295	105,656	109,405	103,184
river	-	-	-	-	-	32	113	89	104	134	135	103	119
air	240.1	233.6	242.4	221.1	196.5	220.9	225.6	237.4	249.2	307.8	361.7	396.6	415.2
taxi	725.0	483.7	376.4	293.4	329.0	722.9	725.4	639.6	697.7	1,056.8	1,007.4	1,097.8	3,413.8
trolleybus	314,187	284,648	260,935	303,082	334,641	248,442	132,968	190,705	196,522	200,963	204,255	201,855	206,338
Passenger turnover, million passenger-km													
Transport – total, including:	3,605	3,296	3,059	3,013	2,675	2,415	2,131	2,624	2,963	3,347	3,549	3,794	4,187
railway	1,019	882	789	656	343	315	325	355	352	346	355	471	468
buses	1,163	1,195	1,071	1,067	1,013	1,021	1,069	1,298	1,640	1,949	2,059	2,206	2,476
river	-	-	-	-	-	0.1	0.2	0.2	0.3	0.4	0.3	0.2	0.2
air	305	294	354	315	239	253	290	324	304	365	440	481	550
taxi	15	11	7	6	6	12	12	11	13	20	19	20	66
trolleybus	1,103	914	838	969	1,074	815	435	636	654	667	676	615	628
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**%**
Transported passengers, thousand passengers													
Transport – total, including:	326,060	291,843	232,455	237,100	240,379	237,238	237,156	248,727	248,315	252,302	261,261	276,542	-32.7
railway	5,763	5,187	4,964	4,711	4,341	4,092	3,838	3,268	2,258	1,814	1,710	1,161	-90.1
buses	110,286	105,806	105,985	115,271	118,091	114,800	108,279	102,642	102,122	100,400	98,687	100,108	19.1
river	105	119	119	123	116	116	142	139	139	130	136	136	
air	473.9	459.6	649.2	700.4	673.0	655.0	897.8	1,085.4	1,128.5	1,640.4	1,628.2	1,575.5	556.2
taxi	4,259.1	3,836.4	4,262.4	4,085.5	3,724.4	3,761.7	3,048.0	4,950.8	4,960.3	6,897.9	9,604.7	9,395.3	1195.9
trolleybus	205,172	176,436	116,477	112,209	113,434	113,812	120,951	136,642	137,708	141,420	149,495	164,166	-47.7
Passenger turnover, million passenger-km													
Transport – total, including:	4,430	3,933	3,993	4,350	4,472	4,574	4,632	5,072	5,302	6,232	6,597	6,693	85.7
railway	486	423	399	363	347	330	257	181	122	99	95	74	-92.7
buses	2,599	2,300	2,417	2,733	2,836	3,004	2,720	2,834	3,006	3,132	3,375	3,512	202.1
river	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	
air	638	604	751	837	875	822	1,225	1,543	1,651	2,424	2,455	2,388	681.9
taxi	84	73	80	81	75	76	63	101	108	149	220	221	1370.7
trolleybus	623	533	347	335	340	342	367	413	416	427	453	498	-54.8

Source: National Bureau for Statistics, Database: <https://statbank.statistica.md/PxWeb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__19%20TRA__TRA030/TRA030500.px/table/tableViewLayout1/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802>.

Railways. Railway transport has been active in the Republic of Moldova for over 140 years. The length of the railways is about 1,150 km, and the density of communication roads per 1000 km^2 is about 34 km. Railway transport is provided by line diesel locomotives (power 400-4000 kW), shunting locomotives (power 200-2000 kW), diesel trains, freight wagons and passenger wagons. During the reporting period a trend towards reducing the number of rolling stock existing in the inventory was recorded (Tab. 1-48). The main type of fuel used in railway transport is diesel.

Table 1-48: Means of railway vehicles existing as of the yearend for the 2000-2019 period, units

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Diesel locomotives	162	162	160	159	156	156	154	154	152	152
Railway wagons	11,037	10,473	9,763	9,175	8,944	8,758	8,613	8,356	8,319	8,342
Freight wagons	10,577	10,033	9,303	8,723	8,492	8,318	8,177	7,940	7,921	7,919
Passenger wagons	460	440	460	452	452	440	436	416	398	423
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Diesel locomotives	152	150	139	138	138	138	138	138	134	134
Railway wagons	8,246	8,005	7,832	7,423	7,247	7,247	7,087	5,850	4,953	4,848
Freight wagons	7,835	7,606	7,433	7,035	6,866	6,866	6,741	5,582	4,690	4,586
Passenger wagons	411	399	399	388	381	381	346	268	263	262

Source: National Bureau for Statistics, Database: <https://statbank.statistica.md/PxWeb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__19%20TRA__TRA020/TRA020300.px/table/tableViewLayout1/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802>.

In 2019, the volume of goods transported by railways was 4.3 million tons and it had decreased by 67.5% as compared to 1995 (Tab. 1-46). A number of 1.2 million passengers were transported by rail, 90.1% less than in 1995 (Tab. 1-47).

River Navigation. River navigation in the Republic of Moldova is developing, after a long period of stagnation (in 2000, the process of transporting goods on the Dniester River was resumed after over a 10-year interruption). Currently, the ports of Bender (Tighina), Dnestrovsk, Malovata and Rabnita on the Dniester River, the port of Ungheni on the Prut River and the port of Giurgiulesti on the Danube River, which also has access to the Black Sea, are active in the Republic of Moldova. The

length on general use waterways is currently about 476 km in the Republic of Moldova (including 410 km on the right side of the Dniester River, respectively 66 km on the left side of the Dniester River). There is a relatively small number of river transport vehicles (Tab. 1-49), which are used in the Republic of Moldova for transport of goods and passengers on the Danube River and the Dniester and Prut rivers, especially during the warm period of the year. In 2019, the volume of goods transported by river transport amounted to 129.6 thousand tons and it had increased about 6.6 times as compared to 1995. A number of 136 thousand passengers were transported by river transport, or about 4.2 times more than in 2000 (32 thousand passengers).

Table 1-49: River transport means existent by the end of the year on the right bank of Dniester River for the 2000-2019 period, units

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
River ships	29	28	28	28	28	28	23	21	18	18
Cargo ships without propulsion	15	15	15	15	15	15	13	12	9	9
Tugs, pushers	12	12	12	12	12	12	11	11	8	8
Self-propelled passenger ships	3	3	3	3	3	3	2	1	1	1
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
River ships	18	18	18	18	18	18	19	16	16	16
Cargo ships without propulsion	9	9	9	9	9	9	9	7	7	7
Tugs, pushers	8	8	8	8	8	8	8	7	7	7
Self-propelled passenger ships	1	1	1	1	1	1	2	2	2	2

Source: National Bureau for Statistics, Database: <https://statbank.statistica.md/PxWeb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__19%20TRA__TRA020/TRA020400.px/table/tableViewLayout1/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802>.

Air Transport. There are four airports in the Republic of Moldova: in Chisinau, Balti, Cahul and Marculesti. Of these, only Chisinau airport operates regular passenger routes. The airports of Cahul and Marculesti are in a state of certification. Balti Airport is certified, but it only serves irregular routes. The aircraft fleet in the Republic of Moldova has changed significantly over the recent years. Prior to 1997, about 90% of flights were operated with aircraft types produced in the CIS countries; however, by 2014 their share fell below 45%. Most of the aircraft in use are modern aircraft with low greenhouse gas emissions, produced mainly in industrially developed western countries. In Tab. 1-50 data are provided on the number of aircraft in use as of the yearend of each calendar year for the 2000-2019 period. In 2019, the volume of goods transported by air was 1.6 thousand tons. A number of 1.5755 million passengers were transported by air, about 6.6 times more than in 1995.

Table 1-50: Air transport means existing by the end of the year, for the 2000-2019 period, units

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Civil aircraft	32	27	26	28	28	39	51	23	26	28
Civil aircraft for passenger transport	26	21	19	19	20	32	35	20	23	24
Civil aircraft for carriage of goods	6	6	7	9	8	7	16	3	3	4
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Civil aircraft	25	24	11	23	23	7	12	5	6	7
Civil aircraft for passenger transport	22	20	9	21	21	7	9	3	4	4
Civil aircraft for carriage of goods	3	4	2	2	2	-	5	2	2	3

Source: National Bureau for Statistics, Database: <https://statbank.statistica.md/PxWeb/pxweb/ro/40%20Statistica%20economica/40%20Statistica%20economica__19%20TRA__TRA020/TRA020500.px/table/tableViewLayout1/?rxid=9a62a0d7-86c4-45da-b7e4-fecc26003802>.

1.6.4. Dwellings

As of 31 December 2019, the housing stock of the Republic of Moldova covered 88.5 million m^2 of total area (a 0.8% increase as opposed to previous year, respectively, a 13.6% increase as compared to 1990) (Tab. 1-51).

Table 1-51: Dwelling stock in the Republic of Moldova (right bank of the Dniester River) during the 1990-2019 period (as of yearend), million m^2 total area

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total dwelling stock, mil m^2	77.9	79.1	66.9	68.7	70.2	71.8	72.2	73.2	74.5	75.4	75.6	75.9	76.2	76.8	76.8
Urban dwelling stock, mil m^2	29.5	30.1	23.5	23.9	24.9	26.0	26.1	26.6	27.1	27.9	28.1	28.4	28.5	28.5	28.4
Rural dwelling stock, mil m^2	48.4	49.0	43.4	44.8	45.3	45.8	46.1	46.6	47.4	47.5	47.5	47.5	47.7	48.3	48.4
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total housing fund, mil m^2	77.1	77.1	77.8	78.4	78.9	79.3	79.9	80.2	80.6	81.0	81.5	86.8	87.3	87.8	88.5
Urban dwelling stock, mil m^2	28.6	28.6	29.1	29.7	30.1	30.4	30.9	31.1	31.7	32.1	32.5	37.9	38.3	38.7	39.4
Rural dwelling stock, mil m^2	48.5	48.5	48.7	48.7	48.8	48.9	49.0	49.1	48.9	49.0	49.0	48.9	49.0	49.1	49.1

Source: Annual Statistical Reports of the Republic of Moldova for the years 1993 (p. 318-320), 1994 (p. 312-315), 1999 (p 214-218), 2003 (p. 183-189), 2006 (p.149-154), 2007 (p.141-146), 2008 (p.143-148), 2009 (p.137-142), 2010 (p.137-142), 2014 (p.137-141), 2015 (p. 135-139), 2016 (p. 180-187), 2017 (p. 134-137), 2020 (p. 130).

According to the number of rooms, in 2019 only 10.2% of the total number of registered dwellings were single-room dwellings (for comparison - 21.7% in 1990), 32.3% - with two rooms (47.6% in 1990), 36.5% - with three rooms (30.7% in 1990), respectively 21.0% - with four and more rooms.

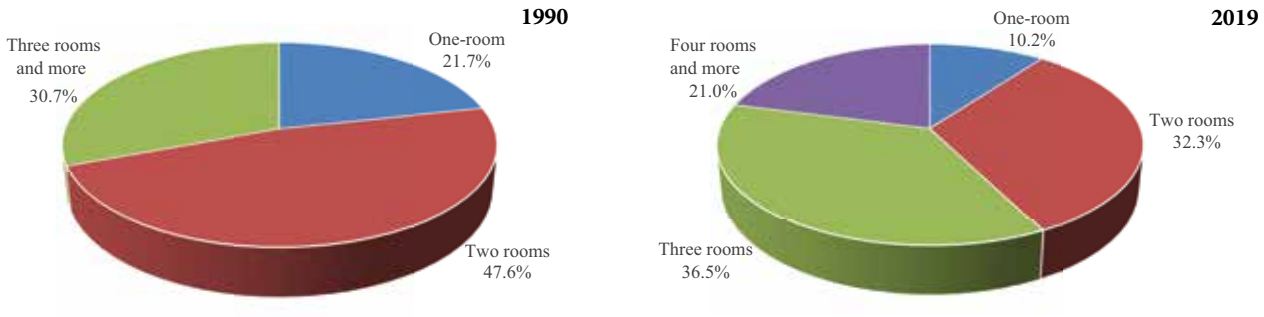


Figure 1-24: Structure of dwellings by number of rooms in 1990 and in 2019 in the RM.

Further information is provided on indicative energy consumption per m² of total area in the residential sector of the Republic of Moldova for the 1990-2019 period (Tab. 1-52).

Table 1-52: Indicative energy consumption per m² of total area in the residential sector of the Republic of Moldova during the 1990-2019 period

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Dwelling stock, mil m² total area	77.9	79.1	66.9	68.7	70.2	71.8	72.2	73.2	74.5	75.4
Energy consumption in the residential sector, kt.c.e.	2025	1670	1314	531	602	613	778	815	697	610
Indicative energy consumption per m² total area in the residential sector, kg c.c./m²	26.0	21.1	19.6	7.7	8.6	8.5	10.8	11.1	9.4	8.1
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Dwelling stock, mil m² total area	75.6	75.9	76.2	76.8	76.8	77.1	77.1	77.8	78.4	78.9
Energy consumption in the residential sector, kt.c.e.	602	610	681	822	938	1004	986	856	906	943
Indicative energy consumption per m² total area in the residential sector, kg c.c./m²	8.0	8.0	8.9	10.7	12.2	13.0	12.8	11.0	11.6	12.0
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Dwelling stock, mil m² total area	79.3	79.9	80.2	80.6	81.0	81.5	86.8	87.3	87.8	88.5
Energy consumption in the residential sector, kt.c.e.	1631	1664	1692	1675	1705	1722	1797	1916	1979	1817
Indicative energy consumption per m² total area in the residential sector, kg c.c./m²	20.6	20.8	21.1	20.8	21.0	21.1	20.7	22.0	22.5	20.5

Sources: Annual Statistical Reports of the RM for the years 1993, 1999, 2003, 2006, 2009, 2014, 2017 and 2020. Energy Balance of the Republic of Moldova for years 1990 and 1993-2019.

The presented data are relevant only for identification of general trends, as the time series associated with energy consumption in the residential sector are not stable (we refer to the 1990-2009 and 2010-2019 periods), due to the fact that consumption of biofuels and waste in the residential sector was revised for the period 2010-2019 with the support of Energy Community experts, based on the results obtained in the "Research on energy consumption in households", conducted by the NBS in 2015.

The significant reduction (by about 69.4%) of the indicative energy consumption per m² of total area in the residential sector during the 1990-2000 period correlates well with the evolution of some socio-economic indicators during the period (for example, GDP per capita) and it is largely a consequence not so much of improving energy efficiency in the residential sector, but rather it is connected with the conditions during the transition to the market economy, after declaration of independence by the Republic of Moldova and the disintegration of the USSR, resulting in low per capita income.

The data also reflect the significant increase in the cost of energy resources during the period and the reduced purchasing capacity of the population for purchase of energy resources, for adequate maintenance of housing as well as the fact that decent livelihoods were inaccessible. During the 2001-2019 years, a gradual increasing trend is recorded in indicative energy consumption per m² of total area in the residential sector, with relatively constant values for the 2010-2019 years. The recorded values are below the level of those in the reference year, including the consequence of implementation of energy efficiency measures provided for in sectoral policies, especially since 2011.

The information presented below shows that over the recent period there is a gradual improvement in the living conditions of the population in the Republic of Moldova. An increasing share of the country's population has access to water supply, sewage, central heating, bathroom, mains gas supply systems and hot water supply systems (Tab. 1-53).

Table 1-53: Equipment of dwelling stock by total area with water supply system, sewerage system, central heating, bathroom, gas and hot water supply system in the 1997-2019 period, %

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Share of total area equipped with:	Total for the country											
water supply	32.4	32.8	33.8	33.4	33.2	33.4	33.9	34.3	34.6	34.8	35.7	36.5
sewerage system	28.3	29.1	28.8	29.4	29.9	30.0	30.4	30.6	30.8	30.9	32.1	32.9
central heating system	27.1	27.3	27.0	26.7	26.9	26.7	26.7	27.4	27.5	27.8	28.4	29.5
bathroom (shower room)	26.4	25.4	25.7	25.7	25.2	25.3	25.8	25.8	26.0	27.4	28.2	28.9
gas	81.3	82.9	81.9	82.6	83.2	83.3	84.4	85.1	85.4	85.7	86.2	86.6

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
hot water supply system	20.5	19.2	19.3	19.4	19.6	19.0	19.2	19.4	19.5	21.1	21.8	22.6
Share of total area equipped with:	**Urban communities**											
water supply	77.9	78.4	77.4	77.0	77.2	77.5	78.7	78.9	79.0	78.9	79.5	79.8
sewerage system	76.2	77.7	75.2	75.9	76.3	76.6	77.8	77.7	77.9	77.8	78.4	78.7
central heating system	77.3	78.0	75.5	74.8	74.5	73.4	74.0	73.7	73.8	74.2	74.9	75.0
bathroom (shower room)	70.3	67.5	66.1	66.0	66.1	66.4	67.6	67.2	67.3	71.4	81.3	72.3
gas	89.0	90.4	90.0	91.0	91.2	91.1	91.4	91.8	92.1	92.4	93.0	93.1
hot water supply system	59.9	56.0	55.1	55.2	55.6	53.9	55.1	55.1	55.0	59.8	62.9	61.6
Share of total area equipped with:	**Rural communities**											
water supply	9.4	9.7	10.9	10.3	9.8	10.0	10.4	11.0	11.3	11.6	12.4	13.1
sewerage system	4.1	4.6	4.5	4.7	5.2	5.4	5.5	6.0	6.1	6.4	7.5	8.2
central heating system	1.5	1.6	1.5	1.3	1.5	1.9	1.9	3.2	3.3	3.4	3.8	5.0
bathroom (shower room)	4.1	4.1	4.4	4.4	3.3	3.5	3.9	4.2	4.2	4.3	4.8	5.5
gas	77.3	79.1	77.7	78.2	78.9	79.4	80.7	81.6	81.8	82.2	82.6	83.1
hot water supply system	0.6	0.6	0.6	0.4	0.4	0.4	0.4	0.8	0.8	0.8	1.0	1.6
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	%
Share of total area equipped with:	**Total for the country**											
water supply	37.5	44.2	46.3	47.5	50.1	51.7	53.5	58.2	58.7	59.6	60.4	86.4
sewerage system	34.6	43.8	46.0	47.5	49.9	51.5	53.2	55.8	56.3	57.5	58.3	106.0
central heating system	30.8	35.1	36.3	37.6	39.3	40.4	41.5	46.0	46.1	46.4	46.9	73.1
bathroom (shower room)	29.5	35.6	37.3	38.5	39.9	41.0	42.6	37.3	37.5	38.1	38.7	46.6
gas	87.3	87.8	88.7	89.0	89.4	90.0	90.2	90.4	90.1	90.2	90.3	11.1
hot water supply system	23.4	29.5	30.4	31.3	33.8	35.2	36.3	34.4	35.1	35.6	36.1	76.1
Share of total area equipped with:	**Urban communities**											
water supply	80.0	82.8	84.4	84.7	85.4	85.6	86.3	90.1	89.3	89.4	89.6	15.0
sewerage system	79.1	82.7	84.4	84.7	84.9	85.1	85.8	84.9	84.2	85.0	85.4	12.1
central heating system	76.3	77.6	78.8	78.4	78.9	79.2	80.5	83.9	83.6	83.5	83.8	8.4
bathroom (shower room)	72.6	75.0	76.4	77.3	77.6	78.1	79.2	60.0	59.2	59.5	59.9	-14.8
gas	93.4	92.6	93.4	93.7	93.9	94.2	94.4	93.9	93.0	93.0	93.2	4.7
hot water supply system	62.3	66.6	67.4	68.7	70.8	71.6	72.5	61.8	62.2	62.2	62.6	4.5
Share of total area equipped with:	**Rural communities**											
water supply	14.5	20.2	22.3	23.9	27.2	29.4	31.7	33.6	34.7	36.1	37.1	294.7
sewerage system	10.4	19.6	22.2	23.9	27.2	29.4	31.6	33.3	34.5	35.7	36.6	792.7
central heating system	6.0	8.6	9.5	11.7	13.7	15.0	15.7	16.6	16.8	17.1	17.3	1053.3
bathroom (shower room)	6.0	11.2	12.7	13.9	15.4	16.8	18.4	19.7	20.5	21.3	21.7	429.3
gas	84.0	84.9	85.6	85.9	86.5	87.3	87.4	87.6	87.8	88.0	88.0	13.8
hot water supply system	2.3	6.4	7.0	7.6	9.7	11.3	12.2	13.1	14.0	14.5	14.8	2366.7

Sources: Annual Statistical Reports of the Republic of Moldova for the years 1993 (p. 318-320), 1994 (p. 312-315), 1999 (p 214-218), 2003 (p. 183-189), 2006 (p.149-154), 2007 (p.141-146), 2008 (p.143-148), 2009 (p.137-142), 2010 (p.137-142), 2014 (p.137-141), 2015 (p. 135-139), 2016 (p. 180-187), 2017 (p. 134-137), 2020 (p. 131).

Over the period 1990-2019, gasification of the country was successfully carried out. This has led to a considerable reduction in consumption of solid and liquid fuels in favor of natural gas consumption, and after 2010 also in favor of renewable energy sources (especially biomass).

According to the data in Tab. 1-54, the length of natural gas networks has increased about 12.9 times in the Republic of Moldova during the 1990-2019 period, including about 6.8 times in urban areas and about 21.1 times in rural areas. In the same context, the total number of apartments (houses) with mains gas supply had increased during the same period about 1.7 times in urban areas and about 11.0 times in rural areas of the Republic of Moldova.

Table 1-54: Gas supply to population in the Republic of Moldova over the 1990-2019 period

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Length of gas pipes - total, km	**1 873.4**	**2 868.0**	**2 040.6**	**2 227.6**	**2 597.3**	**4 305.8**	**4 696.0**	**5 490.4**	**6 427.3**	**7 137.7**
in urban communities	1 072.0	1 699.0	898.3	1 003.7	1 167.9	2 262.5	2 429.7	2 678.5	3 173.6	3 564.9
in rural communities	801.4	1 169.0	1 142.3	1 223.9	1 429.4	2 043.3	2 266.3	2 811.9	3 253.7	3 572.8
Number of apartments (houses) connected to mains gas, thousand	1 286.5	1 304.7	1 083.8	1 105.5	1 112.8	1 115.5	1 115.5	1 108.9	1 103.6	1 108.8
Total number of apartments (houses) connected to mains gas - apartments with gas supply:										
in urban communities	281.8	299.6	214.7	230.9	252.1	263.0	281.2	289.1	296.9	305.8
in rural communities	21.5	26.2	21.7	27.4	33.3	38.9	47.3	55.2	62.8	67.7
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Length of gas network - total, km	**7 470.9**	**7 926.2**	**8 627.9**	**9 509.2**	**10 835.1**	**12 465.0**	**13 955.8**	**15 735.4**	**17 408.6**	**19 003.4**
in urban communities	3 675.0	3 799.8	4 039.7	4 321.8	4 687.8	4 983.7	5 303.4	5 616.7	5 968.0	6 139.3
in rural communities	3 795.9	4 126.4	4 588.2	5 187.4	6 147.3	7 481.3	8 652.4	10 118.6	11 440.6	12 864.1
Number of apartments (houses) connected to mains gas, thousand	1 085.5	1 093.8	1 098.5	1 104.1	1 115.5	1 141.4	1 121.2	1 145.0	1 146.5	592.1
Total number of apartments (houses) connected to mains gas - apartments with gas supply:										
in urban communities	309.3	315.7	322.9	332.9	345.2	357.8	368.2	385.6	396.1	406.9
in rural communities	71.5	77.3	84.6	94.9	107.7	123.7	139.0	157.5	172.8	185.2

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Length of gas network - total, km	**20,203.5**	**21,070.3**	**21,537.6**	**21,843.4**	**22,129.3**	**22,860.0**	**22,981.0**	**23,226.0**	**23,757.0**	**24,208.0**
in urban communities	6,272.8	6,471.3	6,564.9	6,642.7	6,743.4	6,907.0	6,990.0	7,074.0	7,172.0	7,284.0
in rural communities	13,930.7	14,599.0	14,972.7	15,200.7	15,385.9	15,353.0	15,991.0	16,152.0	16,585.0	16,924.0
Number of apartments (houses) connected to mains gas, thousand	610.5	625.7	633.6	642.3	653.0	665.5	675.2	693.8	707.7	725.3
Total number of apartments (houses) connected to mains gas - apartments with gas supply:										
in urban communities	414.7	421.6	427.0	432.9	440.3	449.5	456.4	471.9	480.2	489.6
in rural communities	195.8	204.1	206.6	209.4	212.7	216.0	218.8	221.9	227.5	235.7

Sources: Annual Statistical Reports of the Republic of Moldova for the years 1993 (p. 318-320), 1994 (p. 312-315), 1999 (p. 214-218), 2003 (p. 183-189), 2006 (p.149-154), 2007 (p.141-146), 2008 (p.143-148), 2009 (p.137-142), 2010 (p.137-142), 2014 (p.137-141), 2015 (p. 135-139), 2016 (p. 180-187), 2017 (p. 134-137), 2020 (p. 133).

1.6.5. Waste Management

Current situation with the waste management in the Republic of Moldova is similar to the situation in other developing countries; it is in the budding stage and includes two basic elements: municipal solid waste (MSW) generating sources and the landfills.

The generation of municipal solid waste is influenced by many factors, the most important being the income of the population, consumer behavior, appearance on the market of new packaged products, as well as evolution of the demographic situation. The higher level of welfare of the population during the recent period of time, but also the increased pace of urbanization, has resulted in a capacity to generate a larger amount of waste per capita, which varies, according to a World Bank study, in rural areas in the range of 0.3-0.4 kg/inhabitant/day, respectively, 0.9 kg/inhabitant/day and more, in urban areas. These data were also considered in the development of the Waste Management Strategy in the Republic of Moldova for the years 2013-2027.

Currently, food consumption is generating increasingly more waste. The introduction of new packaging, especially plastic, has a significant negative impact on the environment. Packaging made of polyethylene terephthalate (PET) has replaced glass packaging in recent years; while polyethylene (PE) sacks, bags or boxes have replaced paper packaging, thus influencing the quantities and composition of generated waste.

The higher number of markets, shops and supermarkets, along with increase in the well-being of the population, respectively, of the purchasing power of packaged products, has implicitly led to a greater capacity to generate waste, especially in urban areas.

At the stage of completing the feasibility studies for development of waste management systems at regional level, in the Republic of Moldova the waste generation indicators were revised, the following values being proposed for rural communities: 0.5-0.7 kg/per capita/day, respectively 0.9 kg/per capita/day for small urban communities and district centers, and between 1.3-1.5 kg/per capita/day for Balti and Chisinau municipalities. It should be noted that calculations are based on activity data related to waste disposal at landfills, provided by the MSW collection services.

The most widely used method of treating household waste is landfilling, which is often an important source of soil and groundwater pollution. In this context, the sanitation of communities, urban waste management, is an important objective of governmental and local entities.

According to the "Annual Report of the Inspectorate for Environmental Protection for 2019", a number of 1.137 thousand landfills with an area of 1.222 thousand ha are in operation. The landfills were organized in practically every community by local public authorities. A number of 0.989 thousand landfills with an area of 1.028 thousand ha operate according to decisions of local councils. Most of the MSW landfills, about 3/4 of them, do not comply with sanitary and ecological requirements; thus, the volume of household waste, accumulated since their operation, is not known. Currently, in most Mayor's offices activities regarding the sanitation problems of communities, the separate waste collection are organized at a satisfactory level. Thus, specialized services in waste collection and disposal exist in municipalities, in all district centers. Their management is done in an organized way through services, which work on a contract basis with individual waste generators. Thus, 168 services specialized in waste collection and disposal are organized and operate (56 services in the urban sector and 112 services in the rural sector). A number of 272 rural communities are served by municipal waste collection services. Statistical records of volumes of waste historically accumulated in landfills are not kept; there are only visual estimates by environmental inspectors, who estimate the total volume of MSW accumulated in landfills at about 30-35 million tons.

In most of the district centers landfills are overloaded, the thickness of the deposited waste layer being about 10-15 m (such as in the cities of Ungheni, Cahul, Ocnita, etc.), while in some landfills the thickness reaches about 10-20 m (such as in the cities of Briceni, Balti, Ialoveni, etc.) or even up to about 25-30 m (as in the landfills in Cretoaia and Orhei). About 3/4 of these landfills have been in operation for about 30-40 years, with a degree of usage of over 80%.

Over the recent years, changes were made in waste management in Chisinau. The solid waste landfill in Tantareni village, which serves Chisinau municipality, was put into operation towards the end of 1990 (the actual operation of the landfill began in 1991); the landfill has an area of about 24.95 ha, of which the net area is 20.89 ha.

According to the landfill project, the storage capacity was planned for about 44 million m^3, of MSW, its operation

period having expired by the end of 2010. By 2011, when its use was interrupted, only about 19 million m^3 were stored, which is less than half of the storage capacity.

Starting in 2011 until June 2017, Chisinau municipality has been depositing waste near the waste transshipment station in Bubuieci village, this being a temporary solution, which was a serious environmental problem, as the waste was deposited on an undeveloped land, not equipped with environmental protection measures such as waterproofing of the foundation, collecting and treating leachate, diverting rainwater, etc. In the summer of 2017, the use of the MSW landfill in Tantareni village was resumed, conditions for the reopening of the landfill having been negotiated with the local public authorities, including the solution of environmental protection issues.

During 2018-2019, measures were taken to recultivate and remedy the environmental pollution caused by the landfill, located near the waste trans-shipment station in Bubuieci village. Also, recently, in November 2020, a leachate treatment station at the landfill in the village of Tantareni was put into operation and, simultaneously, a protection dam for the landfill is being built.

Over the 1986-2016 period, several studies were conducted in the Republic of Moldova on identifying the morphological composition of MSW. Fig. 1-25 shows the share of biodegradable waste in the MSW in the Republic of Moldova, with a decrease from 77% in 1986 to 54% in 2001 with a subsequent increase to 72% in 2005 and a subsequent reduction to about 59% in 2016.

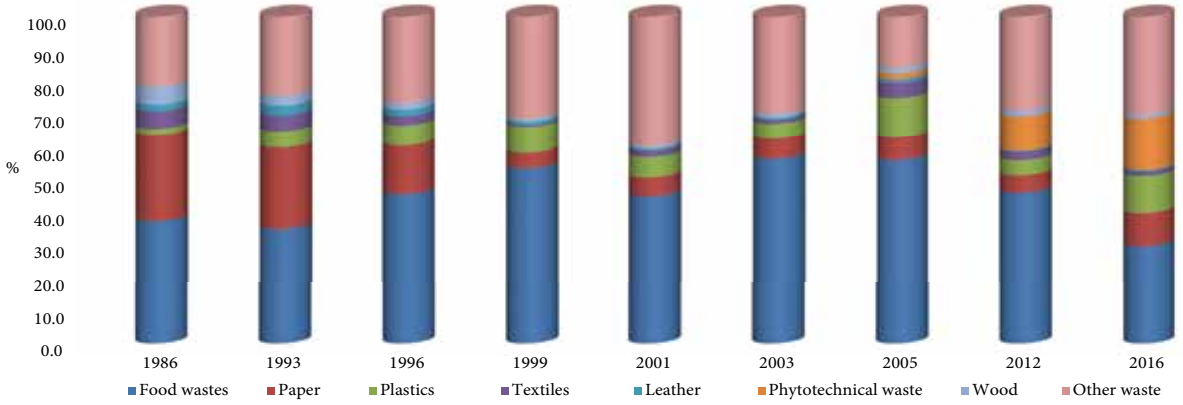


Figure 1-25: Biodegradable waste in the major waste streams in the Republic of Moldova.

The last study on assessing the morphological composition of the municipal solid waste generated in Chisinau, respectively in the cities of Causeni and Straseni, was conducted in 2016 by a team of specialists from the Centre for State Ecological Investigations, previously involved in similar analyses, in agreement with the experts of the "Climate Change Office" and "Prevention of Environmental Pollution Office" of the Ministry of Agriculture, Regional Development and Environment (Tab. 1-55).

Table 1-55: Annual national average of morphological composition of MSW in 2016

Category and type of waste		Morphological composition of municipal solid waste , %			
		Chisinau	Causeni	Straseni	Average for the country
Recyclable waste	Paper, cardboard	6.5	8.0	15.8	10.1
	Glass	5.5	6.0	5.7	5.7
	Plastic products	7.0	14.2	12.8	11.3
	Metals and non-metals	1.5	1.8	1.5	1.6
Organic waste	Food scraps	26.4	33.6	29.2	29.7
	Vegetation waste	19.5	11.8	16.3	15.9
	Textile	2.9	0.3	1.3	1.5
	Footwear	0.1	0.8	0.3	0.4
Bulky waste	Furniture	2.0	0.0	0.0	0.7
	Electrical and electronic equipment	0.3	0.5	0.0	0.3
Other waste	Wood	1.7	0.2	0.0	0.6
	Construction and demolition waste	26.6	22.8	17.0	22.1

In 2013, with the support of the GIZ Project "Modernization of local public services" and based on the Waste Management Strategy of the Republic of Moldova for the years 2013-2027, approved by Government Decision no. 248 of 10.04.2013, waste management planning activities were initiated at the level of development regions. Thus, for example, in February 2014, the regional sectoral programs in the field of waste management for the Central and Northern Development Regions were approved.

With reference to the statistical sources on waste management, statistical forms F-1 "Toxic waste" and F-2 "Waste" and statistical form "Special Road vehicles" are noteworthy, while starting in 2003, the statistical form no. 2-gc "Sanitation of urban communities", approved by order of the Department of Statistics and Sociology of the Republic of Moldova no. 83 of 01.08.2003, are used which show the volumes of stored municipal solid waste.

The analysis revealed that only municipal solid waste is transported through sanitation services, while waste from food industry, livestock husbandry and plant protection waste disposed of by storage are not included in the statistical form no. 2 – GC "Sanitation of urban communities", because such waste is discharged with own transport of the beneficiary. Under these conditions, activity data on the amount of waste

from food industry, livestock and plant protection waste disposed of by storage were collected using the statistical form F-2 "Waste". Taking into account the trends in activity data collected through the statistical form F-2 "Waste" during the years 2007-2012, the decision was taken to calculate a coefficient for conversion of municipal waste into industrial waste, for the 1990-2019 years. The downward trend of the coefficient from 0.8 to 0.4 is justified by the economic decline of the country during the 1990-1999 period, as well as increase in the amount of municipal waste. In the current inventory cycle, the same approach was taken in collection of activity data. For municipal and industrial waste, the data on disposal of municipal solid waste were reported using the statistical form no. 2 – GC "Sanitation of urban communities".

In Tab. 1-56 only landfills in urban communities are included in which where sanitation services operate, which report the information on their activity to the National Bureau for Statistics. Historical activity data for the 1959-1984 period were deduced based on population number, socio-economic development conditions and waste generation trends.

Table 1-56: Activity data on volume of municipal solid waste and industrial waste disposed of in landfills of the Republic of Moldova for the 1959-2019 period

	Total	MSW			D_{ind}, kt	DMSW			Average MCF
	MSW + D_{ind}, kt	Total, kt	Inert material, kt	Without inert material, kt		Managed, MCF=1.0	Unmanaged, >5 m, MCF=0.8	Unmanaged, <5 m, MCF=0.4	
1959	595.26	357.16	103.56	253.60	238.11	0.0	10.0	90.0	23.4
1960	626.59	375.96	109.01	266.95	250.64	0.0	10.0	90.0	23.6
1961	659.57	395.74	114.75	280.99	263.83	0.0	15.0	85.0	23.8
1962	694.29	416.57	120.79	295.79	277.71	0.0	15.0	85.0	24.1
1963	730.83	438.50	127.17	311.33	292.33	0.0	15.0	85.0	24.3
1964	769.29	461.58	133.84	327.74	307.72	0.0	15.0	85.0	24.6
1965	809.78	485.87	140.88	344.99	323.91	0.0	15.0	85.0	24.8
1966	852.40	511.44	148.31	363.13	340.96	0.0	20.0	80.0	25.1
1967	897.26	538.36	156.11	382.25	358.91	0.0	20.0	80.0	25.4
1968	944.49	566.69	164.31	402.38	377.80	0.0	20.0	80.0	25.7
1969	994.20	596.52	172.90	423.62	397.68	0.0	20.0	80.0	26.1
1970	1046.53	627.92	182.09	445.82	418.61	0.0	20.0	80.0	26.4
1971	1162.81	697.68	202.30	495.38	465.12	0.0	25.0	75.0	27.2
1972	1224.01	734.40	212.98	521.43	489.60	0.0	25.0	75.0	27.6
1973	1288.43	773.06	224.19	548.87	515.37	0.0	25.0	75.0	28.0
1974	1356.24	813.74	235.97	577.77	542.50	0.0	25.0	75.0	28.4
1975	1427.62	856.57	248.44	608.13	571.05	0.0	25.0	75.0	28.9
1976	1502.76	901.66	261.46	640.19	601.10	0.0	30.0	70.0	29.4
1977	1581.85	949.11	275.24	673.87	632.74	0.0	30.0	70.0	29.9
1978	1665.11	999.06	289.73	709.34	666.04	0.0	30.0	70.0	30.4
1979	1752.74	1051.65	306.12	745.52	701.10	0.0	30.0	70.0	31.0
1980	1844.99	1014.75	294.26	720.48	830.25	0.0	35.0	65.0	31.2
1981	1892.30	1040.77	301.80	738.96	851.54	0.0	35.0	65.0	31.5
1982	1940.82	1067.45	309.55	757.91	873.37	0.0	35.0	65.0	31.9
1983	1990.59	1094.82	317.49	777.33	895.76	0.0	35.0	65.0	32.2
1984	2041.63	1122.89	325.64	797.25	918.73	0.0	35.0	65.0	32.5
1985	2093.98	1163.32	337.36	825.96	930.66	0.0	40.0	60.0	32.9
1986	2236.52	1242.51	360.33	882.18	994.01	0.0	40.0	60.0	33.8
1987	2217.94	1232.19	357.34	874.85	985.75	0.0	40.0	60.0	33.7
1988	2307.89	1282.16	371.83	910.33	1025.73	0.0	45.0	55.0	34.2
1989	2414.81	1341.56	389.04	952.53	1073.25	0.0	45.0	55.0	34.9
1990	2311.52	1359.72	394.31	965.41	951.80	0.0	45.0	55.0	34.6
1991	2204.61	1377.88	399.56	978.32	826.73	0.0	45.0	55.0	34.2
1992	2156.28	1437.52	416.88	1020.65	718.76	16.3	30.0	53.7	34.3
1993	1279.31	719.41	208.63	510.78	559.90	27.2	30.0	42.8	27.9
1994	1161.65	670.52	194.45	476.07	491.14	28.6	30.0	41.4	27.3
1995	1070.97	632.19	183.34	448.85	438.78	31.1	30.0	38.9	26.8
1996	1074.35	651.73	208.42	443.31	422.62	30.0	30.0	40.0	26.9
1997	1003.87	613.00	196.16	416.84	390.87	32.8	30.0	37.2	26.4
1998	1003.69	618.92	198.05	420.87	384.77	32.5	30.0	37.5	26.5
1999	947.81	580.75	220.67	360.08	367.06	32.9	30.0	37.1	26.1
2000	924.55	523.80	199.04	324.76	400.74	31.8	30.0	38.2	25.8
2001	867.26	475.49	213.98	261.52	391.77	31.9	30.0	38.1	25.4

	Total	MSW			D_{ind}, kt	DMSW			Average MCF
	MSW + D_{ind}, kt	Total, kt	Inert material, kt	Without inert material, kt		Managed, MCF=1.0	Unmanaged, >5 m, MCF=0.8	Unmanaged, <5 m, MCF=0.4	
2002	926.28	522.07	235.22	286.85	404.22	32.0	30.0	38.0	25.8
2003	975.80	548.08	186.35	361.73	427.72	30.6	30.0	39.4	26.1
2004	1041.40	575.44	195.64	379.80	465.96	29.4	30.0	40.6	26.5
2005	1109.58	602.50	162.68	439.83	507.08	28.3	30.0	41.7	26.9
2006	1205.78	653.59	176.47	477.12	552.18	27.2	35.0	37.8	27.5
2007	1529.12	847.37	228.77	618.60	681.74	30.8	35.0	34.2	29.6
2008	1760.41	1003.42	270.92	732.50	756.99	33.8	35.0	31.2	31.1
2009	1651.91	1114.28	300.86	813.42	537.63	35.8	35.0	29.2	31.2
2010	1531.58	1075.06	290.27	784.80	456.52	39.0	35.0	26.0	30.5
2011	1554.28	1091.58	294.73	796.84	462.70	40.1	35.0	24.9	30.7
2012	1590.83	1117.94	346.55	771.39	472.89	40.0	35.0	25.0	31.0
2013	1726.60	1214.21	376.40	837.81	512.39	37.8	35.0	27.2	31.9
2014	1824.88	1270.13	393.73	876.40	554.75	36.3	35.0	28.7	32.5
2015	1826.90	1270.69	393.92	876.78	556.21	39.1	35.0	25.9	32.5
2016	1818.37	1263.09	378.93	884.16	555.28	39.5	35.0	25.5	32.5
2017	2090.53	1445.83	433.75	1012.08	644.71	35.8	35.0	29.2	34.3
2018	1895.71	1303.63	391.09	912.54	592.08	40.1	35.0	24.9	33.0
2019	2005.93	1396.47	418.94	977.53	609.46	39.6	35.0	25.4	33.8

Historical activity data for the 1959-1984 period were deduced based on population size, socioeconomic development conditions and waste generation trends. At the same time, the average value of the methane correction factor was deducted, based on the type of municipal solid waste landfills, in particular, the mode of operation (managed or unmanaged) and the depth of the landfill layer. By the end of 1990, the municipal solid waste landfill in Tantareni, Anenii Noi district, was put into operation, which served the municipality of Chisinau (actual operation of the landfill began in 1991), while calculation of GHG emissions generated by this landfill had started in 1992.

With regard to the trends of waste generation per capita, since 2001, they are increasing, and in Chisinau their level has exceeded even the level recorded in the early 90-ies of the twentieth century. Thus, if in 1990 only about 20% of waste was produced in Chisinau, over the last four or five years the share of Chisinau in the total structure of waste disposed of in landfills has practically tripled and thus the share of Chisinau in total structure of waste disposed of in landfills is already about 30%.

It must be acknowledged, however, that statistical information does not reflect the reality in the field of municipal solid waste management. Thus, for example, the volumes of MSW generated in rural communities are not subject to statistical records, as there are usually no sanitation services. Also, although there are waste processing companies operating in the Republic of Moldova, the information on volumes of recycled waste is not subject to strict statistical records. Taking into account the trend for the Republic of Moldova to align to EU standards, the sector is to be essentially restructured. In this context, most MSW landfills are to be recultivated, and their number - drastically reduced until the commissioning of regional landfills, as planned in the Waste Management Strategy in the Republic of Moldova for 2013-2027, approved by Government Decision no. 248 of 10.04.2013.

1.6.6. Sewerage and Water Supply

Water Supply Systems. Works are carried out annually for renovation, modernization and expansion of public water supply systems. In 2019, the total length of water supply pipes and public water distribution networks expanded by 0.4 thousand km, making up about 14.7 thousand km (Tab. 1-57). As compared to 2016, the total length of public water distribution networks has increased by 10.5%. Also, 268.2 km of new networks were built and 89.0 km of water distribution networks were rebuilt. The highest share of the length of newly built public networks was recorded in communities of the Centre region - 107.2 km (40.0%) and the South region - 95.5 km (35.6%). During the year, 14.5 thousand km of public water distribution networks operated (98.6% of the total length), the rest (about 200 km) reverting to unfunctional water supply systems. In 2019, 53 municipalities and cities and 724 rural communities had access to public water supply systems, which represents 50.7% of the country's communities. About 51% of Moldovan villages do not have access to drinking water supply from the public system[29]. In regional profile, the communities from Chisinau (88.6%) and ATU Gagauzia (78.1%) have the highest level of connection to public water supply systems, while the lowest level is in the North region (35.5%).

[29] The administrative organization of the territory of the Republic of Moldova includes 1,682 settlements, of which 147 are located on the left side of the Dniester River along with 2 communities of Bender municipality. The data were reported for a total of 1,533 settlements, not including the ones on the left bank of the Dniester River and Bender municipality. Out of the total 1,533 communities, 1,478 are villages and 55 - towns and cities.

Table 1-57: Water supply systems in the RM for the 1996-2019 period

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Length of water supply pipelines and water distribution networks – total, km	**7,060.8**	**7,214.8**	**7,171.9**	**6,991.2**	**6,613.4**	**6,483.5**	**6,606.3**	**6,655.5**	**6,712.0**	**6,765.8**	**6,847.2**	**7,100.7**
in urban communities	3,856.7	3,962.2	3,922.7	4,009.4	3,934.0	3,897.3	3,984.5	4,035.7	4,033.8	4,045.0	4,150.5	4,196.2
in rural communities	3,204.1	3,252.6	3,249.2	2,981.8	2,679.4	2,586.2	2,621.8	2,619.8	2,678.2	2,720.8	2,696.7	2,904.5
Water supplied to all consumers – total, mil. m³	**203.9**	**192.1**	**173.1**	**150.0**	**98.7**	**86.8**	**76.7**	**66.3**	**63.4**	**67.1**	**67.9**	**84.5**
in urban communities	182.5	174.7	160.9	141.8	93.3	81.6	72.2	62.0	58.8	62.3	62.7	78.3
in rural communities	21.4	17.4	12.2	8.2	5.4	5.2	4.5	4.3	4.6	4.8	5.2	6.2
Including water supplied to population, mil. m³	**134.7**	**128.7**	**123.2**	**105.8**	**70.9**	**52.1**	**46.3**	**43.7**	**44.1**	**47.9**	**49.2**	**53.2**
in urban communities	122.5	119.5	116.7	100.9	67.2	48.5	43.1	40.6	40.6	44.5	45.3	48.3
in rural communities	12.2	9.2	6.5	4.9	3.7	3.6	3.2	3.1	3.5	3.4	3.9	4.9
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Length of water supply pipelines and water distribution networks – total, km	**7,478.1**	**8,036.2**	**8,509.9**	**8,914.7**	**9,324.2**	**9,901.1**	**10,483.7**	**12,756.5**	**13,385.0**	**14,044.6**	**14,411.8**	**14,697.5**
in urban communities	4,216.7	4,371.8	4,462.4	4,545.9	4,585.2	4,839.8	4,457.2	4,696.0	4,665.9	4,618.8	4,662.9	4,744.5
in rural communities	3,261.4	3,664.4	4,047.5	4,368.8	4,739.0	5,061.3	6,026.5	8,060.5	8,719.1	9,425.8	9,748.9	9,953.0
Water supplied to all consumers – total, mil. m³	**82.8**	**78.1**	**75.0**	**73.5**	**74.9**	**74.9**	**74.3**	**79.5**	**84.8**	**86.4**	**89.0**	**91.3**
in urban communities	76.3	70.9	67.9	66.1	66.6	66.8	62.8	63.4	67.2	68.4	70.4	71.6
in rural communities	6.5	7.2	7.1	7.4	8.3	8.1	11.5	16.1	17.6	18.0	18.6	19.7
Including water supplied to population, mil. m³	**53.2**	**53.6**	**51.3**	**51.2**	**52.1**	**52.8**	**53.2**	**57.3**	**60.0**	**59.9**	**61.8**	**62.9**
in urban communities	48.1	47.5	45.5	44.8	44.8	45.7	43.0	43.1	44.2	43.9	44.9	45.2
in rural communities	5.1	6.0	5.8	6.4	7.3	7.1	10.2	14.2	15.8	16.0	16.9	17.8

Sources: Annual Statistical Reports of the Republic of Moldova for years 1993 (p. 318-320), 1994 (p. 312-315), 1999 (p. 214-218), 2003 (p. 183-189), 2006 (p.149-154), 2007 (p.141-146), 2008 (p.143-148), 2009 (p.137-142), 2010 (p.137-142), 2014 (p.137-141), 2015 (p. 135-139), 2016 (p. 180-187), 2017 (p. 134-137), 2020 (p. 132).

Population with access to water supply systems. In 2019, about 2,154.2 thousand people of the country's population benefited from the public water supply service, of which 1,268.0 thousand from urban areas and 886.2 thousand from rural areas. Thus, nationally, the connection rate of the population to public water supply service was 81.8% of total population. Over the last 4 years, the population's access to public water supply service has increased by about 259.0 thousand people (or 13.6%).

Captured and distributed water. In 2019, the volume of captured water amounted to 132.8 million m³, including water captured from surface sources - 85.8 million m³ (64.6%), from underground sources - 33.9 million m³ (25.5%), and water captured or received from other sources - 13.1 million m³ (9.9%). The share of operational artesian wells used to capture water, in total artesian wells, was 74.5%. At the same time, the amount of water distributed to consumers was 91.3 million m³, 2.4 million m³ more than in 2018. The difference of 41.5 thousand m³, between the volume of captured water and the volume of water distributed to consumers, is own consumption of enterprises which capture water, but also water losses during transportation. On the average, 24.2 m³ of water is distributed per inhabitant per year. Of the total volume of distributed water, 63.0 million m³ (or 69.0%) was supplied to the population, 4.9% - to state budget institutions, and 26.1% - to other consumers, such as economic operators. The volume of water distributed to the population, as compared to the previous year, has increased by 2.1%.

Public sewage systems[30]. The functionality level of public sewage systems is the highest in Chisinau (100%), Central region (94.3%) and South region (88.9%), a lower level being registered in the North region (86.1%) and ATU Gagauzia. (62.5%). The total length of public sewage networks was 2.9 thousand km or about 37 km more than in 2018 (Tab. 1-58). Given that not all sewage systems are operational, in fact, 2.8 thousand km of public sewage networks operated (96.6%). During the year, 33.1 km of public sewage networks were built and 7.5 km rebuilt, 38.2 km and 8.7 km less, respectively, as compared to 2018. Most new public sewage networks, 29.4 km (or 88.8% of the total length built) were built in the Centre region: in the districts of Calarasi - 25.0 km, Orhei and Straseni - 1.5 km each, Criuleni - 1.1 km, etc. In 2019, wastewater disposal from households and economic and social entities operated in 52 towns and cities, but also in 64 villages. A percentage of 7.6% of total communities of the country, 95.0% of towns and cities and 4.4% of rural communities were provided with public sewage service. The highest share of communities with access to the public sewage system was registered in Chisinau (71.4%) and ATU Gagauzia (15.6%), while communities in the South and North have the lowest access rates (5.4% and, respectively, 4.7%). Thus, there is a considerable gap between villages and towns, the public sewage networks being almost absent in rural areas. The rural communities from Drochia, Falesti, Glodeni, Soroca, Rezina, Basarabeasca and Cantemir districts have no access to centralized sewage at all.

[30] Centralized sewerage system - a set of technological installations, functional equipment and specific devices through which the public sewage service is performed. The public sewage system comprises, in particular, the following components: public sewage networks, pumping stations, treatment plants, outlets to the discharge site.

Table 1-58: Sewage systems in the Republic of Moldova for the 1996-2019 period

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Length of sewage networks – total, km	**2,674.2**	**2,683.0**	**2,695.0**	**2,673.0**	**2,614.0**	**2,590.5**	**2,603.3**	**2,586.5**	**2,593.3**	**2,592.2**	**2,540.1**	**2,552.0**
in urban communities	1,850.6	1,846.2	1,885.3	1,990.0	1,970.0	1,989.1	2,057.4	2,062.7	2,070.8	2,078.7	2,083.7	2,103.9
in rural communities	823.6	836.8	809.7	683.0	644.0	601.4	545.9	523.8	522.5	513.5	456.4	448.1
Wastewater passed through purification plants – total, mil. m³	**174.7**	**171.3**	**166.4**	**143.5**	**114.2**	**95.4**	**79.0**	**70.1**	**70.4**	**76.4**	**74.7**	**72.2**
in urban communities	169.3	166.9	162.7	141.9	113.1	94.2	78.1	69.2	69.5	75.4	73.8	71.3
in rural communities	5.4	4.4	3.7	1.6	1.1	1.2	0.9	0.9	0.9	1.0	0.1	0.9
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Length of sewage networks – total, km	**2,556.2**	**2,548.5**	**2,586.5**	**2,592.1**	**2,602.1**	**2,633.4**	**2,690.7**	**2,779.1**	**2,907.4**	**2,909.0**	**2,907.3**	**2,933.1**
in urban communities	2,128.6	2,141.9	2,182.3	2,235.9	2,241.4	2,272.6	2,186.7	2,232.6	2,351.1	2,400.4	2,407.6	2,412.3
in rural communities	427.6	406.6	404.2	356.2	360.7	360.8	504.0	546.5	556.3	508.6	499.7	520.8
Wastewater passed through purification plants – total, mil. m³	**71.2**	**68.8**	**70.1**	**66.3**	**64.4**	**63.8**	**63.8**	**67.6**	**67.3**	**70.1**	**69.5**	**70.4**
in urban communities	70.5	68.3	69.6	65.8	63.9	63.3	63.0	65.4	65.6	68.2	67.4	68.1
in rural communities	0.7	0.5	0.5	0.5	0.5	0.7	1.3	2.2	1.7	1.9	2.1	2.3

Sources: Annual Statistical Reports of the Republic of Moldova for years 1993 (p. 318-320), 1994 (p. 312-315), 1999 (p. 214-218), 2003 (p. 183-189), 2006 (p.149-154), 2007 (p.141-146), 2008 (p.143-148), 2009 (p.137-142), 2010 (p.137-142), 2014 (p.137-141), 2015 (p. 135-139), 2016 (p. 180-187), 2017 (p. 134-137), 2020 (p. 132).

Population connected to sewage system. In 2019, a number of 1,060.9 thousand people benefited from public sewage service, of which 1,011.5 thousand from urban areas and 49.4 thousand - from rural areas. Thus, at national level, in 2019, only 40.3% of the population was connected to public sewage service, the figure having increased by about 3.0% as compared to 2018.

Discharged and treated wastewater. In 2019, the total volume of discharged wastewater was 70.4 million m³, a 0.9 million m³ increase as compared to 2018. In comparison with 2016, the volume of discharged wastewater has increased by 5.2%. About 73% of the total public sewage systems had treatment plants. Of the 90 treatment plants, 75 were operational. The best situation regarding existence of treatment plants was in the Central and North regions, which had 31 and, respectively, 21 operational treatment plants. The lack of treatment plants was registered in Glodeni, Soroca and Rezina districts. A volume of 68.4 million m³ of treated wastewater (97.2%) passed through water treatment plants. Of the total volume of treated wastewater, 96.6% was treated mechanically, 96.2% biologically, and 2.6% - was not treated at all.

1.6.7. Forestry

According to the national idea, forest is an element of geographical landscape, a functional unit of the biosphere, composed of the community of forest vegetation (dominated by trees and shrubs), a living cover, animals and microorganisms, which in their biological development, are interdependent and have impact on their own habitat. Lands covered with forest vegetation with an area of over 0.25 ha are considered to be forests. The minimum consistency of trees and shrubs for forest vegetation to be considered forest is an operational level of 30%. Such stability is attributed only to trees and shrubs that have the natural potential to reach a height of at least five meters at maturity.

The area covered with forests varied considerably over time, from 366.2 thousand ha in 1848 to 222.0 thousand in 1945, reaching 373.2 thousand ha in 2019 or about 11.3% of the country's territory (Fig. 1- 26). The indicator is well below the European average (about 30%). According to scientific studies in the field, the current area of forests is obviously insufficient to meet the ecological and socio-economic needs of the Republic of Moldova. In order to ensure a stable ecological balance and a more pronounced influence on the climatic and hydrological regime of the territory and to increase productivity of agricultural land, it is necessary that forests occupy at least 15% of the territory. Dispersion and fragmentation of forest resources, their uneven distribution in the country is a negative factor in exerting beneficial eco-protective influences on the environment, creating comfortable living conditions for the population and providing wood and non-wood products.

Figure 1-26: Evolution of forest-covered areas during 1848-2019, thousand ha.

The total volume of standing timber in the forests of the Republic of Moldova is about 45.4 million m³, an average of 118 m³ per hectare. The current average growth of forests is 3.8 m³ / year / hectare, and the total average growth is about 1418.2 thousand m³ / year. The average production class is 3.9. The age structure of all

forest species[31] is unbalanced, especially for those of lower productivity.

In accordance with art. 14 of the Forestry Code, the forests of the Republic of Moldova are included in functional group I, having exclusively environmental protection functions. In relation to their functions, the following five functional subgroups are distinguished: forests with water protection functions - 1.6%; land and soil protection forests - 6.7%; forests for protection against harmful climatic and industrial factors - 48.6%; forests with leisure functions - 29.5%; forests of scientific interest and protection of the genetic fund and forest ecological fund - 13.6%.

In the spring-summer of 2007, a catastrophic drought was registered, which affected over 80% of the country's territory. This phenomenon has also considerably damaged the national forests on an area of about 19 thousand ha or 5.5% of the forest fund area, especially in the south and center of the country. The drought affected about 20 forest species, both native and allogeneic, including: pedunculate oak (*Quercus robur L.*), sessile oak (*Quercus petraea (Matt) Liebl.*), downy oak (*Quercus pubescens Willd*), ash (*Fraxinus exelsior L.*), field maple (*Acer platanoides L.*), mountain maple (*Acer pseudoplatanus L.*), acacia (*Robinia pseudoacacia L.*), birch (*Betula verrucosa Ehrh.*), pine (*Pinus sylvestris L.*), black pine of Crimea (*Pinus pallasiana (Lamb) Holmboe*). The most heavily affected were acacias, which make up 71.3% (13 thousand ha) of the total area of damaged forests. The 2007 drought had long-term consequences, with visible effects for over several years. In 2009, according to research data on damage to forests, the total area of degraded and dry stands with different severity of damage was 17.9 thousand ha, in 2010 - 13.1 thousand ha, in 2011 - 8.9 thousand ha, and in 2012 - 9.0 thousand ha.

The diversity of forest species growing in the forests of the Republic of Moldova is represented in Tab. 1-59, comprising 11 large categories (groups of species).

[31] Abbreviations of forestry species used in Table 1-59: Pedunculate oak – ST; Sessile oak – GO; Downy oak – STP; white poplar – PLA; White willow – SA; Field maple – PA; Common ash – FR; Linden (silver linden, large leaf linden and small leaved linden) – TE; Hornbeam – CA; Common walnut – NU; Field elm – ULC; Acacia – SC; Miscellaneous conifers – DR, Miscellaneous softwood species – DM; Miscellaneous hardwood species – DT; Miscellaneous exotic species – EX.

Table 1-59: Categories or groups of species and their structure in the Republic of Moldova

No.	Groups of species		Species included in categories	Abbreviation in Romanian	Abbreviation in English
	Scientific name	Name in English			
1.	*Quercus spp.*	Oaks	Pedunculate oak, sessile oak, fluffy oak, red oak	ST	QU
2.	*Carpinus ssp.*	Hornbeam	Hornbeam	CA	CA
3	*Fraxinus spp.*	Ash	Ash, manna ash etc.	FR	FR
4.	*Acer spp.*	Sycamore	Field maple, jugastra, mountain maple	PA	AC
5.	*Ulmus spp.*	Elm	Field elm, European white elm, Turkistan elm, etc.	UL	UL
6.	*Tilia spp.*	Linden	Small leaved linden, silver linden, large leaf linden, etc.	TE	TI
7.	*Salix spp.*	Willow	White willow, osier, etc.	SA	SA
8.	*Pinus spp.*	Pine	Wild pine, black pine, spruce, fir, etc.	PI	PI
9.	*Populus spp.*	Poplar	White poplar, black poplar, Euro-American poplar	PL	PO
10.	*Robinia spp.*	Acacia	Acacia, maple, sophora	SC	RB
11.	Other species	Other species	Apple, pear, cherry, sour cherry, apricot, Tartar maple, willow, American maple, etc.	AS	OS

The assessment of biomass increases in forests was done by taking data from a series of national / sectoral reports on evolution of forest area for the period 1990-2019 (Tab. 1-60). At the same time, starting with 2013 year, the data on distribution by predominant forest species were taken from the forest management database held by the Institute for Forest Research and Management (ICAS).

Table 1-60: Evolution of the land area covered with forests over the 1990-2019 period, thousand ha

Year	Total	Distribution of areas covered by forests by groups of species										
		QU	CA	FR	AC	UL	TI	SA	PI	PO	RB	OS
1990	325.4	140.6	9.4	16.6	2.9	3.1	2.9	1.9	6.9	5.7	124.0	11.4
1991	328.2	141.3	9.4	16.7	2.9	3.1	2.9	2.0	6.9	5.9	125.7	11.4
1992	331.0	142.0	9.4	16.8	3.0	3.1	2.9	2.1	6.9	6.0	127.4	11.4
1993	333.9	142.7	9.5	16.9	3.0	3.1	2.9	2.2	6.9	6.1	129.1	11.5
1994	335.4	143.1	9.9	17.2	3.0	3.1	2.9	2.2	6.9	6.2	130.0	10.9
1995	336.9	143.5	10.2	17.6	3.0	3.1	2.9	2.3	6.9	6.2	130.9	10.4
1996	338.4	143.8	10.6	17.9	3.0	3.1	2.9	2.3	6.9	6.3	131.7	9.8
1997	339.9	144.2	11.0	18.2	3.0	3.1	2.9	2.4	6.9	6.3	132.6	9.3
1998	341.4	144.6	11.3	18.6	3.0	3.1	2.9	2.4	6.9	6.4	133.5	8.7
1999	342.9	145.0	11.7	18.9	3.0	3.1	2.9	2.5	6.9	6.5	134.4	8.1
2000	344.4	145.3	12.1	19.2	3.0	3.1	2.9	2.5	6.9	6.5	135.3	7.6
2001	345.9	145.7	12.4	19.6	3.0	3.1	2.9	2.6	6.9	6.6	136.1	7.0
2002	347.3	146.0	12.8	19.9	3.0	3.1	2.9	2.6	6.9	6.6	137.0	6.4
2003	352.4	148.4	12.6	20.1	3.2	3.2	3.1	2.5	6.9	6.7	137.9	7.8
2004	357.6	151.7	12.4	20.2	3.4	3.4	3.2	2.4	6.9	6.8	138.8	8.4
2005	362.7	153.6	12.1	20.3	3.7	3.8	3.4	2.4	7.0	6.9	139.7	9.8
2006	366.0	153.9	12.1	20.5	4.0	3.8	3.4	2.4	7.0	7.0	141.9	10.0

Year	Total	Distribution of areas covered by forests by groups of species										
		QU	CA	FR	AC	UL	TI	SA	PI	PO	RB	OS
2007	369.0	154.2	11.8	20.7	4.1	3.9	3.5	2.4	7.0	7.0	144.4	10.0
2008	372.0	154.7	11.9	20.8	4.1	3.9	3.5	2.4	6.9	7.1	146.7	10.0
2009	372.9	155.1	12.1	20.9	4.1	3.9	3.5	2.4	6.9	7.1	146.9	10.0
2010	374.5	155.4	12.1	21.0	4.1	3.9	3.5	2.4	6.9	7.1	148.0	10.1
2011	374.8	155.6	12.1	21.0	4.1	3.9	3.5	2.4	6.9	7.1	148.1	10.1
2012	375.3	155.8	12.1	21.0	4.1	3.9	3.5	2.4	6.9	7.1	148.3	10.1
2013	372.8	154.7	12.0	20.9	4.1	3.9	3.5	2.4	6.8	7.1	147.3	10.1
2014	379.3	167.1	16.4	21.8	5.7	4.1	5.7	3.9	6.3	7.5	125.6	15.1
2015	386.4	170.3	16.7	22.2	5.8	4.2	5.8	4.0	6.4	7.7	128.0	15.4
2016	386.5	170.3	16.7	22.2	5.8	4.2	5.8	4.0	6.4	7.7	128.1	15.4
2017	374.3	164.9	16.1	21.5	5.6	4.1	5.6	3.9	6.2	7.4	124.1	14.9
2018	378.7	166.8	16.3	21.7	5.7	4.1	5.7	3.9	6.3	7.5	125.5	15.1
2019	373.2	164.4	16.1	21.4	5.6	4.1	5.6	3.8	6.2	7.4	123.7	14.9

Source: Galupa, D., Platon, I. et al. (2011), National report on condition of the forestry fund (2011); Land Cadaster of the RM for the period 1990-2019; CCO Report on update of basic indicators of forestry and other type of forest vegetation (2016), Land use and land use change matrix for the period 1970-2019.

Collection of final data for the entire record keeping period on distribution by species from the above listed sources was done by modelling the primary data from the reports / records of the Agency "Moldsilva". According to such data, of the total area of forest crops planted over the reporting period, acacia covered about 80%, walnut (common, black) - 8%, oaks (pedunculated oak, sessile oak, etc.) - 3%, poplar and willow - 3%, other species - 6% (Tab. 1-61).

Table 1-61: Evolution of forest land areas that remain as forest land during the 1990-2019 period, thousand ha

Groups of species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Quercus spp.	97.76	99.33	103.72	107.53	110.63	113.35	116.52	118.55	120.54	123.36
Carpinus spp.	6.54	6.61	6.87	7.16	7.63	8.08	8.59	9.01	9.45	9.95
Fraxinus spp.	11.54	11.74	12.27	12.74	13.33	13.88	14.50	14.99	15.48	16.08
Acer spp.	2.02	2.04	2.19	2.26	2.32	2.37	2.43	2.47	2.50	2.55
Ulmus spp.	2.16	2.20	2.26	2.34	2.40	2.45	2.51	2.55	2.58	2.64
Tilia spp.	2.02	2.04	2.12	2.19	2.24	2.29	2.35	2.38	2.42	2.47
Salix spp.	1.32	1.41	1.53	1.66	1.74	1.81	1.89	1.96	2.02	2.10
Pinus spp.	4.80	4.85	5.04	5.20	5.34	5.45	5.59	5.67	5.75	5.87
Populus spp.	3.96	4.15	4.38	4.60	4.76	4.91	5.09	5.21	5.34	5.50
Robinia spp.	86.22	88.37	93.06	97.28	100.51	103.40	106.73	109.03	111.31	114.36
Other species	7.93	8.01	8.33	8.67	8.43	8.22	7.94	7.65	7.25	6.89
Rare species[1]	31.99	32.11	30.53	29.99	27.64	25.98	25.54	25.87	26.77	24.63
Total	**258.25**	**262.85**	**272.30**	**281.60**	**286.95**	**292.20**	**299.67**	**305.34**	**311.41**	**316.42**
Groups of species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Quercus spp.	126.75	128.28	128.06	128.32	130.51	131.76	130.54	131.44	131.78	131.96
Carpinus spp.	10.52	10.94	11.23	10.90	10.67	10.38	10.26	10.06	10.14	10.29
Fraxinus spp.	16.77	17.23	17.45	17.38	17.38	17.41	17.39	17.64	17.72	17.78
Acer spp.	2.62	2.64	2.63	2.77	2.93	3.17	3.39	3.49	3.49	3.49
Ulmus spp.	2.70	2.73	2.72	2.77	2.93	3.26	3.22	3.32	3.32	3.32
Tilia spp.	2.53	2.55	2.54	2.68	2.75	2.92	2.88	2.98	2.98	2.98
Salix spp.	2.19	2.25	2.28	2.16	2.06	2.06	2.04	2.05	2.04	2.04
Pinus spp.	6.02	6.08	6.05	5.97	5.94	6.00	5.94	5.97	5.88	5.87
Populus spp.	5.69	5.79	5.82	5.79	5.85	5.92	5.94	5.97	6.05	6.04
Robinia spp.	117.97	119.87	120.18	119.24	119.39	119.81	120.37	123.09	124.96	124.98
Other species	6.63	6.16	5.61	6.74	7.23	8.41	8.48	8.52	8.52	8.51
Rare spaces	24.32	24.48	24.97	27.76	27.79	25.84	28.69	30.43	30.42	34.73
Total	**324.71**	**329.01**	**329.57**	**332.48**	**335.43**	**336.94**	**339.15**	**344.96**	**347.30**	**352.00**
Groups of species	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Quercus spp.	132.60	131.93	127.64	122.80	129.17	128.69	125.80	118.55	117.16	111.24
Carpinus spp.	10.32	10.27	9.93	9.55	12.64	12.59	12.31	11.60	11.46	10.88
Fraxinus spp.	17.92	17.82	17.24	16.59	16.81	16.75	16.37	15.43	15.25	14.48
Acer spp.	3.50	3.48	3.37	3.24	4.42	4.41	4.31	4.06	4.01	3.81
Ulmus spp.	3.33	3.31	3.20	3.09	3.20	3.19	3.12	2.94	2.90	2.76
Tilia spp.	2.99	2.97	2.88	2.76	4.41	4.39	4.29	4.04	4.00	3.79
Salix spp.	2.05	2.04	1.97	1.90	3.02	3.01	2.94	2.77	2.74	2.60
Pinus spp.	5.89	5.85	5.66	5.40	4.88	4.86	4.75	4.48	4.42	4.20
Populus spp.	6.06	6.02	5.83	5.64	5.81	5.79	5.66	5.33	5.27	5.01
Robinia spp.	126.29	125.60	121.51	116.89	97.10	96.73	94.65	89.19	88.15	83.69
Other species	8.62	8.57	8.29	7.98	11.82	11.65	11.39	10.73	10.61	10.07
Rare spaces	33.39	30.49	30.27	33.54	26.26	20.94	20.03	29.08	26.44	29.42
Total	**352.95**	**348.34**	**337.79**	**329.39**	**319.53**	**312.99**	**305.62**	**298.19**	**292.40**	**281.95**

Source: Land Cadaster of the RM for the 1990-2019 period; Land use and land use change matrix of the RM for the 1970-2019 period.

[32] Include forest land with consistency under the average index of 0.3, which are under forestry management (plots in process of regeneration, forestry crops which have not reached wood condition, forestry nurseries, various types of forest plantations etc.)

The volume of wood harvested in the forest cutting process includes working wood (without bark) and firewood (round wood for fire, branches and tips, bark, illegally harvested wood) traditionally used in the Republic of Moldova. Commercial wood is identified as "working wood" in national statistical reports. The biomass extension coefficient for firewood crops (BEF_R) applies only to the commercial volume of wood and it is represented only by bark. The data are provided by the Moldsilva Agency and the environmental protection authorities (Inspectorate for Environmental Protection; Environmental Agency) on authorized logging and illegal logging in forests and other wooded areas managed by the state forestry authorities and by the Inspectorate for Environmental Protection (Environmental Agency) for land managed by local public authorities. Data also come from data available in the Annual Statistical Reports on timber harvests in the forests of the Administrative-Territorial Units of the Left Bank of the Dniester (ATULBD) (Tab. 1-62).

Table 1-62: Evolution of timber harvests in forests during 1990-2019, thousand m^3

Categories	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Commercial felling	39.42	27.00	27.39	31.50	39.80	68.49	51.69	52.70	38.00	38.79
Fuelwood gathering	184.80	376.50	490.29	489.18	538.70	531.42	450.43	423.85	398.55	368.62
Total	**224.22**	**403.50**	**517.68**	**520.68**	**578.50**	**599.91**	**502.12**	**476.55**	**436.55**	**407.41**
Categories	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Commercial felling	39.68	37.28	50.41	46.99	43.47	39.01	46.51	44.44	42.79	37.34
Fuelwood gathering	393.34	432.47	381.98	420.20	415.37	394.79	430.10	390.92	401.84	396.82
Total	**433.02**	**469.75**	**432.39**	**467.19**	**458.84**	**433.80**	**476.61**	**435.36**	**444.63**	**434.16**
Categories	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Commercial felling	40.63	33.91	31.69	29.92	25.60	28.00	50.16	46.20	47.30	44.40
Fuelwood gathering	429.89	485.45	541.47	587.20	624.33	607.32	567.42	589.71	596.71	561.29
Total	**470.52**	**519.36**	**573.16**	**617.12**	**649.93**	**635.32**	**617.57**	**635.91**	**644.01**	**605.69**

Sources: Statistical Records/Reports of "Moldsilva" Agency and of the State Ecological Inspectorate for the 1990-2019 time series; D. Galupa, I. Talmaci, L. Spitoc, Study for the Republic of Moldova "Ensuring sustainability of forests and livelihoods through improving governance and control of illegal logging". Chisinau, Editorial Center of UASM, 2005, 116 pages; Statistical Yearbooks of the ATULBD (2000-2019); Galupa Dumitru, Ciobanu Anatol, Scobioala Marian et al. (2011), Illegal logging of forest vegetation in the Republic of Moldova. Analytical study, Chisinau, "Moldsilva" Agency, 38 pages.

Since the statistical annual reports provide a national aggregate value of timber harvest, the breakdown by species is made on the basis of the Moldsilva Agency records, which are kept by categories (excluding working wood varieties): (i) "hardwoods": pedunculate oak, sessile oak, hornbeam, ash, maple, elm, acacia, honey locust, etc.; (ii) "softwoods": poplar, willow, linden, etc. The ratio between the estimated volume by species and the total volume harvested per year provides data of acceptable quality (the difference between estimated volume and harvested volume is 5-10% on the average). Further, distribution by species of commercial felling and firewood harvested over the period 1990-2019 is presented (Tab. 1-63 and Tab. 1-64).

Table 1-63: Evolution of commercial felling yield in forests during 1990-2019, thousand m^3

Groups of species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Quercus spp.	7.16	4.32	4.09	4.41	6.88	9.59	10.05	10.26	7.40	7.51
Carpinus spp.	1.05	0.71	0.72	0.83	1.04	1.79	1.35	1.39	1.00	0.99
Fraxinus spp.	3.65	2.99	3.24	3.94	4.03	8.56	4.47	4.47	3.23	3.49
Acer spp.	0.31	0.23	0.23	0.27	0.34	0.58	0.45	0.44	0.32	0.37
Ulmus spp.	0.17	0.1	0.1	0.12	0.15	0.26	0.19	0.21	0.15	0.13
Tilia spp.	3.78	2.48	2.52	2.9	3.66	6.31	4.70	4.91	3.54	3.34
Salix spp.	0.26	0.19	0.19	0.22	0.28	0.48	0.37	0.36	0.26	0.30
Pinus spp.	0.28	0.17	0.18	0.2	0.26	0.44	0.32	0.35	0.25	0.22
Populus spp.	4.87	3.2	3.26	3.74	4.73	8.14	6.07	6.33	4.56	4.32
Robinia spp.	16.74	12.02	12.26	14.18	17.54	30.83	22.66	22.70	16.37	17.67
Other species	1.15	0.59	0.6	0.69	0.89	1.51	1.06	1.28	0.92	0.45
Total	**39.42**	**27.00**	**27.39**	**31.50**	**39.80**	**68.49**	**51.69**	**52.70**	**38.00**	**38.79**
Groups of species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Quercus spp.	7.77	5.18	10.12	10.31	9.34	7.63	9.26	7.49	7.17	5.84
Carpinus spp.	1.07	1.09	1.85	1.00	0.92	1.05	1.28	0.92	1.13	0.77
Fraxinus spp.	3.17	2.96	4.45	3.41	3.03	3.12	5.57	5.94	6.02	5.70
Acer spp.	0.28	0.30	0.42	0.26	0.19	0.28	0.28	0.28	0.25	0.15
Ulmus spp.	0.18	0.19	0.24	0.22	0.22	0.18	0.27	0.31	0.20	0.17
Tilia spp.	3.97	4.86	4.82	4.22	4.47	3.90	4.06	3.45	3.84	3.24
Salix spp.	0.24	0.32	0.29	0.20	0.21	0.24	0.31	0.42	0.38	0.38
Pinus spp.	0.30	0.33	0.00	0.00	1.10	0.30	0.79	1.60	0.60	0.89
Populus spp.	5.11	2.89	5.82	8.28	6.62	5.02	7.81	6.44	6.09	4.87
Robinia spp.	16.13	18.19	19.94	16.43	15.93	15.85	15.68	16.58	16.01	14.34
Other species	1.46	0.97	2.46	2.66	1.44	1.44	1.22	1.01	1.10	0.98
Total	**39.68**	**37.28**	**50.41**	**46.99**	**43.47**	**39.01**	**46.51**	**44.44**	**42.79**	**37.34**

Groups of species	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Quercus spp.	7.16	5.68	4.77	6.28	6.05	6.62	12.15	8.56	8.76	8.22
Carpinus spp.	0.87	0.74	0.49	0.52	0.33	0.36	0.40	1.10	1.12	1.05
Fraxinus spp.	5.83	4.03	4.52	4.76	4.26	4.66	7.49	5.16	5.29	4.96
Acer spp.	0.20	0.14	0.11	0.15	0.06	0.06	0.14	0.30	0.31	0.29
Ulmus spp.	0.19	0.24	0.12	0.17	0.06	0.06	0.07	0.20	0.20	0.19
Tilia spp.	3.42	3.17	2.67	2.21	2.00	2.19	5.46	4.27	4.37	4.10
Salix spp.	0.14	0.19	0.24	0.25	0.07	0.08	0.37	0.31	0.32	0.30
Pinus spp.	1.19	1.95	1.35	0.73	0.62	0.68	0.49	0.67	0.68	0.64
Populus spp.	6.32	5.61	5.26	5.06	4.69	5.13	9.52	6.39	6.54	6.14
Robinia spp.	14.41	11.47	11.69	9.43	7.09	7.76	13.50	18.07	18.50	17.37
Other species	0.89	0.69	0.47	0.36	0.37	0.40	0.56	1.18	1.21	1.13
Total	**40.63**	**33.91**	**31.69**	**29.92**	**25.60**	**28.00**	**50.16**	**46.20**	**47.30**	**44.40**

Source: Statistical records, reports of „Moldsilva" Agency, Environmental Protection Inspectorate and Environmental Agency for the 1990-2019 period.

Data on the volume of firewood also include the volume of twigs, boughs, etc., which are also the priority destination for heating homes and preparing food. Considering that most of the illegal logging is carried out in the forests managed by the mayor's offices, located near communities, which consist primarily of acacia, the respective volumes were assigned to the category Robinia spp.

Table 1-64: Evolution of firewood yields from forests of the Republic of Moldova during the 1990-2019 period, thousand m^3

Groups of species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Quercus spp.	30.10	50.35	49.29	51.15	39.07	63.60	58.99	49.12	64.60	55.32
Carpinus spp.	12.50	17.96	13.24	13.15	10.05	11.30	15.45	20.41	26.84	24.10
Fraxinus spp.	15.80	38.99	56.52	73.07	55.81	71.97	73.74	25.80	33.93	30.09
Acer spp.	8.70	11.39	6.65	6.19	4.73	5.30	5.00	14.12	18.57	16.64
Ulmus spp.	3.50	6.19	6.54	10.23	7.81	8.76	2.26	5.72	7.52	6.38
Tilia spp.	10.60	18.97	20.40	29.23	22.32	20.10	19.50	17.29	22.73	19.59
Salix spp.	3.40	6.68	7.95	12.42	9.49	10.64	4.14	5.57	7.33	6.32
Pinus spp.	0.40	2.10	4.09	6.58	5.02	5.63	3.80	0.70	0.92	0.74
Populus spp.	11.80	34.34	55.04	73.07	55.81	74.35	70.09	19.21	25.26	20.32
Robinia spp.	76.80	172.62	256.75	198.01	316.31	246.00	184.48	247.59	166.76	168.74
Other species	11.20	16.91	13.82	16.08	12.28	13.77	12.98	18.32	24.09	20.38
Total	**184.80**	**376.50**	**490.29**	**489.18**	**538.70**	**531.42**	**450.43**	**423.85**	**398.55**	**368.62**
Groups of species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Quercus spp.	53.71	48.34	56.93	65.45	64.16	56.64	71.56	57.00	59.84	59.35
Carpinus spp.	23.40	22.46	23.41	23.07	25.30	24.68	27.49	23.70	27.73	26.27
Fraxinus spp.	29.22	28.35	28.91	32.38	30.63	30.81	48.42	47.74	49.05	52.75
Acer spp.	16.16	14.17	17.49	16.50	17.13	17.04	23.05	21.44	23.48	23.33
Ulmus spp.	6.19	5.78	6.36	8.32	7.07	6.53	10.45	10.47	8.55	9.90
Tilia spp.	19.02	18.93	18.35	21.63	23.40	20.06	27.66	24.71	25.19	22.43
Salix spp.	6.13	5.48	6.55	6.28	8.22	6.47	9.95	8.43	7.85	4.75
Pinus spp.	0.72	1.41	0.00	0.00	2.09	0.76	3.06	2.80	2.74	3.91
Populus spp.	19.73	17.37	21.29	28.96	28.19	20.80	27.11	23.26	25.04	23.82
Robinia spp.	199.28	252.20	181.90	190.09	187.09	190.14	164.27	155.19	153.64	148.00
Other species	19.78	17.98	20.79	27.52	22.09	20.86	17.08	16.17	18.74	22.32
Total	**393.34**	**432.47**	**381.98**	**420.20**	**415.37**	**394.79**	**430.10**	**390.92**	**401.84**	**396.83**
Groups of species	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Quercus spp.	65.69	79.64	83.02	98.39	106.84	100.82	103.58	84.55	85.56	80.48
Carpinus spp.	30.17	34.86	40.26	43.26	45.93	44.15	44.61	33.76	34.16	32.13
Fraxinus spp.	62.33	51.55	63.35	71.66	76.71	74.44	73.67	64.42	65.19	61.32
Acer spp.	23.79	22.06	12.98	21.90	17.27	31.63	30.81	21.72	21.97	20.67
Ulmus spp.	12.74	20.56	21.48	20.25	19.15	15.12	17.29	13.15	13.31	12.52
Tilia spp.	22.98	22.18	28.72	29.86	30.30	31.28	38.27	30.36	30.72	28.90
Salix spp.	5.42	7.79	9.24	10.71	10.90	12.82	11.92	10.33	10.45	9.83
Pinus spp.	4.78	10.27	8.92	10.87	17.02	5.59	4.91	5.33	5.39	5.07
Populus spp.	26.00	30.91	33.72	39.37	42.69	40.88	41.78	45.14	45.67	42.96
Robinia spp.	156.80	182.12	200.93	208.77	208.91	222.77	164.35	252.34	255.34	240.18
Other species	19.20	23.51	38.85	32.16	48.61	27.82	36.23	28.61	28.95	27.23
Total	**429.89**	**485.45**	**541.47**	**587.20**	**624.33**	**607.32**	**567.42**	**589.71**	**596.71**	**561.29**

Sources: Statistical Records/Reports of "Moldsilva" Agency and of the State Ecological Inspectorate for the 1990-2019 time series; Arcadie Capcelea, Aurel Lozan, Ion Lupu et al. (2011), *Analytical study on wood mass consumption in the RM*. "Moldsilva" Agency, Chisinau, 48 pages; Statistical Yearbooks of the ATULBD for 2000-2019.

The activity for conversion of land to forest land over the reporting period also included afforestation carried out within Moldova Soil Conservation Project (MSCP) and Moldova Community Forestry Development Project (MCFDP). Both projects were implemented under the Clean Development Mechanism (CDM) of the Kyoto Protocol, have gone through all national and international validation and registration procedures. Within the MSCP and MCFDP project, several objectives were achieved: restoring degraded land, improving

forest products supply to local population and enhancing GHG absorption. The total area planted within the MSCP and MCFDP projects was about 28.8 thousand ha (Tab. 1-65). In addition to harvested forest products, the net reduction of CO_2 emissions into the atmosphere will be about 4.8 million tons (MSCP - 3.6 million tons; MCFD - 1.2 million tons). The main participants in implementation of these projects are the Moldsilva Agency, the World Bank (WB), the Institute for Forest Research and Management (ICAS), territorial forestry entities, municipalities that have allocated land for afforestation (over 500 municipalities).

Table 1-65: Annual afforestation implemented within the CDM projects in the RM, ha

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
MSCP	4894.7	4736.6	4219.6	4029.6	891.2	71.9	475.8	152.8	211.3	276.7	98.8	116.5	45.7	68.8	20289.9
MCFDP	0.0	0.0	0.0	0.0	2009.6	2959.3	2190.4	1224.4	10.0	12.0	8.0	52.6	2.5	0.0	8468.8
Total	**4894.7**	**4736.6**	**4219.6**	**4029.6**	**2900.8**	**3031.2**	**2666.2**	**1377.2**	**221.3**	**288.7**	**106.8**	**169.1**	**48.2**	**68.8**	**28758.7**

Source: Moldsilva Agency (2009), MSCP brief description available: https://cdm.unfccc.int/Projects/DB/SGS-UKL1216031019.22/view. Moldsilva Agency (2012), Brief description of project MCFDP available in: https://cdm.unfccc.int/Projects/DB/TUEV-SUED1352989843.61. Moldsilva Agency (2004-2016), Reports to World Bank for the 2004-2016 period on emission reduction within MSCP and MCFDP projects, Moldsilva Agency (2012-2013 and 2017-2018) Monitoring reports for MSCP and MCFDP projects available in: https://cdm.unfccc.int/Projects/DB/SGS-UKL1216031019.22/view and https://cdm.unfccc.int/Projects/DB/TUEV-SUED1352989843.61.

With reference to the forest areas affected by fires, the information is available in the Annual Statistical Reports of the Republic of Moldova and those of ATULBD (Tab. 1-66). Most fires have occurred in young forest crops or young trees, especially in the vicinity of agricultural land.

Table 1-66: Forest area affected by fires in the RM during the 1990-2019 period, ha

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Right bank of Dniester River	120.10	20.10	22.00	1.50	33.50	1.40	0.00	0.00	9.70	0.00
Left bank of Dniester River	IE	IE	IE	IE	IE	0.53	11.20	3.40	24.00	25.20
Total for the RM	**120.10**	**20.10**	**22.00**	**1.50**	**33.50**	**1.93**	**11.20**	**3.40**	**33.70**	**25.20**
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Right bank of Dniester River	0.00	41.60	12.50	10.50	42.00	5.50	32.60	683.30	31.00	126.00
Left bank of Dniester River	0.90	15.40	18.10	23.00	46.00	2.90	58.20	108.00	24.00	8.20
Total for the RM	**0.90**	**57.00**	**30.60**	**33.50**	**88.00**	**8.40**	**90.80**	**791.30**	**55.00**	**134.20**
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Right bank of Dniester River	20.00	25.90	636.60	460.00	9.50	338.20	119.00	173.00	79.00	169.68
Left bank of Dniester River	26.90	36.90	35.80	7.10	28.90	18.00	59.8	73.80	5.90	34.40
Total for the RM	**46.90**	**62.80**	**672.40**	**467.10**	**38.40**	**356.20**	**178.8**	**246.80**	**84.90**	**204.08**

Source: Statistical Yearbooks of the RM for 1994 (page 38), 1999 (page 20), 2007 (page 22), 2011 (page 22), 2014 (page 22), 2015 (page 22); NBS, Statistics for Geography and Environment (Forest Fires, as of November 1 (2010-2019); Statistical Yearbooks of the ATULBD for 2000 (page 88), 2002 (page 91), 2007 (page 81), 2009 (page 80), 2011 (page 82), 2014 (page 78), 2015 (page 88), 2016 (page 88), 2017 (page 91), 2020 r. (page 92).

CHAPTER 2. NATIONAL GREENHOUSE GAS INVENTORY

2.1. Introduction

2.1.1. Convention, Kyoto Protocol and Party's Commitments

The ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC) is aimed *"to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system"*. To-date 196 countries are Parties to the Convention. The Republic of Moldova signed the UNFCCC on June 12, 1992 and it was ratified by the Parliament on March 16, 1995.

Article 4, paragraph 1(a) and Article 12, paragraph 1(a) of the UNFCCC stipulate that each Party has to make available to the Conference of the Parties (COP) *"a national inventory of anthropogenic emissions by sources and removals by sinks, of all greenhouse gases uncontrolled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be agreed upon by the Conference of the Parties; also a general description of steps taken or envisaged by the Party to implement the Convention; and any other information that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, relevant data for calculations of global emission trends"*.

The main mechanism for making this information available is national communications. COP 2 (Geneva, 1996) adopted the Guidelines on national communications for non-Annex I Parties (Decision 10/CP 2).

According to these Guidelines, over the 1998-2000 period the Republic of Moldova developed the First National Communication to the UNFCCC within the UNDP-GEF Project "*Enabling Moldova to prepare its First National Communication in response to its Commitments to UNFCCC"*, presented at COP 6, 2000.

The COP 8 (New Delhi, 2002) adopted a new Guideline on national communications for non-Annex I Parties (Decision 17/CP 8). In conformity with these Guidelines, during 2005-2009 time period Republic of Moldova developed its NC2 under the UNFCCC (2010), within 2010-2013 period – the Third National Communication (NC3) under the UNFCCC (2014), from 2014 to 2017, the Fourth National Communication (NC4) under the UNFCCC (2018), while from 2019 to 2022, the Fifth National Communication (NC5) under the UNFCCC is being developed.

With regard to the instruments of implementation of the UNFCCC, it should be noted that at COP 3 (Kyoto, 1997) the Kyoto Protocol[33] was adopted, which is a tool to deepen the commitments of the Parties to the Convention, by obliging industrially developed countries (a total of 37 industrially developed countries and the European Union) included in Annex I of the Convention and transition economy countries to reduce total GHG emissions by 1 January 2008 - 31 December 2012 (the first commitment period of the Kyoto Protocol) at least 5% of their emissions as compared to emissions in the base year (1990). The Republic of Moldova ratified the Kyoto Protocol on 13 February 2003. As a country not included in Annex I to the Convention, the Republic of Moldova had no commitments to reduce GHG emissions during the first commitment period of the Kyoto Protocol.

The Bali Action Plan was adopted at COP 13 (Bali, 2007). At this Conference of the Parties, developing countries agreed for the first time to develop and implement National Appropriate Mitigation Actions (NAMAs) in the context of sustainable development, supported by technology transfer, adequate funding and capacity building actions.

At COP 15 (Copenhagen, 2009) a policy statement was adopted and proposed for implementation in support of limiting global warming by less than 2°C compared to the pre-industrial level, in the context of equity and sustainable development. This statement was named *the Copenhagen Accord* and it reaffirmed development issues in the context of climate change, including through implementation of Low Emissions Development Strategies (LEDS).

[33] The Kyoto Protocol has entered into force on 16 February 2005, 90 days after its ratification by the Russian Federation in November 2004, thus comprising at least 55 Signatory Parties to the Convention, including Annex I countries, which contribute at least 55% of total carbon dioxide emissions recorded in 1990.

The Republic of Moldova acceded to the Copenhagen Accord in January 2010 and presented an emission reduction target, which is specified in Annex no. II to this agreement *"National Appropriate Mitigation Actions at the national level of developing countries"*. The target of the mitigation actions of the Republic of Moldova under this Agreement is *"reduction of total national level of greenhouse gas emissions by 2020 by no less than 25% as compared to the reference year (1990), by implementing economic mechanisms focused on global climate change mitigation, in accordance with the principles and provisions of the Convention"*. This target was presented without indicating specific nationally appropriate mitigation actions, identified and quantified, and without further clarification on the support needed to achieve it. At the same time, it is recognized that achieving this target will require significant financial, technological and capacity-building support, which can be provided through the UNFCCC mechanisms.

In the same context, during the 2010-2012 period, the draft version of the Low Emission Development Strategy (LEDS) of the Republic of Moldova until 2020 was developed, a strategic document that would allow the country to adjust its development pathway towards a low-carbon economy and achieve sustainable green development, based on the country's socio-economic and development priorities. LEDS was also aimed to support the achievement of global goals, providing a strategic national context for mitigation efforts for which countries receive international support for nationally appropriate mitigation actions. LEDS was developed in accordance with the provisions of the "Environmental Protection" Chapter of the Program of Activity of the Government of the Republic of Moldova "European Integration: Freedom, Democracy, Welfare" (2011-2014), as well as in accordance with the provisions of the "Climate Change" Chapter of Association Agreement of Republic of Moldova with the European Union.

The LEDS draft comprised a set of measures that were to contribute to reduction of greenhouse gas emissions, to quantification of the appropriate emission reduction for each measure, as well as the financial needs for their implementation. The measures proposed in the Action Plan attached to LEDS included nationally appropriate mitigation actions, as provided for by the Signatory Parties not included in Annex no. 1 to the UNFCCC. The strategy provided for the implementation procedure, deadlines, as well as actions for monitoring, measuring, reporting and verifying obtained results. LEDS was developed under the auspices of the Ministry of Environment of the Republic of Moldova, the process being guided by the Inter-Ministerial Working Group on Climate Change with the support of the country office of the United Nations Development Program. The process of developing the Strategy involved a broad consultation with stakeholders, represented by line ministries, scientific research institutions, donor organizations, non-governmental organizations and the civil society. The strategy was to be considered and approved by the Government by the end of 2013, but this only occurred towards the end of 2016[34].

At COP 16 (Cancun, 2010), the Cancun Agreements were adopted, which encourage developing countries to prepare their LEDS in the context of sustainable development and to undertake NAMAs. The Cancun Agreements acknowledge that *„stopping climate change requires a paradigm shift towards building a low-carbon society that offers substantial opportunities and ensures continued economic growth and sustainable development"*.

The 16th Conference of the Parties in Cancun also established the periodicity for preparation of national communications of countries not included in Annex I (Decision 1/CP.16). Accordingly, countries not included in Annex I shall submit to the UNFCCC Secretariat, every four years, the *National Communications*, and every two years, *Biennial Update Reports (BURs),* containing a summary or *National Inventory Reports (NIRs)* as a technical annex, which should be a component of the inventory, showing in detail and transparently the procedure for conducting the national inventory of anthropogenic greenhouse gas emissions from sources or carbon dioxide removal by sinks, including information on emission trends, key categories, activity data, emission factors, estimation methods, quality assurance and quality control, uncertainties, recalculations and expected improvements, for each source category or sink included in the national inventory.

At COP 17 (Durban, 2011), the *Guidelines on preparation and reporting to the UNFCCC of Biennial Update Reports of countries not included in Annex I* were adopted (Decision 2/CP.17 and Annex III to this decision). In line with existing capacities at national level and the level of international support obtained for reporting, the countries not included in Annex I were to submit to the UNFCCC Secretariat by the end of December 2014, the first Biennial Update Report. The report was to be prepared every two years and reported to the UNFCCC Secretariat as a stand-alone document, or as a summary of parts of National Communications, if their reporting year coincided.

The Republic of Moldova had initiated the process of developing its First Biennial Update Report (BUR1) in July 2014, and the country managed to submit the report to the UNFCCC Secretariat on 5 April 2016. BUR1 was submitted to the UNFCCC Secretariat together with two technical annexes: National Inventory Report for 1990-2013, Sources of Greenhouse Gas Sources and Sinks in the Republic of Moldova (2015) and Report on the National GHG Inventory System in the Republic of Moldova (2015).

Regarding the non-Annex I Parties, the COP 17 in Durban approved (Decision 2/CP.17 and Annex

[34] <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=369528>.

IV) the Modalities and Guidelines for International Consultation and Analysis (ICA) consisting of two steps: (i) the technical analysis of BURs and (ii) a facilitative sharing of views among Parties on BURs content and the results of technical analysis. The process aims to enhance the transparency and accountability of information reported in BURs by non-Annex I Parties. The technical analysis is conducted by a team of technical experts (TTE) and is initiated within six months of BUR submission to the Secretariat.

The international consultation and analysis process aims to increase transparency and accountability for information reported in the Biennial Update Reports by countries not included in Annex I. The technical evaluation is initiated within six months of the official reporting of the Biennial Update Reports to the UNFCCC Secretariat and it is carried out by a Team of Technical Experts (TTE).

As for the First Biennial Update Report of the RM under the UNFCCC, its technical analysis by the technical expert team took place between 19 and 23 of September 2016, with the summary report being published by the Secretariat on the UNFCCC web page on February 20, 2017[35]. The Facilitative Sharing of Views (FSV) among Parties on the BUR1 content and the results of technical analysis was carried out during the 3rd FSV workshop, organized by the UNFCCC Secretariat on 15th of May 2017 in Bonn, Germany[36].

At COP 18 (Doha, 2012), *the Doha Amendment to the Kyoto Protocol* was approved. The amendment includes new commitments for countries included in Annex I to the Kyoto Protocol during the second commitment period (1 January 2013-31 December 2020); a revised list of greenhouse gases to be reported by Annex I countries during the second commitment period; and a series of amendments to several articles of the Kyoto Protocol that specifically address certain issues related to the first commitment period and which were to be revised to remain valid during the second commitment period as well. By 21 December 2012, the Doha Amendment to the Kyoto Protocol was forwarded to all signatory parties to the UNFCCC by the Secretary-General of the United Nations, acting as depositary, in accordance with Articles 20 and 21 of the Protocol. According to the Doha Amendment to the Kyoto Protocol, industrially developed countries are to reduce their greenhouse gas emissions by at least 18% in the second commitment period compared to the base year (1990). As of 28 October 2020[37], a number of 147 countries have ratified the Doha Amendment to the Kyoto Protocol, the vast majority of which are, however, non-Annex I countries to the UNFCCC and the Kyoto Protocol. The Doha Amendment entered into force on 31 December 2020.

At COP 19 (Warsaw, 2013), the Parties agreed to communicate their intended nationally determined contributions (INDC) (Decision 1/CP.19), in order to include them in the new Climate Agreement to be considered and adopted by the COP 21 in 2015, in Paris. The new climate agreement establishes a new commitment period (1st of January 2021 – 31st of December 2030) for reducing the GHG emissions. Also, COP 19 adopted *General guidelines for domestic measurement, reporting and verification of domestically supported nationally appropriate mitigation actions by developing country Parties* (Decision 21/CP.19). This document provides a solid foundation for the new 2015 Paris Climate Agreement.

The COP 20 took place in Lima (2014). The Parties agreed over *Lima Call for Climate Action* and were repeatedly invited to communicate to the Secretariat their intended nationally determined contributions, in order to facilitate clarity, transparency and understanding. The INDC may include, as appropriate, inter alia: (i) quantifiable information on the reference point; (ii) time frames and/or periods for implementation; (iii) scope and coverage; (iv) planning processes; (v) assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals; and (vi) how the Party considers that its national circumstances, and how it contributes towards achieving the objective of the Convention as set out in its Article 2. According to *Lima Call for Climate Action*, countries were invited to communicate their intended nationally determined contributions by March 31, 2015, the deadline for the presentation being September 30, 2015. The request to the Secretariat was to prepare by 1st of November 2015 a synthesis report on the aggregate effect of the INDC communicated by Parties.

The Republic of Moldova was fully committed to the UNFCCC negotiation process towards adopting at COP 21 the Paris Agreement – a document with legal force under the Convention, applicable to all Parties, in line with keeping global warming below 2°C by 2100 compared to the preindustrial era. The Paris Agreement was signed by the Prime Minister of the Republic of Moldova in New York on September 21, 2016, and was subsequently ratified by the Parliament through Law No. 78 from 04.05.2017 for the ratification of the Paris Agreement (Official Monitor No. 162-170 from 26.05.2017)[38].

At 25th of September 2015, the Republic of Moldova communicated its Intended Nationally Determined Contribution (INDC)[39] and the accompanying information

[35] <http://unfccc.int/files/national_reports/non-annex_i_parties/biennial_update_reports/submitted_burs/application/pdf/mda.pdf>.

[36] The conclusions of the 3rd FSV workshop regarding the BUR1 of the RM under the UNFCCC and the results of the technical analysis are available on the web page: <http://unfccc.int/files/national_reports/non-annex_i_parties/ica/facilitative_sharing_of_views/application/pdf/20170529_mda_v04.pdf>; RM's presentation at the 3rd FSV workshop is available on: <http://unfccc.int/files/national_reports/non-annex_i_parties/ica/facilitative_sharing_of_views/application/pdf/moldova_fsv_workshop_presentation_15.05.2017.pdf>, while the video recording of the presentation and the interventions from the Parties are available on: <https://www.youtube.com/playlist?list=PL-m2oy1bnLzpmdRpG2pTBzUeOH3qrXlZt>

[37] <https://unfccc.int/process/the-kyoto-protocol/the-doha-amendment>

[38] <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=370323>

[39] <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Republic%20of%20Moldo-

to facilitate clarity, transparency, and understanding, with reference to decisions 1/CP.19 and 1/CP.20.

Accordingly, the Republic of Moldova has committed to reach by 2030 the unconditional target of reducing GHG emissions by 64-67% as compared to the level recorded in the reference year (1990), and to make every effort to reduce GHG emissions by 67% as compared to 1990 levels. The reduction commitment could be conditionally increased to around 78%, in line with this global agreement, which addresses important issues such as provision of low-cost financial resources, technology transfer and technical cooperation, access to all of these to an extent appropriate to the challenges of global climate change. GHG emission reduction targets have been set in an emissions budget, covering the period from 1 January 2021 to 31 December 2030. GHG emission reduction targets, set in the intended nationally determined contribution of the Republic of Moldova were subsequently officially approved at national level by Government Decision no. 1470 of 30.12.2016 on approval of the Low Emission Development Strategy of the Republic of Moldova until 2030 and of the Action Plan for its implementation (Official Gazette no. 85-91 of 24.03.2017)[40].

On 4 March 2020, the Republic of Moldova had submitted to the UNFCCC Secretariat the updated version of the nationally determined contribution[41]. Accordingly, the Republic of Moldova is committed to achieving more ambitious GHG reduction targets by 2030. Thus, the unconditional target is to increase GHG reduction from 64-67% to 70% as compared to the level recorded in the reference year (1990), while the conditional target is to increase accordingly from 78% to about 88% as compared to the level recorded in 1990. The new GHG emission reduction targets are to be introduced in the Low Emission Development Programme of the Republic of Moldova by 2030 and the Action Plan for its implementation; to be considered and approved by the Government by end of 2021 year.

In respect to the BUR2 of the Republic of Moldova to the UNFCCC (2019), its technical analysis by the technical expert team took place between 27 and 31 May 2019, with the summary report being published by the Secretariat on the UNFCCC web page on 28 October 2019[42]. The Facilitative Sharing of Views (FSV) among Parties on the content of the BUR2 of the Republic of Moldova and the results of the technical analysis was carried out during the during the 9th FSV workshop, organized online by the UNFCCC Secretariat from 24 to 27 November 2020[43].

va/1/INDC_Republic_of_Moldova_25.09.2015.pdf>.

[40] <https://www.legis.md/cautare/getResults?doc_id=114408&lang=ro>

[41] <https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>

[42] <https://unfccc.int/sites/default/files/resource/tasr2_2019_MDA.pdf>, <https://unfccc.int/ICA-cycle2>

[43] Conclusions of the 9th Seminar for FSV on Second Biennial Update Report of the Republic of Moldova to UNFCCC and outcomes of the technical review are available on the website: <https://unfccc.int/ICA-cycle2>, including the presentation of the Republic of Moldova to the 9th FSV seminar and the video record and interventions from Parties.

2.1.2. Greenhouse Gases

The most important greenhouse gas in the atmosphere is water vapors (H_2O), responsible for about 2/3 of the total greenhouse effect. The water content in the atmosphere is not directly influenced by anthropogenic activities; it is rather determined by the natural water cycle, expressed more simply as the difference between evaporation and precipitation.

Carbon dioxide (CO_2) leads to the greenhouse effect in proportion of 30%, and methane (CH_4), nitrogen oxide (N_2O) and ozone (O_3), taken together - in proportion of 3%. The group of artificial (man-made) substances: chlorofluorocarbons (CFCs) and their substitutes, hydrofluorocarbons (HCFCs, HFCs) and other substances such as perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) are also attributed to direct greenhouse gases. There are other photochemically active gases, such as carbon monoxide (CO), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOCs) (including substances such as propane, butane and ethane), which are not attributed to direct greenhouse gases, but indirectly contribute to the greenhouse effect. These gases are considered to be precursors of ozone in the troposphere, thus influencing the formation and disintegration of ozone in the atmosphere in the presence of sunlight (ultraviolet radiation).

Although GHGs are considered natural components of air, their presence in the atmosphere is strongly affected by anthropogenic activities. Increase of the concentration of GHGs in the atmosphere (caused by anthropogenic emissions) leads to strengthening of the greenhouse effect, thus leading to additional warming of the atmosphere. The concentration of GHGs in the atmosphere is determined by the difference between GHG emissions and removals. It has been established with certainty that atmospheric concentrations of GHGs have increased significantly as compared to the pre-industrial period. Thus, from the year of 1750 up to the end of 2020, the CO_2 concentration had increased by about 147.3%, the CH_4 concentration - by 262.1%, and the N_2O concentration by about 123.6% (Tab. 2-1)[44]. These trends can be largely attributed to human activities, in particular, burning of fossil fuels and continuous deforestation of wooded areas.

By the end of 2019, globally, the amount of annual carbon dioxide emissions was about 36.7 Gigatone (Gt)[45], having increasing over the last 45 years more than significantly (more than 5 times). The most important sources of carbon dioxide emissions are considered to be burning of fossil fuels, deforestation and industrial processes (for example, cement production). The

[44] <https://www.esrl.noaa.gov/gmd/ccgg/trends/>, <https://public.wmo.int/en/media/press-release/carbon-dioxide-levels-continue-record-levels-despite-covid-19-lockdown>

[45] <https://library.wmo.int/index.php?lvl=notice_display&id=21795#.YIKYFaFDOUk>

lifespan of carbon dioxide in the atmosphere varies between 50 and 200 years. It can be removed from the atmosphere through a complex of natural storage mechanisms. It is also estimated that about 40% of the carbon dioxide emitted can be absorbed by the oceans. Photosynthesis, in vegetation and plankton in the sea, is an important mechanism for removing CO_2 emissions, although it is a transitional one, because after the death of a plant, carbon dioxide is emitted back into the atmosphere.

Table 2-1: Tropospheric concentration (northern hemisphere), rate of change in concentration and lifespan of direct greenhouse gases in the atmosphere

Green-house gases	Tropospheric pre-industrial concentration (1850-1900)	Tropospheric concentration as of 2020 yearend	Global warming potential for a 100-year horizon (IPCC, 2013)	Tropospheric lifespan (years)
Carbon dioxide (CO_2)	280 ppm	412.4 ppm	1	~ 50-200
Methane (CH_4)	722 ppb	1892.3 ppb	28	12.4
Nitrogen oxide (N_2O)	270 ppb	333.6 ppb	265	121

Note: ppm – parts per million concentration by volume; ppb – parts per billion concentration by volume.

The concentration of methane in the atmosphere is affected to the extent of about 60 percent by anthropogenic activities such as rice cultivation, livestock husbandry (enteric fermentation and manure management), coal, oil and natural gas extraction, transportation and distribution of natural gas, solid waste disposal, biomass burning etc. The decay of methane into the atmosphere takes place through chemical reactions (via OH radicals). The lifespan of methane in the atmosphere is about 12.4 years. The annual CH_4 emissions into the atmosphere amount to about 29-30 Mt[46], about 60% of them coming from anthropogenic activities.

It has been established that about 40% of atmospheric N_2O is of anthropogenic origin[47], from the application of nitrogenous chemical fertilizers, soil cultivation, manure management, wastewater treatment, adipic acid and nitric acid production, burning of fossil fuels, burning of waste and biomass. The other 60% of atmospheric N_2O come from the soil and the process of denitrification of water under anaerobic conditions. N_2O disintegrates photochemically in the atmosphere. Annual global N_2O emissions from anthropogenic activities amount to about 7.3 Mt[48].

HFCs (hydrofluorocarbons), PFCs (perfluorocarbons) and SF_6 (sulphur hexafluoride) are anthropogenic greenhouse gases. HFCs are mainly used to replace ozone-depleting chemicals, but are also emitted in the production of HCFC-22. PFCs and SF_6 are emitted in various industrial processes, including production of aluminium and magnesium, production of semiconductors, transmission and distribution of electricity, etc. All these gases have a long lifespan in the atmosphere and have a considerable capacity to absorb infrared radiation, so that in the future they could have a significant impact on global warming.

2.1.3. Global Warming Potential

The effect of the radiant force of a gas in the atmosphere is a reflection of its ability to cause the atmosphere to heat up. We refer to the direct radiant force when the gas is a GHG and to the indirect radiant force when the chemical transformation of the original gas produces a gas or gases that are GHGs, or when a gas influences the atmospheric lifespan of other gases.

The concept of "Global Warming Potential" (GWP) was developed to allow scientists and politicians to compare the capacity of each GHG to capture heat in the atmosphere. By definition, GWP is the change in radiant force overtime due to the emission of one kg of gas expressed as radiant force from the emission of one kg of CO_2. In other words, GWP is a relative measure of the heating effect that a radiant gas (GHG) can have on the surface of the troposphere. The GWP takes into account both the instantaneous radiant force due to the cumulative increase in the concentration of greenhouse gases in the atmosphere and the lifespan of such gases in the atmosphere. In this report the term "GWP for a period of 100 years" is used, as recommended by the IPCC in the Fourth Assessment Report (IPCC, 2007) for use in the inventory of GHG emissions within the UNFCCC (Tab. 2-2).

Table 2-2: GWP for a period of 100 years and atmospheric lifespan of direct greenhouse gases[49]

GHG	Chemical formula	Lifespan in accordance with AR5	SAR	TAR	AR4	AR5
Carbon dioxide	CO_2	50-200	1	1	1	1
Methane	CH_4	12.4	21	23	25	28
Nitrogen oxide	N_2O	121	310	296	298	265
Nitrogen trifluoride	NF_3	500	NA	10800	17200	16100
Sulphur hexafluoride	SF_6	3200	23900	22200	22800	23500
Hydrofluorocarbons (HFCs)						
HFC-23	CHF_3	222	11700	12000	14800	12140
HFC-32	CH_2F_3	5.2	650	550	675	677
HFC-125	C_2HF_5	28.2	2800	3400	3500	3170
HFC-134a	$C_2H_2F_2$ (CH_2FCF_3)	13.4	1300	1300	1430	1300
HFC-143a	$C_2H_3F_3$ (CF_3CH_3)	47.1	3800	4300	4470	4800
HFC-152a	C_2H4F_2 (CH_3CHF_2)	1.5	140	120	124	138

[46] <https://library.wmo.int/index.php?lvl=notice_display&id=21795#.YIKYFaFDOUk>
[47] <https://www.wmo.int/pages/mediacentre/press_releases/pr_1002_en.html>, <https://library.wmo.int/index.php?lvl=notice_display&id=21795#.YIKYFaFDOUk>.
[48] <https://library.wmo.int/index.php?lvl=notice_display&id=21795#.YIKYFaFDOUk>.
[49] <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2014-Annex-6-Additional-Information.pdf>

GHG	Chemical formula	Lifespan in accordance with AR5	SAR	TAR	AR4	AR5
HFC-227ea	CF_3CHFCF_3	38.9	2900	3500	3220	3350
HFC-236fa	$CF_3CH_2CF_3$	242	6300	9400	9810	8060
HFC-245fa	$CHF_2CH_2CF_3$	7.7	NA	950	1030	858
HFC-365mfc	$CH_3CF_2CH_2CF_3$	8.7	NA	890	794	804
HFC-43-10mee	$CF_3CHFCHFCF_2CF_3$	16.1	1300	1500	1640	1650
Perfluorocarbons (PFCs)						
Perfluor-methane	CF_4	50000	6500	5700	7390	6630
Perfluore-thane	C_2F_6	10000	9200	11900	12200	11100
Perfluorpro-pane	C_3F_8	2600	7000	8600	8830	8900
Perfluorbu-tane	C_4F_{10}	2600	7000	8600	8860	9200
Perfluorpen-tane	C_5F_{12}	4100	7500	8900	9160	8550
Perfluorhex-ane	C_6F_{14}	3100	7400	9000	9300	7910

Source: SAR – Second Assessment Report of the IPCC (1996), TAR – Third Assessment Report of IPCC (2001), AR4 – Fourth Assessment Report of IPCC (2007) and AR5 – Fifth Assessment Report of IPCC (2013).

2.1.4. Republic of Moldova's Relative Contribution to Global Warming

The historical responsibility of the Republic of Moldova for GHG emissions is low. In 2019, the Republic of Moldova emitted about 13.8 Mt CO_2 equivalent (without contribution of the LULUCF sector) and 14.1 Mt CO_2 equivalent (with contribution of LULUCF sector) (Tab. 2-3), which is less than 0.03% of total global emissions. Total and net emissions per capita were practically twice lower than the global average (4.4 t CO_2 equivalent per capita to be compared to 6.4 t CO_2 equivalent per capita, respectively, 4.5 t CO_2 equivalent per capita to be compared to 6.8 t CO_2 equivalent per capita). In addition, the Republic of Moldova has a low level of historical emissions recorded since 1990, below 0.05% of global emissions (without LULUCF) and below 0.04% of global emissions (with LULUCF). Over the 1990-2018 period, total national GHG emissions (excluding contribution of LULUCF sector) have decreased by about 69.3%, well above the reductions recorded by most industrially developed or transition economies included in Annex I of the Convention (Fig. 2-1).

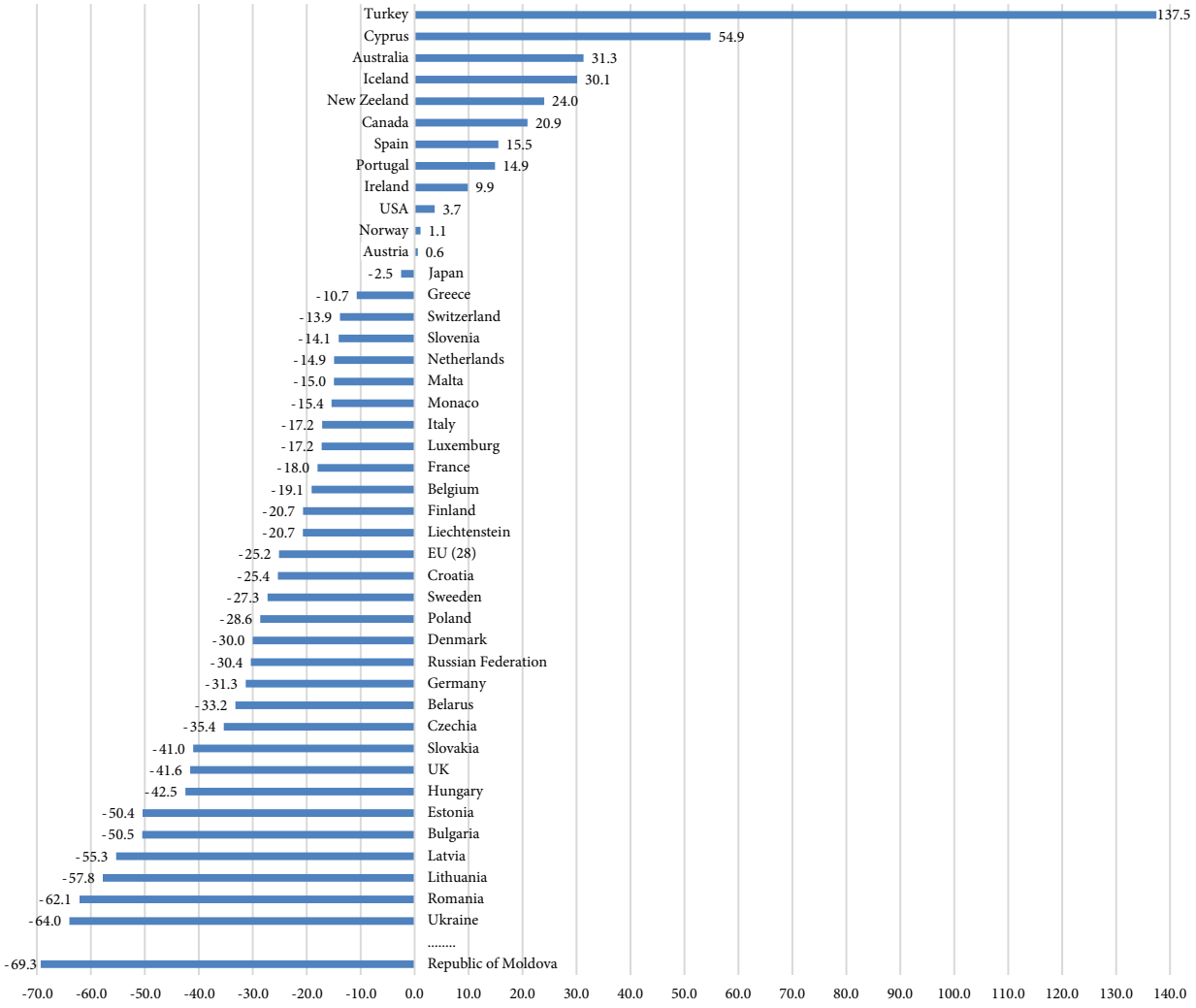


Figure 2-1: Total GHG emissions (without LULUCF) in the Republic of Moldova and in Annex I Parties to the Convention in 2018[50] (% as compared to 1990).

[50] <https://di.unfccc.int/time_series>

Table 2-3: Republic of Moldova's Total Direct GHG Emissions during the 1990-2019 period

SOURCES OF GREENHOUSE GAS EMISSIONS	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
	CO_2 equivalent (kt)									
1. Energy	**36 895.2895**	**12 309.6523**	**6 876.1471**	**8 764.3809**	**9 327.7905**	**9 182.4782**	**9 334.9363**	**8 899.5284**	**9 409.2870**	**9 321.6679**
A. Fuel Combustion	36 082.4102	11 647.8448	6 275.1366	7 987.8235	8 746.6927	8 614.2156	8 722.1748	8 250.2463	8 805.1132	8 924.2142
1. Energy Industries	21 364.2413	7 192.4074	3 159.3286	3 235.4860	4 059.6277	3 689.9589	3 648.6333	2 886.8208	3 180.5484	3 123.5171
2. Manufacturing Industries and Construction	1 923.3779	382.2342	520.3009	575.2151	423.3105	654.1931	643.6290	661.1426	751.3852	718.4760
3. Transport	4 837.9155	1 660.4315	1 005.7542	1 867.0868	2 188.8720	2 307.9763	2 481.6237	2 463.4534	2 581.9145	2 665.4611
4. Other Sectors	7 841.3054	2 286.2222	1 552.9485	2 283.7523	2 047.3623	1 939.2152	1 925.2983	2 175.9589	2 267.8044	2 393.7830
5. Other	115.5701	126.5495	36.8044	26.2833	27.5201	22.8721	22.9905	22.7351	23.4607	22.9770
B. Fugitive Emissions from Fuels	812.8794	661.8075	601.0105	776.5574	581.0977	568.2626	612.7641	649.2847	604.1765	397.4538
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	812.8794	661.8075	601.0105	776.5574	581.0977	568.2626	612.7641	649.2847	604.1765	397.4538
C. CO_2 Transport and Storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Industrial Processes and Product Use	**1 603.6964**	**456.1769**	**314.4396**	**571.3202**	**559.9521**	**762.7907**	**747.9643**	**776.7911**	**959.2291**	**992.1906**
A. Mineral Industry	1 337.4142	351.1816	239.4427	437.4573	404.3936	505.0564	492.5454	476.0597	590.9800	600.3437
B. Chemical Industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal Industry	28.5023	26.2369	36.2689	41.9358	9.6985	17.2792	5.2203	18.8842	20.2133	15.7926
D. Non-energy Products From Fuels and Solvent Use	234.3591	76.5607	32.6395	68.1910	66.2398	84.5691	84.8044	97.0273	151.1808	143.5292
E. Electronic Industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Product Use as Substitutes for ODS	NO	1.0298	5.1199	22.5106	77.8936	153.8517	163.2067	182.4923	194.4750	229.9469
G. Other Product Manufacture and Use	3.4207	1.1679	0.9685	1.2255	1.7265	2.0343	2.1875	2.3277	2.3801	2.5781
H. Other	NA	NA	NA	NA	NA	NA	NA	0.0000	0.0000	0.0000
3. Agriculture	**5 335.4900**	**3 410.3147**	**2 312.1138**	**2 240.3387**	**1 966.7346**	**1 848.4464**	**1 987.5167**	**2 037.8912**	**1 992.9602**	**1 943.4759**
A. Enteric Fermentation	2 189.4276	1 618.0865	1 085.7826	924.0273	708.1752	629.2090	622.0031	577.9552	516.4012	441.6456
B. Manure Management	1 611.7134	939.2484	553.2206	556.5852	503.1437	425.0414	438.2849	419.1947	378.9195	345.0599
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils	1 533.7671	852.9191	672.6709	759.5523	753.6714	782.9558	914.9539	1 014.5332	1 054.2771	1 117.1398
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
G. Liming	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
H. Urea Application	0.5820	0.0607	0.4397	0.1739	1.7443	11.2402	12.2747	26.2081	43.3624	39.6306
I. Other Carbon-containing Fertilizers	NO	NO	NO	NO	NO	NO	NO,NE	NO,NE	NO,NE	NO,NE
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
4. LULUCF	**-1 387.8169**	**-1 761.5693**	**-1 853.8990**	**-1 395.9594**	**-953.9285**	**-903.4922**	**-657.5580**	**-713.7989**	**-560.0883**	**295.7869**
A. Forest Land	-2 563.0889	-2 045.0615	-2 307.4358	-2 409.4945	-2 484.0285	-2 158.4241	-2 115.2503	-2 015.7307	-1 969.1152	-1 950.0633
B. Cropland	2 651.9328	1 589.1918	1 493.3603	1 543.5448	1 546.0900	1 391.1171	1 391.9811	1 369.1743	1 487.3885	1 789.9390
C. Grassland	-1 205.6938	-1 601.1004	-1 291.9495	-1 058.1239	-691.9874	-418.4569	-402.3693	-384.0392	-440.1513	-293.2923
D. Wetlands	-555.3798	-469.4389	-328.4245	-187.4101	-46.3958	-82.7917	-82.7917	-82.8162	-82.8253	-82.8099
E. Settlements	254.2294	357.7389	396.2187	340.1329	303.7123	229.0089	198.3556	248.8550	186.9048	277.7857
F. Other Land	152.3638	401.1281	178.5246	416.5012	441.4824	86.8192	351.6349	218.2055	321.2138	611.7881
G. Harvested Wood Products	-122.1804	5.9727	5.8073	-41.1098	-22.8014	49.2353	0.8816	-67.4476	-63.5037	-57.5604
H. Other	NO	NO	NO	NO	NO	NO	NO	NE	NE	NO
5. Waste	**1 514.2369**	**1 590.4195**	**1 536.3833**	**1 449.1911**	**1 478.6343**	**1 405.9127**	**1 433.0666**	**1 530.2502**	**1 546.2913**	**1 552.6426**
A. Solid Waste Disposal	1 046.7277	1 209.1757	1 169.5330	1 064.3081	1 137.8491	1 087.1715	1 115.1732	1 211.7264	1 223.5561	1 231.5881
B. Biological Treatment of Solid Waste	2.3322	1.0843	0.8984	1.0334	1.8439	2.1795	2.1665	2.4799	2.2360	2.3952
C. Incineration and Open Burning of Waste	24.2621	24.4574	24.2867	23.4100	20.8019	21.5422	21.0986	23.7193	23.1496	22.5520
D. Wastewater Treatment and Discharge	440.9149	355.7021	341.6652	360.4395	318.1393	295.0195	294.6284	292.3246	297.3497	296.1073
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo Items										
International Bunkers	**195.7347**	**42.5212**	**63.7967**	**38.3980**	**41.5312**	**57.4930**	**102.1063**	**149.8553**	**172.2996**	**153.1717**
Aviation	195.7347	42.5212	63.7967	38.3980	41.5312	57.4930	102.1063	149.8553	172.2996	153.1717
Navigation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Multilateral Operations	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CO_2 Emissions from Biomass	**232.8093**	**230.0480**	**272.3720**	**307.3920**	**341.0480**	**1 428.4386**	**1 600.9890**	**2 122.7228**	**3 567.9567**	**2 963.2154**
CO_2 Captured and Stored	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Long-term Storage of C in waste disposal sites	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Indirect N_2O	605.7468	324.3061	223.6470	244.3645	237.1044	233.7742	264.1134	282.4208	285.8518	295.7271
Indirect CO_2	207.5471	65.4471	28.5957	61.0627	59.3041	77.8743	77.9170	90.1477	143.8072	136.1265
Total (without LULUCF)	**45 348.7128**	**17 766.5634**	**11 039.0838**	**13 025.2310**	**13 333.1115**	**13 199.6280**	**13 503.4838**	**13 244.4609**	**13 907.7677**	**13 809.9770**
Total (with LULUCF)	**43 960.8959**	**16 004.9941**	**9 185.1849**	**11 629.2716**	**12 379.1830**	**12 296.1358**	**12 845.9258**	**12 530.6620**	**13 347.6794**	**14 105.7639**

Abbreviations: IE – Included Elsewhere; NE – Not Estimated; NO – Not Occurring.

2.2. Institutional Arrangements, Inventory Process

2.2.1. National Inventory System

The Ministry of Agriculture, Regional Development and Environment (MARDE) of the Republic of Moldova is the state authority responsible for developing and promoting state policies and strategies in agriculture, food production, food security, regional and rural development, spatial planning, environmental protection and climate change and natural resources.

On behalf of the Government of the Republic of Moldova, MARDE is responsible for implementation of international environmental treaties to which the Republic of Moldova is a Party (including the Rio Conventions). The MARDE representative also holds the position of UNFCCC Focal Point.

In accordance with Government Decision no. 549 of 13.06.2018 on establishment, organization and operation of the Environmental Agency[51], it was assigned the following competencies in the field of *atmospheric air protection and climate change*: implementation of provisions of policy documents and international environmental treaties to which Moldova is a party in the field of quality and protection of atmospheric air and the ozone layer, in the field of *reducing greenhouse gas emissions* and *adaptation to climate change*, development and submission to MARDE information on their achievement; participation in the work of the *National Commission on Climate Change*; ensuring implementation of the *system for monitoring, reporting and verifying greenhouse gas emissions*; carrying out the process of *collecting, centralizing, validating and processing the data and information necessary for development of inventories and reports of emissions of air pollutants and greenhouse gases*; providing to MARDE technical support for the preparation of *national communications and biennial update reports*, in accordance with the provisions of the UNFCCC.

At the same time, in accordance with the Government Decision no. 1277 of 26.12.2018 on establishment and operation of the *National Monitoring and Reporting System (NMRS) of greenhouse gas emissions and other information relevant to climate change*, the Environmental Agency has been designated as the *competent authority* responsible for ensuring operation of NMRS of greenhouse gas emissions and other information relevant to climate change, provided that the operation of NMRS is operating at the expense and within the resources approved in the state budget of the institutions which are party to the system, as well as other sources provided by law, including from external financing (*activities carried out on the basis of technical assistance and capacity building projects*).

In the above context, it is important to mention that, in accordance with Government Decision no. 1249 of 19.12.2018 on organization and operation of Public Institution "Environmental Projects Implementation Unit" (PI "EPIU")[52], the latter has the mission to support MARDE and its organizational units in its area of competence, for the purpose of efficient implementation of financial and technical assistance projects, external and internal, in the field of environmental protection and use of natural resources (protection of atmospheric air, ozone layer and *climate change*; waste and chemicals management; prevention of environmental pollution; water resources management, biosecurity, biodiversity conservation and management of state protected natural areas), in accordance with provisions of regulatory documents on implementation of requirements of international conventions to which the Republic of Moldova is a party and alignment with international standards in the field of environmental protection. The tasks of PI "EPIU" consist in: efficient implementation of projects in its fields of competence in accordance with established objectives; supervision and verification of the quality of provided services, works and goods, observance of established deadlines for provision of such services, works and goods; managing financial resources allocated to projects in its areas of competence, in accordance with the assistance agreements and with the approved budgets; providing support to the founder in development of project proposals in its fields of competence; development and submission of progress reports in project implementation and use of funds for projects.

The management body of PI "EPIU" comprises the Director of the institution (executive body), respectively, a Steering Committee - a superior collegiate body, which leads and supervises the activity of the institution. The committee consists of 5 members and it is appointed for a 4-year period. The nominal composition of the Committee members is established by MARDE Order, with mandatory inclusion of at least one representative from each of the following entities: State Chancellery, Ministry of Finance, and Ministry of Agriculture, Regional Development and Environment and civil society in the area of competence of PI "EPIU". The Committee shall be chaired by the Secretary of State for Protection of the Environment and Mineral Resources of MARDE, who shall chair the meetings of the Committee and exercise other established duties. In the absence of the Chairperson of the Committee,

[51] <https://www.legis.md/cautare/getResults?doc_id=119162&lang=ro>

[52] <https://www.legis.md/cautare/getResults?doc_id=113696&lang=ro>.

the meeting shall be chaired by one of the members, elected by the members attending the meeting.

The National Monitoring and Reporting System (NMRS) for greenhouse gas emissions and other information relevant to climate change to the UNFCCC, approved by GD no. 1277 of 26.12.2018, includes two subsystems as integral parts:

1. *The National Inventory System (NIS)*, which provides the institutional, legal and procedural framework established for estimation of anthropogenic emissions from sources and removal by sinks of all greenhouse gases, compiled in the national inventory of greenhouse gas emissions, as well as for reporting and archiving inventory information, in accordance with the decisions taken under the UNFCCC and the Paris Agreement;
2. *The National System for Policies, Measures and Projections (NSPMP)*, which provides the institutional, legal and procedural framework for assessing progress in implementing climate change mitigation policies, for developing projections of anthropogenic greenhouse gas emissions from sources or removal by sinks.

The implementation of the NMRS provides for collection, proper processing of data and information necessary for: (1) development and reporting of the national inventory and projections of anthropogenic emissions from sources or removal by sinks of greenhouse gases and (2) evaluation and reporting of: progress in implementing mitigation policies; vulnerability to climate change, impact of climate change and progress in implementing adaptation actions; as well as aggregate financial and technological support provided by industrially developed countries, listed in Annex I to the UNFCCC for implementation of climate change mitigation and adaptation actions, of technical assistance and capacity building projects in the field of climate change.

In the context of GD No. 1277 of 26.12.2018, NMRS aims to ensure transparent, accurate, coherent and comprehensive monitoring and reporting of greenhouse gases to the UNFCCC Secretariat, through planned reporting tools, including actions to be taken to adapt to the consequences of climate change, respectively to ensure the evaluation, reporting and verification of information on progress at national level in meeting the commitments under the UNFCCC, the Paris Agreement and the decisions taken under them.

With reference to the NIS, it is designed and managed in such a way as to ensure the principles of transparency, consistency, comparability, completeness in preparation of the national inventory of greenhouse gas emissions, in accordance with the provisions of the 2006 IPCC Guidelines on preparation of national greenhouse gas inventories.

The Environmental Agency, as competent authority, in direct collaboration with competent authorities and institutions that are part of the NMRS and with the support of the Central Authority for Natural Resources and Environment, ensures the organization and operation of the NIS, by periodically improving the institutional, legal and procedural framework, in accordance with the national and international legal framework.

Within the NIS, the competent authority shall, every two years, compile the national greenhouse gas emissions inventory. The data of the national inventory shall be presented according to the format set out in Table 1 of Annex No. 1 to GD no. 1277 of 26.12.2018. In case of direct greenhouse gas emissions, the national inventory shall be compiled in accordance with the 2006 IPCC Guidelines, through the reporting software recommended by the UNFCCC, while in case of indirect greenhouse gas emissions, the national inventory shall be compiled in accordance with the updated editions of the EEA/EMEP Air Pollutant Emission Inventory Guidebook, the technical guide for the inventory of national emissions, published and regularly updated by the European Environment Agency (EEA) under the European Monitoring and Evaluation Program (EMEP).

Based on the National GHG Inventory, the competent authority shall be responsible for compiling, every two years, of the National Inventory Report (NIR), in the state language and in English, using the contents structure set out in the relevant COP decisions, namely: (1) introduction; (2) trends in greenhouse gas emissions; (3) Energy Sector; (4) Industrial Processes and Product Use Sector; (5) Agriculture Sector; (6) Land Use, Land Use Change and Forestry Sector; (7) Waste Sector; (8) Recalculations and Planned Improvements; (9) References; and (10) Annexes.

The competent authority shall publish every two years on its official website (<http://mediu.gov.md/>) the National Inventory Report (NIR), as well as the national inventory of greenhouse gas emissions in tabular format. The summary tables shall show the trends of greenhouse gas emissions by gas and by sector.

The competent authority shall ensure the quality of national inventories by implementing the planning, preparation and management stages, which include collection of activity data, appropriate selection of estimation methods and emission factors, estimation of anthropogenic greenhouse gas emissions, implementation of uncertainty analysis, activities for quality assurance and quality control, as well as data verification procedures included in the national inventory.

At the *planning* stage for the national inventory, the following activities are performed:

1. make available financial resources necessary for the development of the national inventory, as well as for collecting activity data, selection of emission factors and estimation methods, implementation of quality assurance and quality control measures, estimation of key categories, uncertainties, envisioned recalculations and improvements, for each source category or sink included in the national inventory;
2. elaborate, approve and periodically update the QA/QC plan which describes specific QC procedures to be implemented during the inventory development process, facilitate the overall QA procedures to be conducted, to the extent possible, on the entire inventory and establish quality objectives;
3. make available on the official website of the competent authority the postal and electronic addresses of the national competent authority responsible for the inventory;
4. establish processes for the official consideration and approval of the inventory, prior to its submission to the UNFCCC Secretariat.

At the stage of *preparation* of the national inventory, the following activities are to be performed:

1. identify key categories by following the methods described in the 2006 IPCC Guidelines;
2. collect sufficient activity data, process information and emission factors as are necessary to support the methods selected for estimating anthropogenic GHG emissions by sources and removals by sinks;
3. prepare estimates in accordance with the methods described in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, and ensure that appropriate methods are used to estimate emissions from key categories;
4. make a quantitative estimate of inventory uncertainty for each source category and for the inventory in total, following the 2006 IPCC Guidelines;
5. ensure that any recalculations of previously submitted estimates of anthropogenic GHG emissions by sources and removals by sink are prepared in accordance with the 2006 IPCC Guidelines;
6. compile the national inventory in accordance with relevant decisions of the COP;
7. implement general inventory QC procedures (tier 1) in accordance with the approved QA/QC plan following the 2006 IPCC Guidelines;
8. apply category specific QC procedures (tier 2) for key categories and for those individual source categories in which significant methodological and/or data revisions have occurred, in accordance with the 2006 IPCC Guidelines;
9. provide for a basic review of the inventory by personnel that have not been involved in the inventory development, preferably an independent third party, before the submission of the inventory;
10. provide for a more extensive review of the inventory for key categories, as well as for categories in which significant changes in methods or data have been made;
11. re-evaluate the inventory planning process in order to meet the established quality objectives established in the QA/QC plan, taking into account recommendations from the actions laid down above in pt. 9) and 10), and of the results of periodic internal evaluations of the inventory preparation process.

At the *management* stage of the national inventory, the following activities are to be performed

1) periodically archive and store the inventory information for each inventory year, including:
   a) all disaggregated emission factors, activity data, and documentation about how these factors and data have been generated and aggregated for the preparation of the inventory;
   b) internal documentation on QA/QC procedures;
   c) documentation on external and internal reviews, documentation on annual key categories identification and planned inventory improvements;
2) provide the technical teams of experts (TTE) in the process of technical analysis of biennial update reports under the international consultation and analysis (ICA) with access to information used to develop the national inventory, as well as to information on the NSMR;
3) respond to requests for clarifying inventory information resulting from the different stages of the process of technical analysis of biennial update reports under the ICA in a timely manner, in accordance with UNFCCC decisions.

The competent authority shall communicate to the central authority for natural resources and the environment, by 15 December of the year in which the report is made (year X), the following data:

1) the level of anthropogenic emissions of direct greenhouse gases – carbon dioxide [CO_2], meth-

ane [CH_4], nitrous oxide [N_2O], hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], sulfur hexafluoride [SF_6], nitrogen trifluoride [NF_3] – recorded two years prior to the year in which the reporting is done (year X-2);

2) the level of anthropogenic emissions of indirect greenhouse gases – carbon monoxide [CO], nitrogen oxides [NO_x], non-methane volatile organic compounds [NMVOCs] and sulfur dioxides [SO_2] – recorded 2 years prior to the year in which the reporting is done (year X-2);

3) accounting of emissions and removals from land use, land-use change and forestry sector, recorded two years prior to the year in which the reporting is done (year X-2);

4) any recalculations and/or modifications of information provided for in pt. 1) - 3), covering the period between the base year (1990) and three years prior to the year in which the reporting is done (X-3);

5) the elements comprised in the NIR, information on QA/QC plan, a general assessment of uncertainty and completeness of the inventory, as well as information on any other recalculations;

6) measures taken to improve GHG emissions estimates, mainly recalculated estimates.

The central authority for natural resources and environment shall submit to the UNFCCC Secretariat, based on data provided by the competent authority, prior to 31 December of the year in which the reporting is done (year X), the complete greenhouse gases national inventory for the period starting with base year (1990) and ending with the year X-2.

The competent authority shall make available to the public the information on greenhouse gas emissions, in accordance with the provisions of GD No. 1277 of 26.12.2018 on establishment and operation of the National Monitoring and Reporting System for greenhouse gas emissions and other information relevant to climate change.

2.2.2. Institutional Arrangements

The list of competent authorities and institutions which are part of the NMRS for greenhouse gas emissions, as well as other information relevant to climate changes in accordance with Annex No. 2 to GD No. 1277 of 26.12.2018, comprises:

1. Specialized central public authorities:
   1) Ministry of Agriculture, Regional Development and Environment;
   2) Ministry of Economy and Infrastructure;
   3) Ministry of Finance;
   4) Ministry of Health, Labor and Social Protection;
   5) Ministry of Defense;
   6) Ministry of Foreign Affairs and European Integration;
   7) Ministry of Education, Culture and Research.
2. Public authorities subordinated to ministries:
   1) Environmental Agency;
   2) Inspectorate for Environmental Protection;
   3) Civil Aeronautical Authority;
   4) Naval Agency of the Republic of Moldova;
   5) Customs Service;
   6) Agency for Energy Efficiency;
   7) National Agency for Public Health;
   8) Moldsilva Agency;
   9) State Hydrometeorological Service.
3. Central public authorities:
   1) National Bureau for Statistics;
   2) Agency for Land Relations and Cadaster;
   3) Agency for Medicines and Medical Devices;
   4) Public Services Agency;
   5) National Agency for Food Safety;
4. State owned companies and joint stock companies subordinated to specialized public authorities and companies with shares of state owned capital:
   1) State Enterprise "State Road Administration";
   2) State Enterprise "Ungheni River Harbor";
   3) State Enterprise "Molovata Ferry";
   4) Forestry-Didactic Enterprise "Forestry Research and Management Institute" (subordinated to "Moldsilva" Agency);
   5) State Enterprise "Moldovan Railways";
   6) State Enterprise "Chisinau Glass Factory";
   7) State Enterprise "Moldelectrica", Chisinau;
   8) Joint Stock Company "RED-NORD";
   9) Joint Stock Company "TERMOELECTRICA", Chisinau;
   10) Joint Stock Company "CET-Nord", Balti;
   11) Joint Stock Company "Moldovagaz".

As competent authority responsible for operation of the National Monitoring and Reporting System for greenhouse gas emissions and other information relevant to climate change, the Environmental Agency, by Letter no. 3471 of 25.09.2019 to the Office of Climate Change within the PI "EPIU", requested to examine and identify the possibility of providing the necessary support for carrying out of responsibilities in the field of climate change by organizing the entire process of developing the Third Biennial Update Report of the Republic of Moldova to UNFCCC, respectively, the Fifth National Communication of the Republic of Moldova to

the UNFCCC, in accordance with the rules, procedures and decisions of the Conference of the Parties to the UNFCCC.

Towards this end, the Climate Change Office of the PI "EPIU" has been given the authority: to request and receive, directly or through the Environmental Agency, information from central public authorities, local public authorities, organizations and institutions, economic operators working in fields holding primary information needed to complete these two national reports; to collect, process and validate the data and information necessary for preparation of national inventory and reports on greenhouse gas emissions; to train specialists from the Environmental Agency in processes for working with collected data and information in order to develop their capacities in targeted fields.

It should be noted that the Climate Change Office, being within MARDE (February 2004 - December 2018), and more recently also under the PI "EPIU" (starting January 2019), held the responsibility for activities associated with the preparation of NCs, BURs, NIRs and national GHG emission inventories.

Figure 2-2 schematically defines the institutional arrangements for the NMRS of the Republic of Moldova.

Thus, within the PI "EPIU", the inventory team is responsible for assessing emissions by source category and removals by sink category, analysis of key emission sources, activities for verification and control of the inventory quality, uncertainty analysis, documentation and archiving of information associated with the process of preparing the national inventory of GHG emissions, development of NCs, BURs and NIRs.

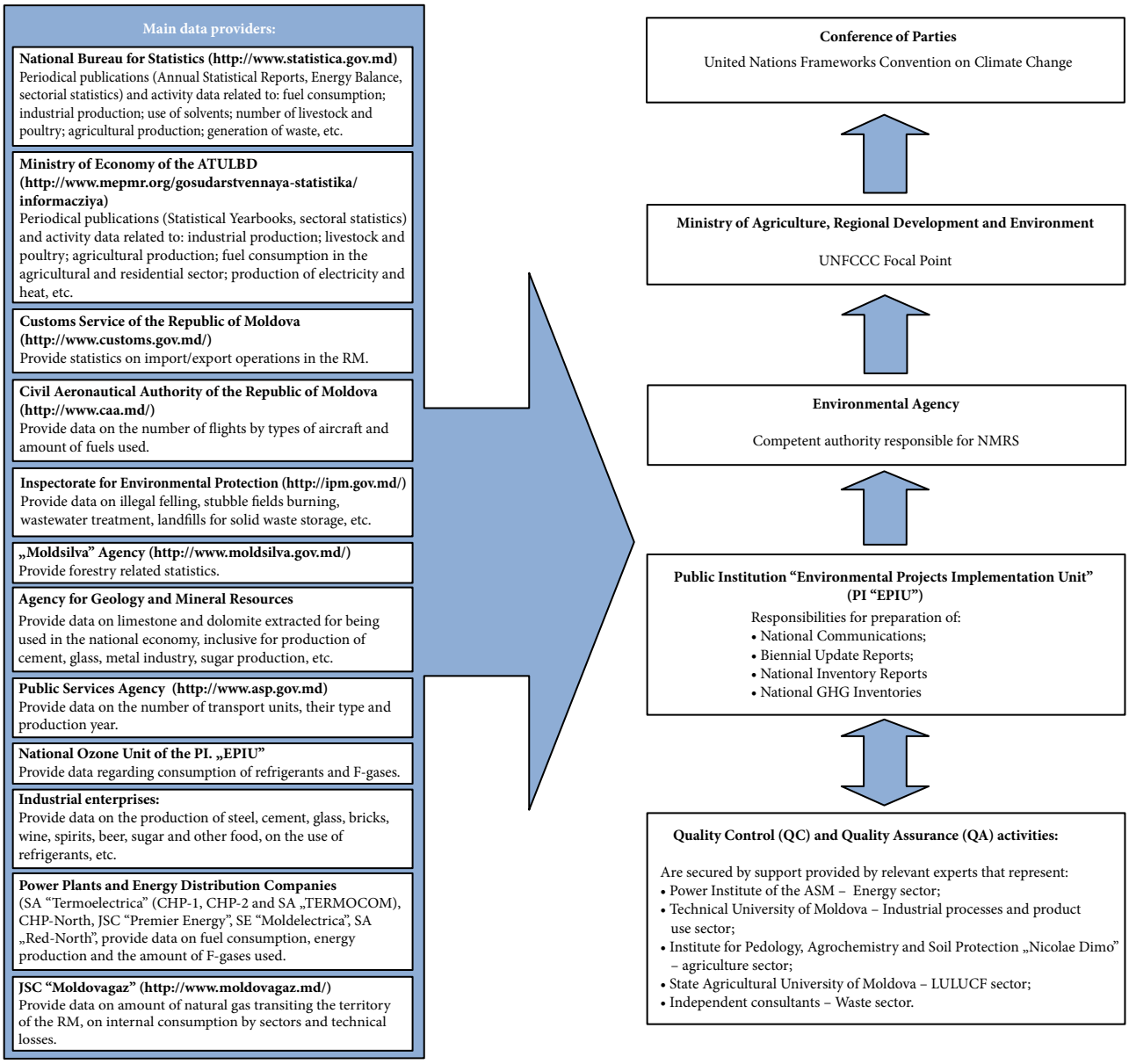


Figure 2-2: Institutional arrangements for the NMRS of the Republic of Moldova.

The functional responsibilities of the participants in the process are briefly described as follows:

- The Coordinator / Compiler of the National GHG Inventory is responsible for the inventory preparation process coordination, including supervision of estimating emissions by individual categories of sources and removals by individual categories of sinks, KCA, uncertainty analysis interpretation, QA&QC activities coordination, documentation and archiving the data used in the inventory preparation process, synthesis of sectoral reports – serving as basis for the NIR compilation, respectively Chapter 2 "GHG National Inventory" from the BURs and NCs;
- The national experts (hired on a contract basis) are responsible for estimating emissions by individual categories of sources and removals by individual categories of sinks at sectoral level (Sector 1 "Energy", Sector 2 "Industrial Processes and Product Use", Sector 3 "Agriculture", Sector 4 "LULUCF" and Sector 5 "Waste"); national experts are responsible for the activity data (AD) collection, application of decision trees in terms of selecting suitable assessment methods and EFs, estimating emission uncertainties by individual categories of sources, as well as for taking correction measures as a response to QA&QC activities.

The activity data necessary for compilation of the national inventory are available in the Statistical Annual Reports, Energy Balance, sectoral statistical publications, as well as in the online database[53] managed by the National Bureau for Statistics (NBS) of the Republic of Moldova.

For the period until 1992, the information is available for the whole territory of the Republic of the Moldova, while since 1993 only for the right bank of Dniester (without Transnistria, further referred as Administrative Territorial Units on the Left Bank of Dniester). The statistical data for the left bank of Dniester are available in the Statistical Yearbooks of the ATULBD[54] and in other relevant sectorial statistical publication, as compiled by the State Statistical Service beside the Ministry of Economy of the ATULBD[55].

Additional statistical information (unpublished) can be obtained upon request from a number of partner institutions, with the status of data providers, in accordance with provisions of GD No. 1277 of 26.12.2018 on establishment and operation of the National Monitoring and Reporting System of Greenhouse Gas Emissions and other information relevant to climate change, including:

- from the Ministry of Health, Labor and Social Protection and the Agency for Medicines and Medical Devices: data on use of dose pressurized aerosols made on the basis of HFCs as a propellant;
- from the Ministry of Defense: information on the amount of fuels used for military transportation;
- from the Customs Service: statistics on import/export operations in the Republic of Moldova;
- from the Public Services Agency: information on the number of transport units registered, their type and production year;
- from the Naval Agency of the Republic of Moldova and the State Enterprises "Ungheni Harbor" and the State Enterprise "Molovata Ferry": information on the amount of fuel used to ensure operation of naval transport;
- from the Civil Aviation Authority of the Republic of Moldova: information on the amount of fuels used in air transportation (civil and international aviation) and the number of flights by type of aircrafts;
- from the Agency for Land Relations and Cadaster: information on land use by categories type;
- from Moldsilva Agency: information on forestry related statistic;
- from the Agency for Geology and Mineral Resources: information on limestone and dolomite extraction and use;
- from the Inspectorate for Environmental Protection: information on illegal felling and stubble fields burning;
- from the National Ozone Unit of PI "EPIU": data on import and use of refrigerants in refrigeration and air conditioning equipment;
- from the State Owned Enterprise "State Road Administration": data on amount of asphalt produced and used in the Republic of Moldova;
- from the State Enterprise "Moldovan Railways": data on amount of fuel consumed for provision of railway transport services, as well as on the rolling stock used at the enterprise;
- from JSC "Moldovagaz": information on the amount of natural gas transited through the territory of the Republic of Moldova, on the consumption of natural gas in the national economy by sector, as well as on technical losses;
- from Power Plants ("TERMOELECTRICA" J.S.C. in Chisinau [CHP-1 J.S.C., CHP-2 J.S.C. and "TERMO-COM" J.S.C.], CHP-North J.S.C. in Balti: information on the amount of fuel used for electricity and heat production;

[53] National Bureau for Statistics of the RM, on-line database: <http://statbank.statistica.md/pxweb/Database/RO/databasetree.asp>
[54] CCO of the PI "EPIU" has copies of the Statistical Yearbooks of ATULBD for the years of 2000-2020, covering the statistical data for the 1990 year and 1995-2019 periods.
[55] Ministry of Economy of the ATULBD: <http://www.mepmr.org/gosudarstvennaya-statistika/informacziya>

- from the enterprises specialized in transmission and distribution of electricity (JSC "Moldelectrica", JSC "Premier Energy", "Red-North" J.S.C.): data on amount of PFCs and SF_6 used as elegaz in electrical transformers;
- from a range of industrial enterprises ("Lafarge Cement (Moldova)" J.S.C., "Macon" J.S.C., Glass Factory No. 1 in Chisinau, "Glass-Container" Company in Chisinau, etc.) – information on the amount of fuel used, industrial output and amount of mineral resources used.

2.3. Process for Inventory Preparation

PI "EPIU" applies a top down approach in the process of preparing the national inventory, which consists of the National Inventory Report (NIR) and the standard evaluation and reporting tables as approved by Decision 24/CP.19 (Annex 1). The process of preparing the national inventory is presented schematically in Fig. 2-3.

The Coordinator / Compiler of the National GHG Inventory is responsible for compiling the estimations and ensuring consistency and quality of the inventory by producing the NIR and Chapters 2 "National GHG Inventory" from the Biennial Update Reports and the National Communications.

Estimation of emissions by individual source categories and removals by individual sink categories is the responsibility of national experts who have more competences about individual features of source/sink categories. The national experts, under direct guidance of the Coordinator of the National GHG Inventory, decide, by applying decision trees, on employing the best estimation methodology, and collect AD needed for emissions estimation. For most source and sink categories methodologies used in the previous inventory cycle are applied. It is needed to collect new AD for a more recent period under review or for the entire period under review if historical AD were amended or recalculated. If a new source/sink category was to be assessed, or a higher Tier methodology had to be used, then the Coordinator of the National GHG Inventory with the national experts would decide on which assessment methodology to use, collect most reasonable AD and EFs, calculate GHG emissions, assess uncertainties, ensured implementation of verification, QA/QC procedures acting on behalf of research and academic institutions, ministries and subordinated institutions, central administrative authorities and/or private sector. National experts produce explanatory texts for the research on estimation of emissions by individual source categories and removals by individual sink categories, as well as provided the bibliography used.

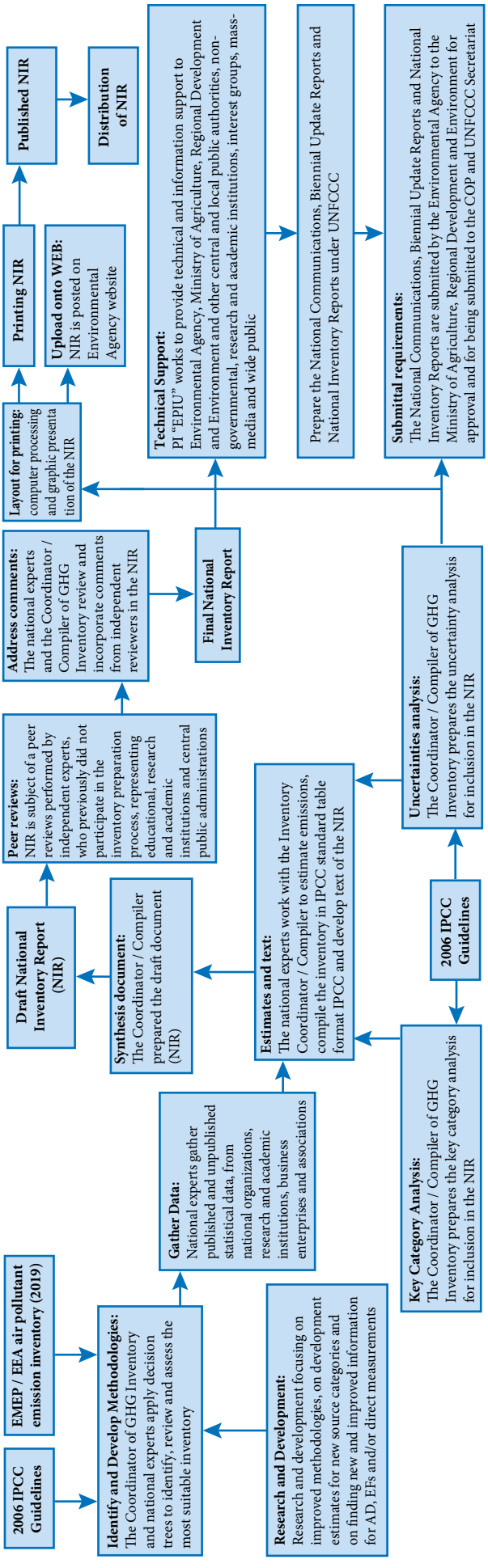


Figure 2-3: Inventory process in the Republic of Moldova.

The Coordinator / Compiler of the National GHG Inventory is responsible for collecting and reviewing these materials, used in drafting the NIR sectoral chapters (Chapter 3 "Energy", Chapter 4 "Industrial Processes and Product Use", Chapter 5 "Agriculture", Chapter 6 "LULUCF", Chapter 7 "Waste"). The Coordinator / Compiler is also responsible for drafting other chapters (Executive Summary, Chapter 1 "Introduction", Chapter 2 "Trends in National GHG Emissions", Chapter 8 "Recalculations", "Bibliography" and "Annexes"), as well as for checking the correctness of the key category analysis, compatible with the 2006 IPCC Guidelines.

The NIR is produced in compliance with the general structure of the National Inventory Reports, as was established in the Decision 24/CP.19. In addition to NIR, the Common Reporting Format (CRF) Tables are filled-in (see Annex 1). The Coordinator / Compiler of the National GHG Inventory has the task to monitor the process of producing the Sectoral and Summary CRF Tables, to ensure the consistency of results. The national experts accomplished the uncertainties analysis, as well as verification and QA/QC activities, in close cooperation with the Coordinator / Compiler of the National GHG Inventory.

The first *QA/QC Plan* was produced in 2006 within the UNDP-GEF Regional Project "*Capacity Building for Improving the Quality of the National GHG Inventories (Central Europe and CIS region)*", and complied with the 2006 IPCC Guidelines requirements. Subsequently, it was periodically updated during the national GHG inventory processes.

During the peer reviews, the draft version of the NIR is sent to a group of independent experts (who did not previously participate in the national inventory preparation). The purpose of the inventory peer reviews is to receive from relevant experts in the areas of major interest comments on quality of the work done, in particular on relevance of methodological approaches, EFs and AD used. The received comments are reviewed and estimations and explanatory notes to them are corrected.

Following the final review, after the incorporation of comments received in the process of peer reviews, the Climate Change Office of the PI "EPIU" prepares the MS Word final version of the National Inventory Report, which is then sent for approval to the Environmental Agency. When the Report is approved, the final version is electronically processed, printed and published.

Once published, the National Inventory Report, the Biennial Update Reports and/or the National Communications are submitted by the Environment Agency to the Ministry of Agriculture, Regional Development and Environment for approval, after which it is officially submitted to the UNFCCC Secretariat, in accordance with Moldova's international commitments to UNFCCC.

2.4. Methodological Issues

2.4.1. Methodologies, Emissions Factors and Data Sources

The national inventory is structured to match the reporting requirement of the UNFCCC and is divided into five main sectors: (1) Energy, (2) Industrial Processes and Product Use, (3) Agriculture, (4) Land Use, Land-Use Change and Forestry and (5) Waste. Each of these sectors is further subdivided, within the inventory, by source categories (Tab. 2-4).

Emissions of direct (CO_2, CH_4, N_2O, HFCs, PFCs and SF_6) (no NF_3 emissions have been registered in the Republic of Moldova so far) greenhouse gases were estimated based on methodologies contained in the 2006 IPCC Guidelines, while the indirect emissions (NOx, CO, NMVOC and SO_2) were estimated based on methodologies according to the EEA/EMEP Air Pollutant Emission Inventory Guidebook (2019).

Generally, a GHG inventory can be defined as *a "comprehensive account of anthropogenic sources of emissions and removals by sinks and associated data from source and sink categories within the inventory area over a specified time frame"*.

It can be prepared "top-down", "bottom-up", or using a combination approach. The Republic of Moldova's national inventory is prepared using a "top-down" approach, providing estimates of GHG emissions at a national level. Ideally, a GHG inventory should be developed by using direct measurements of emissions and removals from individual categories of sources or sinks in the country, considering the methodological approach "bottom-up".

The national inventory team is continuously working to improve accuracy, completeness and transparency of its inventory. Comprehensive bottom-up inventory is neither practicable nor possible at the present time, although for some sectors, estimates are derived from individual source specific data.

Table 2-4: Summary of methods and emission factors used in the process of preparing the National Inventory of the Republic of Moldova

Categories by sources and sinks	CO_2		CH_4		N_2O		HFC		PFC		SF_6	
	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF	Methods	EF
1. Energy												
A. Fuel Combustion	T1	D, CS	T1	D	T1	D						
1. Energy Industries	T1	D, CS	T1	D	T1	D						
2. Manufacturing Industries and Construction	T1	D, CS	T1	D	T1	D						
3. Transport	T1	D, CS	T1	D	T1	D						
4. Other Sectors	T1	D, CS	T1	D	T1	D						
5. Other	T1	D, CS	T1	D	T1	D						
B. Fugitive Emissions from Fuels	T1	D, CS	T1	D	T1	D						
1. Solid Fuels	NO	NO	NO	NO	NO	NO						
2. Oil and Natural Gas	T1	D, CS	T1	D	T1	D						
C. CO_2 Transport and Storage	NO	NO										
2. Industrial Processes and Product Use												
A. Mineral Industry	T2, T1	D, CS	NA	NA	NA	NA						
B. Chemical Industry	NO	NO	NO	NO	NO	NO						
C. Metal Industry	T2	CS, D	NO	NO	NO	NO						
D. Non-energy Products From Fuels and Solvent Use	T2, T1	D	NA	NA	NO	NO						
E. Electronic Industry	NA	NA	NA	NA	NA	NA	NA	NA	NO	NO	NO	NO
F. Product Use as Substitutes for ODS	NA	NA	NA	NA	NA	NA	T2, T1	CS, D	NA	NA	NA	NA
G. Other Product Manufacture and Use	T2, T1	D	NA	NA	T1	D	NA	NA	T1	D	T1	D
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Agriculture												
A. Enteric Fermentation			T2, T1	D, CS	NA	NA						
B. Manure Management			T2, T1	D, CS	T2, T1	D, CS						
C. Rice Cultivation			NO	NO	NA	NA						
D. Agricultural Soils			NA	NA	T1, T3	D, CS						
E. Prescribed Burning of Savannas			NO	NO	NA	NA						
F. Field Burning of Agricultural Residues			IE	IE	IE	IE						
G. Liming	NO	NO	NA	NA	NA	NA						
H. Urea Application	T1	D	NA	NA	NA	NA						
I. Other Carbon-containing Fertilizers	NO	NO	NA	NA	NA	NA						
J. Other	NO	NO	NO	NO	NO	NO						
4. LULUCF												
A. Forest Land	T3, T2, T1	D, CS	T1	D	T1	D						
B. Cropland	T2, T1	D, CS	T1	D	T1	D						
C. Grassland	T2	CS	NE	NE	NE	NE						
D. Wetlands	T2, T1	D, CS	NE	NE	NE	NE						
E. Settlements	T2, T1	D, CS	NE	NE	T1	D						
F. Other Land	T2, T1	D, CS	NE	NE	NE	NE						
G. Harvested Wood Products	T1	D	NA	NA	NA	NA						
H. Other	NO	NO	NO	NO	NO	NO						
5. Waste												
A. Solid Waste Disposal	NA	NA	T3	D, CS	NA	NA						
B. Biological Treatment of Solid Waste	NA	NA	T1	D	T1	D						
C. Incineration and Open Burning of Waste	T1	D	T1	D	T1	D						
D. Wastewater Treatment and Discharge	NA	NA	T1	D, CS	T1	D						
E. Other	NO	NO	NO	NO	NO	NO						
6. Other	NO	NO	NO	NO	NO	NO						
Memo Items												
International Bunkers	T2, T1	D, CS	T1	D	T1	D						
Multilateral Operations	NO	NO	NO	NO	NO	NO						
CO_2 Emissions from Biomass	T1	D, CS	IE	IE	IE	IE						
CO_2 Captured and Stored	NO	NO	NA	NA	NA	NA						

Abbreviations: T1 – Tier 1 Method; T2 – Tier 2 Method; C – EMEP/EEA; CS – Country Specific; D – Default; IE – Included Elsewhere; NA – Not Applicable; NE – Not Estimates; NO – Not Occurring.

To the extent possible, AD used in this report are based on officially published data: national (Statistical Yearbooks of the RM, respectively of the ATULBD, Energy Balances etc.) and international statistical publications (UN FAO on-line database), publications of academic, research and development institutions (Institute

of Pedology, Agrochemistry and Soil Protection "Nicolae Dimo", Institute of Ecology and Geography, Institute of Power Engineering, Forest Research and Management Institute, etc.), AD provided by ministries and subordinated institutions (Ministry of Economy and Infrastructure; MARDE; Ministry of Defense; Ministry of Health, Labor and Social Protection), AD provided by administrative authorities subordinated to ministries (Environment Agency, Environmental Protection Inspectorate, Customs Service; Agency „Moldsilva", State Hydrometeorological Service, Agency for Geology and Mineral Resources), data from central administrative authorities (National Bureau of Statistics, Agency for Land Relations and Cadaster, Public Services Agency, Naval Agency, Civil Aeronautical Authority, Medicines and Medical Devices Agency, National Food Safety Agency), data obtained from enterprises and businesses associations (State Enterprise "Moldavian Railways", "Moldovagaz" J.S.C., "Lafarge Cement (Moldova)" J.S.C., "Macon" J.S.C., "Glass Plant Chisinau" J.S.C., "Glass Container Company" J.S.C., etc.).

2.4.2. Key Categories

According to 2006 IPCC Guidance, it is good practice to identify key categories, as it helps prioritize efforts and improve the overall quality of the national inventory. A "key category" is defined as a "source or sink category, that is prioritized within the national inventory system because its estimate has a significant influence on a country's total inventory of direct greenhouse gases in terms of the absolute level of emissions, the trend in emissions, or both".

Table 2-5, respectively Annex 1, presents the key categories for the RM's National GHG Inventory, 1990-2019, without LULUCF – based on the Tier 1 methodological approach – 21 key categories by level (L) and 20 key categories by trend (T); based on a Tier 2 approach – 19 key categories by level (L) and 17 key categories by trend (T); with LULUCF, based on the Tier 1 methodological approach – 28 key categories by level (L) and 26 key categories by trend (T), respective, based on a Tier 2 approach – 26 key categories by level (L) and 22 key categories by trend (T).

Table 2-5: Summary Overview of the Republic of Moldova's Key Categories for 1990-2019, Based on a Tier 1 and Tier 2 Approaches

IPCC classification	Key categories	Gas	Without LULUCF				With LULUCF			
			T1		T2		T1		T2	
			L	T	L	T	L	T	L	T
1A1	Energy industries - liquid fuels	CO_2	X	X	X	X	X	X	X	X
1A1	Energy industries - gaseous fuels	CO_2	X	X	X	X	X	X	X	X
1A1	Energy industries - solid fuels	CO_2	X	X	X	X	X	X	X	X
1A2	Manufacturing industries and construction	CO_2	X	X	X		X	X	X	
1A3b	Road transportation	CO_2	X	X	X	X	X	X	X	X
1A3c	Railways	CO_2	X	X			X	X		
1A4a	Commercial/institutional	CO_2	X	X			X	X	X	
1A4b	Residential	CO_2	X	X	X		X		X	
1A4b	Residential	CH_4	X	X	X	X	X	X	X	X
1A4c	Agriculture/forestry/fishing	CO_2	X	X	X		X	X	X	
1B2	Fugitive emissions from oil and natural gas	CH_4	X	X	X	X	X	X	X	X
2A1	Cement production	CO_2	X	X			X	X		
2D	Non-energy products from fuels and solvent use	CO_2	X		X	X	X		X	
2F1	Product Uses as Substitutes for ODS – Refrigeration and Air Conditioning	HFC	X	X	X	X	X	X	X	X
2F2	Product Uses as Substitutes for ODS – Foam Blowing	HFC		X		X				X
3A	Enteric fermentation	CH_4	X	X	X	X	X	X	X	X
3B	Manure management	CH_4	X	X	X	X	X		X	
3B1	Direct N_2O emissions from manure management	N_2O	X		X	X	X		X	X
3B5	Indirect N_2O emissions from manure management	N_2O			X	X			X	X
3Da	Direct N_2O emissions from managed soils	N_2O	X	X	X	X	X	X	X	X
3Db	Indirect N_2O emissions from managed soils	N_2O	X	X	X	X	X	X	X	X
4A1	Forest lands remaining forest lands	CO_2					X	X	X	X
4A2	Land converted to forest land	CO_2					X	X	X	X
4B1	Cropland remaining cropland	CO_2					X	X	X	X
4B2	Land converted to cropland	CO_2								
4C2	Land converted to grassland	CO_2					X	X	X	X
4D2	Land converted to wetlands	CO_2					X	X		X
4E2	Land converted to settlements	CO_2					X	X	X	
4F2	Land converted to other land	CO_2					X	X	X	X
4G	Harvested wood products	CO_2						X		X
5A	Solid waste disposal	CH_4	X	X	X	X	X	X	X	X
5D	Wastewater treatment and disposal	CH_4	X	X	X	X	X	X	X	X

Abbreviations L – Level Assessment; T – Trend Assessment; T1 – Tier 1; T2 – Tier 2.

Following the recommendations set in the 2006 IPCC Guidelines, the inventory was first disaggregated by source categories which further were used to identify key categories.

Source and sink categories were defined in conformity with the following guidelines: (1) emissions/ removals from individual source/sink categories identified according to standard classification, were expressed CO_2 equivalent units, estimated by using the GWP; (2) a category should be identified for each gas emitted by the sources and sinks, since the methods, emission factors, and related uncertainties differ for each gas; (3) source and sink categories that use the same emission factors based on common assumptions were aggregated before analysis.

Key categories were identified from two perspectives: (1) the first analysis the emission contribution that each category makes to the national total; and (2) the second perspective analysis the trend of emission contributions from each category to identify where the greatest absolute changes (either increases or reductions) have taken place over a given time.

The per cent contributions to both levels (L), and trends (T), in emissions are calculated and sorted from greatest to least (see also Annex 1 of the NIR). When a Tier 1 approach was used, a 95 per cumulative contribution threshold has been used in this analysis to define an upper boundary for the key category identification, respectively when a Tier 2 approach was used (considering AD and EFs uncertainties used to estimate GHG emissions for individual source/sink categories), a 90 per cumulative contribution threshold has been used in this analysis to define an upper boundary for the key category identification.

The Key Category Analysis was carried out using the Key Category Calculation Tool developed by the United States Environment Protection Agency (US EPA v2.5)[56].

2.4.3. Quality Assurance and Quality Control

Following the recommendations from the 2006 IPCC Guidelines, national inventories have to be transparent, well documented, consistent, complete, comparable, assessed for uncertainties, subject to verification and QA/QC. The 2006 IPCC Guidelines defines the QA/QC terms as follows:

- *Quality Control* (QC) is a system of routine technical activities to measure and control the quality of the inventory as it is being developed. A basic QC system should provide routine and consistent checks to ensure data integrity, correctness, and completeness; identify and address errors and omissions; and document and archive inventory material and record all QC activities.
- *Quality Assurance* (QA) comprises a planned system of review procedures conducted by personnel not directly involved in the inventory compilation and development process.

As a part of continuous efforts to develop a transparent and reliable inventory, the Republic of Moldova developed a "*Quality Assurance and Quality Control Plan*". The key attributes of the "*Quality Assurance and Quality Control Plan*" include detailed specific procedures (Figure 2-4) and standard verification and quality control forms and checklists (see Annex 4 of the NIR), by using Tier 1 (general procedures) and Tier 2 (source-specific procedures), that serve to standardize the process of implementing quality assurance and quality control activities meant to ensure the quality of the national inventory; peer review carried out by experts not directly involved in the national inventory development process; data quality check including by comparing the sets of data obtained from different sources; inventory planning and coordination at an inter-institutional level; as well as the continuous documentation and archiving of all materials used in inventory preparation process.

It is well known that inventory development implies huge amounts of information that has to be gathered, handled and stored. The process sustainability is ensured through a good management and archiving of materials used along the inventory process.

In the Republic of Moldova, the National Inventory Working Group has a sufficiently transparent documentation allowing to fully reproducing the GHG emissions estimates. A standard system for documenting and archiving numeric and qualitative information, in compliance with the 2006 IPCC Guidelines recommendations was used. The activity data sources were documented by inserting references to these into the inventory document text. Estimation methods & emission factors sources and their selection justification are documented in the corresponding chapters of the NIR.

Recalculations made are documented and argued both in sectoral Chapters (3-7), as well as in the Chapter 8 "Recalculations and Improvements" of the NIR.

Individual source and sink categories related documentation include: (1) list of personnel responsible for estimates and individual responsibilities as per Terms of Reference; (2) reference sources for the activity data used; (3); justification of emission factors estimation methods selection; (4) samples of GHG emissions estimation process (in Excel format); (5) uncertainties analysis results by individual source and sink categories; (6) annexes; (7) references.

[56] <https://19january2017snapshot.epa.gov/climatechange/national-ghg-inventory-capacity-building_.html>

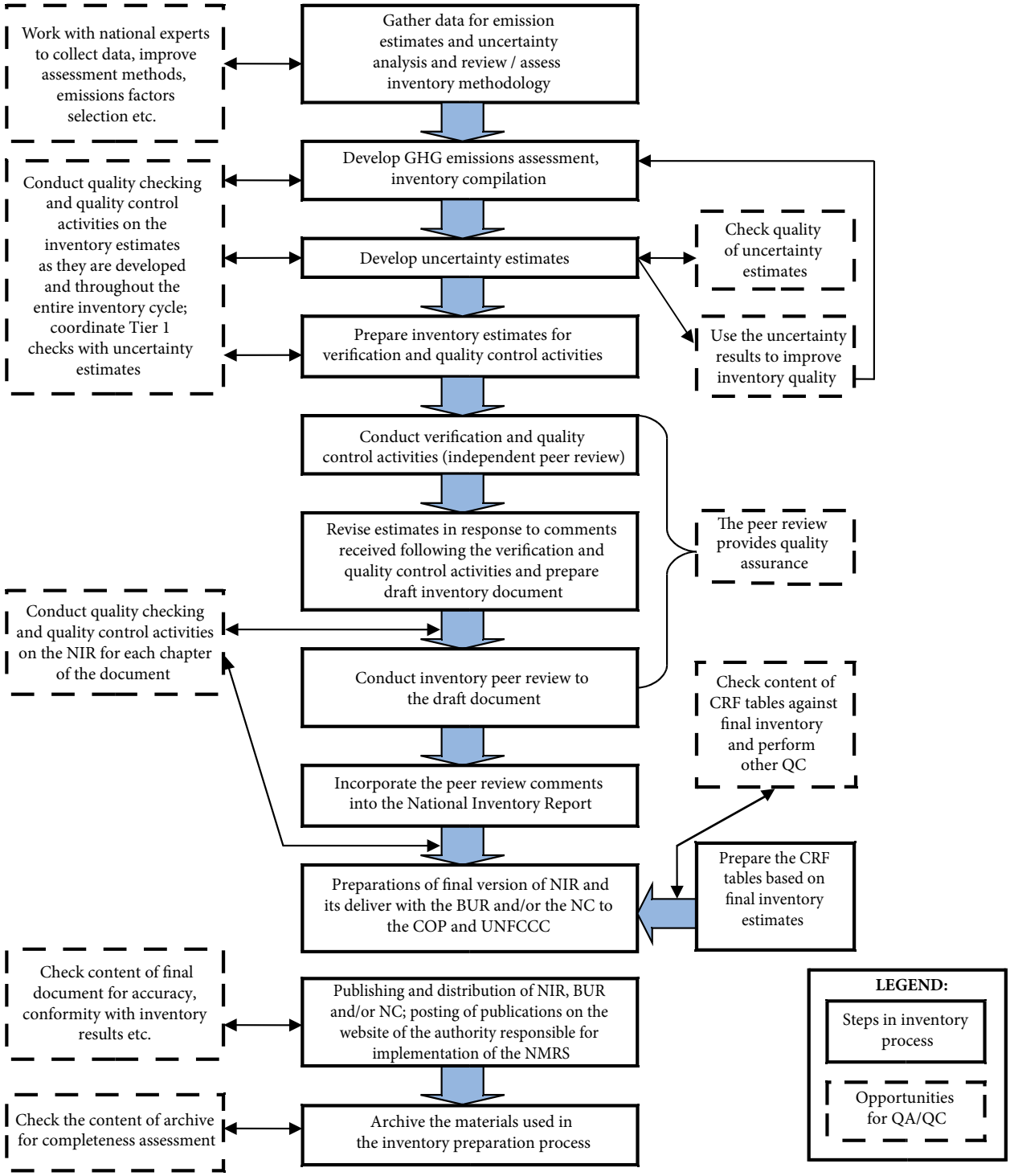


Figure 2-4: The Role of QA/QC Activities in the Inventory Preparing Process.

Materials used in the inventory development process were archived both electronically and on hard copies. As the entity responsible for the national inventory development, the Climate Change Office of the PI "EPIU" holds all documentation used for its compilation.

Summing up, one can assert that transparency and credibility of a national inventory are ensured through: (1) the ability to demonstrate, through appropriate documentation, transparency of inventory development process; (2) further improvements of the inventory process and its basic products; and (3) ensuring that the inventory process employed consistent approaches allowing to obtain comparable results for all source and sink categories.

It is obvious that in comparison with the previous inventory cycles, by continuous integration of QA/QC activities, the Republic of Moldova ensures a better-quality inventory.

2.4.4. Recalculations

The national inventory team revised and recalculated GHG emissions and CO_2 removals for each calendar year covered

by the inventory for the period from 1990 through 2016, a component part of the BUR2 of the RM to UNFCCC (2019).

These activities were carried out during the on-going process of improving the quality of the National GHG Inventory (including, by considering the updated activity data, higher tier methodological approaches available in the 2006 IPCC Guidelines, updating country-specific emission factors used, and errors correcting actions). Under the current inventory cycle, improvements were made in all sectors (move to higher tier methodologies, revision of emission factors, activity data, etc.), entailing the need to make recalculations of national GHG emissions for the time period from 1990 through 2016, reflected in the BUR2 of the Republic of Moldova under the UNFCCC (Chapter 2 „National GHG Inventory").

As compared to the results recorded in BUR2 of the RM to the UNFCCC (2019), the changes undertaken in the process of compiling current inventory resulted in a slightly increasing trend of total GHG emissions (without LULUCF) in 1990, 1994 and 1996, ranging from to a minimum of +0.2% in 1996 to a maximum of +1.0% in 1990, respectively in a decreasing trend of total direct GHG emissions in the years 1991-1993, 1995 and 1997-2016, ranging from a minimum of -0.2% in 1995 to a maximum of -12.1% in 2009 (Tab. 2-6).

Table 2-6: Recalculations of Total GHG Emissions (without LULUCF) included into the BUR2 of the Republic of Moldova under the UNFCCC, Mt CO_2 equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
BUR2	44.9188	40.7762	32.9006	24.7408	21.0382	17.8055	17.5224	16.1683	14.3515	12.5913
BUR3	45.3487	39.1255	31.2699	24.5235	21.1746	17.7666	17.5533	15.8773	14.2292	11.9511
Difference, %	1.0	-4.0	-5.0	-0.9	0.6	-0.2	0.2	-1.8	-0.9	-5.1
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BUR2	11.6256	12.4024	12.1971	12.5502	13.5394	13.8478	12.9467	12.7101	13.8693	14.4220
BUR3	11.0391	11.7365	11.6392	12.0733	12.6310	13.0252	12.2163	12.2220	12.6964	12.6698
Difference, %	-5.0	-5.4	-4.6	-3.8	-6.7	-5.9	-5.6	-3.8	-8.5	-12.1
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
BUR2	14.5256	14.9033	14.0006	13.4784	14.3801	14.3705	14.5778			
BUR3	13.3331	13.7595	13.2349	13.0439	13.1730	13.1996	13.5035	13.2445	13.9078	13.8100
Difference, %	-8.2	-7.7	-5.5	-3.2	-8.4	-8.1	-7.4			

Abbreviations: BUR2 – Second Biennial Update Report; BUR3 – Third Biennial Update Report.

Regarding the total net GHG emissions (with LULUCF) included in the BUR2 of the Republic of Moldova to the UNFCCC (2019), the changes undertaken in the process of compiling the inventory resulted in a slight increase in net direct GHG emissions in 1990 and 1994-1996, ranging from a minimum of + 0.4% in 1995 to a maximum of + 1.3% in 1990, respectively in a decreasing trend of net direct GHG emissions over the 1991-1993 and 1997-2016 periods, ranging from a minimum of -0.8 % in 1998 to a maximum of -13.0% in 2009 (Tab. 2-7).

Table 2-7: Recalculations of Total Net GHG Emissions (with LULUCF) included into the BUR2 of the Republic of Moldova under the UNFCCC, Mt CO_2 equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
BUR2	43.3912	38.1864	30.9290	22.7398	19.1372	15.9366	15.2393	14.2949	12.4608	10.9940
BUR3	43.9609	36.6725	29.4236	22.6543	19.3714	16.0050	15.3463	14.0326	12.3653	10.3782
Difference, %	1.3	-4.0	-4.9	-0.4	1.2	0.4	0.7	-1.8	-0.8	-5.6
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BUR2	9.7449	10.8863	10.5938	11.0170	11.8371	12.4369	11.4159	10.9829	12.4489	13.3888
BUR3	9.1852	10.2376	10.0530	10.5567	10.9408	11.6293	10.6973	10.5071	11.2869	11.6491
Difference, %	-5.7	-6.0	-5.1	-4.2	-7.6	-6.5	-6.3	-4.3	-9.3	-13.0
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
BUR2	13.5637	13.9953	13.0611	12.6757	13.9265	13.4683	13.6578			
BUR3	12.3792	12.8635	12.3081	12.2463	12.7241	12.2961	12.8459	12.5307	13.3477	14.1058
Difference, %	-8.7	-8.1	-5.8	-3.4	-8.6	-8.7	-5.9			

Abbreviations: BUR2 – Second Biennial Update Report; BUR3 – Third Biennial Update Report.

2.4.5. Uncertainty Assessment

Uncertainty estimates are an essential element of a complete and transparent emissions inventory. Uncertainty information is not intended to challenge the validity of inventory estimates, but to help prioritize efforts to improve the accuracy of future inventories and guide future decisions on methodological choice. While the Republic of Moldova's National Inventory Team calculates the emission estimates with the highest possible accuracy, uncertainties are associated to a varying degree with the development of emission estimates for any inventory.

Some of current estimates, such as those for CO_2 emissions from fossil fuels combustion or from cement production are considered to have minimal uncertainty associated with them. For some other categories of emissions, however, a lack of data, the use of emission factors used by default or an incomplete understanding of how emissions are generated increases the uncertainty surrounding the estimates presented.

Additional research in the following areas could help reduce uncertainty in the RM's Inventory:

- *Incorporating excluded emission sources.* Quantitative estimates for some of the sources and sinks of GHG emissions are not available at this time.
- *Improving the accuracy of emission factors.* Further research is needed in some cases to improve the accuracy of emission factors used to calculate emissions from a variety of sources (for example, the accuracy of current emission factors applied to CH_4 fugitive emissions from oil and natural gas, emissions of CO_2 from solvents and other products, indirect N_2O emissions from manure management and indirect N_2O emissions from agricultural soils etc., is highly uncertain).
- *Collecting more detailed activity data.* Although methodologies for estimating emissions for some sources exist, problems arise in obtaining activity data at a level of detail in which aggregate emission factor can be applied, in particular the ability to estimate emissions of F-gases within Sector 2 "Industrial Processes and Product Use".

The overall inventory uncertainty was estimated using a Tier 1 methodological approach. An estimate of the overall quantitative uncertainty (±6.62 per cent level uncertainty and, respectively ±2.14 per cent trend uncertainty) are shown in Table 2-8, as well as in the Annex 5 of the NIR.

Table 2-8: Estimated Overall National Inventory Quantitative Uncertainty in the RM

	CO_2	CH_4	N_2O	Total
Level uncertainty	±5.12	±25.33	±25.09	±6.62
Trend uncertainty	±1.59	±12.31	±11.35	±2.14

Emissions evaluated under the RM's National GHG Inventory reflect current best estimates; in some cases, however, estimates are based on approximate methodologies, assumptions, and incomplete data. As new information become available in the future, the RM's inventory team will continue to improve, revise and recalculate its GHG emission estimates.

2.4.6. Completeness Assessment

Republic of Moldova's National GHG Inventory is, mostly, a complete inventory of the following direct GHG – CO_2, CH_4, N_2O, HFC, PFC and SF_6. The national inventory includes also the indirect GHGs such as: CO, NO_x, NMVOC and SO_2.

Despite the effort to cover all existent sources and sinks, the inventory still has some gaps, most being determined by lack of activity data needed to estimate certain emissions and removals, such as: HFC emissions from source categories 2F5 "Solvents" and 2F6 "Other uses".

As part of the inventory improvement plan, during the future inventory activities, the inventory team will continue the efforts to identify new and relevant data for the GHG emissions/removals assessment from the respective categories.

2.5. Reporting Greenhouse Gas Emissions

2.5.1. Summary of Direct GHG Emission Trends

Over the 1990-2019 period, the dynamics of total direct greenhouse gas emissions, expressed in CO_2 equivalent, shows a decreasing trend in the Republic of Moldova, emissions having decreased by about 69.5%: from 45.35 Mt CO_2 equivalent in 1990 to 13.81 Mt CO_2 equivalent in 2019, net greenhouse gas emissions having decreased for the same period by about 67.9%: from 43.96 Mt CO_2 equivalent in 1990 to 14.11 Mt CO_2 equivalent in 2019 (Fig. 2-5).

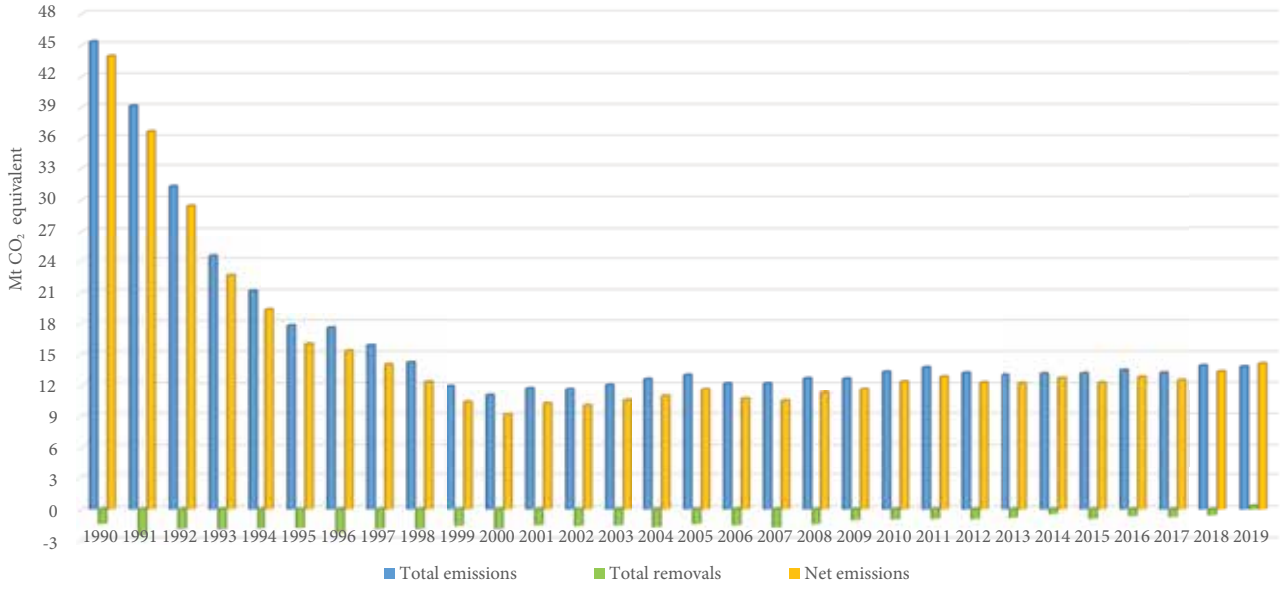


Figure 2-5: Greenhouse Gas Emission and Removals Trends within 1990-2019 time series.

The most significant reductions in direct GHG emissions by source category were recorded during the 1990-2019 period in the following categories: 1A1 "Energy industries" (-85.4%), 4C "Wetlands" (-85.1%), 1A5 "Other works and needs in energy" (-80.1%), 3A "Enteric fermentation" (-79.8%), 3B "Manure management" (-78.6%), 4C "Grassland" (-75.7%), 1A4 "Other sectors" (-69.5%), 1A2 "Manufacturing industries and construction" (-62.6%), 2A "Mineral industry" (-55.1%), 4G "Harvested wood products" (-52.9%), 1B2 "Fugitive emissions from oil and natural gas" (-51.1%), 1A3 "Transport" (-44.9%), 2C "Metal industry" (-44.6%), 2D "Non-energy products from fuels and solvent use" (-38.8%), 5D "Wastewater treatment and discharge" (-32.8%), 4B "Cropland" (-32.5%), 2G "Other Product Manufacture and Use" (-24.6%), 3D "Agricultural soils" (-27.2%) and 4A „Forest land" (-23.9%).

Between 2018 and 2019, total direct GHG emissions increased by about 5.7%, including due to increasing emissions from the following source categories: 4F "Other land" (+90.5%), 4E "Settlements" (+48.6%), 4B "Cropland" (+20.3%), 2F "Product Use as Substitutes for ODS" (+18.2%), 2G "Other Product Manufacture and Use" (+8.3%), 5B "Biological treatment of solid waste" (+7.1%), 3D "Agricultural soils" (+6.0%), 1A4 "Other sectors" (+5.6%), 1A3 "Transport" (+3.2%), 2A "Mineral industry" (+1.6%) and 5A "Solid waste disposal" (+0.7%).

2.5.2. Emission Trends by Gas

Over the 1990-2019 period, total CO_2 emissions (without LULUCF) have decreased by about 74.6% (from about 37.0 Mt in 1990 to 9.4 Mt in 2019). CH_4 and N_2O emissions have decreased by about 50.1% (from about 5.2 Mt CO_2 equivalent in 1990 to 2.6 Mt CO_2 equivalent in 2019) and by about 49.1% (respectively) from about 3.1 Mt CO_2 equivalent in 1990 to 1.6 Mt CO_2 equivalent in 2019) (Tab. 2-9).

Table 2-9: Direct GHG Emissions within 1990-2019, Mt CO_2 equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CO_2 (without LULUCF)	37.0207	31.3644	24.1653	18.0878	15.0571	11.9418	11.8048	10.7263	9.2847	7.2566
CO_2 (with LULUCF)	35.4599	28.7250	22.1121	15.9931	13.0157	9.9265	9.3340	8.6068	7.1339	5.3876
CH_4 (without LULUCF)	5.2414	4.9009	4.6720	4.3560	4.2697	4.0389	3.9809	3.5856	3.4459	3.3372
CH_4 (with LULUCF)	5.2441	4.9033	4.6742	4.3590	4.2713	4.0411	3.9824	3.5883	3.4484	3.3396
N_2O (without LULUCF)	3.0866	2.8603	2.4326	2.0797	1.8478	1.7848	1.7660	1.5630	1.4955	1.3532
N_2O (with LULUCF)	3.2569	3.0442	2.6373	2.3022	2.0844	2.0363	2.0282	1.8351	1.7798	1.6471
HFCs	NO	NO	NO	NO	NO	0.0010	0.0017	0.0023	0.0031	0.0040
PFCs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
SF_6	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Total (without LULUCF)	**45.3487**	**39.1255**	**31.2699**	**24.5235**	**21.1746**	**17.7666**	**17.5533**	**15.8773**	**14.2292**	**11.9511**
Total (with LULUCF)	**43.9609**	**36.6725**	**29.4236**	**22.6543**	**19.3714**	**16.0050**	**15.3463**	**14.0326**	**12.3653**	**10.3782**
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
CO_2 (without LULUCF)	6.5133	7.1455	6.9116	7.5787	8.0989	8.4374	7.7735	8.1595	8.5354	8.5708
CO_2 (with LULUCF)	4.3622	5.3489	5.0282	5.7677	6.1184	6.7547	5.9716	6.1651	6.8531	7.2844
CH_4 (without LULUCF)	3.2594	3.2429	3.3177	3.2259	3.1935	3.2081	3.0796	2.9079	2.8936	2.8165
CH_4 (with LULUCF)	3.2603	3.2442	3.3180	3.2259	3.1937	3.2084	3.0799	2.9094	2.8944	2.8168
N_2O (without LULUCF)	1.2613	1.3412	1.4007	1.2565	1.3226	1.3571	1.3296	1.1093	1.2095	1.2144
N_2O (with LULUCF)	1.5576	1.6377	1.6977	1.5509	1.6127	1.6436	1.6122	1.3873	1.4815	1.4798
HFCs	0.0051	0.0069	0.0091	0.0122	0.0160	0.0225	0.0332	0.0448	0.0574	0.0675
PFCs	NO	NO	NO	NO	NO	NO	0.0000	0.0000	0.0000	0.0000
SF_6	NO	NO	NO	0.0000	0.0000	0.0000	0.0003	0.0004	0.0005	0.0005
Total (without LULUCF)	**11.0391**	**11.7365**	**11.6392**	**12.0733**	**12.6310**	**13.0252**	**12.2163**	**12.2220**	**12.6964**	**12.6698**
Total (with LULUCF)	**9.1852**	**10.2376**	**10.0530**	**10.5567**	**10.9408**	**11.6293**	**10.6973**	**10.5071**	**11.2869**	**11.6491**
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
CO_2 (without LULUCF)	9.1281	9.5230	9.1163	8.8718	8.7605	9.0465	9.1156	8.6129	9.2479	9.3923
CO_2 (with LULUCF)	7.9158	8.3749	7.9549	7.8562	8.1091	7.9520	8.2785	7.7268	8.5222	9.5261
CH_4 (without LULUCF)	2.8291	2.8775	2.8168	2.7334	2.7714	2.7227	2.7984	2.9254	2.9258	2.6158
CH_4 (with LULUCF)	2.8292	2.8777	2.8180	2.7343	2.7716	2.7233	2.7987	2.9259	2.9260	2.6162
N_2O (without LULUCF)	1.2973	1.2681	1.2010	1.3293	1.5184	1.2755	1.4251	1.5225	1.5382	1.5705
N_2O (with LULUCF)	1.5555	1.5200	1.4344	1.5465	1.7209	1.4658	1.6044	1.6943	1.7036	1.7321
HFCs	0.0779	0.0901	0.1000	0.1084	0.1216	0.1539	0.1632	0.1825	0.1945	0.2299
PFCs	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SF_6	0.0007	0.0007	0.0008	0.0010	0.0011	0.0011	0.0011	0.0011	0.0013	0.0014
Total (without LULUCF)	**13.3331**	**13.7595**	**13.2349**	**13.0439**	**13.1730**	**13.1996**	**13.5035**	**13.2445**	**13.9078**	**13.8100**
Total (with LULUCF)	**12.3792**	**12.8635**	**12.3081**	**12.2463**	**12.7241**	**12.2961**	**12.8459**	**12.5307**	**13.3477**	**14.1058**

Abbreviations: NA – Not Applicable; NO – Not Occurring.

Halocarbons emissions (HFCs, PFCs) and sulphur hexafluoride (SF_6) emissions have been recorded beginning with 1995, considered as a starting year for monitoring F-gases (HFCs, PFCs and SF_6) (no NF_3 emissions were recorded so far in the Republic of Moldova). Evolution of these emissions denotes a steady trend towards increase in the last years, though their share in the total national emissions structure is insignificant for now.

CO_2 continues to be the most important source of total national direct greenhouse gas emissions in the Republic of Moldova. Figure 2-6 reveals the variation of direct GHG emissions share by gas in the structure of total national emissions in 1990 and 2019.

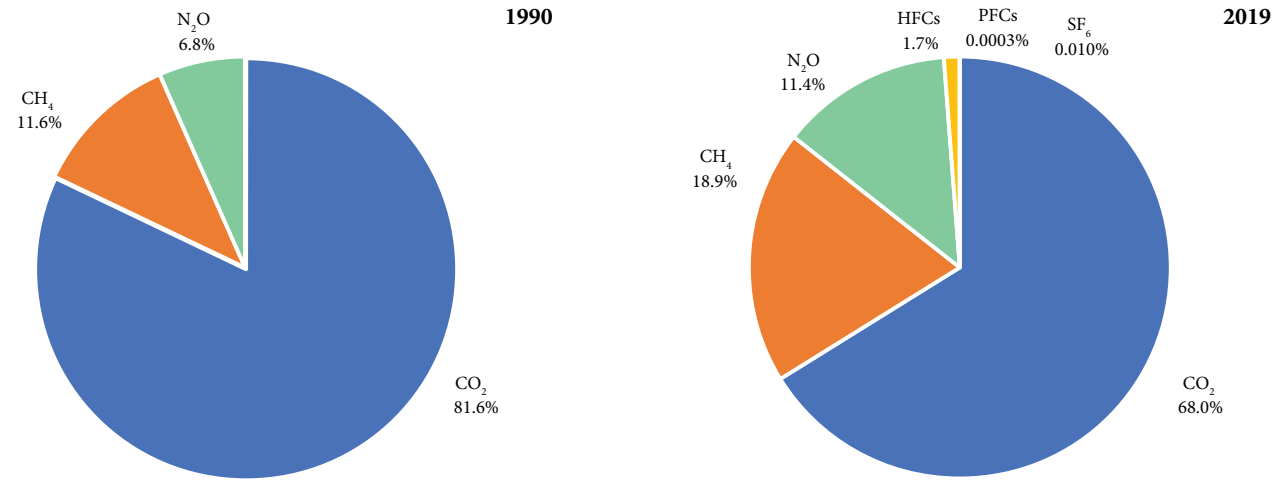


Figure 2-6: Direct GHGs share in the structure of total national GHG emissions in 1990 and 2019 years.

In 2019, the categories of sources with the highest share in the structure of total carbon dioxide emissions were: 1A1 "Energy industries" (32.8% of the total), 1A3 "Transport" (27.4% of the total), 1A4 "Other sectors" (22.1% of the total), 4A"Forest land" (-20.5% of the total), 4B "Cropland" (18.8% of the total), 1A2 "Manufacturing industries and construction" (7.5% of the total), 4F "Other land" (6.4% of the total), 2A "Mineral industry" (6.3% of the total), 4C "Grassland" (-3.1% of the total), 2D "Non-energy products from fuels and solvent use" (1.5% of the total), 4E "Settlements" (1.2% of the total) and 4D "Wetlands" (-0.9% of the total) (Fig. 2-7).

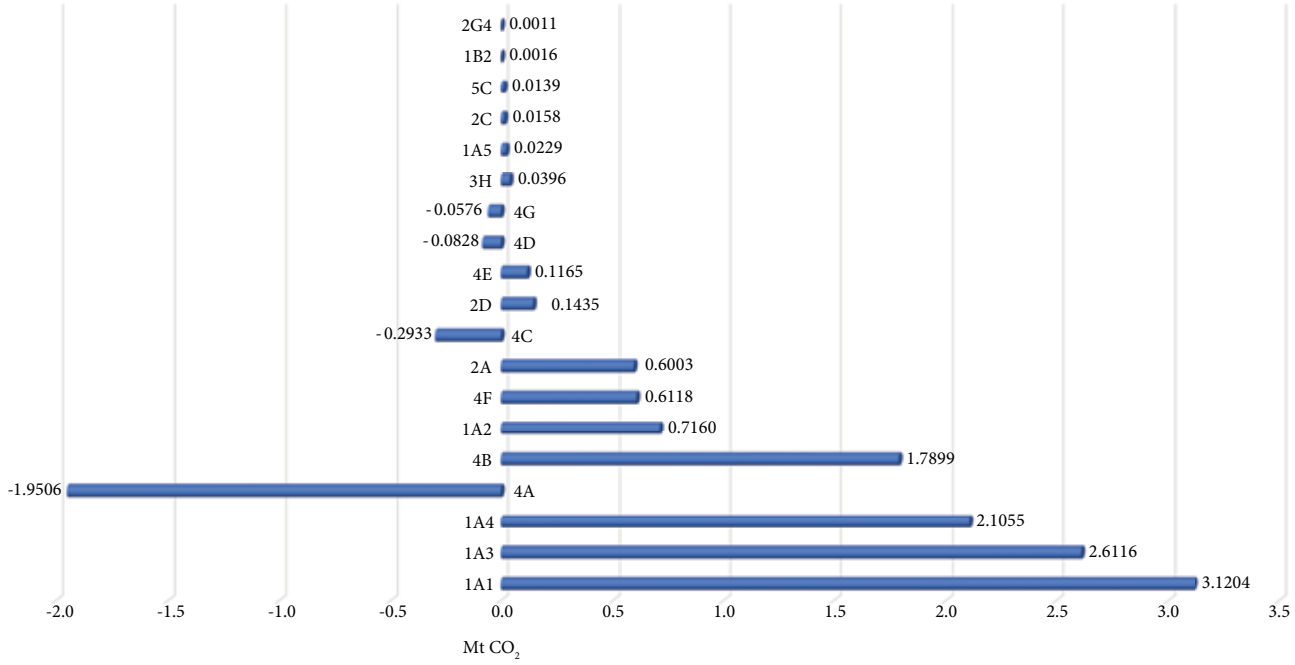


Figure 2-7: Source Categories of CO_2 in the Republic of Moldova in 2019.

The source categories with the highest share in the structure of total methane emissions in 2019 were: 5A "Solid waste disposal" (47.1% of the total), 3A "Enteric fermentation" (16.9% of the total), 1B2 "Fugitive emissions from oil and natural gas" (15.1% of the total), 5D "Wastewater treatment and discharge" (9.1% of the total), 1A4 "Other sectors" (8.4% of the total), 3B "Manure management" (2.5% of the total) and 1A3 "Transport" (0.5% of the total) (Fig. 2-8).

In 2019, the source categories with the highest share in the structure of total N_2O emissions were: 3D "Agricultural soils" (64.5% of the total), 3B "Manure management" (16.1% of the total), 4E "Settlements" (9.3% of the total), 1A4 "Other sectors" (4.0% of the total), 5D "Wastewater treatment and discharge" (3.4% of the total) and 1A3 "Transport" (2.4% of the total) (Fig. 2-9).

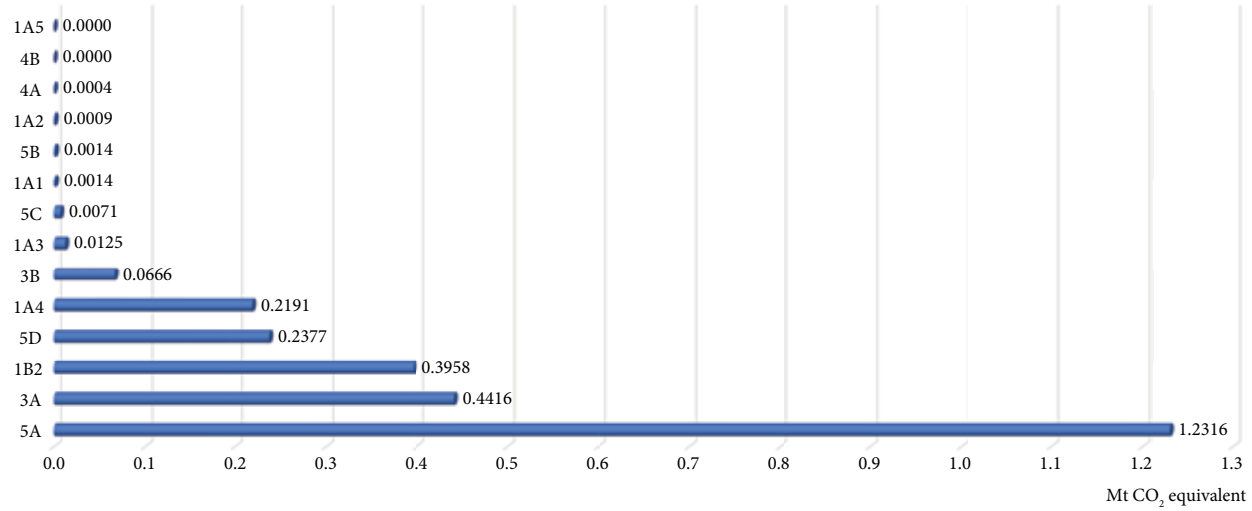


Figure 2-8: Source Categories of CH_4 in the Republic of Moldova in 2019.

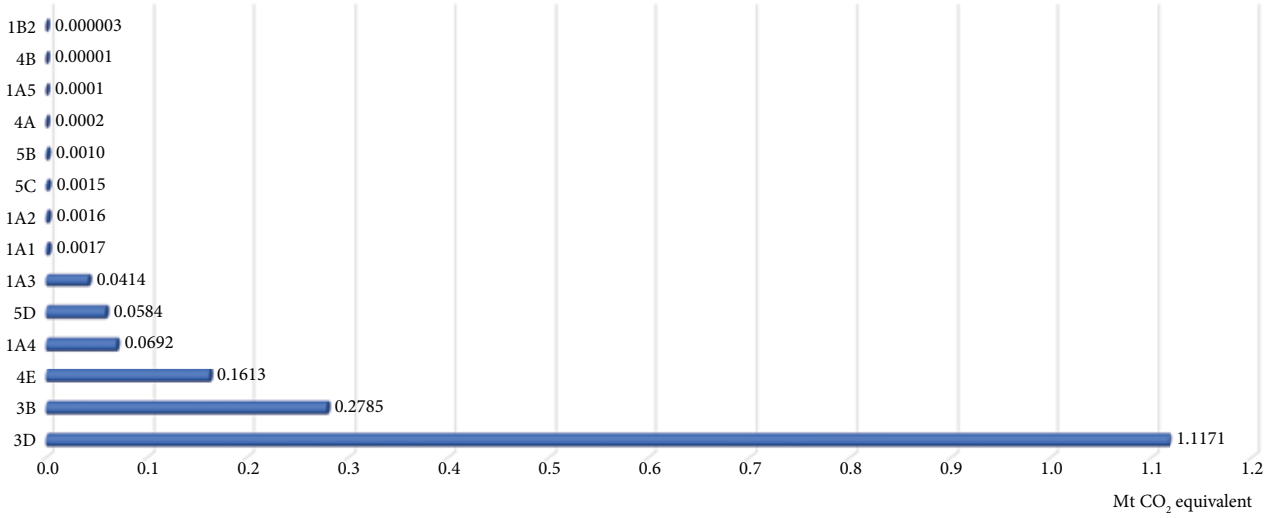


Figure 2-9: Source Categories of N_2O in the Republic of Moldova in 2019.

2.5.3. Emission Trends by Sources

Emissions estimates were grouped into five sectors: (1) "Energy", (2) "Industrial Processes and Product Use", (3) "Agriculture", (4) "Land Use, Land-Use Change and Forestry" (LULUCF) and (5) "Waste". Interpretation of GHG emissions inventory results under LULUCF Sector is different from other sectors: positive figures indicate that this sector is a net source of emissions, while negative figures state that the sector is a net sink of CO_2 removals.

Over the 1990-2019 period, total GHG emissions tended to decrease, thus, emissions from the energy sector decreased by about 74.7%, those from the IPPU sector - by about 38.1%, in the agriculture sector - by 63.6%, in the LULUCF sector - by 121.3%, and those in the waste sector increased by 2.5% (Tab. 2-10).

Table 2-10: Direct Greenhouse Gas Emissions by Sector within 1990-2019, Mt CO_2 equivalent

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1. Energy	36.8953	31.2043	24.3515	18.1696	15.2946	12.3097	12.2798	11.0094	9.5700	7.5571
2. Industrial processes and product use	1.6037	1.4098	0.8216	0.7371	0.5562	0.4562	0.4163	0.4544	0.3782	0.3419
3. Agriculture	5.3355	4.9634	4.5461	4.0067	3.7312	3.4103	3.2641	2.8258	2.7171	2.4927
4. LULUCF	-1.3878	-2.4531	-1.8464	-1.8691	-1.8032	-1.7616	-2.2070	-1.8447	-1.8639	-1.5728
5. Waste	1.5142	1.5480	1.5508	1.6101	1.5925	1.5904	1.5931	1.5876	1.5639	1.5594
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
1. Energy	6.8761	7.4994	7.2925	7.9740	8.4757	8.7644	7.9199	8.0885	8.3876	8.8010
2. Industrial processes and product use	0.3144	0.3186	0.3688	0.3971	0.4707	0.5713	0.6775	0.9361	1.0242	0.5295
3. Agriculture	2.3121	2.4080	2.4778	2.2347	2.2340	2.2403	2.1819	1.7714	1.8428	1.8844
4. LULUCF	-1.8539	-1.4988	-1.5862	-1.5166	-1.6902	-1.3960	-1.5190	-1.7149	-1.4094	-1.0207
5. Waste	1.5364	1.5105	1.5001	1.4674	1.4506	1.4492	1.4370	1.4260	1.4417	1.4548

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1. Energy	9.3278	9.7144	9.2874	8.9802	8.8830	9.1825	9.3349	8.8995	9.4093	9.3217
2. Industrial processes and product use	0.5600	0.6649	0.6829	0.7326	0.7605	0.7628	0.7480	0.7768	0.9592	0.9922
3. Agriculture	1.9667	1.8915	1.7906	1.9148	2.1240	1.8484	1.9875	2.0379	1.9930	1.9435
4. LULUCF	-0.9539	-0.8960	-0.9268	-0.7976	-0.4489	-0.9035	-0.6576	-0.7138	-0.5601	0.2958
5. Waste	1.4786	1.4887	1.4741	1.4163	1.4055	1.4059	1.4331	1.5303	1.5463	1.5526

Energy sector is the most important source of total national direct greenhouse gas emissions, its share varying during the 1990-2019 period between 81.4% and 67.5%. Other relevant sources of direct greenhouse gas emissions are represented by the agriculture, waste and IPPU sectors (Fig. 2-10). Throughout the study period, except for 2019, the LULUCF sector was a net source of carbon removal. With the reduction of direct greenhouse gas emissions at the national level, the relevance of this sector in the structure of net greenhouse gas emissions at national level showed a similar trend: in 1990 about 3.1% of total GHG emissions were removed at national level, while in 2019 the sector has already contributed 2.1% of total GHG emissions at national level.

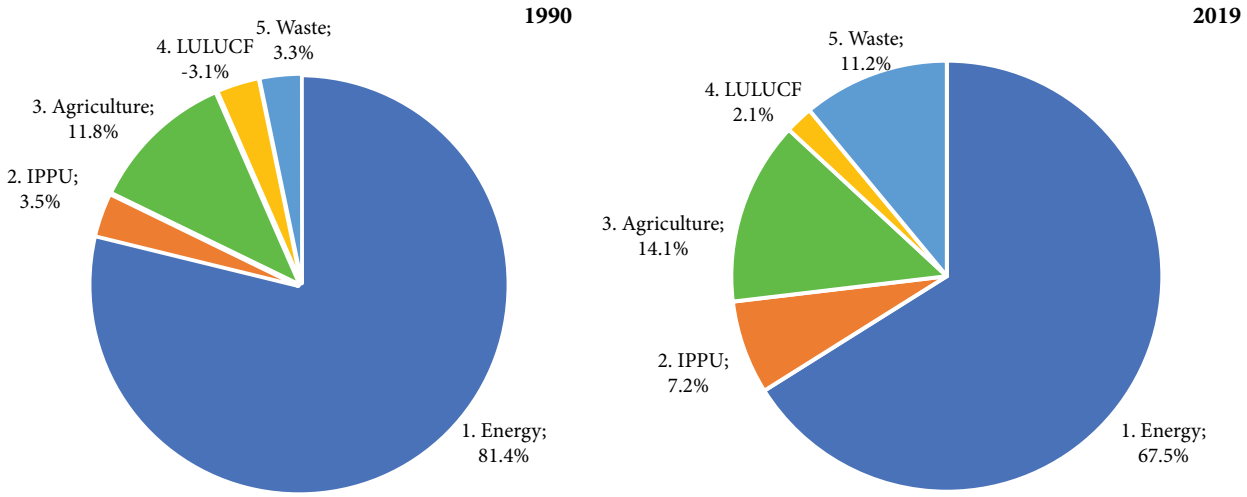


Figure 2-10: Sectoral Breakdown of total GHG Emissions in 1990 and 2019.

Energy Sector

In the Republic of Moldova, energy sector is the most important source of greenhouse gas emissions. The sector includes emissions from stationary and mobile combustion of fuels for energy (95.7% of total emissions per sector in 2019), as well as fugitive emissions from oil and natural gas production, processing, transportation, storage, delivery and distribution (4.3% of total emissions by sector in 2019) (Fig. 2-11, Tab. 2-11).

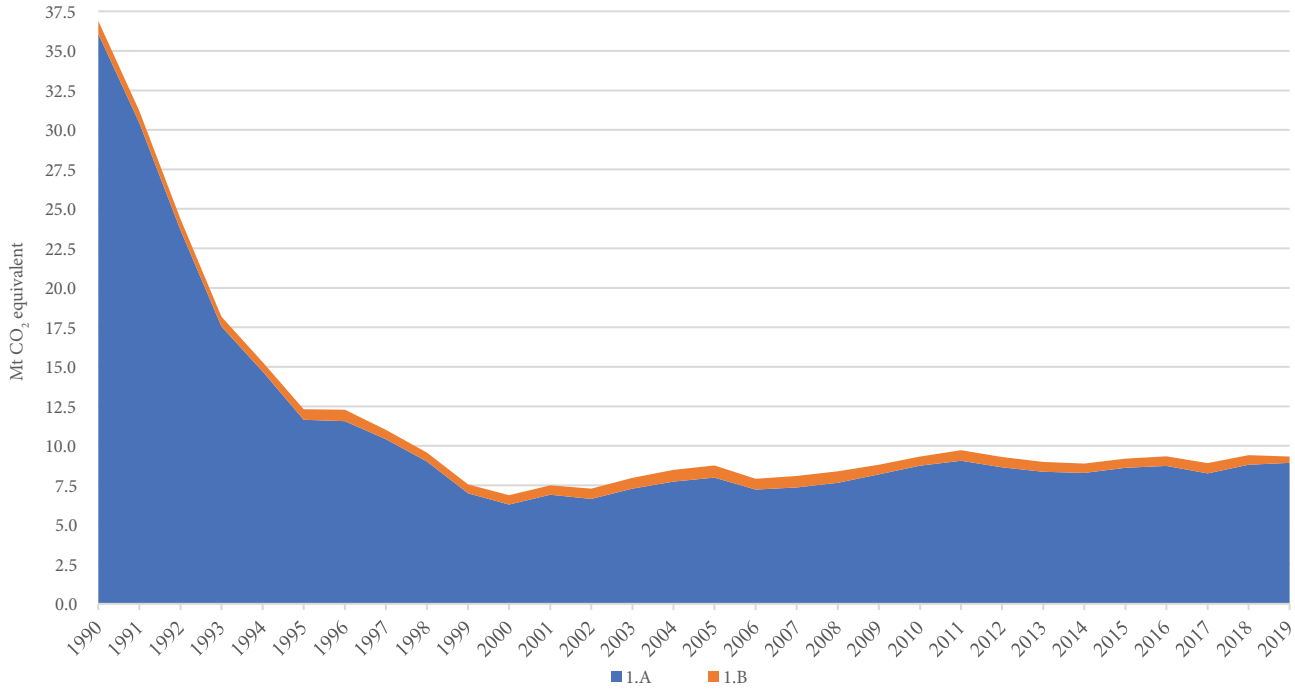


Figure 2-11: GHG Emissions from Energy Sector within 1990-2019 periods.

Overall, these emissions have accounted for about 67.5% of total national direct GHG emissions in 2019. During the 1990-2019 period, total direct GHG emissions from the energy sector have decreased by about 74.7%: from 36.9 Mt CO_2 equivalent in 1990 to 9.3 Mt CO_2 equivalent in 2019.

Table 2-11: GHG Emissions from Energy Sector within 1990-2019 periods, Mt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
1. Energy	**36.8953**	**12.3097**	**6.8761**	**8.7644**	**9.3278**	**9.1825**	**9.3349**	**8.8995**	**9.4093**	**9.3217**
1A. Fuel Combustion	**36.0824**	**11.6478**	**6.2751**	**7.9878**	**8.7467**	**8.6142**	**8.7222**	**8.2502**	**8.8051**	**8.9242**
1A.1. Energy Industries	21.3642	7.1924	3.1593	3.2355	4.0596	3.6900	3.6486	2.8868	3.1805	3.1235
1A.2. Manufacturing Industries and Construction	1.9234	0.3822	0.5203	0.5752	0.4233	0.6542	0.6436	0.6611	0.7514	0.7185
1A.3. Transport	4.8379	1.6604	1.0058	1.8671	2.1889	2.3080	2.4816	2.4635	2.5819	2.6655
1A.4. Other Sectors	7.8413	2.2862	1.5529	2.2838	2.0474	1.9392	1.9253	2.1760	2.2678	2.3938
1A.5. Other	0.1156	0.1265	0.0368	0.0263	0.0275	0.0229	0.0230	0.0227	0.0235	0.0230
1B. Fugitive Emissions from Fuels	**0.8129**	**0.6618**	**0.6010**	**0.7766**	**0.5811**	**0.5683**	**0.6128**	**0.6493**	**0.6042**	**0.3975**
1B.1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
1B.2. Oil and Natural Gas	0.8129	0.6618	0.6010	0.7766	0.5811	0.5683	0.6128	0.6493	0.6042	0.3975
1C. CO_2 Transport and Storage	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Abbreviations: NO – Not Occurring.

Within energy sector the most important source category is 1A1 "Energy industries", with a share of about 33.5% of the total in the sector, in 2019 (57.9% in 1990). Other relevant sources are represented by source category 1A3 "Transport" with a share of 28.6% of the total (13.1% in 1990), the category 1A4 "Other sectors" with a share of about 25.7% of the total (21.3% in 1990) and the source category 1A2 "Manufacturing industries and construction" with a share of about 7.7% of the total (5.2% in 1990) (Fig. 2-12).

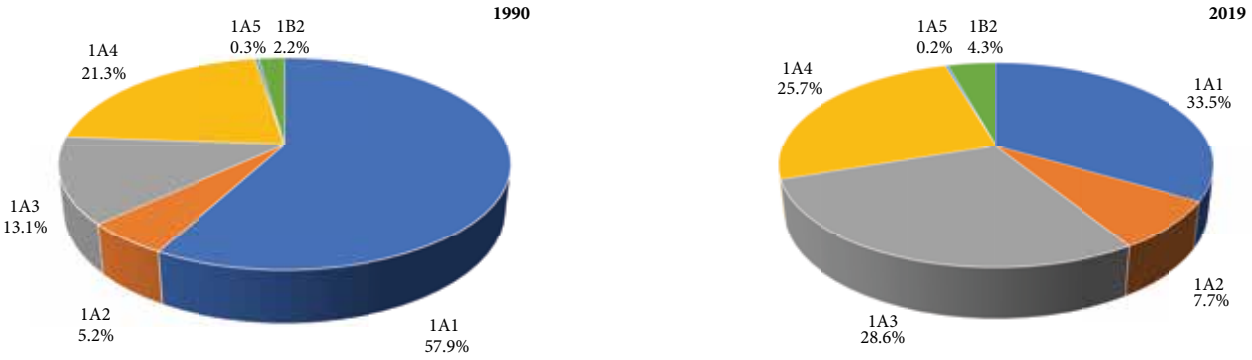


Figure 2-12: Energy Sector Greenhouse Gas Sources in 1990 and 2019 years.

Industrial Processes and Product Use Sector

IPPU Sector is a relevant source of GHG emissions and it includes emissions from non-energy industrial activities. In 2019, this sector had a share of about 7.2% of total national GHG emissions (3.5% in 1990).

Over the 1990-2019 period, total GHG emissions from the sector decreased by about 38.1%: from 1.6 Mt CO_2 equivalent in 1990 to 1.0 Mt CO_2 equivalent in 2019 (Tab. 2-12).

Table 2-12: Direct GHG Emissions from IPPU within 1990-2019, Mt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
2. Industrial Processes and Product Use	**1.6037**	**0.4562**	**0.3144**	**0.5713**	**0.5600**	**0.7628**	**0.7480**	**0.7768**	**0.9592**	**0.9922**
A. Mineral Industry	1.3374	0.3512	0.2394	0.4375	0.4044	0.5051	0.4925	0.4761	0.5910	0.6003
B. Chemical Industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Metal Industry	0.0285	0.0262	0.0363	0.0419	0.0097	0.0173	0.0052	0.0189	0.0202	0.0158
D. Non-energy Products from Fuels and Solvent Use	0.2344	0.0766	0.0326	0.0682	0.0662	0.0846	0.0848	0.0970	0.1512	0.1435
E. Electronic Industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Product Uses as Substitutes for ODS	NO	0.0010	0.0051	0.0225	0.0779	0.1539	0.1632	0.1825	0.1945	0.2299
G. Other Product Manufacture and Use	0.0034	0.0012	0.0010	0.0012	0.0017	0.0020	0.0022	0.0023	0.0024	0.0026
H. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Abbreviations: NA – Not Applicable; NO – Not Occurring.

Between 2008 and 2009, these emissions have decreased by 48% as a consequence of the economic crisis that significantly affected the industrial sector of the Republic of Moldova.

Subsequently, during the 2010-2019 period, direct GHG emissions from the sector showed a slight increasing trend, mainly due to increase in production of cement, lime, glass, steel, as well as due to increase in halocarbon consumption.

Between 2018 and 2019, total GHG emissions from the sector increased by 3.4% (Fig. 2-13).

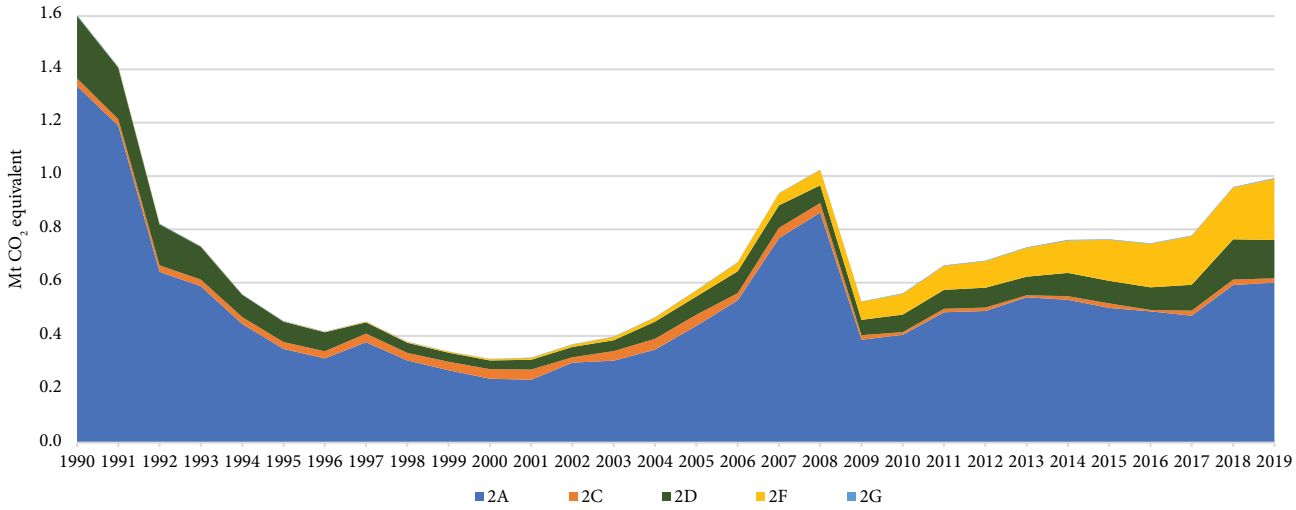


Figure 2-13: Total GHG Emissions from IPPU within 1990-2019 periods.

Within IPPU sector, the most important source category is 2A1 "Cement Production", with a share of about 52.8% of the total sector in 2019 (60.6% in 1990). Other relevant source categories in 2019 were 2F1 "Refrigeration and Air Conditioning" with a share of about 14.0% of the total, 2D3 "Solvent use" with a share of 13.6% of the total (12.7% in 1990) , 2F2 "Foam Blowing Agents" with a share of 9.0% of the total, 2A3 "Glass production" with a share of 3.3% of the total (1.6% in 1990), 2A2 "Lime production" with a share of 2.8% of the total (16.5% in 1990), 2A4 "Other Process Uses of Carbonates" with a share of 1.6% of the total (4.7% in 1990) and 2C1 "Iron and steel production" with a share of 1.6% of the total (1.8% in 1990) (Fig. 2-14).

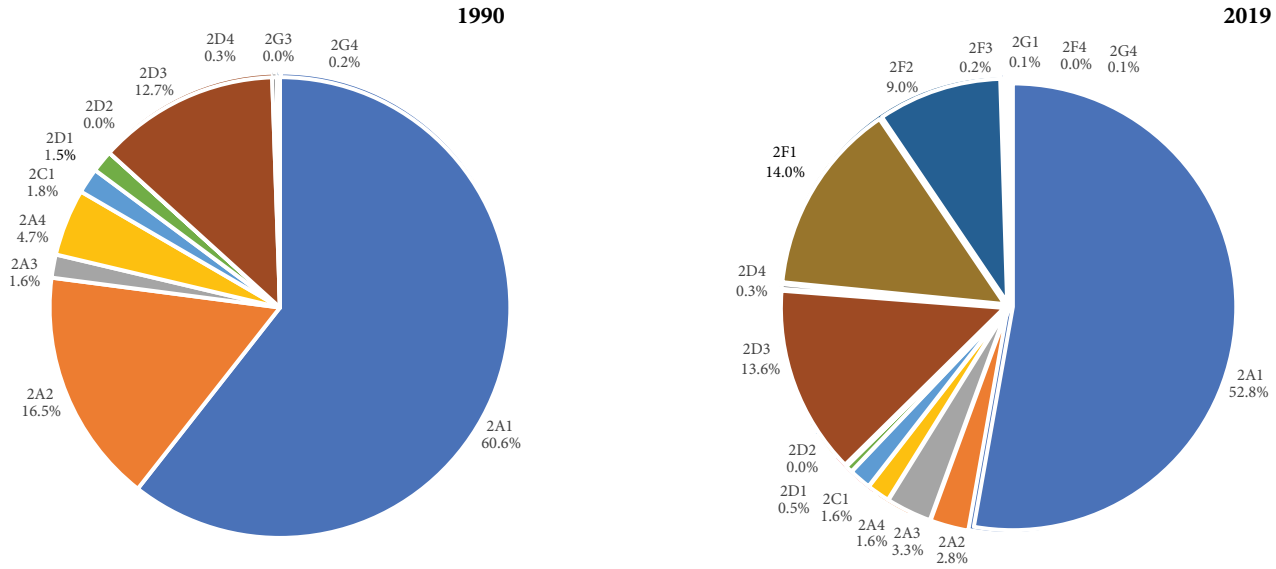


Figure 2-14: Breakdown of IPPU's GHG Emissions by Category in 1990 and 2019 years.

Agriculture Sector

Agriculture sector represents an important source of direct GHG emissions in the Republic of Moldova: CH_4 emissions, in particular from "Enteric fermentation" (category 3A) and "Manure management" (category 3B); N_2O emissions from "Manure management" (category 3B) and "Agricultural soils" (category 3D), respectively CO_2 emissions from "Urea application" (category 3H).

In the Republic of Moldova there are no registered emissions from 3C "Rice cultivation", 3E "Prescribed burning of savannas", 3G "Liming", 3I "Other carbon-containing fertilizers" and 3J "Other", as for the emissions from 3F "Field burning of agricultural residues", these are monitored in the LULUCF Sector, under the category 4B "Cropland".

In 2019, agriculture sector had a share of about 14.1% of total national direct GHG emissions (11.8% in 1990). Over the 1990-2019 period, total direct GHG emissions from the respective sector decreased by about 63.6%: from 5.3 Mt CO_2 equivalent in 1990 to 1.9 Mt CO_2 equivalent in 2019 (Tab. 2-13), mainly due to the decrease in such indicators as: livestock and poultry population, the amount of synthetic nitrogen and organic fertilizers applied to soils, the amount of agricultural crop residues returned to soils and the increase in carbon losses from mineral soils and changes of tillage practices.

Table 2-13: Direct GHG Emissions from Agriculture Sector within 1990-2019, Mt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
3. Agriculture	**5.3355**	**3.4103**	**2.3121**	**2.2403**	**1.9667**	**1.8484**	**1.9875**	**2.0379**	**1.9930**	**1.9435**
A. Enteric fermentation	2.1894	1.6181	1.0858	0.9240	0.7082	0.6292	0.6220	0.5780	0.5164	0.4416
B. Manure management	1.6117	0.9392	0.5532	0.5566	0.5031	0.4250	0.4383	0.4192	0.3789	0.3451
C. Rice cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural soils	1.5338	0.8529	0.6727	0.7596	0.7537	0.7830	0.9150	1.0145	1.0543	1.1171
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field burning of agricultural residues	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
G. Liming	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
H. Urea application	0.0006	0.0001	0.0004	0.0002	0.0017	0.0112	0.0123	0.0262	0.0434	0.0396
I. Other carbon-containing fertilizers	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
J. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Abbreviations: IE –Included Elsewhere; NO – Not Occurring.

Between 2018 and 2019, direct greenhouse gas emissions from agriculture sector decreased by about 2.5% (Fig. 2-15), mainly due to the reduction of livestock and poultry population.

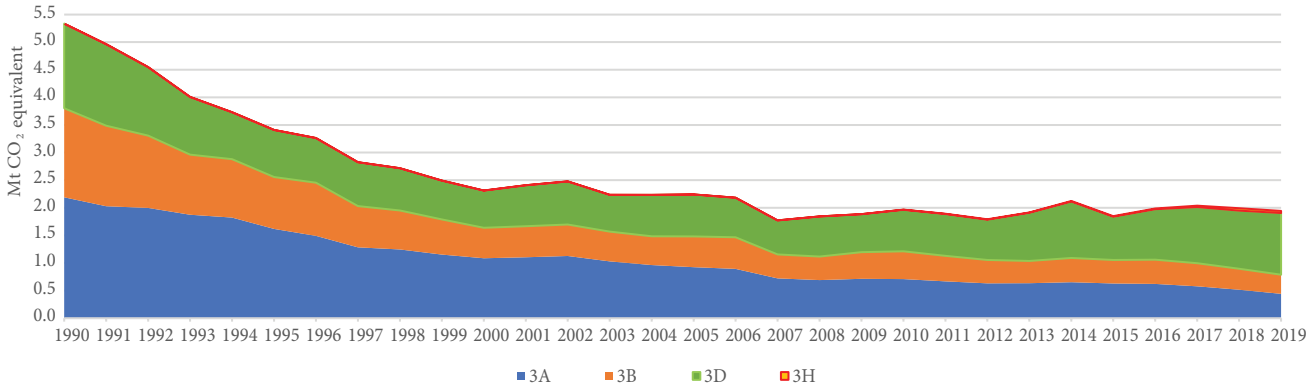


Figure 2-15: Total Direct GHG Emissions from Agriculture Sector within 1990-2019 periods.

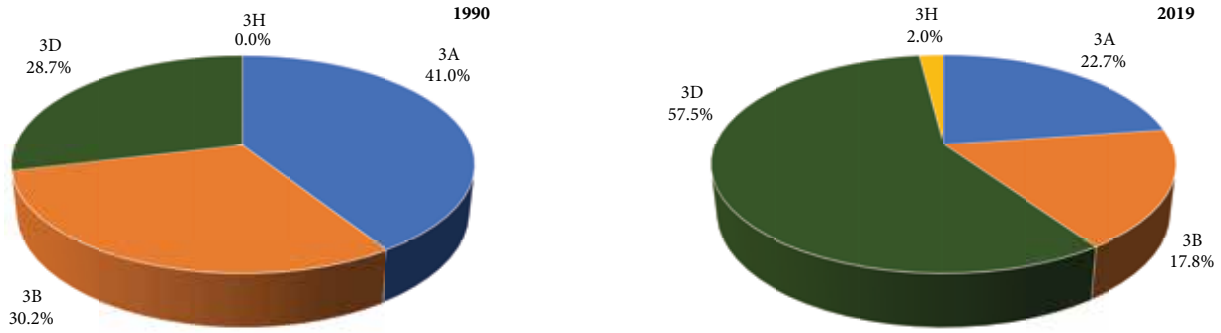


Figure 2-16: Breakdown of Agriculture GHG Emissions by Category in 1990 and 2019 years.

In 2019, the most important category of sources was 3D "Agricultural soils", with a share of about 57.5% of the total sector (28.7% in 1990) (Fig. 2-16). Other relevant source categories are represented by 3A "Enteric fermentation" with a share of 22.7% of the total (41.0% in 1990) and 3B "Manure management" with a share of about 17.8% of the total (30.2% in 1990). The share of category 3H "Urea application" for the time being is insignificant within the sector, however, it shows a trend towards steady growth.

Land Use, Land-Use Change and Forestry Sector

During the period 1990-2018, LULUCF sector was a source of net carbon removal in the Republic of Moldova. In 2019, for the first time the sector has become a net source of emissions nationwide. During the 1990-2019 period, the dynamics of net CO_2 removals/emissions registered a decreasing trend, reducing by about 121.3%, from -1.4 Mt CO_2 equivalent recorded in 1990 to +0.3 Mt CO_2 equivalent in 2019 (Tab. 2-14, Fig. 2-17).

Table 2-14: Emissions and removals in LULUCF sector in 1990-2019 periods, Mt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
4. LULUCF	**-1.3878**	**-1.7616**	**-1.8539**	**-1.3960**	**-0.9539**	**-0.9035**	**-0.6576**	**-0.7138**	**-0.5601**	**0.2958**
A. Forest Land	-2.5631	-2.0451	-2.3074	-2.4095	-2.4840	-2.1584	-2.1153	-2.0157	-1.9691	-1.9501
B. Cropland	2.6519	1.5892	1.4934	1.5435	1.5461	1.3911	1.3920	1.3692	1.4874	1.7899
C. Grassland	-1.2057	-1.6011	-1.2919	-1.0581	-0.6920	-0.4185	-0.4024	-0.3840	-0.4402	-0.2933
D. Wetlands	-0.5554	-0.4694	-0.3284	-0.1874	-0.0464	-0.0828	-0.0828	-0.0828	-0.0828	-0.0828
E. Settlements	0.2542	0.3577	0.3962	0.3401	0.3037	0.2290	0.1984	0.2489	0.1869	0.2778

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
F. Other Land	0.1524	0.4011	0.1785	0.4165	0.4415	0.0868	0.3516	0.2182	0.3212	0.6118
G. Harvested Wood Products	-0.1222	0.0060	0.0058	-0.0411	-0.0228	0.0492	0.0009	-0.0674	-0.0635	-0.0576
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Abbreviation: NO – Not Occurring.

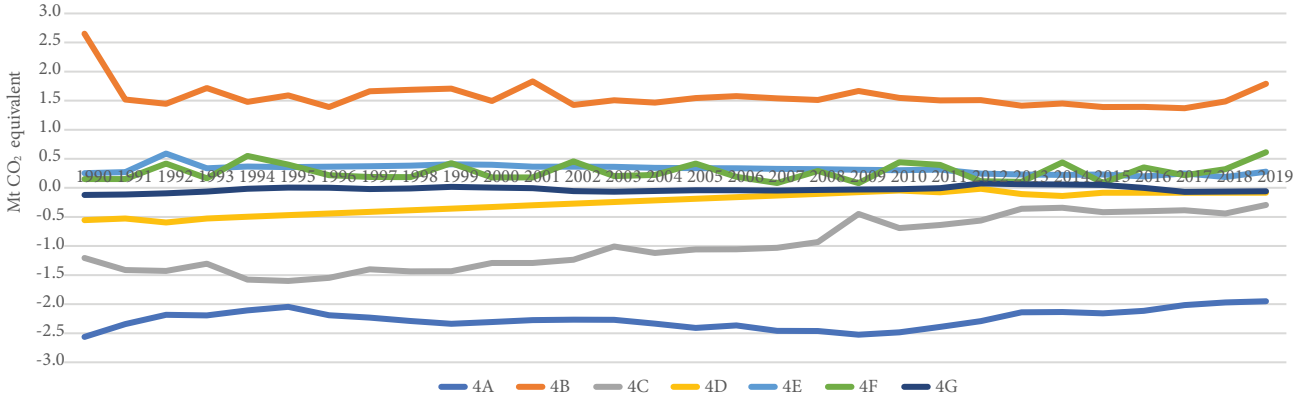


Figure 2-17: Direct GHG Emissions/Removals in LULUCF Sector by Source/Sink Categories within 1990-2019 period.

This is mainly due to changes in the use and management practices of cropland (category 4B), which have led to a significant reduction in organic carbon reserves in agricultural soils[57], thus changing the humus balance from positive to negative and/or to deeply negative. The process was also influenced by some changes in forest management and use (category 4A), such as increase in the volume of authorized harvesting of timber, substantial increase in the volume of illegal logging, increase in conversion of cropland to forest land, etc.

In the Republic of Moldova, in 2019, the main source of CO_2 emission removal in LULUCF sector was 4A "Forest lands" (forests, forest belts, etc.) with a share of 38.5% of the total (34.2% in 1990), followed by 4C "Grassland" with a share of about 5.8 percent (16.1 percent in 1990) and 4D "Wetlands" with a share of about 1.6 percent (7.4 percent in 1990). Category 4B "Cropland" is a net source of emissions, with a share of 35.4% (35.3% in 1990), followed by category 4F "Other land", with a share of about 12.1 percent (2.0 percent in 1990) and category 4E "Settlements", with a share of about 5.5 percent (3.4 percent in 1990) (Fig. 2-18).

[57] The organic carbon and nitrogen in soil are highly dependent within the humus content in soil; carbon losses through the oxidation process due to changes in the use and management of agricultural soils are accompanied by the simultaneous mineralization (biochemical decomposition) of nitrogen.

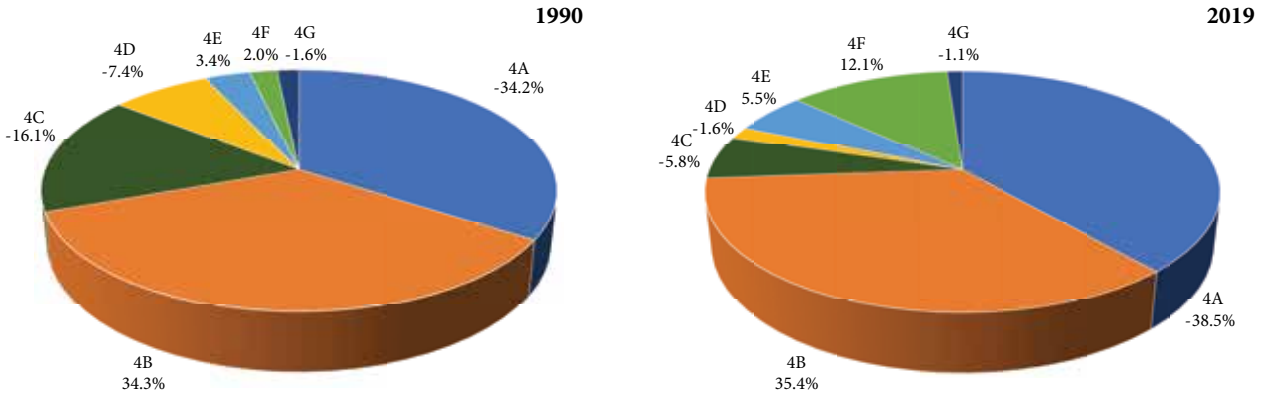


Figure 2-18: Breakdown of GHG Emissions and Removals by Source and Sink Categories in LULUCF Sector in 1990 and 2019 years.

Waste Sector

Waste sector is an important source of GHG emissions in the Republic of Moldova: CO_2 emissions from Incineration and Open Burning of Waste (category 5C), methane emissions from "Solid Waste Disposal" (category 5A), "Biological Treatment of Solid Waste" (category 5B), "Incineration and Open Burning of Waste" (category 5C) and "Wastewater Treatment and Discharge" (category 5D), respectively N_2O emissions from "Biological Treatment of Solid Waste" (category 5B), "Incineration and Open Burning of Waste" (category 5C) and "Wastewater Treatment and Discharge" (human manure) (category 5D). At the moment, in RM there are no any emissions registered in category 5E "Other".

In 2019, waste sector had a share of about 11.2% of total national GHG emissions (3.3% in 1990). During the 1990-2019 period, total direct GHG emissions from the sector increased by about 2.5%: from 1.51 Mt CO_2 equivalent in 1990 to 1.55 Mt CO_2 equivalent in 2019 (Tab. 2-15). Between 2018 and 2019, GHG emissions directly generated by waste sector increased by about 0.4%.

Table 2-15: GHG Emissions from Waste Sector within 1990-2019 periods, Mt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
5. Waste	**1.5142**	**1.5904**	**1.5364**	**1.4492**	**1.4786**	**1.4059**	**1.4331**	**1.5303**	**1.5463**	**1.5526**
A. Solid Waste Disposal	1.0467	1.2092	1.1695	1.0643	1.1378	1.0872	1.1152	1.2117	1.2236	1.2316
B. Biological Treatment of Solid Waste	0.0023	0.0011	0.0009	0.0010	0.0018	0.0022	0.0022	0.0025	0.0022	0.0024
C. Incineration and Open Burning of Waste	0.0243	0.0245	0.0243	0.0234	0.0208	0.0215	0.0211	0.0237	0.0231	0.0226
D. Wastewater Treatment and Discharge	0.4409	0.3557	0.3417	0.3604	0.3181	0.2950	0.2946	0.2923	0.2973	0.2961
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Abbreviations: NO –Not Occurring.

Reduction of total GHG emissions from the waste sector, in particular until 2000, could be explained by the economic decline that occurred in the Republic of Moldova during the respective period, by a significant drop in the wellbeing of population, and respectively, capacity to generate wastes. At the same time, starting with 2006, there has been a slight growing trend of direct GHG emissions from the waste sector (Fig. 2-19).

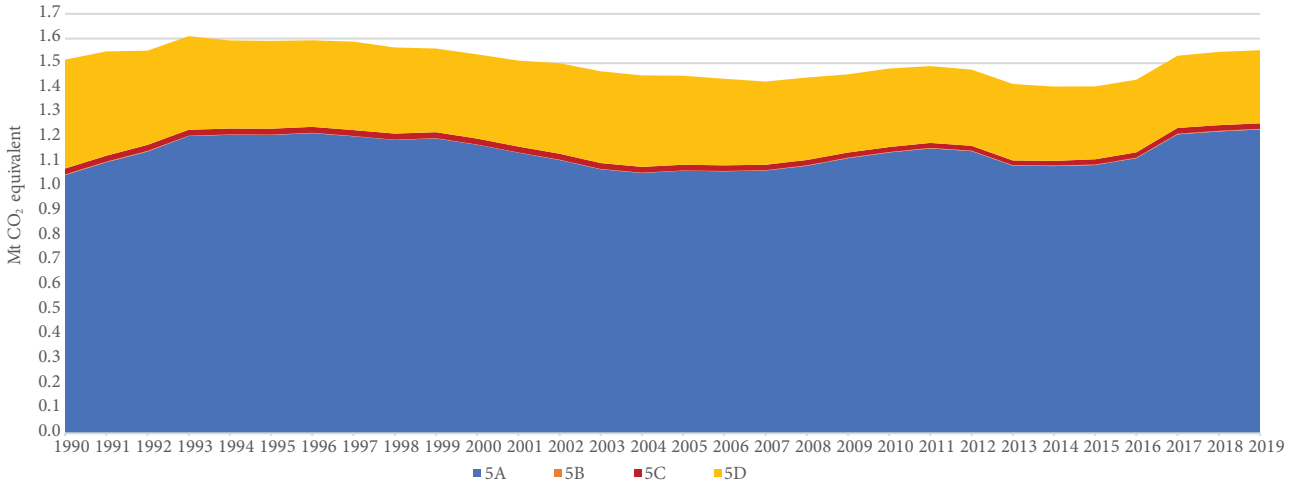


Figure 2-19: Total Waste Sector GHG Emissions Trends within 1990-2019 period.

In 2019, the most important source category in this sector was category 5A "Solid waste disposal", with a share of about 79.3% of the total sectoral emissions (69.1% in 1990), followed by category 5D "Wastewater treatment and discharge", with a share of about 19.1% of total (29.1% in 1990), respectively, by category 5C "Incineration and open burning of waste", with a share of about 1.5% of total (1.6% in 1990) (Fig. 2-20).

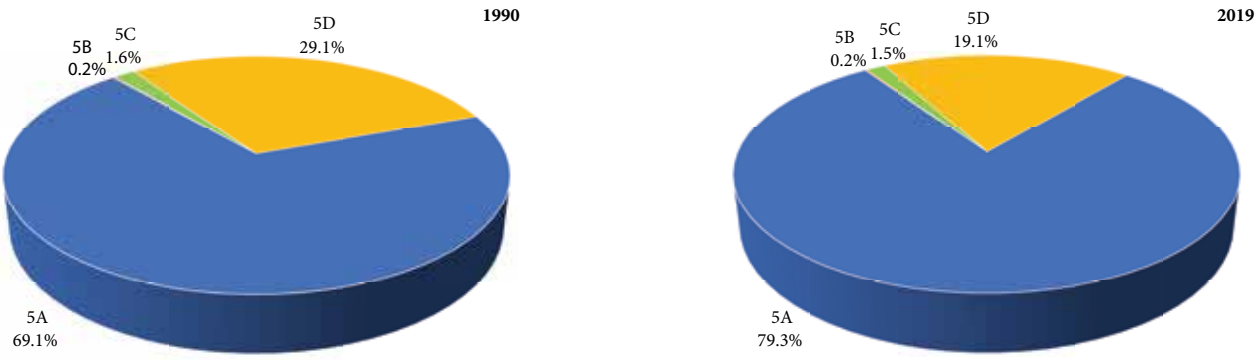


Figure 2-20: Breakdown of Waste GHG Emissions by Category in 1990 and 2019 years.

2.5.4. Emission Trends for Ozone and Aerosol Precursors

Though not considered greenhouse gases, photochemically active gases like carbon monoxide (CO), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOC), have an indirect global warming effect. These gases are considered as ozone precursors influencing the formation and destruction of tropospheric and stratospheric ozone. In particular, they are emitted from transportation, fossil fuel combustion, consumption of solvents and other household products, etc. Thus, the national GHG inventory of the Republic of Moldova includes emissions of the following ozone and aerosol precursors: NOx, CO, NMVOC and SO_2.

Over the 1990-2019 period, total nitrogen oxides emissions had decreased by about 79.5%: from 89.65 kt in 1990 to 18.35 kt in 2019, total carbon monoxide emissions decreased by about 48.0%: from 276.33 kt in 1990 to 143.72 kt in 2019, non-methane volatile

organic compounds emissions decreased by about 34.9%: from 138.79 kt in 1990 to 90.32 kt in 2019, and sulphur dioxide emissions decreased by about 96.5%: from 150.10 kt in 1990 to 5.24 kt in 2019 (Tab. 2-16).

Table 2-16: Ozone and Aerosol Precursors (NO_x, CO and NMVOC) and SO_2 Emission Trends in the RM within 1990-2019 period, kt

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
NO_x	89.6454	73.8289	55.1200	76.0499	35.0342	29.0746	27.1974	24.2386	20.4127	14.6476
CO	276.3349	204.1325	130.2957	65.5835	73.0763	62.6580	75.8546	69.5933	53.7625	41.7150
NMVOC	138.7872	111.8032	87.9944	69.2095	50.6096	47.3142	45.8441	31.2793	27.4305	23.2289
SO_2	150.0997	124.8723	92.0640	72.3599	57.3452	31.7701	31.9482	16.7211	12.4779	5.8630
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
NO_x	13.1615	14.3963	14.7933	15.0274	16.1240	17.1389	15.9969	17.0241	24.4397	15.5890
CO	39.4335	38.4124	44.7257	53.9554	51.2589	53.1523	53.7269	48.2494	50.4998	48.7510
NMVOC	22.7982	24.5445	27.0803	28.0904	39.7519	42.3738	47.7740	47.5842	41.0900	35.6733
SO_2	4.4903	3.9993	4.8266	6.3041	5.4639	5.1702	5.3193	4.0356	5.6582	5.1965
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
NO_x	16.6163	17.0452	16.4326	15.9387	15.4756	16.1663	16.4033	16.3541	18.0524	18.3535
CO	49.8489	53.6658	51.0761	52.7260	78.5976	84.4305	87.4851	110.2489	159.4791	143.7154
NMVOC	40.1884	43.3979	44.8018	43.9545	56.3898	54.3331	55.5414	65.0590	96.4462	90.3206
SO_2	4.5204	5.5519	4.6501	13.2050	4.3062	5.0062	4.2279	5.0951	4.5109	5.2391

In 2019, the source categories with the highest share in the structure of total nitrogen oxides emissions were: 1A4 "Other sectors" (35.8% of the total), 1A1 "Energy industries" (27.0% of the total), 1A3 "Transport" (18.8% of the total), 2A "Mineral industry" (10.0% of the total) and 1A2 "Manufacturing industries and construction" (6.9% of the total) (Fig. 2-21).

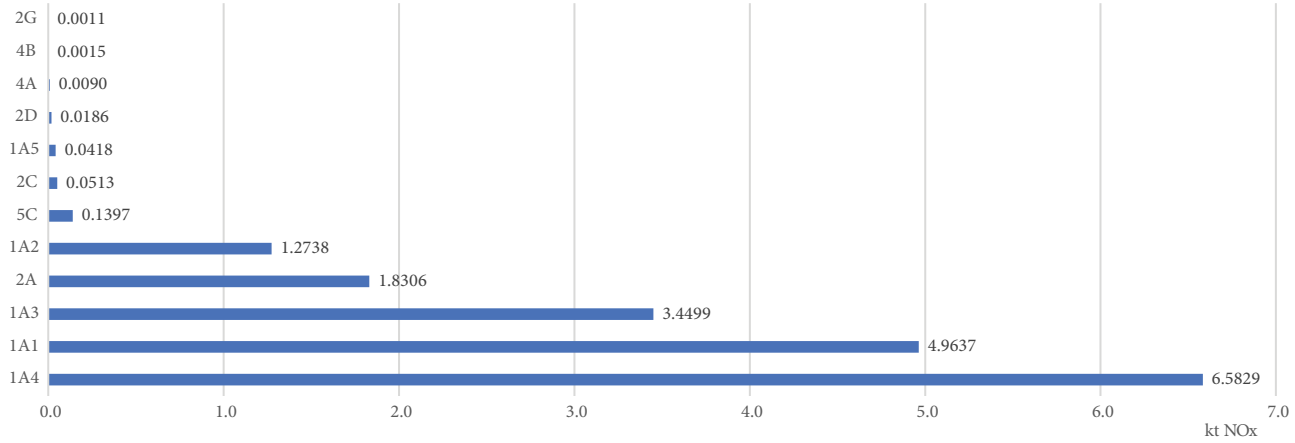


Figure 2-21: Source Categories of NO_x in the Republic of Moldova in 2019.

The source categories with the highest in the total carbon monoxide emissions in 2019 were: 1A4 "Other sectors" (81.3% of the total), 1A3 "Transport" (12.4% of the total), 5C "Incineration and open burning of waste" (1.7% of the total), 1A1 "Energy industries" (1.5% of the total), 2A "Mineral industry" (1.1% of the total) and 1A2 "Manufacturing industries and construction" (1.1% of the total) (Fig. 2-22).

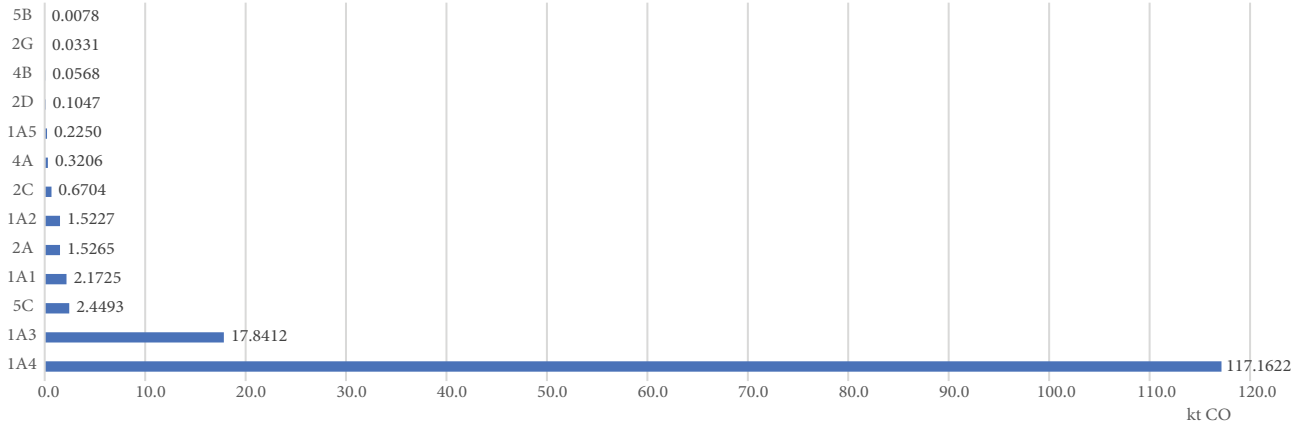


Figure 2-22: Source Categories of CO in the Republic of Moldova in 2019.

In 2019, the source categories with the highest share in the total non-methane volatile organic compounds emissions were: 2D "Non-energy Products from Fuels and Solvent Use" (67.9% of the total), 1A4 "Other sectors" (19.2% of the total), 2H "Other" (food and alcoholic beverages) (5.2% of the total), 5A "Solid waste disposal" (3.3% of the total) and 1A3 "Transport" (2.4% of the total) (Fig. 2-23).

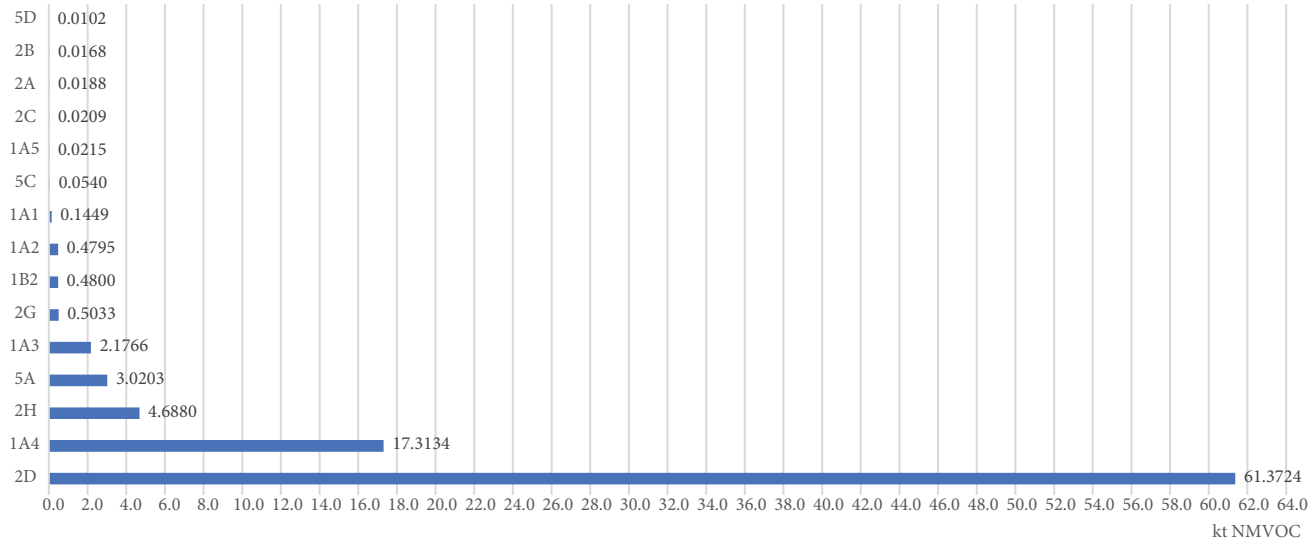


Figure 2-23: Source Categories of NMVOC in the Republic of Moldova in 2019.

The source categories with the highest share in the total sulphur dioxide emissions in 2019 were: 1A4 "Other sectors" (62.6% of the total), 1A2 "Manufacturing industries and construction" (17.6% of the total), 2A "Mineral industry" (14.2% of the total), 1A5 "Other works and needs in energy" (3.9% of the total) and 1A1 "Energy industries" (0.9% of the total) (Fig. 2-24).

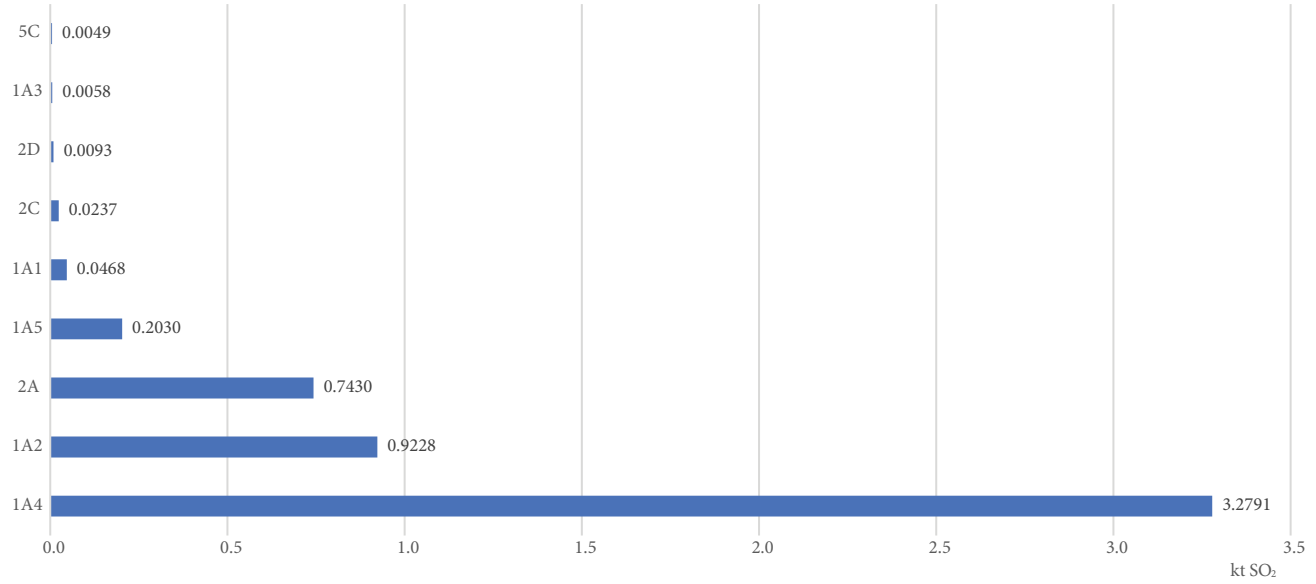


Figure 2-24: Source Categories of SO_2 in the Republic of Moldova in 2019.

CHAPTER 3. INFORMATION ON MITIGATION ACTIONS AND THEIR EFFECTS

3.1. Quantified Economy-Wide Emissions Targets

As known, the Paris Agreement (2015), ratified by the Republic of Moldova by Law No. 78/2017[58], established an action plan to limit global warming below 2°C. In order to achieve the objective of the Paris Agreement (2015), all its signatory Parties are to communicate national efforts level to reduce GHG emissions to the UNFCCC through Nationally Determined Contributions (NDCs). The Republic of Moldova submitted its initial NDC to UNFCCC on 25 September 2015. According to it, the country has undertaken to achieve, by 2030, the unconditional target of reducing net greenhouse gas emissions by 64% compared to the 1990 level. The reduction commitment could be conditionally increased to 78%, with donor support.

In order to achieve NDC targets, the Government of the Republic of Moldova has developed and approved the Low Emission Development Strategy of the Republic of Moldova until 2030 (LEDS 2030) and the Action Plan for its implementation[59] at the end of 2016.

According to Decision 1/CP.21, the signatory parties to the Paris Agreement (2015) which have NDCs with implementation deadline prior to 2030, shall update them by 2020, and shall do so every five years thereafter, in accordance with requirements of Article 4, paragraph 9, of the Paris Agreement.

The intended NDC of the Republic of Moldova was updated and submitted to the UNFCCC Secretariat on 4 March 2020[60]. In the updated NDC (2020), the Republic of Moldova shows the intention to achieve more ambitious reduction targets than those included in the INDC (2015). The updated unconditional target provides for reduction of GHG emissions by up to 70% by 2030 compared to the level of the reference year 1990, instead of 64-67% undertaken in the INDC. Regarding the conditional target, instead of the 78% undertaken in the INDC, the reduction commitment expressed above could be increased to 88% as compared to 1990 level, provided that external support is obtained, including in form of low-cost financial resources, technology transfer and technical cooperation, etc.

Along with establishment of more ambitious targets for reducing GHG emissions in the updated NDC, the Republic of Moldova has proposed to develop and approve by the end of 2021 the Low Emission Development Program of the Republic of Moldova until 2030 (LEDP 2030) and the Action Plan for its implementation, which is to replace the LEDS 2030 and to serve as guidance and officially approved document for achieving the targets included in the updated NDC (2020). According to it, the aim is to achieve the following sectoral and intermediate targets for reducing GHG emissions compared to the level of the 1990 reference year (Tab. 3-1).

Table 3-1: Sectorial targets for reducing GHG emissions, %

Sectors	Up to 2025		UP to 2030	
	unconditional	conditional	unconditional	conditional
Energy	83	87	81	87
Transport	56	58	52	55
Buildings	76	78	74	77
Industry	34	37	27	31
Agriculture	48	50	44	47
LULUCF	-33	195	10	391
Waste	16	19	14	18
TOTAL	**71**	**83**	**70**	**88**

LEDP 2030 of Moldova will allow the country to adjust its development pathway to a low-carbon economy and achieve sustainable green development, based on the country's socio-economic and development priorities, set out in its draft National Development Strategy "Moldova 2030"[61].

3.2. Activities Related to Nationally Appropriate Mitigation Actions

In order to achieve the general and specific targets of LEDP 2030, for each of the considered sectors (energy, transport, buildings, industry, agriculture, LULUCF and waste) nationally appropriate mitigation actions

[58] Law No. 78 of 04-05-2017 on ratification of the Paris Agreement. Official Gazette No. 162-170 of 26.05.2017.

[59] Government Decision No. 1470 of 30.12.16 on approval of the Low Emission Development Strategy of the Republic of Moldova until 2030 and of the Action Plan for its implementation. Official Gazette No. 85-91 of 24.03.17

[60] <https://www4.unfccc.int/sites/ndcstaging/Pages/LatestSubmissions.aspx>

[61] Government Decision No. 377 of 10.06.2020 on approval of the draft law for approval of the National Development Strategy "Moldova 2030". Published in the Official Gazette No. 153-158 art. 508 on 26.06-2020. <https://www.legis.md/cautare/getResults?doc_id=121920&lang=ro>

(technologies and / or measures) (NAMAs) were identified. They were prioritized with participation of all stakeholders.

The actions are divided into three categories:

1. Unconditional (unilateral) actions: mitigation actions taken based on country's own resources;
2. Conditional (supported) actions: mitigation actions supported by financial aid, technology transfer and capacity building by developed countries included in Annex No. I to UNFCCC; and
3. Credited actions: mitigation actions, with possibilities to generate credits for the carbon market.

According to LEDP 2030, the achievement of the unconditional target of the updated NDC (2020) is foreseen by implementing several NAMAs, 12 of which are registered in the NAMA Register of UNFCCC62. The list of supported NAMA registered in the UNFCCC's NAMA Register is provided in Annex 3 to this Report. The largest contribution towards reaching the conditional target of the updated NDC (2020) is expected to be achieved through the financial mechanisms of the Paris Agreement, including the Green Climate Fund (GCF). In this regard, in 2019 the Country Program of the Republic of Moldova was developed for projects to be supported by the Green Climate Fund over the 2019-2024 period63. This activity was carried out within the GCF Project "Support to the Republic of Moldova in establishment and strengthening the NDA, development of strategic framework, and preparation of country programme". In aggregate form, the measures identified to achieve the updated NDC targets are set forth in Annex 2 of the BUR3, presented in the format specified in Annex III to Decision 2/CP.17 of the Durban Conference of the Parties. The financial needs, technology transfer and capacity building needs for achieving the updated NDC objectives are fully reflected in Chapter 5 of the Report.

3.3. Clean Development Mechanism of the Kyoto Protocol

The applicability of the Kyoto Protocol (1997) was extended for the 2012-2020 period by the Doha Amendment (2012), new commitments being also established to reduce GHG emissions. The market mechanisms established by the Kyoto Protocol to reduce GHG emissions, namely: emissions trading (carbon market) and joint implementation of projects (to encourage foreign investment and technology transfer) are also found in the Paris Agreement for its period of action (2021-2030).

Regarding the Clean Development Mechanism (CDM) of the Kyoto Protocol, ten applications to launch CDM projects have been registered so far, eight of which have been registered by the CDM Executive Committee[64], all prior to the year of 2012. Only two of these are still ongoing. During the second implementation period (2012-2020) of the Kyoto Protocol, no new CDM projects were submitted for promotion in the Republic of Moldova.

In our country there is no market for carbon trading and there is no special budget created for carbon reductions. In order to assess the possibility for creating such a market, a feasibility study[65] was carried out. The study identified that the implementation of the EU GHG emission reduction trading scheme in the Republic of Moldova will be possible only when the country becomes a member of the EU[66].

3.4. Economic Instruments

Taxes and other economic instruments can play a significant role in achieving the goals of fighting climate change. They can provide incentives for behavior that protects or improves the environment and, at the same time, discourages actions that have a negative impact on it. Economic instruments, such as "taxes" contribute to achievement of environmental objectives at low cost and in an efficient manner. Such "taxes", once included in prices for goods and services, will send adequate signals for structural changes in the economy, making the economy more sustainable. The taxes can encourage innovation and development of new technologies. Revenues from the application of environmental taxes can then be used to reduce the level of other taxes, thus helping to reduce distortions in the economy.

From the experience of other countries, an introduced tax must pass the test of success before it can achieve a long-term green light. That is, it must be well designed, without leading to accumulation of negative impacts in the future, or if they do occur, they should be minimal. Of course, the implications for international competitiveness must also be taken into account. Where environmental taxes meet these tests, the Government should implement them.

To date, few such instruments have been used in the Republic of Moldova, especially to reduce GHG emissions. Thus, the Law on payment for environmental pollution[67], updated several times, including in 2021, establishes such pollution payments which do not

[62] <http://www4.unfccc.int/sites/nama/SitePages/NamaImplementation.aspx>
[63] <http://portal.clima.md/public/files/FS_Country_Programme_En.pdf>
[64] <https://cdm.unfccc.int/Projects/projsearch.html> (click „Database for PAs and PoAs").
[65] <http://www.undp.org/content/dam/moldova/docs/Publications/ETS_Feasibility_Study_UNDP.pdf>
[66] <http://www.mfa.gov.md/img/docs/Annex_6_to_Progress_Report.pdf>
[67] Law on payment for environmental pollution, No. 1540-XIII of 25.02.1998, Official Gazette No. 54-55 / 378 of 18.06.1998.

induce a significant reduction of GHG emissions. For example, the payment for pollutant emissions from stationary sources covers a list of pollutants that do not include greenhouse gases, while the tax on goods that, in the process of use (the Law does not specify mobile sources separately), cause environmental pollution (hydrocarbons, used vehicles, fertilizers, etc., according to Annex 8[68] of the Law) is: (a) 0.6% of the customs value of the imported goods and those purchased from economic operators on the territory of the Republic of Moldova that have no fiscal relations with its budgetary system and (b) 0.6% of the value of delivery, excluding VAT, of goods delivered by domestic producers.

The environmental pollution tax set for road transport[69] was aimed at reducing carbon monoxide emissions, not carbon dioxide emissions. At the same time, the respective Instruction was repealed in 2019.

In order to limit the import of second-hand vehicles, which are considered sources with a high degree of emissions, the Parliament of the Republic of Moldova has introduced an accepted vehicle age limit for import into the country[70]. Subsequently, by Law on amending some regulatory documents No. 257 of 16.12.2020[71], the restrictions related to operation age of vehicles imported into the Republic of Moldova, provided in the Customs Code, were eliminated. Instead, increased excise duties have been introduced for vehicles operational for over 10 years. These legal changes aimed to incentivize imports of new vehicles which have been in operation for a shorter age (less polluting ones) and, respectively, to discourage purchase of old vehicles (with a higher or more intense degree of pollution).

To address the rising level of motor vehicle pollution, the authorities have intervened by halving customs duties on hybrid motor vehicles imported into the country. As a result, in 2017 every eighth car imported into the Republic of Moldova was a hybrid one, and from 2020 the imports of vehicles equipped with electric motor were exempted from VAT.

3.5. Climate Change Mitigation Policies and Measures by Sectors

3.5.1. Energy Sector

The basic document outlining the policies in the energy sector is the Energy Strategy of the Republic of Moldova until 2030. It was approved in 2013 and it comprises specific targets only till 2020, the fulfilment of which is reflected in Tab. 3-2.

[68] <http://lex.justice.md/UserFiles/File/2016/mo472-477md/an.8_1540.doc>
[69] Instruction on calculation of payment for environmental pollution when exercising the instrumental ecological control of vehicles of 25.11.98. Official Gazette No. 109-110 / 211 of 10.12.1998.
[70] Law on amending and supplementing some regulatory acts, No. 154 of 21.07.2005, Official Gazette of the Republic of Moldova No. 126-128 / 611 of 23.09.2005 (the age limit for import of motor vehicles was increased from 7 to 10 years by Law on amending and supplementing some legal acts, No. 178 of 11.07.2012, Official Gazette of the Republic of Moldova No. 190-192 / 644 of 14.09.2012; but higher taxes are levied on import of vehicles older than 7 years).
[71] <https://www.legis.md/cautare/getResults?doc_id=124566&lang=ro>

Table 3-2: Status of reaching 2020 targets in the energy sector

Objectives	Targets till 2020	Status of implementation as of the 2020 yearend	Comments, learnt lessons
1. Energy security			
Making energy interconnections	139 km of power lines and 40 km of natural gas pipelines	Power lines are being designed; natural gas pipelines are already built.	
Increasing the internal capacity to produce electricity	Up to 800 MW	The need to build such capacities is still under debate.	The target was overestimated, and a study conducted by the World Bank in 2015 established that the most appropriate solution to achieve the country's energy security is to build interconnection lines with ENTSO-E. It is also worth mentioning that the construction of 800 MW of power plants based on traditional fuel would have a negative impact on reaching the NDC objectives.
2. Energy efficiency			
Reducing energy intensity	By 10% as compared to 2010	The energy intensity in 2010 was 0.6 toe / thousand. Euro, in 2017 - 0.35 toe / thousand. Euro, i.e. a decrease of 40%. The established trend allows to believe that the target set for 2020 will be achieved.	
Reducing losses in transport and distribution networks	By up to 11% for electricity and by 39% for natural gas and by 5% for heat as compared to 2010	The reduction of electricity losses in 2016 was at the level of 0.03 ktoe, while in 2018 - 0.2 ktoe; respectively, natural gas: 8.1 ktoe in 2016 and 6.3 ktoe in 2018; heat: 0 ktoe in 2016 and 0.24 ktoe in 2018. The established trend allows to believe that the targets set for 2020 will be achieved.	
Reducing energy consumption in buildings	By 20% as compared to 2010	The reduction of energy losses in buildings in 2016 was 43.2 ktoe, while in 2018 - 75.9 ktoe. The established trend allows to believe that the target set for 2020 will be achieved.	
Renovation of public buildings	Renovation of 10% of the public buildings	No data available. However, reducing energy losses in public buildings as specified above shows that the target will be achieved.	There is need to improve national statistics or to set targets in a format in which they can be monitored on the basis of available information.
3. Development of RES for electricity production			
Promoting use of energy produced from renewable energy sources in relation to total gross domestic consumption	20% of RES energy in total gross domestic consumption	27% have already been registered in 2018. The 2020 target will be reached.	

[72] <http://www.clima.md/lib.php?l=ro&idc=82&>

Objectives	Targets till 2020	Status of implementation as of the 2020 yearend	Comments, learnt lessons
Ensuring use of biofuels	A share of 10% of the total fuel used in the transport sector	No data available. However, there is a reduction in the amount of fuel consumed in the transport sector.	There is need to improve national statistics or to set targets in a format in which they can be monitored on the basis of available information.
Increasing production of electricity from renewable sources	Ensuring a 10% share of annual electricity production from renewable energy sources.	A share of 2.6% of electricity demand covered by RES is expected to be reached by the end of 2020	GD No. 689/2018 on approval of capacity limits, maximum quotas until 2020 and capacity categories in the field of electricity in RES, is now under review. Electricity produced by renewable sources is expected to cover 25-30% of the country's electricity demand by 2025.
4. Reducing greenhouse gas emissions (compared to 1990)	By 25%	By 72.9% in 2016[72]. The 2020 target has already been met and exceeded.	

Below the most relevant policies of the Republic of Moldova in the energy field are presented, either effective or in draft form under public debate, which have or may have an impact on the scenarios with measures and scenarios with additional measures as related to GHG emissions by 2035.

Energy Strategy of the Republic of Moldova until 2030, GD No. 102/2013[73]

Objective: The objectives for 2020 and the status of their achievement are shown in Tab. 3-2, while for the 2020-2030 period, targets are the following:

- *Developing use of renewable energy sources. Availability of long-term carbon capture and storage (CCS) technology.* Given that the technology of capturing and storing carbon at coal-fired power plants will not be a high performance one, renewable sources will have to experience a more accelerated development;
- *Improving energy efficiency.* It is expected that rising CO_2 prices in the market will accelerate the implementation of energy efficiency measures;
- *Introducing smart grids.* A specific regulatory framework and fundraising will need to be developed to implement this idea.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2013

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Energy intensity; energy losses in electricity, gas and heat networks; GHG emissions; energy consumption in buildings; number of renovated public buildings; share of renewable electricity in meeting the demand; share of biofuels in total fuels consumed in transport.

Mitigation impact: Reduction of greenhouse gas emissions (compared to 1990) by 25% in 2020.

Cost and benefit estimate: 617.5 million Euros for construction of 650 MW combined cycle; other costs and benefits are not available.

National Energy Efficiency Program for the 2011-2020 period, GD No. 833/2011[74], amended by GD No. 738/2018[75]

Objective: The program sets out priority policies and actions to be implemented over the 2011-2020 period, in order to respond to challenges of rising energy prices, dependence on import for energy resources and impact of the energy sector on climate change. The program will be supported by national energy efficiency action plans, adopted every three years.

In order to reduce the dependence on import of energy resources and the impact of the energy sector on climate change, the Program provides the following global objectives for the Republic of Moldova, compared to the base year 2009:

- Streamlining overall primary energy consumption by 20% by 2020;
- Increasing the share of renewable energy in the total energy mix from 6% in 2010 to 20% in 2020;
- Increasing the share of biofuels to at least 10% of the total fuels used in 2020;
- Reducing greenhouse gas emissions by at least 25% by 2020 compared to the base year 1990.

The program also sets specific objectives for improving energy efficiency, as follows:

a) Promoting production of electricity in cogeneration, as more efficient than separate production of electricity and heat. The overall efficiency of new district heating power plants with combined cycle will not be less than 80%, and the electrical efficiency - 45-50%;

b) Revision of the Concept for renovation of the national heat supply system, approved by the Government Decision No. 189 of 20 February 2003, priority being given to production of electricity in cogeneration, capitalization of potential of renewable energy sources and use of existing heat supply system (completed);

[73] <https://www.legis.md/cautare/getResults?doc_id=68103&lang=ro>

[74] <https://www.legis.md/cautare/getResults?doc_id=21332&lang=ro#>

[75] <https://www.legis.md/cautare/getResults?doc_id=108888&lang=ro>

c) Reduction of losses in electricity distribution networks from 13% in 2011 to 7-10% in 2020, which requires an annual reduction of losses of 0.52% - 0.82%;

d) Metering of natural gas consumption in the amount of 100% by 2020;

e) Certification of the energy performance of buildings;

f) Increasing the number of buildings with "almost zero" energy consumption. Starting with 31 December 2018, the new buildings occupied and owned by public authorities will be buildings with almost zero energy consumption;

g) Development and adoption of a draft Law on energy performance of buildings, as well as regulations on energy performance of buildings and periodic inspection of boilers and heating systems (completed);

h) Development of an energy efficiency program for the industrial sector.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2011

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Share of renewable energy in the total energy mix; share of biofuels in total fuels used; power and energy produced by new high-efficiency CHPs; concept on renovation of the revised national heat supply system; level of energy loss reductions in distribution networks; level of metering of natural gas consumption; number of buildings with "almost zero" energy consumption; number of energy managers trained; national program for development of heat distribution networks developed; norms regarding energy and ecological performance of products with energy impact developed; heat measuring equipment for 100% of installed buildings; developed energy efficiency program for industrial sector; own energy efficiency plans developed by local public authorities, etc.

Mitigation impact: Reduction of greenhouse gas emissions by at least 25% by 2020, compared to the base year 1990 or by about 761.5 thousand tonnes of CO_2.

Cost and benefit estimate: The costs are to be specified in the National Energy Efficiency Action Plan launched every three years. Benefits: long-term energy savings, by 2020, in the amount of 20%, which is 14167.857 TJ.

2020 National Development Strategy: 8 solutions for economic growth and poverty reduction. Law No. 166/2012[76], amended by Law No. 121/2014[77]

Objective: One of the 8 solutions of the Strategy pertains to the energy sector: "Energy: supplied safely, used efficiently". It is expected to be reached by 2020: reduction of energy intensity by 10%; 20% of energy demand to come from RES; reduction of heat losses in transmission and distribution networks by 5%, reduction of greenhouse gas emissions (compared to 1990) - by 25%, reduction of energy consumption in buildings by 10%, share of renovated public buildings - 10%.

In the transport sector: by 2020, 80% of roads will be in good and very good condition, including: 1900 km of national public roads rehabilitated, and 4900 km of local public roads repaired.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2012

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Government apparatus, State Chancellery, line ministries

Monitoring and evaluation indicators: Reduction of energy intensity, share of RES, reduction of heat losses in transmission and distribution networks, reduction of energy consumption in buildings, share of renovated public buildings; rehabilitated national public roads, repaired local public roads; share of national public roads in very good and good condition.

Mitigation impact: Reduction of greenhouse gas emissions (compared to 1990) - by 25%.

Costs and benefits estimate: Planned gradual increase of energy efficiency by up to 10% leads to obtaining annual savings of about 830 million lei, in current prices, by 2020; the cost of road rehabilitation: 1.1 billion Euros.

National Action Plan in the field of Renewable Energy for the years 2013-2020, GD No. 1073/2013[78], amended by GD No. 327/2018[79]

Objective: By 2020 to reach the contribution of 20% of energy from renewable sources in the volume of energy consumption, the sectoral targets being: 10% energy from renewable sources in electricity consumption, 10% energy from renewable sources in fuel consumption in transport, 27% energy from renewable sources in energy consumption for heating and cooling.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

[76] <https://www.legis.md/cautare/getResults?doc_id=48696&lang=ro>
[77] <https://www.legis.md/cautare/getResults?doc_id=48684&lang=ro>
[78] <https://www.legis.md/cautare/getResults?doc_id=11752&lang=ru#>
[79] <https://www.legis.md/cautare/getResults?doc_id=102975&lang=ru>

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Share of renewable energy in final gross energy consumption in 2020, total installed power of biomass recovery units, total area of installed solar collectors, amount of biofuels consumed.

Mitigation impact: About 242 kt CO_2 reduction by 2020.

Cost and benefit estimate: Minimum investment volume 250 million Euros, and if 400 MW of wind power is built, the necessary investment will exceed 600 million Euros.

Capacity limits, maximum quotas and capacity categories in the field of electricity from renewable sources until 2020[80]

Objective: Adjusting support schemes to promote use of energy from renewable sources; increasing generation capacities from renewable energy sources by 2025:

- Wind and PV installations, 260 MW,
- Biogas cogeneration plants, 150 MW
- Syngas cogeneration plants, 15 MW
- Biofuel direct combustion cogeneration plants, agricultural waste, 30 MW.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: Planned

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Capacities of installed RES

Mitigation impact: Not available

Cost and benefit estimate: Approximately 1000 EUR/kW installed; increase of energy security.

Law on labelling of products with energy impact, No. 44/2014[81]***, as amended by Law No. 79/2018***[82]

Objective: Establishes the regulatory framework for labelling and standard information to be posted on energy impact products

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure, Energy Efficiency Agency.

Monitoring and evaluation indicators: Labels and product sheets supplied and displayed by economic operators on the market.

Mitigation impact: Not available.

Cost and benefit estimate: Not available.

Environmental Strategy for 2014-2023 and Action Plan for its implementation, GD No. 301/2014[83]***, as amended by GD No. 1143/2018***[84]

Objective: Reduction by at least 25% greenhouse gases from the energy sector; by 20% - those from the residential sector, industrial and agricultural sectors; use of 15% biofuels in the transport sector

GHGs affected by policy: CO_2, CH_4, N_2O

Category of policy: Regulatory

Status: On-going

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Strategic, legal and regulatory framework harmonized with the provisions of the EU environmental directives, approved and implemented; integrated environmental information system created and operational; new environmental economic and fiscal instruments developed and applied; integrated ecological monitoring system developed and applied; water supply and sewage infrastructure insured; year 2020: euro 4 standard - applied to import of cars; year 2023: increase in the number of imported cars with hybrid and electric propulsion; share of biofuels in total fuel consumption.

Mitigation impact: Reduction of at least 20% of greenhouse gases by 2020, compared to the baseline scenario.

Cost and benefit estimate: Reducing air pollution, greenhouse gas emissions and car emissions can bring annual benefits of up to 2.5% of GDP; the long-term

[80] http://particip.gov.md/public/documente/130/ro_7841_proiectul782.pdf
[81] <https://www.legis.md/cautare/getResults?doc_id=21702&lang=ro>
[82] <https://www.legis.md/cautare/getResults?doc_id=106000&lang=ro>
[83] <https://www.legis.md/cautare/getResults?doc_id=48131&lang=ro>
[84] <http://lex.justice.md/md/378910/>

economic benefits of improving sewage, wastewater collection and treatment systems would be 0.44% - 1.73% of GDP; 66.2 million lei in the transport sector, which will lead to a decrease in carbon emissions in the sector by 15% compared to baseline scenario; about 329 million lei for implementation of mitigation measures with direct or indirect impact on GHG emissions generated by industry sector.

Law on heating and promotion of cogeneration, No. 92/2014[85], as amended by Law No. 185/2017[86] and Law No. 74/2020[87]

Objective: The law regulates activities carried out in the heat generation sector; establishes principles and objectives of the state policy in the field of centralized heat supply systems; state management of the heating sector; diminishing negative impact of the heating sector on the environment; determination and approval of regulated tariffs for heat; licensing of activities carried out in the heat generation sector, etc. Among the most important objectives of the Law are:

- Promoting the production of heat in a cogeneration regime;
- Ensuring the security, quality and reliability of the heat supply;
- Accessibility of tariffs for heat consumers;
- Promoting centralized heat supply systems;
- Efficient use of energy resources and reducing their impact on the environment.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: MEI, EEA, local public authorities

Monitoring and evaluation indicators: Updated legal and regulatory framework; power of renovated heating plants transformed into mini-CHPs; implemented contracts.

Mitigation impact: Not available.

Cost and benefit estimate: Not available.

Law on energy performance of buildings, No. 128/2014[88], as amended by Law No. 160/2016[89]

Objective: The law promotes improvement of energy performance of buildings and establishes requirements regarding: the general framework for methodology of calculating energy performance of buildings and their elements; application of minimum energy performance requirements for buildings; certification of the energy performance of buildings; periodic inspection of the heating and air conditioning system in buildings; the respective monitoring systems, etc. After 30 June 2019, new public buildings must be buildings with almost zero energy consumption. After 30 June 2021, all new buildings must be buildings with almost zero energy consumption.

Certification of the energy performance of buildings is mandatory for:

a) New buildings and their elements;
b) Existing buildings and their elements for sale or rent;
c) Existing public buildings with a total usable area of over 500 m^2. As of 30 September 2016, the 500 m^2 threshold was reduced to 250 m^2;
d) Existing buildings frequently visited by the public with a total useful area of over 500 m^2. As of 30 September 2016, the 500 m^2 threshold was reduced to 250 m^2;
e) Existing buildings and their elements that are undergoing major renovation;
f) Existing public buildings that have an energy performance certificate and in which changes have taken place (reconstructions, extensions, modernizations, etc.) that have significantly influenced their energy performance.

After 30 June 2019, new public buildings must be buildings with almost zero energy consumption. After 30 June 2021, all new buildings must be buildings with almost zero energy consumption.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2015

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Central specialized public authority in the field of construction, Energy Efficiency Agency, public authorities in the field of energy efficiency

Monitoring and evaluation indicators: Updated legal and regulatory framework; construction and rehabilitation of buildings according to new requirements; performance certificates for buildings developed; periodic inspection of heating and air conditioning systems implemented.

Mitigation impact: Not available.

Cost and benefit estimate: Increasing energy performance of buildings; costs are not available.

[85] <https://www.legis.md/cautare/getResults?doc_id=48676&lang=ro>
[86] <https://www.legis.md/cautare/getResults?doc_id=101154&lang=ro>
[87] <https://www.legis.md/cautare/getResults?doc_id=121896&lang=ro>
[88] <https://www.legis.md/cautare/getResults?doc_id=21474&lang=ru#>
[89] <https://www.legis.md/cautare/getResults?doc_id=95000&lang=ru>

Law on promoting use of energy from renewable sources, No. 10/2016[90], as amended by Law No. 34/2018[91]

Objective: The law creates the necessary framework for the application of Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on promoting use of energy from renewable sources. It aims to establish a legal framework for promotion and use of energy from renewable sources. The document defines the rules on support schemes, guarantees of origin, administrative procedures, access of renewable energy producers to networks. The law provides for achievement by 2020 of at least a 17% share of energy from renewable sources in gross final energy consumption, as well as at least a 10% share of energy from renewable sources in final energy consumption in transport.

It is important to emphasize that the support scheme to be applied in the Republic of Moldova for renewable energy has been approved. It consists of tenders with a ceiling price, oriented towards lowest price and newest technologies proposed by investors, and obligation of suppliers to purchase the entire quantity of energy produced by eligible producers of renewable electricity.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2018

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure, ANRE, license owners

Monitoring and evaluation indicators: Fixed tariffs and ceiling prices; RES electricity capacity; number of eligible producers; number of consumers benefiting from net metering; amount of renewable energy in the energy balance, including electricity, heat and biofuels produced from renewable sources

Mitigation impact: Not available

Cost and benefit estimate: Reducing impact on environment; increase of energy security; costs - not available.

Low Emission Development Strategy of the Republic of Moldova until 2030 and action plan for its implementation, GD No. 1470/2016[92], as amended by GD No. 738/2018[93] and GD No. 1143/2018[94]

Objective: The objective is in line with the one established in the Intended Nationally Determined Contribution (2015) and it is aimed at unconditionally reducing, by 2030, total national net greenhouse gas emissions by no less than 64% compared to 1990 levels. Emission reductions could be increased up to 78% upon conditionality of external support.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2017

Included in: Scenario with Existing Measures (WEM), Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: According to progress indicators of Annex 2 to LEDS 2030

Mitigation impact: Reducing GHG emissions by sectors, % compared to 1990, as follows:

Sectors	Up to 2020		Up to 2025		Up to 2030	
	Uncondi-tional	Condi-tional	Uncondi-tional	Condi-tional	Uncondi-tional	Condi-tional
Energy	78	82	76	82	74	82
Transport	49	56	41	48	30	40
Buildings	78	79	79	81	77	80
Industry	58	62	51	59	45	56
Agriculture	48	50	43	45	37	41
LULUCF	12	18	43	54	62	76
Waste	23	26	46	51	38	47
TOTAL	**65**	**71**	**69**	**76**	**64 - 67**	**78**

Cost and benefit estimate: For the 2021-2030 period – US$ 3.3 billion unconditionally and US$ 2.5 billion conditionally.

Program for promoting "green" economy in the Republic of Moldova for the years 2018-2020 and the Action Plan for its implementation, GD No. 160/2018[95]

Objective: Promoting implementation of the principles of "green" economy in the Republic of Moldova in harmony with economic development and social welfare. The implementation of the Program will ensure the development of necessary capacities of all those involved in the planned activities, by implementing the following specific objectives, by 2020:

1) Ensuring conditions of good governance and strengthening of the institutional and management potential in promoting "green" economy by 30% at national level;
2) Ensuring promotion of measures to implement "green" economy principles, so that 17% of gross final energy consumption comes from renewable sources and energy efficiency is improved by 8.2%;
3) Ensuring greening of about 30% of small and medium enterprises through adequate support in implementing "green" economy principles;

[90] <https://www.legis.md/cautare/getResults?doc_id=98936&lang=ru#>
[91] <https://www.legis.md/cautare/getResults?doc_id=105420&lang=ru>
[92] <https://www.legis.md/cautare/getResults?doc_id=98493&lang=ro>
[93] <https://www.legis.md/cautare/getResults?doc_id=108888&lang=ro>
[94] <https://www.legis.md/cautare/getResults?doc_id=112021&lang=ro>
[95] <https://www.legis.md/cautare/getResults?doc_id=102127&lang=ro>

4) Ensuring promotion of organic agriculture by implementing "green" economy principles and expanding the area of agricultural land used for organic farming by about 20%;
5) Reduction of air pollution by 30% by developing sustainable transport;
6) Ensuring promotion of measures for implementation of "green" economy principles in constructions by 15%;
7) Ensuring implementation of resource efficiency and purer production principles in about 30% of enterprises and organizations;
8) Ensuring that at least 15% of all public procurement comply with sustainable procurement criteria;
9) Increasing the level of knowledge in "green" economy and sustainable development among pupils and students by at least 30%;
10) Increasing the level of public awareness about "green" economy and sustainable development by at least 30%;
11) Creation of a monitoring system for "green" growth indicators.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2018

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: GDP growth (%, in absolute figures and *per capita*); greenhouse gas emissions; CO_2 emissions from all sources as a function of real GDP; final energy consumption; energy intensity; share of RES energy in final energy consumption.

Mitigation impact: Not available.

Cost and benefit estimate: The overall cost of Program implementation is estimated at about 122.5 million lei.

Law on energy efficiency No. 139/2018[96]

Objective: Creating the legal framework necessary for promoting and improving energy efficiency by implementing action plans in the field of energy efficiency, by developing the market for energy services, and by implementing other energy efficiency measures. In order to meet at least the minimum energy performance requirements, the annual renovation rate of public buildings will constitute 1% of the total area of state owned public buildings, with a total usable area of over 250 m^2. The national objectives in the field of energy efficiency for 2020 are set at a level that will not exceed the final energy consumption of 2796 thousand tonnes of oil equivalent (ktoe) or 2968 ktoe primary energy.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2018

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure, Energy Efficiency Agency

Monitoring and evaluation indicators: Secondary legislation developed and approved, annual area of renovated public buildings, final and primary energy consumption

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Program on implementation of commitments for renovation of buildings of central and specialized public authorities for the years 2020-2022, GD No. 372/2020[97]

Objective: Implementation over the 2020-2022 period of measures necessary for annual renovation of 1% of total area of public buildings owned by the state, which is an area equivalent of about 10,086 m^2

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2020

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Annual energy audits, area of public buildings renovated annually, reaching estimated energy savings

Mitigation impact: About 140.3 tonnes CO_2/year

Cost and benefit estimate: Investment in the amount of about 38 million lei; reaching energy saving target of about 694.9 MWh per year.

National Action Plan in Energy Efficiency (NAPEE) for the years 2019-2021, GD No. 698/2019[98]

Objective: Energy efficiency objectives are in line with the ones in the table below, ktep

[96] <https://www.legis.md/cautare/getResults?doc_id=105498&lang=ro>

[97] <https://www.legis.md/cautare/getResults?doc_id=121818&lang=ro>

[98] <https://www.legis.md/cautare/getResults?doc_id=119890&lang=ro>

Indicators	Objectives according to Law No. 139/2018		Objective NAPEE 2019-2021
	2019	2020	2021
General objectives, energy reduction	**144.4**	**167.2**	**193.6**
Government buildings (art. 14 of Law 139/2018)	0.05	0.1	
Scheme of energy efficiency obligations or alternative policy measures (art. 8 of Law 139/2018)	12.23	24.46	
Primary energy consumption	**2936**	**2968**	**2990**
Final energy consumption	**2723**	**2769**	**2808**
Energy reduction in final energy consumption - buildings (residential)	62.33	72.2	83.6
Energy reduction in final energy consumption - industry	12.96	15.0	17.0
Energy reductions in final energy consumption - transport	25. 92	30. 0	35.0
Energy reduction in final energy consumption - other (public sector)	43.18	50.0	58.0
Primary energy intensity, *toe / thousand Euros*	0.22	0.19	0.17

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2020

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Area of renovated residential and public buildings, energy saving by sectors

Mitigation impact: Over the 2019-2021 period emission reduction: in the residential sector by about 67.55 kt CO_2, in the public sector – by 68.96 kt CO_2, in the centralized heat supply system – by 13.88 kt CO_2

Cost and benefit estimate: Investment of about 1 billion lei/year; increase of energy security; expenditure strategy for the 2019–2021 period provides for a budget of about 11.318 billion lei, distributed as follows: year 2019 – 3.722 billion lei; year 2020 – 3.875 billion lei; year 2021 – 3.721 billion lei.

Law on ratification of the Loan Agreement between the Republic of Moldova and the International Bank for Reconstruction and Development on implementation of the Second Project for improving the efficiency of the Centralized Heat Supply System (CHSS), No. 193/2020[99]

Objective: Energy efficiency increase of Chisinau CHSS

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Economic

Status: On-going

Implementation start: 2020

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Reconstruction measures of CHP-1, power of modular units based on internal combustion engines installed at HP-West and CHP-3, number of individual heating points installed, area of residential and public buildings with reconstructed heat supply systems, area of insulated residential and public buildings.

Mitigation impact: Not available

Cost and benefit estimate: 92 million Euros.

Decision on initiation of negotiations of draft Financing Agreement for the Project "Energy Efficiency in the Republic of Moldova" between the Republic of Moldova and the European Investment Bank and granting competences for such negotiation, GD No. 218/2020[100].

Objective: Creating a financial instrument necessary for energy related renovation of the real estate fund of the Republic of Moldova, which includes public buildings owned by central and local public authorities.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Economic

Status: Approved

Implementation start: According to output of negotiations

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Signed funding agreement

Mitigation impact: Not available

Cost and benefit estimate: 75 million euros; electricity savings - 16.8 GWh / year; heat savings - 55.3 GWh / year; monetary savings - 5.2 million Euros / year; simple return on investment - 15.3 years.

Draft law on approval of the National Development Strategy "Moldova 2030"[101], GD No. 377/2020[102]

Objective: Increasing people's access to safe sources of water, energy, sewage systems, road infrastructure

[99] <https://www.legis.md/cautare/getResults?doc_id=124251&lang=ro>

[100] <https://www.legis.md/cautare/getResults?doc_id=121088&lang=ro>

[101] <https://gov.md/sites/default/files/document/attachments/intr40_12_0.pdf>

[102] <https://www.legis.md/cautare/getResults?doc_id=121920&lang=ro>

and information technology infrastructure; facilitating creation of regional energy centers in order to raise the degree of energy autonomy at local level through use of renewable energy resources; strengthening centralized heat supply systems in cities; creating proper conditions for development of competitive energy markets; promoting projects to streamline consumption of energy resources and capitalize on renewable energy.

In this respect: by 2023 universal access to adequate and equitable sanitation conditions for 65% of the population and communities will be ensured and by 2030 - for all, paying special attention to the needs of women and girls and to people in vulnerable situations. The share of renewable resources in final electricity consumption, intermediate targets for 2022, 2026 and 2030 are 0%.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: Approved

Implementation start: 2021(Commitment)

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Share of renewable resources in final electricity consumption, level of water supply and sewage, level of energy efficiency, degree of opening of free energy markets

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Law on environmental protection, No. 1515/1993[103], last amended by Law No. 253/2018[104]

Objective: Approval of annual limits for energy production and consumption, harmful emissions into the atmosphere from fixed and mobile sources; creating and ensuring operation of an air quality monitoring system on the entire territory of the country; ensuring reduction of energy and fuel consumption in all areas of activity.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 1993

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Annual limits for production and consumption of energy developed and approved, annual allowed limits for harmful emissions into the atmosphere from fixed and mobile sources developed and approved, air quality monitoring system implemented

Mitigation impact: Not available.

Cost and benefit estimate: Not available.

Law on payment for pollution of the environment, No. 1540/1998[105], last amended by Law No. 170/2019[106]

Objective: Creating a system of economic activity in which it becomes inappropriate to cause any damage to the environment; incentivizing construction and operation of pollutant capture and neutralization systems; establishment of ecological funds for financing the activity oriented towards improving the quality of the environment

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 1998

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment, State Tax Service

Monitoring and evaluation indicators: Funds paid annually for respective imported goods.

Mitigation impact: Not available.

Cost and benefit estimate: Not available.

National gas extension program of the RM, GD No. 1643/2002[107], amended by GD No. 1168/2007[108]

Objective: Development of gas supply system, connecting communities of the country to gas supply systems, provision of natural gas to consumers

GHGs affected by policy: CO_2, CH_4 and N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2002

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

[103] <https://www.legis.md/cautare/getResults?doc_id=88192&lang=ro>
[104] <https://www.legis.md/cautare/getResults?doc_id=110599&lang=ro>
[105] <https://www.legis.md/cautare/getResults?doc_id=66796&lang=ro#>
[106] <https://www.legis.md/cautare/getResults?doc_id=119646&lang=ro>
[107] <https://www.legis.md/cautare/getResults?doc_id=70171&lang=ro#>
[108] <https://www.legis.md/cautare/getResults?doc_id=24227&lang=ro>

Monitoring and evaluation indicators: Number of communities connected to gas

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Technical Regulations "Efficiency requirements for new hot water boilers with liquid or gaseous combustion", GD No. 428/2009[109], as amended by GD No. 1088/2017[110] and GD No. 1089/2017[111]

Objective: Establishing energy efficiency requirements for new hot water boilers placed on the market, running on liquid or gaseous fuel and having a rated power of at least 4 kW and a maximum of 400 kW.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2009

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Main State Inspectorate for Market Surveillance, Metrology and Consumer Protection; Main State Inspectorate for Technical Surveillance of Dangerous Industrial Objects.

Monitoring and evaluation indicators: Performance of hot water boilers.

Mitigation impact: Not available.

Cost and benefit estimate: Not available.

Law on Accession of Treaty Establishing the Energy Community by the Republic of Moldova, No. 117/2009[112]

Objective: The task of the Energy Community is to organize relations between the Parties and to create a legal and economic framework for the Energy Network, to improve the environment, to increase energy efficiency, to promote use of renewable energy and to establish energy trading conditions within an unique regulatory space[113]. The energy network includes the electricity and natural gas sectors.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2010

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Level of openness of the electricity and natural gas markets; penetration of renewable sources in meeting demand; energy efficiency indicators; fuel quality.

Mitigation impact: Not available

Cost and benefit estimate: Not established to full extent.

Regulation on solid biofuel, GD No. 1070/2013[114], as amended by GD No. 738/2018[115]

Objective: It establishes the terms, classes and quality requirements, labelling requirements, as well as conditions for placing on the market and surveillance of biomass products both domestic and imported, intended for use in households and small buildings in the residential, commercial and public sectors.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Requirements to biofuels quality

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Creation of the energy statistics system, GD No. 141/2014[116], as amended by GD No. 45/2019[117]

Objective: Establishment of the energy statistics system based on information technologies. The energy statistics system will have three main components:

- Component of the National Bureau for Statistics: historical energy balances and consolidated indicators of the energy sector, which represent official energy statistics;
- Component of the Ministry of Economy and Infrastructure: energy balances for the following year and medium- and long-term energy balances, which represent the official projections intended to ensure the national security of energy supply;
- Component of the Energy Efficiency Agency: database in the field of energy efficiency and renewable energy sources for monitoring and verifying the National Action Plan in the field of energy efficiency and RES.

[109] <https://www.legis.md/cautare/getResults?doc_id=60420&lang=ro#>
[110] <https://www.legis.md/cautare/getResults?doc_id=102431&lang=ro>
[111] <https://www.legis.md/cautare/getResults?doc_id=102365&lang=ro>
[112] <https://www.legis.md/cautare/getResults?doc_id=3445&lang=ro>
[113] <https://lege5.ro/Gratuit/he3tgnzv/tratatul-de-constituire-a-comunitatii-energiei-din-25102005>
[114] <https://www.legis.md/cautare/getResults?doc_id=18489&lang=ro#>
[115] <https://www.legis.md/cautare/getResults?doc_id=108888&lang=ro>
[116] <https://www.legis.md/cautare/getResults?doc_id=54245&lang=ro#>
[117] <https://www.legis.md/cautare/getResults?doc_id=112491&lang=ro>

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Energy balances and projections on energy consumption

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Law on environmental impact assessment, No. 86/2014[118], amended by Law No. 185/2017[119]

Objective: Establishing a legal framework for functioning of the mechanism for assessing the environmental impact of public and private projects or planned types of activity, in order to ensure prevention or minimization, at the initial stages, of the negative impact on the environment and public health.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of policy: Regulatory

Status: On-going

Implementation start: 2015

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Assessment procedures observed

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Law on eco-design requirements for energy-related products No. 151/2014[120], amended by Law No. 79/2018[121]

Objective: Transposition of Directive 2009/125 / EC of the European Parliament and of the Council of 21 October 2009 setting up a framework for establishing eco-design requirements for products with impact on energy

GHGs affected by policy: CO_2, CH_4 and N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2015

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Directive 2009/125/EC transposed in national legislation

Mitigation impact: Not available.

Cost and benefit estimate: Not available.

National action plan for implementation of the Republic of Moldova-EU Association Agreement for the 2017–2019 period, GD No. 1472/2016[122], as amended by GD No. 559/2019[123]

Objective: In the energy area: development of strategies and policies, promotion of energy efficiency, development of renewable energy sources in a saving and ecological manner, reduction of greenhouse gas emissions

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2017

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of External Affairs and European Integration

Monitoring and evaluation indicators: EU Directives are transposed in national legislation

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Law on energy industry, No. 174/2017[124], as amended by Law No. 238/2018[125]

Objective: Sets the legal framework for organization, regulation and ensuring efficient operation of the energy sectors

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2017

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

[118] <https://www.legis.md/cautare/getResults?doc_id=21797&lang=ro>
[119] <https://www.legis.md/cautare/getResults?doc_id=101154&lang=ro>
[120] <https://www.legis.md/cautare/getResults?doc_id=48665&lang=ro>
[121] <https://www.legis.md/cautare/getResults?doc_id=105456&lang=ro>
[122] <https://www.legis.md/cautare/getResults?doc_id=102622&lang=ro#>
[123] <https://www.legis.md/cautare/getResults?doc_id=119036&lang=ro>
[124] <https://www.legis.md/cautare/getResults?doc_id=101612&lang=ro#>
[125] <https://www.legis.md/cautare/getResults?doc_id=109778&lang=ro>

Monitoring and evaluation indicators: Provisions of the law implemented

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Decision on establishment and operation of the National Monitoring and Reporting System for Greenhouse Gas Emissions and Other Information Relevant to Climate Change, GD No. 1277/2018[126]

Objective: Implementation of provisions of the United Nations Framework Convention on Climate Change, provisions of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, provisions of the Paris Agreement

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2019

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Environmental Agency, Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Reports established by UNFCCC developed and submitted

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Decision on establishment of the mechanism for coordinating activities in the field of climate change, GD No. 444/2020[127]

Objective: Establishment of: National Commission on Climate Change, its organization and operation; the intersectoral coordination mechanism; the mechanism for coordinating nationally appropriate mitigation actions

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2020

Included in: Scenario with Existing Measures (WEM) and Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment, Public Institution „Environmental Projects Implementation Unit"

Monitoring and evaluation indicators: Developed, promoted and implemented actions

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Roadmaps for the energy area for the 2015-2030 period, GD No. 409/2015

Objective: Creating the regulatory, institutional and organizational frameworks in the electricity sector and the natural gas sector; ensuring security of electricity and natural gas supply

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2015

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure, license owners from the electricity and natural gas sectors

Monitoring and evaluation indicators: Regulatory framework worked out and adopted; development of the electricity market and the natural gas market; energy security; implemented interconnection projects; accession to ENTSO-E and ENTSO-G, GHG emissions

Mitigation impact: Greenhouse gas emissions will be assessed together with the implementation of provisions of the energy package II and the energy package III, respectively.

Cost and benefit estimate: Costs and benefits are not available, but will be estimated at the implementation phase of interconnection projects and, respectively, upon increase the operation efficiency of the electricity system and natural gas system.

Methodology for determining fixed tariffs and prices for electricity produced by eligible producers from renewable energy sources, approved by the Decision of ANRE Board of Directors No. 375/2017[128]

Objective: Establishing principles and method for determining the ceiling prices and fixed tariffs for electricity produced from renewable energy sources by eligible producers, who have been confirmed as eligible producers and have been granted the respective status, on how to adjust fixed tariffs and prices for electricity produced from renewable sources

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

[126] <https://www.legis.md/cautare/getResults?doc_id=112485&lang=ro>
[127] <https://www.legis.md/cautare/getResults?doc_id=122314&lang=ro>
[128] <://www.legis.md/cautare/getResults?doc_id=103972&lang=ro>

Included in: Scenario with Existing Measures (WEM) and Scenario with Additional Measures (WAM)

Implementation start: 2018

Responsible entity: Ministry of Economy and Infrastructure, eligible producers

Monitoring and evaluation indicators: Fixed tariffs and ceiling prices for electricity produced from renewable sources

Mitigation impact: Not available

Cost and benefit estimate: Costs and benefits not available. They will be estimated along with evaluation of support schemes implementation.

Law on electricity, No. 107/2016[129]

Objective: Establishing requirements for priority access to the electricity network of power plants, conditions for operating interconnections and conditions of liberalized electricity market operation.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Included in: Scenario with Existing Measures (WEM) and Scenario with Additional Measures (WAM)

Implementation start: 2016

Responsible entity: Ministry of Economy and Infrastructure, license owners

Monitoring and evaluation indicators: Approved regulatory acts; electricity losses in electricity networks; GHG emissions; competition in the electricity market; electricity prices and tariffs; electricity network development plans; annual investment in power plants and networks.

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Rules of the electricity market, approved by the Decision of ANRE Board of Directors No. 283/2020

Objective: Establishing principles, conditions and terms of organization and functioning of the electricity market, rights and obligations of participants in the electricity market, rules and mechanisms for calculating prices and relations between the participants in the electricity market, etc.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Included in: Scenario with Existing Measures (WEM) and Scenario with Additional Measures (WAM)

Implementation start: 2021

Responsible entity: ANRE, license owners

Monitoring and evaluation indicators: Balancing electricity; import-export of electricity; GHG emissions; quantities of electricity traded on centralized markets; interconnection capacity

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Methodology for calculating, approving and applying regulated prices and tariffs for production of electricity and heat, for distribution and supply of heat, approved by the Decision of ANRE Board of Directors No. 396/2019[130]

Objective: Establishing method for calculation, approval and application of regulated prices and tariffs for electricity and heat produced by municipal district heating power plants

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Included in: Scenario with Existing Measures (WEM) and Scenario with Additional Measures (WAM)

Implementation start: 2019

Responsible entity: ANRE, license owners in the electricity and heat sectors

Monitoring and evaluation indicators: Tariffs for electricity produced by municipal district heating power plants, tariffs for heat production; tariffs for heat distribution and supply services; tariffs for heat delivered to consumers; GHG emissions.

Mitigation impact: Not available.

Cost and benefit estimate: Not available.

Law on amending some regulatory documents, No. 257 of 16.12.2020[131]

Objective: Elimination of restrictions related to vehicles age of operation which are imported into the Republic of Moldova, provided in the Customs Code. At the same time, excises for vehicles with operating age between 8-10 years were increased, as well as the new increased excises were introduced for vehicles with operating age in excess of 10 years. Thus, according to presented the arguments, these amendments were intended to encourage import of new vehicles with a

[129] <https://www.legis.md/cautare/getResults?doc_id=121988&lang=ro#>

[130] <https://www.legis.md/cautare/getResults?doc_id=119203&lang=ro>

[131] <https://www.legis.md/cautare/getResults?doc_id=124566&lang=ro>

shorter operating age. Prior to this change in the legal framework, the following limits related to vehicles term of operation were in force, including:

10 years - motor vehicles for transport of more than 20 persons, motor vehicles for transport of goods and those for special use;

12 years - for other types of tractors;

20 years - for agricultural and forestry tractors;

10 years - cars;

7 years - vehicles for transport of a maximum of 20 people;

10 years - motorcycles

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2021

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Custom Service of the Republic of Moldova

Monitoring and evaluation indicators: Number and age of vehicles imported to the country

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Transport and Logistics Strategy until 2022, GD No. 827 of 28.10.2013[132]

Objective: Creating an efficient transport and logistics system that supports citizens' mobility needs and facilitates trade in domestic and international markets

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2013

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring indicators: Average operating costs of vehicles on the road network reduced: from current 2.88 lei / km (0.18 Euro / km) to 2.72 lei / km (0.17 euro / km) for cars; from 12.8 lei / km (0.80 Euro / km) to 11.2 lei / km (0.70 Euro / km) for trucks. Roads in good, poor condition, properly maintained.

Mitigation impact: Not available

Cost and benefit estimate: The estimated cost of implementing the Strategy is 2405.27 million Euros, including 2047.00 million euros in the road sector; benefits - reduction of operating costs in the transport sector.

Law on amending and completing some legal acts, No. 171 of 19.12.2019[133]

Objective: Reduction of excise duty from 50% to 25% for hybrid motor cars that do not have charging capacity from the mains. For micro hybrid and mild hybrid cars the 25% reduced excise duty no longer applies.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: Implemented

Implementation start: 2020

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Customs Service of the Republic of Moldova

Monitoring indicators: Number of imported vehicles with hybrid motor

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Law on amending and completing some legal acts, No. 170 of 19.12.2019[134]

Objective: Maintaining the 50% reduced quota only for hybrid motor cars that have charging capacity from the electricity network; application of the VAT exemption for import of electric cars in the country.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: Implemented

Implementation start: 2020

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Customs Service of the Republic of Moldova

Monitoring indicators: Number of imported electric vehicles

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Regulation on measures to reduce emissions from automotive air conditioning systems, GD No. 1242 of 14.11.2016[135]

[132] <http://lex.justice.md/viewdoc.php?action=view&view=doc&id=350111&lang=1>

[133] <https://www.legis.md/cautare/getResults?doc_id=121329&lang=ro>

[134] <https://www.legis.md/cautare/getResults?doc_id=119646&lang=ro>

[135] <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=367710>

Objective: Partial transposition of Directive 2006/40/EC of the European Parliament and of the Council of 17 May 2006 on emissions from air conditioning systems in motor vehicles and amending Council Directive 70/156/EEC; prohibiting charging of motor vehicles with fluorinated gases with a GWP100 greater than 150, except for recharging of air-conditioning systems containing such gases, but which were installed on vehicles before 1 January 2021

GHGs affected by policy: SF_6

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2017

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring indicators: Import of fluorinated gases with a GWP100 greater than 150

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Program for promoting "green" economy in the Republic of Moldova for the years 2018-2020 and the Action Plan for its implementation, GD No. 160 of 21.02.2018[136]

Objective: Promoting "green" economy, including by 2020: 17% of gross final energy consumption to come from RES, 8.2% - from energy efficiency

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Economic

Status: On-going

Implementation start: 2019

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure, Ministry of Agriculture, Regional Development and Environment

Monitoring indicators: Energy intensity, share of renewable energy in final energy consumption, greenhouse gas emissions, CO_2 emissions relative to real GDP

Mitigation impact: Reducing, by 2020, air pollution by 30% by developing sustainable transport

Cost and benefit estimate: Implementation costs - 24.5 million lei, benefits - saving resources, reducing dependence on imports, reducing emissions, increasing competitive capacity of domestic products, reducing the level of risk factors for public health.

Action Plan for implementation of the National Regional Development Strategy for the years 2016-2020, GD No. 485 of 2017[137]

Objective: Increase of energy efficiency in public buildings by implementing 11 projects

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Economic

Status: On-going

Implementation start: 2016

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure, Ministry of Agriculture, Regional Development and Environment

Monitoring indicators: Number of renovated buildings

Mitigation impact: Not available

Cost and benefit estimate: 928.2 million lei.

Draft Law on creation and maintaining a minimal level of crude oil or petroleum products reserve

Objective: Transposition of Directive No. 2009/119/EC on the obligation of Member States to maintain a minimum reserve level of crude oil and/or petroleum products and Directive 2018/1581 (EU) on methods for calculating storage obligations.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: Planned

Implementation start: Undetermined

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: The implementation of the Law will lead to an increase in greenhouse gas emissions due to increase in stocks of petroleum products to a level of 217 thousand tonnes.

Cost and benefit estimate: An estimated 148 million US dollars for purchase of petroleum products needed to maintain minimum emergency stocks (217 thousand tonnes of petroleum products - gasoline, diesel, LPG) and an estimated 10.5 million Euros capital costs (investment sources) for development of new capacities and / or reconstruction, renovation of existing storage

[136] <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=374523>

[137] Law No. 239 of 13.10.2016 on approval of the National Regional Development Strategy for the 2016-2020 period. Published: 03.02.2017 in the Official Gazette No. 30-39 art. No. 65 <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=368696>

capacities. Benefits: increasing security of the country's supply of oil products, ensuring minimum stocks of oil products that would ensure domestic consumption for a period of at least 61 days.

Draft ANRE Decision on approval of the Methodology for determining the technological consumption and natural gas losses in the distribution networks[138]

Objective: Establishing a method for calculating natural gas losses in distribution networks

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: Planned

Implementation start: Not determined

Included in: Scenario with Additional Measures (WAM)

Responsible entity: ANRE

Monitoring and evaluation indicators: Methodology approved

Mitigation impact: Reduction of normative losses of natural gas in the natural gas distribution networks, admissible ceiling being of 3.0%

Cost and benefit estimate: Costs: Not available; Benefits: incentivizing reducing natural gas losses and reducing natural gas tariffs.

Regulation on control of volatile organic compounds emissions resulting from storage and distribution of gasoline from terminals to petrol stations, GD No. 587/2020[139]

Objective: Transposition of Directive 94/63/EC on emission control of volatile organic compounds (VOCs) resulting from storage of fuels and their distribution from terminals to service stations; reducing total annual gasoline losses resulting from loading and storage in each storage facility at the terminals to a level below the target reference value of 0.01% by weight of the total annual quantity transited; for mobile containers at terminals - reduction of total annual gasoline losses to levels lower than the target reference value of 0.005% by weight of the total quantity transited; for gasoline loading and storage facilities at filling stations - reduction of total annual gasoline loss to levels below the reference value of 0.01% by weight of the total quantity of gasoline transited.

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2021

Included in: Scenario with Additional Measures (WAM)

Responsible entity: MARDE and Environmental Protection Inspectorate

Monitoring and evaluation indicators: Total annual gasoline losses at gasoline storage facilities at terminals, at facilities for loading and unloading mobile containers at terminals, in mobile containers and at facilities for loading and storage of gasoline at filling stations.

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Methodology for calculating impact of biofuels and bioliquids on greenhouse gas emissions, GD No. 107 of 27.02.2019[140]

Objective: Establishing calculation method for impact of biofuels and bioliquids on GHG emissions

GHGs affected by policy: CO_2, CH_4

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2019

Included in: Scenario with Existing Measures (WEM)

Responsible entity: MARDE

Monitoring and evaluation indicators: Biofuels/ bioliquids in total fuel consumption, impact of biofuels and bioliquids on GHG emissions

Mitigation impact: Depending on production chain of biofuels and bioliquids (wheat, sugar beet, rapeseed vegetable oil, etc.), typical and default values for greenhouse gas emission reduction for each are estimated, which results from land use change.

Cost and benefit estimate: Not available.

Law on market of petroleum products, No. 461/2001, updated by Law No 168/2018[141]

Objective: Establishment of an institutional, legal and economic framework for ensuring economic security of the country and regulating import, transport, storage and trade of petroleum products on the domestic market, as strategic products, with a special regime of activity

GHGs affected by policy: CO_2, CH_4, N_2O

[138] <http://www.anre.md/consultari-publice-3-27> proiectul nr. 137

[139] Government Decision No. 587 of 31-07-2020 on approval of the Regulation on emission control of volatile organic compounds resulting from storage and distribution of gasoline from terminals to filling stations with petroleum products. Published: 07-08-2020 in the Official Gazette No. 199-204 art. 713. <https://www.legis.md/cautare/getResults?doc_id=122611&lang=ro>

[140] Government Decision No. 107 of 27-02-2019 on approval of the Methodology for calculating impact of biofuels and bioliquids on greenhouse gas emissions. Published: 15-03-2019 in the Official Gazette No. 94-99 art. 189. <https://www.legis.md/cautare/getResults?doc_id=112852&lang=ro>

[141] Law No. 461 of 30-07-2001 on market of petroleum products. Published: 10-02-2017 in the Official Gazette No. 40-49 art. 82. Modified by LP168 of 26.07.18, MO333-335/24.08.18 art.549. <https://www.legis.md/cautare/getResults?doc_id=108148&lang=ro#>

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2001

Included in: Scenario with Existing Measures (WEM)

Responsible entity: MEI and ANRE

Monitoring and evaluation indicators: Consumption of petroleum products and prices / profitability in trading with petroleum products

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Law No. 108/2016 on natural gas, as updated by Law No. 182/2018[142]

Objective: Establishing a general legal framework for organization, regulation, ensuring efficient operation and monitoring of the natural gas sector

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2016

Included in: Scenario with Existing Measures (WEM)

Responsible entity: MEI and ANRE

Monitoring and evaluation indicators: Gas losses in transport and distribution networks

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Law No. 105/2017 on declaring public utility for works of national interest for construction of natural gas transmission pipeline in Ungheni-Chisinau direction and implementing measures for operation, use and maintenance of the natural gas transmission pipeline Iasi-Ungheni-Chisinau[143]

Objective: Facilitating construction of the Ungheni-Chisinau gas pipeline. In August 2020, construction works of the Ungheni-Chisinau gas pipeline were completed

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Economic

Status: In force since 2017

Implementation start: 2017

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Infrastructure for natural gas networks built

Mitigation impact: Not available

Cost and benefit estimate: About 80 million Euros; the pipeline, 120 km long, will ensure the energy security of the country, being able to provide approximately 75% of the average consumption of the Republic of Moldova or about 60% of the average gas consumption of the country during the cold period of the year.

Methodology for calculating technological consumption and technical losses of natural gas in distribution networks, ANRE Decision No. 398/2010[144]

Objective: Establishing a single method for calculating, determining, adjusting and approving technological consumption and technical losses of natural gas in natural gas distribution networks

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2011

Included in: Scenario with Existing Measures (WEM)

Responsible entity: ANRE

Monitoring and evaluation indicators: Energy losses in natural gas networks

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Methodology for norms on technological consumption and technical losses when transporting natural gas through the main pipelines of the Republic of Moldova, ANRE Decision No. 24/2000[145]

Objective: Establishing norms on technological consumption and technical losses in the natural gas transmission system

GHGs affected by policy: CO_2, CH_4, N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2000

[142] Law No. 108 of 27-05-2016 on natural gas. Published: 08-07-2016 in the Official Gazette No. 193-203 art. 415. Amended by LP182 of 26.07.18, MO321-332/24.08.18 art.531; in force since 24.08.18. <https://www.legis.md/cautare/getResults?doc_id=121987&lang=ro>

[143] Law No. 105 of 09-06-2017 on declaration of the public utility for works of national interest in construction of the natural gas transmission pipeline in Ungheni – Chisinau direction. Published: 30-06-2017 in the Official Gazette No. 216-228 art. 351. < https://www.legis.md/cautare/getResults?doc_id=105691&lang=ro>

[144] ANRE decision No. 398 of 31-12-2010 on approval of the Methodology for calculating technological consumptions and technical losses of natural gas in the distribution networks. Published: 21-01-2011 in the Official Gazette No. 16-17 art. 72. <https://www.legis.md/cautare/getResults?doc_id=49798&lang=ro>

[145] ANRE decision No. 24 of 28.07.2000 on approval of the Methodology for regulation of technological consumptions and technical losses when transporting natural gas through the main pipelines of the Republic of Moldova. Published: 10-08-2000 in the Official Gazette No. 98 art. 290. <https://www.legis.md/cautare/getResults?doc_id=62716&lang=ro>

Included in: Scenario with Existing Measures (WEM)

Responsible entity: ANRE

Monitoring and evaluation indicators: Gas losses in distribution networks

Mitigation impact: Not available

Cost and benefit estimate: Not available.

3.5.2. Industrial Processes and Product Use Sector

Policies approved in the Republic Moldova in the area of decreasing greenhouse gas emissions originating from the industry sector comprise the Environmental Strategy for 2014-2023 and the Action Plan for its implementation, the Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. The areas of GHG emissions mitigation in the sector are also found in the National Energy Efficiency Program for the period 2011-2020 and the National Action Plans in the field of energy efficiency for the years 2013-2015, 2016-2018 and 2019-2021, Law No. 139 of 19.07.2018 on energy efficiency, National Development Strategy "Moldova-2020", Law No. 166/2012, Program for promoting "green" economy in the Republic of Moldova for the years 2018-2020 and the Action Plan for its implementation, GD No. 160/2018[146], Regulation on measures to reduce emissions from air conditioning systems of vehicles, GD No. 1242/2016, etc. As most of them have already been described in Chapter 3.5.1, they will be omitted hereinafter.

It is worth mentioning that the legal framework related to environmental protection issues in the industry sector is also reflected, while occasionally, tangentially, in a general manner or in a more focused way in a number of legal acts, such as: Law on evaluation of products conformity (2003)[147], Law on technical regulation activity (2006)[148], Law on conformity assessment and accreditation (2011)[149], Law on industrial security of dangerous industrial objects (2012)[150] and Law on national standards (2016)[151], Law No. 1515 of 16.06.1993 on environmental protection[152] (which serves as legal basis for developing specialized regulatory documents), Law No. 1540 of 25.02.1998 on payment for pollution of the environment[153] (described in Section 3.5.1), Law No. 852 of 14.02.2002 on approval of Regulation on commercial regime and regulation of using halogenated hydrocarbons which destroy the ozone layer[154] and Law No. 119 of 18.05.2006 on accession by the Republic of Moldova to the Amendment to the Montreal Protocol on ozone depleting substances[155] (which prohibits or includes a special record keeping and management regime for ozone depleting substances in the Republic of Moldova), Law No. 182 of 15.07.2010 on industrial parks[156], Law No. 92 of 29.05.2014 on heat and promotion of cogeneration[157] (described in Section 3.5.1), Law No. 151 din 17.07.2014 on eco-design requirements applicable to products with energy impact[158] (which establishes eco-design requirements applicable to products with energy impact in order to ensure free circulation of such products on the internal market), Law No. 209 of 29.07.2016 on waste[159] (described in Section 3.5.5), Association Agreement between the Republic of Moldova, on the one side and the European Union and the Energy Community for Atomic Energy and their members states, on the other side, Law No. 112/2014[160] (according to Annex XII (Chapter 17, Climate policies) of the Association Agreement, the RM has committed to progressively approximate national legislation to the following EU legislation: by 2018 - Regulation (EU) 517/2014 (art. 5, 6, 13); by 2019 - Regulation (EC) No. 1005/2009 (art. 4, 5, 11, 22-23, 26-27 and Chapters III and IV); by 2022 - Directive 2003/87/CE (Annexes I and II, art. 9, 14 - 17, 19 and 21), Cooperation Strategy between the RM and Government of Sweden, through the Swedish International Development Agency (SIDA), for the 2014-2020 period[161] (which focuses also on developing a better environment, reducing climate impact of human activity and strengthening resilience

[146] Government Decision No. 160 of 21.02.2018 on approval of the National Plan for promoting Green Economy in the Republic of Moldova for 2018-2020 and the National Plan for its implementation. Published: 02.03.2018 in the Official Gazette No. 68-76, art. No: 208. <https://www.legis.md/cautare/getResults?doc_id=102127&lang=ro>

[147] Law No. 186 of 24.04.2003 on conformity assessment of products. Published: 11-07-2003 in the Official Gazette No. 141-145 art. 566. <https://www.legis.md/cautare/getResults?doc_id=27997&lang=ro#>

[148] Law No. 420 of 22.12.2006 on technical regulation activity. Published: 16-03-2007 in the Official Gazette No. 36-38 art. 141. <https://www.legis.md/cautare/getResults?doc_id=26097&lang=ro>

[149] Law No. 235 of 01.12.2011 on accreditation and conformity assessment activities. Published: 07-03-2012 in the Official Gazette No. 46-47 art. 136. <https://www.legis.md/cautare/getResults?doc_id=23162&lang=ro>

[150] Law No. 116 of 18.05.2012 on industrial security of dangerous industrial objects. Published: 10-02-2017 in the Official Gazette No. 40-49 art. 83. <https://www.legis.md/cautare/getResults?doc_id=120652&lang=ro#>

[151] Law No. 20 of 04.03.2016 on national standardization. Published: 08-04-2016 in the Official Gazette No. 90-99 art. 170. <https://www.legis.md/cautare/getResults?doc_id=91809&lang=ro>.

[152] Law No. 1515 of 16.06.1993 on protection of the environment. Published: 30.10.1993 in the Parliament Gazette No. 10, art. No: 283. <https://www.legis.md/cautare/getResults?doc_id=112032&lang=ro>

[153] Law No. 1540 of 25.02.1998 on payment for environmental pollution. Published: 18.06.1998 in the Official Gazette No. 54-55, art. No: 378. <https://www.legis.md/cautare/getResults?doc_id=117159&lang=ro>

[154] Law No. 852 of 14.02.2002 on approval of the Regulation on commercial regime and regulation of the use of halogenated hydrocarbons that destroy the ozone layer. Published: 18.04.2002 in the Official Gazette No. 54-55, art. No: 383. <https://www.legis.md/cautare/getResults?doc_id=122851&lang=ro>. Subsequently amended by Law No. 159 of 20.07.2020, MO 205-211 of 14.08.2020, art 464, Law No. 79 of 24.05.2018, MO 195-209 of 15.06.2018, art. 338; Law No. 185 of 21.09.2017, MO 371-382 of 27.10.2017, art. 632; No. 245 of 03.11.2016, MO 441-451 of 16.12.2016, art. 881; Law No. 228 of 10.10.2013, MO 258-261 of 15.11.2013, art. 715; Law No. 109 of 04.06.2010, MO 131-134 of 30.07.2010, art. 443; Law No. 72 of 22.03.2007, MO 54-56 of 20.04.2007, art. 256.

[155] Law No. 119 of 18.05.2006 on accession of the Republic of Moldova to the Amendment to the Montreal Protocol on substances that destroy the ozone layer. Published: 09.06.2006 in the Official Gazette No. 87-90, art. No: 391. <https://www.legis.md/cautare/getResults?doc_id=107184&lang=ro>

[156] Law No. 182 of 15.07.2010 on industrial parks. Published: 03-09-2010 in the Official Gazette No. 155-158 art. 561. <https://www.legis.md/cautare/getResults?doc_id=106588&lang=ro>.

[157] Law No. 92 of 29.05.2014 on heat and promotion of cogeneration. Published: 11-07-2014 in the Official Gazette No. 178-184 art. 415. <https://www.legis.md/cautare/getResults?doc_id=121989&lang=ro>

[158] Law No. 151 of 17.07.2014 on the eco-design requirements applicable to products with energy impact. Published: 10-10-2014 in the Official Gazette No. 310-312 art. 616. <https://www.legis.md/cautare/getResults?doc_id=106031&lang=ro>

[159] Law No. 209 of 29.07.2016 on waste. Published: 23.12.2016 in the Official Gazette No. 459-471, art. No: 916. Entered into force on: 23.12.2017. <https://www.legis.md/cautare/getResults?doc_id=118272&lang=ro >

[160] Law No. 112 of 02.07.2014 on ratification of the Association Agreement between the Republic of Moldova, on the one hand, and the European Union and the European Atomic Energy Community and their Member States, on the other hand. Published: 18.07.2014 in the Official Gazette No. 185-199, art. No: 442. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=353829>

[161] Cooperation strategy between the Republic of Moldova and the Government of Sweden, through the Swedish International Development Agency Cooperation (SIDA) for the period 2014-2020. <http://www.infoeuropa.md/suedia/>

of society and the economy to extreme climate events and global climate change), Cooperation Agreement between the Republic of Moldova and the United States Agency for International Development (USAID) and the Government of Sweden, through the Swedish International Development Agency (SIDA), for the 2014-2020 period[162] (dedicated to joint implementation of the USAID Competitiveness Project (MCP) in the Republic of Moldova), etc.

Below, the legal and policy framework aimed directly or indirectly at reducing greenhouse gas emissions from the industrial sector is analyzed.

National program in the field of research and innovation for the years 2020-2023 and the Action Plan for its implementation[163]

Objective: Increasing efficiency of the national research and innovation system and ensuring optimal conditions for generating new knowledge based on fundamental and applied research and its implementation in order to increase the competitiveness of the national economy and the general level of well-being. Research includes the *Environment and Climate Change* direction, which covers the topics of "Safe, Clean and Efficient Energy" and "Waste, Plastics and Pollutants".

GHGs affected by policy: CO_2, CH_4, N_2O, HFC, PFC and SF_6

Category of measure: Economic

Status: On-going

Implementation start: 2020

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Education, Culture and Research

Monitoring and evaluation indicators: Number of projects funded and implemented; grant programs launched; number of grants awarded; number of grant beneficiaries; funding programs launched; number of researchers involved; number of innovative start-ups and / or spin-offs created annually; incentive measures developed and implemented, etc.

Mitigation impact: Reduction of GHG emissions without indicative targets compared to 1990

Cost and benefit estimate: Estimated costs for implementation of projects as a result of the call for proposals according to priorities and strategic directions are: 224.7 million lei for 2020 and, respectively, 238.9 million lei - for 2021, 257.9 million lei - for 2022, 276.3 million lei - for 2023 The costs for institutional strengthening measures in the fields of research and innovation are estimated at 149.8 million lei for 2020 and, respectively, 128.7 million lei - for 2021, 110.5 million lei - for 2022, 92.1 million lei - for 2023 The implementation of the Program will lead, among others, to the development of solutions, technologies and materials with impact on reduction of GHG emissions, as well as to the sustainable development of society.

Commitment "Zero net carbon emissions, science-based goal" signed by the LafargeHolcim Group on 21 September 2020 at the New York Climate Conference[164]

Objective: By 2030, according to the LafargeHolcim Group's investment roadmap, launched in 2019 for implementation of the "Zero Net Carbon, Science-Based Objective" commitment, the LafargeHolcim Group sets out its ambition to increase CO_2 reduction targets, by reducing the intensity of emissions from cement production, down to 475 kg CO_2 net emissions per ton of cement produced. Among others the Group will:

- Accelerate use of its low or neutral carbon footprint products, such as ECOPact, which allows carbon-neutral construction and Susteno, the basic circular cement;
- Capitalize on 100 million tonnes of waste and by-products as energy sources and raw materials;
- Intensify use of calcined clay and develop cements with new binders;
- Double the capacity to use waste-derived fuels in the production process, in order to reach a substitution rate of 37%;
- Reach 550 kg net CO_2 emissions per ton of cement by 2022, respectively 457 kg net CO_2 emissions per ton of cement produced by 2030 (compared to the level of about 800 kg net CO_2 emissions per ton of cement in 1990; 576 kg net CO_2 emissions per ton of cement in 2018 and 561 kg CO_2 net emissions per ton of cement in 2019);
- Operate its first zero-carbon production unit;
- Reduce by 20% emissions related to transportation and fuel consumption;
- Reduce clinker content by up to 68%;
- Make wider use of waste based fuels, to achieve a substitution rate of 37%;
- Use alternative raw materials;
- Capture and store carbon;

[162] Cooperation Agreement between the Republic of Moldova and the United States Agency for International Development (USAID) and the Government of Sweden, through the Swedish International Development Agency (SIDA). <http://agora.md/stiri/26138/video--agentia-sua-pentru-dezvoltarea-internationala-si-guvernul-suediei-au-semnat-un-acord-de-cooperare>

[163] Government Decision No. 381 of 01.08.2019 on approval of the National Program in the fields of research and innovation for the years 2020-2023 and of the Action Plan on its implementation. Published: 16.08.2019 in the Official Gazette No. 256-259 art. 506. <https://www.legis.md/cautare/getResults?doc_id=115747&lang=ro>

[164] <https://www.lafarge.md/ro/lafargeholcim-semneaza-angajamentul-net-zero-emisii-de-carbon-cu-obiective-bazate-pe-stiinta>

- Reduce intensity of emissions from purchase of electricity by up to 13 kg CO_2 per ton of cement produced (or by 65% compared to 2018), by recovering residual heat and using renewable energy;
- Reduce level 3 emissions, or those from transport of finished production, by optimizing transport networks, routes and cargo through better logistics and distribution, while the vehicles will reduce traditional fuel consumption

GHGs affected by policy: CO_2

Category of measure: Economic

Status: On-going

Implementation start: 2020

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Lafarge Ciment (Moldova) S.A. (member of the LafargeHolcim Group)

Monitoring and evaluation indicators: Reduced clinker content in the types of cement produced and reduced CO_2 emissions

Mitigation impact: The target for mitigating net CO_2 emissions per ton of cement by 2030 is 40% compared to the year 1990[165]

Cost and benefit estimate: 160 million Swiss francs by 2030.

Business plan for the years 2016-2020 of SoE. "Chisinau Glass Factory", approved by the Decision of the Board of Directors, Minutes No. 29 of 24.11.2016[166]

Objective: Ensuring further development of the enterprise based on increasing efficiency of its activity, by: increasing export of products based on competitiveness of glass products; increase production efficiency as a result of partial repair of the glass melting furnace, capital repair of glass forming machines, modernization of the electricity transmission line.

GHGs affected by policy: CO_2

Category of measure: Economic

Status: On-going

Implementation start: 2016

Included in: Scenario with Existing Measures (WEM)

Responsible entity: SoE „Chisinau Glass Factory"

Monitoring and evaluation indicators: Amount of molten glass; share of shards of glass in the batch; consumption of natural gas used to melt glass; specific consumption of natural gas per tonne of molten glass; electricity consumption used to melt glass; low CO_2 emissions

Mitigation impact: Not available

Cost and benefit estimate: About 5.5 million Euros, according to the institutional roadmap of the SoE „Chisinau Glass Factory".

Government Decision No. 561 of 31.07.2020 on approval of Regulation on packaging and packaging waste[167]

Objective: Partial transposition of Directive 94/62/EC of the European Parliament and of the Council of 20 December 1994 on packaging and packaging waste. The Regulation lays down priority measures to prevent production of packaging waste and principles of reducing final disposal of packaging waste through reuse, recycling and recovery. The objectives of recovery and reuse by recycling, overall and by type of packaging material, at national level, for the period 2023-2029 are the following:

[165] LafargeHolcim <https://www.lafargeholcim.com/our-climate-pledge>

[166] Business plan for the years 2016-2020 of the SoE „Chisinau Glass Factory", approved by Decision of the Board of Directors, Minutes No. 29 of 24.11.2016. <http://www.glass.md/>

[167] Government Decision No. 561 of 31.07.2020 on approval of the Regulation on packaging and packaging waste. Published: 21-08-2020 in the Official Gazette No. 212-220 art. 743. <https://www.legis.md/cautare/getResults?doc_id=122773&lang=ro>

Year	Minimal objective for use by recycling / type of material (%)					Overall objective for use by recycling*) (%)	Overall objective for recovery **) (%)
	Paper and cardboard	Plastic	Glass	Metals	Wood		
2023	15	10	15	10	5	15	17
2024	20	11	20	20	5	20	22
2025	25	12	25	25	5	25	27
2026	30	14	30	30	5	30	32
2027	40	16	40	35	10	35	37
2028	45	18	45	40	10	40	42
2029	50	20	50	45	10	45	50

Note: Composite packaging is classified according to the predominant material. *) Minimum percentage of the total mass of packaging materials contained in packaging waste; **) Minimum percentage by mass of packaging waste

GHGs affected by policy: CO_2

Category of measure: Economic

Status: On-going

Implementation start: 2021

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment, through the Environmental Agency and the Environmental Protection Inspectorate

Monitoring and evaluation indicators: Weight of packaging waste; weight of recycled packaging materials, including glass, paper / cardboard, metal, wood, plastic

Mitigation impact: Not available

Cost and benefit estimate: Costs paid by producers per ton of materials placed on the market ranging from 14 Euro / ton (UK) to 200 Euro / ton (Austria), with an average of 92 Euro / ton; for the Republic of Moldova, the costs are to be estimated based on corresponding feasibility studies.

Kigali Amendment to the Montreal Protocol on progressive reduction of the use of hydrofluorocarbons worldwide, signed on 15.10.2016[168]

Objective: Gradual reduction of hydrofluorocarbons in CO_2 equivalent; by 2048, all countries will reach the target of 15–20% of their current HFC consumption, expressed in CO_2 equivalent.

The Republic of Moldova, classified according to the Montreal Protocol in group 1 of developing countries (country of Art. 5), has the following HFC suppression schedule:

- estimate of the baseline level (HFC production / consumption) as an average for the years 2020-2022 + 65% of the basic level (production / consumption) of HCFC (*consumption of the basic level of HCFC amounted to about 17 metric tonnes or 30,770 thousand tonnes of CO_2 equivalent; 65% of consumption of the baseline level represents about 20,001 thousand tonnes of CO_2 equivalent*) in the Republic of Moldova;
- 2024-2028 – freezing consumption at the amount of baseline level;
- 2029-2034 (stage I) – reducing consumption by 10%;
- 2035-2039 (stage II) – reducing consumption by 30%;
- 2040-2044 (stage III) – reducing consumption by 50%;
- 2045 and subsequently (stage IV) – reducing consumption by 80% (of the baseline level).

The Government of the Republic of Moldova approved by Government Decision No. 536 of 20.07.2020 the draft Law on accession of the of the Kigali Amendment to the Montreal Protocol on Substances that Destroy the Ozone Layer, adopted on October 15, 2016[169] (ratification is planned for 2021) by the Republic of Moldova. By adhering to the Kigali Amendment, the Republic of Moldova will demonstrate the commitment of our country to contribute to reducing greenhouse gas emissions and achieving the objectives set under the Paris Agreement (2015). In the Republic of Moldova, the sectors that use hydrofluorocarbons are stationary and mobile air conditioning devices, commercial and industrial refrigeration, refrigerated transport of food, production and use of expanded foams and aerosols.

GHGs affected by policy: HFC

Category of measure: Regulatory

Status: Planned for approval in 2021

Implementation start: 2023

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Annual consumption of hydrofluorocarbons expressed in metric tonnes and thousands tonnes of CO_2 equivalent

Mitigation impact: HFC suppression schedule, frozen HFC consumption, reduced HFC consumption

Cost and benefit estimate: Costs are not available; ratification of the Kigali Amendment will help reduce the consumption of HFCs in the Republic of Moldova, eliminate consequences for the environment resulting from their use.

3.5.3. Agriculture Sector

Policies approved in the Republic of Moldova and specifically aimed at reducing greenhouse gas emissions from the agricultural sector are: Environmental Protection Strategy for 2014-2023 and the Action Plan for its implementation, Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. These have already been described in Section 3.5.1.

It should be noted that the legal framework associated with addressing environmental protection issues in the agricultural sector is also reflected, either episodically, tangentially, in general or with a more focused manner, in a number of legal documents such as : Land Code No. 828/1991, Law No. 1515 of 16.06.1993 on environmental protection[170], Law No. 371 of 15.02.1995 on selection and reproduction in animal husbandry[171], Law No. 728 of

[168] Kigali amendment to the Montreal Protocol on progressive reduction of the use of hydrofluorocarbons worldwide, <http://conf.montreal-protocol.org/meeting/oewg/oewg-39/presession/briefingnotes/ratification_kigali.pdf>, <https://europa.eu/capacity4dev/unep/document/full-text-kigali-amendment-pt-1>

[169] Government Decision No. 536 of 20.07.2020 on approval of the draft law for accession of the Republic of Moldova to the Amendment to the Montreal Protocol on substances that destroy the ozone layer, adopted on 15 October 2016. Published: 24-07-2020 in the Official Gazette No. 188-192 art. 649. <https://www.legis.md/cautare/getResults?doc_id=122328&lang=ro>

[170] Law No. 1515 of 16.06.1993 on protection of the environment. Published: 30.10.1993 in the Parliament Gazette No. 10, art No: 283. <https://www.legis.md/cautare/getResults?doc_id=112032&lang=ro>

[171] Law No. 371 of 15.02.1995 on selection and reproduction in animal husbandry. Published: 06.04.1995 in the Official Gazette No. 20, art. No: 182. <https://www.legis.md/cautare/getResults?doc_id=109449&lang=ro>

06.02.1996 on orchards, Law No. 1353 of 03.11.2000 on peasants farms (small farms), Law No. 119 of 22.06.2004 on plant protection substances and fertilizer[172], Law No. 115 of 09.06.2005 on organic agri-food production[173], Law No. 221 of 19.10.2007 on sanitary-veterinary activity[174], Law No. 39 of 29.02.2008 on protection of plant varieties[175], National Development Strategy „Moldova 2020", Law No. 166/2012[176], Strategy for Development of rural extension services for 2012-2022, GD No. 486/2012[177], Program for Inclusive Rural Economic and Climatic Resilience (IFAD VI) for the period 2014-2020[178], National Regional Development Strategy for the years 2016-2022, Law No. 239/2016[179], Food Security Strategy for the years 2018-2022, GD No. 1150/2017[180], GD No. 455 of 21.06.2017 on distribution of funds of the National Fund for Development of Agriculture and Rural Environment[181], Law No. 276 of 16.12.2016 on subsidy principles in development of agriculture in rural areas[182], Rural Resilience Program (IFAD VII) for the period 2017-2023[183], GD No. 381 of 01.08.2019 on approval of the National Program in research and innovation for the years 2020-2023 and of the Action Plan for its implementation[184], Law No. 183 of 11.09.2020 on subsidized insurance in agriculture[185], Law on animal husbandry (draft)[186], Program for the improvement of dairy cattle in the Republic of Moldova for the years 2014-2020[187], Program for improvement of sheep and goats in the Republic of Moldova for the years 2014-2020[188], FAO Project "Development of the National Strategy and Action Plan for Animal Genetic Resources and Program for genetic improvement of dairy cows"[189], Waste Management Strategy in the Republic of Moldova for 2013-2027, GD No. 248/2013[190], Regulation on conditions and procedure for granting subsidies in advance for investment projects on land improvement for implementation of the Land Improvement Program in order to ensure sustainable management of soil resources for 2021-2025, approved at the Government session of 22 December 2020[191], Capacity Building Program for Rural Transformation (IFAD VIII) for the period 2021-2026[192].

The regulatory documents described below are also part of the legal framework that can be treated as having an impact on the level of GHG emissions in the agricultural sector.

Animal Husbandry

The main purpose of the activities in the field of animal husbandry was and still is utmost sufficiency of animal origin food for the population. To achieve this goal, programs and strategies are implemented that improve the genetic fund of agricultural livestock and poultry, contribute to increasing animal productivity and reducing specific feed costs per production unit. In parallel with these positive effects on animal productivity, specific GHG emissions per production unit are also decreasing, although the overall volume of emissions increases along with revitalization of the sector and increase of livestock and poultry numbers.

National Strategy for Agricultural and Rural Development for the years 2014-2020, GD No. 409/2014[193] and the Action Plan for implementation of the National Strategy for Agricultural and Rural Development for the years 2014-2020, GD

[172] Law No. 119 of 22.06.2004 on plant protection products and fertilizers. Published: 25.06.2004 in the Official Gazette No. 100-103, art. No: 510. <https://www.legis.md/cautare/getResults?doc_id=107644&lang=ro>

[173] Law No. 115 of 09.06.2005 on organic agri-food production. Published: 15.07.2005 in the Official Gazette No. 95-97, art. No: 446. <https://www.legis.md/cautare/getResults?doc_id=115169&lang=ro>

[174] Law No. 221 of 19.10.2007 on sanitary-veterinary activity. Published: 19.10.2007 in the Official Gazette No. 51-54, art. No: 153. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=327196>

[175] Law No. 39 of 29.02.2008 on protection of plant varieties. Published: 06.06.2008 in the Official Gazette No. 99-101, art. No: 364. <https://www.legis.md/cautare/getResults?doc_id=93465&lang=ro>

[176] Law No. 166 of 11.07.2012 on approval of the National Development Strategy „Moldova 2020". Published: 30.11.2012 in the Official Gazette No. 245-247, art. No: 791. <https://www.legis.md/cautare/getResults?doc_id=48697&lang=ro>. Amended by Law No. 121 of 03.07.2014 on amending and completing Annex to Law No. 166 of 11 July 2012 on approval of the National Development Strategy „Moldova 2020". Published: 03.10.2014 the Official Gazette No. 293-296, art. No: 603. <https://www.legis.md/cautare/getResults?doc_id=48684&lang=ro/>

[177] Government Decision No. 486 of 04.07.2012 on approval of the Strategy for development of rural extension services for the years 2012-2022. Published: 13.07.2012 in the Official Gazette No. 143-148, art. No: 537. <https://www.legis.md/cautare/getResults?doc_id=114376&lang=ro>

[178] Program for Inclusive Rural Economic and Climatic Resilience (IFAD VI) 2014-2020. <https://www.ucipifad.md/programe/programe-in-derulare/proiectul-de-rezilienta-rurala-ifad-vii/>

[179] Law No. 239 of 13.10.2016 on approval of the National Strategy for regional development for the years 2016-2020. Published: 03.02.2017 in the Official Gazette No. 30-39, art. No: 65. <https://www.legis.md/cautare/getResults?doc_id=105791&lang=ro>

[180] Government Decision No. 1150 of 20.12.2017 on approval of the Strategy for food safety for the years 2018-2022. Published: 19.01.2018 in the Official Gazette No. 18-26, art. No: 06. <https://www.legis.md/cautare/getResults?doc_id=111638&lang=ro>.

[181] Government Decision No. 455 of 21.06.2017 on distribution of funds from the National Fund for Development of Agriculture and Rural Environment. Published: 23.06.2017 in the Official Gazette No. 201-213, art. No: 537. <https://www.legis.md/cautare/getResults?doc_id=123859&lang=ro>. Amended by Government Decision No. 772 of 21.10.2020 on amending some Government Decisions No. 772 of 21.10.2020. Published: 24.10.2020 in the Official Gazette No. 278, art. No: 909. <https://www.legis.md/cautare/getResults?doc_id=123697&lang=ro>

[182] Law No. 276 of 16.12.2016 on subsidy principles for development of agriculture and rural environment. Published: 03.03.2017 in the Official Gazette No. 67-71, art. No: 93. <https://www.legis.md/cautare/getResults?doc_id=122915&lang=ro>

[183] Rural Resilience Program (IFAD VII) 2017-2023. <https://www.ucipifad.md/programe/programe-in-derulare/programul-rural-de-rezilienta-economico-climatica-incluziva-ifad-vi/>

[184] Government Decision No. 381 of 01.08.2019 on approval of the National Program in the field of research and innovation for the years 2020-2023 and of the Action Plan for its implementation. Published: 16.08.2019 in the Official Gazette No. 256-259 art. 506. <https://www.legis.md/cautare/getResults?doc_id=115747&lang=ro>

[185] Law No. 183 of 11.09.2020 on subsidized insurance in agriculture. Published: 16.10.2020 in the Official Gazette No. 267-271, art. No: 572. <https://www.legis.md/cautare/getResults?doc_id=123554&lang=ro>

[186] Draft Law on Animal Husbandry (in new edition). Published for consultation by the State Chancellery on 18 March 2020: <https://cancelaria.gov.md/ro/content/cu-privire-la-aprobarea-proiectului-de-lege-zootehniei-238madrm2020>

[187] Dairy cattle breeding program in the Republic of Moldova for the years 2014-2020, approved for implementation by the Zooveterinary Commission of the Technical-Scientific Council of the Ministry of Agriculture and Food Industry of the Republic of Moldova, Minutes No. 2 of 17.10.2013. Focșa, V., Constandoglo, A. Chișinău, Tipogr. "Print-Caro". 2013, 22 p., ISBN 978-9975-56-122-8.

[188] Sheep and goat breeding program in the Republic of Moldova for the years 2014-2020, approved for implementation by the Zooveterinary Commission of the Technical-Scientific Council of the Ministry of Agriculture and Food Industry of the Republic of Moldova, Minutes No. 3 of 18.12.2013. Mașner, O., Liuțcanov, P., Evtodienco, S., Dănuță, A. Chișinău, Tipogr. "Print-Caro". 2014, 34 p. ISBN 978-9975-56-197-6.

[189] FAO Project „Development of the National Strategy and Action Plan for Animal Genetic Resources and the Dairy Cow Genetic Improvement Program", <http://www.madrm.gov.md/ro/content/moldova-%C3%AE%C8%99i-consolideaz%C4%83-sectorul-cre%C8%99terii-vacilor-de-lapte-cu-suportul-fao>, <http://maia.gov.md/ro/categorii/proiecte-de-asistenta-externa-sectorul-agroalimentar>

[190] Government Decision No. 248 of 10.04.2013 on approval of the Waste Management Strategy of the Republic of Moldova for the years 2013-2027. Published: 12.04.2013 in the Official Gazette No. 82 art. No: 306. <https://www.legis.md/cautare/getResults?doc_id=114412&lang=ro>

[191] Government Decision on approval of the Regulation on conditions and procedure for granting subsidies in advance for investment projects on land improvements for implementation of the Land Improvement Program in order to ensure sustainable management of soil resources for 2021-2025, approved at the Government session of 22 December 2020 (topic of discussion no. 66). <https://gov.md/ro/content/sedinta-guvernului-din-22-decembrie-2020-ora-1600>

[192] Capacity building program for rural transformation (IFAD VIII) 2021-2026, <https://www.ucipifad.md/noutati/parlamentul-a-ratificat-un-nou-acord-de-finantare-cu-fondul-international-pentru-dezvoltarea-agricola/>, ratified by Law No. 194 of 19.11.2020 on ratification of the Financing Agreement between the Republic of Moldova and the International Fund for Agricultural Development in order to carry out the Project "Improving capacities for transformation of the rural area (IFAD VIII)", published on 18.12.2020 in the Official Gazette No 329-331, Art. 199 <https://www.legis.md/cautare/getResults?doc_id=124253&lang=ro>

[193] Government Decision No. 409 of 04.06.2014 on approval of the National Strategy for agricultural and rural development for the years 2014-2020. Published: 10.06.2014 in the Official Gazette No. 152, art. No: 451. <https://www.legis.md/cautare/getResults?doc_id=110039&lang=ro>

No. 742/2015[194], updated National Strategy for Agricultural and Rural Development for the years 2014-2020 and the Action Plan for implementation of the National Strategy for Agricultural and Rural Development for the years 2018-2020, GD No. 785/2018

Objective: Increasing competitiveness of the agri-food sector by restructuring and modernizing the market; ensuring sustainable management of natural resources in agriculture; improving livelihoods in rural areas, including increasing production volume by at least 20% as compared to the 2013 baseline by creating / modernizing by 2020 at least 50 livestock farms, of which at least 10 cattle farms; achievement of a herd optimized to provide genetic stock of biological material, a total of 600 heads of bovines and 1800 heads of pure-bred pigs or at least 200 heads of bovines purchased annually.

GHGs affected by policy: CH_4 and N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Number of farms created / modernized; herd of animals with highly optimized productivity; number of insured animals extended

Mitigation impact: Not available

Cost and benefit estimate: Over the period 2014-2017, about 8.318 billion lei were used; for the period 2018-2020 allocation of another 19.384 billion lei was planned.

Government Decision No. 455 of 21.06.2017 on distribution of funds from the National Fund for Development of Agriculture and Rural Environment[195]

Objective: Establishing support measures, as well as conditions, order and procedure for granting funds from the Fund; reaching general and specific objectives established in the National Strategy for agricultural and rural development for the years 2014-2020, approved by Government Decision No. 409 of 04.06.2014, as well as in the Financing Agreement between the Government of the Republic of Moldova and the European Commission on implementation of the ENPARD Moldova Program - support for agriculture and rural development.

GHGs affected by policy: CH_4 and N_2O

Category of measure: Economic

Status: On-going

Implementation start: 2017

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Public Institution „Agency for Interventions and Payments for Agriculture"

Monitoring and evaluation indicators: Number of farms created / modernized; herd of animals with highly optimized productivity; number of insured animals extended.

Mitigation impact: Not available

Cost and benefit estimate: About 1 billion lei in 2020, 950 million lei in 2019, 900 million lei in 2017 and 2018 each. As a result of applications for subsidies, it was possible to attract investments in the agro-industrial sector of about 4.0 billion lei, while investments made in 2019 have generated 2,553 new jobs, of which 1,251 were seasonal jobs.

Government Decision No. 836 of 18.11.2020 on approval of the Regulation on granting direct payments per livestock head[196]

Objective: Establishing conditions, order and procedure for granting direct payments to animal breeders in order to: revitalize the livestock sector; increase average productivity per farm; growth, breeding, improving breeds and use of animals on agricultural holdings; adaptation to climate change and mitigation of climate change effects on agricultural production. Animals registered and used in livestock farms located outside the built-up area - females at least 12 months old, kept in a herd of at least 10 cows and heifers, 50 heads of sheep and lambs specialized for milk production, 30 heads of sheep and lambs specialized for meat production, 30 heads of goats and does are eligible for direct payment.

GHGs affected by policy: CH_4 and N_2O

Category of measure: Economic

Status: On-going

Implementation start: 2021

Included in: Scenario with Additional Measures (WAM)

[194] Government Decision No. 742 of 21.10.2015 on approval of the Action Plan regarding implementation of the National Strategy for agricultural and rural development for the years 2014-2020. Published: 30.10.2015 in the Official Gazette No. 297-300, art. No: 835. <https://www.legis.md/cautare/getResults?doc_id=110254&lang=ro>

[195] Government Decision No. 455 of 21.06.2017 on distribution of funds from the National Fund for Development of Agriculture and Rural Environment. Published: 23.06.2017 in the Official Gazette No. 201-213, art. No: 537. <https://www.legis.md/cautare/getResults?doc_id=123859&lang=ro>. Amended by Government Decision No. 772 of 21.10.2020 on amending some Government Decisions No. 772 of 21.10.2020. Published: 24.10.2020 in the Official Gazette No. 278, art. No. 909. <https://www.legis.md/cautare/getResults?doc_id=123697&lang=ro>

[196] Government Decision No. 836 of 18.11.2020 on approval of the Regulation on granting direct payments per animal head. Published: 02.12.2020 in the Official Gazette No. 318, art. No: 992. <https://www.legis.md/cautare/getResults?doc_id=124163&lang=ro>

Responsible entity: Ministry of Agriculture, Regional Development and Environment through Public Institution „Agency for Interventions and Payments for Agriculture"

Monitoring and evaluation indicators: Number of farms created / modernized; livestock with highly optimized productivity

Mitigation impact: Not available

Cost and benefit estimate: Value of direct payment granted to an agricultural producer for each animal head is established according to the species and category of the animal: cows of specialized breeds for dairy and mixed production – 7,000 lei; cows of specialized breeds for meat production – 7,000 lei; heifers over 12 months - 5,000 lei; sheep of specialized breeds for dairy and mixed production - 500 lei; sheep of specialized breeds for meat production - 500 lei; lambs over 12 months - 300 lei; goats - 500 lei; does over 12 months - 300 lei. For properly used purebred animals, the amount of direct payment granted shall be increased by 50%. As a result, pollution of villages will be reduced, the environment will be improved and specific GHG emissions per unit of animal production will be reduced.

Draft National Program for Development of the Dairy Sector in the Republic of Moldova 2020-2025 and the Action Plan for its implementation for the years 2020-2022[197]

Objective: Creating conditions for development of the sector by improving the legal framework, introducing modern equipment and machinery, implementing advanced technologies for maintenance, nutrition and use of animals, genetic improvement and creating a sufficient feed base, with an impact of increasing the number of cattle, sheep and goats, as well as increasing the productivity of animals and the competitiveness of obtained products. The objectives for 2025 are:

- Harmonization of regulatory acts in the field with EU requirements;
- Redirection of livestock from households to farms located outside the built-up area and increase of the number of cows in dairy farms from 5.1 thousand heads in 2020 to about 21.8 thousand heads by 2025;
- Increasing production of beef, sheep / goat as a by-product obtained from the dairy sector, up to 40%;
- Increasing production of cow's milk by up to 60% (from 3,700 liters to 6,200 liters);
- Construction of new dairy farms of various capacities, by 2025 (no less than 150 farms);
- Genetic improvement of livestock; modernization of milk processing enterprises.

GHGs affected by policy: CH_4 and N_2O

Category of measure: Economic

Status: On-going

Implementation start: 2021

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Number of farms created / modernized; livestock with highly optimized productivity

Mitigation impact: Not available

Cost and benefit estimate: Cost for implementation of the Program until 2022 is 383.273 million lei, of which 374.585 million from the state budget and 8.688 million lei from other sources, including from the World Bank MAC-P project (cost 5.163 million lei). Expected impact: revitalization of the animal husbandry branch; at the same time, however, the volume of GHG emissions from the branch will increase, in particular, as a result of the increase in livestock and poultry numbers. However, it is anticipated that specific emissions per production unit will show a declining trend.

Plant Production and Land Resource

Environmental Protection Strategy for the years 2014-2023 and Action Plan for its implementation, GD No. 301/2014[198]

Objective: Granting to the population of the Republic of Moldova the right to a sustainable unpolluted and healthy environment, in harmony with economic development and social welfare; development of environmentally friendly agricultural techniques and infrastructure; elaboration and implementation of complex regional measurement systems, adapted to the specifics of the natural conditions of each region, based on the concept of resource-productive technologies; improvement of 880 thousand ha of eroded land and of 21.57 thousand ha of lands subject to landslides; planting forest strips on about 33 thousand ha; reduction of at least 20% of greenhouse gases by 2020 compared to the baseline scenario.

GHGs affected by policy: CO_2, CH_4 and N_2O

Category of measure: Regulatory

Status: On-going

[197] Draft National Program for Development of the Dairy Sector in the Republic of Moldova for 2020-2025 and Action Plan for its implementation for the years 2020-2022. <http://particip.gov.md/proiectview.php?l=ro&idd=7741>

[198] Government Decision No. 301 of 24.04.2014 on approval of the Environmental Protection Strategy for the years 2014-2023 and the Action Plan for its implementation. Published: 06.05.2014 in the Official Gazette No 104-109, art No: 328. <https://www.legis.md/cautare/getResults?doc_id=114539&lang=ro>

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment; Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Area of degraded or rehabilitated land in thousand ha; area of land subject to landslides in thousand ha of reconstructed land; number of rehabilitated and extended irrigation systems; area in thousands ha of the restored and created riparian strips; area in thousand ha of forest plantations and green spaces with protection function created; area in thousand ha of road protection strips, including those on agricultural fields.

Mitigation impact: Reduction of at least 20% of GHG emissions from the agricultural sector by 2020 compared to the baseline scenario.

Cost and benefit estimate: About 383 million lei for implementation of mitigation measures with direct or indirect impact on GHG emissions generated by the plant protection sector.

Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation, GD No. 1470/2016[199]

Objective: Unconditional reduction, by 2030, of greenhouse gas emissions from the agricultural sector by 37% and reduction of conditional greenhouse gases by up to 41% compared to 1990.

GHGs affected by policy: CO_2, CH_4 and N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2017

Included in: Scenario with Existing Measures (WEM) and Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Area in ha covered by conservation agriculture (no-till and mini-till); quantity of manure in thousand tonnes stored in communal platforms or individual deposits; share of livestock covered by advanced animal feed technologies.

Mitigation impact: Reduction by 2030 of GHG emissions from the agricultural sector compared to 1990, unconditionally - by 37% and conditionally – by up to 41%

Cost and benefit estimate: An amount of 15.995 million lei for carrying out the scenario with unconditional measures (including 14.080 million lei for the plant protection sector), plus an additional 4.183 million for carrying out the scenario with conditional additional measures (including 3.520 million for the plant protection sector).

Program for soil conservation and increase of soil fertility for the years 2011-2020, GD No. 626/2011[200], respectively, Action Plan for implementation of Program for soil conservation and increase of soil fertility for the years 2014-2016, GD No. 138/2014[201] and the Action Plan for implementation of the Program for soil conservation and increase of soil fertility for the years 2017-2020, GD No. 554/2017[202]

Objective: Maintaining long-term quality and production capacity of soils to ensure the country's food security; stopping active forms of soil cover degradation on an area of 877 thousand ha of arable land by the end of 2020; application of measures for soil conservation and increase of soil fertility on an area of 1.7 million ha by 2020; implementation of zonal crop rotations; application of a soil conservation tillage system; compensation of humus loss in soil by producing and applying manure, compost, incorporation of secondary agricultural production (straw, other organic waste) with application of 10 kg of nitrogen to 1 t of organic waste; cultivation of legumes on a 20-25 percent share of the arable land area for accumulation of biological nitrogen; application of mineral fertilizers to prevent depletion of nutrients in soils and obtaining expected yields, etc.

GHGs affected by policy: CO_2 and N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2011

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Area of land on which: active forms of degradation of the ground cover have been stopped; measures have been applied

[199] Government Decision No. 1470 of 30.12.2016 on approval of the Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. Published: 24.03.2017 in the Official Gazette No. 85-91, art. No: 222. <https://www.legis.md/cautare/getResults?doc_id=114408&lang=ro>

[200] Government Decision No. 626 of 20.08.2011 on approval of the Program for soil conservation and increase of soil fertility for the years 2011-2020. Published: 26.08.2011 in the Official Gazette No. 139-145, art. No: 696. <https://www.legis.md/cautare/getResults?doc_id=110149&lang=ro>

[201] Government Decision No. 138 of 24.02.2014 on approval of the Action Plan for implementation of the Program for soil conservation and increase of soil fertility for the years 2014-2016. Published: 28.02.2014 in the Official Gazette No. 49-52, art. No: 154. <https://www.legis.md/cautare/getResults?doc_id=13424&lang=ro>

[202] Government Decision No. 554 of 14.07.2017 on approval of the Action Plan for implementation of the Program for soil conservation and increase of soil fertility for the years 2017-2020. Published: 21.07.2017 in the Official Gazette No. 253-264, art. No: 650. <https://www.legis.md/cautare/getResults?doc_id=113349&lang=ro>

to preserve and increase soil fertility; zonal crops have been introduced; humus loss was offset by production and application of manure, compost, by incorporating secondary agricultural production; legume crops were cultivated; mineral fertilizer was applied to prevent depletion of nutrients in soil and to obtain expected yields, etc.

Mitigation impact: Not available

Cost and benefit estimate: For the implementation of the Program from the state budget, the allocation of 140 million lei was planned.

National Strategy for Agricultural and Rural Development for the years 2014-2020, GD No. 409/2014[203] and the Action Plan for the implementation of the National Strategy for Agricultural and Rural Development for the years 2014-2020, GD No. 742/2015[204], updated National Strategy for Agricultural and Rural Development for the years 2014-2020 and the Action Plan for implementation of the National Strategy for Agricultural and Rural Development for the years 2018-2020, GD No. 785/2018

Objective: Increasing competitiveness of the agri-food sector by restructuring and modernizing the market; ensuring sustainable management of natural resources in agriculture; by 2020: extension of irrigated areas by at least 2000 ha annually, baseline values being 21 thousand ha in 2013 and 27.8 thousand ha in 2017; increasing by up to 10% annually the cultivated areas under sustainable land management practices, as compared to baseline values of 51.0 thousand ha in 2013 and 101.4 thousand ha in 2017; increasing by at least 60% the land areas allocated for organic farming, as compared to baseline values in 2013 and 1072.88 ha in 2017; rehabilitation of about 2199 ha of forest belts, respectively of about 50 thousand ha of land protected by robust anti-erosion strips, to compare with zero hectare in 2013 and 2610 ha in 2017; annual increase of protected areas by at least 100 hectares per year through use of frost prevention and anti-hail equipment, to be compared to zero baseline areas protected by the anti-hail service in 2013 and 70 ha area protected by the anti-hail service in 2017.

GHGs affected by policy: CO_2 and N_2O

Category of measure: Regulatory and economic

Status: On-going

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Extended irrigated areas; extended areas cultivated according to sustainable land management practices with minimal tillage of the no-till / mini-till type; areas of insured agricultural holdings; extensive areas protected by crop protection systems against adverse climate conditions.

Mitigation impact: Not available

Cost and benefit estimate: For the period 2014-2017 - 8.318 billion lei, for the period 2018-2020 - 19.384 billion lei.

Program for promoting "green" economy in the Republic of Moldova for the years 2018-2020 and Action Plan for its implementation, GD No. 160/2018[205]

Objective: Ensuring, by 2020, promotion of organic farming by implementing "green" economy principles and expanding the area of agricultural land under organic farming by about 20%

GHGs affected by policy: CO_2 and N_2O

Category of measure: Economic

Status: On-going

Implementation start: 2018

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment; Ministry of Economy and Infrastructure

Monitoring and evaluation indicators: Fifteen sectoral policy documents developed; economic instruments, taxes and payments to support development of "green" economy developed and approved; area of land on which plants are grown for organic food (ha / year); number of farmers trained in organic farming, etc.

Mitigation impact: Not available

Cost and benefit estimate: About 121.5 million lei, including about 29.5 million lei for promotion of organic agriculture.

Land Improvement Program for Sustainable Management of Soil Resources for the years 2021-2025 and the Action Plan on its implementation for the years 2021-2023, GD No. 864/2020[206]

[203] Government Decision No. 409 of 04.06.2014 on approval of the National Strategy for agricultural and rural development for the years 2014-2020. Published: 10.06.2014 in the Official Gazette No. 152, art. No: 451. <https://www.legis.md/cautare/getResults?doc_id=110039&lang=ro>

[204] Government Decision No. 742 of 21.10.2015 on approval of the Action Plan for implementation of the National Strategy for agricultural and rural development for the years 2014-2020. Published: 30.10.2015 in the Official Gazette No. 297-300, art. No: 835. <https://www.legis.md/cautare/getResults?doc_id=110254&lang=ro>

[205] Government Decision No. 160 of 21.02.2018 on approval of the Program for promotion of "green" economy in the Republic of Moldova for the years 2018-2020 and of the Action Plan for its implementation. Published: 02.03.2018 in the Official Gazette No. 68-76, art. No: 208. <https://www.legis.md/cautare/getResults?doc_id=102127&lang=ro>

[206] Government Decision No. 864 of 09.12.2020 on approval of the Land Improvement Program in order to ensure sustainable management of soil resources for the years 2021-2025 and the Action Plan on its implementation for the years 2021-2023. Published: 22.01.2021 in the Official Gazette No. 13-20, art. No: 22. <https://www.legis.md/cautare/getResults?doc_id=125027&lang=ro>.

Objective: Reaching established targets by 2025 on preventing, stopping soil degradation and increasing soil fertility, including combating surface erosion on 482 hectares; fighting deep erosion on 1900 hectares; fighting wind erosion (deflation) on 170 hectares; soil improvement on 68.5 thousand hectares; chemical improvement on 500 hectares; water improvement (irrigation facilities), and increase of irrigated areas by 68 thousand hectares; soil conservation and increase of soil fertility on an area of 5 thousand hectares.

GHGs affected by policy: CO_2 and N_2O

Category of measure: Economic

Status: On-going

Implementation start: 2021

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Rehabilitated grass cover, improved pastures, degraded land, rehabilitated buffer strips, decontaminated polluted lands, grassy terraces, in ha; agricultural land affected by landslides planted with forest; ha of hydrotechnical and plant protection anti-erosion systems; ha of established/ rehabilitated windbreak forest strips; ha of created agroforestry plantations; ha of created riparian water protection forest belts; ha of forest strips in ravines and valleys created; ha of improved soils; ha under sidereal crops and ha under leguminous crops.

Mitigation impact: Not available

Cost and benefit estimate: Funds in the amount of 4.278 billion lei were planned, including 59.626 million lei from the state budget, respectively 4.219 billion lei from external sources; the benefits are in line with the objectives stated above.

In generalizing the information presented above in the sectoral policies related to plant protection and soil resource sector, we conclude that measures that contribute in the most efficient way to the achievement of the target for reducing greenhouse gas emissions from plant growth and soil resource sector, would be the following:

- *Land use in accordance with their adequateness for different agricultural uses*, assessed on the basis of soil study and study of local relief and climate conditions;
- *Introducing a soil conservation agriculture system*, based on implementation of technologies for soil conservation tillage (SCT): "mini-till" and "no-till", on scientifically substantiated crop rotation schemes; on harmless fertilization system and plant protection of crops;
- *Use of sidereal (green) fertilizer (annual leguminous crops mixed with grasses):* introduction into the soil of intermediate vegetation carbon between periods of cultivation of basic agricultural crops;
- *Incorporation of vegetable residues into the soil:* increase of carbon content in the soil is ensured by incorporation of agricultural residues left in the field after harvesting the main crop;
- *Optimizing application of fertilizer:* reducing use of chemical nitrogen fertilizers and replacing them with green fertilizer would lead in particular to reducing GHG emissions;
- *Crop rotation:* application of crop rotation on slopes with predominant participation of often sown crops can considerably increase sequestration of carbon in the soil and fighting soil erosion;
- *Crop rotation schemes comprising legumes:* crop rotation schemes comprising nitrogen-fixing legumes, such as beans, peas, soybeans, graupel, alfalfa, sagebrush, help to reduce the need for nitrogen fertilizer, respectively to reduce GHG emissions, increase organic carbon content in soil and restore the structure and general quality of the arable layer.

3.5.4. Land Use, Land Use Change and Forestry Sector

The legal framework, which underlies the state policy promoted in the "Land use, land use change and forestry" (LULUCF) sector, includes the Constitution of the Republic of Moldova, over 30 laws and a set of Government decisions that refer, directly or indirectly, to forestry and land use area.

The Forestry Code[207] (No. 887/1996, last updated in 2017) is the basic document that regulates the relations of forest use, land and water protection, as well as use and conservation of the plant and animal kingdom within the forest fund. Another important document related to the LULUCF sector is the Land Code[208] (No. 828/1991, last updated in 2020), which regulates land relations, establishes the modalities for allocating and changing land destination and land use categories and regulates the regime for land ownership, land protection and improvement.

Additionally, the legal framework related to issues of the LULUCF sector, also comprises episodically, tangentially, in general, or with a more pronounced focus a series of

[207] Forestry Code No. 887/1996, Published: 16-01-1997 in the Official Gazette No. 4-5 art. 36. Currently effective version of 27.10.2017. < https://www.legis.md/cautare/getResults?doc_id=118482&lang=ro>

[208] Land code No. 828/1991. Published: 04-09-2001 in the Official Gazette No. 107 art. 817, Amended by LP96 of 11.06.20, MO161-164/03.07.20 art.311; in force since 03.08.2020, < https://www.legis.md/cautare/getResults?doc_id=122075&lang=ro>

legal acts such as: Law on environmental protection, No. 1515/1993[209]; Law on water protection zones and protection forest strips of rivers and water basins, No. 440/1995[210]; GD No. 595/1996 on improvement of forest management and protection of forest vegetation[211]; Law on natural resources, No. 1102/1997[212]; Law on improvement of degraded land by afforestation, No. 1041/2000[213]; National Strategy and Action Plan for Biodiversity Conservation, PD No. 112/2001[214]; Law on nut crops, No. 658/1999[215]; GD No. 740/2003 on approval of regulatory acts on forest management[216]; Regulation on logging trees in the forest fund and logging forest vegetation outside the forest fund, GD No. 27/2004[217]; Law on the plant kingdom, No. 239/2007[218]; Regulation on grazing and mowing, GD No. 667/2010[219]; National program on establishment of the national ecological network for the years 2011-2018, GD No. 593/2011[220]; Strategy for development of rural extension services for the years 2012-2022, HG No. 486/2012[221]; National strategy for agricultural and rural development for the years 2014-2020, GD No. 409/2014[222]; Regulation on carrying out forestry works on degraded land publicly owned by administrative-territorial units and privately owned degraded land, GD No. 1186/2016[223]; Program for promoting "green" economy in the Republic of Moldova for the years 2018-2020 and Action Plan for its implementation, GD No. 160/2018[224]; Regulation on conditions and procedures for carrying out land improvement activities, soil protection, conservation and increase of soil fertility, GD No. 691/2018[225]; Action Plan for the years 2018-2022 on implementation of the Strategy for development of rural extension services in the Republic of Moldova (2012-2022), draft GD, etc.

The regulatory acts described below are part of the legal framework that can be treated as having an impact on the level of GHG sequestration in the LULUCF sector.

GD No. 106/1996 on measures to ensure protection of forests, forest protection strips and other forest plantations[226]

Objective: Stopping illegal logging of forests, protection forest belts, other forest plantations, as well as fighting other violations of forestry legislation.

GHGs affected by policy: CO_2 (indirect)

Category of measure: Regulatory

Status: On-going

Implementation start: 1996

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment, „Moldsilva" Agency, District executive committees, Mayor's offices of villages and cities.

Monitoring and evaluation indicators: Measures for prevention and repression of violations of forestry legislation undertaken; volume of illicit logging detected and documented.

Mitigation impact: Not available

Cost and benefit estimate: Not available.

GD No. 32/2001 on measures to establish riparian zones and strips for protection of rivers and water basins[227]

Objective: Establishing size of riparian water protection zones and strips for rivers and water basins in the Republic of Moldova (84 thousand ha), as well

[209] Law No. 1515/1993 on environmental protection. Published: 30-10-1993 in the Official Gazette No. 10 art. 283 amended by LP253 of 22.11.18, MO1-5/04.01.19 art.4; enacted on 04.02.2019, <https://www.legis.md/cautare/getResults?doc_id=112032&lang=ro>

[210] Law No. 440/1995 on the areas and strips for protection of rivers and water basins. Published: 03-08-1995 in the Official Gazette No. 43 art. 482, amended by LP64 of 23.04.20, MO115-117/15.05.20 art.203; enacted on 15.05.2020, < https://www.legis.md/cautare/getResults?doc_id=121475&lang=ro>

[211] GD No. 595/1996 on improvement of forest management and protection of the forest vegetation. Published: 05-12-1996 in the Official Gazette No. 78-79 art. 635, < https://www.legis.md/cautare/getResults?doc_id=47442&lang=ro>

[212] Law No. 1102/1997 on natural resources. Published: 19-06-1997 in the Official Gazette no. 40 art. 337. amended by LP185 of 21.09.17, MO371-382/27.10.17 art.632; enacted on 27.10.2017, <https://www.legis.md/cautare/getResults?doc_id=109389&lang=ro>

[213] Law No. 1041/2000 on improvement of degraded land by afforestation. Published: 09-11-2000 in the Official Gazette no. 141-143 art. 1015. Version in force from 01.01.2004 based on the amendments by LP482/04.12.03, MO6-12/01.01.04 art.48, < https://www.legis.md/cautare/getResults?doc_id=64409&lang=ro>

[214] PD No. 112 / 2001 on approval of the National Strategy and of the Action Plan in the field of biological diversity conservation. Published: 02-08-2001 in the Official Gazette No. 90 art. 700. Version in force from 04.05.07 based on the modifications by HP80-XVI of 29.03.07, MO60-63/04.05.07 art.288, < https://www.legis.md/cautare/getResults?doc_id=77328&lang=ro>

[215] Law No. 658/1999 on nut crops. Published: 29-12-1999 in the Official Gazette No. 153-155 art. 749, Version in force from 15.06.2018 based on the amendments by LP79 of 24.05.2018, MO195–209/338 din 15.06.2018, < https://www.legis.md/cautare/getResults?doc_id=108460&lang=ro>

[216] GD No. 740/2003 on approval of regulatory acts aiming at management of the forestry fund. Published: 27-06-2003 in the Official Gazette No. 126-131 art. 778. Amended by GD1143 of 21.11.18, MO13-21/18.01.19 art.7; enacted on 18.01.2019, < https://www.legis.md/cautare/getResults?doc_id=112873&lang=ro>

[217] GD No. 27/2004 on approval of the Regulation on authorization of tree logging in the forest fund and logging of forest vegetation outside the forest fund Published: 30-01-2004 in the Official Gazette No. 19-21 art. 155. Amended by GD1143 of 21.11.18, MO13-21/18.01.19 art.7; enacted on 18.01.2019, < https://www.legis.md/cautare/getResults?doc_id=113236&lang=ro>

[218] Law No. 239/2007 on the vegetable kingdom. Published: 26-02-2008 in the Official Gazette no. 40-41 art. 114. Version in force of 24.08.18 based on the amendments by LP172 of 27.07.18, MO321-332/24.08.18 art.529;< https://www.legis.md/cautare/getResults?doc_id=107020&lang=ro>

[219] GD No. 667/2010 on approval of the Regulation on grazing and mowing. Published: 30-07-2010 in the Official Gazette No 131-134 art. 748, <https://www.legis.md/cautare/getResults?doc_id=19561&lang=ro>

[220] GD No. 593/2011 on approval of the National Program for establishment of the national ecological network for the years 2011-2018. Published: 12-08-2011 in the Official Gazette No. 131-133 art. 664, amended by GD1143 of 21.11.18, MO13-21/18.01.19 art. 7; enacted on 18.01.19, < https://www.legis.md/cautare/getResults?doc_id=114335&lang=ro>

[221] GD No. 486/2012 on approval of the Strategy for development of rural extension services for the years 2012-2022. Published: 13-07-2012 in the Official Gazette No. 143-148 art. 537. Amended by GD1143 of 21.11.18, MO13-21/18.01.19 art. 7; enacted on 18.01.2019, < https://www.legis.md/cautare/getResults?doc_id=114376&lang=ro>

[222] GD No. 409/2014 on approval of the National Strategy for agricultural and rural development for the years 2014-2020. Published: 10-06-2014 in the Official Gazette No. 152 art. 451. Version in force from 28.09.18 based on the amendments by GD785 of 01.08.18, MO366-376/28.08.18 art.962, < https://www.legis.md/cautare/getResults?doc_id=110039&lang=ro>

[223] GD No. 1186 / 2016 on approval of Regulation on carrying out the afforestation works on degraded land - public property of the administrative-territorial units and on degraded land in private property. Published: 04-11-2016 in the Official Gazette No. 379-386 art. 1283, amended by GD1143 of 21.11.18, MO13-21/18.01.19 art.7; enacted on 18.01.19, < https://www.legis.md/cautare/getResults?doc_id=114853&lang=ro>

[224] GD No. 1186 / 2016 on approval of the Regulation on afforestation works on degraded lands - public property of the administrative-territorial units and of degraded private land. Published: 04-11-2016 in the Official Gazette No. 379-386 art. 1283, amended by GD1143 of 21.11.18, MO13-21/18.01.19 art.7; enacted on 18.01.19, < https://www.legis.md/cautare/getResults?doc_id=114853&lang=ro>

[225] GD No. 691/2018 on approval of the Regulation on conditions and procedures for carrying out land improvement activities, soil protection, conservation and increasing soil fertility. Published: 10-08-2018 in the Official Gazette No. 295-308 art. 833. Abrogated by GD985 of 22.12.20, MO22-32/29.01.21 art.33; enacted 29.01.21, < https://www.legis.md/cautare/getResults?doc_id=125431&lang=ro>

[226] GD No. 106/1996 on measures for ensuring protection of forests, protection forest belts and other forest plantations. Published: 30-05-1996 in the Official Gazette No. 32-33 art. 222, <https://www.legis.md/cautare/getResults?doc_id=112777&lang=ro>

[227] GD No. 32/2001 on measures for establishing riparian zones and strips for protection of rivers and water basins. Published: 31-05-2001 in the Official Gazette No. 57-58 art. 366. <https://www.legis.md/cautare/getResults?doc_id=48658&lang=ro>

as carrying out afforestation works on riparian water protection zones and strips on a total area of 23 thousand ha.

GHGs affected by policy: CO_2

Category of measure: Regulatory

Status: On-going

Implementation start: 2001

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Local public authorities, Agency for Land Relations and Cadaster, "Apele Moldovei" Agency, MARDE, "Moldsilva" Agency

Monitoring and evaluation indicators: Forest belts planted in protection riparian zones

Mitigation impact: Afforested areas, removed greenhouse gas emissions

Cost and benefit estimate: 2300 thousand lei.

Strategy for Sustainable Development of the Forestry Sector of the Republic of Moldova, PD No. 350/2001[228]

Objective: Covering with forest vegetation of at least 130 thousand ha (15% of the country's territory); establishment of new forest bodies as green islands of trees and shrubs, interconnection corridors between forested massifs, protective forest belts along rivers, roads and around industrial enterprises.

GHGs affected by policy: CO_2

Category of measure: Regulatory

Status: On-going

Implementation start: 2001

Included in: Scenario with Existing Measures (WEM)

Responsible entity: „Moldsilva" Agency, MARDE

Monitoring and evaluation indicators: Afforested area

Mitigation impact: Not available

Cost and benefit estimate: According to GD No. 739/2003, 345.9 million lei (US$ 25.5 million).

State Program for Regeneration and Afforestation of Forest Fund Land for the years 2003-2020, GD No. 737/2003[229]

Objective: Planting forest crops on 24.7 thousand ha (26%), aiding natural regeneration on 39.0 thousand ha (41%) and natural regeneration on 31.4 thousand ha (33%). Overall, regeneration and afforestation works in the forest fund until 2020 will be carried out on a total area of 95.1 thousand ha.

GHGs affected by policy: CO_2

Category of measure: Regulatory

Status: On-going

Implementation start: 2003

Included in: Scenario with Existing Measures (WEM)

Responsible entity: MARDE, „Moldsilva" Agency

Monitoring and evaluation indicators: Area of afforested land and regenerated areas of the forest fund

Mitigation impact: Not available

Cost and benefit estimate: 588.1 million lei or 42.6 million US dollars, including annual expenditures of about 32.7 million lei or US$ 2.4 million.

Possibility of harvesting wood mass in the process of cutting main products for the period 2016-2020, GD No. 890/2015[230]

Objective: Harvesting wood in a total volume of 1871.5 thousand m^3 or 374.3 thousand m^3 annually during the 2016-2020 period

GHGs affected by policy: CO_2

Category of measure: Regulatory

Status: Implemented

Implementation start: 2016

Included in: Scenario with Existing Measures (WEM)

Responsible entity: MARDE, Moldsilva Agency, Environmental Protection Inspectorate, Environment Agency

Monitoring and evaluation indicators: Volume of wood harvested annually by cutting of main products, conservation and ecological reconstruction

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Environmental strategy for the years 2014-2023 and the Action Plan for its implementation, GD No. 301/2014[231]

Objective: Expansion of forest area up to 15% of the country's territory, of state-protected natural areas up to 8% of the territory

[228] PD No. 350/2001 on approval of the Strategy for sustainable development of the forestry sector in the Republic of Moldova, Published: 08-11-2001 in the Official Gazette No. 133-135 art. 1021, <https://www.legis.md/cautare/getResults?doc_id=63247&lang=ro>

[229] On approval of the State Program for regeneration and afforestation of forest fund land for the years 2003-2020. Published: 01-07-2003 in the Official Gazette No. 132-133 art. 788, <https://www.legis.md/cautare/getResults?doc_id=112869&lang=ro>

[230] GD No. 890/2015 on approval of the possibility of harvesting wood mass in the process of cutting main products for the period 2016-2020. Published: 31-12-2015 in the Official Gazette No. 370-376 art. 996, < https://www.legis.md/cautare/getResults?doc_id=114820&lang=ro>

[231] GD No. 301/2014 on approval of the Environmental Strategy for 2014-2023 and the Action Plan for its implementation. Published: 06-05-2014 in the Official Gazette No. 104-109 art. 328. < https://www.legis.md/cautare/getResults?doc_id=114539&lang=ro>

GHGs affected by policy: CO_2

Category of measure: Regulatory

Status: On-going

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Area of afforested land; area of forest belts for protection of restored agricultural land; area of afforested riparian strips; area of forest plantations, created green spaces

Mitigation impact: Greenhouse gas emissions reduced by 20%

Cost and benefit estimate: 83 million lei.

Action Plan for implementation of the National Strategy for agricultural and rural development for the years 2014-2020, GD No. 742/2015[232]

Objective: Establishment of 4.5 thousand modern vineyards by 2020; planting 7500 ha of energy crops; rehabilitation of 2199 ha of forest belts

GHGs affected by policy: CO_2, CH_4 and N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Area of newly established vineyards; rehabilitated forest belts

Mitigation impact: Not available

Cost and benefit estimate: 225.7 million lei for vineyard plantations; 15.2 million lei for the rehabilitation of forest belts for protection of agricultural fields.

Climate Change Adaptation Strategy of the Republic of Moldova until 2020 and Action Plan for its implementation, GD No. 1009/2014[233]

Objective: Afforestation of 20 thousand ha of land and creation of green islands, creation / restoration of 3000 ha of forest belts and creation of energy plantations on an area of 5 thousand ha by 2020

GHGs affected by policy: CO_2, CH_4 and N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2014

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment, „Moldsilva" Agency

Monitoring and evaluation indicators: Area of afforested land, green islands, forest belts, energy plantations

Mitigation impact: Not available

Cost and benefit estimate: 500 million lei for land afforestation; 66 million lei for the restoration / creation of forest belts; 380 million lei for creation of energy plantations.

Low Emission Development Strategy of the Republic of Moldova until 2030 and Action Plan for its implementation, GD No. 1470/2016[234]

Objective: 3.8 thousand hectares afforested annually; 5.9% of the total area (860,000 ha) of degraded land improved by afforestation; 3.6% of the total area of degraded land planted with forest vegetation; 12,000 ha of planted protection forest belts, 10 thousand ha of planted forest energy crops

GHGs affected by policy: CO_2, CH_4 and N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2016

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment; „Moldsilva" Agency

Monitoring and evaluation indicators: Number of hectares afforested annually, including on degraded land, with protection forest belts, energy forestry crops

Mitigation impact: Unconditional increase, by 2030, of carbon sequestration capacity up to 62% and greenhouse gas sequestration up to 76% compared to 1990.

Cost and benefit estimate: 2597 million lei from the state budget and 1621.4 million lei from foreign aid.

Strategy for Biological Diversity of the Republic of Moldova for the years 2015-2020 and the Action Plan for its implementation, GD No. 274/2015[235]

[232] GD No. 742/2015 on approval of the Action Plan for implementation of the National Strategy for agricultural and rural development for the years 2014-2020. Published: 30-10-2015 in the Official Gazette No. 297-300 art. 835, < https://www.legis.md/cautare/getResults?doc_id=110254&lang=ro>

[233] GD No. 1009 / 2014 on approval of the Strategy of the Republic of Moldova for adaptation to climate change until 2020 and of the Action Plan for its implementation. Published: 19-12-2014 in the Official Gazette No. 372-384 art. 1089, < https://www.legis.md/cautare/getResults?doc_id=114739&lang=ro>

[234] GD No. 1470/2016 on approval of the Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. Published: 24-03-2017 in the Official Gazette No. 85-91 art. 1470, < https://www.legis.md/cautare/getResults?doc_id=114408&lang=ro>

[235] GD No. 274/2015 on approval of the Strategy for biological diversity of the Republic of Moldova

Objective: Rehabilitation of forest belts for protection of agricultural fields on an area of 3000 ha; restoration of riparian forest belts for protection of rivers and water basins on an area of 3000 ha; creation of forest plantations on degraded land, with the promotion of native species on an area of 500 ha (Central and Northern area) etc.

GHGs affected by policy: CO_2, CH_4 and N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2015

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment, „Apele Moldovei" Agency, „Moldsilva" Agency

Monitoring and evaluation indicators: Afforested riparian strips, rehabilitated protection strips for agricultural fields; forest plantations created on degraded land.

Mitigation impact: Not available

Cost and benefit estimate: 379.2 million lei for afforestation of riparian strips for protection of rivers and water basins; 376.20 million lei for rehabilitation of forest belts for protection of agricultural fields; 338.0 million lei for creation of forest plantations on degraded land, with promotion of native species.

Strategy on Adaptation of the Forestry Sector to Climate Change for the years 2017-2025 and the Action Plan for its implementation, draft GD

Objective: Extension of areas covered with forest vegetation outside the forest fund by 13.5 thousand ha; creation of rural and urban green spaces on 5 thousand ha; planting energy forest crops on an area of about 10.0 thousand ha

GHGs affected by policy: CO_2, CH_4 and N_2O

Category of measure: Regulatory

Status: Planned

Implementation start: Undetermined

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment, „Moldsilva" Agency

Monitoring and evaluation indicators: Area covered with forest vegetation outside the forest fund; area of rural and urban green spaces; area of plantations of energy forest crops

Mitigation impact: Not available

Cost and benefit estimate: Not available.

Possibility of harvesting wood mass in the process of cutting the main products for the period 2021–2025, GD No. 958/2020[236]

Objective: Harvesting of 1601.5 thousand m^3 of wood or about 320.3 thousand m^3 annually

GHGs affected by policy: CO_2, CH_4 and N_2O

Category of measure: Regulatory

Status: Planned

Implementation start: Undetermined

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment, „Moldsilva" Agency

Monitoring and evaluation indicators: Amount of harvested wood

Mitigation impact: Not available

Cost and benefit estimate: Not available.

National Plan for expanding areas under forest vegetation for the years 2019-2024, draft GD

Objective: Extension of forest vegetation on a total area of 13.0 thousand ha at the expense of degraded land, as well as provision of 71.5 million pieces of planting material for extension works

GHGs affected by policy: CO_2

Category of measure: Regulatory

Status: Planned

Implementation start: Undetermined

Included in: Scenario with Additional Measures (WAM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment, „Moldsilva" Agency

Monitoring and evaluation indicators: Area of: afforested degraded land, afforested protection areas of rivers and water basins, established forest belts for protection of agricultural land

Mitigation impact: Not available

Cost and benefit estimate: 545.8 million lei for implementation of all activities.

3.5.5. Waste Sector

The legal framework associated with addressing waste sector issues comprises, either episodically, tangentially,

for the years 2015-2020 and of the Action Plan for its implementation Published: 29-05-2015 in the Official Gazette No. 131-138 art. 321, < https://www.legis.md/cautare/getResults?doc_id=114746&lang=ro>

[236] GD 958/2020 on approval of the possibility of harvesting wood in the process of cutting main products for the period 2021–2025 Published: 31-12-2020 in the Official Gazette No. 372-382 art. 1143, <https://www.legis.md/cautare/getResults?doc_id=124767&lang=ro>

in general or with a more accentuated focus, a series of legal acts such as: Law No. 209 of 29.07.2016 on waste, which transposes Directive 2008/98 / EC and 9 other European Union acts into national legislation; GD No. 212/2018 on approval of Regulation on electrical and electronic equipment waste; GD No. 373/2018 on National Register of Emissions and Transfer of Pollutants; GD No. 561/2020 on approval of the Regulation on packaging and packaging waste; National program for recovery of production and household waste, GD No. 606/2000; Concept of the environmental policy of the Republic of Moldova, PD No. 605/2001; Program for promoting "green" economy in the Republic of Moldova for the years 2018-2020 and the Action Plan for its implementation, GD No. 160 of 21.02.2018; Environmental Strategy for 2014-2023 and the Action Plan for its implementation, GD No. 301/2014.

The regulatory acts presented below are part of the legal framework that can be treated as having an impact on the level of GHG emissions in the waste sector.

Waste Management Strategy of the Republic of Moldova for the years 2013-2027, GD No. 248/2013[237]

Objective: Development of integrated municipal waste management systems by harmonizing regulatory acts; territorial division of the country into 8 waste management regions; increasing the amount of recycled and recovered waste by 20-30% by 2025; reducing the amount of deposited biodegradable waste; development of regional waste disposal infrastructure through construction of 7 MSW landfills and 2 mechanical-biological treatment plants in Chisinau and Balti municipalities; recultivation of at least 50% of the number of non-compliant landfills by 2027

GHGs affected by policy: CH_4 and N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2013

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Percentage of the population that benefits from continuous waste collection services; number of environmentally friendly waste treatment and disposal capacities; amount of waste collected separately and recycled; amount of waste to be recovered; amount of waste disposed of by storage; number of closed and recultivated non-compliant waste disposal sites.

Mitigation impact: Not available

Cost and benefit estimate: 145.168 million Euros; benefits: increased coverage with waste collection services for all waste streams; reducing quantity of waste deposited of in landfills that does not comply with the new requirements; increase of the degree of collection and use of secondary raw materials by promoting waste recycling and reuse; reduction of quantities of untreated biodegradable household waste, deposited on land; development of new processing, treatment and waste disposal facilities that meet international standards.

Law on waste No. 209 of 29.07.2016[238]

Objective: Establishing the legal basis, the state policy and the necessary measures for protection of the environment and the health of the population by preventing or reducing the effects of waste generation and management. The law transposes Directive 2008/98 / EC of the European Parliament and a number of provisions from about nine regulatory acts of the European Union

GHGs affected by policy: CH_4 and N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2017

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Quantity of biodegradable waste collected separately for composting and fermentation; number of composting stations, individual composting and biodigestion platforms.

Mitigation impact: Not available

Cost and benefit estimate: Specific costs and benefits will be estimated in feasibility studies for development of regional integrated waste management systems.

Low Emission Development Strategy of the Republic of Moldova until 2030 and Action Plan for its implementation, GD No. 1470 of 30.12.2016[239]

Objective: With regard to the waste sector, unconditional reduction, by 2030, of greenhouse

[237] GD No. 248/2013 on approval of the Waste Management Strategy of the Republic of Moldova for the years 2013-2027. Published: 12-04-2013 in the Official Gazette No. 82 art. 306, <https://www.legis.md/cautare/getResults?doc_id=114412&lang=ro>

[238] Law No. 209, of 29.07.2016 on waste, Official Gazette No. 459-471 / 916 of 23.12.2016 < https://www.legis.md/cautare/getResults?doc_id=118272&lang=ro>

[239] GD No. 1470 of 30-12-2016 on approval of Low Emission Development Strategy of the Republic of Moldova until 2030 and of the Action Plan for its implementation Published: 24-03-2017 in the Official Gazette No. 85-91 art. 1470. < https://www.legis.md/cautare/getResults?doc_id=114408&lang=ro>

gas emissions by 38% and conditional reduction of greenhouse gases - by up to 47% compared to 1990

GHGs affected by policy: CH_4 and N_2O

Category of measure: Regulatory

Status: On-going

Included in: Scenario with Existing Measures (WEM) and Scenario with Additional Measures (WAM)

Implementation start: 2017

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Seven municipal solid waste landfills and two mechanical-biological treatment plants in Chisinau and Balti built.

Mitigation impact: 1.827 Mt CO_2 by 2030 in the unconditional scenario

Cost and benefit estimate: 7.8 billion lei.

Regulation on packaging and packaging waste, GD No. 561/2020 [240]

Objective: Recovery of at least 50% of packaging waste by weight; recycling at least 45% of the total weight of packaging materials contained in packaging waste, with achievement of the following minimum values for recycling of each type of material contained in packaging waste: 45% of glass by weight; 50% of paper / cardboard by weight; 40% of metal by weight; 10% of wood by weight; 20% of plastic by weight, considering only recycled plastic material.

GHGs affected by policy: CH_4 and N_2O

Category of measure: Regulatory

Status: On-going

Implementation start: 2021

Included in: Scenario with Existing Measures (WEM)

Responsible entity: Ministry of Agriculture, Regional Development and Environment

Monitoring and evaluation indicators: Waste quantities collected and recovered by type

Mitigation impact: Not available

Cost and benefit estimate: Not available.

[240] GD No. 561 of 31-07-2020 on approval of the Regulation on packaging and packaging waste, Published: 21-08-2020 in the Official Gazette No. 212-220 art. 743. <https://www.legis.md/cautare/getResults?doc_id=122773&lang=ro>

CHAPTER 4. GHG EMISSIONS PROJECTIONS

4.1. Assumptions and Tools Used

4.1.1. Introduction

Within the BUR3 the GHG emissions projections were made for two scenarios: with existing measures (WEM) and with additional measures (WAM).

The need to develop the business-as-usual (BAU) scenario has been dropped due to the fact that when identifying the mitigation targets in the context of the Nationally Determined Contribution (NDC), the RM has chosen the emissions target relative to the 1990 reference year. Thus, GHG emissions in the WEM and WAM are compared to emissions recorded in 1990, and not to emissions under the BAU scenario.

GHG emissions mitigation scenarios were generated for the following sectors: (1) Energy, (2) Industrial Processes and Product Use, (3) Agriculture, (4) LULUCF and (5) Waste.

The mitigation scenarios mentioned above considered the following direct GHG emissions: CO_2, CH_4, N_2O and F-gases.

GHG emissions projections are also expressed in aggregate form (CO_2 equivalent). Projections were made for years 2020, 2025, 2030 and 2035. The GHG emissions for years 1990-2015 corresponds to the actual emissions referred to as GHG emissions inventory results for the period 1990-2019, as reflected in Chapter 2 "*National GHG Inventory*" in BUR3 and in its technical annex *"National Inventory Report: 1990-2019. GHG Sources and Sinks in the Republic of Moldova"* (2021).

Emissions from combustion of fuels in international transport are also presented in this chapter, but they are not accounted in total national emissions.

4.1.2. Scenarios Considered

As already mentioned above, the GHG emissions projections were developed for the years 2020, 2025, 2030 and 2035 for the following scenarios, which also reflect the actual emissions of 1990, 1995, 2000, 2005, 2010 and 2015: (1) WEM scenario – reflects the projections complying with the policies and measures implemented or adopted before 01.01.2020; (2) WAM scenario – reflects policies and measures adopted or under development since 01.01.2020.

4.1.3. Methodologies and Tools Used

The content of this chapter is based on the UNFCCC Biennial Update Reporting Guidelines for Parties not included in Annex I (Decision 2/CP.17, Annex III, Chapter 4)[241].

Computer based tools as well as top-down and bottom-up methodology were used to measure assess the GHG emissions mitigation potential. Mitigation scenarios were developed for each individual sector (Energy, Transport, Industry, Agriculture, LULUCF and Waste), and GHG emissions were estimated separately for each GHG (CO_2, CH_4, N_2O, F-gases). The list of tools considered, and tools selected to be used, along with a brief argument to support the selection, is presented in Table 4-1.

[241] UNFCCC Biennial Update Reporting Guidelines for Parties not included in Annex I to the Convention (Decision 2 / CP.17, Annex 3, Chapter 4).

Table 4-1: Tools used to assess the GHG emissions mitigation potential in the Republic of Moldova

Sector	Recommended tools	Tools used	Observations
Energy	MESSAGE MARKAL ENPEP-BALANCE LEAP	ENPEP, in complex with the subprograms: WASP, IMPACT 2006 IPCC Guidance	1) For the electricity subsector the electricity sources development scenarios were calculated using WASP module, while the GHG emissions mitigation potential - using the IMPACT module; 2) For the thermal power and transport sub-sectors, the GHG emission mitigation potential was assessed using Excel–based calculation tools developed by sectoral experts.
Industry	LEAP	2006 IPCC Guidance	For Industry, Agriculture and LULUCF sectors, the GHG emissions mitigation potential was assessed using the Excel-based calculation tools developed by sectoral experts, and the 2006 IPCC Guidance methodologies. To simulate the evolution of GHG emissions/removals in LULUCF, the LULUCF Matrix for the period 1970-2019 extended for the period 2020-2035, was used.
Agriculture	STAIR		
LULUCF	COPATH		
Waste	LEAP	First Order Decay Method from 2006 IPCC Guidance	The potential for mitigation of methane emissions from solid waste deposits was assessed using the Excel-based calculation tool developed by sectoral experts, and the First Order Decay Methodology (Tier 3) from the 2006 IPCC Guidelines; The potential for mitigation of methane and nitrous oxide emissions from wastewater treatment was assessed by using the 2006 IPCC Guidelines methodologies (Tier 1 and Tier 2), and the Excel-based calculation tools developed by the sectoral experts.

4.1.4. Key Parameters and Assumptions

Table 4-2 shows the projected key parameters for the national economy, and Table 4-3 shows the specific key parameters used for projections made by sectors.

Table 4-2: Key parameters used in scenarios

Parameters	MU	2000	2005	2010	2015	2020	2025	2030	2035
Real GDP	mil $ US	1 289	2 988	6 977	7 746	11 727	17 105	24 266	33 555
Annual GDP growth	%	-2.2	18.3	18.5	2.1	8.6	7.8	7.2	6.7
Stable population, annual average	thousands persons	3 640	3,595	3,562	3,554	No data			
Population with habitual residence, annual average	thousands persons	No data			2 835	2 643	2 541	2 440	2 349
Population growth	%	0.21	-0.25	-0.18	-0.04	-1.39	-0.78	-0.81	-0.76
Price of imported natural gas	$ / 1000m^3	NA	67	273	293	232	296	406	427
Price of imported electricity	cents / kWh	2.75	2.39	5.83	6.80	5.90	5.02	5.28	5.54

Table 4-3: Key parameters used in projections for relevant sectors

Parameters	MU	2000	2005	2010	2015	2020	2025	2030	2035
Power Production									
Electricity demand under WEM and WAM	billion kWh	5.3	6.6	6.0	5.6	5.9	6.3	6.9	7.4
Annual increase in electricity demand	%	NA	4.5	1.9	-1.4	1.0	1.3	1.8	1.4
Transport									
Number of private vehicles	thousand units	NA	NA	NA	637	784	910	1038	1165
Fuel consumption under WEM	PJ	NA	NA	NA	29.8	25.4	29.1	31.8	35.1
Fuel consumption in WAM	PJ	NA	NA	NA	29.8	25.4	28.1	30.3	33.3
Buildings (Residential, Commercial and Tertiary)									
Area of buildings	mil m^2	88.0	89.6	92.2	94.2	102.4	108.2	114.0	119.8
Increasing the ambient temperature during the cold season caused by global warming, allowed	K						0.5	1.1	1.3
Industrial Processes and Product Use									
Cement production, WEM	kt	431.9	772.8	861.4	1 122.8	1 270.0	1 470.0	1 670.0	1 870.0
Cement production, WAM	kt	431.9	772.8	861.4	1 122.8	1 285.0	1,525.0	1 725.0	1 925.0
Steel production, WEM	kt	908.1	1 049.4	242.4	431.8	452.2	577.8	703.5	829.8
Steel production, WAM	kt	908.1	1 049.4	242.4	431.8	457.3	603.0	728.8	855.0
Agriculture									
Areas where the conservation agriculture practices will be employed, WEM	kha	NO	NO	NO	54	100	200	300	400
Areas where the conservation agriculture practices will be employed, WAM	kha	NO	NO	NO	54	100	300	400	500
LULUCF									
Area of annual successful afforestation, WEM	ha	NA	NA	NA	578.9	715.0	3 795.1	5 060.2	6 072.2
Area of annual successful afforestation, WAM	ha	NA	NA	NA	578.9	715.0	4 746.4	5 222.0	10 476.4
Waste									
Municipal solid waste, WEM	kt	523.8	602.5	1 075.1	1 270.7	1 393.7	1 522.5	1 634.4	1 622.6
Municipal solid waste, WAM	kt	523.8	602.5	1 075.1	1 270.7	1 393.7	1 016.1	1 212.0	1 290.2

4.2. Projections of Aggregate Direct GHG Emissions

4.2.1. Projections of Aggregate Direct GHG Emissions by Sector

Following the promotion of GHG emissions mitigation policies and measures described in Chapter 3 and underlying the WEM and WAM scenarios concepts, the assumed impact was calculated for 5 IPCC sectors, expressed in CO_2 equivalent. The results apply to the entire country, including ATULBD, and are shown in Table 4-4 and Figure 4-1.

Table 4-4: Projected aggregate GHG emissions in the RM, kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
WEM										
Energy	36 895	12 310	6 876	8 764	9 328	9 182	8 109	8 017	8 125	8 045
IPPU	1 604	456	314	571	560	763	1 043	1 140	1 183	1 225
Agriculture	5 335	3 410	2 312	2 240	1 967	1 848	1 733	1 963	1 999	2 046
LULUCF	-1 388	-1 762	-1 854	-1 396	-954	-903	-334	-495	-642	-1 243
Waste	1 514	1 590	1 536	1 449	1 479	1 406	1 555	1 519	1 521	1 515
Total (with LULUCF)	**43 961**	**16 005**	**9 185**	**11 629**	**12 379**	**12 296**	**12 106**	**12 144**	**12 187**	**11 588**
Total (without LULUCF)	**45 349**	**17 767**	**11 039**	**13 025**	**13 333**	**13 200**	**12 440**	**12 639**	**12 829**	**12 830**

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
WAM										
Energy	36 895	12 310	6 876	8 764	9 328	9 182	7 887	7 521	7 492	7 512
IPPU	1 604	456	314	571	560	763	1 034	1 089	1 106	1 126
Agriculture	5 335	3 410	2 312	2 240	1 967	1 848	1 721	1 922	1 965	1 990
LULUCF	-1 388	-1 762	-1 854	-1 396	-954	-903	-334	-2 171	-4 041	-7 447
Waste	1 514	1 590	1 536	1 449	1 479	1 406	1 553	1 465	1 135	947
Total (with LULUCF)	**43 961**	**16 005**	**9 185**	**11 629**	**12 379**	**12 296**	**11 861**	**9 825**	**7 656**	**4 128**
Total (without LULUCF)	**45 349**	**17 767**	**11 039**	**13 025**	**13 333**	**13 200**	**12 195**	**11 996**	**11 697**	**11 575**

As can be seen in Figure 4-1, GHG emissions under the WEM are lower than the commitments made by the Republic of Moldova through the updated NDC in 2020. Thus, by 2030 GHG emissions are expected to be lower than in 1990 by 72.3%, compared to 70% according to the unconditional updated NDC. By 2035, net GHG emissions will continue to decrease, reaching a 73.6% reduction versus 1990. Under the WAM, GHG emissions reductions by 2030 will be lower than those set up in the updated conditional NDC, for sector-specific reasons, considered separately in the following chapters dedicated to GHG emissions by sector.

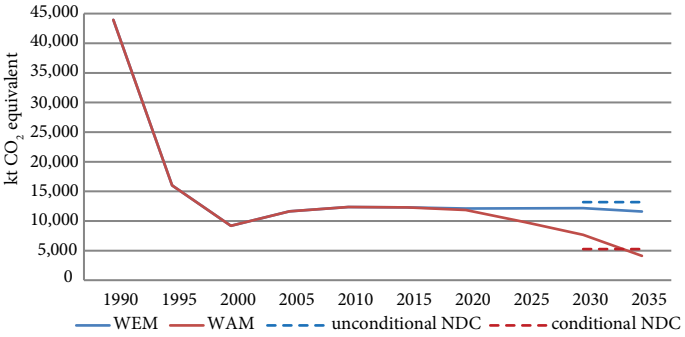


Figure 4-1: Projected net total GHG emissions (with LULUCF) under both scenarios.

The most significant contribution towards achieving these objectives comes from the Energy and the LULUCF sectors, as seen in Figure 4-2 showing the GHG emissions for the sectors under review.

Due to promotion of energy efficiency and attraction of renewable energy sources in the country's energy balance, the GHG emissions from the energy sector tends to maintain their level compared to 2015 under both WEM and WAM scenarios, while the real GDP of the country is expected to grow by 333% by 2035 compared to 2015. The same trend is observed in agriculture sector, due to use of conservation agriculture practices, with effects of increased yields on cultivated land. On the other hand, in LULUCF sector, expansion of wooded areas, meadows and implementation of sustainable agricultural practices will result in gradual increase of GHG removals, especially under the WAM scenario. These findings are supported by Table 4-5 and Figure 4-3, which show the projected GHG emissions reductions for 2025 and 2035 compared to the reference year (1990), according to WEM and WAM scenarios.

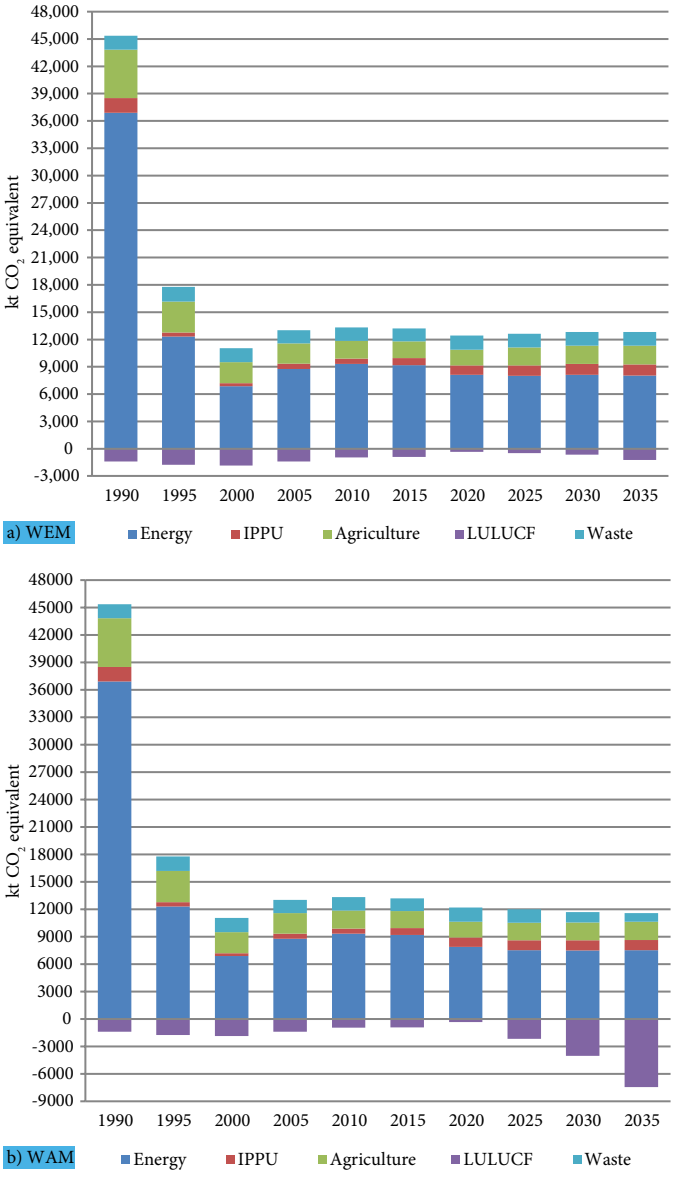


Figure 4-2: Sectors share in total GHG emissions under WEM (a) and WAM (b) scenarios.

Table 4-5: GHG emission reductions anticipated for 2025, 2030 and 2035 compared to 1990, according to WEM and WAM scenarios, kt CO_2 equivalent

Sectors	WEM			WAM		
	2025	2030	2035	2025	2030	2035
Energy	-28 878	-28 770	-28 851	-29 374	-29 404	-29 384
IPPU	-464	-420	-379	-515	-498	-478
Agriculture	-3 372	-3 336	-3 290	-3 414	-3 371	-3 346
LULUCF	892	746	145	-783	-2 653	-6 059
Waste	4	7	1	-50	-379	-567
Total (with LULUCF)	**-31 817**	**-32 519**	**-32 373**	**-34 136**	**-33 651**	**-39 833**
Total (without LULUCF)	**-32 710**	**-31 774**	**-32 518**	**-33 353**	**-36 305**	**-33 774**

Figure 4-3 shows the evolution of individual GHG emissions, under the WEM and WAM scenarios, compared to emissions reported in 1990.

F-gases should not require significant attention, as their share in the total emissions at national level does not exceed 3% during the period under review, under both scenarios (exception: 3.6% under the WAM, 2035).

As shown in Figure 4-3, in the post-2015 period the amounts of CO_2 and CH_4 emissions tend to decrease, while the N_2O, conversely, increase, under both WEM and WAM. This evolution is explained by the gradual increase of livestock and poultry over the years up to 2035, as well as carbon loss through the mineralization process due to the change in land use and soil management practices over the years up to 2035, which increases N_2O emissions (in particular, from the 3D source category "Agricultural Soils"). It should be noted that the share of N_2O in the total GHG emissions during 2020-2035 is expected around 12-16% under the WEM, and around 12-45% under the WAM scenarios. It should also be noted that the WAM shows net CO_2 level of almost zero by 2035, mainly due to the extensive promotion of conservation agriculture, afforestation, and significant increase of grasslands.

The projected direct GHG emissions (with LULUCF) under the considered scenarios up to 2035 are presented in Table 4-6.

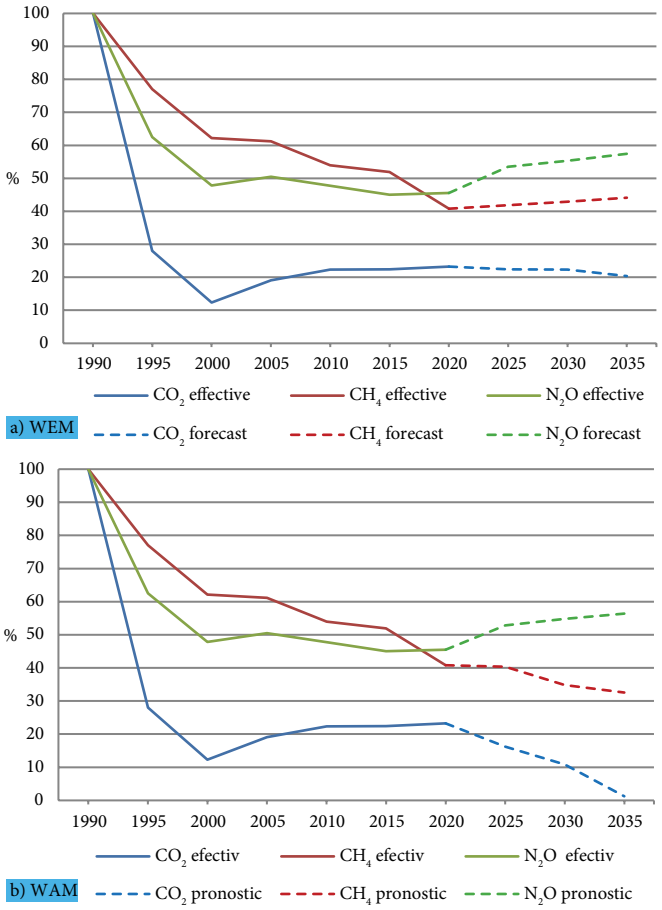


Figure 4-3: GHG emissions by type, according to WEM (a) and WAM (b), compared to 1990, %.

Table 4-6: Projected direct GHG emissions (with LULUCF) in the Republic of Moldova under the considered scenarios up to 2035, kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
WEM										
Total CO_2 emissions	35 460	9 927	4 362	6 755	7 917	7 953	8 245	7 945	7 920	7 228
Total CH_4 emissions	5 244	4 041	3 260	3 208	2 829	2 723	2 140	2 193	2 249	2 313
Total emissions of N_2O	3 257	2 036	1 558	1 644	1 556	1 466	1 483	1 742	1 803	1 870
Total emissions of F-gases	-	1	5	23	78	154	239	264	216	176
Total national emissions (with LULUCF)	**43 961**	**16 005**	**9 185**	**11 629**	**12 379**	**12 296**	**12 106**	**12 144**	**12 187**	**11 588**
WAM										
Total CO_2 emissions	35 460	9 927	4 362	6 755	7 917	7 953	8 245	5 738	3 850	435
Total CH_4 emissions	5 244	4 041	3 260	3 208	2 829	2 723	2 140	2 117	1 827	1 705
Total emissions of N_2O	3 257	2 036	1 558	1 644	1 556	1 466	1 483	1 720	1 785	1 837
Total emissions of F-gases	-	1	5	23	78	154	239	250	195	152
Total national emissions (with LULUCF)	**43 961**	**16 005**	**9 185**	**11 629**	**12 379**	**12 296**	**12 106**	**9 825**	**7 656**	**4 128**

4.2.2. Comparison of GHG Emissions Projections from BUR2 and BUR3

Table 4-7 shows the difference between GHG emissions projections (without LULUCF) made in BUR2 and BUR3, as well as the parameters that have undergone the most important change with the respective impact on emissions. The difference between the projected GHG removals/emissions for the LULUCF sector, as described in BUR2 and BUR3, is presented in Chapter 4.3.4.

As seen from Table 4-7, both WEM and WAM show a decrease in GHG emissions in BUR3 compared to BUR2. Such change is mainly due to the overestimation of the electricity demand projected in BUR2.

Table 4-7: Comparison of projections made in BUR2 and BUR3

Indicators	Unit of measure	2020	2025	2030
Annual GDP growth in BUR3	%	8.6	7.8	7.2
Real GDP BUR2	%	9.8	7.6	7.6
BUR3-BUR2 difference	%	-1.2	0.2	-0.4
Electricity demand in BUR3, WEM	billion kWh	5.9	6.3	6.9
Electricity demand in BUR2, WEM	billion kWh	7.4	9.1	10.9
BUR3-BUR2 difference compared to BUR2, WEM	%	-20.3	-30.8	-36.7

Indicators	Unit of measure	2020	2025	2030
Electricity demand in BUR3, WAM	billion kWh	5.9	6.3	6.9
Electricity demand in BUR2, WAM	billion kWh	6.0	6.7	7.4
BUR3-BUR2 difference compared to BUR2, WAM	%	-1.7	-6.0	-6.8
Total emissions in WEM, BUR3 (without LULUCF)	kt CO_2 equivalent	12 440	12 639	12 829
Total emissions in WEM, BUR2 (without LULUCF)	kt CO_2 equivalent	13 334	13 472	14 506
BUR3-BUR2 difference compared to BUR2, WEM	%	-6.7	-6.2	-11.6
Total emissions in WAM, BUR3 (without LULUCF)	kt CO_2 equivalent	12 195	11 996	11 697
Total emissions in WAM, BUR2 (without LULUCF)	kt CO_2 equivalent	12 307	12 074	12 488
BUR3-BUR2 difference compared to BUR2, WAM	%	-0.9	-0.6	-6.3

4.3. Projections of Direct GHG Emissions by Sectors

4.3.1. Energy Sector

The energy sector generates GHG emissions by combusting and transforming fossil fuels. Fugitive emissions are mainly generated as methane in the process of extracting, transportation and processing natural gas. The WASP calculation tool was used to develop scenarios for the energy sector, and GHG emissions from this sector were calculated by using the emission factors reported in the "*National Inventory Report: 1990-2019. GHG Sources and Sinks in the Republic of Moldova*". The 2006 IPCC Guidelines and its calculation tool was used for the other sectors.

The WEM and WAM scenarios include the measures set out in Chapter 3.5.1. Additionally, the WAM included measures contained in draft documents and studies, as well as those approved after 01.01.2020, including:

1. The new draft of the Energy Strategy of the Republic of Moldova until 2030;
2. Draft amendment to the Government Decision no. 689/2018 on approval of capacity limits, maximum quotas and capacity categories for electricity from renewable sources until 2020 (782 / MEI / 2020)[242] ;
3. ANRE draft Decision on approval of the Methodology for calculating technological consumption and natural gas losses in the distribution networks[243] ;
4. Evaluation of electricity sources development options in the Republic of Moldova. USAID, August 2020[244] ;
5. Environmental and social impact assessment for Component 1 and environmental and social management framework for Component 2. World Bank, April, 2020[245] ;

Measures to mitigate GHG emissions mainly include energy efficiency, efficient power generation technologies, and use of energy from renewable energy sources.

Projections of CO_2 emissions

In the energy sector the share of CO_2 emissions in the total GHG emissions in 2019 accounted for about 91.3%. The CO_2 emissions projections assessment for the energy sector are presented in Table 4-8 and Figure 4-4.

[242] <https://cancelaria.gov.md/ro/content/pentru-modificare-hotararii-guvernului-nr-6892018-cu-privire-la-aprobarea-limitelor-de>
[243] <http://www.anre.md/consultari-publice-3-27 project no. 137>
[244] <https://pdf.usaid.gov/pdf_docs/PA00X1TX.pdf>
[245] The second project to improve the efficiency of the central heat supply system. World Bank, Consolidated Unit for the Implementation and Monitoring of Energy Projects. <https://mepiu.md/dheip-ii-esia-esmf-april-12-2020-final.docx>

Table 4-8: Projections of CO_2 emissions by 2035 for the energy sector, kt CO_2

	1990	2010	2015	2020	2025	2030	2035
WEM							
1. Energy	**35 401.5**	**8 632.2**	**8 414.1**	**7 880.8**	**7 669.2**	**7 698.9**	**7 528.1**
1A. Fuel Combustion Activities	**35 400.9**	**8 630.9**	**8 412.4**	**7 879.2**	**7 667.7**	**7 697.7**	**7 526.8**
1A1. Energy Industries	21 300.3	4 054.4	3 686.3	3 704.0	3 252.3	2 872.8	2 718.6
1A2. Manufacturing Industries and Construction	1 916.8	422.6	651.5	689.9	745.7	801.0	885.4
1A3. Transport	4 697.5	2 140.6	2 261.6	1 731.7	1 925.1	2 105.6	2 000.0
1A4. Other Sectors	7 372.3	1 986.0	1 790.2	1 730.9	1 721.8	1 895.6	1 900.0
1A5. Other	114.0	27.3	22.7	22.7	22.7	22.7	22.7
1B. Fugitive Emissions from Fuels	**0.6**	**1.3**	**1.7**	**1.5**	**1.5**	**1.2**	**1.3**
1B2. Oil and Natural Gas	0.6	1.3	1.7	1.5	1.5	1.2	1.3
WAM							
1. Energy	**35 401.5**	**8 632.2**	**8 414.1**	**7 661.5**	**7 177.4**	**7 086.0**	**7 014.9**
1A. Fuel Combustion Activities	**35 400.9**	**8 630.9**	**8 412.4**	**7 660.0**	**7 175.8**	**7 084.8**	**7 013.7**
1A1. Energy Industries	21 300.3	4 054.4	3 686.3	3 690.8	3 116.8	2 690.1	2 654.7
1A2. Manufacturing Industries and Construction	1 916.8	422.6	651.5	688.1	710.2	723.2	736.3
1A3. Transport	4 697.5	2 140.6	2 261.6	1 686.3	1 847.8	1 983.7	2 000.0
1A4. Other Sectors	7 372.3	1 986.0	1 790.2	1 572.0	1 478.3	1 665.1	1 600.0
1A5. Other	114.0	27.3	22.7	22.7	22.7	22.7	22.7
1B. Fugitive Emissions from Fuels	**0.6**	**1.3**	**1.7**	**1.5**	**1.6**	**1.2**	**1.2**
1B2. Oil and Natural Gas	0.6	1.3	1.7	1.5	1.6	1.2	1.2

As seen, CO_2 emissions under WEM and WAM slightly decrease after 2020, even if GDP has an upward trend, above 6.7% annual growth, which should normally lead to an increase in the amount of CO_2. CO_2 emissions by 2035, will decrease under WEM and WAM by 10.5% and, respectively, 16.6% compared to 2015. The reason for such evolution is mainly the widespread promotion of energy efficiency and renewable energy sources.

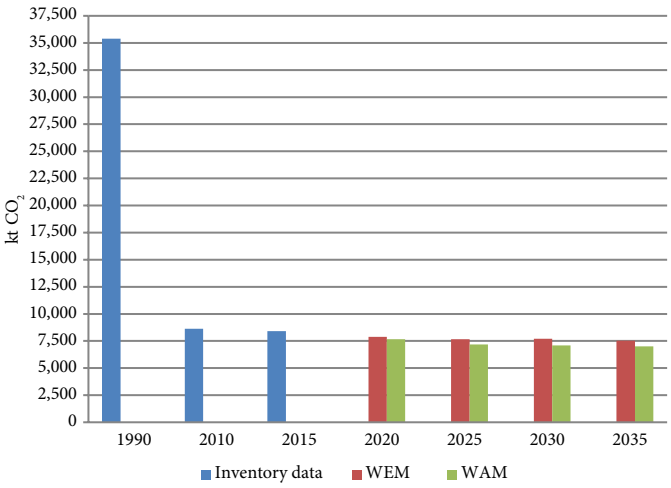


Figure 4-4: Projections of CO_2 emissions until 2035 for the energy sector, kt CO_2.

Projections of CH_4 emissions

In the energy sector the share of CH_4 emissions in the total GHG emissions at sector level in 2015 amounted to about 7.5%, of which 82.3% are fugitive emissions from oil and gas operations. Projections of CH_4 emissions resulting from burning and transformation of fossil fuels were made based on the assumed fossil fuel consumption using calculation methods available in the 2006 IPCC Guidelines, as well as emission factors reported in the "*National Inventory Report:1990-2019. GHG Sources and Sinks in the Republic of Moldova*". The calculations results are shown in Table 4-9.

Table 4-9: Projections of CH_4 emissions from the energy sector until 2035, kt CO_2 equivalent

	2010	2015	2020	2025	2030	2035
WEM						
1. Energy	**633.3**	**688.6**	**194.1**	**311.2**	**386.3**	**480.0**
1A. Fuel Combustion Activities	**53.5**	**122.0**	**29.9**	**29.7**	**31.2**	**30.1**
1A1. Energy Industries	2.2	1.6	1.5	1.3	1.1	1.1
1A2. Manufacturing Industries and Construction	0.3	1.0	0.9	0.9	0.9	1.0
1A3. Transport	11.8	10.7	9.5	10.4	11.2	10.0
1A4. Other Sectors	39.1	108.6	18.0	17.2	18.0	18.0
1A5. Other	0.1	0.0	0.0	0.0	0.0	0.0
1B. Fugitive Emissions from Fuels	**579.8**	**566.6**	**164.2**	**281.5**	**355.0**	**449.9**
1B2. Oil and Natural Gas	579.8	566.6	164.2	281.5	355.0	449.9
WAM						
1. Energy	**633.3**	**688.6**	**192.2**	**308.3**	**370.3**	**460.4**
1A. Fuel Combustion Activities	**53.5**	**122.0**	**27.9**	**26.8**	**27.3**	**27.0**
1A1. Energy Industries	2.2	1.6	1.4	1.2	1.1	1.1
1A2. Manufacturing Industries and Construction	0.3	1.0	0.9	0.9	0.0	0.9
1A3. Transport	11.8	10.7	9.5	10.4	11.1	10.0
1A4. Other Sectors	39.1	108.6	16.1	14.2	15.1	15.0
1A5. Other	0.1	0.0	0.0	0.0	0.0	0.0
1B. Fugitive Emissions from Fuels	**579.8**	**566.6**	**164.2**	**281.5**	**343.0**	**433.4**
1B2. Oil and Natural Gas	579.8	566.6	164.2	281.5	343.0	433.4

Projected N_2O emissions

The share of N_2O emissions in the total GHG emissions at sector level is modest, accounting for only 1.4% of the total. Similarly with CH_4 emissions, the N_2O emissions resulting from combusting and transformation of fossil fuels were calculated on the basis of assumed fossil fuel consumption using the calculation methods available in the 2006 IPCC Guidelines. The calculations results are shown in Table 4-10.

Table 4-10: Projections of N_2O emissions from the energy sector until 2035, kt CO_2 equivalent

	2010	2015	2020	2025	2030	2035
WEM						
1. Energy	**62.3**	**79.9**	**34.3.**	**36.8**	**40.1**	**36.7**
1A. Fuel Combustion Activities	**62.3**	**79.9**	**34.3.**	**36.8**	**40.1**	**36.7**
1A1. Energy Industries	2.9	2.0	2.1	1.9	1.7	1.5
1A2. Manufacturing Industries and Construction	0.4	1.6	2.1	2.1	2.2	2.4
1A3. Transport	36.5	35.7	27.7	30.4.	33.4	30.0
1A4. Other Sectors	22.2.	40.4	2.3	2.5	2.9	2.8
1A5. Other	0.2	0.1	0.0	0.0	0.0	0.0
1B. Fugitive Emissions from Fuels	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
1B2. Oil and Natural Gas	0.0	0.0	0.0	0.0	0.0	0.0
WAM						
1. Energy	**62.3**	**79.9**	**33.4**	**35.2**	**35.3.**	**36.3**
1A. Fuel Combustion Activities	**62.3**	**79.9**	**33.4**	**35.2**	**35.3.**	**36.3**
1A1. Energy Industries	2.9	2.0	2.1	1.8	1.5	1.5
1A2. Manufacturing Industries and Construction	0.4	1.6	2.1	2.2	0.0	2.2
1A3. Transport	36.5	35.7	27.0	29.0	31.2	30.0
1A4. Other Sectors	22.2.	40.4	2.1	2.2	2.6	2.5
1A5. Other	0.2	0.1	0.0	0.0	0.0	0.0
1B. Fugitive Emissions from Fuels	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
1B2. Oil and Natural Gas	0.0	0.0	0.0	0.0	0.0	0.0

Projections of aggregated total GHG emissions

Table 4-11 and Figure 4-5 show the aggregate GHG emissions projections in the energy sector, including transport, which can be compared with emissions reported in 1990, the baseline year, and the updated NDC reference year. The analysis of these data shows that the energy sector, distinguished by the largest contribution to GHG emissions in the Republic of Moldova (67.5%, 2019), will significantly contribute to achieving the country's commitments towards reducing GHG emissions. Thus, by 2035 the level of GHG emissions under WEM and WAM compared to 1990 will be 21.8% and 20.4%, respectively.

Table 4-11: Projections of aggregated total GHG emissions from the energy sector, kt CO_2 eq.

	1990	2010	2015	2020	2025	2030	2035
WEM							
1. Energy	**36 895.3**	**9 327.8**	**9 182.5**	**8 109.2**	**8 017.2**	**8 125.3**	**8 044.7**
1A. Fuel Combustion Activities	**36 082.4**	**8 746.7**	**8 614.2**	**7 943.4**	**7 734.1**	**7 769.1**	**7 593.6**
1A1. Energy Industries	21 364.2	4 059.6	3 690.0	3 707.5	3 255.5	2 875.6	2 721.2
1A2. Manufacturing Industries and Construction	1 923.4	423.3	654.2	692.9	748.6	804.1	888.8
1A3. Transport	4 837.9	2 188.9	2 308.0	1 768.9	1 965.9	2 150.2	2 040.0
1A4. Other Sectors	7 841.3	2 047.4	1 939.2	1 751.3	1 741.4	1 916.4	1 920.8
1A5. Other	115.6	27.5	22.9	22.7	22.7	22.7	22.7
1B. Fugitive Emissions from Fuels	**812.9**	**581.1**	**568.3**	**165.8**	**283.1**	**356.2**	**451.2**
1B2. Oil and Natural Gas	812.9	581.1	568.3	165.8	283.1	356.2	451.2
WAM							
1. Energy	**36 895.3**	**9 327.8**	**9 182.5**	**7 887.0**	**7 520.9**	**7 491.6**	**7 511.5**
1A. Fuel Combustion Activities	**36 082.4**	**8 746.7**	**8 614.2**	**7 721.3**	**7 237.8**	**7 147.4**	**7 076.9**
1A1. Energy Industries	21 364.2	4 059.6	3 690.0	3 694.4	3 119.8	2 692.7	2 657.3
1A2. Manufacturing Industries and Construction	1 923.4	423.3	654.2	691.1	713.4	723.3	739.4
1A3. Transport	4 837.9	2 188.9	2 308.0	1 722.8	1 887.2	2 026.0	2 040.0
1A4. Other Sectors	7 841.3	2 047.4	1 939.2	1 590.3	1 494.7	1 682.7	1 617.5
1A5. Other	115.6	27.5	22.9	22.7	22.7	22.7	22.7
1B. Fugitive Emissions from Fuels	**812.9**	**581.1**	**568.3**	**165.8**	**283.1**	**344.2**	**434.6**
1B2. Oil and Natural Gas	812.9	581.1	568.3	165.8	283.1	344.2	434.6

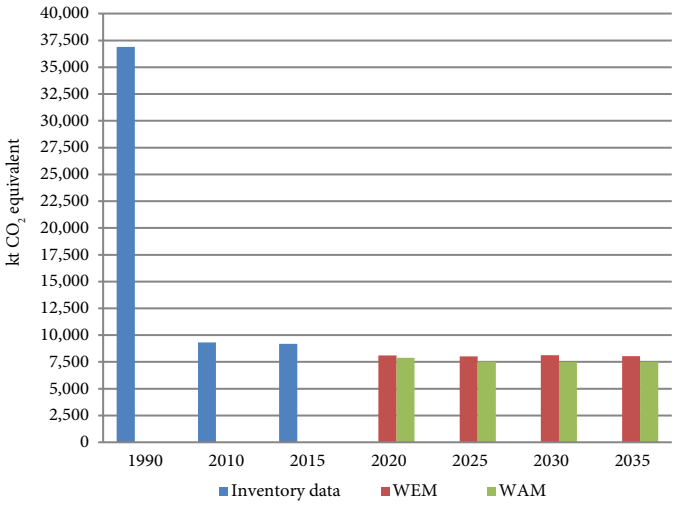


Figure 4-5: Projections of aggregated total GHG emissions from the energy sector, kt CO_2 eq.

Sensitivity analysis

Sensitivity Analysis (SA) in the energy sector was undertaken for two sub-sectors, 1A.1. Energy industries and 1A.3. Transport, that together produce 62.1% (33.5% and 28.6%, respectively, 2019) of the total GHG emissions of the energy sector. Given that the most important sensitivity parameters for these sub-sectors are not common, the analysis will be carried out separately for each.

1A.1. Energy Industries

The study on electricity sources development in BUR3 was carried out based on the WASP Model. The optimal economic solution is determined by several parameters, of which the most influential and with a higher probability of change over time are:

– The specific value of investment in construction of district heating power plants based on internal combustion engines that will run on natural gas. Instead of 700, the SA uses 1,062 US $ / kWh, a value found in a thematic study carried out by USAID in 2020[5] .

– The discount rate value. Instead of the 10% discount rate, the SA uses the value of 8.28%, taking into account ANRE's decision in this regard, which uses this rate when approving fixed tariffs and ceiling prices for electricity produced from renewable sources by eligible producers.

Calculations have shown that solutions for the development of electricity sources remain unchanged, i.e. all power plants produce the same amounts of electricity and consume the same type and amount of fuel, without changing the amounts of emitted GHGs.

1A.3. Transport

For the purpose of the sensitivity analysis, two key indicators were considered: evolution of the real GDP (expressed in US dollars 2010) and population numbers, key factors influencing the evolution of the transport sector and, respectively, fuel consumption. A variation of +1% of the two key indicators was used. The results are presented in Table 4-12, which shows that the used variation insignificantly affected GHG emissions.

Table 4-12: Sensitivity analysis (SA) of GHG emissions in the transport sector

	Last year of inventory	2020	2025	2030	2035
The impact of real GDP variation					
GHG emissions under WEM, kt CO_2 equivalent	2382.9	1705.5	1955.9	2142.6	2373.3
GHG emissions - sensitivity analysis (SA), kt CO_2 equivalent	2382.9	1705.2	1955.6	2142.5	2373.2
Difference WEM-SA, %	0.000	-0.020	-0.013	-0.004	-0.001
The impact of population numbers					
GHG emissions under WEM, kt CO_2 equivalent	2382.9	1705.5	1955.9	2142.6	2373.3
GHG emissions - sensitivity analysis (SA), kt CO_2 equivalent	2382.9	1709.9	1959.9	2146.3	2376.7
Difference WEM-SA, %	0.000	0.259	0.208	0.174	0.146
The impact of the combined variation of GDP and population numbers					
GHG emissions under WEM, kt CO_2 equivalent	2382.9	1705.5	1955.9	2142.6	2373.3
GHG emissions - sensitivity analysis (SA), kt CO_2 equivalent	2382.9	1709.6	1959.7	2146.2	2376.7
Difference WEM-SA, %	0.000	0.239	0.195	0.170	0.145

4.3.2. Industrial Processes and Product Use Sector

The GHG emissions reduction measures taken into account for this sector are described in Chapter 3.5.2. Emissions of carbon dioxide (CO_2), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6) were considered under the WEM and WAM scenarios for the IPPU sector.

Projections of CO_2 emissions

In the IPPU sector, CO_2 emissions are generated by source categories 2A "Mineral Industry", 2C "Metal Industry", 2D "Non-Energy Products from Fuels and Solvent Use" and 2G "Other Product Manufacture and Use". Category 2A accounts for about 61% (2019) of total sectoral emissions, of which about 87% come from cement production.

Both scenarios show a continuous growth of cement production, which however, will not reach the level of the reference year (by 2035, the cement production in the Republic of Moldova will be 18.3% below the level of 1990 under WEM, respectively by 15.9 % under WAM). Continuous reduction of clinker content in cement brands in the Republic of Moldova is expected (by 10.5% below 1990 levels – WEM and 21.9% below the reference year – WAM). Compared to the reference year, CO_2 emissions reduction from cement production in 2035 is anticipated by about 29.1% under WEM and by about 36.9% under WAM. Results of CO_2 emissions calculations are shown in Table 4-13.

Table 4-13: Projections of CO_2 emissions in the IPPU sector until 2035, kt

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
WEM										
2. Industrial Processes and Product Use	**1603.7**	**455.1**	**309.3**	**548.8**	**482.1**	**608.9**	**804.1**	**875.9**	**967.7**	**1048.5**
A. Mineral Industry	1337.4	351.2	239.4	437.5	404.4	505.1	621.9	669.8	737.1	792.8
C. Metal Industry	28.5	26.2	36.3	41.9	9.7	17.3	17.9	22.6	27.1	31.6
D. Non-Energy Products from Fuels and Solvent Use	234.4	76.6	32.6	68.2	66.2	84.6	161.5	180.5	200.0	220.2
G. Other Product Manufacture and Use	3.4	1.2	1.0	1.2	1.7	2.0	2.8	3.2	3.5	3.9
WAM										
2. Industrial Processes and Product Use	**1603.7**	**455.1**	**309.3**	**548.8**	**482.1**	**608.9**	**797.2**	**838.2**	**911.6**	**974.6**
A. Mineral Industry	1337.4	351.2	239.4	437.5	404.4	505.1	609.6	626.9	676.8	716.8
C. Metal Industry	28.5	26.2	36.3	41.9	9.7	17.3	17.9	22.1	24.7	26.0
D. Non-Energy Products from Fuels and Solvent Use	234.4	76.6	32.6	68.2	66.2	84.6	166.9	185.9	206.4	227.5
G. Other Product Manufacture and Use	3.4	1.2	1.0	1.2	1.7	2.0	2.8	3.3	3.7	4.2

Projections of F-gases emissions

In the Republic of Moldova, the most important sources of F-gas emissions come from category 2F1 "Refrigeration and air conditioning equipment" (approx. 60%, 2019) and 2F2 "Foam blowing" (approx. 39%). A significant increase in HFC emissions is expected for category 2F "Product Uses as Substitutes for ODS" – about 171.3 times under WEM and about 147.2 times under WAM, compared to the 1995 level. (Table 4 -14).

Table 4-14: Projections of F-gases emissions in the IPPU sector by 2035, kt CO_2 equivalent

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
	WEM									
2F. Product Uses as Substitutes for ODS	**NO**	**1.0**	**5.1**	**22.5**	**77.9**	**153.9**	**239.2**	**264.0**	**215.7**	**176.4**
2F1. Refrigeration and Air Conditioning Equipment	NO	0.8	3.8	10.2	23.3	71.2	144.3	169.8	159.2	147.5
2F2. Foam Blowing	NO	0.3	1.3	12.3	54.6	82.6	90.5	88.9	51.4	23.8
2F3. Fire Protection	NO	NO	NO	NO	NO	NO	4.4	5.3	5.2	5.0
2F4. Aerosols	NO	NO	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	WAM									
2F. Product Uses as Substitutes for ODS	**NO**	**1.0**	**5.1**	**22.5**	**77.9**	**153.9**	**236.5**	**250.4**	**194.5**	**151.6**
2F1. Refrigeration and Air Conditioning Equipment	NO	0.8	3.8	10.2	23.3	71.2	141.9	158.3	143.3	128.9
2F2. Foam Blowing	NO	0.3	1.3	12.3	54.6	82.6	90.2	86.2	45.6	17.3
2F3. Fire Protection	NO	NO	NO	NO	NO	NO	4.4	5.9	5.7	5.4
2F4. Aerosols	NO	NO	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0

At the same time, compared to the historical level of emissions reported in 2019, it is anticipated that by 2035 the HFCs emissions will decrease by 23.3% under WEM, and by 34.1% under WAM.

Projections of aggregated total GHG emissions

Table 4-15 and Figure 4-6 show projections of aggregated total GHG emissions from the IPPU sector that can be compared with GHG emissions reported in 1990. The comparison results show that by 2035 the respective emissions will account for about 76.4% of the reference 1990 year under WEM and for about 70.2% of the 1990 under WAM. The trend towards a slight increase in GHG emissions in this sector will be maintained until 2035. Implementation of mitigation policies in this sector will allow to temper the growth under the WAM scenario.

Table 4-15: Projections of aggregated total GHG emissions from IPPU sector by 2035, kt CO_2 eq.

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
WEM										
2. Industrial Processes and Product Use	**1603.7**	**456.2**	**314.4**	**571.3**	**560.0**	**762.8**	**1043.3**	**1140.0**	**1183.4**	**1224.9**
2A. Mineral Industry	1337.4	351.2	239.4	437.5	404.4	505.1	621.9	669.8	737.1	792.8
2C. Metal Industry	28.5	26.2	36.3	41.9	9.7	17.3	17.9	22.6	27.1	31.6
2D. Non-Energy Products from Fuels and Solvent Use	234.4	76.6	32.6	68.2	66.2	84.6	161.5	180.5	200.0	220.2
2F. Product Uses as Substitutes for ODS	NO	1.0	5.1	22.5	77.9	153.9	239.2	264.0	215.7	176.4
2G. Other Product Manufacture and Use	3.4	1.2	1.0	1.2	1.7	2.0	2.8	3.2	3.5	3.9
WAM										
2. Industrial Processes and Product Use	**1603.7**	**456.2**	**314.4**	**571.3**	**560.0**	**762.8**	**1033.7**	**1088.6**	**1106.1**	**1126.1**
2A. Mineral Industry	1337.4	351.2	239.4	437.5	404.4	505.1	609.6	626.9	676.8	716.8
2C. Metal Industry	28.5	26.2	36.3	41.9	9.7	17.3	17.9	22.1	24.7	26.0
2D. Non-Energy Products from Fuels and Solvent Use	234.4	76.6	32.6	68.2	66.2	84.6	166.9	185.9	206.4	227.5
2F. Product Uses as Substitutes for ODS	NO	1.0	5.1	22.5	77.9	153.9	236.5	250.4	194.5	151.6
2G. Other Product Manufacture and Use	3.4	1.2	1.0	1.2	1.7	2.0	2.8	3.3	3.7	4.2

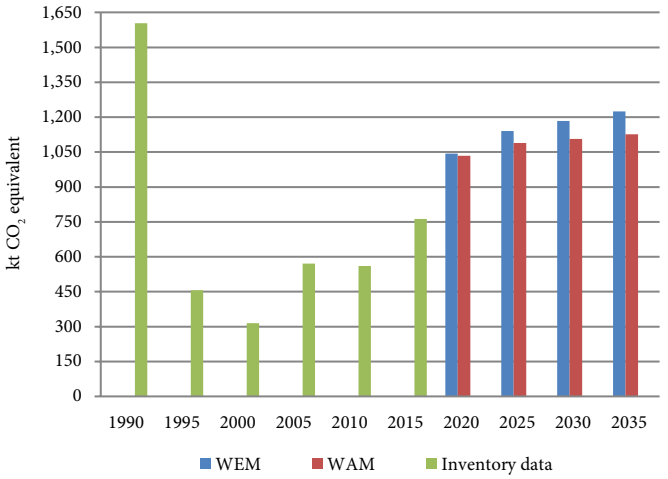


Figure 4-6: Projections of aggregated total GHG emissions from IPPU sector until 2035.

Sensitivity Analysis

Given that the source category 1A1 "Cement production" had a maximum share of 63.9% and a minimum share of 52.8% in the structure of total GHG emissions from IPPU sector, the amount of cement produced, respectively, the ratio of tones of clinker produced relative to one tone of cement produced, are the main indicators that could potentially affect the trend of GHG emissions from IPPU sector. The sensitivity analysis is based on the scenario in which the amount of cement produced would be 5% higher, and the ratio of tons of clinker produced to one ton of cement, respectively 2.5% higher than the values expected in the WEM during years 2020-2035 (Table 4-16).

Given the increase of the amount of cement produced by 5%, respectively of the ratio of tons of clinker produced to one ton of cement produced by about 2.5%, during the years 2020-2035, we could anticipate an increase in GHG emissions from IPPU sector by about 3.9-4.3%, compared to the values calculated for the WEM scenario (Table 4-16).

Table 4-16: Sensitivity analysis (SA) for GHG emissions in IPPU sector compared to those included in the WEM scenario

	2019	2020	2025	2030	2035
Cement production, WEM, kt	1 220.2	1 270.0	1 470.0	1 670.0	1 870.0
Cement production, SA, kt	1 220.2	1 333.5	1 543.5	1 753.5	1 963.5
WEM-SA difference, %	**0.0**	**5.0**	**5.0**	**5.0**	**5.0**
Clinker production, WEM, kt	982.1	1 014.3	1 102.5	1 227.5	1 318.4
Clinker production, SA, kt	982.1	1 091.6	1 186.6	1 321.0	1 418.9
WEM-SA difference, %	**0.0**	**7.6**	**7.6**	**7.6**	**7.6**
Clinker / cement ratio, WEM	0.8	0.8	0.8	0.7	0.7
Clinker / cement ratio, SA	0.8	0.8	0.8	0.8	0.7
WEM-SA difference, %	**0.0**	**2.5**	**2.5**	**2.5**	**2.5**
Total GHG emissions from IPPU sector, WEM, kt	992.2	1 043.3	1 140.0	1 183.4	1 224.9
Total GHG emissions from IPPU sector, SA, kt	992.2	1 084.6	1 184.7	1 232.8	1 277.4
WEM-SA difference, %	**0.0**	**4.0**	**3.9**	**4.2**	**4.3**

4.3.3. Agriculture Sector

Within the agriculture sector, CH_4 emissions are monitored from the animal husbandry sector, in particular from source categories 3A "Enteric Fermentation" and 3B "Manure Management", emissions of N_2O emissions from the source categories 3B "Manure Management" and 3D "Agricultural Soils", and CO_2 emissions from the source category 3H "Urea Application".

The key indicators and the main working assumptions used for projecting GHG emissions from agriculture sector are provided below for the two scenarios, taking into account the sectoral policies set out in Chapter 3.5.3.

Table 4-17 shows the projections of livestock and poultry numbers, and Table 4-18 shows the share of different manure management systems (MS%) by 2035.

According to Table 4-17, there is a tendency to return to the manure management practices specific to the 90s of the twentieth century.

Table 4-17: Projections of livestock and poultry numbers over1990-2035, thousands of heads

Animal Categories	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
	WEM									
Cattle	1 060.7	729.5	445.4	339.8	236.4	204.5	126.0	110.0	95.0	80.0
Dairy cows	395.2	380.8	298.5	233.1	165.8	137.7	82.0	70.0	60.0	50.0
Other cattle	665.5	348.7	146.9	106.7	70.5	66.9	44.0	40.0	35.0	30.0
Sheep	1 244.8	1 326.6	846.3	827.0	793.1	722.2	470.0	460.0	450.0	440.0
Goats:	37.1	96.4	115.8	127.3	127.5	158.6	135.0	125.0	115.0	105.0
Horses	47.2	61.6	76.0	72.0	53.6	40.2	24.0	22.0	20.0	18.0
Asses	1.7	3.2	3.8	3.7	2.8	2.0	1.3	1.2	1.1	1.0
Swine	1 850.1	1 016.4	492.7	493.0	511.7	484.5	420.0	415.0	410.0	405.0
Rabbits	283.0	209.3	161.3	278.9	277.0	350.2	325.0	320.0	315.0	310.0
Poultry	24 625.0	13 746.4	13 624.9	22 773.6	23 782.5	12 590.6	10 750.0	10 500.0	10 250.0	9 990.0
	WAM									
Cattle	1 060.7	729.5	445.4	339.8	236.4	204.5	122.0	100.0	85.0	70.0
Dairy cows	395.2	380.8	298.5	233.1	165.8	137.7	80.0	65.0	55.0	45.0
Other cattle	665.5	348.7	146.9	106.7	70.5	66.9	42.0	35.0	30.0	25.0
Sheep	1 244.8	1 326.6	846.3	827.0	793.1	722.2	465.0	450.0	440.0	430.0
Goats:	37.1	96.4	115.8	127.3	127.5	158.6	130.0	120.0	110.0	100.0
Horses	47.2	61.6	76.0	72.0	53.6	40.2	22.0	20.0	18.0	16.0
Asses	1.7	3.2	3.8	3.7	2.8	2.0	1.2	1.1	1.0	0.9
Swine	1 850.1	1 016.4	492.7	493.0	511.7	484.5	415.0	410.0	405.0	400.0
Rabbits	283.0	209.3	161.3	278.9	277.0	350.2	320.0	315.0	310.0	305.0
Poultry	24 625.0	13 746.4	13 624.9	22 773.6	23 782.5	12 590.6	10 500.0	10 250.0	10 000.0	9 750.0

Table 4-18: Share of different manure management systems (MS%) used in the Republic of Moldova in the period up to 2035, %

Animal categories (T) and manure management systems (MS)	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
	MS values $_{(T,S)}$									
	WEM									
Dairy cows	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Pasture/Range/Paddock	6	20	24	24.5	24.5	24.8	25	22	18	14
Liquid/Slurry	24	7	1	1.5	1.5	1.5	2.5	6	12	18
Solid Storage	70	73	75	74	74	73.7	72.5	72	70	68
Other cattle	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Pasture/Range/Paddock	4	16	22	22	22	22	21.5	18	16	14
Liquid/Slurry	34	10	4	6	6	6.1	14	17	20	23
Solid Storage	62	74	74	72	72	71.9	64.5	65	64	63
Swine	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Liquid/Slurry	73	55	30	32	35	37	53	56	59	62
Solid Storage	27	45	70	68	65	63	47	44	41	38
Sheep and Goats	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Pasture/Range/Paddock	18	20	22	24	26	26	26	25	24	23
Solid Storage	82	80	78	76	74	74	74	75	76	77
Horses and Asses	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Pasture/Range/Paddock	18	20	22	24	26	26	26	25	24	23
Solid Storage	82	80	78	76	74	74	74	75	76	77
Rabbits	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Solid Storage	100	100	100	100	100	100	100	100	100	100
Poultry	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Pasture/Range/Paddock	7	8	8	9	10	10	9.5	9	8.5	8
Solid Storage	93	92	92	91	90	90	90.5	91	91.5	92
	WAM									
Dairy cows	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Pasture/Range/Paddock	6	20	24	24.5	24.5	24.8	25	20	16	12
Liquid/Slurry	24	7	1	1.5	1.5	1.5	3	9	15	21
Solid Storage	70	73	75	74	74	73.7	72	71	69	67
Other cattle	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Pasture/Range/Paddock	4	16	22	22	22	22	21	17	15	13
Liquid/Slurry	34	10	4	6	6	6.1	15	19	22	25
Solid Storage	62	74	74	72	72	71.9	64	64	63	62
Swine	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Liquid/Slurry	73	55	30	32	35	37	54	58	62	66
Solid Storage	27	45	70	68	65	63	46	42	38	34
Sheep and Goats	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Pasture/Range/Paddock	18	20	22	24	26	26	25	24	23	22

Animal categories (T) and manure management systems (MS)	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
	MS values (T, S)									
Solid Storage	82	80	78	76	74	74	75	76	77	78
Horses and Asses	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Pasture/Range/Paddock	18	20	22	24	26	26	25	24	23	22
Solid Storage	82	80	78	76	74	74	75	76	77	78
Rabbits	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Solid Storage	100	100	100	100	100	100	100	100	100	100
Poultry	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Pasture/Range/Paddock	7	8	8	9	10	10	9	8.5	8	7.5
Solid Storage	93	92	92	91	90	90	91	91.5	92	92.5

Under the WEM scenario, the projections show a slow decreasing trend of livestock and poultry population. The WAM predicts a more alert decreasing trend of livestock and poultry population, focusing on increasing the productivity and implementing the most effective measures to mitigate GHG emissions at sector level.

The more alert rate of animal productivity increase characteristic of WAM will contribute to the increase in emission factors value calculated according to Tier 2 calculation methodology (2006 IPCC Guidelines), used to assess CH_4 emissions from category 3A "Enteric fermentation". According to WAM, it is anticipated that the level of livestock sector productivity in the Republic of Moldova will be close to the current one reported for Eastern European (EE) countries with economies in transition included in Annex I under the UNFCCC, respectively emission factors will have values close to default emission factors used implicitly in the assessment of CH_4 emissions from category 3A "Enteric Fermentation" specific to EE countries.

Under WEM and WAM, the emission factors are expected to have values close to default emission factors used for the assessment of methane emissions from category 3B "Manure Management" specific to EE countries, respectively, values close to those reported in the Republic of Moldova in the 90s of the XX century.

Regarding the agricultural crops and soil resources, the two scenarios considered carbon dioxide (CO_2) emissions, from the application of urea, and nitrous oxide emissions (N_2O) from application of mineral fertilizers.

Table 4-19 shows the urea application projections, and Table 4-20 – application of chemical nitrogen and organic natural fertilizers until 2035.

It is necessary to mention that the growth rate of urea application in the Republic of Moldova is impressive. Over the years 2010-2020, the applied quantities increased about by circa 24 times (from about 2.4 thousand tons in 2010, to about 58.1 thousand tons in 2020).

Table 4-19: Projections of urea application in the Republic of Moldova over 1990-2035, kt

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
	WEM									
Application of urea	0.8	0.1	0.6	0.2	2.4	15.3	58.1	62.6	68.9	75.2
	WAM									
Application of urea	0.8	0.1	0.6	0.2	2.4	15.3	58.1	60.8	66.9	73.0

Table 4-20: Projections for the application of chemical nitrogen and organic natural fertilizers in the Republic of Moldova over 1990-2035, kt N

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
	WEM									
Chemical nitrogenous fertilizers, F_{SN}	92.1	10.5	10.2	16.1	20.6	38.7	75.6	85	92.5	99.9
Organic natural fertilizers, F_{ON}	54.5	33.4	20.8	20.6	18.3	15.6	11.6	16.1	19.9	23.7
	WAM									
Chemical nitrogenous fertilizers, F_{SN}	92.1	10.5	10.2	16.1	20.6	38.7	75.6	82.5	89.7	96.9
Organic natural fertilizers, F_{ON}	54.5	33.4	20.8	20.6	18.3	15.6	11.6	19.9	23.7	27.5

For projecting urea application in the Republic of Moldova until 2035 it was deemed appropriate to use the linear regression method based on 2010-2020 period trends.

This evolution has been considered in line with the WEM. Under the WAM the emphasis has been put on optimizing urea application doses, taking into account the best practice recommendations for the sustainable development of the agricultural sector and the application of the most effective mitigation measures for the agricultural sector, as described in specialty literature. In the above context, it will contribute to reducing the quantities applied, on average by about 3% annually, compared to the values featured in the WEM.

In the case of WEM projections were based on the information available in the New Land Reclamation and Soil Fertility Enhancement Program (Part II: Soil Fertility Enhancement), and based on the Soil Conservation and Fertility Enhancement Program for 2011-2020, the National Strategy for Agricultural and Rural Development for the years 2014-2020 and the Low Emissions Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. The evolution of the demand for chemical nitrogen

and organic natural fertilizers in the period 1990-2020 was also taken into account. In this context, it was deemed appropriate to transfer the targets initially envisaged in the New Land Reclamation and Soil Fertility Enhancement Program for 2020 to 2035.

In the WAM scenario, particular emphasis was made on optimizing the doses of mineral and organic fertilizers, which will contribute to reducing the applied quantities, on average by about 3% per year, compared to the amounts applied used in the WEM scenario. This scenario also provides for increased application rates of organic fertilizers due to the increase of the share of crop residues incorporated in the soil and wider use of green fertilizers and conservation agriculture system.

Taking into account that the GHG emissions from agricultural soils depend on the annual flow of organic matter in the soil, incorporation of green fertilizer into the soil on a larger scale was considered. It is recommended that green mass of annual leguminous crops with highly developed semi-fasciculate radicular system should be used as fertilizer incorporated into the soil. The most suitable leguminous crops that can be used as green fertilizer are vetch and autumn and spring peas. Introducing intermediate crops as a green fertilizer will be carried out in parallel with the implementation of the "no-till" and "mini till" conservation tillage system.

Table 4-21 shows the prospects for the application of green (sidereal) fertilizers, and Table 4-22 – the information on the areas of the Republic of Moldova on which it is currently applied, as well as the prospects for the application of the conservation agriculture system in the period up to year 2035.

Table 4-21: Projections for use of green fertilizer in the Republic of Moldova over 1990-2035

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
	WEM									
Areas on which green fertilizer will be used - vetch, kha	0	0	0	0	0	0	0	25	50	75
Green vetch mass incorporated in the soil, kt	0	0	0	0	0	0	0	500	1000	1500
Green fertilizer, converted to equivalent organic fertilizer, kt	0	0	0	0	0	0	0	700	1400	2100
Green fertilizer - $F_{SIDEREAL}$, kt N	0	0	0	0	0	0	0	3.9	7.8	11.8
	WAM									
Areas on which green fertilizer will be used - vetch, kha	0	0	0	0	0	0	0	50	75	100
Green vetch mass incorporated in the soil, kt	0	0	0	0	0	0	0	1000	1500	2000
Green fertilizer, converted to equivalent organic fertilizer, kt	0	0	0	0	0	0	0	1400	2100	2800
Green fertilizer - $F_{SIDEREAL}$, kt N	0	0	0	0	0	0	0	7.8	11.8	15.7

Table 4-22: Projections for areas on which conservation agriculture system will be used in the Republic of Moldova over 1990-2035, thousand hectares

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
	WEM									
Areas on which the conservation agriculture system will be used, including:	0	0	0	0	0	54	100	200	300	400
winter wheat	0	0	0	0	0	21	35	70	90	120
autumn barley	0	0	0	0	0	6	15	30	60	80
maize	0	0	0	0	0	21	35	70	90	120
sunflower	0	0	0	0	0	6	15	30	60	80
	WAM									
Areas on which the conservation agriculture system will be used, including:	0	0	0	0	0	54	100	300	400	500
winter wheat	0	0	0	0	0	21	35	90	120	150
autumn barley	0	0	0	0	0	6	15	60	80	100
maize	0	0	0	0	0	21	35	90	120	150
sunflower	0	0	0	0	0	6	15	60	80	100

Projections of CO_2 emissions

In agriculture sector CO_2 emissions are generated only from category 3H "Urea Application". The results of the respective calculations are presented in Table 4-23. As seen from the table, CO_2 emissions from category 3H "Urea Application" will increase by about 95 times by 2035 relative to the CO_2 level reported under the same category in the reference year (1990) under WEM, and by about 92 times under WAM. The implementation of good practices and mitigation policies at the branch sector level will make it possible to somewhat reduce the growth rate of CO_2 from category 3H "Urea Application".

Table 4-23: Projections of CO_2 emissions from the category 3H "Urea Application" in the Republic of Moldova under the scenarios analyzed for 1990-2035

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
	WEM									
CO_2 emissions, kt	0.6	0.1	0.4	0.2	1.7	11.2	42.6	45.9%	50.5	55.2
CO_2 emissions,% compared to 1990	100	10.4	75.6	29.9	299.7	1 931.5	7 322.8	7 892.9	8 685.8	9 478.6
	WAM									
CO_2 emissions, kt	0.6	0.1	0.4	0.2	1.7	11.2	42.6	44.6	49.0	53.5
CO_2 emissions,% compared to 1990	100	10.4	75.6	29.9	299.7	1 931.5	7 322.8	7 656.1	8 425.2	9 194.2

Projections of CH_4 emission

In agriculture sector CH_4 emissions are generated from categories 3A "Enteric Fermentation" and 3B "Manure Management". Projections for these emissions are shown in Table 4-24. In 2019, CH_4 emissions from enteric fermentation exceeded almost 7 times the emissions from manure management, which call for greater attention to measures optimizing the livestock and poultry structure, to be promoted to reduce GHG emissions from this category. At the same time, manure management also generates N_2O emissions (Table 4-25), which by amount, are about at the same level as CH_4 emissions from enteric fermentation. Thus, the effort to mitigate GHG emissions in the livestock sector has to be divided practically equally between these two categories.

Table 4-24: Projections of CH_4 emissions from agriculture sector until 2035, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035
WEM							
3. Agriculture	2 684.5	785.1	698.1	463.6	431.2	402.2	370.6
3A. Enteric Fermentation	2 189.4	708.2	629.2	399.0	363.6	330.8	296.6
3B. Manure Management	495.1	76.9	68.9	64.6	67.6	71.4	74.0
WAM							
3. Agriculture	2 684.5	785.1	698.1	456.3	411.9	382.4	350.3
3A. Enteric Fermentation	2 189.4	708.2	629.2	391.7	342.4	309.2	274.5
3B. Manure Management	495.1	76.9	68.9	64.6	69.5	73.2	75.8

Projections of N_2O emissions

Projected N_2O emissions from the agriculture sector are shown in Table 4-25. In 2019, N_2O emissions from category 3D "Agricultural Soils" by more than three times exceeded the emissions in category 3B "Manure Management".

Table 4-25: Projections of N_2O emissions from the agriculture sector until 2035, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035
WEM							
3. Agriculture	**2 650.4**	**1 179.9**	**1 139.1**	**1 226.8**	**1 486.2**	**1 546.6**	**1 620.2**
3B. Manure Management	1 116.6	426.3	356.2	278.4	275.9	273.0	269.1
3D. Agricultural Soils	1 533.8	753.7	783.0	948.4	1 210.3	1 273.6	1 351.1
WAM							
3. Agriculture	**2 650.4**	**1 179.9**	**1 139.1**	**1 222.2**	**1 465.3**	**1 533.2**	**1 585.7**
3B. Manure Management	1 116.6	426.3	356.2	277.2	272.5	268.8	265.3
3D. Agricultural Soils	1 533.8	753.7	783.0	945.0	1 192.8	1 264.4	1 320.4

Projections of aggregated total GHG emissions

Table 4-26 and Figure 4-7 show the projected aggregate GHG emissions from the agriculture sector, in comparison with emissions reported in 1990. Compared to the reference year, in 2035 the level of GHG emissions under the WEM and WAM scenarios will be 38.3% and 37.3%, respectively.

Table 4-26: Projections of aggregated total GHG emissions from agriculture sector, kt CO_2 eq.

	1990	2010	2015	2020	2025	2030	2035
WEM							
Agriculture	**5 335.5**	**1 966.7**	**1 848.4**	**1 733.0**	**1 963.3**	**1 999.3**	**2 046.0**
3A. Enteric Fermentation	2 189.4	708.2	629.2	399.0	363.6	330.8	296.6
3B. Manure Management	1 611.7	503.1	425.0	343.0	343.5	344.4	343.1
3D. Agricultural Soils	1 533.8	753.7	783.0	948.4	1 210.3	1 273.6	1 351.1
3H. Urea Application	0.6	1.7	11.2	42.6	45.9%	50.5	55.2
WAM							
Agriculture	**5 335.5**	**1 966.7**	**1 848.4**	**1 721.1**	**1 921.8**	**1 964.6**	**1 989.5**
3A. Enteric Fermentation	2 189.4	708.2	629.2	391.7	342.4	309.2	274.5
3B. Manure Management	1 611.7	503.1	425.0	341.8	342.0	342.0	341.1
3D. Agricultural Soils	1 533.8	753.7	783.0	945.0	1 192.8	1 264.4	1 320.4
3H. Urea Application	0.6	1.7	11.2	42.6	44.6	49.0	53.5

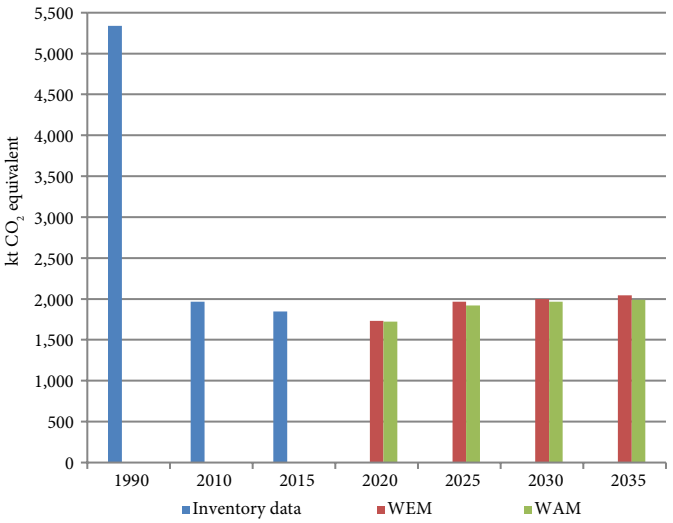


Figure 4-7: Projections of aggregated total GHG emissions from the agriculture sector.

Sensitivity Analysis

The main indicators affecting GHG emissions in the agriculture sector are: the amount of nitrogenous chemical fertilizers and the numbers of dairy cows and other cattle. The sensitivity analysis is based on the scenario in which these two indicators, during the years 2025, 2030 and 2035, will get values by 5% higher than values calculated in WEM scenario. The results are shown in Table 4-27 and Table 4-28. As seen from these tables, provided there is a 5% increase in the amount of chemical nitrogen fertilizers applied to the soil, and numbers of dairy cows and other cattle during the years 2025, 2030 and 2035, a 1.9-2.2% increase in GHG emissions from the sub-sectors under review can be anticipated, compared to the values included in the WEM.

Table 4-27: Sensitivity analysis (SA) for aggregate direct GHG emissions at the sub-sector level (crop production and soil resources) compared to the same included in the WEM scenario, kt CO_2 eq.

	2019	2020	2025	2030	2035
3H. Urea Application, CO_2 emissions, WEM	39.6	42.6	45.9%	50.5	55.2
3H Urea Application, CO_2 emissions, SA	39.6	42.6	48.2	53.1	57.9
Difference, WEM-SA,%	-	-	**5.0**	**5.0**	**5.0**
3D. Agricultural Soils, total emissions N_2O, WEM	1 117.1	948.4	1 210.3	1 273.6	1 351.1
3D. Agricultural Soils, total emissions N_2O, SA	1 117.1	948.4	1 230.8	1 295.3	1 374.4
Difference, WEM-SA,%	-	-	**1.7**	**1.7**	**1.7**
Total, Crop Production and Soil Resources, GHG emissions, WEM	1 156.8	991.1	1 256.3	1 324.2	1 406.2
Total, Crop Production and Soil Resources, GHG emissions, SA	1 156.8	991.1	1 279.1	1 348.4	1 432.4
Difference, WEM-SA,%	-	-	**2.2**	**2.0**	**1.9**

Table 4-28: Sensitivity analysis (SA) for aggregate direct GHG emissions at the sub-sector level (animal husbandry) compared to the same included in the WEM scenario, kt CO_2 eq.

	2019	2020	2025	2030	2035
3A. Enteric Fermentation, CH_4 emissions, WEM	441.6	399.0	363.6	330.8	296.6
3A. Enteric Fermentation, CH_4 emissions, SA	441.6	399.0	375.5	341.2	305.5
Difference, WEM-SA,%	-	-	**3.3**	**3.1**	**3.0**
3B. Manure Management, CH_4 emissions, WEM	66.6	64.6	67.6	71.4	74.0
3B. Manure Management, CH_4 emissions, SA	66.6	64.6	68.3	72.2	74.9
Difference, WEM-SA,%	-	-	**1.1**	**1.2**	**1.2**
3B. Manure Management, N_2O emissions, WEM	278.5	278.4	275.9	273.0	269.1
3B. Manure Management, N_2O emissions, SA	278.5	278.4	278.7	275.5	271.2
Difference, WEM-SA,%	-	-	**1.0**	**0.9**	**0.8**
Total, Animal Husbandry, GHG emissions, WEM	786.7	741.9	707.1	675.2	639.7
Total, Animal Husbandry, GHG emissions, SA	786.7	741.9	722.5	688.9	651.6
Difference, WEM-SA,%	-	-	**2.2**	**2.0**	**1.9**

4.3.4. Land Use, Change of Land Use and Forestry Sector

Within the LULUCF sector, GHG emissions/removals are monitored in categories 4A "Forest Land", 4B "Cropland", 4C "Grassland", 4D "Wetland", 4E "Settlements", 4F "Other Land" 4G "Harvested Wood Products". CH_4 and N_2O emissions related to LULUCF sector are not considered in this analysis because of low values. At the same time, they were taken into account in calculation of total GHG emissions/removals, expressed in kt CO_2 equivalent in each of the categories mentioned above.

The policies used for development of WEM and WAM scenarios for the LULUCF sector are described in Chapter 3.5.4. These policies are aimed at expanding wooded areas, with subsequent increase of the wood mass; diminishing the areas prone to forest fires; gradual increase of protection belts, plantations of trees and shrubs, orchards and vineyards, improving the quality of plantations, etc.

Under the WEM scenario the following assumptions were made for:

- Forests - the average afforestation rates are established in accordance with the GD 1470/2016 and would constitute 8,549 ha/year. The year 2021 is considered as an intermediate year of planning and primary organization of afforestation works. Thus, in the period 2022-2035, the total area of 119,686 ha would have to be planted. The experience gained in the Republic of Moldova demonstrates that this is an optimistic pace;
- Forest belts and other types of forest vegetation (PFP) - the target is to plant 21,994 ha of new land (11,998 ha of PFP; 9,996 ha of energy crops), equivalent to an average annual rate of 1,571 ha;
- Vineyards - by 2025 the area will increase by 340 ha, or on average by 85 ha annually, based on the GD 742 of 21.10.2015 (amended by the GD 785/2018) for the approval of the Action Plan on the implementation of the National Strategy for Agricultural and Rural Development;
- Orchards - the orchards area will be maintained at the level of 2020, with quality improving activities in existing plantations, including through comprehensive reconstructions;
- Mineralized agricultural soils – gradual extension of conservation tillage and organic fertilization practices on about 30% of arable soils, thus ensuring the reduction of carbon emissions from 0.35 t/ha/year to 0.25 t/ha/year;
- Grassland - the meadows area will be maintained at the level of 2020;
- Wetlands - the wetlands area will be maintained at the level of 2020;
- Settlements and infrastructure – the area will increase by 1000 ha annually (roads, infrastructure, residential areas, etc.);
- Wood products - the possibility of harvesting of 633.1 thousand m^3/year as forest cutbacks, including 320.3 thousand m^3/year from cutting of main products (GD 958/2020); 312.8 thousand m^3 of by-products and other cuts (average for the period 2016-2020, including municipalities - 52.2 thousand m^3 and ATULBD - 22.0 thousand m^3) was used as benchmark.

The scenario with additional measures (WAM) provides for an increase of expansion indexes for areas with other types of vegetation, based on draft policy documents, donor financed projects, etc.

The main benchmark is the "NAMA on Afforestation of Degraded Land, Riparian Areas and Protection Belts", which aims to reverse the forest and land degradation trend and increase carbon removal by 261.6 kt CO_2 annually until 2030 by afforestation of 45 kha of degraded, unproductive lands and by planting 15 kha of riparian forest belts and 1500 ha of forest protection belts in farming systems. At the same time, the WAM

includes the provisions of the draft GD regarding the approval of the National Plan for the extension of forest vegetation areas for the years 2019-2024 (afforestation of 13.0 kha of degraded land), which is the Government's commitment as part of NAMA. Overall, it is expected that 61.5 kha will be afforested, at an average annual rate of 6,833.3 ha. Thus, the WAM main assumptions are:

- Forests – planting of forest vegetation on the total area of 45,000 ha or on average 3,214.3 ha per year (additional to WEM);
- Forest belts – 16,500 ha, which is an average of 1,178.6 ha per year (additional to WEM);
- Vineyards – the area will conventionally increase by 500 ha/year compared to WEM or a total increase of 7,000 ha;
- Orchards – the area will conventionally increased by 500 ha/year compared to WEM or a total increase of 7,000 ha;
- Mineralized agricultural soils – the gradual extension of conservation tillage and organic fertilization practices on most arable soils, thus ensuring the reduction of carbon emissions from 0.35 t/ha/year to 0.15 t/ha/year (coefficient calculated for the period 1970-1989), and carrying on this practice until 2035;
- Grassland – increasing the grassland area to reach 16% of the country's territory or up to 541,541 ha by 2035. Thus, 178,655 ha of grassland are to be created at an annual rate of 12,761.1 ha;
- Settlements – the area will increase by 500 ha annually (in addition to WEM) or a total increase of 7,000 ha;
- Wetlands – the area will increase by about 10% or 9,654 ha, including swamps – 1,842 ha and water – 7,812 ha (131.6 ha/year – swamps; 558.0 ha/year – water);
- Wood products – the option of gradually achieving the possibility of harvesting 55% of current stands (main products, plus by-products and other cuts) was used as a benchmark.

To simulate the GHG emissions/removals evolution under both scenarios, the Land Use Matrix for 1970-2019 was used, extended for the period 2020-2035. This application includes all ratios, emission/removal coefficients, and equations necessary for development of the national GHG inventory and/or projecting for future periods.

Based on the assumptions made under the WEM and WAM scenarios, the evolution of the land fund area was simulated, broken down by land use categories (Table 4-29) and GHG emissions/removals in the LULUCF sector (Table 4-30, Figure 4-9).

Table 4-29: Evolution of the areas of the main land use categories over 2020-2035, ha

Land use categories	2020	2025	2030	2035
WEM				
Agricultural land	1 869 167.0	1 835 256.5	1 777 389.9	1 704 885.2
Grassland	362 885.9	362 885.9	362 885.9	362 885.9
Vineyards	126 234.0	125 192.9	125 192.9	125 192.9
Orchards	151 824.7	151 824.7	151 824.7	151 824.7
Forest vegetation	50 777.4	54 268.5	60 159.7	73 120.5
Forestry	416 330.0	442 614.4	485 359.4	536 653.4
Areas of annual successful afforestation	715.0	3 795.1	5 060.2	6 072.2
Settlements	244 702.5	247 680.6	251 430.6	259 680.6
Swamps	18 422.7	18 422.7	18 422.7	18 422.7
Waters	78 113.8	78 113.8	78 113.8	78 113.8
Other land	65 453.0	64 571.0	68 786.2	67 774.2
WAM				
Agricultural land	1 869 167.0	1 783 808.2	1 648 138.1	1 434 076.3
Grassland	362 885.9	401 169.2	464 974.7	541 540.9
Vineyards	126 234.0	126 192.9	128 067.9	132 192.9
Orchards	151 824.7	152 824.7	154 699.7	158 824.7
Forest vegetation	50 777.4	56 625.7	66 936.7	89 620.5
Forestry	416 330.0	449 043.0	493 155.4	581 653.4
Areas of annual successful afforestation	715.0	4 746.4	5 222.0	10 476.4
Settlements	244 702.5	248 680.6	254 305.6	266 680.6
Swamps	18 422.7	18 685.9	19 179.4	20 264.7
Waters	78 113.8	79 229.8	81 322.3	85 925.8
Other land	65 453.0	63 619.7	68 624.4	63 370.0

Table 4-30: Projected GHG emissions/removals in LULUCF sector, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035
WEM							
4. LULUCF	**-1 387.8**	**-953.9**	**-903.5**	**-333.9**	**-495.4**	**-642.2**	**-1 242.6**
4A Forest Land	-2 563.1	-2 484.0	-2 158.4	-1 800.7	-1 819.3	-1 953.3	-2 471.2
4B Cropland	2 651.9	1 546.1	1 391.1	1 181.6	1 087.6	1 002.4	751.5
4C Grassland	-1 205.7	-692.0	-418.5	-97.3	-187.4	-255.6	-231.9
4D Wetlands	-555.4	-46.4	-82.8	-82.8	-82.8	-82.8	0.0
4E Settlements	254.2	303.7	229.0	188.5	203.0	216.1	244.3
4F Other Land	152.4	441.5	86.8	304.4	331.1	458.6	492.3
4G Harvested Wood Products.	-122.2	-22.8	49.2	-27.6	-27.6	-27.6	-27.6
WAM							
4. LULUCF	**-1 387.8**	**-953.9**	**-903.5**	**-333.9**	**-2 171.2**	**-4 040.9**	**-7 446.5**
4A Forest Land	-2 563.1	-2 484.0	-2 158.4	-1 800.7	-1 803.6	-1 754.0	-2 230.4
4B Cropland	2 651.9	1 546.1	1 391.1	1 181.6	184.0	-118.0	-856.4
4C Grassland	-1 205.7	-692.0	-418.5	-97.3	-1 122.6	-2 899.1	-5 511.6
4D Wetlands	-555.4	-46.4	-82.8	-82.8	-82.8	-82.8	0.0
4E Settlements	254.2	303.7	229.0	188.5	209.7	229.3	274.9
4F Other Land	152.4	441.5	86.8	304.4	471.7	611.3	904.6
4G Harvested Wood Products.	-122.2	-22.8	49.2	-27.6	-27.6	-27.6	-27.6

As seen in Figure 4-8, under the WAM, the CO_2 equivalent reductions will exceed the CO_2 reductions under the WEM by about 6 times by 2035 However, to achieve this performance, donors support is required.

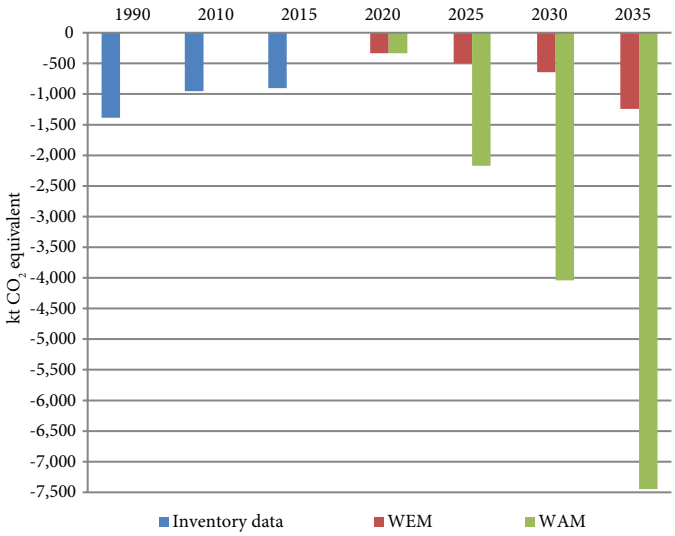


Figure 4-8: CO_2 emissions/removals in the LULUCF sector according to considered scenarios.

Comparison of projected GHG emissions/removals calculated in BUR2 and BUR3 for the LULUCF sector

As seen from Table 4-31, BUR3 provides for a slower rate of CO_2 removal than in BUR2. In BUR3, it is assumed that CO_2 removals will decrease by 61.9% under the WEM, and by 46.2% under the WAM, compared to BUR2, by 2030. The main reasons for such evolution under the WEM scenario are associated with the delay or chronic non-fulfillment of state commitments set out in various policy documents aimed at afforestation of new land, rehabilitation of vineyards and orchards, transforming heavily degraded farmland into grassland, expanding forest belts for the protection of agricultural fields/ riparian areas, etc. The projections made in BUR3 took into account the respective shortcomings/ delays. Within BUR3, the pace of the policy documents implementation was phased in three distinct periods: I - 2021-2025, II - 2026-2030, III - 2031-2035, with slower pace at initial stage and gradual speed up at stages II and III.

Table 4-31: Analysis of projected GHG emissions /removals in LULUCF sector in BUR3 compared to BUR2 to UNFCCC

	2020			2025			2030		
	BUR2	BUR3	Difference	BUR2	BUR3	Difference	BUR2	BUR3	Difference
WEM, total GHG in the LULUCF sector, kt CO_2 equivalent	-333.3	-333.9	-0.2	-1 023.8	-495.4	51.6	-1 686.1	-642.2	61.9
WAM, total GHG in the LULUCF sector, kt CO_2 equivalent	-1 305.1	-333.9	74.4	-4 503.6	-2 171.2	51.8	-7 507.1	-4 040.9	46.2

Sensitivity Analysis

Given that category 4A "Forest Lands" contributes to the largest proportion of CO_2 removals (Table 4-30), sensitivity analysis was made for this category. The following variations of parameters with the greatest impact on emissions removals were applied:

- Increase in forests biomass, reduced by 10% compared to WEM;
- Harvesting wood from forests, increased by 10% compared to WEM.

The concrete values of these parameters under WEM and SA are presented in Table 4-32.

Table 4-32: Values of parameters with impact on GHG emissions/ removals in LULUCF sector used in the sensitivity analysis (SA), thousand m^3

Parameters and measurement unit	2019	2020	2025	2030	2035
Current biomass increases according to WEM	1 418.0	1 408.8	1 469.7	1 565.9	1 681.2
Current biomass increases according to SA	1 276.2	1 267.9	1 322.7	1 409.3	1 513.1
Wood harvesting, WEM	605.7	633.1	633.1	633.1	633.1
Wood harvesting, SA	605.7	633.1	696.4	696.4	696.4
Net accumulation of biomass in stands in forests, WEM	812.3	775.7	836.6	932.8	1 048.1
Net accumulation of biomass in stands in forests, SA	812.3	775.7	626.3	712.9	816.7

The decrease of current biomass growth by 10%, cumulated with the increase in the same proportion of the wood harvesting volumes, will decrease the GHG removal capacity of forests in the Republic of Moldova on average by 23.6% on the account of the accumulated net biomass volume in category 4A "Forest Lands" under WEM (Table 4-33).

Table 4-33: Sensitivity analysis (SA) projections made for category 4A "Forest Lands" in LULUCF under WEM

	2025	2030	2035
Forest Lands WEM, kt CO_2	-1819.3	-1953.3	-2471.2
Forest Lands, SA, kt CO_2	-1362.5	-1493.3	-1926.0
WEM-SA difference, %	25.1	23.5	22.1

4.3.5. Waste Sector

In the waste sector, direct GHG emissions from solid waste management activities are monitored, including industrial waste (source categories 5A "Solid Waste Disposal", 5B "Biological Treatment of Solid Waste", 5C "Incineration and Open Burning of Waste") and wastewater treatment (source category 5D "Wastewater Treatment and Discharge"). GHG emission projections were made based on the methodological approaches described in the 2006 IPCC Guidelines.

Policies used in mitigation scenarios for the waste sector (WEM and WAM) are described in Chapter 3.5.5. GHG emissions mitigation measures for the waste sector include: development of regional waste disposal infrastructure, construction of regional SWDs and transfer stations, in line with the Waste Management Strategy of the Republic of Moldova for 2013-2027 and

applying EU and national standards; expanding the current system of primary collection and storage of urban waste in rural area; improving the water supply and sanitation infrastructure.

The two scenarios for mitigating GHG emissions in the waste sector include:

Scenario with Existing Measures (WEM) – provides for measures aimed at mitigation of GHG emissions to be undertaken at the same pace with solid waste generation, including promotion and development of recycling systems for recyclable waste in urban areas of the Republic of Moldova, which is already under way. With the 1.7% annual increase in the amount of waste generated during 2010-2019, the separate collection of paper and cardboard waste is assumed to be 5% in urban areas and 2% in rural areas. It should be noted that at the time of feasibility studies for regional waste management systems sizing, due to lack of data and uncertainty, estimated data on municipal waste generation were used. Currently, according to statistical sanitation data, there is a slow increase, on average of about 3.6%, of waste amounts generated over 2017-2019, the trend for rural areas is 30% increase on average, while in urban areas, the growth is more modest, of 1.3%. The disposal of industrial waste is also not included in the statistical reports submitted by the sanitation services, so the estimated difference between the values of respective data would be about 25%.

Based on the above findings, the above-mentioned 25% difference for the period 2020-2030 was taken into account when projecting municipal waste generation in the country for the WEM, given the expansion of waste collection systems in rural areas. From 2030 to 2035, a slow increase of 1% per year in the total amount of waste generated is expected, taking into account demographic trends. Cumulatively, circa 30% increase in waste amounts is projected over 2021-2035.

GHG emissions reductions are also envisaged from separate waste paper and cardboard collection measures, expected to reach 5% of municipal waste collected from institutions and other businesses in urban areas and 2% in rural areas. This scenario will not include the option of GHG emission reduction due to implementation of the integrated waste management systems by construction of regional SWD sites, composting platforms, sorting sites and transfer stations.

WEM scenario projects ensuring by 2030 access to sanitation systems (sewerage system or other wastewater collection and management systems, such as septic tanks) for 85% of urban population and 50% of the rural population, and by 2035 – 100% of urban population and about 75% of rural population. The amount of degradable organic matter in industrial wastewater is gradually reduced by 2% in 2020 to 40% in 2035. This scenario assumes that protein consumption rates per capita will remain constant compared to 2019, due to better endowment with modern wastewater treatment plants, from 21.5% in 2020 to 28.5% in 2035.

In the case of *Scenario with Additional Measures (WAM)* – data on waste disposal available in the feasibility studies were used. This GHG emissions reduction scenario provides for a higher implementation rates of the Waste Management Strategy, approved by the GD no. 248 of 10.04.2013, in particular, development of integrated waste management systems by construction of regional SWD sites, composting platforms, sorting sites and transfer stations. Based on studies regarding morphological composition of municipal waste in the Republic of Moldova, mechanical and biological waste treatment technology is preferred. The medium-term impact (until 2030) of one single mechanical and biological waste treatment plant would result in 20% direct GHG emissions reduction from the Waste sector.

The WAM scenario projects ensuring by 2030 access to sanitation systems (sewerage system or other wastewater collection and management systems, such as septic tanks) for 85% of urban population and 53% of the rural population, and by 2035 – 100% of urban population and about 85% of rural population. At the same time, WAM proposes as additional measure to mitigate CH_4 emissions by refurbishing the wastewater treatment plant in Balti municipality, starting with the year 2028. The amount of degradable organic matter in industrial wastewater shall be gradually reduced by 3% in 2020 and up to 55% in 2035. This scenario assumes that protein consumption rates per capita will remain constant compared to 2019, due to better endowment with modern wastewater treatment plants from 21.5% in 2020 to 98% in 2035.

Projections of CO_2 emissions

The CO_2 emissions projections in the waste sector refer to CO_2 emissions generated under the source category 5C "Incineration and Open Burning of Waste". The projected CO_2 emissions do not exceed 1% of the total GHG emissions attributed to the waste sector.

Projections of CH_4 emission

The projected CH_4 emissions from the waste sector for both scenarios (WEM and WAM) are shown in Table 4-34. These emissions are mainly generated from solid waste deposit sites, as well as from the source category 5D "Wastewater Treatment and Discharge".

Table 4-34: Projections of CH_4 emissions from the waste sector, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035
WEM							
5. Waste	**1 408.7**	**1 410.7**	**1 336.1**	**1 481.4**	**1 450.3**	**1 459.8**	**1 461.6**
5A Solid Waste Disposal	1 046.7	1 137.9	1 087.2	1 244.1	1 257.1	1 276.7	1 289.7
5B Biological Treatment of Solid Waste	1.4	1.1	1.3	1.6	1.6	1.7	2.2
5C Incineration and Open Burning of Waste	7.7	6.6	6.8	6.7	5.6	3.5	0.7
5D Wastewater Treatment and Discharge	353.0	265.2	240.8	228.9	186.0	177.9	169.1
WAM							
5. Waste	**1 408.7**	**1 410.7**	**1 336.1**	**1 479.7**	**1 396.4**	**1 073.8**	**894.3**
5A Solid Waste Disposal	1 046.7	1 137.9	1 087.2	1 244.1	1 209.1	913.3	752.6
5B Biological Treatment of Solid Waste	1.4	1.1	1.3	1.6	1.9	2.8	3.9
5C Incineration and Open Burning of Waste	7.7	6.6	6.8	6.7	5.5	3.0	0.1
5D Wastewater Treatment and Discharge	353.0	265.2	240.8	227.3	179.8	154.7	137.8

Projections of N_2O emissions

The projected N_2O emissions from the waste sector for both scenarios (WEM and WAM) are shown in Table 4-35. These emissions are mainly generated from the source category 5D "Wastewater Treatment and Discharge".

Projections of aggregated total GHG emissions

Table 4-36 and Figure 4-9 show the projected aggregate GHG emissions from the waste sector, compared to the GHG emissions reported in 1990. Compared to the level of emissions reported in the reference year, in 2035 the level of GHG emissions from the waste sector will is expected to reach 100% under the WEM and 62.6% under the WAM.

Table 4-35: Projections of N_2O emissions from the waste sector, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035
WEM							
5. Waste	**90.5**	**55.1**	**56.50**	**60.1**	**; 57.3**	**54.5**	**52.0**
5B Biological Treatment of Solid Waste	1.0	0.8	0.9	1.1	1.1	1.2	1.6
5C Incineration and Open Burning of Waste	1.6	1.4	1.4	1.4	1.2	0.7	0.1
5D Waste Water Treatment and Discharge	87.9	52.9.	54.2	57.5	55.0	52.5.	50.3
WAM							
5. Waste	**90.5**	**55.1**	**56.50**	**60.1**	**57.5**	**55.2**	**53.1**
5B Biological Treatment of Solid Waste	1.0	0.8	0.9	1.1	1.4	2.0	2.8
5C Incineration and Open Burning of Waste	1.6	1.4	1.4	1.4	1.2	0.6	0.0
5D Waste Water Treatment and Discharge	87.9	52.9.	54.2	57.5	55.0	52.5.	50.3

Table 4-36: Projections of aggregate GHG emissions from the waste sector, kt CO_2 equivalent

	1990	2010	2015	2020	2025	2030	2035
WEM							
5. Waste	**1 514.2**	**1 478.6**	**1 405.9**	**1 554.6**	**1 518.5**	**1 521.2**	**1 514.9**
5A Solid Waste Disposal	1 046.7	1 137.9	1 087.2	1 244.1	1 257.1	1 276.7	1 289.7
5B Biological Treatment of Solid Waste	2.3	1.8	2.2	2.7	2.7	3.0	3.7
5C Incineration and Open Burning of Waste	24.3	20.8	21.5	21.3	17.7	11.1	2.1
5D Wastewater Treatment and Discharge	440.9	318.1	295.0	286.5	241.0	230.4	219.4
WAM							
5. Waste	**1 514.2**	**1 478.6**	**1 405.9**	**1 552.9**	**1 464.6**	**1 134.9**	**947.5**
5A Solid Waste Disposal	1 046.7	1 137.9	1 087.2	1 244.1	1 209.1	913.3	752.6
5B Biological Treatment of Solid Waste	2.3	1.8	2.2	2.7	3.3	4.8	6.6
5C Incineration and Open Burning of Waste	24.3	20.8	21.5	21.3	17.4	9.5	0.2
5D Wastewater Treatment and Discharge	440.9	318.1	295.0	284.8	234.8	207.2	188.1

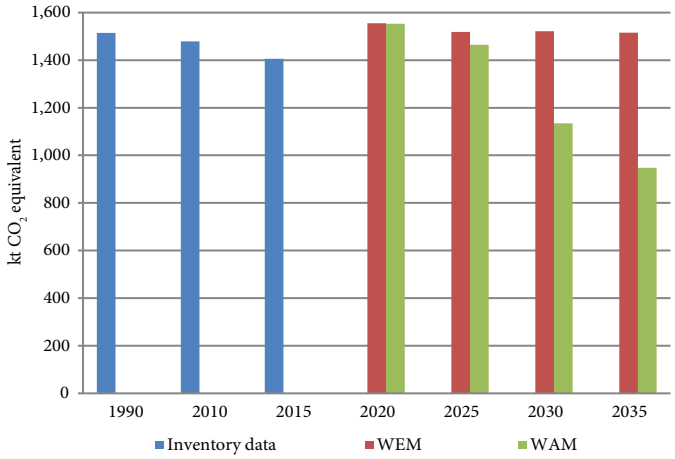


Figure 4-9: Projections of aggregated total GHG emissions from the waste sector, kt CO_2 eq.

Sensitivity Analysis

In the structure of GHG emissions of the waste sector, the largest share belongs to the source category 5A "Solid Waste Disposal" which accounted for 79% in 2019. Compared to the WEM scenario, the amount of municipal waste was reduced by 25% for all years until 2035. The impact of changing this key parameter on GHG emissions is reflected in Table 4-37.

Table 4-37: Sensitivity analysis (SA) on projections for source category 5A "Solid Waste Disposal" under the WEM scenario

	2019	2020	2025	2030	2035
GHG emissions for the source category 5A under the WEM, kt CO_2 equivalent	685.9	700.2	769.4	841.9	907.7
GHG emissions for the source category 5A under the SA, kt CO_2 equivalent	685.9	688.2	704.1	730.3	757.9
WEM-SA difference,%	0.0	-1.7	-8.5	-13.2	-16.5

4.3.6. International Bunkers

Of the two types of international bunkers, navigation and aviation, only the latest is relevant for the country (international navigation is not occurring in the Republic of Moldova). The projections listed for international aviation were not considered for calculation of aggregated total national GHG emissions.

The projections were developed on the basis of activity data on international aviation offered by the Civil Aviation Authority of the Republic of Moldova for the period up to 2019. The data for 2000-2019 was subject to regression analysis. Emissions were calculated using the emission factors available in the 2006 IPCC Guidelines. Projected GHG emissions from international aviation are shown below in Table 4-38. It is estimated that compared to 2020, emissions from international air transport will increase by about 42% to 2030 and by 61% to 2035.

Table 4-38: Projections of GHG emissions from international aviation until 2035, kt CO_2 eq.

	1990	2015	2020	2025	2030	2035
CO_2	216.6	218.4	295.8	360.7	420.7	476.6
CH_4	0.3	0.1	0.1	0.1	0.1	0.1
N_2O	2.1	2.1	2.5	3.0	3.5	4.0
Total	**218.9**	**220.6**	**298.3**	**363.7**	**424.3**	**480.7**

CHAPTER 5. FINANCIAL, TECHNICAL AND CAPACITY CONSTRAINTS AND NEEDS

5.1. GHG Emissions Mitigation Constraints

The studies conducted during the development of BUR3 showed that GHG emissions mitigation potential of the Republic of Moldova is significant. Its valorization, however, is highly dependent on the extent to which the country will be able to overcome the barriers faced on the way to implementing carbon emissions reduction and removal actions. These constraints are different by nature and specific to each sector. They are described below.

5.1.1. Energy Sector

The Republic of Moldova has made progress in creating the regulatory framework for the electricity and natural gas sectors[246], but not all approved regulations are implemented.

The low payment capacity of consumers and the relatively high cost of capital in the Republic of Moldova continue to be the most important barriers to the construction of new electricity generation and transmission capacities required to ensure energy security and performance of power plants.

Also, the free energy market of the country shows lack of interest for construction of new, fossil fuels-based power plants, given the availability of sources supplying electricity at much lower prices (Ukrainian suppliers and Moldavian Thermal Power Plant in Dnestrovsk) than the price of electricity produced by a new plant.

The investment risks of the RM are also determined by the Transnistrian separatism, as well as political and economic instability, with a negative impact on the exchange rate of the national currency, which does not favor access to foreign loans and discourages small and medium enterprises to invest in increasing energy efficiency. For example, due to the unstable policy, the EBRD-MOSEFF III project was canceled, the previous editions of which were very successful among SMEs due to transferring new to energy consumption reduction technologies and promoting RES.

Currently, a favorable regulatory framework for the development and capitalization of renewable energy sources (RES) is approved. However, the tender for the status of eligible producer has not been announced, although the ceiling prices for electricity to be produced from renewable sources have been approved[247]. The Register of Eligible Producers[248] shows that the limits for photovoltaic and wind installations capacity, established by the Government according to the provisions of the Law on promoting use of energy from renewable sources, for the application of the support scheme based on the fixed tariff have already been exhausted by 2020. As a result, achieving the RES promotion objectives set out in the country's strategic documents, becomes problematic. On the other hand, lack of own traditional sources of electricity (≈ 81% of electricity is imported) makes it difficult to balance the electricity demand over time, due to the dependence of electricity production from renewable sources (solar and wind) on weather conditions. At the same time, in conditions of climate change, there are high risks of drought and, consequently, of reducing the production of biomass used for energy purposes.

Now, one can assure that global mitigation policies will be based on market instruments and price capping. This approach is implemented by the European Union, which applies emission limits and CO_2 emissions prices on its territory. This means that the Republic of Moldova will start preparing for an institutional change and change the paradigm of all GHG emitting entities' activity, including power plants, because once such system is implemented, it will quickly cover not only emissions from to international air traffic, but also from other emission categories and sources. The Republic of Moldova relied heavily on the country's accession to the EU carbon market, on which the country could trade the emissions produced on its territory. In this regard, according to the Association Agreement between the EU and the Republic of Moldova, the country had to implement the Directive 2003/87/EC on establishing a system for greenhouse gas emission trading within the European Union by 2022, to promote GHG reductions in a cost-effective and efficient. At the same time, in

[246] Energy Community Secretariat. Annual Implementation Report 2020. <https://www.energy-community.org/implementation/IR2020.html >

[247] ANRE Decision no. 54/2020 of 28.02.2020 on fixed tariffs and cap prices for electricity produced from renewable energy sources by producers who will receive the status of eligible producer in 2020, Official Gazette no.94-98 / 326 of 27.03.2020.

[248] ANRE Register of Eligible Producers. <http://www.anre.md/registrul-producatorilor-eligibili-3-339>

order to be part of the EU-ECS, at least seven other EU directives and regulations should be implemented together with the Directive mentioned above, including those governing MRV, GHG recording, benchmarking, auctioning, etc. It turned out that maintenance and use of all these systems costs much more than the potential GHG reduction effect achieved by the country under the Directive. As a result, the Republic of Moldova has to consider the opportunity to initiate negotiations with the European Union aimed at overcoming this problem.

5.1.2. Transport Sector

In general, the transportation means fleet of the Republic of Moldova is obsolete. In recent years, the number of vehicles in the country has increased considerably, the largest share accounting for the second-hand cars, as a consequence of the weak purchasing power of population, which cannot afford buying new cars. Due to wear and tear, but also to the low efficiency of the road transport, this sector has become an important source of carbon emissions.

The problem is expanding especially in large cities, where inadequate infrastructure and heavy traffic generate significant GHG emissions, mainly due to traffic jams, insufficient public transport and poorly developed "pro-environmental" culture.

In order to overcome the situation, the MARDE launched the "Rabla" project, which aimed to modernize the car fleet by replacing old vehicles with new ones. However, the project has not started yet, and its total cost is unknown.

In order to curb the increasing pollution, the authorities have halved customs duties on hybrid motor vehicles imported into the country. As a result, in 2017 every eighth imported car was a hybrid one. At the same time, starting 2020, imports of means of vehicles equipped with an electric motor are exempted from VAT.

Another barrier is the perceived commercial risk of investing in the development of efficient technologies, which partly results from the lack of clear regulatory signals, in the form of vehicle efficiency standards.

In terms of demand for high-performance vehicles, pre-operational costs for electric vehicles remain high. The still poorly developed infrastructure for charging electric vehicles is also an impediment to reducing GHG emissions.

The use of biofuels as low GHG-intensive fuels, taking into account the demand for arable land and water resources for irrigation, competes with the higher priority objectives of domestic food security policy.

Energy efficiency in transport can also be improved by using rail transport as a more efficient and correspondingly less polluting means of transportation. However, it is still under-developed and low-demanded due to the lack of necessary investments in the field. It is also difficult to develop infrastructure for cycling, a mode of transport that can also help reduce emissions in this sector.

A major challenge for the development of transport infrastructure is associated with very high pre-operational capital costs. Unsatisfactory urban planning, as well as inadequate institutional mechanisms for managing transport demand in urban areas are also among the constraints of this sector.

5.1.3. Buildings Sector

To date, the sector long-term strategy for the renovation of the national real estate fund (for residential and public buildings) has not been developed and approved, and the legal/regulatory framework for the residential sector is still being developed. This prevents the promotion of low-energy buildings and attraction of financial resources needed to achieve the national energy efficiency potential in the buildings sector and therefore does not allow implementation of actions associated with real savings in this sector.

The allocation of financial resources to the public sector is insufficient, and the means attracted by development partners in the form of preferential loans are not accessible to all local public authorities.

Regarding the difficulties encountered in increasing energy performance of multi-story apartment buildings, it is worth mentioning the following:

- owners of apartments with district heating have no interest for insulating the external walls, due to the fact that the thermal energy consumed for one apartment is not recorder for the respective apartment, but for the entire building;
- widespread poverty and unaffordability of the current heat tariff deprive tenants of the ability to invest in insulating the exterior walls of buildings and/or in reconstruction of building internal heat supply system into one with a horizontal heat distribution, allowing to keep record of heat consumption at the apartment level;
- lack of possibility to regulate energy consumption in the multi-story blocks of flats and aging of the heating system with vertical distribution in the absence of sufficient technical service from the Municipal Enterprises for the Management of the Housing Fund, motivate tenants to look for more advantageous heating possibilities and schemes, with effects of hydraulic disturbance of the building's heating system and reduction of the heating system efficiency of the building;

- massive thermal rehabilitation of buildings leads to a decrease in thermal load at cogeneration power plants in Chisinau and Balti, and at thermal plants in all cities, with impact of reducing overall efficiency of these sources, supply of electricity and heat delivered to the network and, as a result, freezing of investments attracted to the construction of these facilities, as well as the increase of tariffs for electricity and heat;
- there are damaged buildings that need urgent major renovations and significant financial means.

Lately, there has been a very small number of buildings rehabilitation and RES capitalization projects, previously financed largely from the Energy Efficiency Fund. The reason was the uncertain long-term situation created by the merger of EEA with EEF, changes in the regulatory framework in the field of buildings regarding estimation methodologies, minimum performance requirements, etc., insufficient funding of skilled specialists and projects. Once the minimum performance requirements for major building rehabilitation become more demanding, investments in the rehabilitation of buildings will become more significant, and this will become an additional barrier to rehabilitation, resources consumption reduction and GHG emissions mitigation.

In addition to the above constraints, there are other, more specific impediments in the building sector that do not favor the GHG emissions mitigation:

- lack of interest of young people to join the sector, lack of specialists in the field;
- migration of labor force and research staff abroad;
- widening gap between the training of engineering and technical staff and the real needs of the sector;
- technical and moral tear and wear of energy production equipment;
- operation of equipment in partial load mode;
- the recent years drought diminishes the interest for capitalizing on biomass for energy purposes.

5.1.4. Industrial Sector

Although there is a wide range of cost-effective technologies for reducing greenhouse gas emissions from the industrial sector, their employment to the full realization is hampered by a multitude of barriers.

The existing machinery and equipment in industrial enterprises in the Republic of Moldova have a high degree of moral and physical wear and tear, and the state has limited possibilities to financially support the process of restructuring and re-furbishing industrial enterprises. There is also a growing shortage of qualified engineering and technical staff and a profound discrepancy between the training of technical staff and the industry's needs. On the other hand, loans from local and foreign banks for purchasing energy efficient equipment are still very expensive and few companies can afford to invest in modern equipment, and the share of grants in the total amount of external funding has been reduced or even excluded under some external credit lines. The pledge availability issue for loans is a pressing one. In many projects to be carried out, businesses are required to financially contribute with substantial co-financing, which becomes a barrier for the initiation of the projects.

The financial shocks during the years 2015-2019 and the problems related to corruption scandals and "*theft of the billion from the banking system*", tightened the conditions and made the loaning process difficult. Another financial barrier is strong depreciation of the national currency against the main international currencies (euro and US dollar), which involves a high risk for loan repayment.

Some industrial products (for example, dairy products, bakery products) are social products, respectively prices are regulated by the state. In this sense, companies operating in these industries are unlikely to accumulate enough revenue to be able to invest in upgrading and implementing EU standards, including for the export of its products. For the time being, the Republic of Moldova cannot deliver products of animal origin to the countries of the European Union due to the non-traceability of products of animal origin.

Historical debts repayment is also a problem for the industry sector, such as, for example, the case of glass, brick and sugar factories, involved in long-term litigation due to historical debts and VAT refunds.

In the above context, lack of enabling business environment is undoubtedly a barrier to technology transfer as well. The ability of small and medium-sized enterprises to access and absorb information about the best technologies is often limited. Even large companies have limited technical resources to interpret and translate the available information.

The still modest development of industrial parks and limited financial sources available for them is a key barrier in promoting innovation and know-how technologies in the industry sector.

Also, the efficient use of energy resources is impeded by:

- insufficient policies to promote industrial energy efficiency and unavailability of national technical expertise, resources and programs aimed at enhancing industrial potential due to improved energy efficiency;

- insufficient technical capacity of enterprises to identify, develop and implement industrial energy efficiency projects and further improve energy performance;
- lack of funds for the development and preparation of industrial energy efficiency projects, promotion of good practices at national level to support, raise awareness and promote energy efficiency in industry;
- outdated standards (GOST type), which do not allow for product range diversification and contribute to maintaining high level of emissions;
- lack of energy service companies (ESCOs) that would take on the role of helping small and medium-sized enterprises to find and finance energy efficiency improvements; establishment of energy service companies is constrained by unavailability of start-up capital from financial institutions, which are not accustomed to the business model of these organizations.

Another barrier to low-carbon development in the industrial sector is often associated with legislative instability, especially in fiscal and budgetary policy.

In order to overcome the said barriers and achieve essential GHG emissions reductions it is necessary to change the legislative framework so that it fully supports the implementation of new technologies in industrial enterprises in the Republic of Moldova.

Regarding fluorinated gases, for now there is no approved legislation in the Republic of Moldova specifically for regulation of these gases. Taking this as a starting point, in 2020, from the assistance provided in the framework of EU4Climate project, a roadmap to overcoming this situation was proposed. During the years until 2022, the Law on fluorinated greenhouse gases and amendments to other regulations shall be developed and approved to effectively transpose the Regulation (EU) no. 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006.[249]

5.1.5. Agriculture Sector

Agriculture in the Republic of Moldova is a volatile activity and very vulnerable to risks, being susceptible especially to climatic factors (such as droughts, frosts, floods, hail, erosion and landslides). Reducing dependence on such phenomena is a major challenge for this sector. Other low-carbon development barriers are associated with:

- reduced budget allocations, especially for the renovation of the inventory base, reduced capital investments for assets renovation;
- underdeveloped insurance market in agriculture;
- excessive fragmentation of agricultural land, which entails low agricultural production efficiency due to failure to use anti-erosion and soil protection tillage technologies on agricultural land. Soil degradation is estimated at 2.723 billion lei annual losses;
- insufficient development of "no till" and "mini-till" conservation agriculture technologies with subsoil tillage and maintaining positive balance of humus, nitrogen and carbon in the soil by systemic use of green fertilizers (vetch). New "no-till" and "mini-till" technologies were used during the years 2015-2019 on only about 2.8-7.3% of the arable lands;
- insufficient and unbalanced fertilization of agricultural crops with chemical fertilizers (in the period 2015-2019 varied between 46-94 kg of active substance/ha, of which 67-74% - chemical nitrogen fertilizers, gradual depletion of phosphorus and potassium stocks in soil with a negative effect on the amount and quality of agricultural production;
- Insufficient use of organic fertilizers on arable lands, reduced efficiency of chemical fertilizers, a profoundly negative balance of humus and carbon in soil, increasing greenhouse gas emissions, destructuring, strong compaction of the arable layer and increasing the risk of drought with serious consequences for the quality status and production capacity of agricultural soils;
- The multitude of strategies, programs, activity plans, as well as lack of a special legal framework on soil conditions fragmentation of duties among the executive staff in the field of agricultural land use, which results in lack of integrated management;
- lack of investments for the recovery of the animal husbandry sector and for implementation of sustainable animal manure management systems;
- reduced possibilities for procurement of breeding animals and highly efficient equipment, inefficient pricing policy for purchasing raw materials for the animal husbandry sector;
- intensive animal breeding system based on implementation of advanced meat and milk production technologies is underdeveloped. Small-scale production prevails in individual households where extensive production technologies prevail. As a consequence, the sector productivity has reduced, and environmental pollution has intensified, because the manure is not used in fields as organic fertilizer, but remains stored within the area of rural settlements, aggravating the ecological and sanitary situation;

[249] Energy Community. EU4Climate. Development of a Roadmap for EU4Climate support outlining priority actions for the Republic of Moldova. <https://eu4climate.eu/download/development-of-a-roadmap-for-eu4climate-support-outlining-priority-actions-for-the-republic-of-moldova/>

- lack of an integrated and comprehensive approach to efficient use of renewable energy resources (agricultural waste, animal manure);
- insignificant development of value chain segments of high value-added agricultural products;
- inefficient statistical system for recording agricultural crops, livestock and poultry.

Unfortunately, the sector strategies and programs approved to date have not been successful enough to improve the situation. The financial coverage of these programs and action plans has been very modest. The situation could change in a positive direction with the implementation of the Land Improvement Program aimed at ensuring sustainable management of soil resources for the years 2021-2025, for which an estimated amount of 4.278 billion lei, including 59.626 million lei from the state budget, respectively 4.219 billion lei from external sources, were planned.

5.1.6. Forestry Sector

The main barriers and constraints related to the forestry sector in the Republic of Moldova, with an impact of GHG emissions removals are:

- *Financial:* the state, private and local budgets intended for forest management and enlargement forest areas are small;
- *Institutional:* inadequate management at various levels; limited capacities for designing various forestry works; limited number of experts in the field of climate change related to the forestry sector;
- *Technological:* the land fund is fragmented into small privately owned plots, what complicates the process of consolidation and implementation of measures aimed at expanding forest areas; there are no studies on genetic variability of the edifying species of valuable forest habitats; the endowment with modern technologies, equipment and machinery is insufficient; the amount of ecological regeneration and reconstruction works, as well as the techniques used to improve the composition of stands, restoration of the fundamental phytocenoses do not correspond to the needs;
- *Ecological:* a large part of natural forest stands are regenerated from shoots, which have a low regeneration and climate change adaptation capacity; the compositional structure of forests includes a significant share of non-native species; the situation of rare and endangered ecosystems (beeches, fluffy oaks, petrophytic formations, etc.) worsens due to shrinking of areas occupied by these ecosystems; degradation and diminution of the forest stands bonification; continuous erosion of forest biodiversity; continuous degradation, fragmentation, destruction, spontaneous management, lack of planning in compliance with the forestry regime of the forests owned by municipalities;
- *Regulatory:* lack of coordination and collaboration between forestry regulatory, research and management institutions and institutions specific to relevant economic sectors, with a negative impact on synergy;
- *Social:* public awareness about climate change mitigation and adaptation is low, especially at community and individual level; the high degree of rural poverty disadvantages expansion of necessary forestry and pastoral resources; population opposes the process of afforestation expansion due to diminution of communal (public) grasslands.

There is also a significant slowdown in the wooded areas expansion rate because of degraded agricultural land. Although the mechanism for allocation of land for afforestation is relatively established, it does not work properly, including due to deficient monitoring and failure to sanction the executors responsible for implementation.

The Republic of Moldova does not have a National Forest Inventory, and the data collection process does not meet the international requirements. Exact and up-to-date information on the volume, distribution, composition and overall state of forests (public and private) is of utmost importance for drafting development and monitoring policies, providing assistance and support aimed at sustainable management, as well as complying with national and international reporting requirements.

The role of perennial plantations in GHG emissions removal is steadily decreasing, primarily because between 1990 and 2019 the area occupied by perennial plantations decreased by about 39%. Planting of new vineyards and orchards is a slow process with low chances of reaching the quantitative indicators of 1990.

At present, there is no clear picture of the grassland degradation state at national, regional, or local level. The proportion of abandoned or overloaded grasslands, the share of grassland affected by bushes, weeds or other restrictive factors, is not known. This makes it difficult to assess at national level the needs to undertake ecological improvement/reconstruction and grasslands capitalization measures in the context of sustainable development and investment needed for this purpose. The practices of converting different categories of degraded land into grassland, including as a major GHG removal factor, are declining, and are practically overlooked by local and regional authorities.

5.1.7. Waste Sector

Although the waste collection and disposal infrastructure in the Republic of Moldova is currently underdeveloped, in recent years the waste management legal framework has been substantially improved by the Law on waste no. 209 of 29.07.2016 and the subsequent regulatory framework. In 2019, the Environmental Agency became functional, providing the institutional framework for the implementation of the law and regulation of waste management activities. At the same time:

- waste collection, transportation and disposal infrastructure, especially in rural areas, continues to remain precarious at both state and private level; reason - insufficient funding for waste management at both state and private level;
- management of hazardous waste is not progressing, due to the lack of about 4 million euro for setting up the Hazardous Waste Management Center;
- there is no infrastructure for planning, organizing and implementing an integrated waste management system at all levels (national and regional);
- there are no adequate capacities for waste disposal and partial coverage with collection and transport services in urban areas (60-80%), and in 10-20% these services are unavailable in rural areas;
- lack of final waste storage capacities, built and operated in accordance with environmental standards;
- the infrastructure for management of other categories of waste, such as construction and demolition waste, manure, municipal waste, etc. is not available;
- evolution of water supply and sanitation sector in the Republic of Moldova during the last 15-20 years has remained insignificant, access to sewerage systems for population continues to be a current problem; although the legal and regulatory framework is harmonized with EU requirements, there are shortcomings in its implementation, due to lack of capacities of all kinds;
- there is lack of capacity among water and sanitation sector specialists, and the regulatory/ standards framework is poorly developed;
- the level of awareness among population and businesses is low, including about the importance of integrated waste management measures and active involvement in their implementation.

Along with constraints regarding implementation of the new regulations on biodegradable waste management - the greatest potential for GHG generation - there are a number of constraints in development of the composting segment, such as:

a) Lack of targets for reducing the amount of the stored biodegradable waste, Art. 56, of the Law 209/2016;

b) There is no tariff differentiation for different types of waste, so there are no defined instruments to discourage the storage of biodegradables;

c) Poorly developed infrastructure for composting waste, lack of separate collection of biodegradable municipal waste;

d) The amount and calculation methodology for waste disposal charges are not set and the LPA must verify that the price set by the operator is sufficient to cover the costs. In the absence of this normative requirement verification is therefore unfeasible;

e) Insufficient funding for waste management at LPAs level.

5.2. Capacity Building Needs for Climate Change Mitigation

Climate change mitigation capacity should be understood as an ability of individuals, groups, organizations and institutions to identify, plan and implement climate change mitigation and adaptation actions, considered an integral part of sustainable development efforts.[250]

Climate change mitigation capacity building needs are relevant and cover four dimensions: carry out climate studies, research and assessments; formulate strategies and policies in climate change area; implement strategies and policies in climate change area; and negotiate climate issues at international level, mainly for attracting funds.[251]

5.2.1. Capacity to Carry Out Climate Studies, Research and Assessments

The Republic of Moldova has a wide network of research institutions in various fields, however, there are no structures strictly oriented towards studies related to GHG emissions mitigation. This is justified by the fact that the country is not distinguished by sectors with significant greenhouse gas emissions, and the existing legal framework so far has not stated emission mitigation as the country's top priority. At the same time, the respective institutions continue to have research structures related to climate change and highly qualified staff in this field, which allows to carry out climate change studies, including for the

[250] Donor assistance to capacity development in environment, OECD, Paris, 1995.
[251] Sagar, A. Capacity development for the environment: A view from the south, a view from the north, in: Annual Review of Energy and Environment 25, 2000, pages 377–439.

preparation of National Communications, Biennial Reports and National Inventory Reports to UNFCCC.

It is true, however, that the same cannot be said about the available and applied calculation models, as well as about the available information capacity. For example, since 2000, the Power Engineering Institute (PEI) has obtained the right to use the ENPEP (Energy and Power Evaluation Program) model package. Mainly WASP and IMPACT models were used. Due to insufficient funding, the specialists who successfully handled these instruments quit, and the PEI lost the capacity to professionally carry out studies on development of electricity sources in the country. The same story happened with the MARCAL calculation model. Use of other tools, such as MAED (Model for Analysis of Energy Demand), LEAP, TIMES and others faced an impediment of a different nature – there are no reliable sources of input data for these tools, and independent preparation of information by experts requires significant time and financial resources. In other words, the national statistical system cannot meet the requirements for conducting studies to assess energy efficiency reserves and develop energy demands based on the "bottom-up" approach.

At the same time, the restructuring of the country's statistical system to comply with the EU requirements is under way. Thus, in the future the official statistics may be able to meet the requirements for conducting studies and research related to GHG emissions mitigation.

5.2.2. Capacity to Formulate Strategies and Policies in Climate Change Area

As is well known, the range of climate strategies and policies includes those that are specifically targeted towards GHG emissions mitigation and climate change adaptation, and those that tangentially contribute to overcoming climate problems. The policy documents aimed at climate change mitigation include the Low Emission Development Strategy until 2030 (LEDS 2030) and the Action Plan for its implementation, approved by the GD 1470/2016, developed by international and national experts with financial support from the United Nations Development Program (UNDP) Regional Office for Europe and the Commonwealth of Independent States (RBEC Bratislava) and UNDP Moldova. Subsequently, many national consultants were involved in this process, which contributed to important changes to the document and who, at the same time, improved their capacities to develop such documents.

Once the updated NDC (2020) has been approved, the need to update the LEDS 2030 arose as well. This time the development of the Low Emission Development Programme (LEDP) until 2030 and the Action Plan for its implementation, which will replace the LEDS 2030, was entrusted solely to national consultants. Within the EU4Climate Project, they have developed the concept of the programme, which in 2021 has been present to the MARDE for consideration. MARDE launched the public consultation process with stakeholders, and subsequently intends to approve it by the end of 2021 year.

Regarding climate change related policies and strategies, some of them have been developed with donors' support. In this sense, the Energy Strategies of the Republic of Moldova of 2000 – 2010[252], 2007 - 2008[253], 2013 - 2030[254] are relevant, the latter being developed largely by external consultants, with the financial support of the European Union. Unfortunately, the objectives of this strategy set for 2020, with few exceptions, were not met, given that for the last six years about 2 billion US dollars had to be capitalized, an investment volume disproportionate to the realities of the Republic of Moldova, the gross domestic product of which amounted to circa 12 billion US dollars in 2019.

Strategies developed for other sectors have had a similar fate. The fundamental reason for the situation when the most important sector development documents produce no impact for the country is lack of feasibility studies substantiating the objectives formulated in these policy documents. Otherwise speaking, the objectives set are wishes rather than targets, because they do not have adequate justifications for social, technical, economic, etc. impacts, and do not substantiate the ways to overcome barriers. For the most part, national consultants (i.e., national institutions) have the potential to carry out such studies. At the same time, lack of adequate calculation models, handling capacity, financing that would motivate the staff, as well as credible data sets for calculations significantly reduce the capacity of these institutions. Donor assistance is very welcome here. Donor support would have to finalize with ongoing training, licensing of the respective software, and assistance in launching and using these tools. Of course, at the same time, state budget resources have to be allocated for keeping the personnel trained on using the mentioned calculation models. Unfortunately, all these elements are not met when the assistance projects in this field are promoted in the RM. For example, the idea of implementing the TIMES model (EU STARS Project "Support for the Modernization of the Energy Sector in the Republic of Moldova") was welcomed by energy specialists. During the years 2019-2020, five workshops, of 5 days each, were organized to master the tool. However,

[252] Government Decision no. 958 of 21.08.2007 on the Energy Strategy of the Republic of Moldova until 2020. Official Gazette no. 141-145 / 1012 of 07.09.2007.
[253] Government Decision no. 360 of April 11, 2000 on the approval of the Energy Strategy of the Republic of Moldova until 2010. Official Gazette no. 42-44.
[254] Energy Strategy of the Republic of Moldova until 2030. Government Decision no. 102 from 05.02.2013. Official Gazette no. 27-30 / 146 of 08.02.2013.

subsequently, the license for using was not issued, and the authorities did not take steps to ensure the financing of the trained teams.

5.2.3. Capacity to Implement Strategies and Policies in Climate Change Area

As mentioned above, following the presentation of the updated NDC (2020) to UNFCCC, the MARDE planned the approval of the Low Emission Development Programme (LEDP) until 2030 and the Action Plan for its implementation by the end of 2021 year (LEDP 2030 will replace the LEDS 2030). The document will outline the policies and actions for achieving the new GHG reduction objectives set out in the updated NDC. The LEDP 2030 will contain sector policies and actions to mitigate direct GHG emissions, most of which can be found in other policy documents. Many of them aim to achieve objectives considered a priority for the key sectors of the national economy, the aspect of GHG emissions mitigation being of secondary importance in most of them. Most of the mentioned actions will correspond to those developed in BUR2, which served as basis for identifying the emission mitigation targets set forth in the updated NDC (2020).

As mentioned above, the Republic of Moldova intends to achieve LEDP 2030 objectives by developing and implementing the Nationally Appropriate Mitigation Actions (NAMAs). Their implementation requires the involvement of the strongest national institutions, efficient management, as well as adequate assistance from the international community. The institutional arrangements for LEDP 2030 implementation will cover three main areas:

1) National planning and streamlining the low-emission development priorities with the national regulatory framework and strategic development priorities;
2) Investments attraction and efficient management of public finances and donor funding, as well as environmentally friendly technologies to support LEDP 2030 implementation;
3) Monitoring and control of the implementation of the low-emission economic development actions planned in the LEDP 2030.

The country's capacity to fulfil the tasks set forth for the areas mentioned above is already proved by the following actions:

Area 1:

- The LEDP 2030 is in line with the objectives of the draft National Development Strategy "Moldova 2030",[255] submitted for debate and approval to the Parliament of the RM. The document pays special attention to the climate change issue (p. 19, 117). According to the document, a higher quality of life means achieving sustainable and broad social progress in 10 dimensions, including the quality of the environment. The Strategy "Moldova 2030" emphasizes that *climate change* affects all areas of any country's development. Most sectors are vulnerable to climate change and are affected by the extreme phenomena striking the country. In this context, climate change adaptation and GHG reduction measures must be promoted;
- The GD no. 444/2020 of 01.07.2020 on the establishment of the mechanism for coordinating climate change activities provided for the establishment of the National Commission on Climate Change, which provides the institutional coordination framework for monitoring, reporting and verification, as well as facilitates streamlining of climate change issues with national and sectoral programs and plans. Annex 4 to the Government Decision no. 444/2020 establishes the NAMAs coordination mechanism. This mechanism is developed for the purpose of establishing the regulatory and institutional framework for the process of drafting, evaluation, approval, monitoring, reporting and verification of NAMAs. It aims at establishing the responsibilities and framework for designing, evaluation and approval of projects for the implementation of nationally appropriate mitigation actions.
- A number of regulations, outlined for each sector in Chapter 3, are being drafted and implemented to support GHG mitigation actions.

Area 2:

- The Republic of Moldova relies heavily on attracting investments to combat GHG emissions by means of NAMA registered in the UNFCCC NAMA Registry. In this sense, to be more convincing, five of the ten NAMAs registered in the UNFCCC Registry (Tab. 5-1) were developed in a pre-feasibility study format. Unfortunately, this mechanism proved to be dysfunctional. Based on this, the country tried to use a different way to get funding. Supported by the Green Climate Fund, it was developed during 2017-2019 the Republic of Moldova's Country Program aimed at engaging with the Green Climate Fund for the years 2019-2024.[256]However, the investments funding mechanism of the GCF proved to be quite difficult, with approval phase for the respective financing requiring at least 2 years, which greatly discourages the potential beneficiaries. Besides, the GCF does not finance mitigation projects in agriculture and waste sectors. At the same time, the GCF come up with the

[255] Government Decision no. 377 of 10.06.2020 on the approval of the draft Law for the approval of the National Development Strategy "Moldova 2030" https://www.legis.md/cautare/getResults?doc_id=121920&lang=ro>

[256] <http://portal.clima.md/libview.php?l=ro&idc=45&id=569&t=/Presa/Noutati/Programul-de-ara-de-angajare-a-Republicii-Moldova-cu-Fondul-Verde- for-Climate />

initiatives to accredit companies, among which, for example, is Mobiasbanca - OTP Group. Regarding the promotion of specific GHG emissions mitigation projects, only regional projects are on the way to implementation, which also includes the Republic of Moldova: Green City Program (GC)[257], GCF-EBRD sustainable energy financing facilities, with both projects co-financed by the GCF and EBRD.

- The Republic of Moldova has a number internal funds to finance climate change activities, with adequate management experience. These include:
  - *National Ecological Fund (NEF)*[258]*:* In the Republic of Moldova, access to funding from national funds is possible through a two-tier system of green funds, which includes the *National Ecological Fund (NEF)* and *36 local ecological funds*. NEF is directly subordinated to MARDE. The general mandate of the NEF is to provide grants to support environmental protection and environmental research projects, and operation of environmental NGOs;
  - *National Regional Development Fund (NRDF)*[259]*:* NRDF has become operational since 2011 and has an annual budget of 150-200 million lei (9-12 million USD). It is the largest internal source of funding for regional development projects. The fund is managed by MARDE. Since 2013, the NRDF is also involved in energy efficiency projects;
  - *Energy Efficiency Agency* (EEA)[260], which in 2019[261] merged with the Energy Efficiency Fund. The EEA is subordinated to the Ministry of Economy and Infrastructure, which has the mission to implement state policy in the field of energy efficiency, energy performance of buildings, and use of renewable energy sources, including by attracting and managing financial resources to finance projects in those areas in an environmentally and climate change sustainable way. In recent years, the investment fund has been very limited.

Area 3:

- The domestic system for monitoring, reporting and verifying the progress of the LEDS 2030 and NAMA implementation in the Republic of Moldova is regulated by the GD 1277/2018[262] on the establishment and operation of the National System for Monitoring and Reporting on Greenhouse Gas Emissions and Other Information Relevant to Climate Change, as well as the GD 444/2020[263] on the establishment of a mechanism for coordinating climate change activities;
- The technical tasks related to the implementation of potential actions supported by donors and creditable activities in the Energy, Industry, Buildings and Transport sectors are assigned to the EEA; mitigation issues in the agriculture sector – to MARDE; mitigation issues in the forestry sector – to MARDE's Moldsilva Agency; and mitigation in the waste and industry sectors (refrigeration and air conditioning) – to the Public Institution "Environmental Projects Implementation Unit" (PI "EPIU") of the MARDE;
- National GHG emissions, as well as their evolution trends are periodically reported in the NCs and BURs of the Republic of Moldova to the UNFCCC, as well as in NIRs. The NBS also publishes the level of GHG emissions actually recorded by the Republic of Moldova.

[257] <https://www.greenclimate.fund/countries/moldova>
[258] <http://madrm.gov.md/ro/content/fondul-ecologic-na%C8%9Bional>
[259] <http://www.serviciilocale.md/pageview.php?l=ro&idc=94&id=150&t=/Cadrul-legal-si-institutional/Dezvoltare-regionale/Fondul-National-pentru-Dezvoltare-Regionale/>
[260] Energy efficiency agency. <https://www.aee.md/ro/page/misiunea>
[261] Official Gazette no. 38-47 of 08.02.2019. Government Decision no. 45 of 30.01.2019 on organization and functioning of the Energy Efficiency Agency.
[262] Official Gazette no. 38-47 of 08.02.2019. Government Decision no. 1277 of 26.12.2018 on the establishment and operation of the National System for Monitoring and Reporting of Greenhouse Gas Emissions and Other Information Relevant to Climate Change. <https://www.legis.md/cautare/getResults?doc_id=112485&lang=ro>
[263] Official Gazette of the Republic of Moldova no. 188-192 / 635 of 24.07.2020, Government Decision no. 444 of 01.07.2020, on the establishment of the mechanism for coordinating activities in the field of climate change.

Table 5-1: Features of the RM's NAMAs registered in the UNFCCC NAMA Registry

No.	NAMA	Emission reduction, kt CO_2 / year by 2030	Needed Investment, mil US $	Specific investment, US $ / t CO_2
1	Promotion of wind power sources in the Republic of Moldova	609	640	53
2	Promotion of small capacity CHPs in the Republic of Moldova	41	23	23
3	Promotion of heat pumps in the Republic of Moldova	148	180	108
4	Use of solar energy for domestic hot water production in the Republic of Moldova	116	606.3	758
5	Use of energy willow for production of thermal energy in the Republic of Moldova	250	89	15
6	Waste to Energy in the Republic of Moldova	109	15	4
7	Hybrid and electric buses and minibuses in Chisinau municipality	17	344.3	2006
8	Promoting energy efficient lighting in the Republic of Moldova	327	236.3	52
9	Clinker replacement in cement production	301	100	92
10	Implementation of cattle feeding technologies using dried grape pomace in cattle rations	69	4	4
11	Implementing the conservation tillage system	323	184	38
12	Afforestation of degraded lands, riparian areas and protection belts in the RM	284	144	10
	TOTAL	**2595**	**2567**	

5.2.4. Capacity to Negotiate Climate Issues at International Level

Typically, climate change is a complex horizontal set of issues, which are similar to other sustainable development issues. These issues require new capabilities such as the ability to establish long-term sustained commitments, create a strong political and integration coherence, and enter into partnerships between governments and civil society.[264]

Climate change as a horizontal issue, require the availability of two kinds of capabilities: climate specific capabilities and climate relevant capacities. The climate specific capability implies the capacity to develop exclusively climate actions. At the same time, given that climate change is a cross-sectoral issue, the most significant institutional capacity, which might be necessary for the development of climate actions cannot be regarded as climate specific, but rather climate relevant. This means that this capability shall be developed for purposes other than those directly related to climate change, and for concrete sectors, such as energy, transport, agriculture and forestry. While the display of such capabilities could have a very significant impact on the success of climate action or policies in this area.

Starting from this division of capacities, Table 5-2 shows the specifics of the above mentioned capacities, as well as their availability in the Republic of Moldova at present (in brackets, 10 corresponds the maximum necessary availability, 1 - lack of such in practice).

The level of availability of capacities listed in Table 5-2 predetermines the capacity to negotiate climate change issues internationally. Considering that negotiation in itself is an art and a science, maximum performance in negotiations cannot be achieved without knowledge transfer, as well as relevant best practices. In this regard, the Republic of Moldova needs relevant training, which is provided by donors based on predetermined programs, and systematically.

[264] <http://pdf.wri.org/inst_capacity_climate_change.pdf>

Table 5-2: Climate-specific and relevant capacity needs

Categories	Climate-specific capacities	Climate-relevant capacities
Staff	Sufficient availability of: staff at Government level (5), experts (5), business representatives and NGOs for national assessments (6), formulation of national strategies (8), design and implementation of policies and measures, as well as monitoring, reporting and review (6); Reasonable level of climate-specific skills and training (7); Interest in climate change (6).	Availability of experts at governmental level and beyond for the development of relevant climate policies in the following sectors: Energy (9), Transport (6), Agriculture (8), Forestry (9), Industry (5), Research and Development (8), Economy (7), Finance (7), Education (6) Availability of general training opportunities (7) Availability of financial and other incentives (4).
Organizations	Availability of: specific mandate for climate change (8), "Unit" within the organization (7), working climate for senior management (5).	Compatibility of organizational objectives with climate change (7), structured management and processing skills (7), availability of financial and human resources (4), broad capability to carry out missions (5).
Network of organizations	Financial procedures and provisions (6), level of cooperation on climate issues (7), existence of a coordinating organization (8), assigning of responsibilities (6), stability/adaptability of the institutional framework (5)	Public sector practices and procedures underlying policy streamlining (4).
Public governance	Ability to influence mass policies to take into account climate change (7)	Political stability (2), the right to express oneself and responsibility (5); the capacity to implement sound climate-relevant policies and ensure a sound business environment (5), independent public service (5), the capacity to raise sufficient resources (5); a rule of law and corruption control (2).
Social norms, values, practices	Knowledge of climate change and positive attitude towards climate change mitigation measures (7)	Compliance with laws (5); positive attitude towards environmental protection (6), cooperative attitude among citizens (5).

5.3. Financial Needs in the Context of Ensuring Low-Carbon Development

In order to ensure the objectives of GHG emissions reduction in the context of low carbon development, availability of two funding categories is required. The first is the need to reach an adequate capacity level in GHG mitigation. The second are the investments needed to implement measures and technologies contributing to the proposed GHG reductions.

The relevant financial needs are shown in Table 5-3, where the investments needed for NAMAs implementation correspond to investments needed to achieve the country's conditional objective.

The table shows the technical and capacity development needs of the Republic of Moldova are currently estimated at 1.530 million US dollars, those related to technology transfer, respectively 0.675 million US dollars, and for the implementation of NAMA aimed at achieving the determined national contribution - 4.9 billion US dollars, according to LEDS 2030 and the Action Plan for its implementation. The investments needed to implement GHG emissions reduction measures and technologies, which at the same time, ensure the sustainable development of national economy with its own forces amount to about 3.3 billion US dollars, according to LEDS 2030.

Table 5-3: Funding needs in the context of ensuring the RM's low carbon development

No.	Actions	Necessary support
Technical and capacity development needs, thousands of US $		
	TOTAL, including:	**1530**
1	Supporting the country's capacity to develop capability and strengthen the national inventory system	50
2	Strengthen the national GHG inventory development capability for the LULUCF sector, including the development of the land use matrix and completing the transition to the 2006 IPCC Guidelines for LULUCF	30

No.	Actions	Necessary support
3	Strengthen the capacity of the national network of research institutions to conduct studies, research and assessments to identify additional mitigation opportunities, that include financial and organizational justification in terms of social, technical and economic impact	170
4	Enhancing national capacity to prepare viable NAMAs project proposals in transport, industry and agriculture sectors to attract investment	100
5	Strengthen the policies, legal framework and management of the Forestry sector of the Republic of Moldova	50
6	Strengthen the waste stakeholder's capacity to implement EU directives and regulations	40
7	Facilitate the dialogue towards knowledge transfer and lessons learned, as well as training relevant stakeholders and experts from the administrative structures of the Republic of Moldova for successful implementation of the national MRV system, with special emphasis on MRV of LEDS and NAMAs	40
8	Involve and mobilize private sector in low-carbon and climate-resilient actions	300
9	Mobilization of investments for the implementation of the NDC of the RM	300
10	Integrate mitigation and adaptation measures and objectives into business development plans, national and sectoral Energy sector plans.	200
11	Stakeholder training and promotion of workshops on afforestation, land reclamation practices, forestry and sustainable pasture management	50
12	Stakeholders training, including through workshops on renewable energy and energy efficiency, as well as developing the respective technical and financial demonstration tools (in the context of NAMA on renewable energy and energy efficiency)	200
Financial needs, US $ mil		
	TOTAL, including:	**4899**
1	Promotion of small capacity CHPs in the Republic of Moldova	23
2	Promotion of heat pumps in the Republic of Moldova	180
3	Promotion of wind power sources in the Republic of Moldova	640
4	Use of solar energy for domestic hot water production in the Republic of Moldova	606
5	Promoting efficient lighting in the Republic of Moldova	236
6	Hybrid and electric buses and minibuses in Chisinau municipality	344
7	Clinker replacement in cement production	100
8	Reduction of GHG emissions in enteric fermentation by including dried grape pomace in cattle rations	228
9	Implementation of the conservation tillage system in the Republic of Moldova	5
10	Afforestation of degraded lands, riparian areas and protection belts in the Republic of Moldova	144
11	Use of energy willow for thermal energy production in the Republic of Moldova	89
12	Promoting Waste to Energy in the Republic of Moldova	15
13	Other NAMAs conditioned by LEDS	2289
Technology transfer needs, thousands of US $		
	TOTAL, including:	**675**
1	Institutional assistance in promoting advanced technologies	250
2	Internship programs for learning advanced technologies in operation	125
3	Identifying the most relevant and efficient financial instruments to be used by Moldovan financial institutions for climate investments promotion and implementation	300

5.4. Technical Needs in the Context of Ensuring Low-Carbon Development

An increasing number of international programs provide technical assistance to developing countries for drafting and promoting low-emission development plans and projects. Assistance includes support for: achieving low-carbon progress, low-emission development and climate strategies, Technological Needs Assessment (TNA), Nationally Appropriate Mitigation Actions (NAMAs), preparing roadmaps for development and implementation of advanced technologies, as well as other similar activities to support the promotion of practical goods and initiatives with an impact on GHG mitigation. The Republic of Moldova has been benefiting from such assistance, but the need for it has not been exhausted, especially at sector level. Aiming at getting it in a motivational and transparent way, the Government of the Republic of Moldova issued the GD No. 377 of 25.04.2018 regarding regulation of the institutional framework and external assistance coordination and management mechanism.

The regulation approved by this decision establishes the principles and procedures defining:

1) External assistance related institutional framework;
2) External assistance coordination and management mechanism.

By this decision the Government ensures better coordination and synergy in external assistance programming, implementation, monitoring and evaluation by establishing a broad consultative process and dialogue between the Government, the private sector and civil society.

The technical assistance coordination mechanism is distinguished by several stages, each being the responsibility of the respective entity within the corresponding established institutional framework. The latter is represented in Figure 5-1. The programming stage consists of the following phases:

1) Defining assistance priorities;
2) Identifying project ideas and formulation of project proposals, fiches and terms of reference;
3) Negotiation and signing the external assistance agreements.

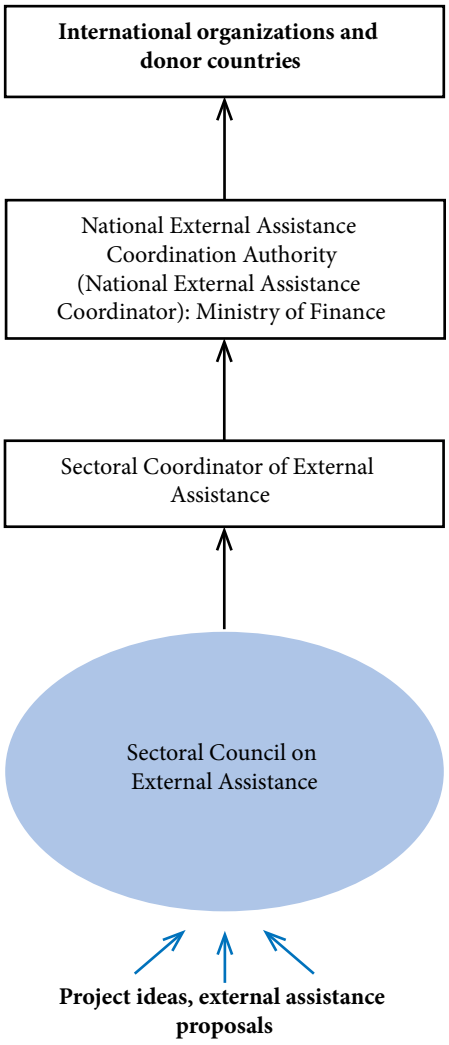
External assistance priorities at sector level are reviewed and approved within the Sectoral Council, and submitted to the National Coordination Authority by the Sectoral Coordinator. Proposals on external assistance priorities are formulated by the National Coordination Authority based on proposals submitted by sectoral coordinators, in compliance with the following documents:

1) The National Development Strategy and the related Action Plan;
2) Commitments to the international community, in particular to the European Union;
3) The Government activity program;
4) Other programs and strategies, including the LEDS.

The Sector Coordinator of External Assistance shall submit the project proposal examined and approved

by the Sectoral Council, to the National Coordination Authority. Agreements providing external assistance are signed by the Prime Minister, the Minister of Finance or by the person empowered in accordance with the law.

The implementation of the external assistance project/ program is the responsibility of the primary beneficiary and/or the implementer under the leadership of the Sector Coordinator.



Provides assistance.

Responsible for the external assistance coordination and management mechanism and fulfills the role of single point of contact /control in relation to external development partners and public authorities regarding project proposals/external assistance programs. Coordinates at national level the process of monitoring the implementation of external assistance projects / programs.

Develops proposals for sectoral projects/ programs, in accordance with the sectoral priorities established by the Government. Leads the agreement negotiating group for the sectoral external assistance project / program. Ensures the proper functioning of projects/programs implementation and monitoring process, etc.

An advisory body, created based on the partnership principle, empowered with sectoral programming and monitoring functions. Identifies, formulates and proposes the sector assistance priorities, including project proposals to the National Coordination Authority. It consists of: heads or representatives of the sector subdivisions; representatives of donors active in the sector; the national coordination unit; private sector; scientific community; public organizations; other relevant institutions.

Ideas and proposals for assistance can be submitted by agencies, ministerial subdivisions, private sector, public organizations, etc.

Figure 5-1: Institutional arrangements on external assistance for the Republic of Moldova.

Monitoring of external assistance projects/programs implementation to evaluate their efficiency, effectiveness, impact and sustainability, is carried out by means of reports provided in Operational Guidelines on external assistance coordination and management.

In 21 calendar days after opening the new external assistance financing line, the State Chancellery, as the National Coordinating Authority for the Module "Data on financial assistance available for launching and developing business" shall ensure the registration of projects/programs on External Assistance Management Platform (AMP)[265].

[265] <http://amp.gov.md/portal/activities?search=&da=&ba=&psec=&loc=>

CHAPTER 6. DOMESTIC MONITORING, REPORTING AND VERIFICATION ARRANGEMENTS

The domestic monitoring, reporting and verifying (MRV) system for LEDS and NAMAs implementation progress in the Republic of Moldova is regulated by the GD 1277/2018[266] on establishment and operation of the National System for Monitoring and Reporting Greenhouse Gas Emissions and Other Climate Change Relevant Information, as well as by the GD 444/2020[267] on the establishment of Climate Change Activities Coordination Mechanism.

6.1. Domestic Measurement, Reporting and Verification System in Place

At present, the key elements of the national measurement, reporting and verification system are featured both through the mechanisms established by the UNFCCC on reporting actual emissions produced in the country and future projections, and through a number of energy efficiency and renewable energy sources promotion activities, as well as through CDM projects of the Kyoto Protocol.

In the above context, it is necessary to mention that the national GHG emissions, as well as their evolution trends, are periodically reported in the NCs of the RM to the UNFCCC[268] (since 2000), respectively in the NIRs[269] (since 2010). These documents are prepared based on studies, research, reports by highly qualified national consultants, including experts with international experience in the field, selected for the calculation and analysis of retrospective information, and entrusted with responsibilities for development of short and medium term GHG emissions evolution scenarios for each sector, based on the macroeconomic development scenarios of the Republic of Moldova.

Additionally, in order to improve the transparency, stability, comparability, completeness and accuracy of the national inventory of anthropogenic greenhouse gas emissions from sources or carbon removals by sinks, not regulated by the Montreal Protocol, the Republic of Moldova has developed the "*Report on the National Inventory System of the Republic of Moldova*" (there are three editions of respective Report published so far, in 2016, 2019 and 2021, submitted to the UNFCCC as technical annexes of BUR1, BUR2 and BUR3), using as starting point six templates developed by the United States Environmental Protection Agency (US EPA)[270] (Institutional Arrangements; Assessment Methodologies and Data Documentation Process; Quality Assurance and Quality Control Procedures; Description of the Archiving System; Analysis of Key Categories; and National Inventory Improvement Plan).

As part of the ongoing effort to achieve a qualitative, transparent and credible inventory, in 2005 the Republic of Moldova developed, and periodically updates the "Quality Assurance and Quality Control Plan". The key features of the QA/QC Plan include detailed specific procedures and quality control and verification template forms, employment of Tier 1 (general procedures) and Tier 2 (specific procedures for individual source categories) methodological approaches, to standardize the process of quality assurance (QA) and quality control (QC) implementation activities within the national inventory; also, the external technical review (audit) out by personnel not directly involved in the process of preparation and development of the national inventory (both by national consultants and by international consultants[271] included in the UNFCCC Roster of Experts[272]); checking the activity data quality, including by comparing data sets obtained from different sources; planning and coordinating the inventory process at inter-institutional level; as well as continuous documentation of the national inventory development process.

Legal and Administrative Framework of the Measurement, Reporting and Verification System

The MARDE is the state authority responsible for developing and promoting policies and strategies

[266] Official Gazette no. 38-47 of 08.02.2019. Government Decision no. 1277 of 26.12.2018 on the establishment and operation of the National System for Monitoring and Reporting of Greenhouse Gas Emissions and Other Climate Change Relevant Information <https://www.legis.md/cautare/getResults?doc_id=112485&lang=ro>

[267] Official Gazette of the Republic of Moldova no. 188-192 / 635 of 24.07.2020, Government Decision no. 444 of 01.07.2020, on the establishment of Climate Change Activities Coordination Mechanism.

[268] <http://clima.md/lib.php?l=ro&idc=81&>

[269] <http://clima.md/lib.php?l=ro&idc=82&>

[270] < www.epa.gov/climatechange/emissions/ghginventorycapacitybuilding >

[271] < http://clima.md/doc.php?l=ro&idc=82&id=3853 >; <http://clima.md/doc.php?l=en&idc=82&id=3852>

[272] <http://unfccc.int/parties_and_observers/roster_of_experts/items/534.php>

that address environmental protection, rational use of natural resources and biodiversity conservation. Within MARDE, the Environment Agency is responsible for implementing the provisions of policy documents and international environmental treaties to which the Republic of Moldova is a party. It shall draw up and submit to the Ministry information on their implementation. In the field of atmospheric air protection and climate change, these activities concern:

- Ensuring implementation of GHG emissions monitoring, reporting and verification system; national legislation on certain air pollutant emissions limitation, ozone layer protection, monitoring and regular reporting to the Ministry on the state of legislation implementation, providing proposals to amend and supplement the respective legislation;
- Implementation of the provisions of policy documents and international environmental treaties to which the Republic of Moldova is a party, including in GHG emissions reduction and climate change adaptation;
- Collecting, centralizing, validating and processing data and information for the preparation of inventories and reports of air pollutants and GHG emissions;
- Ensuring collection and processing of data on the import and consumption of ozone-depleting substances, providing technical support to the Ministry in preparing the Report on consumption of these substances in accordance with the requirements of the Vienna Convention for Ozone Layer Protection;
- Providing technical support to the Ministry in preparation of NCs and BURs, in accordance with the provisions of the UNFCCC, etc.

6.2. Domestic Monitoring, Reporting and Verification System for LEDS and NAMA Implementation Progress

The Republic of Moldova can achieve the GHG reduction targets set out in the NDC by implementing NAMAs identified and set forth in the LEDS, but also other NAMAs initiated by stakeholders. In the Republic of Moldova, the institutional coordination framework for monitoring, reporting and verification, as well as facilitating the streamlining of climate change issues in the national and sectoral programs and plans is provided by the National Commission for Climate Change (NCCC), created by the GD no. 444/2020. Annex 4 to the GD establishes the mechanism for coordinating the nationally appropriate mitigation actions (NAMAs). This mechanism is developed for the purpose of establishing the regulatory and institutional framework for NAMAs development, evaluation, approval, monitoring, reporting and verification process. It aims to establish the responsibilities and framework for the development, evaluation and approval of NAMA implementing projects.

In this respect, the NCCC has the following responsibilities and duties:

1. Coordinates the project development process;
2. Reviews the projects at the meeting and decide whether to accept or reject them;
3. Calls on the central public administration authorities and recommends to local public authorities to take the necessary measures aimed at promoting the nationally appropriate mitigation actions;
4. Requests semi-annual and annual reports on projects implementation.

In order to implement the nationally appropriate mitigation actions, NAMA projects are developed in the national economy sectors. Their implementation is ensured through technology transfer, financing and capacity building, monitoring, reporting and verification mechanism.

NAMA projects fall into two categories:

1) Unconditional (unilateral) – projects managed and financed from the state budget and/or other financial resources, which are provided for in the national and sectoral planning documents and in the related financing plans prepared by the Government. They are not subject to registration in the NAMA Registry of the UNFCCC;
2) Conditioned (supported from external funds) – projects financially supported by UNFCCC Annex I countries, which aim to ensure technical assistance, technology transfer and good practices in the field. They are subject to registration in the NAMA Registry of the UNFCCC.

Unconditional NAMA projects are subject to simplified monitoring, reporting and verification procedure set out in paragraph 36 of the GD 444/2020. NAMA projects supported from external funds go through the development, evaluation, approval and monitoring, reporting and verification cycle provided for in Chapter IV of the same GD.

The documentation of NAMA projects supported from external funds will include the description of at least the following components: legal and administrative, relevant policies and strategies, financial, technical, direct and collateral benefits, risks and constraints, as well as monitoring, reporting and verification.

The procedures, deadlines, monitoring, reporting and verification elements, as well as standard documents for the development, evaluation and approval of NAMA projects supported by external funds are set out in the Operational Manual on the NAMAs Projects Coordination Mechanism, developed by the central authority for environment and natural resources management, and approved by Order of the Minister.

Monitoring, Reporting and Verification of NAMA Projects

1. The monitoring, reporting and verification procedure aims to monitor the overall performance of NAMA projects and include the following activities: (a) measuring the GHG emissions reduction; (b) reporting the information; (c) verification of the reported information;
2. The monitoring, reporting and verification procedure shall be employed both at the implementation stage and after the project completion;
3. Monitoring and reporting are provided by the NAMA project beneficiary, and verification is carried out by the verifier;
4. Project monitoring is carried out during the project implementation period. At the monitoring phase, the beneficiary measures and calculates the GHG emission reductions achieved as the result of NAMA project implementation, according to the standardized measurement and calculation methodologies and instruments set out in the project document;
5. The reporting during the project implementation period implies submission of half-yearly reports, and the final report by the beneficiary at project completion;
6. The beneficiary shall submit the reports based on reporting templates in accordance with the procedure set out in the Operational Manual of the NAMA Projects Coordination Mechanism. The reports shall contain data on the GHG emissions reduction monitoring results. These shall be provided based on monitoring indicators set out in the reporting template annexed to the Operational Manual of the NAMA Projects Coordination Mechanism;
7. The prepared report must be subject to the verification procedure, in order to ensure the veracity and reliability of the information reported by the project beneficiary;
8. The verifier shall draw up the verification report and submit it to the beneficiary, who shall use it as basis for drawing up the GHG emissions reduction report and further submit to the National Commission;
9. The project beneficiary shall hire and pay for the verifier's services;
10. Authorities and institutions implementing unconditional NAMA projects, which are not registered in the NAMA Registry of the UNFCCC, shall apply the simplified monitoring, reporting and verification procedure. They shall submit annual projects reports on actions undertaken and results achieved, to the National Commission. The reporting format and deadline for reporting are set out in the Operational Manual of the NAMA Projects Coordination Mechanism;
11. The Secretariat of the National Commission shall process the data submitted by the beneficiaries and calculate the total amount of reduced GHG emissions, as a result of implementation of unconditional NAMA projects supported from external funds;
12. The primary information on the amount of reduced GHG emissions as a result of NAMA projects implementation is used in the development of the national GHG emissions inventory, the BURs and the NCs to the UNFCCC.

CHAPTER 7. OTHER RELEVANT INFORMATION TO THE CONVENTION

7.1. Integrating Climate Change Mitigation Issues into Social, Economic and Environmental Policies

Climate change mitigation in the Republic of Moldova is considered one of the country's economic and social development priorities, being a component of actions aimed at creating a healthy living environment and sustainable development of all sectors of the national economy. This aspect was reflected in the country's supreme strategic document: the National Development Strategy "Moldova 2030"[273] (NDS 2030), the draft of which is in the Parliament of the Republic of Moldova for approval. Accordingly, a higher quality of life implies achieving sustainable and broad social progress in 10 dimensions, including the quality of environment. The "Moldova 2030" strategy emphasizes that climate change affects all areas of the country's development. Most sectors are vulnerable to climate change and are affected by the extreme climate phenomena. In this context, it is necessary to promote measures aimed at climate change adaptation and GHG emissions reduction.

The strategy is aligned with sustainable development goals. In September 2015, the Republic of Moldova, together with 192 other UN member states, committed itself to implementing the 2030 Agenda for Sustainable Development by adopting the Declaration on the New York Summit on Sustainable Development.

According to the NDS, the progressive development of the Republic of Moldova is seen through advanced regional cooperation, including overcoming the climate change related challenges. In this regard, two very important documents have been signed in the last ten years:

- The Association Agreement between the Republic of Moldova, of the one part, and the European Union and the European Atomic Energy Community, and their Member States, of the other part[4] (AA RM-EU, 2014);
- Accession of the Republic of Moldova to the Treaty establishing the Energy Community[274] (TCE, 2010).

The commitment to implement the European standards on climate change mitigation in the Republic of Moldova-EU AA are set forth in Chapter 17, in particular, in Art. 95, according to which "the development and implementation of:

a) A global climate strategy and action plan for the long-term climate change mitigation and adaptation;

b) A low-carbon development strategy;

c) Long-term measures to reduce greenhouse gas emissions;

d) Measures to prepare for the trading of carbon dioxide certificates;

e) Measures to promote technology transfer based on technology needs assessment;

f) Measures to streamline climate considerations, as well as measures on ozone-depleting substances, into sectoral policies.

According to the same document (Annex XII), the Republic of Moldova undertakes to bring its legislation progressively closer to the following EU legislation and the following international instruments on climate change:

- Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for GHG emissions allowance trading within the Community[275] - by 2022;
- Commission Regulation (EC) no. 619/2008 842/2006 on certain fluorinated greenhouse gases, replaced by Regulation (EU) no. 517/2014 of the European Parliament and of the Council of 16 April 2014[276] - by 2018;
- Commission Regulation (EC) no. 619/2008 1005/2009 on ozone-depleting substances[277] - by 2019;
- Directive no. 98/70 / EC on the quality of petrol and diesel[278] - by 2019.

[273] Government Decision no. 377 of 10.06.2020 on the approval of the draft law for the approval of the National Development Strategy &"Moldova 2030" published in the Official Gazette no. 153-158 art. 508 on 26.06-2020. <https://www.legis.md/cautare/getResults?doc_id=121920&lang=ro>

[274] Official Gazette no. 8-10 of 22.01.2010. Parliament of the Republic of Moldova. Law no. 117 of 23.12.2009 for the accession of the Republic of Moldova to the Treaty establishing the Energy Community. <https://www.legis.md/cautare/getResults?doc_id=3445&lang=ro>

[275] EUR-Lex. Directive 2003/87 / EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61 / EC. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02003L0087-20200101>

[276] EUR-Lex. Regulation (EU) No Regulation (EC) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006. < https://eur-lex.europa.eu/legal-content/RO/TXT/?uri=CELEX%3A32014R0517>

[277] EUR-Lex. Commission Regulation (EC) No 619/2008 Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02009R1005-20170419>

[278] EUR-Lex. Directive 98/70 / EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuel and amending Council Directive 93/12 / EEC. <https://

Within the Energy Community, the following EU acquis is to be taken into account:

- Regulation (EU) no. 525/2013 on the mechanism for monitoring and reporting greenhouse gas emissions and reporting other information at national level (no longer in force starting with 01.01.2021)[279];
- Directive 2009/28/CE on the promotion of the use of energy from renewable sources [280];
- Directive 2012/27 / EU on energy efficiency[281];
- Directive 2010/31/UE on energy performance of buildings[282].

Regarding climate change, the following two EC laws are recommended for implementation:

1. Recommendation 2016/02/MC-EnC on preparing for the implementation of Regulation (EU) 525/2013 on the mechanism for monitoring and reporting greenhouse gas emissions[283];
2. Recommendation 2018/01/MC-EnC on preparing for the development of integrated national energy and climate plans[284].

Meanwhile, in September 2015, the Republic of Moldova submitted to the UNFCCC its Intended Nationally Determined Contribution" (INDC) for the Paris Climate Agreement, while the updated NDC was submitted to the UNFCCC by the MARDE on 4 March 2020.[285] In the updated NDC (2020), the Republic of Moldova intends to achieve more ambitious targets than in the INDC (2015). The new, unconditional target, which covers the entire economy of the country, provides for the reduction of greenhouse gas emissions by 70% in 2030 compared to 1990, instead of 64-67% committed in INDC (2015).

Regarding the conditional target, instead of the 78% committed in the INDC (2015), the reduction commitment expressed above could be increased to 88% below 1990, provided that a global agreement is reached, which would address important issues, including low-cost financial resources, technology transfer and technical cooperation, accessible to all, on a scale commensurate with the challenge posed by global climate change.

Regarding the commitments made by the Republic of Moldova under the EU Association Agreement, the Energy Community Treaty, and INDC (2015), the following are already approved:

1. The Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation[286], which provides for 51 GHG emissions reduction measures within the INDC (2015).
2. The Law ratifying the Paris Agreement, adopted on May 4, 2017[287], by which the country commits to achieving the NDC objectives.
3. The Law on Promoting Use of Energy from Renewable Energy Sources[288]. The new amendments proposed to this law provide for covering 25% of energy demand from renewable sources by 2025.
4. Moldova's Sustainable Development Fund, which aims to continue certain activities ensuring sustainability of projects funded by the Millennium Challenge Corporation and programs and projects funded by other donors[289].
5. Energy Roadmap for the period 2015-2030[290]. The objective of the Roadmap is to create the normative, institutional and organizational framework in the electricity and natural gas sector, as well as to ensure the security of electricity and natural gas supply resulting from achieving the specific targets stipulated in the Energy Strategy of the Republic of Moldova until 2030. The Energy Roadmap determines the evaluation, reporting and progress monitoring mechanisms for the actions implementation process.
6. New modules in the vocational education system: "Energy Plants, Renewable Energy Sources" and "Solid Biofuel-based Heat Plants" for the specialization "Boiler Room Operator"[291], and "Installation of Solar Thermal Panels" and "Operation of Heating Installations and Solar Heating Panels" for the related specializations "Installer of heating installations and solar equipment - Installer of ventilation and air conditioning installations, apparatus and equipment"[292].

eur-lex.europa.eu/legal-content/RO/TXT/?uri=celex%3A31998L0070>

[279] EUR-Lex. Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC. <https://eur-lex.europa.eu/legal-content/RO/TXT/?uri=CELEX%3A32013R0525>

[280] EUR-Lex. Directive 2009/28 / EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources, amending and subsequently repealing Directives 2001/77 / EC and 2003/30 / EC. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02009L0028-20151005>

[281] EUR-Lex. Directive 2012/27 / EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125 / EC and 2010/30 / EU and repealing Directives 2004/8 / EC and 2006/32 / WHAT THE. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02012L0027-20210101>

[282] EUR-Lex. Directive 2010/31 / EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02010L0031-20210101>

[283] Energy Community. Recommendation 2016/02 / MC-EnC on preparing for the implementation of Regulation (EU) 525/2013 on a mechanism for monitoring and reporting greenhouse gas emissions. < https://www.energy-community.org/legal/other.html >

[284] Energy Community. Recommendation 2018/01 / MC-EnC on preparing for the development of integrated national energy and climate plans by the Contracting Parties of the Energy Community. <https://www.energy-community.org/legal/other.html>

[285] <https://www4.unfccc.int/sites/ndcstaging/Pages/LatestSubmissions.aspx>

[286] The low-emission development strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. Government Decision of December 14, 2016. Official Gazette of the Republic of Moldova no. 85-91 from 24.03.2017.

[287] Law for the ratification of the Paris Agreement no. 78 from 04.05.2017. Official Gazette no. 162-170 of 26.05.2017.

[288] Official Gazette of the Republic of Moldova no. 69-77 / 117 of 25.03.2016, Parliament of the Republic of Moldova. Law no. 10 of 26.02.2016 on promoting the use of energy from renewable sources.

[289] Official Gazette of the Republic of Moldova no. 2-12 of 15.01.2016, Government Decision no. 903 of 31.12.2015 regarding the public institution "Moldova Sustainable Development Fund".

[290] Official Gazette of the Republic of Moldova no. 177-184 of 10.07.2015, Government Decision no. 409 of 16.06.2015 regarding the roadmaps in the energy field for the period 2015-2030.

[291] Ministry of Education of the Republic of Moldova, Order no. 858 of 04.10.2016 on the approval of the curriculum for secondary technical vocational education.

[292] Ministry of Education of the Republic of Moldova, Order no. 783 of 22.09.2016 on the approval of the curriculum for secondary technical vocational education. < https://mecc.gov.md/sites/default/files/curriculum_ventilare_incalzire.pdf >

7. The Program for Promoting Green Economy in the Republic of Moldova for 2018-2020 and the Action Plan for its Implementation, GD no.160/2018. The Program for Promoting Green Economy in the Republic of Moldova for 2018-2020 and the Action Plan for its Implementation, GD no.160/2018. The program integrates the green economy promotion priorities in line with the final declaration of the United Nations Conference on sustainable Development "The Future We Want" (Rio de Janeiro, June 20-22, 2012). The program introduces a short list of green growth indicators for the Republic of Moldova, and the Program Implementation Plan provides for 84 actions.
8. The Greening Program for Small and Medium Enterprises (SMEs), adopted by the Government Decision no. 592 of 27.11.2019[293], which provides for implementing actions encouraging SMEs to adopt more environmentally friendly business practices. Implementing tools and good practices aimed at "greening" SMEs in the Republic of Moldova aims to stimulate sustainable development and increase international economic competitiveness.
9. The Country Program of the Republic of Moldova for engaging with the Green Climate Fund for the years 2019-2024. The country program (CP) takes into account the country's national development priorities, climate objectives and targets stemming from the strategy papers. The document presents the analysis of existing capacities and gaps, needs and funding opportunities related to climate change mitigation and adaptation at national and sectoral level. Through its commitment to GCF, the Ministry of Agriculture, Regional Development and Environment, as the Designated National Authority (DNA), will improve its capacities and leadership as a provider of technical knowledge and expertise in climate change, and capacities for managing the national mechanism for coordinating cross-sectoral climate change planning and implementation. The country program is designed as a living document, with regular updates of priority investment areas, depending on the country's internal circumstances and climate change impact, as well as updates of the flow of ideas and project proposals.
10. The National Program on Research and Innovation for the years 2020-2023[294]. The strategic priorities of the research and innovation for the period 2020-2023 set out in the Program are in line with priorities established in the country's strategic development document - the National Development Strategy "Moldova 2030", sectoral strategies and EU framework programs for research and innovation. The strategic priority no. III described in the document corresponds to "Environment and Climate Change", including: the impact of biotic and abiotic factors on the environment and society; Safe, clean and efficient energy; waste, plastics and pollutants; ecological security; biodiversity conservation. In 2019, the National Agency for Research and Development (NARD) announced the "State Program" contest (2020 - 2023) for funding fundamental and/or applied scientific research projects, including strategic priority III. The results of the contest can be viewed on the NARD website[295].
11. Regulations on measures to reduce emissions from vehicle air conditioning systems, GD no. 1242/2016[296]. The document contains provisions on installation of air-conditioning systems in motor vehicles to be placed on the market and for the recharging of air-conditioning systems of any vehicle with fluorinated greenhouse gases with a global warming potential greater than 150. Directive 2006/40/EC of the European Parliament and of the Council of 17 May 2006 regarding emissions from air-conditioning systems in motor vehicles and amending Council Directive 70/156/EEC.
12. The Law on Payments for Environmental Pollution no. 1540/1998[297], amended in 2019, establishes payments for environmental pollution from use of fluorides.
13. The mechanism for climate change related activities coordination, GD no. 444/2020[298].
14. The methodology for calculating the price caps and the fixed tariffs for electricity produced from renewable energy sources, ANRE Decision no. 375/2017[299]. For the year 2020, the coefficients determining the respective tariffs and price caps have been published by ANRE's Decision no. 54/2020[300].

[293] Official Gazette of the Republic of Moldova no. 360-366 / 907 of 06.12.2019, Government Decision no. 592 of 27.11.2019, regarding the approval of the Greening Program for small and medium enterprises.
[294] Official Gazette of the Republic of Moldova No. 256-259 of 16.08.2019. Government Decision no. 381 of 01.08.2019 regarding the approval of the National Research and Innovation Program for the years 2020-2023 and the Action Plan for its implementation.
[295] Government of the Republic of Moldova National Agency for Research and Development. <https://ancd.gov.md/>
[296] Official Gazette of the Republic of Moldova no. 405-414 / 1353 of 25.11.2016, Government Decision no. 1242 of 14.11.2016 for the approval of the Regulation on measures to reduce emissions from air conditioning systems of vehicles. Amended by the Government Decision no. 1143 of 21.11.2018, regarding the approval of the amendments that are operated in some decisions of the Government, published in the Official Gazette of the Republic of Moldova no. 13-21 / 07 of 18.01.2019.
[297] Official Gazette of the Republic of Moldova no. 54-55 / 378 of 18.06.1998, Parliament of the Republic of Moldova. Law no. 1540 of 25.02.1998 regarding the payment for environmental pollution.
[298] Official Gazette of the Republic of Moldova no. 188-192 / 635 of 24.07.2020, Government Decision no. 444 of 01.07.2020, on the establishment of the mechanism for coordinating activities in the field of climate change.
[299] Official Gazette of the Republic of Moldova no. 390-395 / 1988 of 10.11.2017, Decision of the National Agency for Energy Regulation no. 375 of 28.09.2017, regarding the approval of the Methodology for determining the fixed tariffs and prices for electricity produced by eligible producers from renewable energy sources.
[300] Official Gazette of the Republic of Moldova no. 94-98 / 326 of 27.03.2020, Decision of the National Agency for Energy Regulation no. 54 of 28.02.2020, on fixed tariffs and price caps for electricity produced from renewable energy sources by producers who will obtain the status of eligible producer in 2020.

15. Greenhouse Gas Emissions and Sustainable Development Goals of the country regularly reported by the National Bureau of Statistics of the Republic of Moldova[301].
16. The National Energy Efficiency Action Plan for the years 2019-2021, approved by the Government Decision no. 698 as of 27.12.2019[302].
17. The Law on Energy Efficiency no. 139 as of 19.07.2018[303].

It is noteworthy that the climate change mitigation objectives of the Republic of Moldova are achieved by implementing priority economic, social and environmental policies approved prior to signing of the Republic of Moldova-EU Association Agreement and the country's NDC declaration, which were updated over time, including NDC in 2020. These are described in detail in Chapter 3. Among the most relevant are:

1. National Energy Efficiency Program for the 2011-2020 period, GD no. 833/2011[304];
2. Energy Strategy of the Republic of Moldova until 2030, GD no. 102/2013[305];
3. National Action Plan on Energy from Renewable Sources for the years 2013-2020, GD no. 1073/2013[306];
4. Law on Heating and Promotion of Cogeneration no. 92/2014[307];
5. Law on Energy Performance of Buildings no. 128/2014[308];
6. Law on the Labeling of Products with Energy Impact no. 44/2014[309];
7. Soil Conservation and Soil Fertility Enhancement Program for the years 2011-2020, GD no. 626/2011[310] and the Action Plan on implementation of the Soil Conservation and Soil Fertility Enhancement Program 2014-2016, GD no. 138/2014[311];
8. National Strategy for Agricultural and Rural Development for the years 2014-2020, GD no. 409/2014[312];
9. Waste Management Strategy of the Republic of Moldova for the years 2013-2027, GD no. 248/2013[313].

At the same time, it should be noted that the will to achieve the objectives formulated in the AA RM-EU and ECT on climate change is facing a number of difficulties in implementation of measures aimed to mitigate the committed GHG emissions. The Republic of Moldova is limited in institutional, technical and financial capacities to fulfill its commitments under those agreements and to proactively promote national action on climate change. In order to overcome these barriers, in the autumn 2019, within the EU4Climate Project, the gaps analysis of the current legislation of the Republic of Moldova was carried out and a roadmap was developed describing the support provided by EU4Climate to the Republic of Moldova[314].

According to the study:

- Only one of the four EU acquis provided for in the Moldova-EU AA is transposed into the national legislation. Directive 98/70/EC (quality of petrol and diesel oil) is fully integrated in the GD no. 1116/2002[315], amended in 2019. Three other EU acquis, for which the transposition deadline has already expired (in 2018-2019), are partially transposed into the national legislation with the exception of Directive no. 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading (until 2022);
- Only one of the two EC climate recommendations is transposed into the national legislation: Recommendation 2016/02/MC-EnC – by approved GD 1277/2018[316]. The second Recommendation 2018/01/MC-EnC is being implemented;

[301] National Bureau of Statistics of the Republic of Moldova. <https://statistica.gov.md/pageview.php?l=ro&id=6306&idc=605>
[302] Official Gazette of the Republic of Moldova no. 7-13 / 12 of 17.01.2020, Government Decision no. 698 of 27.12.2019, regarding the approval of the National Energy Efficiency Action Plan for the years 2019-2021.
[303] Official Gazette of the Republic of Moldova no. 309-320 / 476 of 17.08.2018, Parliament of the Republic of Moldova. Law no. 139 of 19.07.2018 on Energy Efficiency.
[304] Official Gazette of the Republic of Moldova no. 197-202 / 914 of 18.11.2011, Government Decision no. 833 of 10.11.2011, on the National Energy Efficiency Program 2011-2020. Amended by Government Decision no. 738 of 20.07.2018, published in the Official Gazette of the Republic of Moldova no. 309-320 / 850 of 17.08.2018.
[305] Official Gazette of the Republic of Moldova no. 27-30 / 146 of 08.02.2013, Government Decision no. 102 of 05.02.2013, on the Energy Strategy of the Republic of Moldova until 2030.
[306] Official Gazette of the Republic of Moldova no. 4-8 / 01 of 10.01.2014, Government Decision no. 1073 of 27.12.2013, on the approval of the National Action Plan on energy from renewable sources for the years 2013-2020. Amended by the Government Decision no. 327 of 17.04.2018, published in the Official Gazette of the Republic of Moldova no. 126-132 / 369 of 20.04.2018.
[307] Official Gazette of the Republic of Moldova no. 178-184 / 415 of 11.07.2014, Parliament of the Republic of Moldova. Law no. 92 of 29.05.2014, on Heat and Promotion of Cogeneration. Modified by the Law no. 74 of 21.06.2020, published in the Official Gazette of the Republic of Moldova no. 153-158 / 278 of 26.06.2020, in force since 26.06.2021.
[308] Official Gazette of the Republic of Moldova no. 297-309 / 609 of 10.10.2014, Parliament of the Republic of Moldova. Law no. 128 of 10.10.2014, on Energy Performance of Buildings. Amended by Law no. 160 of 07.07.2016, on amendment and completion of some legislative acts, published in the Official Gazette of the Republic of Moldova no. 306-313 / 647 of 16.09.2016, in force since 16.09.2016.
[309] Official Gazette of the Republic of Moldova no. 99-102 / 249 of 25.04.2014, Parliament of the Republic of Moldova. Law no. 44 of 27.03.2014, on Labeling of Products with Energy Impact. Amended by Law no. 79 of 24.05.2018, published in the Official Gazette of the Republic of Moldova no. 195-209/338 of 15.06.2018, in force since 15.06.2018.
[310] Official Gazette of the Republic of Moldova no. 139-145 / 696 of 26.08.2011, Government Decision no. 626 of 20.08.2011, on approval of the Soil Conservation and Soil Fertility Enhancement Program for the years 2011-2020. Amended by the Government Decision no. 691 of 11.07.2018, on approval of the Regulation on conditions and procedures for carrying out activities aimed at land improvement, protection, conservation and soil fertility enhancement, published in the Official Gazette of the Republic of Moldova no. 295-308 / 833 of 10.08.2018.
[311] Official Gazette of the Republic of Moldova no. 49-52 / 154 of 28.02.2014, Government Decision no. 138 of 24.02.2014, on approval of the Action Plan on implementation of the Soil Conservation and Soil Fertility Enhancement Program for the years 2014-2016.
[312] Official Gazette of the Republic of Moldova no. 152/451 of 10.06.2014, Government Decision no. 409 of 04.06.2014, on approval of the National Strategy for Agricultural and Rural Development for the years 2014-2020. Amended by the Government Decision no. 785 of 01.08.2018, on approval of amendments operated in some Government Decisions, published in the Official Gazette of the Republic of Moldova no. 366-376/962 of 28.09.2018.
[313] Official Gazette of the Republic of Moldova no. 82/306 of 12.04.2013, Government Decision no. 248 of 10.04.2013, on approval of the Waste Management Strategy of the Republic of Moldova for the years 2013-2027. Amended by the Government Decision no. 1143 of 21.11.2018, on approval of amendments operated in some Government Decisions, published in the Official Gazette of the Republic of Moldova no. 13-21/07 of 18.01.2019.
[314] Energy Community. EU4Climate. Development of a Roadmap for EU4Climate support outlining priority actions for the Republic of Moldova. <https://eu4climate.eu/download/development-of-a-roadmap-for-eu4climate-support-outlining-priority-actions-for-the-republic-of-moldova/>
[315] Official Gazette of the Republic of Moldova No. 122-123 of 29.08.2002. Government Decision no. 1116 of 22.08.2002 on approval of the Regulation on storage and wholesale, through an automated system, of the identified petroleum products. <https://www.legis.md/cautare/getResults?doc_id=113761&lang=ro#>
[316] Official Gazette no. 38-47 of 08.02.2019. Government Decision no. 1277 of 26.12.2018 on the establishment and operation of the National System for Monitoring and Reporting of Greenhouse Gas Emissions and Other Climate Change Relevant Information. <https://www.legis.md/cautare/getResults?doc_id=112485&lang=ro>

- The Country Report of 01.11.2020, posted on the Energy Community[317] website, describes the state of implementation of all commitments under the ECT, including climate. The indicator "Monitoring of greenhouse gas emissions and national reporting systems" is assessed at 75% compliance, while the goal of updating the Low Emission Development Strategy, based on the more ambitious targets set in the updated NDC of the country (25%) remains to be achieved. Fulfillment of the indicator "National Energy and Climate Plan (NECP)" is assessed at 20%.

Regarding the RM-EU AA acquis on climate, partially transposed into national legislation, the roadmap recommended above identifies the following:

1. By transposing Directive 2003/87/EC on the establishment of a system for trading GHG emission allowances, the Republic of Moldova relied heavily on the country's accession to the EU carbon market, on which the country could trade emissions produced on its territory in a cost-effective and economically efficient way. The transposition of this Directive into national law should be considered as the first step in creating an Emissions Trading Scheme (ETS) that will be compatible for later connection to the EU-ETS. To be part of the EU-ETS, at least seven other EU directives and regulations should be implemented, including the one governing MRV, GHG emissions recording, benchmarking, auctioning, etc. It has been shown that maintenance and use of all these systems costs much more than the effect of the potential GHG reduction expected in the country under the Directive.[318] As a result, the Energy Community, at the National Consultative Webinar on May 27, 2020[319] , ruled in favor of the simplified transposition of Directive 2003/87/EC in the Republic of Moldova, which consists in setting emission levels for companies falling under the action of the Directive, with their subsequent tightening to the level established in the EU. However, under this approach the companies in the country will not be able to trade emissions on the carbon market. Consequently, the Republic of Moldova has to evaluate the opportunity to initiate negotiations with the European Union aimed at overcoming this problem. According to the recommended roadmap, the new deadline for transposition of Directive 2003/87/EC is 2023;
2. Of the 6 clauses of the Regulation (EC) no. 842/2006, on certain fluorinated greenhouse gases, replaced by Regulation (EU) no. 517/2014, none is transposed into national legislation, except for Art. 5 (2, establishing the national training and certification requirements) and art. 10 (4, holding certificates by company staff), which are partially transposed in GD 483/2019[320], the last transposition of the Regulation (EU) no. 517/2014. Because of the fact that:
   a) The Republic of Moldova is in the process of ratifying the Kigali amendment to the Montreal Protocol - the complexity of its implementation requires that the country should have a legal act at the level of a law;
   b) The amount of imported F-gases with a very high global warming potential increases from year to year;
   c) In the updated NDC (2020), the Republic of Moldova intends to achieve more ambitious goals than in the INDC (2015).

   The transposition of EU Regulation 517/2014 becomes a key priority action for the country. According to the above-mentioned path, a new deadline for transposing the Regulation is recommended, by approving the Law on F-gases - the year 2022, instead of 2018. Along with the approval of the Law on F-gas, the GD 483/2019, as well as the Contravention Code of the Republic of Moldova no. 218/2008[321] have to be amended to reflect the sanctions applicable to infringements of the provisions of Regulation (EU) no. 517/2014. The Government Action Plan for the period 2020-2023[322] specifies the year 2023 for the approval of the Law on F-gases.
3. Transposition analysis of Regulation (EC) no. 1005/2009 on ozone layer depleting substances showed that out of 26 clauses of the Regulation, five are transposed into national legislation (19%), ten are partially transposed (38%), nine are not transposed (35%)), and there is no need to transpose two of them (8%). The respective amendment needs to be operated to the Law 852/2002, and it is necessary to adopt secondary legislation on ozone layer depleting substances. The new deadline for transposing Regulation (EC) no. 1005/2009 is set for 2021, instead of 2019.

Currently, several aspects related to the GHG emissions mitigation are still reflected in a number of the country's

[317] Energy Community. Moldova: Annual Implementation Report. 1 November 2020. <https://www.energy-community.org/implementation/Moldova.html>
[318] FEASIBILITY STUDY ON INTRODUCING THE EMISSION TRADING SYSTEM IN MOLDOVA. <https://www.undp.org/content/dam/moldova/docs/Publications/ETS_Feasibility_Study_UNDP.pdf>
[319] Energy Community. UNDP. EU4CLIMATE PROGRAMS. WEBINAR ON EU Acquis Strategic Roadmap for EU4Climate Moldova of EU4Climate project. 27 May 2020. Zoom online platform.
[320] Official Gazette no. 320-325 of 01.11.2019.Government Decision no. 483 of 18.10.2019 on approval of the Regulation on the training and certification of specialists in the field of refrigeration technology containing hydrochlorofluorocarbons and fluorinated gases with greenhouse effect .
[321] Official Gazette of the Republic of Moldova No. 78-84 of 17.03.2017. Parliament of the RM. COD No. 218 of 24.10.2008. Contravention Code of the Republic of Moldova. <https://www.legis.md/cautare/getResults?doc_id=124835&lang=ro#>
[322] Official Gazette of the Republic of Moldova no. 378-379 / 976 of 13.12.2019, Government Decision no. 636 of 11.12.2019, regarding the approval of the Government Action Plan for the years 2020-2023. Modified by Government Decision no. 848 of 30.11.2020, published in the Official Gazette of the Republic of Moldova no. 319-328 / 1004 of 04.12.2020.

policies which are under development or in the draft phase for public debate. These include:

1. National Energy and Climate Plan, in accordance with Recommendation 2018/01/MC-EnC;
2. Low Emissions Development Strategy until 2030 updated to align to the NDC objectives (2020);
3. Government Decision amending GD no. 689/2018 on approval of capacity limits, maximum quotas and capacity categories for electricity from renewable sources until 2020[323]. The project provides for approval of maximum quotas and capacity categories for electricity from renewable sources, valid until December 31, 2025, allowing to apply the support schemes provided in art. 34 of the Law no. 10/2016 on Use of Energy from Renewable Sources;
4. Energy Strategy 2021-2030, which sets out three general strategic objectives that the Republic of Moldova aims to achieve by 2030, namely: ensuring security of energy supply, developing competitive energy markets and their integration into the regional and European market, and promoting energy efficiency, renewable energy sources and the sustainable development of the energy sectors.

7.2. Technology Transfer Related Activities to Mitigate Climate Change

It is recognized that technology transfer plays a decisive role in achieving the direct GHG emissions reduction target as most of the used technologies are emission sources, so replacing obsolete technologies by more efficient ones imminently entail direct GHG emissions reduction. Among the many definitions of the technology transfer concept, it is worth to mention the one proposed by the Global Environment Facility (GEF), according to which the technology transfer is:

"... a broad set of processes encompassing know-how, experience and equipment for mitigation and adaptation to climate change between different stakeholders such as governments, private sector entities, financial institutions, non-governmental organizations and research/education institutions...;

…The term "transfer" includes the diffusion of technologies and technological cooperation between and within countries. It covers technology transfer processes between developed countries, developing countries and countries with economies in transition. It includes the process of studying to understand, use and reproduce technology, including the ability to choose and adapt to local conditions, and integrate them with native technologies"[324].

The IPCC identifies three major dimensions needed to ensure the efficient technology transfer: capacity building; enabling business environment; technology transfer mechanisms.

7.2.1. Capacity Building

In accordance with the Law no. 182 of 15.07.2010[325], in the Republic of Moldova, 10 industrial parks (IP) have been established until now: IP "Tracom" and IP "FAIP" (Chisinau municipality), IP "Raut" (Balti municipality), IP "Cimislia" (Cimislia town), IP „Edinet" (Edinet town), IP „Comrat", (Comrat town), IP „CAAN" and IP „Triveneta Cavi Divelopment" (Straseni town), IP „Bioenergagro" (Drochia town) and IP „Cahul" (Cahul town). Industrial parks have technical and production infrastructure in which economic activities are carried out, mainly industrial production, service provision, capitalization of scientific research and/or technological development, benefitting of specific incentives to capitalize on the human and material potential of a region.

These entities comprise more than 60 businesses which provide almost 4 300 jobs and invested almost 2.4 billion lei in infrastructure development[326].

In order to increase the competitiveness, productivity and employment in industrial sector, as well as to uniformly diversify these industrial platforms on the territory of the country, the GD no. 748 of 13.10.2020[327] provided for creation of 18 Multifunctional Industrial Platforms (MIPs) in the regions that do not have IP type platforms or Free Economic Zones (FEZ). Fully equipped in terms of access to utilities, the locations designated for the establishment of the MIP will become true "centers of excellence" for industrial development at the local level. Unlike IP or FEZ, the operating model of Multifunctional Industrial Platforms is based on ensuring easy access for investors, which would stimulate the efficiency of industrial projects in a short time, rather than providing tax incentives. The Organization for the Development of the Small and Medium Enterprises Sector (ODIMM) has been designated as the Implementation Unit of the Pilot Program for the creation of Multifunctional Industrial Platforms. Seven Collaboration Agreements on creation of PIMs in the districts of the Republic of Moldova have been already signed with level II Local Public Authorities[328].

[323] <https://particip.gov.md/proiectview.php?l=ro&idd=7841>

[324] < http://www.ipcc.ch/ipccreports/sres/tectran/index.php?idp=517>

[325] Official Gazette of the Republic of Moldova no. 155-158 / 561 of 03.09.2010, Parliament of the Republic of Moldova. Law no. 182 of 15.07.2010 on Industrial Parks. Modified by Law no. 79 of 24.05.2018, published in the Official Gazette of the Republic of Moldova no. 195-209 / 338 of 15.06.2018.

[326] Industrial parks. Informative material published on the web page of the Ministry of Economy and Infrastructure, on 15.07.2020. < https://mei.gov.md/ro/content/parcuri-industriale >

[327] Official Gazette of the Republic of Moldova no. 272-277 / 888 of 23.10.2020, Government Decision no. 748 of 13.10.2020, on approval of the Pilot Program for the creation of Multifunctional Industrial Platforms.

[328] Basarabeasca district, one step away from creating the Multifunctional Industrial Platform. Informative material published on the web page of the Organization for the Development of the Small and Medium Enterprises Sector, on 10.03.2021. < https://odimm.md/ro/presa/comunicate-de-pre-

7.2.2. Enabling Business Environment

According to the World Bank, a vulnerable political system, a polarized society, low productivity, demographic challenges, skills mismatches and high vulnerability to both climate and external shocks are the biggest economic challenges of the Republic of Moldova[329]. All this has an imminent impact on the business environment of the country.

In the "Cost of Doing Business" international ranking developed by the World Bank (2020), in 2017 Moldova ranked 48th out of 190 countries, being next to Armenia (ranked 43) and Belarus (ranked 49)[330]. The value of this country indicator in 2020 was 74.4, with a slight increase compared to 2019 (73.1). A slight improvement of the business climate is showed by the indicator "Starting a business", which increased in 2020 compared to 2019 by 0.1 points, the Republic of Moldova ranking the 13th in world ranking[331]. At the same time, the country's administrative system in terms of granting permits and conducting inspections is far from perfect: for example, for the indicator "Granting building permits" the Republic of Moldova ranks 156th out of 190 countries in the same ranking.

Within the global competitiveness ranking, in 2019 the Republic of Moldova ranked 86th among 141 countries[332], surpassed by most countries in the region and by almost all CIS countries.

According to the same report, entrepreneurs highlighted the following factors as the main problems in business, in order of priority: (i) corruption; (ii) political instability; (iii) government instability; (iv) access to finance; (v) inefficient government bureaucracy, etc.

Another international benchmark is the Economic Freedom Index, developed by *The Heritage Foundation*[333]. This index assesses the degree of state intervention in economic activity based on twelve sub-indicators: property rights, government integrity, efficiency of the judiciary, tax burden, state spending, fiscal health, freedom of business, freedom of labor, monetary freedom, freedom of trade, freedom of investment, and financial freedom.

In 2021, the Republic of Moldova ranked 85th in the Economic Freedom Index ranking among 178 countries and territories, with a value of 62.5 – a slight increase of 0.5 points compared to the previous year.

A favorable legal framework for the medium and long-term development of small and medium enterprises was created in the Republic of Moldova, with the following policy documents approved:

- Small and Medium Enterprises Development Strategy for 2012-2020[334] of 2012, updated in 2016;
- Strategy for the Reform of the Entrepreneurial Activity Regulatory Framework for 2013-2020 of 2013, updated in 2016 and 2018, and the Action Plan for its implementation for 2018-2020[335];
- Law on Small and Medium Enterprises[336] of 2016;
- The Law on Peasant Farms of 2000[337], updated in 2017;
- Law on Investments in Entrepreneurship of 2004[338], updated in 2020;
- Law on Entrepreneurship and Enterprises of 1992[339], updated in 2020.

Elimination of regulatory constraints and unreasonable costs in the domestic business environment creates premises for a more dynamic and sustainable economic growth, encouraging domestic and foreign investment. Thus, the Small and Medium Enterprise Development Strategy for 2012-2020 aims to eliminate existing barriers so that the risks and costs associated with each stage of the business life cycle, including technology transfer, can become lower than in the countries of the region. The extent to which the proposed objectives have been achieved can be identified from the RM-EU AA implementation Report of the European External Action Service of the European Union[340]. According to this report, corruption, lack of trust in the judiciary and incoherent economic policies have affected the business environment and the investment climate. At present, the Republic of Moldova does not have coherent and efficient policies in industrial sector and business. In this context, development of a strategy for the industrialization the country by 2030 is welcomed.

sa/4931-raionul-basarabeasca-la-un-pas-de-creare-a-platformei-industriale-multifunctionale >

[329] <https://www.worldbank.org/en/country/moldova/overview>

[330] "Costs of Doing Business" ranking, developed by the World Bank. < https://www.doingbusiness.org/en/rankings >

[331] Doing Business Data -Moldova. Data collected by the World Bank. < https://www.doingbusiness.org/en/data/exploreeconomies/moldova >

[332] K. Schwab, "Global Competitiveness Report for 2019", World Economic Forum. < http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf >

[333] Economic Freedom Index rating, developed by The Heritage Foundation for 2021. < https://www.heritage.org/index/ranking >

[334] Official Gazette of the Republic of Moldova no. 198-204 / 740 of 21.09.2012, Government Decision no. 685 of 13.09.2012, on approval of the Small and Medium Enterprises Development Strategy for 2012-2020. Amended by the Government Decision no. 463 of 23.05.2018 (approval of the Action Plan for the Strategy implementation), published in the Official Gazette of the Republic of Moldova no. 167-175 / 514 of 25.05.2018.

[335] Official Gazette of the Republic of Moldova no. 297-303 / 1129 of 20.12.2013, Government Decision no. 1021 of 16.12.2013, on approval of the Strategy for the Reform of the Entrepreneurial Activity Framework for 2013-2020 and of the Action Plan for its implementation. Amended by the Government Decision no. 369 of 19.04.2018 (approval of the Action Plan for the Strategy implementation for 2018-2020), published in the Official Gazette of the Republic of Moldova no. 133-141 / 411 of 27.04.2018.

[336] Official Gazette of the Republic of Moldova no. 306-313 / 651 of 16.09.2016, Parliament of the Republic of Moldova. Law no. 179 of 21.07.2016, on Small and Medium Enterprises. Amended by Law no. 23 of 27.02.2020, published in the Official Gazette of the Republic of Moldova no. 87-93 / 112 of 20.03.2020, in force since 20.04.2020.

[337] Official Gazette of the Republic of Moldova no. 14-15 / 52 of 08.02.2001, Parliament of the Republic of Moldova. Law no. 1353 of 03.11.2000, on Peasant Farms Amended by the Law no. 178 of 21.07.2017, published in the Official Gazette of the Republic of Moldova no. 301-315 / 537 of 18.08.2017.

[338] Official Gazette of the Republic of Moldova no. 64-66 / 344 of 23.04.2008, Parliament of the Republic of Moldova. Law no. 81 of 18.03.2004, on Investments in the Entrepreneurial Activity. Amended by Law no. 111 of 18.06.2020, published in the Official Gazette of the Republic of Moldova no. 161-164 / 315 of 03.07.2020, in force since 01.09.2020.

[339] Parliament Monitor no. 2/33 of 28.02.1994, Parliament of the Republic of Moldova. Law no. 845 of 03.01.1992, on Entrepreneurship and Enterprises. Amended in the latest version by the Law no. 257 of 16.12.2020, published in the Official Gazette of the Republic of Moldova no. 353-357 / 288 of 22.12.2020, in force since 01.05.2021.

[340] *Joint Staff Working Document: Association Implementation Report on Moldova,* 11.09.2019, European External Action Service. < https://eeas.europa.eu/sites/default/files/swd_2019_325_f1_joint_staff_working_paper_en_v10_p1_1045191.pdf >

7.2.3. Technology Transfer Mechanisms

According to the IPCC's "Methodological and technological aspects in technology transfer"[341], the technology transfer mechanisms include: The national innovation system; The Official Development Assistance; Global Environment Facility; Multilateral Development Banks; and Kyoto Protocol Mechanisms.

7.2.3.1. National Innovation System

The National Innovation System of the Republic of Moldova is regulated by a number of normative acts: the Code on Science and Innovation of the Republic of Moldova no. 259/2004; the Education Code of the Republic of Moldova no. 152/2014; National Research and Innovation Program for 2020 - 2023[342] and Methodology for Research and Innovation Projects Financing[343]; GD no. 691/2017 on organization and functioning of the Ministry of Education, Culture and Research[344] etc.

On February 20, 2018, a series of amendments to the Code on Science and Innovation of the Republic of Moldova became effective. According to the new version of the Code, all scientific research institutes within the Academy of Sciences of Moldova (ASM) were transferred into subordination of the Ministry of Education, Culture and Research (MECR). The purpose of the transfer is to ensure more efficiency in managing and funding research and innovation.

Consequently, it provides for the possibility of substantial increase in funding of research projects, while the ASM will only be in charge of research, and absolved of the administrative management and assets administration. The most important provisions of the project are aimed at: (a) transmitting the development of relevant policies from the ASM to the central specialized body of the state which ensures the development of the national policy in the field of research and innovation; (b) creation of the National Agency for Research and Development (NARD) as an entity responsible for policy implementation[345]; as the entity responsible for implementing the policies; c) establishment of the National Agency for Quality Assurance in Education and Research[346]; d) transfer of the status of founder of all public law organizations in the field of research and innovation to the central specialized body of the state. In addition to these bodies, the research-development and innovation system also includes research institutions, the Agency for Innovation and Technology Transfer (AITT), three TSPs "(Academica", "INAGRO" and "Micronanoteh"), eight innovative incubators, universities, and Organization for SME development (ODIMM).

Currently, there are 50 research organizations subordinated to three ministries in the Republic of Moldova: the Ministry of Education, Culture and Research (32 institutions), the Ministry of Health, Labor and Social Protection (9 institutions) and the Ministry of Agriculture, Regional Development and Environment (8 institutions) and the State Chancellery of the Government of the Republic of Moldova (1 institution)[347].

In the process of managing public finances allocated for research-development and innovation, MECR takes into account the evaluation of institutions made by the National Agency for Quality Assurance in Education and Research (ANACEC) – an institution with currently extensive responsibilities in evaluation and accreditation of institutions and training programs at all levels. A new element in this respect was the generalization of the procedure for competitive financing of research projects in all fields. The proportion of institutional funding for research, development and innovation is currently about 40%, the remaining 60% are allocated on the basis of competitive mechanisms for research projects.

Despite the difficulties and blockages characteristic for the initial implementation period, the 2017 reform brought the institutional and organizational architecture of research-development and innovation sector closer to that of the European Union member states. The current system ensures separation of responsibilities for the development and coordination of the state policy in the field, institutional and project-based funding, research evaluation, selection, supervision and monitoring processes.

International experience has shown that in order to reduce barriers to technology transfer, the involvement of intermediary bodies associated with the flow of information, management, technology and financing is needed. The role of intermediaries in the technology transfer process can be taken by specialized government agencies, energy and service companies, non-governmental organizations, university liaison departments, regional technology centers, research

[341] Intergovernmental Panel on Climate Change Summary for Policymakers. Methodological and Technological Issues in Technology Transfer. A Special Report of IPCC Working Group III. <https://www.ipcc.ch/site/assets/uploads/2018/03/srtt-en-1.pdf>

[342] Official Gazette of the Republic of Moldova no. 256-259 / 506 of 16.08.2019, Government Decision no. 381 of 01.08.2019, on approval of the National Research and Innovation Program for 2020 - 2023 and of the Action Plan on its implementation. Amended by the Government Decision no. 832 of 18.11.2020, published in the Official Gazette of the Republic of Moldova no. 304-312 / 978 of 20.11.2020.

[343] Official Gazette of the Republic of Moldova no. 256-259 / 506 of 16.08.2019, Government Decision no. 382 of 01.08.2019, on approval of the Methodology for Research and Innovation Financing.

[344] Official Gazette of the Republic of Moldova no. 322-328 of 01.09.2017. Government Decision no. 691 of 30.08.2017 on organization and functioning of the Ministry of Education, Culture and Research. <http://lex.justice.md/md/371186/>

[345] Official Gazette of the Republic of Moldova no. 68-76 / 227 of 02.03.2018, Government Decision no. 196 of 28.02.2018, on organization and functioning of the National Research and Development Agency. Amended by the Government Decision no. 559 of 19.11.2019, published in the Official Gazette of the Republic of Moldova no. 352-359 / 864 of 29.11.2019, in force since 29.12.2019

[346] Official Gazette of the Republic of Moldova no. 68-76 / 232 of 02.03.2018, Government Decision no. 201 of 28.02.2018, on organization and functioning of the National Agency for Quality Assurance in Education and Research. Modified by Government Decision no. 559 of 19.11.2019, published in the Official Gazette of the Republic of Moldova no. 352-359 / 864 of 29.11.2019, in force since 29.12.2019.

[347] List of Research Organizations, on the web page of the National Research and Development Agency. Available at: https://ancd.gov.md/ro/content/organizații-de-cercetare

and technology organizations, electricity utilities and transnational networks, etc[348].

Like other important areas in the Republic of Moldova, research and development and continuous innovation face the problem of extremely low institutional and human capacities, due to the endemic lack of financial resources. The data in Table 7-1 demonstrates this finding. Expenditure on RDI, relative to GDP, during 2010-2018 decreased by more than 43%.

[348] O. Davidson, B. Metz et al, "Methodological and Technological Aspects in Technology Transfer" - Summary for Political Decision Makers of the IPCC Working Group III Special Report (2000), p. 4. < https://www.ipcc.ch/site/assets/uploads/2018/03/srtt-en-1.pdf >

Table 7-1: Spending and salaries in research, development and innovation in the Republic of Moldova[349]

Indicators	2010	2011	2012	2013	2014	2015	2016	2017	2018	Decrease by 2018 compared to 2010,%
Spending on science and innovation,% of GDP	0.44	0.4	0.42	0.35	0.37	0.37	0.33	0.26	0.25	43.18
The salary of a researcher, in% compared to the average salary per economy	100.24	98.09	100.7	105.33	108.81	104.27	95.99	86.28		
Spending on scientific equipment,% of total RDI funding	2.59.	4.86	3.72	3.74	5.92	4.32	2.22.	3.55	2.75	

[349] <http://indicator.idsi.md/>

7.2.3.2. Official Development Assistance

The Republic of Moldova plans a long-term economic development supported by the country's own forces through sustainable development. However, until the development paradigm changes, the Republic of Moldova will continue to rely on development partners support.

Official Development Assistance (ODA) is divided into grants and loans to developing countries for macroeconomic consolidation (by the IMF), concessional loans to the Government (in particular by AID), grants for direct budget support (by the EU, WB, DID), technical assistance from a number of multinational organizations and bilateral donors[350].

In order to formalize development assistance, the Republic of Moldova has acceded to the Paris Declaration (2005), the Accra Agenda for Action (2008), the Busan Commitments (2011) and the Mexico Communiqué (2014).

Detailed information on official development assistance provided to the Republic of Moldova can be accessed online from External Assistance Management Platform (MPA)[351], which since 22.03.21 provide data on 2235 ongoing, as well as on completed projects. The total official development assistance commitments to the Republic of Moldova amount to 5,387.86 million Euro, and 3,829.41 million Euros are already disbursed.

The Government of the Republic of Moldova accesses money from international funds on preferential terms through credit schemes, grants or subsidies. The interest rates on these preferential funds are lower or not applied to grants and subsidies. Also, the repayment period for loans is longer than for commercial loans, many of which also offer grace periods.

Regarding ODA for climate change, external assistance funds that can help overcome climate change issues include[352]: Global Environment Facility; Austrian Development Agency; German Agency for International Cooperation; Swedish Agency for Cooperation and Development; European Bank for Reconstruction and Development; World Bank etc. The Republic of Moldova is eligible for these funds and efforts are being made to increase its internal access and absorption capacities.

The share of climate-related funding, both for adaptation and mitigation, in the data presented below, is an estimate, as the interventions implemented did not have sufficient justification from the point of view of climate, while the effect of climate objectives and targets produced associated benefits for adaptation and mitigation, therefore, these funds are considered climate-related development funds.

Unfortunately, due to the degradation of democratic principles in the country, external climate related development financing to Moldova in 2014-2018 showed a downward trend, starting with 160.9 million Euro in 2014 and ending with 1.05 million Euro in 2018. According to the GPA, external development financing during this period amounted to 232.05 million Euro, of which 58.2% were committed for mitigation projects only, 40.8% for adaptation only and 1% for overlap (mixed) projects (Fig. 7-1).

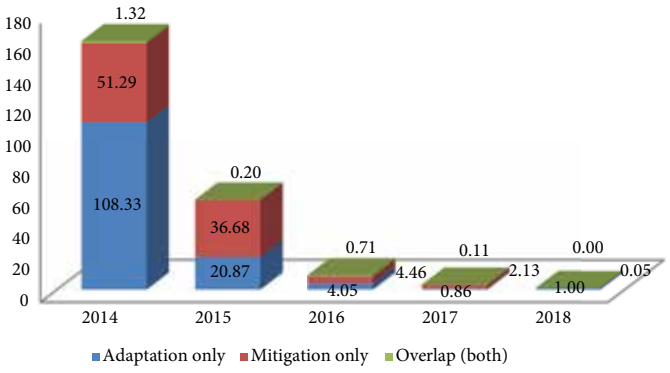


Figure 7-1: Evolution of the climate-related ODA flow in 2014-2018, mil. €[353].

[350] The analysis of the evolution of foreign assistance offered Moldova in the period 2001-2007, ADEPT. 2008

[351] <http://amp.gov.md/portal/>

[352] Analysis of the financial instruments market to facilitate green technologies. This study was conducted by Fast Training Consulting LTD within the GEF-UNDP project "Capacity Building to Implement Environmental Tax Reform to Achieve National and Global Environmental Priorities" implemented by the United Nations Development Program (UNDP) in the Republic of Moldova and the Ministry Environment of the Republic of Moldova, with the financial support of the Global Environment Facility (GEF).

[353] Source: based on data included in the External Assistance Management Platform (MPA)

The largest amounts of climate related development financing in the period 2014-2018 were committed for water supply and sewerage, transport and energy production and supply (Figure 7-2). Lack of an adequate water supply and sewerage system in the rural sector has motivated the authorities to declare this activity as one of the main priorities, which mainly concerns adaptation to climate change. More than 40 different projects in water supply and sewerage sector (approximately 17 million Euro per year), supported by 10 institutions and donors, reflect the importance of this sector for the country, both for adaptation and mitigation.

A relatively large amount of climate-related development funding (approximately 10 million Euro per year) is allocated to the energy production and supply sector, including renewable energy. The largest contribution in this field belongs to the EU with "Energy and Biomass" Project in Moldova (2011-2018, 23.4 million Euro).

Transport sector also received a substantial amount of climate-related development funding (€ 10 million per year), reflecting a large increase in energy consumption in the sector over the last decade (35% increase in 2016 compared to 2005). It should be noted that this amount is attributed to a rail transport project, largely supported by the EBRD (concessional loan of 52.5 million Euro in 2014) dedicated to improving infrastructure.

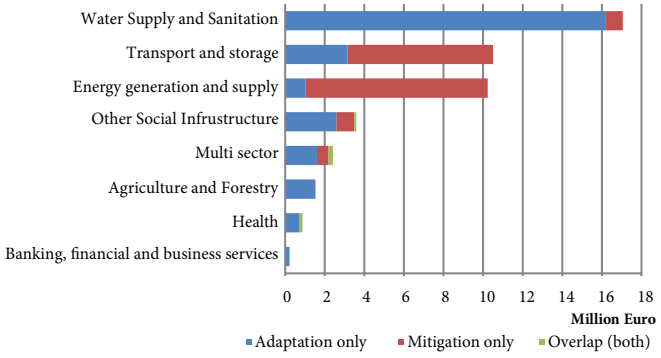


Figure 7-2: Evolution of ODA for climate, by sectors, in 2014-2018, million Euro/year[342].

Multilateral development banks (MDBs), bilateral donors members of the DAC and international climate funds have financially committed to climate development in the Republic of Moldova using various financial instruments (Figure 7-3). Finance channeled through MDB accounted for about 69%, while bilateral support was 30% during 2014-2018. Most of the MDB financing is concessional and non-concessional loans, while financing by DAC members is largely in the form of grants. Regarding climate funds, the Global Environment Facility (GEF) is the main entity providing loans and grants (75%).

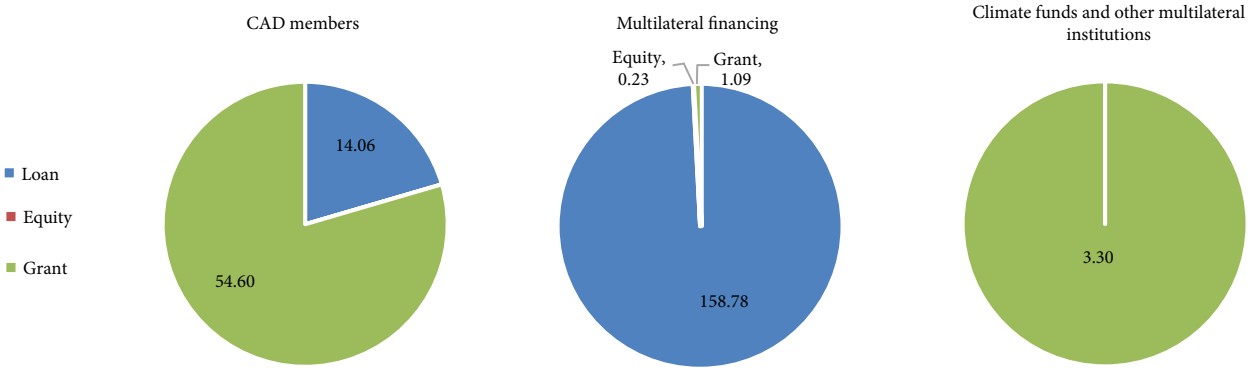


Figure 7-3: Channels and financial instruments used for the allocation of climate related development finance, million Euro, 2014-2018[342].

During 2014-2018, the EBRD, the World Bank and the European Investment Bank (EIB) made the largest financial commitments for development in the Republic of Moldova (Figure 7-4), which can be attributed to climate. The European Union (EU) has also committed to providing a large amount of funding. The EU's commitment was made under the "Integration and Cooperation in the Eastern Partnership" Program (EaPIC), through which, in 2011-2018, projects related to the energy sector reform, as well as energy from biomass projects, were implemented in two phases: 2011-2014 and 2015-2018. The Austrian Government is committed to supporting a number of projects, mainly with adaptation benefits, including water and sanitation, health, infrastructure and municipal services, but also to financing adaptation planning in the Republic of Moldova, especially NAP1. Germany's commitment was largely for supporting the development of the water supply and sewerage sector, as well as energy production and supply, with benefits attributed to both mitigation and adaptation. Romania's commitment focused on the rehabilitation of social buildings, public health, energy production and supply, water and sewerage sectors, with direct benefits on the climate.

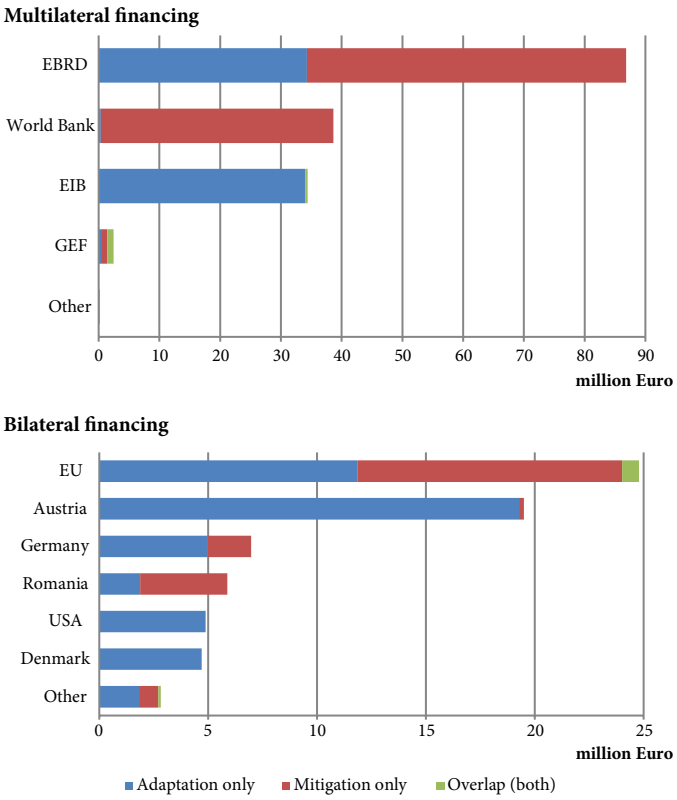


Figure 7-4: Major climate development partners of the Republic of Moldova in 2014-2018, million Euro[342].

As mentioned above, since 2019, the Republic of Moldova expects to benefit from a significant increase in financial donor support for the economy, including for the development of climate-related projects. In this sense, first it is necessary to activate the agreements concluded in recent years, which have been frozen due to the undermining of democratic values in the country. The agreements for the medium term, along with other agreements, which are in the final stage of negotiations, are presented in Table 7-2.

Table 7-2: Budget for climate-related medium term projects implementation in the RM

Donors	Project / Program	Amount	Implementation period
EIB EBRD	Rehabilitation of national roads[354]	59.4 mil € 32.4 mil €	2019-2022
EBRD BEI EU NIP (grant component - under negotiation)	Improving energy efficiency of public and residential buildings in the Republic of Moldova[344]	80 mil €	2019-2023
Japan International Cooperation Agency	Developing the capacities of local energy managers for good implementation of state policies on energy efficiency at local level[344]	5 mil US$	2019-2021
USAID	Clean technology innovation program for SMEs and start-ups in the Republic of Moldova[343]	2.25 mil US$	2019-2021
	Farmer-to-farmer program in Moldova[355]	1,313,140 US$	2018-2021
CPIU-IFAD	Rural Inclusive Economic Development and Climate Resilience Program (IFAD VI)[356] and the Rural Resilience Project (IFAD VII)[357]	26.08 mil US$ 23.7 mil US$	2014-2020 2017-2022
ADA / UNDP	Promoting climate change and disaster risk reduction solutions in the water and civil protection sectors for increased rural resilience[358]	1,294,686 US$	2019-2021
EU	EU4Climate[359]	1,080,700 US$	2019-2022
Romania	Elimination of direct sources of groundwater pollution by conservation or liquidation of abandoned or damaged artesian wells on the territory of the Republic of Moldova.	2,650,000 €	2016-2019
	Restoration and maintenance of lake ecosystems in the lower Prut meadow (Manta, Beleu), part of the RAMSAR wetland	1,500,000 €	2016-2019
	Solutions for climate change adaptation of the Bic river basin.	10,000,000 €	2016-2019
	Reducing GHG emissions by improving hazardous waste management in the Republic of Moldova	850,000 €	2016-2019

7.2.3.3. Global Environment Facility

The Global Environment Facility (GEF), the operating entity of UNFCCC's financial mechanism, is a key multilateral institution for environmental technology transfers. GEF also aims at promoting GHG emissions reduction by eliminating long-term barriers, reducing implementation and technology costs. An important objective of these programs is to catalyze sustainable markets and create a favorable environment for technology transfer. GEF's agencies in the Republic of Moldova are: International Fund for Agricultural Development (IFAD); World Bank; United Nations Development Program (UNDP); United Nations Environment Program (UNEP) and United Nations Industrial Development Organization (UNIDO).

GEF projects are geared towards testing and demonstrating a variety of funding and institutional models to promote technology fusion, with many GEF projects being designed to mobilize private sector funding. Capacity building is a core element of most GEF projects, with a direct impact on host countries' capacities to understand, absorb and disseminate technologies.

Since 1992, over 28 years of activity, GEF has granted developing countries and countries with economies in transition around US$ 21.1 billion in grants and US$ 114 billion in co-financing of more than 5000 projects in 170 countries[360]. Through the Small Grants Program (SGP), GEF channeled more than 25,000 small grants directly to civil society and community organizations in a total of 133 countries[361].

[354] < https://mei.gov.md/sites/default/files/matricea_proiectelor_de_asistenta_externa_pe_domeniul_economic_2019_ro.docx >
[355] < http://amp.gov.md/aim/viewActivityPreview.do~public=true~pageId=2~activityId=12217~language=en >
[356] < https://www.ucipifad.md/en/programe/programe-in-derulare/proiectul-de-rezilienta-rurala-ifad-vii/ >
[357] < https://www.ucipifad.md/en/programe/programe-in-derulare/programul-rural-de-reziliente-economico-climatica-incluziva-ifad-vi/ >
[358] < https://www.md.undp.org/content/moldova/en/home/projects/Promotion-of-climate-change-disaster-risk-reduction.html >
[359] < https://www.md.undp.org/content/moldova/en/home/projects/eu-4-climate.html >
[360] <https://www.thegef.org/sites/default/files/council-meeting-documents/EN_GEF.C.53.03_APMR%2BScorecard.pdf>
[361] <https://www.thegef.org/about-us>

Regarding GHG mitigation, GEF provided at least US$ 4.2 billion and leveraged US$ 38.3 billion from other sources for more than 1000 mitigation projects and programs in more than 160 countries. GEF largely supports energy production and consumption projects, which are the largest contributors to greenhouse gas emissions. GEF investments are intended to mitigate these emissions through specific projects, in particular projects promoting energy efficiency, renewables and policies that introduce market-based financial mechanisms and instruments to accelerate clean energy investments[362].

Since the accession of the Republic of Moldova to GEF and the request for grants from this fund, the country has obtained financial support as described in Table 7-3.

[362] <https://www.thegef.org/topics/climate-change-mitigation>

Table 7-3: Financial support provided by GEF to the Republic of Moldova during 1992-2020[363]

Indicators	National				Regional			
	Climate change		Other		Climate change		Other	
	Grant	Co-financing	Grant	Co-financing	Grant	Co-financing	Grant	Co-financing
Funding granted, mil $ US	13	76	34	116	115	370	60	455
Number of projects	11	8	20	16	5	5	18	14

Source: BUR3 authors from the Republic of Moldova based on information from the GEF platform[352]

[363] <https://www.thegef.org/projects>

Under the System for the Transparent Allocation of GEF-6 Resources for the Period 2014-2018, the Republic of Moldova was allocated approximately US$ 9 million, of which US$ 5.4 million was spent, including for climate change – US$ 2 million and US$ 3.2 million. Application for GEF-7 is in progress. The GEF-7 mitigation strategy aims to capitalize on and maximize synergies with other GEF focal areas, including through integrated programming focused on sustainable cities, sustainable forest management and food value chains.

The Republic of Moldova has also joined the Small Grants Program (SGP) promoted by the Global Environment Facility. Launched in 1992, GSP supports the activities of non-governmental and community organizations in developing countries to reduce climate change, conserve biodiversity, protect international waters, reduce the impact of persistent organic pollutants and prevent land degradation, while generating sustainable livelihoods. In this sense, about US$ 2.37 million are reserved for the Republic of Moldova for 2012-2024.

The objectives pursued by SGP in the Republic of Moldova are:

- Promoting and supporting innovative, inclusive and impactful initiatives, as well as encouraging partnerships with multiple actors at local level to address global environmental issues in priority terrestrial landscapes;
- Developing strategies at community level and implementing technologies that could reduce threats to the global environment over time;
- Identify lessons learned from experience at community level and initiate the exchange of successful strategies and innovations at the level of communities, NGOs, government, ODA agencies, GEF and other bodies on a regional or global scale;
- Develop partnerships and networks with stakeholders to support and strengthen the community capacity, community based organizations (CBOs), NGOs and national capacities to promote sustainable development.

By 31.03.2021, the following results were achieved:

- 37 projects are successfully completed and 9 projects are in progress;
- 7 830 hectares of globally significant biodiversity areas are protected or managed sustainably within the implemented projects;
- 282.29 tons of CO_2 have been reduced or avoided by energy-efficient and renewable energy technologies introduced by SGP projects;
- 48 ha of forest plantations and 8 ha of forest strips were created;
- 70 tons of electronic waste collected;
- 301,860 people benefit from the projects implemented under the SGP program;
- 32 810 women participated/ were involved in SGP projects[364].

It is also important to point out that in recent years, some already completed projects have created the basis for implementation of new projects, supported by the GEF SGP. These include: improving the terrain and the efficiency of protected areas management in the Republic of Moldova, the climate in the eastern area, the Environmental Tax Reform in the Republic of Moldova, the Inclusive Rural Economic and Climate Resilience Program (IFAD VI), Energy and Biomass, implemented by UNDP in the Republic of Moldova[331].

7.2.3.4. Green Climate Fund

At present, the Republic of Moldova implements a number of projects supported by GCF. Detailed information on this topic is provided in Table 7-4.

[364] <https://www.md.undp.org/content/moldova/en/home/projects/the-gef-small-grants-programme.html>

Table 7-4: GCF projects in the Republic of Moldova[365]

No.	Project name	Allocated financial resources, million US dollars		Status of funding/comments
		Grant	Loan	
1.	Three support projects (Readiness projects)	3.3		Ongoing. US$ 918,000 have already been disbursed
2.	Facilitating the sustainable energy financing (regional)	34.00	344.00	Ongoing, Total funding $ 1.4 billion, 2018-2033, 10 countries
3.	Facilitation for green cities (regional)	74.1	242.4	In progress (2019-2021), 9 countries, 10 cities
	TOTAL	**111.4**	**586.4**	

[365] <https://www.greenclimate.fund/countries/moldova#overview>

During the years 2018-2019, under the GCF project "Support for the Republic of Moldova in establishing and strengthening the DNA (Designated National Authority), development of the strategic framework and national program with the Green Climate Fund (GCF) the Country Program of the Republic of Moldova with the Green Climate Fund for the years 2019-2024[366] was developed, a primary stage for getting direct access to the GCF funds by the Republic of Moldova.

7.2.3.5. Multilateral Development Banks

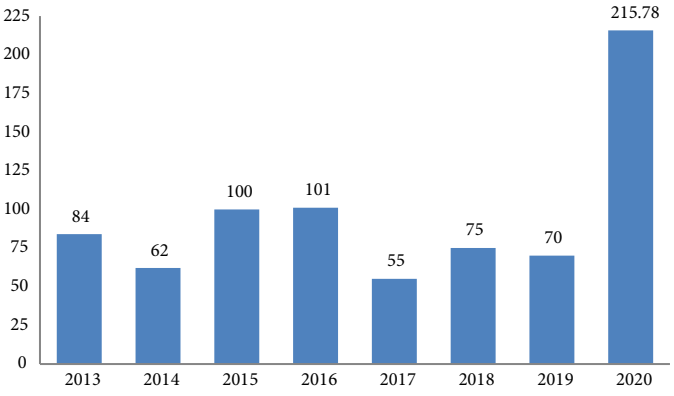
Multilateral Development Banks (MDB) consider technology transfer as part of their development encouraging mission, including for a cleaner environment. They have become aware of the role they 272 can play in mobilizing capital to meet sustainable development and the environment needs, as well as the opportunity to use financial innovation to encourage environmental projects and initiatives. Of the Multilateral Development Banks, the World Bank (WB) and the European Bank for Reconstruction and Development (EBRD) have been particularly prominent in the promotion of sustainable development and environmental projects in the Republic of Moldova.

World Bank Group (IBRD, IDA, IFC, MIGA, ICSID)

The RM joined the IBRD on 12 August 1992, the day on which it became a member of the World Bank. The International Development Association (IDA) lends low-interest or interest free loans – called "credits" – and grants to poorer countries. The RM became a member of IDA on 14 June 1994. The International Financial Corporation (IFC) provides loans, capital and technical assistance to encourage private sector investment in developing countries. The RM became an IFC member on 10 March 1995. The Multilateral Investment Guarantee Agency (MIGA) provides guarantees against losses caused by non-commercial risks borne by investors in developing countries. The RM became a member of the MIGA on 9 June 1993. The International Center for Settlement of Investment Disputes (ICSID) provides international facilities for reconciliation and arbitration of investment disputes. The RM became a member of ICSID on 4 June 2011.

Since 1992 to 31.03.2021, the World Bank granted about US$ 1.8 billion[367] for 111 development projects in the RM, with more than US$ 1.2 billion already disbursed. For 2017-31.03.2021 the World Bank Group provides financial commitments totaling US$ 412 million[356]. The distribution of the loan over the last 8 years is reflected in Figure 7-5.

Currently (31.03.2021), the World Bank's portfolio includes 17 active projects, with a total commitment of US$ 606.58 million. Areas of support include regulatory framework reform and business development, education, social work, energy, healthcare, agriculture, local roads, the environment and more[356].



Source: World Bank. Amounts include IBRD and IDA commitments.

Figure 7-5: World Bank Annual Lending Commitments, million US Dollars.

The WB projects in the Republic of Moldova with GHG mitigation impacts during the last ten years are presented in Table 7-5.

Table 7-5: The WB projects with impact on GHG mitigation in the Republic of Moldova[368]

No.	Project name	Loan, US$ million	Date of approval
1	The second district heating efficiency improvement project	100.0	18.06.20
2	Development of the electric power system of the Republic of Moldova	70.0	08.05.19
3	Climate change adaptation project	27.2	09.06.17
4	Agriculture Competitiveness Project (WB), second additional funding	10.0	07.07.16
5	Rehabilitation of local roads	80.0	30.10.15
6	Agriculture Competitiveness Project (WB), additional funding	12.0	19.05.15
7	Efficient heating system	40.5	11.21.14
8	Emergency Agriculture Support Project	10.0	14.05.13

[366] <http://portal.clima.md/search.php?l=ro>

[367] <https://projects.worldbank.org/en/projects-operations/projects-list?lang=en&countrycode_exact=MD>

[368] <http://www.worldbank.org/en/country/moldova/projects/all>

No.	Project name	Loan, US$ million	Date of approval
9	Agriculture Competitiveness Project (WB)	18.0	01.05.12
10	Agriculture Competitiveness Project (GEF)	4.4	01.05.12
11	Production of Biogas from Manure, pilot project	1.0	06.24.11
12	Moldova: SIDA Trust Fund for financing energy reforms and increasing energy efficiency	2.9	17.02.11
TOTAL		**376.0**	

The biggest environmental problems of the Republic of Moldova are: soil degradation, surface water pollution, lack of sustainable waste management (both solid and liquid), as well as increased groundwater pollution caused by poor manure management in rural communities. The RM has made significant progress in the field of environmental protection. At the same time, projects have been successfully implemented to stop and reverse soil degradation while providing global benefits such as the planned CO_2 emission reduction in the years to come.

European Bank for Reconstruction and Development

The European Bank for Reconstruction and Development (EBRD) is owned by 67 shareholders, 65 countries and two international organizations.

As of 31.01.2021, the EBRD's financing portfolio in the Republic of Moldova consists of 611 million euro structured as follows: sustainable infrastructure - 71%; industry, trade and agriculture - 17%; and financial sector - 12%.

The assistance granted to the Republic of Moldova during the years 1991 - 31.01.2021 includes a total of 142 projects with a total value of 1,397 million Euro, of which the amount already disbursed is 827 million Euro, and the current investment portfolio including 50 ongoing projects[369].

During the last ten years the EBRD projects with direct impacts on GHG emissions mitigation in the Republic of Moldova are presented in Table 7-6.

[369] <http://www.ebrd.com/where-we-are/moldova/data.html>

Table 7-6: The EBRD projects/loans with impact on direct GHG emission mitigation in the Republic of Moldova[370]

No.	Loan / Project Title	Committed Loan, million USD	Approval Date
1	Energy efficiency of buildings in Moldova	30.0	13.05.21
2	Provision of own equity investment in the form of capital increase in exchange for a share in Vestmoldtransgaz Srl ("VMTG")	20.0	11.12.19
3	GrCF - Balti Trolleybus	2.5	19.03.19
4	Green cities: solid waste in Chisinau	10.5	10.08.17
5	Chisinau glass factory	5.6	06.12.16
6	Chisinau buildings in the green city	10.0	14.09.16
7	Balți district heating system	7.0	17.04.14
8	Rehabilitation of roads in Moldova IV	150.0	26.03.13
9	Rehabilitation of the railway park of Moldova	25.0	16.10.13
10	Sustainable Energy Financing Facility in Moldova (MoSEFF and MoSEFF II)	42.0	09.05.12
11	Sustainable Energy Financing Facility in Rural Moldova (MoREEFF)	35.0	09.05.12
12	Rehabilitation of Moldelectrica transmission networks	21.5.	09.05.12
13	Rehabilitation of the Chisinau road sector	11.4	11.22.11
14	Rehabilitation of roads in Moldova III	75.0	26.10.10
TOTAL		**445.5**	

Among the above-mentioned projects/credits, the most important impact on direct GHG emissions reduction was produced by the MoSEFF credit line.[371] As a rule, the reduction of energy consumption in projects financed by these credit lines exceeds 30%, with respective impact on direct GHG emissions mitigation.

To make investments in energy efficiency projects more attractive, MoSEFF provided a grant component for eligible projects. Depending on the energy savings and amount of direct GHG emissions reduction achieved, the grant component varies between 5 and 20% of the loan amount.

Figure 7-6 presents the evolution of annual investments and the annual number of EBRD projects in the Republic of Moldova.

[370] <http://www.ebrd.com/work-with-us/project-finance/project-summary-documents.html?1=1&filterCountry=Moldova>
[371] <https://www.ebrd.com/work-with-us/projects/psd/moseff-ii---moldovan-sustainable-energy-ff-extension.html >

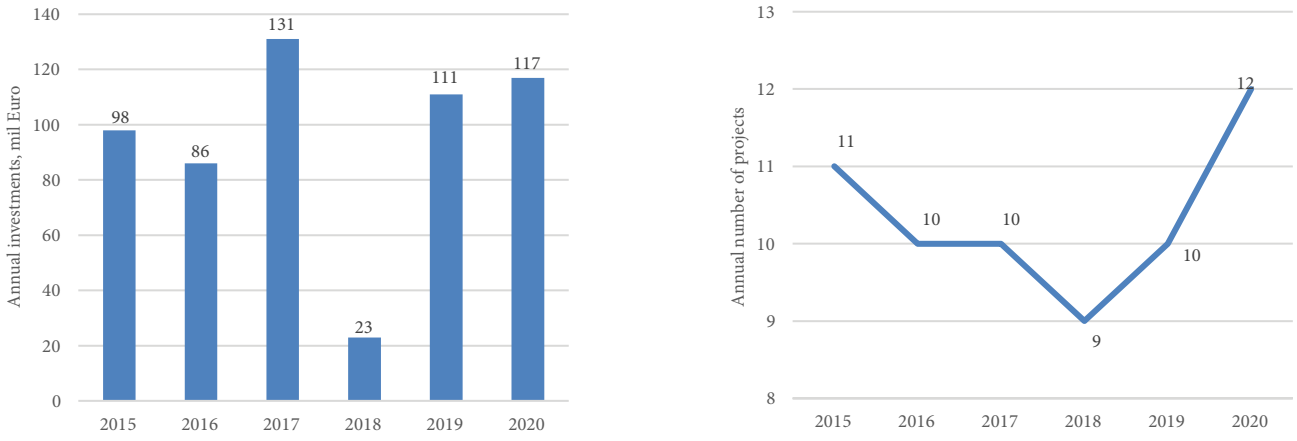


Figure 7-6: EBRD: Evolution of annual investments and annual number of projects in the Republic of Moldova.

7.2.3.6. The Clean Development Mechanism of the Kyoto Protocol

As already mentioned in Chapter 3, the validity term of the Kyoto Protocol expired in 2012, but by the COP 18 decisions in Doha, Qatar, the term of the Kyoto Protocol was extended for another eight years. Thus, the CDM projects approved until 2020 keep their functionality even after this year, if their crediting period has not expired, and new projects of this type can no longer be submitted starting with the year 2021.

By 2020, ten CDM projects have been initiated in the Republic of Moldova, as shown in Table 7-7. Following their implementation, it is expected to achieve reductions in GHG emissions, equivalent to about 1.5 million tons of CO_2 annually. At present, only two CDM projects are still in progress: "The Afforestation/ Reforestation Project of the Republic of Moldova" and "Soil Conservation in the Republic of Moldova".

Table 7-7: CDM projects implemented in the Republic of Moldova[372]

Date of approval by DNA	Project name	Expected annual emission reduction, CO_2 tons	CERs issued by 03.03.2021, t CO_2 eq	Project status
07.02.2012	Reduction of fugitive gas leaks from the distribution network "Tiraspoltrans-gaz-Pridnestrovie"; SRL, Republic of Moldova	164 043	0	Registered
20.12.2011	Reduction of fugitive gas leaks from the Moldovagaz distribution network, Republic of Moldova	748 903	0	Registered
17.03. 2009	The afforestation / reforestation project of the Republic of Moldova	94 354	1,023,906	Ongoing
31.07.2006	Production of biogas from pressed beet pulp at the sugar production plant in Drochia, Südzucker Moldova	21 142	0	Registered
31.07.2006	Construction of the Combined Heat and Power Plant at S.E. "Tirotex", the city of Tiraspol, Republic of Moldova	62,000	0	In the process of registration
19.07.2006	Recovery of biogas from solid waste disposal site in Țantareni, Anenii Noi district, Republic of Moldova	61 757	0	In the process of registration
30.09.2005	Biomass-based heating in rural communities in the Republic of Moldova no. 2	17 888	36 658	Lending period completed
01.10.2005	Biomass heating in rural communities in the Republic of Moldova no. 1	17 888	43 062	Lending period completed
02.10.2005	Energy conservation in the Republic of Moldova	11 567	44 339	Lending period completed
09.09.2004	Soil conservation in the Republic of Moldova	179 242	2,795,009	Ongoing
TOTAL		**1,378,784**	**3,942,974**	

[372] <https://cdm.unfccc.int/Projects/projsearch.html>

The total amount of emission reduction certificates (CERs) issued by the CDM Executive Board until 03.03.2021 for the CDM projects registered in the Republic of Moldova account for 3,942,974 tons of CO_2 equivalent[373].

To facilitate the CDM projects contributing to reducing electricity consumption produced from fossil fuels, in 2011, the World Bank financially supported development of the National Grid Emission Factor (NGEF) calculation tool, and the NGEF concrete values for the credit periods starting 2010 were determined[374] (in 2017 the NGEF was updated).

Due to the additional criteria applied in CDM projects (for example, projects are eligible if they are not economically feasible without carbon trade, the technology is new for the country, etc.) it was possible to transfer technologies that commonly would not have been implemented in the RM in those years. All projects mentioned above are part of this category.

7.3. Gender-Related Activities in the Context of Climate Change Mitigation

7.3.1. The Nexus between Gender and Climate Change Mitigation Issues

Internationally[375] and nationally[376] it is recognized that climate change adaptation and mitigation is essential for the protection of well-being and the achievement of continuous progress in sustainable development. Climate change affects all members of society, but its impact may be different on men and women. Respectively, it is important to understand and capitalize on gender issues when considering climate change adaptation and/or mitigation measures, including GHG emissions reduction, given the different roles and responsibilities, consumption patterns of women and men in society.

Scientific evidence shows that man-made climate change is now responsible for a large proportion of extreme weather events around the world[377]. Climate change affects the entire population of all countries, however women, girls, men and boys are affected differently by climate change and disasters, with many women and girls facing greater risks, tasks and impacts[378]. The European Parliament's resolution on women, gender equality and climate justice recognizes that men and women experience the impact of climate

[373] <https://cdm.unfccc.int/Projects/projsearch.html> (click & quot; Database for PAs and PoAs & quot)
[374] < http://clima.md/lib.php?l=ro&idc=243& >

[375] < https://sustainabledevelopment.un.org/post2015/transformingourworld >
[376] The National Strategy for Adaptation to Climate Change by 2020 and the Action Plan for its implementation, approved by the Government Decision no. 1009 of 10.12.2014
[377] S. Hassol et al., '(Un) Natural Disasters: Communicating Linkages Between Extreme Events and Climate Change', WMO Bulletin 65 (2), 2016.
[378] < https://tbinternet.ohchr.org/Treaties/CEDAW/Shared%20Documents/1_Global/CEDAW_C_GC_37_8642_E.pdf >

change differently and calls on the EU to fund both adaptation to climate change and the mitigation of its gender-adaptive effects[379].

The impact of climate change addresses the combined factors of natural hazards and human vulnerability. These vulnerabilities take the form of physical exposure, socio-economic vulnerability, limited capacity to reduce and cope with vulnerability/risk of climate change.

Women and men have different life and work experiences, perceive and identify differently the risks related to health, activity and life in the context of climate change. The capacities to reduce vulnerability and risks are determined by several factors: poverty, social class, education, age, ethnicity and gender norms/relations, etc.

Given that climate change has a stronger impact on marginalized groups, women and girls are most at risk, with higher rates of morbidity, mortality and economic impact, due to their reduced resilience to climate risks.

For example, in the case of natural hazards, women are at higher risk of injury or death due to physical condition. In the case of climatic hazards, their impact can have detrimental consequences on reproductive health. In the case of these hazards, for example, it should be borne in mind that water from wells (in cases of contamination) is used by women in greater proportions, so the degree of exposure to this risk is higher. And in the case of all types of hazards, the probability of social conflicts increases, which often mainly affects women and girls, especially from vulnerable groups.

It should be reiterated that gender equality is fundamental to achieving sustainable development, as recognized by the Sustainable Development Goals (SDGs) - explicitly in SDG 5 on Achieving Gender Equality and Empowering All Women and Girls, but also as a precondition to achieve other SDGs, from education, health, decent work to tackling climate change. By actively involving both women and men in all sectors of society, countries can realize the potential of all citizens and make the transition to more resilient societies, including truly sustainable low-carbon ones. For example, women often play a central role in sectors where emissions can be substantially reduced along with the benefits of development, such as the efficient use of household energy, supporting income-generating activities and targeting low-emission products consumption patterns.

At the same time, highlighting women as active members of society and promoting their participation in new/non-traditional climate-related jobs, for example as technicians and entrepreneurs in the field of renewable energy, refrigeration and air conditioning (RAC) and so on, they can contribute to poverty reduction and economic growth.

Studies show that equal involvement of women and men in decision-making processes has a positive impact on business and investment performance in general, as evidenced by the better performance of companies with more women on their board in terms of return on investment, sales and own equity[380].

Similarly, studies show that groups with a mixed representation of women and men tend to be more innovative and make better decisions, especially for tasks with greater complexity. A better representation of women in teams offers a greater diversity of points of view, respectively a better collection of ideas and relevant decision-making.

In the context of international standards, given that gender equality can contribute to Low-Emission Development Program until 2030 (LEDP 2030) and Action Plan for its implementation, respectively, to increasing the effectiveness of climate change initiatives[381], it is recommended to focus efforts on the following dimensions:

- improving the sustainability of the LEDP 2030 design and implementation by ensuring the full and active participation of women and men, including in decision-making;
- inclusion of the gender dimension in actions targeting core sectors with a high share of greenhouse gas emissions;
- identifying and providing solutions to lift women and men out of poverty;
- understanding how differentiated consumption patterns of women and men affect their carbon footprint[382], contributing to the carbon emissions reduction;
- encouraging women to be equal to men in order to capitalize on energy-efficient technologies in agriculture and households, solar energy, sustainable agricultural land management practices, etc.;
- collecting gender-disaggregated data to estimate the social and gender impact of LEDP 2030.

Therefore, the inclusion of gender dimension[383] at the design, implementation, monitoring and evaluation

[379] European Parliament resolution of 16 January 2018 on women, gender equality and climate justice (2017/2086 (INI)) < https://www.europarl.europa.eu/doceo/document/TA-8-2018-0005_EN.html >

[380] Carter, NM and Wagner, HM (2011) The bottom line: Corporate performance and women's representation on boards (2004–2008). New York: Catalyst

[381] Low Emission Development Strategies Global Partnership. Promote gender equality. To realize the benefits of low emission development / LEDS in Practice, June 2016. < https://www.climatelinks.org/resources/leds-practice-promote-gender-equality-realize-benefits-low-emission-development >

[382] The amount of carbon dioxide and other carbon compounds emitted due to the consumption of fossil fuels by a particular person, group, etc.

[383] Gender analysis is a tool for diagnosing differences between women and men in terms of specific activities, conditions, needs, access to/control over their resources, as well as their access to developmental and decision-making benefits. Thus, the analysis of different situations of men and women,

stages of LEDP 2030 is an important precondition for an efficient process.

On the other hand, the impact of low-emission development on gender equality should be mentioned as well. Thus, LEDP 2030 can contribute to improving gender equality issues by creating equal opportunities for women to benefit from improved services and conditions (including transport and infrastructure, access to water and accessible and efficient energy services, etc.) and by promoting revenue generation opportunities.

Several Governments, including the Government of the Republic of Moldova, have recognized in nationally approved documents that women are not only affected differently by climate change, but can contribute differently to climate change adaptation/mitigation actions.

Respectively, LEDP 2030 that exploit the potential of men and women to reduce emissions in various sectors, keeping in mind and taking into account their social roles and responsibilities, will not only contribute to climate change mitigation, they can also provide access to services and income opportunities that can alleviate gender inequalities.

At the same time, LEDP 2030 can have a positive gender impact if they also include measures that give women equal access to developing new skills, finance and technology, health, education, decision-making and sales markets, etc.; if they support women's entrepreneurship in low-emission development; and by reducing unequal social burdens (in the context of traditional labor division in the family/household), for which women are predominantly responsible. Thus we can conclude that capitalizing on the gender dimension in LEDP 2030 is important not only from the political correctness perspective (achieving international standards), but also as a practical necessity.

7.3.2. Incorporating Gender Perspective in Climate Change Mitigation Measures by Sectors

In the context of climate change, gender mainstreaming in climate change policies and actions, low-emission development should be achieved taking into account the following key issues:

- considering men and women as users of resources (energy, water, land, transport, etc.) with different levels of responsibility and understanding their importance in the context of climate change;
- access of men and women to resources (energy, land, water, forests, etc.) and their derivative products and services in the context of climate change and low-emission development;
- involving men and women as providers of resource-based services in the context of climate change and low-emission development;
- participation of men and women as labor force in various sectors affected by climate change, which contribute to reducing greenhouse gas emissions;
- participation of men and women in decision-making and consultation processes in the context of climate change and low-emission development.

It is important that the process of planning and implementing low-emission adaptation and development should involve all stakeholders, especially those representing vulnerable groups. Respectively, given that women's and men's groups are not homogeneous, participation involves intersectionality: addressing the needs of women and men in connection with other variables, such as age, place of residence, disability, socio-economic status, family status, etc.

7.3.3 Gender Specifics by Main Sectors

Energy Sector

- Energy significantly contributes to the development of human habitus. Identifying and addressing the needs of women and men are key elements in ensuring the success of policy in the energy sector.
- Women and men have different types of energy-related knowledge/experience, either through their traditional or non-traditional roles (especially in women-led households), or as professionals in the energy sector. Respectively, the policies and interventions promoted in the field must take into account gender differences, different capacities to anticipate risk, response and recovery.
- Women play a key role in energy use, especially in poor communities. The capitalization of these experiences will contribute to the more efficient realization of some energy projects.
- Access to modern energy services contributes to reducing women's domestic tasks, giving them more time for other activities, such as education, health protection, entrepreneurial activities, etc.

Recommended activities:

- Creating equal opportunities for entrepreneurial development, employment in the energy sector, including in decision-making positions.
- Providing women and men with equal access to information through training in the field of modern technologies, business opportunities in the sector, etc.

directly or indirectly related to climate change and the reduction of greenhouse gas emissions, can provide an understanding of the impact of different practices, policies and programs on women and men and their relevant adjustment.

- Organizing information campaigns on the benefits of green energy and GHG emissions impact on health and economy, taking into account gender issues.
- Involvement of women's NGO representatives in the sector companies' and projects' boards.
- Involvement of women in the consultation processes at the stage of energy project concepts development.

Transport Sector

- Women and men have different types of knowledge/ experiences related to transport, either by virtue of their roles as drivers/passengers/pedestrians, or as professionals in the transport sector. Respectively, policies and interventions in this sector must take into account gender differences, different capacities to anticipate risk, response and recovery.
- Modern activities imply that car travel and the ideas of mobility and freedom, associated with vehicles, are closely linked to the image of men. Men are more often represented traveling - as owners and drivers; and women - as being responsible for household chores - as users of public transport. For these reasons, the gender aspect is an important factor in meeting transport needs at all levels.
- A high level of economic development is associated with equal access of men and women to resources (including transport), reduction of gender inequalities in terms of income, etc. Respectively, access to modern and safe transport services contributes to the restructuring of women's domestic tasks, giving them more time for entrepreneurial activities, while contributing to economic and social development.

Recommended activities:

- Creating equal opportunities for women and men in entrepreneurship, employment in the transport sector, including in decision-making positions.
- Providing women on an equal footing with men access to information through training in the field of transport, infrastructure, business opportunities in the sector, etc.
- Organizing information campaigns on the benefits of eco-transport; traffic safety, taking into account gender issues.
- Involvement of women's NGO representatives in the sector companies' and projects' boards.
- Involvement of women in the processes of consulting projects, allocating resources and developing relevant infrastructure.

Buildings Sector

- Women and men have common needs, but also specific in relation to the place and living conditions.
- Studies confirm that the development of women's capacities in the field of energy efficiency, can contribute to increasing the motivation of women to participate in activities related to the thermal modernization of residential buildings, traditionally associated with men.
- At the same time, in the context of prevalence of women among the elderly population, against the background of a gender difference in salaries and pensions, respectively, the category of women over 63 can become economically vulnerable in terms of financial opportunities (personal investments). These aspects should be taken into account when organizing housing stock thermal insulation programs.
- In order to make the sector more efficient, establishing partnerships between local government and tenants' associations is welcomed to coordinate efforts and resources for implementation of programs related to thermal modernization of residential buildings taking into account gender issues.
- Informing the population about the importance of thermal modernization of residential buildings should be done by indicating the benefits of reducing greenhouse gas emissions and improving the health and well-being of women and men.

Recommended activities:

- Development of women's capacities in the field of energy efficiency can contribute to increasing the motivation of women to participate in activities related to the thermal modernization of residential buildings, traditionally associated with men.
- Providing women on an equal footing with men access to information through training in the field of buildings, associated services, business opportunities in the sector, etc.
- Awareness campaigns about opportunities to reduce greenhouse gas emissions in the building sector, taking into account the needs of women, men, children and the elderly.
- Involvement of women and men in maintenance of residential buildings at high technical condition level.
- Involvement of women in the processes of consulting projects, allocating resources and developing relevant infrastructure.

Industry Sector

- In the industry sector there are gender disparities at the level of qualified engineering and technical staff, women being underrepresented in glass production, construction materials and other. At the

same time, women are predominant in industries that produce social products (for example, dairy products, bakery products).

– Although women's participation in entrepreneurship has increased in recent years, women continue to represent a little-used growth potential and a minority in the business community owning and managing about 33.9% of enterprises.[384]

– Women more often than men own micro businesses and rarely own medium and large businesses.

Recommended activities:

– Creating opportunities for women on an equal footing with men for entrepreneurial development, employment in the industrial sector, including in decision-making positions.

– Providing women with access to information through training on financial possibilities of purchasing and maintaining modern equipment and business opportunities in the sector.

– Awareness campaigns on the harmful impact of emissions from obsolete equipment on the health of employees of the companies, taking into account gender issues.

– Involvement of women in consultation and decision-making processes with reference to projects, resource allocations, sector development, etc.

Agricultural Sector

– In the Republic of Moldova, women in rural areas account for almost 30% of the total population of the country and 51% of the stable population in rural areas.

– The time spent by rural women as food producers (growing, collecting and preparing agricultural production) and caring for other members of the household is rarely included in the income measurement system or taken into account in the policy-making process. At the same time, the unequal distribution of the labor in the households significantly limits women's economic prospects for productive and decent work.

– As a gender-specific aspect, it should be mentioned that the agricultural production of the Republic of Moldova is completely dependent on agrochemicals, seeds and fuels, which affects the competitiveness of agri-food products.

– The climate impact and the vulnerability of the agricultural sector are directly projected towards income reduction in rural areas; aggravation of poverty due to rising food prices, especially among people from socially vulnerable groups (women with children, older women and men, etc.).

Recommended activities:

– Creating equal opportunities for women for entrepreneurial development in the agricultural and animal sectors and access to markets, based on modern technologies.

– Providing preferential financial support for the purchase of seeds, raw materials for agricultural products subject to processing; financial possibilities for purchasing facilities and equipment for agricultural products processing.

– Offering women equal opportunities for access to information through training in agro-ecological, agroforestry and renewable energy, business opportunities for producing high value-added products, etc.

– Involvement of women in consultation/decision-making process on projects, allocation of resources, sector development, etc.

Forestry Sector

– Women play a significant role in collecting, producing, distributing and use of forest products, especially in poor communities. Putting in value these experiences would contribute to the more efficient implementation of forestry projects.

– Empowering women in the forestry sector can create significant development opportunities and generate important collateral benefits for their households and communities, especially in rural areas. Given their knowledge and role in the forestry and forestry sector, women need to be sufficiently represented in relevant institutions, accepted as stakeholders with specific views and interests and people who can make transformation decisions.

– At the same time, access to modern energy services, including based on energy agroforestry plantations can contribute to reducing the household burdens on women, giving them more time for other activities, such as education, health protection, entrepreneurship, etc.

Recommended activities:

– Creating equal opportunities for women for forestry sector related entrepreneurship, including creation of energy agroforestry plantations, development of beekeeping, collection and use of medicinal plants and berries based on modern technologies.

– Providing financial and preferential support for the establishment of private forest plantations.

[384] NBS presented the results of the study on the development of the business environment from a gender perspective, 06.08.2020: < https://statistica.gov.md/newsview.php?l=ro&idc=30&id=6724 >.

– Awareness campaigns about the importance of protecting and developing forests, taking into account gender issues.
– Informing the population about the role of forests in the process of carbon removal and their contribution to reducing greenhouse gas emissions.
– Involvement of women in the processes of consultation/decision-making on projects, allocation of resources, relevant sector development, etc.

Waste Sector

– Gender issues are directly related to successful waste management, as women and men have different sensitivities and roles in the family and society that can influence decision-making and exposure to waste.
– The impact and effects of exposure vary depending on factors such as geographical location, behaviors, age, nutritional status, socio-economic status, biological effects and/or exposure to certain chemicals. Consequently, in order to ensure the safety of the population in the waste management process, gender issues need to be considered together with the factors noted.
– Inequality often affects waste management and the associated access of women and men to various services (health, social protection, information, etc.), secure jobs, secure products and resources, including decision-making processes, etc.

Recommended activities:

–Creating opportunities for the involvement of men and women as service providers in waste management with a maximum share of reducing or removing greenhouse gas emissions.
–Creating opportunities for men and women to participate as workforce in sectors that contribute to waste reduction.
–Awareness and education campaigns focused on development of responsible consumer behavior (use of eco-bags, waste separation, especially hazardous waste), taking into account gender issues.
–Providing access to waste transportation and storage services, taking into account gender issues
–Informing the population about the harmful impact of waste on the health of women and men.
–Involvement of women in the consultation/decision-making processes with reference to projects, resource allocations, relevant sector development, etc.

Strengthening the capacity of women and men in these sectors will enable them to develop sustainable resilience to climate change.

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ANNEXES

Annex 1: Summary Reports on GHG Emissions in the Republic of Moldova within 1990-2019

Annex 1-1: Inventory Year - 1990

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)					(kt)			
Total national emissions and removals	**35459.8920**	**209.7622**	**10.9294**	**NO**	**NO**	**NO**	**NO**	**NO**	**89.7413**	**279.8576**	**138.7872**	**150.0997**
1. Energy	**35401.5108**	**45.9255**	**1.1599**						**85.7741**	**268.1988**	**31.3695**	**148.7358**
A. Fuel combustion Reference approach	35188.0913											
Sectoral approach	35400.8731	13.4359	1.1599						85.7741	268.1988	30.7878	148.7358
1. Energy industries	21300.2929	0.4913	0.1734						39.4664	7.2099	0.6297	102.3606
2. Manufacturing industries and construction	1916.8273	0.0866	0.0147						9.0489	3.4763	0.8788	2.6881
3. Transport	4697.5183	1.3467	0.3582						14.9012	68.3923	8.6079	0.7843
4. Other sectors	7372.2624	11.5005	0.6092						21.5980	188.2917	20.5488	42.5973
5. Other	113.9722	0.0109	0.0044						0.7597	0.8286	0.1226	0.3055
B. Fugitive emissions from fuels	0.6377	32.4897	0.0000						NO	NO	0.5817	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.6377	32.4897	0.0000						NO	NO	0.5817	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**1603.6767**	**NO**	**0.0001**	**NO**	**NO**	**NO**	**NO**	**NO**	**3.7209**	**5.4932**	**106.5515**	**1.3586**
A. Mineral industry	1337.4142								3.5653	3.4372	0.0339	1.2943
B. Chemical industry	NO	NO	NO						NO	NO	0.0650	NO
C. Metal industry	28.5023	NO	NO	NO	NO	NO	NO	NO	0.0925	1.2102	0.0370	0.0427
D. Non-energy products from fuels and solvent use	234.3591	NO	NO						0.0434	0.2441	92.7937	0.0216
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				NO	NO	NO	NO	NO				
G. Other product manufacture and use	3.4010	NO	0.0001	NO	NO	NO	NO	NO	0.0197	0.6017	1.5459	NO
H. Other									NO	NO	12.0760	NO
3. Agriculture	**0.5820**	**107.3809**	**8.8939**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		87.5771										
B. Manure management		19.8038	3.7470								NO	
C. Rice cultivation		NO										
D. Agricultural soils			5.1469									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.5820											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1560.8442**	**0.1061**	**0.5717**						**0.0959**	**3.5227**	**NO, NE**	
A. Forest land	-2563.4328	0.0083	0.0005						0.0053	0.1887	NO, NE	
B. Cropland	2648.7307	0.0978	0.0025						0.0906	3.3340	NO	
C. Grassland	-1205.6938	NE	NE						NE	NE	NE	
D. Wetlands	-555.3798	NE	NE						NE	NE	NE	
E. Settlements	84.7480	NO, NE	0.5687						NO, NE	NO, NE	NO, NE	
F. Other land	152.3638	NE	NE						NE	NE	NE	
G. Harvested wood products	-122.1804											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**14.9667**	**56.3496**	**0.3038**						**0.1503**	**2.6430**	**0.8662**	**0.0052**
A. Solid waste disposal	NA, NO	41.8691							NA, NO	NA, NO	0.7671	
B. Biological treatment of solid waste		0.0544	0.0033						NO, NE	0.0076	NO, NE	
C. Incineration and open burning of waste	14.9667	0.3075	0.0054						0.1503	2.6354	0.0581	0.0052
D. Wastewater treatment and discharge		14.1186	0.2951						NA, IE	NA, IE	0.0410	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**193.4599**	**0.0153**	**0.0063**						**0.7651**	**0.5859**	**0.2298**	**0.0613**
Aviation	193.4599	0.0153	0.0063						0.7651	0.5859	0.2298	0.0613
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	232.8093											

CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**2.0327**									
Indirect CO_2	**207.5471**											

Annex 1-2: Inventory Year - 1991

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**28724.9948**	**196.1309**	**10.2154**	**NO**	**NO**	**NO**	**NO**	**NO**	**73.9174**	**207.3877**	**111.8032**	**124.8723**
1. Energy	**29939.0721**	**40.3057**	**0.8645**						**70.2758**	**196.5828**	**23.0138**	**123.5938**
A. Fuel combustion Reference approach	29776.3533											
Sectoral approach	29938.4581	9.8131	0.8645						70.2758	196.5828	22.4700	123.5938
1. Energy industries	18927.0336	0.4230	0.1562						35.0660	6.4107	0.5515	90.5225
2. Manufacturing industries and construction	1277.9476	0.0546	0.0096						6.5424	1.7479	0.5482	1.2265
3. Transport	3655.5565	1.0343	0.2931						11.9958	52.0755	6.5987	0.6152
4. Other sectors	5971.5518	8.2940	0.4021						16.0136	135.7317	14.6862	30.9518
5. Other	106.3685	0.0072	0.0034						0.6579	0.6170	0.0855	0.2778
B. Fugitive emissions from fuels	0.6140	30.4926	0.0000						NO	NO	0.5438	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.6140	30.4926	0.0000						NO	NO	0.5438	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**1409.7794**	**NO**	**0.0001**	**NO**	**NO**	**NO**	**NO**	**NO**	**3.4025**	**4.9046**	**87.8864**	**1.2732**
A. Mineral industry	1188.6687								3.2662	3.0431	0.0315	1.2182
B. Chemical industry	NO	NO	NO						NO	NO	0.0544	NO
C. Metal industry	24.7297	NO	NO	NO	NO	NO	NO	NO	0.0803	1.0502	0.0323	0.0371
D. Non-energy products from fuels and solvent use	193.3185	NO	NO						0.0361	0.2030	76.2635	0.0180
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				NO	NO	NO	NO	NO				
G. Other product manufacture and use	3.0625	NO	0.0001	NO	NO	NO	NO	NO	0.0199	0.6083	1.3920	NO
H. Other									NO	NO	10.1126	NO
3. Agriculture	**0.5226**	**97.7579**	**8.4527**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		81.1547										
B. Manure management		16.6032	3.4991									
C. Rice cultivation		NO										
D. Agricultural soils			4.9535									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.5226											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-2639.3787**	**0.0960**	**0.6171**						**0.0885**	**3.2552**	**NO, NE**	
A. Forest land	-2343.3131	0.0014	0.0001						0.0009	0.0316	NO, NE	
B. Cropland	1517.2470	0.0946	0.0025						0.0876	3.2236	NO	
C. Grassland	-1414.3167	NE	NE						NE	NE	NE	
D. Wetlands	-526.4627	NE	NE						NE	NE	NE	
E. Settlements	88.7139	NO, NE	0.6145						NO, NE	NO, NE	NO, NE	
F. Other land	152.3638	NE	NE						NE	NE	NE	
G. Harvested wood products	-113.6108											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**14.9994**	**57.9712**	**0.2811**						**0.1506**	**2.6451**	**0.9029**	**0.0053**
A. Solid waste disposal	NA, NO	43.9447							NA, NO	NA, NO	0.8074	
B. Biological treatment of solid waste		0.0551	0.0033						NO, NE	0.0077	NO, NE	
C. Incineration and open burning of waste	14.9994	0.3080	0.0054						0.1506	2.6374	0.0582	0.0053
D. Wastewater treatment and discharge		13.6633	0.2724						NA, IE	NA, IE	0.0373	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**147.3846**	**0.0117**	**0.0048**						**0.5829**	**0.4464**	**0.1751**	**0.0467**
Aviation	147.3846	0.0117	0.0048						0.5829	0.4464	0.1751	0.0467
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	201.2009											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**1.8766**									
Indirect CO_2	**170.8422**											

Annex 1-3: Inventory Year - 1992

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**22112.1127**	**186.9661**	**8.8500**	**NO**	**NO**	**NO**	**NO**	**NO**	**55.2010**	**133.2734**	**87.9944**	**92.0640**
1. Energy	**23328.3149**	**33.7339**	**0.6034**						**53.1383**	**124.2406**	**14.8719**	**91.3906**
A. Fuel combustion Reference approach	23208.4202											
Sectoral approach	23327.7974	6.1296	0.6034						53.1383	124.2406	14.3788	91.3906
1. Energy industries	15660.9863	0.3579	0.1219						28.7536	5.5760	0.4762	71.2477
2. Manufacturing industries and construction	926.7893	0.0399	0.0069						4.5977	1.3236	0.4070	0.9321
3. Transport	2614.8520	0.7228	0.2234						9.0885	35.7574	4.5881	0.4462
4. Other sectors	4047.4223	5.0044	0.2490						10.2209	81.2407	8.8561	18.6039
5. Other	77.7474	0.0046	0.0023						0.4776	0.3429	0.0514	0.1606
B. Fugitive emissions from fuels	0.5175	27.6043	0.0000						NO	NO	0.4931	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.5175	27.6043	0.0000						NO	NO	0.4931	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**821.5621**	**NO**	**0.0001**	**NO**	**NO**	**NO**	**NO**	**NO**	**1.8308**	**3.4045**	**72.1808**	**0.6681**
A. Mineral industry	640.8940								1.7039	1.6459	0.0165	0.6171
B. Chemical industry	NO	NO	NO						NO	NO	0.0238	NO
C. Metal industry	23.9922	NO	NO	NO	NO	NO	NO	NO	0.0780	1.0194	0.0314	0.0360
D. Non-energy products from fuels and solvent use	154.2628	NO	NO						0.0304	0.1706	62.9651	0.0151
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				NO	NO	NO	NO	NO				
G. Other product manufacture and use	2.4132	NO	0.0001	NO	NO	NO	NO	NO	0.0186	0.5686	1.0969	NO
H. Other									NO	NO	8.0471	NO
3. Agriculture	**0.3905**	**94.7961**	**7.3013**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		79.8715										
B. Manure management		14.9247	3.1392								NO	
C. Rice cultivation		NO										
D. Agricultural soils			4.1621									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.3905											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-2053.2024**	**0.0879**	**0.6868**						**0.0809**	**2.9777**	**NO, NE**	
A. Forest land	-2184.2404	0.0015	0.0001						0.0010	0.0346	NO, NE	
B. Cropland	1443.9675	0.0864	0.0022						0.0800	2.9431	NO	
C. Grassland	-1428.4835	NE	NE						NE	NE	NE	
D. Wetlands	-595.5455	NE	NE						NE	NE	NE	
E. Settlements	386.6196	NO, NE	0.6844						NO, NE	NO, NE	NO, NE	
F. Other land	418.7786	NE	NE						NE	NE	NE	
G. Harvested wood products	-94.2986											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**15.0476**	**58.3482**	**0.2585**						**0.1510**	**2.6506**	**0.9417**	**0.0053**
A. Solid waste disposal	NA, NE	45.6782							NA, NO	NA, NO	0.8499	
B. Biological treatment of solid waste		0.0575	0.0035						NO, NE	0.0081	NO, NE	
C. Incineration and open burning of waste	15.0476	0.3089	0.0054						0.1510	2.6425	0.0584	0.0053
D. Wastewater treatment and discharge		12.3036	0.2496						NA, IE	NA, IE	0.0335	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**108.5369**	**0.0086**	**0.0036**						**0.4293**	**0.3287**	**0.1289**	**0.0344**
Aviation	108.5369	0.0086	0.0036						0.4293	0.3287	0.1289	0.0344
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	169.5924											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**1.6034**									
Indirect CO_2	**140.9363**											

Annex 1-4: Inventory Year - 1993

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**15993.1166**	**174.3592**	**7.7257**	**NO**	**NO**	**NO**	**NO**	**NO**	**76.1590**	**69.5986**	**69.2095**	**72.3599**
1. Energy	**17335.5539**	**27.4021**	**0.5000**						**74.1648**	**59.6995**	**7.9444**	**71.7045**
A. Fuel combustion Reference approach	17274.3650											
Sectoral approach	17335.1157	2.5995	0.5000						74.1648	59.6995	7.5007	71.7045
1. Energy industries	12640.6006	0.2823	0.1058						23.6435	4.2355	0.3687	62.2743
2. Manufacturing industries and construction	612.1245	0.0268	0.0045						34.8853	0.9478	0.2790	0.6765
3. Transport	1855.0176	0.4932	0.1808						7.3893	23.2766	3.0794	0.3241
4. Other sectors	2133.9212	1.7913	0.2065						7.7876	30.6143	3.6883	8.0858
5. Other	93.4518	0.0058	0.0024						0.4591	0.6253	0.0853	0.3437
B. Fugitive emissions from fuels	0.4382	24.8026	0.0000						NO	NO	0.4437	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.4382	24.8026	0.0000						NO	NO	0.4437	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**737.0521**	**NO**	**0.0001**	**NO**	**NO**	**NO**	**NO**	**NO**	**1.7342**	**3.2411**	**60.2823**	**0.6501**
A. Mineral industry	586.7703								1.6117	1.4853	0.0143	0.6015
B. Chemical industry	NO	NO	NO						NO	NO	0.0199	NO
C. Metal industry	24.4250	NO	NO	NO	NO	NO	NO	NO	0.0794	1.0383	0.0315	0.0366
D. Non-energy products from fuels and solvent use	123.8759	NO	NO						0.0241	0.1356	50.1008	0.0120
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				NO	NO	NO	NO	NO				
G. Other product manufacture and use	1.9809	NO	0.0001	NO	NO	NO	NO	NO	0.0190	0.5819	0.9004	NO
H. Other									NO	NO	9.2154	NO
3. Agriculture	**0.1276**	**85.9140**	**6.2374**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		74.9162										
B. Manure management		10.9978	2.7360								NO	
C. Rice cultivation		NO										
D. Agricultural soils			3.5014									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.1276											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-2094.6617**	**0.1179**	**0.7469**						**0.1091**	**4.0151**	**NO, NE**	
A. Forest land	-2193.5115	0.0001	0.0000						0.0001	0.0024	NO, NE	
B. Cropland	1713.0301	0.1178	0.0031						0.1090	4.0127	NO	
C. Grassland	-1303.5202	NE	NE						NE	NE	NE	
D. Wetlands	-525.8447	NE	NE						NE	NE	NE	
E. Settlements	114.6181	NO, NE	0.7438						NO, NE	NO, NE	NO, NE	
F. Other land	164.0168	NE	NE						NE	NE	NE	
G. Harvested wood products	-63.4504											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**15.0447**	**60.9251**	**0.2413**						**0.1508**	**2.6428**	**0.9829**	**0.0053**
A. Solid waste disposal	NA, NO	48.1887							NA, NO	NA, NO	0.8947	
B. Biological treatment of solid waste		0.0288	0.0017						NO, NE	0.0040	NO, NE	
C. Incineration and open burning of waste	15.0447	0.3087	0.0054						0.1508	2.6388	0.0583	0.0053
D. Wastewater treatment and discharge		12.3989	0.2341						NA, IE	NA, IE	0.0299	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**55.2342**	**0.0044**	**0.0018**						**0.2184**	**0.1673**	**0.0656**	**0.0175**
Aviation	55.2342	0.0044	0.0018						0.2184	0.1673	0.0656	0.0175
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	143.2360											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**1.3011**									
Indirect CO_2	**112.2027**											

Annex 1-5: Inventory Year - 1994

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			($kt\ CO_2$ equivalent)			(kt)					
Total national emissions and removals	**13015.6690**	**170.8538**	**6.9945**	**NO**	**NO**	**NO**	**NO**	**NO**	**35.0949**	**75.3065**	**50.6096**	**57.3452**
1. Energy	**14485.6701**	**26.9625**	**0.4526**						**33.5131**	**67.5876**	**8.6559**	**56.8209**
A. Fuel combustion Reference approach	14451.3398											
Sectoral approach	14485.2616	3.0910	0.4526						33.5131	67.5876	8.2290	56.8209
1. Energy industries	9961.8515	0.1888	0.0872						18.8108	3.5570	0.2847	47.1207
2. Manufacturing industries and construction	731.5285	0.0178	0.0013						1.2443	0.7197	0.3201	0.3552
3. Transport	1612.7695	0.4373	0.1096						4.5224	21.4510	2.7103	0.2180
4. Other sectors	2090.7472	2.4402	0.2529						8.6031	41.2528	4.8276	8.8679
5. Other	88.3648	0.0069	0.0016						0.3325	0.6071	0.0863	0.2592
B. Fugitive emissions from fuels	0.4085	23.8714	0.0000						NO	NO	0.4269	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.4085	23.8714	0.0000						NO	NO	0.4269	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**556.2338**	**NO**	**0.0001**	**NO**	**NO**	**NO**	**NO**	**NO**	**1.3699**	**2.8404**	**40.9264**	**0.5189**
A. Mineral industry	444.9885								1.2556	1.1521	0.0116	0.4736
B. Chemical industry	NO	NO	NO						NO	NO	0.0074	NO
C. Metal industry	25.3289	NO	NO	NO	NO	NO	NO	NO	0.0824	1.0774	0.0322	0.0380
D. Non-energy products from fuels and solvent use	84.4738	NO	NO						0.0146	0.0820	32.7972	0.0073
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				NO	NO	NO	NO	NO				
G. Other product manufacture and use	1.4426	NO	0.0001	NO	NO	NO	NO	NO	0.0173	0.5290	0.6557	NO
H. Other									NO	NO	7.4223	NO
3. Agriculture	**0.0537**	**83.5225**	**5.5139**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		72.9133										
B. Manure management		10.6093	2.6585								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.8554									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.0537											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-2041.3832**	**0.0662**	**0.7938**						**0.0606**	**2.2302**	**NO, NE**	
A. Forest land	-2108.0022	0.0023	0.0001						0.0015	0.0526	NO, NE	
B. Cropland	1476.2941	0.0639	0.0017						0.0592	2.1776	NO	
C. Grassland	-1577.3332	NE	NE						NE	NE	NE	
D. Wetlands	-497.6418	NE	NE						NE	NE	NE	
E. Settlements	130.4883	NO, NE	0.7920						NO, NE	NO, NE	NO, NE	
F. Other land	549.4579	NE	NE						NE	NE	NE	
G. Harvested wood products	-14.6464											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**15.0947**	**60.3026**	**0.2343**						**0.1512**	**2.6482**	**1.0273**	**0.0054**
A. Solid waste disposal	NA, NO	48.3920							NA, NO	NA, NO	0.9417	
B. Biological treatment of solid waste		0.0268	0.0016						NO, NE	0.0038	NO, NE	
C. Incineration and open burning of waste	15.0947	0.3096	0.0054						0.1512	2.6445	0.0584	0.0054
D. Wastewater treatment and discharge		11.5741	0.2272						NA, IE	NA, IE	0.0272	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**30.8414**	**0.0024**	**0.0010**						**0.1220**	**0.0934**	**0.0366**	**0.0098**
Aviation	30.8414	0.0024	0.0010						0.1220	0.0934	0.0366	0.0098
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	157.4600											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**1.1449**									
Indirect CO_2	**73.5965**											

Annex 1-6: Inventory Year - 1995

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**9926.5250**	**161.6451**	**6.8333**	**1.0298**	**NO**	**NO**	**NO**	**NO**	**29.1576**	**65.7090**	**47.3142**	**31.7701**
1. Energy	**11471.5441**	**28.3934**	**0.4304**						**27.7416**	**57.4485**	**7.1117**	**31.2910**
A. Fuel combustion Reference approach	11437.2030											
Sectoral approach	11471.1247	1.9379	0.4304						27.7416	57.4485	6.6356	31.2910
1. Energy industries	7174.0286	0.1370	0.0502						12.9854	3.1484	0.2369	25.5949
2. Manufacturing industries and construction	381.5061	0.0114	0.0015						0.6870	0.5581	0.1795	0.3662
3. Transport	1617.7816	0.4448	0.1058						4.4098	22.5934	2.8292	0.2340
4. Other sectors	2172.1646	1.3343	0.2708						9.1456	30.5187	3.2884	4.8320
5. Other	125.6438	0.0104	0.0022						0.5138	0.6299	0.1015	0.2639
B. Fugitive emissions from fuels	0.4194	26.4555	0.0000						NO	NO	0.4761	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.4194	26.4555	0.0000						NO	NO	0.4761	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**455.1468**	**NO**	**0.0000**	**1.0298**	**NO**	**NO**	**NO**	**NO**	**1.1818**	**2.5644**	**39.1320**	**0.4737**
A. Mineral industry	351.1816								1.0679	0.9044	0.0090	0.4277
B. Chemical industry	NO	NO	NO						NO	NO	0.0060	NO
C. Metal industry	26.2369	NO	NO	NO	NO	NO	NO	NO	0.0854	1.1166	0.0327	0.0394
D. Non-energy products from fuels and solvent use	76.5607	NO	NO						0.0132	0.0740	29.2180	0.0065
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				1.0298	NO	NO	NO	NO				
G. Other product manufacture and use	1.1676	NO	0.0000	NO	NO	NO	NO	NO	0.0153	0.4695	0.5307	NO
H. Other									NO	NO	9.3357	NO
3. Agriculture	**0.0607**	**72.9745**	**5.3218**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		64.7235										
B. Manure management		8.2510	2.4596								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.8621									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.0607											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-2015.3244**	**0.0896**	**0.8440**						**0.0829**	**3.0510**	**NO, NE**	
A. Forest land	-2045.0670	0.0001	0.0000						0.0001	0.0030	NO, NE	
B. Cropland	1586.2644	0.0895	0.0023						0.0828	3.0480	NO	
C. Grassland	-1601.1004	NE	NE						NE	NE	NE	
D. Wetlands	-469.4389	NE	NE						NE	NE	NE	
E. Settlements	106.9167	NO, NE	0.8417						NO, NE	NO, NE	NO, NE	
F. Other land	401.1281	NE	NE						NE	NE	NE	
G. Harvested wood products	5.9727											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**15.0979**	**60.1876**	**0.2370**						**0.1512**	**2.6451**	**1.0704**	**0.0054**
A. Solid waste disposal	NA, NO	48.3670							NA, NO	NA, NO	0.9913	
B. Biological treatment of solid waste		0.0253	0.0015						NO, NE	0.0035	NO, NE	
C. Incineration and open burning of waste	15.0979	0.3096	0.0054						0.1512	2.6416	0.0584	0.0054
D. Wastewater treatment and discharge		11.4857	0.2301						NA, IE	NA, IE	0.0207	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**41.9508**	**0.0066**	**0.0014**						**0.1676**	**0.1539**	**0.0809**	**0.0133**
Aviation	41.9508	0.0066	0.0014						0.1676	0.1539	0.0809	0.0133
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	230.0480											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**1.0883**									
Indirect CO_2	**65.4471**											

Annex 1-7: Inventory Year - 1996

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**9333.9640**	**159.2973**	**6.8061**	**1.6593**	**NO**	**NO**	**NO**	**NO**	**27.2543**	**77.9462**	**45.8441**	**31.9482**
1. Energy	**11375.0177**	**31.7295**	**0.3744**						**26.0139**	**70.5633**	**8.5666**	**31.5407**
A. Fuel combustion Reference approach	11319.0368											
Sectoral approach	11374.5451	2.9740	0.3744						26.0139	70.5633	8.0506	31.5407
1. Energy industries	7107.0544	0.1353	0.0469						12.7474	3.2595	0.2422	23.4411
2. Manufacturing industries and construction	321.2863	0.0115	0.0016						0.6490	0.6323	0.1600	0.4747
3. Transport	1578.6670	0.4313	0.1009						4.2800	21.5297	2.7137	0.2207
4. Other sectors	2285.6997	2.3850	0.2228						7.8951	44.6759	4.8360	7.2025
5. Other	81.8376	0.0109	0.0023						0.4423	0.4659	0.0987	0.2016
B. Fugitive emissions from fuels	0.4726	28.7555	0.0000						NO	NO	0.5160	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.4726	28.7555	0.0000						NO	NO	0.5160	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**414.5996**	**NO**	**0.0000**	**1.6593**	**NO**	**NO**	**NO**	**NO**	**1.0325**	**2.6496**	**36.1550**	**0.4021**
A. Mineral industry	315.6974								0.9126	0.8037	0.0070	0.3560
B. Chemical industry	NO	NO	NO						NO	NO	0.0085	NO
C. Metal industry	26.7261	NO	NO	NO	NO	NO	NO	NO	0.0870	1.1375	0.0332	0.0401
D. Non-energy products from fuels and solvent use	71.0712	NO	NO						0.0119	0.0671	27.0276	0.0059
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				1.6593	NO	NO	NO	NO				
G. Other product manufacture and use	1.1050	NO	0.0000	NO	NO	NO	NO	NO	0.0210	0.6414	0.5023	NO
H. Other									NO	NO	8.5764	NO
3. Agriculture	**0.0911**	**67.1693**	**5.3180**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		59.6750										
B. Manure management		7.4943	2.5974								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.7206									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.0911											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-2470.8404**	**0.0616**	**0.8801**						**0.0569**	**2.0916**	**NO, NE**	
A. Forest land	-2190.4337	0.0008	0.0000						0.0005	0.0176	NO, NE	
B. Cropland	1388.2124	0.0609	0.0016						0.0564	2.0740	NO	
C. Grassland	-1548.0826	NE	NE						NE	NE	NE	
D. Wetlands	-441.2360	NE	NE						NE	NE	NE	
E. Settlements	101.5910	NO, NE	0.8784						NO, NE	NO, NE	NO, NE	
F. Other land	217.3293	NE	NE						NE	NE	NE	
G. Harvested wood products	1.7792											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**15.0960**	**60.3369**	**0.2336**						**0.1511**	**2.6417**	**1.1226**	**0.0054**
A. Solid waste disposal	NA, NO	48.6713							NA, NO	NA, NO	1.0435	
B. Biological treatment of solid waste		0.0261	0.0016						NO, NE	0.0036	NO, NE	
C. Incineration and open burning of waste	15.0960	0.3094	0.0054						0.1511	2.6380	0.0584	0.0054
D. Wastewater treatment and discharge		11.3300	0.2266						NA, IE	NA, IE	0.0208	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**56.7300**	**0.0048**	**0.0018**						**0.2197**	**0.1539**	**0.0822**	**0.0180**
Aviation	56.7300	0.0048	0.0018						0.2197	0.1539	0.0822	0.0180
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	294.0280											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**1.0881**									
Indirect CO_2	**60.5658**											

Annex 1-8: Inventory Year - 1997

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			($kt\ CO_2$ equivalent)			(kt)					
Total national emissions and removals	**8606.7740**	**143.5333**	**6.1582**	**2.3137**	**NO**	**NO**	**NO**	**NO**	**24.3381**	**73.2543**	**31.2793**	**16.7211**
1. Energy	**10258.1517**	**25.9642**	**0.3429**						**22.8510**	**63.9617**	**7.7630**	**16.2324**
A. Fuel combustion Reference approach	10192.9270											
Sectoral approach	10257.6867	2.3214	0.3429						22.8510	63.9617	7.3454	16.2324
1. Energy industries	5615.6123	0.1108	0.0244						9.5174	3.1362	0.2233	10.5370
2. Manufacturing industries and construction	546.9038	0.0181	0.0023						0.9180	0.7370	0.2841	0.3965
3. Transport	1515.9813	0.4010	0.0976						4.2427	23.8049	2.9428	0.2299
4. Other sectors	2502.5306	1.7835	0.2165						7.8855	35.7839	3.8166	4.8638
5. Other	76.6587	0.0081	0.0020						0.2875	0.4997	0.0785	0.2051
B. Fugitive emissions from fuels	0.4651	23.6428	0.0000						NO	NO	0.4176	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.4651	23.6428	0.0000						NO	NO	0.4176	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**452.0432**	**NO**	**0.0000**	**2.3137**	**NO**	**NO**	**NO**	**NO**	**1.2371**	**3.0011**	**22.3411**	**0.4833**
A. Mineral industry	376.6116								1.1071	0.9721	0.0096	0.4327
B. Chemical industry	NO	NO	NO						NO	NO	0.0068	NO
C. Metal industry	32.3806	NO	NO	NO	NO	NO	NO	NO	0.1054	1.3781	0.0401	0.0486
D. Non-energy products from fuels and solvent use	42.0528	NO	NO						0.0040	0.0227	14.1331	0.0020
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				2.3137	NO	NO	NO	NO				
G. Other product manufacture and use	0.9982	NO	0.0000	NO	NO	NO	NO	NO	0.0205	0.6281	0.4537	NO
H. Other									NO	NO	7.6977	NO
3. Agriculture	**1.0992**	**57.3905**	**4.6643**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		51.3040										
B. Manure management		6.0866	2.0035								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.6607									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	1.0992											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-2119.5658**	**0.1075**	**0.9134**						**0.0995**	**3.6610**	**NO, NE**	
A. Forest land	-2232.2854	0.0002	0.0000						0.0001	0.0053	NO, NE	
B. Cropland	1656.8247	0.1073	0.0028						0.0993	3.6556	NO	
C. Grassland	-1400.8607	NE	NE						NE	NE	NE	
D. Wetlands	-413.0332	NE	NE						NE	NE	NE	
E. Settlements	100.7954	NO, NE	0.9106						NO, NE	NO, NE	NO, NE	
F. Other land	188.2363	NE	NE						NE	NE	NE	
G. Harvested wood products	-19.2429											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**15.0456**	**60.0710**	**0.2376**						**0.1505**	**2.6305**	**1.1751**	**0.0054**
A. Solid waste disposal	NA, NO	48.1521							NA, NO	NA, NO	1.0984	
B. Biological treatment of solid waste		0.0245	0.0015						NO, NE	0.0034	NO, NE	
C. Incineration and open burning of waste	15.0456	0.3083	0.0054						0.1505	2.6271	0.0581	0.0054
D. Wastewater treatment and discharge		11.5861	0.2307						NA, IE	NA, IE	0.0186	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**66.1918**	**0.0054**	**0.0021**						**0.2640**	**0.1777**	**0.0937**	**0.0210**
Aviation	66.1918	0.0054	0.0021						0.2640	0.1777	0.0937	0.0210
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	291.1280											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.9502**									
Indirect CO_2	**32.0911**											

Annex 1-9: Inventory Year - 1998

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**7133.9405**	**137.9347**	**5.9726**	**3.1372**	**NO**	**NO**	**NO**	**NO**	**20.5036**	**57.1055**	**27.4305**	**12.4779**
1. Energy	**8894.2769**	**23.8409**	**0.2674**						**19.1724**	**48.6044**	**6.2399**	**12.0244**
A. Fuel combustion Reference approach	8841.4250											
Sectoral approach	8893.8495	1.7160	0.2674						19.1724	48.6044	5.8483	12.0244
1. Energy industries	4836.6106	0.0962	0.0190						8.1103	2.7791	0.1972	7.9288
2. Manufacturing industries and construction	542.6603	0.0186	0.0024						1.0266	0.7118	0.3020	0.3295
3. Transport	1363.0743	0.4035	0.0827						3.4803	20.7338	2.5523	0.1945
4. Other sectors	2078.6760	1.1889	0.1612						6.1632	23.7935	2.6926	3.3628
5. Other	72.8283	0.0088	0.0021						0.3919	0.5862	0.1041	0.2088
B. Fugitive emissions from fuels	0.4274	22.1250	0.0000						NO	NO	0.3916	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.4274	22.1250	0.0000						NO	NO	0.3916	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**375.0296**	**NO**	**0.0000**	**3.1372**	**NO**	**NO**	**NO**	**NO**	**1.0896**	**2.5238**	**19.9607**	**0.4481**
A. Mineral industry	307.9930								0.9767	0.7878	0.0078	0.4034
B. Chemical industry	NO	NO	NO						NO	NO	0.0066	NO
C. Metal industry	28.6822	NO	NO	NO	NO	NO	NO	NO	0.0934	1.2208	0.0371	0.0431
D. Non-energy products from fuels and solvent use	37.6084	NO	NO						0.0033	0.0185	13.2678	0.0016
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				3.1372	NO	NO	NO	NO				
G. Other product manufacture and use	0.7460	NO	0.0000	NO	NO	NO	NO	NO	0.0162	0.4967	0.3391	NO
H. Other									NO	NO	6.3022	NO
3. Agriculture	**0.2721**	**54.9163**	**4.5098**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		49.8079										
B. Manure management		5.1085	1.9398								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.5700									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.2721											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-2150.7175**	**0.0989**	**0.9542**						**0.0909**	**3.3430**	**NO, NE**	
A. Forest land	-2288.4857	0.0023	0.0001						0.0015	0.0529	NO, NE	
B. Cropland	1683.9458	0.0966	0.0025						0.0894	3.2900	NO	
C. Grassland	-1436.2698	NE	NE						NE	NE	NE	
D. Wetlands	-384.8303	NE	NE						NE	NE	NE	
E. Settlements	99.0440	NO, NE	0.9516						NO, NE	NO, NE	NO, NE	
F. Other land	185.0077	NE	NE						NE	NE	NE	
G. Harvested wood products	-9.1293											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**15.0794**	**59.0786**	**0.2412**						**0.1508**	**2.6344**	**1.2299**	**0.0054**
A. Solid waste disposal	NA, NO	47.5742							NA, NO	NA, NO	1.1562	
B. Biological treatment of solid waste		0.0248	0.0015						NO, NE	0.0035	NO, NE	
C. Incineration and open burning of waste	15.0794	0.3089	0.0054						0.1508	2.6310	0.0582	0.0054
D. Wastewater treatment and discharge		11.1707	0.2342						NA, IE	NA, IE	0.0155	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**53.5923**	**0.0041**	**0.0017**						**0.2144**	**0.1439**	**0.0721**	**0.0170**
Aviation	53.5923	0.0041	0.0017						0.2144	0.1439	0.0721	0.0170
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	269.0120											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.9001**									
Indirect CO_2	**29.9352**											

Annex 1-10: Inventory Year - 1999

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**5387.5857**	**133.5823**	**5.5272**	**4.0002**	**NO**	**NO**	**NO**	**NO**	**14.7356**	**41.8414**	**23.2289**	**5.8630**
1. Energy	**6903.7219**	**23.9591**	**0.1824**						**13.5355**	**36.4419**	**4.8899**	**5.4709**
A. Fuel combustion Reference approach	6841.6529											
Sectoral approach	6903.3288	1.5546	0.1824						13.5355	36.4419	4.4892	5.4709
1. Energy industries	3660.2540	0.0727	0.0088						5.8881	2.3787	0.1638	2.1288
2. Manufacturing industries and construction	473.8274	0.0129	0.0015						0.7360	0.4969	0.2249	0.2275
3. Transport	910.6886	0.2475	0.0514						2.0599	11.9843	1.4854	0.1366
4. Other sectors	1809.4024	1.2151	0.1190						4.7057	21.2190	2.5511	2.8154
5. Other	49.1563	0.0065	0.0016						0.1458	0.3630	0.0640	0.1625
B. Fugitive emissions from fuels	0.3931	22.4045	0.0000						NO	NO	0.4007	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.3931	22.4045	0.0000						NO	NO	0.4007	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**337.9160**	**NO**	**0.0000**	**4.0002**	**NO**	**NO**	**NO**	**NO**	**0.9619**	**2.6451**	**17.0520**	**0.3868**
A. Mineral industry	271.3959								0.8365	0.6973	0.0076	0.3375
B. Chemical industry	NO	NO	NO						NO	NO	0.0050	NO
C. Metal industry	31.7942	NO	NO	NO	NO	NO	NO	NO	0.1035	1.3533	0.0408	0.0478
D. Non-energy products from fuels and solvent use	34.0839	NO	NO						0.0031	0.0172	12.7587	0.0015
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				4.0002	NO	NO	NO	NO				
G. Other product manufacture and use	0.6421	NO	0.0000	NO	NO	NO	NO	NO	0.0189	0.5773	0.2919	NO
H. Other									NO	NO	3.9481	NO
3. Agriculture	**0.0034**	**50.5648**	**4.1226**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		46.0727										
B. Manure management		4.4921	1.7608								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.3619									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.0034											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1869.0627**	**0.0956**	**0.9861**						**0.0880**	**0.1265**	**NO, NE**	
A. Forest land	-2336.8468	0.0017	0.0001						0.0011	0.0396	NO, NE	
B. Cropland	1702.1754	0.0938	0.0024						0.0869	0.0869	NO	
C. Grassland	-1433.2865	NE	NE						NE	NE	NE	
D. Wetlands	-356.6274	NE	NE						NE	NE	NE	
E. Settlements	111.8259	NO, NE	0.9836						NO, NE	NO, NE	NO, NE	
F. Other land	425.1554	NE	NE						NE	NE	NE	
G. Harvested wood products	18.5414											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**15.0071**	**58.9628**	**0.2360**						**0.1502**	**2.6281**	**1.2870**	**0.0053**
A. Solid waste disposal	NA, NO	47.8091							NA, NO	NA, NO	1.2171	
B. Biological treatment of solid waste		0.0232	0.0014						NO, NE	0.0033	NO, NE	
C. Incineration and open burning of waste	15.0071	0.3077	0.0054						0.1502	2.6248	0.0581	0.0053
D. Wastewater treatment and discharge		10.8228	0.2292						NA, IE	NA, IE	0.0119	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**63.0390**	**0.0040**	**0.0020**						**0.2517**	**0.1574**	**0.0796**	**0.0200**
Aviation	63.0390	0.0040	0.0020						0.2517	0.1574	0.0796	0.0200
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	266.1120											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.8146**									
Indirect CO_2	**28.7113**											

Annex 1-11: Inventory Year - 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			($kt\ CO_2$ equivalent)			(kt)					
Total national emissions and removals	**4362.1880**	**130.4108**	**5.2269**	**5.1199**	**NO**	**NO**	**NO**	**NO**	**13.1953**	**40.6761**	**22.7982**	**4.4903**
1. Energy	**6188.5808**	**25.5633**	**0.1627**						**11.9074**	**34.0667**	**4.7767**	**3.9685**
A. Fuel combustion Reference approach	6126.5290											
Sectoral approach	6188.2049	1.5379	0.1627						11.9074	34.0667	4.3426	3.9685
1. Energy industries	3155.7517	0.0610	0.0069						5.0439	2.1204	0.1437	0.9753
2. Manufacturing industries and construction	519.5881	0.0119	0.0014						0.7914	0.4871	0.2261	0.2274
3. Transport	982.3588	0.2520	0.0574						2.1165	11.8853	1.4687	0.1582
4. Other sectors	1494.1182	1.2084	0.0960						3.8246	19.3419	2.4620	2.4553
5. Other	36.3881	0.0046	0.0010						0.1311	0.2320	0.0421	0.1523
B. Fugitive emissions from fuels	0.3759	24.0254	0.0000						NO	NO	0.4341	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.3759	24.0254	0.0000						NO	NO	0.4341	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**309.3065**	**NO**	**0.0000**	**5.1199**	**NO**	**NO**	**NO**	**NO**	**1.1041**	**2.7463**	**16.6713**	**0.5164**
A. Mineral industry	239.4427								0.9636	0.5762	0.0068	0.4607
B. Chemical industry	NO	NO	NO						NO	NO	0.0073	NO
C. Metal industry	36.2689	NO	NO	NO	NO	NO	NO	NO	0.1181	1.5438	0.0462	0.0545
D. Non-energy products from fuels and solvent use	32.6395	NO	NO						0.0025	0.0139	12.5638	0.0012
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				5.1199	NO	NO	NO	NO				
G. Other product manufacture and use	0.9554	NO	0.0000	NO	NO	NO	NO	NO	0.0200	0.6124	0.4343	NO
H. Other									NO	NO	3.6129	NO
3. Agriculture	**0.4397**	**46.8318**	**3.8285**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		43.4313										
B. Manure management		3.4005	1.5712								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.2573									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.4397											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-2151.1356**	**0.0365**	**0.9944**						**0.0338**	**1.2427**	**NO, NE**	
A. Forest land	-2307.4384	0.0001	0.0000						0.0000	0.0014	NO, NE	
B. Cropland	1492.1681	0.0364	0.0009						0.0337	1.2413	NO	
C. Grassland	-1291.9495	NE	NE						NE	NE	NE	
D. Wetlands	-328.4245	NE	NE						NE	NE	NE	
E. Settlements	100.1768	NO, NE	0.9934						NO, NE	NO, NE	NO, NE	
F. Other land	178.5246	NE	NE						NE	NE	NE	
G. Harvested wood products	5.8073											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**14.9965**	**57.9792**	**0.2413**						**0.1500**	**2.6204**	**1.3503**	**0.0054**
A. Solid waste disposal	NA, NO	46.7813							NA, NO	NA, NO	1.2812	
B. Biological treatment of solid waste		0.0210	0.0013						NO, NE	0.0029	NO, NE	
C. Incineration and open burning of waste	14.9965	0.3073	0.0054						0.1500	2.6175	0.0579	0.0054
D. Wastewater treatment and discharge		10.8697	0.2346						NA, IE	NA, IE	0.0111	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**63.0779**	**0.0043**	**0.0020**						**0.2591**	**0.1688**	**0.0773**	**0.0200**
Aviation	63.0779	0.0043	0.0020						0.2591	0.1688	0.0773	0.0200
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	272.3720											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.7505**									
Indirect CO_2	**28.5957**											

Annex 1-12: Inventory Year - 2001

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**5348.8609**	**129.7683**	**5.4957**	**6.8681**	**NO**	**NO**	**NO**	**NO**	**14.4422**	**40.0992**	**24.5445**	**3.9993**
1. Energy	**6818.6569**	**25.2353**	**0.1673**						**13.1876**	**32.9406**	**4.6812**	**3.5081**
A. Fuel combustion Reference approach	6768.9070											
Sectoral approach	6818.2477	1.4145	0.1673						13.1876	32.9406	4.2534	3.5081
1. Energy industries	3677.7189	0.0726	0.0080						5.8773	2.5004	0.1689	0.8801
2. Manufacturing industries and construction	601.1675	0.0147	0.0019						1.1500	0.5744	0.2598	0.2825
3. Transport	1061.8643	0.2668	0.0634						2.2613	12.7722	1.5702	0.1332
4. Other sectors	1434.1009	1.0554	0.0928						3.7425	16.7367	2.1939	2.1063
5. Other	43.3961	0.0050	0.0012						0.1565	0.3569	0.0605	0.1061
B. Fugitive emissions from fuels	0.4092	23.8208	0.0000						NO	NO	0.4278	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.4092	23.8208	0.0000						NO	NO	0.4278	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**311.7431**	**NO**	**0.0000**	**6.8681**	**NO**	**NO**	**NO**	**NO**	**1.0590**	**2.8557**	**18.4464**	**0.4857**
A. Mineral industry	235.8758								0.9098	0.5713	0.0067	0.4262
B. Chemical industry	NO	NO	NO						NO	NO	0.0080	NO
C. Metal industry	38.6274	NO	NO	NO	NO	NO	NO	NO	0.1257	1.6441	0.0500	0.0580
D. Non-energy products from fuels and solvent use	36.4195	NO	NO						0.0031	0.0174	14.0195	0.0015
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				6.8681	NO	NO	NO	NO				
G. Other product manufacture and use	0.8204	NO	0.0000	NO	NO	NO	NO	NO	0.0203	0.6229	0.3729	NO
H. Other									NO	NO	3.9893	NO
3. Agriculture	**0.1496**	**47.5675**	**4.0894**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		44.1309										
B. Manure management		3.4366	1.5998								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.4896									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.1496											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1796.6576**	**0.0508**	**0.9951**						**0.0459**	**1.6868**	**NO, NE**	
A. Forest land	-2273.7027	0.0039	0.0002						0.0025	0.0896	NO, NE	
B. Cropland	1828.5659	0.0469	0.0012						0.0434	1.5972	NO	
C. Grassland	-1290.6541	NE	NE						NE	NE	NE	
D. Wetlands	-300.2217	NE	NE						NE	NE	NE	
E. Settlements	67.0898	NO, NE	0.9937						NO, NE	NO, NE	NO, NE	
F. Other land	178.5246	NE	NE						NE	NE	NE	
G. Harvested wood products	-6.2594											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**14.9689**	**56.9146**	**0.2438**						**0.1497**	**2.6161**	**1.4170**	**0.0054**
A. Solid waste disposal	NA, NO	45.4990							NA, NO	NA, NO	1.3485	
B. Biological treatment of solid waste		0.0190	0.0011						NO, NE	0.0027	NO, NE	
C. Incineration and open burning of waste	14.9689	0.3067	0.0054						0.1497	2.6134	0.0578	0.0054
D. Wastewater treatment and discharge		11.0899	0.2373						NA, IE	NA, IE	0.0106	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**50.4863**	**0.0039**	**0.0016**						**0.1936**	**0.1468**	**0.0630**	**0.0160**
Aviation	50.4863	0.0039	0.0016						0.1936	0.1468	0.0630	0.0160
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	282.2280											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.8021**									
Indirect CO_2	**31.6632**											

Annex 1-13: Inventory Year - 2002

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**5028.2150**	**132.7197**	**5.6969**	**9.1227**	**NO**	**NO**	**NO**	**NO**	**14.8025**	**45.0642**	**27.0803**	**4.8266**
1. Energy	**6537.0389**	**27.6591**	**0.2146**						**13.4336**	**40.0559**	**5.7445**	**4.2675**
A. Fuel combustion Reference approach	6478.0567											
Sectoral approach	6536.6488	1.7766	0.2146						13.4336	40.0559	5.2748	4.2675
1. Energy industries	2933.2101	0.0614	0.0069						4.6959	2.0055	0.1356	0.6884
2. Manufacturing industries and construction	410.3969	0.0096	0.0011						0.6019	0.4089	0.1809	0.2019
3. Transport	1405.7644	0.3418	0.0947						3.5165	16.6121	2.0849	0.1735
4. Other sectors	1747.8245	1.3555	0.1103						4.4782	20.7434	2.8052	3.0494
5. Other	39.4529	0.0083	0.0016						0.1411	0.2860	0.0683	0.1543
B. Fugitive emissions from fuels	0.3901	25.8825	0.0000						NO	NO	0.4697	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	0.3901	25.8825	0.0000						NO	NO	0.4697	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**359.6162**	**NO**	**0.0000**	**9.1227**	**NO**	**NO**	**NO**	**NO**	**1.2104**	**2.0646**	**19.7693**	**0.5537**
A. Mineral industry	299.9546								1.1263	0.7266	0.0084	0.5216
B. Chemical industry	NO	NO	NO						NO	NO	0.0104	NO
C. Metal industry	20.5030	NO	NO	NO	NO	NO	NO	NO	0.0667	0.8725	0.0263	0.0308
D. Non-energy products from fuels and solvent use	38.3743	NO	NO						0.0027	0.0153	14.8206	0.0013
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				9.1227	NO	NO	NO	NO				
G. Other product manufacture and use	0.7843	NO	0.0000	NO	NO	NO	NO	NO	0.0147	0.4503	0.3565	NO
H. Other									NO	NO	4.5471	NO
3. Agriculture	**0.0470**	**48.6223**	**4.2357**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		45.0244										
B. Manure management		3.5979	1.6116								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.6241									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.0470											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1883.4274**	**0.0106**	**0.9965**						**0.0092**	**0.3385**	**NO, NE**	
A. Forest land	-2267.6159	0.0021	0.0001						0.0013	0.0481	NO, NE	
B. Cropland	1424.6996	0.0085	0.0002						0.0079	0.2904	NO	
C. Grassland	-1235.1380	NE	NE						NE	NE	NE	
D. Wetlands	-272.0188	NE	NE						NE	NE	NE	
E. Settlements	67.0898	NO, NE	0.9961						NO, NE	NO, NE	NO, NE	
F. Other land	456.2431	NE	NE						NE	NE	NE	
G. Harvested wood products	-56.6873											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**14.9402**	**56.4277**	**0.2500**						**0.1493**	**2.6051**	**1.5665**	**0.0054**
A. Solid waste disposal	NA, NO	44.3224							NA, NO	NA, NO	1.4984	
B. Biological treatment of solid waste		0.0209	0.0013						NO, NE	0.0029	NO, NE	
C. Incineration and open burning of waste	14.9402	0.3059	0.0054						0.1493	2.6022	0.0576	0.0054
D. Wastewater treatment and discharge		11.7785	0.2434						NA, IE	NA, IE	0.0104	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**59.9541**	**0.0036**	**0.0020**						**0.2413**	**0.1619**	**0.0653**	**0.0190**
Aviation	59.9541	0.0036	0.0020						0.2413	0.1619	0.0653	0.0190
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	322.0800											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.8378**									
Indirect CO_2	**33.3896**											

Annex 1-14: Inventory Year - 2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**5767.7437**	**129.0376**	**5.2042**	**12.1632**	**NO**	**NO**	**0.0000**	**NO**	**15.0290**	**54.0127**	**28.0904**	**6.3041**
1. Energy	**7178.5944**	**29.3273**	**0.2087**						**13.6324**	**48.5365**	**6.7927**	**5.7410**
A. Fuel combustion Reference approach	7143.6135											
Sectoral approach	7177.5353	2.2688	0.2087						13.6324	48.5365	6.2607	5.7410
1. Energy industries	3036.7494	0.0626	0.0069						4.8529	2.0895	0.1407	0.5251
2. Manufacturing industries and construction	438.8946	0.0096	0.0011						0.6697	0.3867	0.1868	0.1729
3. Transport	1588.8147	0.4004	0.0912						3.2350	19.3977	2.3730	0.2110
4. Other sectors	2084.6537	1.7920	0.1085						4.7321	26.3815	3.5078	4.7236
5. Other	28.4228	0.0043	0.0009						0.1427	0.2811	0.0524	0.1085
B. Fugitive emissions from fuels	1.0592	27.0585	0.0000						NO	NO	0.5320	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.0592	27.0585	0.0000						NO	NO	0.5320	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**384.9507**	**NO**	**0.0000**	**12.1632**	**NO**	**NO**	**0.0000**	**NO**	**1.2463**	**2.8260**	**19.6527**	**0.5577**
A. Mineral industry	307.6352								1.1103	0.7495	0.0091	0.5032
B. Chemical industry	NO	NO	NO						NO	NO	0.0123	NO
C. Metal industry	35.4283	NO	NO	NO	NO	NO	NO	NO	0.1153	1.5074	0.0456	0.0532
D. Non-energy products from fuels and solvent use	40.9252	NO	NO						0.0026	0.0145	14.8735	0.0013
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				12.1632	NO	NO	NO	NO				
G. Other product manufacture and use	0.9620	NO	0.0000	NO	NO	NO	0.0000	NO	0.0181	0.5545	0.4373	NO
H. Other									NO	NO	4.2749	NO
3. Agriculture	**0.2381**	**44.4885**	**3.7660**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		41.1415										
B. Manure management		3.3469	1.5302								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.2358									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.2381											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1810.9497**	**0.0024**	**0.9877**						**0.0016**	**0.0573**	**NO, NE**	
A. Forest land	-2270.1176	0.0023	0.0001						0.0015	0.0526	NO, NE	
B. Cropland	1505.7575	0.0001	0.0000						0.0001	0.0046	NO	
C. Grassland	-1007.1842	NE	NE						NE	NE	NE	
D. Wetlands	-243.8159	NE	NE						NE	NE	NE	
E. Settlements	67.8615	NO, NE	0.9876						NO, NE	NO, NE	NO, NE	
F. Other land	201.6619	NE	NE						NE	NE	NE	
G. Harvested wood products	-65.1129											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**14.9100**	**55.2194**	**0.2418**						**0.1488**	**2.5930**	**1.6449**	**0.0054**
A. Solid waste disposal	NA, NO	42.8093							NA, NO	NA, NO	1.5772	
B. Biological treatment of solid waste		0.0219	0.0013						NO, NE	0.0031	NO, NE	
C. Incineration and open burning of waste	14.9100	0.3050	0.0054						0.1488	2.5899	0.0574	0.0054
D. Wastewater treatment and discharge		12.0831	0.2351						NA, IE	NA, IE	0.0103	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**34.7676**	**0.0035**	**0.0012**						**0.1317**	**0.1223**	**0.0403**	**0.0110**
Aviation	34.7676	0.0035	0.0012						0.1317	0.1223	0.0403	0.0110
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	373.5760											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.7455**									
Indirect CO_2	**33.6837**											

Annex 1-15: Inventory Year - 2004

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**6118.3768**	**127.7492**	**5.4118**	**16.0027**	**NO**	**NO**	**0.0000**	**NO**	**16.1297**	**51.3990**	**39.7519**	**5.4639**
1. Energy	**7629.0126**	**31.3493**	**0.2113**						**14.5781**	**45.4715**	**6.8425**	**4.8407**
A. Fuel combustion Reference approach	7593.9863											
Sectoral approach	7627.9081	1.9794	0.2113						14.5781	45.4715	5.9870	4.8407
1. Energy industries	3109.0519	0.0640	0.0071						4.9687	2.1439	0.1442	0.4936
2. Manufacturing industries and construction	443.9172	0.0115	0.0014						0.9313	0.4457	0.2047	0.2038
3. Transport	1787.2739	0.4316	0.1062						3.7615	21.1158	2.6011	0.2464
4. Other sectors	2260.0278	1.4692	0.0957						4.7005	21.4786	2.9899	3.8578
5. Other	27.6373	0.0031	0.0010						4.7005	21.4786	2.9899	3.8578
B. Fugitive emissions from fuels	1.1045	29.3699	0.0000						NO	NO	0.8554	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.1045	29.3699	0.0000						NO	NO	0.8554	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**454.6376**	**NO**	**0.0001**	**16.0027**	**NO**	**NO**	**0.0000**	**NO**	**1.3978**	**3.2083**	**31.1818**	**0.6178**
A. Mineral industry	348.9485								1.2390	0.8629	0.0105	0.5529
B. Chemical industry	NO	NO	NO						NO	NO	0.0129	NO
C. Metal industry	40.5084	NO	NO	NO	NO	NO	NO	NO	0.1318	1.7236	0.0522	0.0608
D. Non-energy products from fuels and solvent use	64.1303	NO	NO						0.0082	0.0459	25.3328	0.0041
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				16.0027	NO	NO	NO	NO				
G. Other product manufacture and use	1.0504	NO	0.0001	NO	NO	NO	0.0000	NO	0.0188	0.5759	0.4774	NO
H. Other									NO	NO	5.2960	NO
3. Agriculture	**0.3669**	**41.7088**	**3.9964**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		38.4568										
B. Manure management		3.2519	1.4804								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.5160									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.3669											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1980.5023**	**0.0080**	**0.9736**						**0.0057**	**0.1401**	**NO, NE**	
A. Forest land	-2334.7768	0.0061	0.0003						0.0039	0.1383	NO, NE	
B. Cropland	1466.3473	0.0020	0.0001						0.0018	0.0018	NO	
C. Grassland	-1120.4767	NE	NE						NE	NE	NE	
D. Wetlands	-215.6130	NE	NE						NE	NE	NE	
E. Settlements	53.6737	NO, NE	0.9732						NO, NE	NO, NE	NO, NE	
F. Other land	223.8177	NE	NE						NE	NE	NE	
G. Harvested wood products	-53.4745											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**14.8621**	**54.6831**	**0.2305**						**0.1481**	**2.5791**	**1.7277**	**0.0054**
A. Solid waste disposal	NA, NO	42.2061							NA, NO	NA, NO	1.6602	
B. Biological treatment of solid waste		0.0230	0.0014						NO, NE	0.0032	NO, NE	
C. Incineration and open burning of waste	14.8621	0.3039	0.0053						0.1481	2.5759	0.0572	0.0054
D. Wastewater treatment and discharge		12.1502	0.2238						NA, IE	NA, IE	0.0103	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**34.7903**	**0.0035**	**0.0012**						**0.1283**	**0.1296**	**0.0344**	**0.0110**
Aviation	34.7903	0.0035	0.0012						0.1283	0.1296	0.0344	0.0110
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	307.6800											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.7901**									
Indirect CO_2	**56.7824**											

Annex 1-16: Inventory Year - 2005

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**6754.6895**	**128.3358**	**5.5155**	**22.5106**	**NO**	**NO**	**0.0000**	**NO**	**17.1480**	**53.4840**	**42.3738**	**5.1702**
1. Energy	**7874.0484**	**33.0942**	**0.2113**						**15.3208**	**47.1427**	**6.9429**	**4.4388**
A. Fuel combustion Reference approach	7835.9210											
Sectoral approach	7872.9265	2.0769	0.2113						15.3208	47.1427	6.1778	4.4388
1. Energy industries	3231.6708	0.0661	0.0073						5.1612	2.2323	0.1500	0.4532
2. Manufacturing industries and construction	574.4257	0.0133	0.0015						1.4886	0.4932	0.2545	0.1904
3. Transport	1821.8133	0.4397	0.1150						4.1042	21.5603	2.6742	0.0452
4. Other sectors	2219.0765	1.5553	0.0866						4.3367	22.7299	3.0691	3.7081
5. Other	25.9403	0.0024	0.0010						0.2301	0.1272	0.0300	0.0418
B. Fugitive emissions from fuels	1.1219	31.0174	0.0000						NO	NO	0.7651	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.1219	31.0174	0.0000						NO	NO	0.7651	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**548.7488**	**NO**	**0.0001**	**22.5106**	**NO**	**NO**	**0.0000**	**NO**	**1.6740**	**3.4998**	**33.6172**	**0.7262**
A. Mineral industry	437.4573								1.5114	1.1045	0.0134	0.6594
B. Chemical industry	NO	NO	NO						NO	NO	0.0149	NO
C. Metal industry	41.9358	NO	NO	NO	NO	NO	NO	NO	0.1364	1.7839	0.0545	0.0630
D. Non-energy products from fuels and solvent use	68.1910	NO	NO						0.0077	0.0431	27.2264	0.0038
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				22.5106	NO	NO	NO	NO				
G. Other product manufacture and use	1.1646	NO	0.0001	NO	NO	NO	0.0000	NO	0.0186	0.5683	0.5294	NO
H. Other									NO	NO	5.7786	NO
3. Agriculture	**0.1739**	**40.3670**	**4.1308**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		36.9611										
B. Manure management		3.4059	1.5820								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.5488									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.1739											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1682.7486**	**0.0099**	**0.9615**						**0.0090**	**0.3317**	**NO, NE**	
A. Forest land	-2409.5185	0.0006	0.0000						0.0004	0.0132	NO, NE	
B. Cropland	1543.2389	0.0093	0.0002						0.0087	0.3185	NO	
C. Grassland	-1058.1239	NE	NE						NE	NE	NE	
D. Wetlands	-187.4101	NE	NE						NE	NE	NE	
E. Settlements	53.6737	NO, NE	0.9613						NO, NE	NO, NE	NO, NE	
F. Other land	416.5012	NE	NE						NE	NE	NE	
G. Harvested wood products	-41.1098											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**14.4670**	**54.8647**	**0.2118**						**0.1442**	**2.5098**	**1.8136**	**0.0053**
A. Solid waste disposal	NA, NO	42.5723							NA, NO	NA, NO	1.7476	
B. Biological treatment of solid waste		0.0241	0.0014						NO, NE	0.0034	NO, NE	
C. Incineration and open burning of waste	14.4670	0.2957	0.0052						0.1442	2.5064	0.0556	0.0053
D. Wastewater treatment and discharge		11.9725	0.2051						NA, IE	NA, IE	0.0103	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**37.9260**	**0.0035**	**0.0013**						**0.1433**	**0.1362**	**0.0373**	**0.0120**
Aviation	37.9260	0.0035	0.0013						0.1433	0.1362	0.0373	0.0120
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	307.3920											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.8200**									
Indirect CO_2	**61.0627**											

Annex 1-17: Inventory Year - 2006

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**5971.6037**	**123.1947**	**5.4102**	**33.2493**	**0.0231**	**NO**	**0.0000**	**NO**	**16.0044**	**53.9974**	**47.7740**	**5.3193**
1. Energy	**7115.3279**	**29.6025**	**0.2164**						**14.0428**	**48.1466**	**7.0634**	**4.5650**
A. Fuel combustion Reference approach	7077.0963											
Sectoral approach	7114.1019	2.2722	0.2164						14.0428	48.1466	6.4042	4.5650
1. Energy industries	2494.5441	0.0518	0.0057						3.9870	1.7266	0.1161	0.3443
2. Manufacturing industries and construction	634.7036	0.0134	0.0015						1.2181	0.4873	0.2692	0.1704
3. Transport	1742.1498	0.4060	0.1198						4.2102	19.7807	2.4731	0.0436
4. Other sectors	2203.6648	1.7981	0.0881						4.2950	25.7482	3.4823	3.8856
5. Other	39.0397	0.0029	0.0013						0.3325	0.4037	0.0635	0.1212
B. Fugitive emissions from fuels	1.2260	27.3303	0.0000						NO	NO	0.6592	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.2260	27.3303	0.0000						NO	NO	0.6592	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**643.8927**	**NO**	**0.0001**	**33.2493**	**0.0231**	**NO**	**0.0000**	**NO**	**1.8134**	**3.1294**	**38.8065**	**0.7492**
A. Mineral industry	533.8283								1.6951	1.3597	0.0164	0.7025
B. Chemical industry	NO	NO	NO						NO	NO	0.0130	NO
C. Metal industry	27.0182	NO	NO	NO	NO	NO	NO	NO	0.0879	1.1492	0.0355	0.0406
D. Non-energy products from fuels and solvent use	81.9807	NO	NO						0.0124	0.0697	33.2258	0.0062
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				33.2493	NO	NO	NO	NO				
G. Other product manufacture and use	1.0655	NO	0.0001	NO	0.0231	NO	0.0000	NO	0.0180	0.5508	0.4843	NO
H. Other									NO	NO	5.0313	NO
3. Agriculture	**0.1460**	**39.2652**	**4.0273**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		35.7523										
B. Manure management		3.5129	1.6257								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.4016									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.1460											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1801.8890**	**0.0100**	**0.9483**						**0.0075**	**0.2706**	**NO, NE**	
A. Forest land	-2366.5168	0.0063	0.0003						0.0040	0.1427	NO, NE	
B. Cropland	1577.6205	0.0038	0.0001						0.0035	0.1279	NO	
C. Grassland	-1056.3692	NE	NE						NE	NE	NE	
D. Wetlands	-159.2073	NE	NE						NE	NE	NE	
E. Settlements	53.6737	NO, NE	0.9479						NO, NE	NO, NE	NO, NE	
F. Other land	189.4964	NE	NE						NE	NE	NE	
G. Harvested wood products	-40.5864											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**14.1260**	**54.3169**	**0.2180**						**0.1408**	**2.4509**	**1.9042**	**0.0051**
A. Solid waste disposal	NA, NO	42.4737							NA, NO	NA, NO	1.8395	
B. Biological treatment of solid waste		0.0261	0.0016						NO, NE	0.0037	NO, NE	
C. Incineration and open burning of waste	14.1260	0.2888	0.0051						0.1408	2.4472	0.0543	0.0051
D. Wastewater treatment and discharge		11.5283	0.2114						NA, IE	NA, IE	0.0103	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**37.9241**	**0.0039**	**0.0013**						**0.1428**	**0.1424**	**0.0397**	**0.0120**
Aviation	37.9241	0.0039	0.0013						0.1428	0.1424	0.0397	0.0120
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	361.4360											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.8005**									
Indirect CO_2	**74.1622**											

Annex 1-18: Inventory Year - 2007

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**6165.0995**	**116.3761**	**4.6555**	**44.7889**	**0.0231**	**NO**	**0.0000**	**NO**	**17.0646**	**49.7006**	**47.5842**	**4.0356**
1. Energy	**7254.6164**	**30.8615**	**0.2092**						**14.5286**	**41.5390**	**6.4325**	**3.1267**
A. Fuel combustion Reference approach	7210.1856											
Sectoral approach	7253.3587	1.8076	0.2092						14.5286	41.5390	5.5816	3.1267
1. Energy industries	2894.4441	0.0593	0.0064						4.6191	2.0159	0.1351	0.2335
2. Manufacturing industries and construction	800.8383	0.0156	0.0017						1.8040	0.5048	0.3350	0.0992
3. Transport	1846.8209	0.4275	0.1253						4.3251	20.3245	2.5389	0.0462
4. Other sectors	1666.7458	1.3012	0.0741						3.3949	18.3862	2.5173	2.6494
5. Other	44.5097	0.0039	0.0017						0.3855	0.3075	0.0552	0.0983
B. Fugitive emissions from fuels	1.2577	29.0539	0.0000						NO	NO	0.8509	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.2577	29.0539	0.0000						NO	NO	0.8509	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**890.8914**	**NO**	**NO**	**44.7889**	**0.0231**	**NO**	**0.0000**	**NO**	**2.3583**	**4.3206**	**39.1521**	**0.9039**
A. Mineral industry	766.4702								2.1999	1.9983	0.0245	0.8394
B. Chemical industry	NO	NO	NO						NO	NO	0.0139	NO
C. Metal industry	38.6127	NO	NO	NO	NO	NO	NO	NO	0.1256	1.6426	0.0508	0.0580
D. Non-energy products from fuels and solvent use	84.7433	NO	NO						0.0130	0.0732	34.9915	0.0065
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				44.7889	NO	NO	NO	NO				
G. Other product manufacture and use	1.0652	NO	NO	NO	0.0231	NO	0.0000	NO	0.0198	0.6066	0.4842	NO
H. Other									NO	NO	3.5873	NO
3. Agriculture	**0.2631**	**31.3859**	**3.3103**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		28.8838										
B. Manure management		2.5021	1.2423								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.0680									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.2631											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1994.4386**	**0.0607**	**0.9330**						**0.0405**	**1.4511**	**NO, NE**	
A. Forest land	-2460.3855	0.0546	0.0030						0.0349	1.2432	NO, NE	
B. Cropland	1540.3986	0.0061	0.0002						0.0056	0.2079	NO	
C. Grassland	-1031.2350	NE	NE						NE	NE	NE	
D. Wetlands	-131.0044	NE	NE						NE	NE	NE	
E. Settlements	49.2742	NO, NE	0.9298						NO, NE	NO, NE	NO, NE	
F. Other land	83.1072	NE	NE						NE	NE	NE	
G. Harvested wood products	-44.5936											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**13.7672**	**54.0681**	**0.2031**						**0.1372**	**2.3898**	**1.9996**	**0.0050**
A. Solid waste disposal	NA, NO	42.5929							NA, NO	NA, NO	1.9364	
B. Biological treatment of solid waste		0.0339	0.0020						NO, NE	0.0047	NO, NE	
C. Incineration and open burning of waste	13.7672	0.2814	0.0049						0.1372	2.3851	0.0529	0.0050
D. Wastewater treatment and discharge		11.1599	0.1961						NA, IE	NA, IE	0.0102	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**44.2052**	**0.0027**	**0.0015**						**0.1782**	**0.1296**	**0.0393**	**0.0140**
Aviation	44.2052	0.0027	0.0015						0.1782	0.1296	0.0393	0.0140
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	304.6560											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.6624**									
Indirect CO_2	**78.0464**											

Annex 1-19: Inventory Year - 2008

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**6853.1332**	**115.7752**	**4.9716**	**57.3627**	**0.0288**	**NO**	**0.0000**	**NO**	**24.4671**	**51.5065**	**41.0900**	**5.6582**
1. Energy	**7554.7011**	**30.7785**	**0.2128**						**21.7647**	**43.8150**	**6.9585**	**4.7111**
A. Fuel combustion Reference approach	7510.2532											
Sectoral approach	7553.4263	1.8799	0.2128						21.7647	43.8150	5.8303	4.7111
1. Energy industries	2997.3662	0.0655	0.0072						4.7979	2.0911	0.1406	0.3428
2. Manufacturing industries and construction	885.0132	0.0337	0.0045						8.9704	2.2677	0.4690	1.8481
3. Transport	1950.0498	0.4512	0.1272						4.3022	20.8778	2.5997	0.0485
4. Other sectors	1677.3708	1.3260	0.0723						3.3719	18.2724	2.5708	2.3550
5. Other	43.6263	0.0036	0.0015						0.3223	0.3060	0.0503	0.1167
B. Fugitive emissions from fuels	1.2748	28.8986	0.0000						NO	NO	1.1281	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.2748	28.8986	0.0000						NO	NO	1.1281	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**966.3539**	**NO**	**NO**	**57.3627**	**0.0288**	**NO**	**0.0000**	**NO**	**2.5411**	**4.3540**	**32.0314**	**0.9421**
A. Mineral industry	863.1338								2.4014	2.2832	0.0277	0.8853
B. Chemical industry	NO	NO	NO						NO	NO	0.0122	NO
C. Metal industry	35.4118	NO	NO	NO	NO	NO	NO	NO	0.1152	1.5064	0.0465	0.0532
D. Non-energy products from fuels and solvent use	66.7047	NO	NO						0.0075	0.0427	26.5891	0.0037
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				57.3627	NO	NO	NO	NO				
G. Other product manufacture and use	1.1036	NO	NO	NO	0.0288	NO	0.0000	NO	0.0170	0.5217	0.5016	NO
H. Other									NO	NO	4.8542	NO
3. Agriculture	**0.8505**	**30.0651**	**3.6588**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		27.5714										
B. Manure management		2.4937	1.2244								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.4344									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.8505											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1682.2257**	**0.0308**	**0.9128**						**0.0274**	**1.0067**	**NO, NE**	
A. Forest land	-2462.7874	0.0038	0.0002						0.0024	0.0864	NO, NE	
B. Cropland	1510.8422	0.0270	0.0007						0.0250	0.9203	NO	
C. Grassland	-932.1498	NE	NE						NE	NE	NE	
D. Wetlands	-102.8015	NE	NE						NE	NE	NE	
E. Settlements	49.2742	NO, NE	0.9119						NO, NE	NO, NE	NO, NE	
F. Other land	291.0044	NE	NE						NE	NE	NE	
G. Harvested wood products	-35.6078											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**13.4533**	**54.9007**	**0.1871**						**0.1339**	**2.3308**	**2.1002**	**0.0049**
A. Solid waste disposal	NA, NO	43.3679							NA, NO	NA, NO	2.0383	
B. Biological treatment of solid waste		0.0401	0.0024						NO, NE	0.0056	NO, NE	
C. Incineration and open burning of waste	13.4533	0.2748	0.0048						0.1339	2.3252	0.0517	0.0049
D. Wastewater treatment and discharge		11.2179	0.1799						NA, IE	NA, IE	0.0102	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**44.1680**	**0.0016**	**0.0014**						**0.1855**	**0.1080**	**0.0365**	**0.0140**
Aviation	44.1680	0.0016	0.0014						0.1855	0.1080	0.0365	0.0140
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	352.4520											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.7322**									
Indirect CO_2	**59.5995**											

Annex 1-20: Inventory Year - 2009

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)					(kt)			
Total national emissions and removals	**7284.4315**	**112.6729**	**4.9657**	**67.4807**	**0.0288**	**NO**	**0.0000**	**NO**	**15.5979**	**49.0749**	**35.6733**	**5.1965**
1. Energy	**8095.5552**	**25.9141**	**0.1933**						**14.1829**	**44.1050**	**6.8238**	**4.6784**
A. Fuel combustion Reference approach	8051.1089											
Sectoral approach	8094.2820	1.9968	0.1933						14.1829	44.1050	5.7115	4.6784
1. Energy industries	3844.8870	0.0835	0.0093						6.1595	2.6604	0.1794	0.6695
2. Manufacturing industries and construction	494.2397	0.0215	0.0029						0.7591	1.5897	0.2773	1.3676
3. Transport	1919.7221	0.4576	0.1112						3.6631	20.7880	2.5446	0.0046
4. Other sectors	1824.9424	1.4331	0.0696						3.4994	18.9129	2.6852	2.6186
5. Other	10.4909	0.0011	0.0003						0.1018	0.1540	0.0251	0.0182
B. Fugitive emissions from fuels	1.2732	23.9173	0.0000						NO	NO	1.1123	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.2732	23.9173	0.0000						NO	NO	1.1123	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**461.4652**	**NO**	**NO**	**67.4807**	**0.0288**	**NO**	**0.0000**	**NO**	**1.2752**	**2.3712**	**26.6433**	**0.5133**
A. Mineral industry	386.0179								1.1937	0.9874	0.0123	0.4849
B. Chemical industry	NO	NO	NO						NO	NO	0.0100	NO
C. Metal industry	17.0619	NO	NO	NO	NO	NO	NO	NO	0.0555	0.7255	0.0227	0.0256
D. Non-energy products from fuels and solvent use	57.5805	NO	NO						0.0056	0.0316	22.9783	0.0028
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				67.4807	NO	NO	NO	NO				
G. Other product manufacture and use	0.8048	NO	NO	NO	0.0288	NO	0.0000	NO	0.0205	0.6267	0.3658	NO
H. Other									NO	NO	3.2541	NO
3. Agriculture	**0.5864**	**31.3551**	**3.6911**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		28.5438										
B. Manure management		2.8113	1.3794								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.3117									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	0.5864											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1286.3366**	**0.0126**	**0.8904**						**0.0090**	**0.3239**	**NO, NE**	
A. Forest land	-2526.0659	0.0093	0.0005						0.0059	0.2108	NO, NE	
B. Cropland	1664.9870	0.0033	0.0001						0.0031	0.1130	NO	
C. Grassland	-447.6932	NE	NE						NE	NE	NE	
D. Wetlands	-74.5986	NE	NE						NE	NE	NE	
E. Settlements	45.5694	NO, NE	0.8898						NO, NE	NO, NE	NO, NE	
F. Other land	79.9357	NE	NE						NE	NE	NE	
G. Harvested wood products	-28.4708											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**13.1613**	**55.3911**	**0.1909**						**0.1308**	**2.2748**	**2.2062**	**0.0048**
A. Solid waste disposal	NA, NO	44.6020							NA, NO	NA, NO	2.1456	
B. Biological treatment of solid waste		0.0446	0.0027						NO, NE	0.0062	NO, NE	
C. Incineration and open burning of waste	13.1613	0.2686	0.0047						0.1308	2.2685	0.0505	0.0048
D. Wastewater treatment and discharge		10.4759	0.1835						NA, IE	NA, IE	0.0102	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**44.1719**	**0.0017**	**0.0014**						**0.1878**	**0.1094**	**0.0380**	**0.0140**
Aviation	44.1719	0.0017	0.0014						0.1878	0.1094	0.0380	0.0140
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	362.1000											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.7381**									
Indirect CO_2	**51.3571**											

Annex 1-21: Inventory Year - 2010

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			($kt\ CO_2$ equivalent)			(kt)					
Total national emissions and removals	**7915.8467**	**113.1687**	**5.2199**	**77.8936**	**0.0403**	**NO**	**0.0000**	**NO**	**16.6205**	**50.0018**	**40.1884**	**4.5204**
1. Energy	**8632.1613**	**25.3328**	**0.2091**						**15.1357**	**45.4312**	**6.6774**	**3.9590**
A. Fuel combustion Reference approach	8590.7973											
Sectoral approach	8630.8866	2.1399	0.2091						15.1357	45.4312	5.8205	3.9590
1. Energy industries	4054.4452	0.0894	0.0099						6.4930	2.8209	0.1900	0.5660
2. Manufacturing industries and construction	422.5661	0.0120	0.0015						0.9779	0.5900	0.1993	0.3732
3. Transport	2140.5856	0.4708	0.1225						3.7759	19.9436	2.4515	0.0052
4. Other sectors	1985.9921	1.5654	0.0746						3.7644	21.8247	2.9363	2.9155
5. Other	27.2976	0.0023	0.0006						0.1245	0.2519	0.0434	0.0991
B. Fugitive emissions from fuels	1.2747	23.1928	0.0000						NO	NO	0.8568	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.2747	23.1928	0.0000						NO	NO	0.8568	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**481.3565**	**NO**	**NO**	**77.8936**	**0.0403**	**NO**	**0.0000**	**NO**	**1.3529**	**2.2003**	**31.1949**	**0.5567**
A. Mineral industry	404.3936								1.2908	1.0242	0.0127	0.5387
B. Chemical industry	NO	NO	NO						NO	NO	0.0143	NO
C. Metal industry	9.6985	NO	NO	NO	NO	NO	NO	NO	0.0315	0.4121	0.0128	0.0145
D. Non-energy products from fuels and solvent use	66.2398	NO	NO						0.0069	0.0392	26.4907	0.0034
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				77.8936	NO	NO	NO	NO				
G. Other product manufacture and use	1.0245	NO	NO	NO	0.0403	NO	0.0000	NO	0.0237	0.7247	0.4657	NO
H. Other									NO	NO	4.1987	NO
3. Agriculture	**1.7443**	**31.4025**	**3.9595**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		28.3270										
B. Manure management		3.0755	1.4304								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.5291									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	1.7443											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1212.2817**	**0.0056**	**0.8665**						**0.0042**	**0.1529**	**NO, NE**	
A. Forest land	-2484.1627	0.0032	0.0002						0.0021	0.0737	NO, NE	
B. Cropland	1546.0139	0.0023	0.0001						0.0022	0.0792	NO	
C. Grassland	-691.9874	NE	NE						NE	NE	NE	
D. Wetlands	-46.3958	NE	NE						NE	NE	NE	
E. Settlements	45.5694	NO, NE	0.8663						NO, NE	NO, NE	NO, NE	
F. Other land	441.4824	NE	NE						NE	NE	NE	
G. Harvested wood products	-22.8014											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**12.8663**	**56.4278**	**0.1848**						**0.1277**	**2.2175**	**2.3162**	**0.0048**
A. Solid waste disposal	NA, NO	45.5140							NA, NO	NA, NO	2.2567	
B. Biological treatment of solid waste		0.0430	0.0026						NO, NE	0.0060	NO, NE	
C. Incineration and open burning of waste	12.8663	0.2624	0.0046						0.1277	2.2115	0.0492	0.0048
D. Wastewater treatment and discharge		10.6084	0.1776						NA, IE	NA, IE	0.0102	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**41.0593**	**0.0026**	**0.0014**						**0.1667**	**0.1218**	**0.0377**	**0.0130**
Aviation	41.0593	0.0026	0.0014						0.1667	0.1218	0.0377	0.0130
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	341.0480											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.7957**									
Indirect CO_2	**59.3041**											

Annex 1-22: Inventory Year - 2011

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**8374.8996**	**115.1082**	**5.1008**	**90.1296**	**0.0403**	**NO**	**0.0000**	**NO**	**17.0499**	**53.8352**	**43.3979**	**5.5519**
1. Energy	**8932.6787**	**28.6871**	**0.2165**						**15.2503**	**48.9451**	**7.3977**	**4.8498**
A. Fuel combustion Reference approach	8891.2753											
Sectoral approach	8931.3646	2.2709	0.2164						15.2503	48.9451	6.4011	4.8498
1. Energy industries	3752.5675	0.0801	0.0087						5.9997	2.6109	0.1755	0.4345
2. Manufacturing industries and construction	575.5238	0.0263	0.0036						1.1461	1.8629	0.3338	1.5813
3. Transport	2272.7076	0.4687	0.1281						3.8091	20.7693	2.5479	0.0056
4. Other sectors	2310.7777	1.6944	0.0756						4.1423	23.3551	3.2990	2.7405
5. Other	19.7881	0.0013	0.0004						0.1531	0.3469	0.0449	0.0879
B. Fugitive emissions from fuels	1.3141	26.4162	0.0000						NO	NO	0.9966	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.3141	26.4162	0.0000						NO	NO	0.9966	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**574.0527**	**NO**	**NO**	**90.1296**	**0.0403**	**NO**	**0.0000**	**NO**	**1.6703**	**2.5605**	**33.5228**	**0.6974**
A. Mineral industry	488.6436								1.5970	1.2450	0.0156	0.6742
B. Chemical industry	NO	NO	NO						NO	NO	0.0157	NO
C. Metal industry	12.8556	NO	NO	NO	NO	NO	NO	NO	0.0418	0.5465	0.0169	0.0193
D. Non-energy products from fuels and solvent use	71.3244	NO	NO						0.0078	0.0443	28.6400	0.0039
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				90.1296	NO	NO	NO	NO				
G. Other product manufacture and use	1.2291	NO	NO	NO	0.0403	NO	0.0000	NO	0.0237	0.7248	0.5587	NO
H. Other									NO	NO	4.2760	NO
3. Agriculture	**3.6752**	**29.5815**	**3.8532**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		26.6765										
B. Manure management		2.9050	1.3045								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.5488									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	3.6752											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1148.0863**	**0.0064**	**0.8455**						**0.0047**	**0.1694**	**NO, NE**	
A. Forest land	-2390.5712	0.0043	0.0002						0.0028	0.0987	NO, NE	
B. Cropland	1504.5789	0.0021	0.0001						0.0019	0.0707	NO	
C. Grassland	-638.1726	NE	NE						NE	NE	NE	
D. Wetlands	-75.3129	NE	NE						NE	NE	NE	
E. Settlements	62.0438	NO, NE	0.8452						NO, NE	NO, NE	NO, NE	
F. Other land	393.7285	NE	NE						NE	NE	NE	
G. Harvested wood products	-4.3808											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**12.5793**	**56.8332**	**0.1856**						**0.1246**	**2.1602**	**2.4774**	**0.0047**
A. Solid waste disposal	NA, NO	46.2032							NA, NO	NA, NO	2.4191	
B. Biological treatment of solid waste		0.0437	0.0026						NO, NE	0.0061	NO, NE	
C. Incineration and open burning of waste	12.5793	0.2562	0.0045						0.1246	2.1541	0.0480	0.0047
D. Wastewater treatment and discharge		10.3301	0.1785						NA, IE	NA, IE	0.0102	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	41.0082	0.0028	0.0013						0.1611	0.1246	0.0496	0.0130
Aviation	41.0082	0.0028	0.0013						0.1611	0.1246	0.0496	0.0130
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	384.6400											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.7777**									
Indirect CO_2	**64.2370**											

Annex 1-23: Inventory Year - 2012

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**7954.8556**	**112.7200**	**4.8135**	**100.0227**	**0.0403**	**NO**	**0.0000**	**NO**	**16.4625**	**52.1427**	**44.8018**	**4.6501**
1. Energy	**8516.3274**	**28.4550**	**0.2003**						**14.7349**	**46.5729**	**7.0769**	**4.0166**
A. Fuel combustion Reference approach	8468.7601											
Sectoral approach	8515.0170	2.4185	0.2003						14.7349	46.5729	6.1673	4.0166
1. Energy industries	3810.0873	0.0758	0.0086						6.0970	2.6166	0.1758	0.7051
2. Manufacturing industries and construction	433.9361	0.0111	0.0013						1.1466	0.4237	0.2029	0.1794
3. Transport	1992.5907	0.4049	0.1152						3.4048	17.0098	2.1022	0.0048
4. Other sectors	2271.4679	1.9260	0.0750						4.0329	26.3885	3.6707	3.1225
5. Other	6.9350	0.0006	0.0002						0.0536	0.1342	0.0157	0.0047
B. Fugitive emissions from fuels	1.3104	26.0365	0.0000						NO	NO	0.9095	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.3104	26.0365	0.0000						NO	NO	0.9095	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**582.0682**	**NO**	**NO**	**100.0227**	**0.0403**	**NO**	**0.0000**	**NO**	**1.5763**	**2.4006**	**35.1868**	**0.6289**
A. Mineral industry	493.5610								1.5088	1.2782	0.0159	0.6054
B. Chemical industry	NO	NO	NO						NO	NO	0.0150	NO
C. Metal industry	12.6973	NO	NO	NO	NO	NO	NO	NO	0.0413	0.5398	0.0171	0.0191
D. Non-energy products from fuels and solvent use	74.6523	NO	NO						0.0088	0.0500	30.6212	0.0044
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				100.0227	NO	NO	NO	NO				
G. Other product manufacture and use	1.1575	NO	NO	NO	0.0403	NO	0.0000	NO	0.0174	0.5326	0.5261	NO
H. Other									NO	NO	3.9915	NO
3. Agriculture	**5.5908**	**27.9761**	**3.6430**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		25.2109										
B. Manure management		2.7652	1.1973								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.4457									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	5.5908											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1161.4016**	**0.0467**	**0.7833**						**0.0299**	**1.0665**	**NO, NE**	
A. Forest land	-2294.8221	0.0464	0.0026						0.0296	1.0564	NO, NE	
B. Cropland	1508.7640	0.0003	0.0000						0.0003	0.0101	NO	
C. Grassland	-562.7510	NE	NE						NE	NE	NE	
D. Wetlands	-15.4700	NE	NE						NE	NE	NE	
E. Settlements	11.8882	NO, NE	0.7807						NO, NE	NO, NE	NO, NE	
F. Other land	114.1449	NE	NE						NE	NE	NE	
G. Harvested wood products	76.8444											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**12.2708**	**56.2422**	**0.1870**						**0.1214**	**2.1026**	**2.5381**	**0.0046**
A. Solid waste disposal	NA, NO	45.7446							NA, NO	NA, NO	2.4812	
B. Biological treatment of solid waste		0.0447	0.0027						NO, NE	0.0063	NO, NE	
C. Incineration and open burning of waste	12.2708	0.2498	0.0044						0.1214	2.0963	0.0468	0.0046
D. Wastewater treatment and discharge		10.2031	0.1799						NA, IE	NA, IE	0.0101	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**47.3142**	**0.0028**	**0.0015**						**0.1806**	**0.1322**	**0.0558**	**0.0150**
Aviation	47.3142	0.0028	0.0015						0.1806	0.1322	0.0558	0.0150
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	403.3840											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.7476**									
Indirect CO_2	**68.5241**											

Annex 1-24: Inventory Year - 2013

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**7856.1559**	**109.3707**	**5.1896**	**108.3873**	**0.0403**	**NO**	**0.0000**	**NO**	**15.9618**	**53.5496**	**43.9545**	**13.2050**
1. Energy	**8232.5336**	**27.2893**	**0.2194**						**14.0791**	**48.5108**	**7.1035**	**12.4901**
A. Fuel combustion Reference approach	8190.8002											
Sectoral approach	8230.8896	2.4910	0.2194						14.0791	48.5108	6.2507	12.4901
1. Energy industries	3603.6566	0.0679	0.0189						6.2373	2.0266	0.1399	7.1687
2. Manufacturing industries and construction	575.6355	0.0299	0.0042						0.8821	2.2984	0.3553	2.0310
3. Transport	2101.3096	0.4086	0.1153						3.1411	16.4003	2.0085	0.0049
4. Other sectors	1947.9381	1.9842	0.0809						3.7783	27.7557	3.7434	3.2852
5. Other	2.3497	0.0003	0.0001						0.0403	0.0297	0.0037	0.0003
B. Fugitive emissions from fuels	1.6441	24.7983	0.0000						NO	NO	0.8528	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.6441	24.7983	0.0000						NO	NO	0.8528	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**623.2187**	**NO**	**NO**	**108.3873**	**0.0403**	**NO**	**0.0000**	**NO**	**1.7417**	**2.1714**	**34.2507**	**0.7105**
A. Mineral industry	544.9842								1.6947	1.3902	0.0172	0.6943
B. Chemical industry	NO	NO	NO						NO	NO	0.0159	NO
C. Metal industry	7.6569	NO	NO	NO	NO	NO	NO	NO	0.0249	0.3250	0.0100	0.0115
D. Non-energy products from fuels and solvent use	69.4810	NO	NO						0.0088	0.0501	28.2397	0.0044
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				108.3873	NO	NO	NO	NO				
G. Other product manufacture and use	1.0965	NO	NO	NO	0.0403	NO	0.0000	NO	0.0133	0.4062	0.4984	0.0003
H. Other									NO	NO	5.4694	NO
3. Agriculture	**4.1840**	**28.1106**	**4.0532**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		25.3945										
B. Manure management		2.7160	1.1202								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.9330									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	4.1840											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1015.6837**	**0.0349**	**0.7290**						**0.0230**	**0.8236**	**NO, NE**	
A. Forest land	-2141.8702	0.0322	0.0018						0.0206	0.7339	NO, NE	
B. Cropland	1413.3777	0.0026	0.0001						0.0024	0.0898	NO	
C. Grassland	-360.1740	NE	NE						NE	NE	NE	
D. Wetlands	-106.0998	NE	NE						NE	NE	NE	
E. Settlements	13.7512	NO, NE	0.7272						NO, NE	NO, NE	NO, NE	
F. Other land	103.4500	NE	NE						NE	NE	NE	
G. Harvested wood products	61.8814											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**11.9033**	**53.9360**	**0.1879**						**0.1179**	**2.0438**	**2.6003**	**0.0045**
A. Solid waste disposal	NA, NO	43.3907							NA, NO	NA, NO	2.5448	
B. Biological treatment of solid waste		0.0486	0.0029						NO, NE	0.0068	NO, NE	
C. Incineration and open burning of waste	11.9033	0.2424	0.0043						0.1179	2.0370	0.0454	0.0045
D. Wastewater treatment and discharge		10.2543	0.1807						NA, IE	NA, IE	0.0101	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**41.0717**	**0.0046**	**0.0013**						**0.1592**	**0.1584**	**0.0571**	**0.0130**
Aviation	41.0717	0.0046	0.0013						0.1592	0.1584	0.0571	0.0130
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	429.2796											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.8295**									
Indirect CO_2	**63.2239**											

Annex 1-25: Inventory Year - 2014

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**8109.0510**	**110.8624**	**5.7747**	**121.5640**	**0.0403**	**NO**	**0.0000**	**NO**	**15.4792**	**78.7269**	**56.3898**	**4.3062**
1. Energy	**8100.9817**	**28.3950**	**0.2423**						**13.6328**	**74.2343**	**11.1095**	**3.5942**
A. Fuel combustion Reference approach	8046.8852											
Sectoral approach	8099.3097	4.5821	0.2422						13.6328	74.2343	10.3588	3.5942
1. Energy industries	3562.1775	0.0752	0.0083						5.7085	2.4794	0.1666	0.4461
2. Manufacturing industries and construction	443.8148	0.0139	0.0018						0.6822	0.7672	0.2183	0.5408
3. Transport	2140.5749	0.4056	0.1070						2.6984	16.1489	1.9476	0.0049
4. Other sectors	1927.7357	4.0868	0.1247						4.4921	54.5828	8.0026	2.4012
5. Other	25.0067	0.0006	0.0005						0.0516	0.2560	0.0237	0.2011
B. Fugitive emissions from fuels	1.6721	23.8129	0.0000						NO	NO	0.7507	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.6721	23.8129	0.0000						NO	NO	0.7507	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**637.7956**	**NO**	**NO**	**121.5640**	**0.0403**	**NO**	**0.0000**	**NO**	**1.7285**	**2.3772**	**42.6162**	**0.7077**
A. Mineral industry	535.5064								1.6590	1.3602	0.0167	0.6799
B. Chemical industry	NO	NO	NO						NO	NO	0.0166	NO
C. Metal industry	13.8464	NO	NO	NO	NO	NO	NO	NO	0.0450	0.5882	0.0186	0.0208
D. Non-energy products from fuels and solvent use	87.2367	NO	NO						0.0128	0.0723	36.3007	0.0064
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				121.5640	NO	NO	NO	NO				
G. Other product manufacture and use	1.2062	NO	NO	NO	0.0403	NO	0.0000	NO	0.0117	0.3565	0.5483	0.0007
H. Other									NO	NO	5.7153	NO
3. Agriculture	**10.2058**	**28.9200**	**4.6670**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		26.1032										
B. Manure management		2.8169	1.2335								NO	
C. Rice cultivation		NO										
D. Agricultural soils			3.4335									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	10.2058											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-651.4692**	**0.0047**	**0.6794**						**0.0036**	**0.1293**	**NO, NE**	
A. Forest land	-2134.7390	0.0027	0.0001						0.0017	0.0603	NO, NE	
B. Cropland	1450.4798	0.0020	0.0001						0.0019	0.0690	NO	
C. Grassland	-341.1085	NE	NE						NE	NE	NE	
D. Wetlands	-139.7535	NE	NE						NE	NE	NE	
E. Settlements	18.9848	NO, NE	0.6792						NO, NE	NO, NE	NO, NE	
F. Other land	436.6463	NE	NE						NE	NE	NE	
G. Harvested wood products	58.0208											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**11.5371**	**53.5427**	**0.1860**						**0.1144**	**1.9861**	**2.6641**	**0.0043**
A. Solid waste disposal	NA, NO	43.3232							NA, NO	NA, NO	2.6100	
B. Biological treatment of solid waste		0.0508	0.0030						NO, NE	0.0071	NO, NE	
C. Incineration and open burning of waste	11.5371	0.2351	0.0041						0.1144	1.9790	0.0441	0.0043
D. Wastewater treatment and discharge		9.9335	0.1788						NA, IE	NA, IE	0.0100	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**53.6855**	**0.0034**	**0.0018**						**0.2110**	**0.1599**	**0.0553**	**0.0170**
Aviation	53.6855	0.0034	0.0018						0.2110	0.1599	0.0553	0.0170
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	1314.4896											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.9701**									
Indirect CO_2	**81.0677**											

Annex 1-26: Inventory Year - 2015

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**7952.0481**	**108.9340**	**4.9188**	**153.8517**	**0.0403**	**NO**	**0.0000**	**NO**	**16.1834**	**85.0427**	**54.3331**	**5.0062**
1. Energy	**8414.0596**	**27.5422**	**0.2680**						**14.3835**	**79.7012**	**11.9147**	**4.3217**
A. Fuel combustion Reference approach	8356.8931											
Sectoral approach	8412.4014	4.8782	0.2680						14.3835	79.7012	11.2253	4.3217
1. Energy industries	3686.3133	0.0659	0.0067						5.8546	2.5551	0.1705	0.1241
2. Manufacturing industries and construction	651.5441	0.0405	0.0055						0.8128	2.1701	0.4888	1.6259
3. Transport	2261.5959	0.4285	0.1197						3.1090	16.5574	2.0183	0.0051
4. Other sectors	1790.2120	4.3428	0.1357						4.5595	58.1877	8.5261	2.3805
5. Other	22.7360	0.0005	0.0004						0.0475	0.2309	0.0216	0.1861
B. Fugitive emissions from fuels	1.6581	22.6641	0.0000						NO	NO	0.6894	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.6581	22.6641	0.0000						NO	NO	0.6894	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**607.8444**	**NO**	**NO**	**153.8517**	**0.0403**	**NO**	**0.0000**	**NO**	**1.6501**	**2.4169**	**39.6803**	**0.6796**
A. Mineral industry	505.0564								1.5734	1.2767	0.0160	0.6490
B. Chemical industry	NO	NO	NO						NO	NO	0.0119	NO
C. Metal industry	17.2792	NO	NO	NO	NO	NO	NO	NO	0.0561	0.7340	0.0221	0.0259
D. Non-energy products from fuels and solvent use	84.5691	NO	NO						0.0089	0.0501	34.9703	0.0044
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				153.8517	NO	NO	NO	NO				
G. Other product manufacture and use	0.9397	NO	NO	NO	0.0403	NO	0.0000	NO	0.0116	0.3561	0.4271	0.0003
H. Other									NO	NO	4.2329	NO
3. Agriculture	**11.2402**	**27.9227**	**3.8226**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		25.1684										
B. Manure management		2.7544	1.1952								NO	
C. Rice cultivation		NO										
D. Agricultural soils			2.6274									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	11.2402											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-1094.4097**	**0.0261**	**0.6385**						**0.0171**	**0.6122**	**NO, NE**	
A. Forest land	-2159.4439	0.0246	0.0014						0.0157	0.5596	NO, NE	
B. Cropland	1391.0666	0.0015	0.0000						0.0014	0.0526	NO	
C. Grassland	-418.4569	NE	NE						NE	NE	NE	
D. Wetlands	-82.7917	NE	NE						NE	NE	NE	
E. Settlements	39.1617	NO, NE	0.6371						NO, NE	NO, NE	NO, NE	
F. Other land	86.8192	NE	NE						NE	NE	NE	
G. Harvested wood products	49.2353											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**13.3135**	**53.4429**	**0.1897**						**0.1326**	**2.3124**	**2.7381**	**0.0049**
A. Solid waste disposal	NA, NO	43.4869							NA, NO	NA, NO	2.6769	
B. Biological treatment of solid waste		0.0508	0.0030						NO, NE	0.0071	NO, NE	
C. Incineration and open burning of waste	13.3135	0.2721	0.0048						0.1326	2.3053	0.0512	0.0049
D. Wastewater treatment and discharge		9.6331	0.1819						NA, IE	NA, IE	0.0100	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**56.8077**	**0.0056**	**0.0018**						**0.2255**	**0.1841**	**0.0817**	**0.0180**
Aviation	56.8077	0.0056	0.0018						0.2255	0.1841	0.0817	0.0180
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	1428.4386											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.7845**									
Indirect CO_2	**77.8743**											

Annex 1-27: Inventory Year - 2016

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**8278.4511**	**111.9492**	**5.3839**	**163.2067**	**0.0403**	**NO**	**0.0000**	**NO**	**16.4130**	**87.8319**	**55.5414**	**4.2279**
1. Energy	**8506.6885**	**29.7033**	**0.2875**						**14.6974**	**83.3929**	**12.6250**	**3.5714**
A. Fuel combustion Reference approach	8406.3366											
Sectoral approach	8505.0181	5.2597	0.2875						14.6974	83.3929	11.9423	3.5714
1. Energy industries	3644.9312	0.0657	0.0069						5.7964	2.5196	0.1682	0.2330
2. Manufacturing industries and construction	641.3590	0.0345	0.0047						0.7558	1.6752	0.4441	1.1555
3. Transport	2428.3819	0.4966	0.1370						3.5658	16.9243	2.0880	0.0054
4. Other sectors	1767.4874	4.6624	0.1384						4.5317	62.0479	9.2199	1.9853
5. Other	22.8586	0.0005	0.0004						0.0476	0.2260	0.0221	0.1923
B. Fugitive emissions from fuels	1.6704	24.4436	0.0000						NO	NO	0.6827	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.6704	24.4436	0.0000						NO	NO	0.6827	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**583.6350**	**NO**	**NO**	**163.2067**	**0.0403**	**NO**	**0.0000**	**NO**	**1.5759**	**1.8206**	**40.1158**	**0.6517**
A. Mineral industry	492.5454								1.5410	1.2375	0.0156	0.6398
B. Chemical industry	NO	NO	NO						NO	NO	0.0131	NO
C. Metal industry	5.2203	NO	NO	NO	NO	NO	NO	NO	0.0169	0.2204	0.0075	0.0078
D. Non-energy products from fuels and solvent use	84.8044	NO	NO						0.0076	0.0429	34.9327	0.0038
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				163.2067	NO	NO	NO	NO				
G. Other product manufacture and use	1.0649	NO	NO	NO	0.0403	NO	0.0000	NO	0.0105	0.3198	0.4841	0.0003
H. Other									NO	NO	4.6628	NO
3. Agriculture	**12.2747**	**27.7164**	**4.3031**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		24.8801										
B. Manure management		2.8363	1.2328								NO	
C. Rice cultivation		NO										
D. Agricultural soils			3.0703									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	12.2747											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-837.1816**	**0.0143**	**0.6016**						**0.0097**	**0.3467**	**NO, NE**	
A. Forest land	-2115.7622	0.0123	0.0007						0.0079	0.2809	NO, NE	
B. Cropland	1391.9179	0.0019	0.0001						0.0018	0.0658	NO	
C. Grassland	-402.3693	NE	NE						NE	NE	NE	
D. Wetlands	-82.7917	NE	NE						NE	NE	NE	
E. Settlements	19.3071	NO, NE	0.6008						NO, NE	NO, NE	NO, NE	
F. Other land	351.6349	NE	NE						NE	NE	NE	
G. Harvested wood products	0.8816											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**13.0346**	**54.5152**	**0.1918**						**0.1301**	**2.2716**	**2.8005**	**0.0047**
A. Solid waste disposal	NA, NO	44.6069							NA, NO	NA, NO	2.7403	
B. Biological treatment of solid waste		0.0505	0.0030						NO, NE	0.0071	NO, NE	
C. Incineration and open burning of waste	13.0346	0.2667	0.0047						0.1301	2.2645	0.0502	0.0047
D. Wastewater treatment and discharge		9.5911	0.1841						NA, IE	NA, IE	0.0100	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**100.9698**	**0.0062**	**0.0033**						0.4139	0.2665	0.1113	0.0320
Aviation	100.9698	0.0062	0.0033						0.4139	0.2665	0.1113	0.0320
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	1600.9890											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.8863**									
Indirect CO_2	**77.9170**											

Annex 1-28: Inventory Year - 2017

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**7726.7513**	**117.0372**	**5.6857**	**182.4923**	**0.0403**	**NO**	**0.0000**	**NO**	**16.3676**	**110.7356**	**65.0590**	**5.0951**
1. Energy	**7978.8973**	**32.8547**	**0.3331**						**14.6688**	**105.3838**	**15.8287**	**4.4594**
A. Fuel combustion Reference approach	7832.3013											
Sectoral approach	7977.2397	6.9497	0.3331						14.6688	105.3838	15.1571	4.4594
1. Energy industries	2883.9360	0.0523	0.0053						4.5840	2.0066	0.1339	0.0467
2. Manufacturing industries and construction	658.7329	0.0361	0.0051						0.9406	1.7853	0.4514	1.2695
3. Transport	2451.2514	0.4838	0.1350						3.3935	16.3018	2.0056	0.0054
4. Other sectors	1960.6971	6.3772	0.1874						5.7093	85.0674	12.5450	2.9370
5. Other	22.6223	0.0002	0.0004						0.0414	0.2226	0.0212	0.2009
B. Fugitive emissions from fuels	1.6576	25.9050	0.0000						NO	NO	0.6716	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.6576	25.9050	0.0000						NO	NO	0.6716	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**593.1469**	**NO**	**NO**	**182.4923**	**0.0403**	**NO**	**0.0000**	**NO**	**1.5388**	**2.2988**	**46.2368**	**0.6304**
A. Mineral industry	476.0597								1.4599	1.2025	0.0146	0.5970
B. Chemical industry	NO	NO	NO						NO	NO	0.0123	NO
C. Metal industry	18.8842	NO	NO	NO	NO	NO	NO	NO	0.0613	0.8019	0.0249	0.0283
D. Non-energy products from fuels and solvent use	97.0273	NO	NO						0.0097	0.0547	40.4418	0.0048
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				182.4923	NO	NO	NO	NO				
G. Other product manufacture and use	1.1757	NO	NO	NO	0.0403	NO	0.0000	NO	0.0078	0.2396	0.5344	0.0003
H. Other									NO	NO	5.2088	NO
3. Agriculture	**26.2081**	**25.9044**	**4.5774**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		23.1182										
B. Manure management		2.7862	1.1730								NO	
C. Rice cultivation		NO										
D. Agricultural soils			3.4045									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	26.2081											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-886.1457**	**0.0199**	**0.5767**						**0.0136**	**0.4867**	**NO, NE**	
A. Forest land	-2016.4373	0.0170	0.0009						0.0109	0.3878	NO, NE	
B. Cropland	1369.0793	0.0029	0.0001						0.0027	0.0990	NO	
C. Grassland	-384.0392	NE	NE						NE	NE	NE	
D. Wetlands	-82.8162	NE	NE						NE	NE	NE	
E. Settlements	77.3098	NO, NE	0.5757						NO, NE	NO, NE	NO, NE	
F. Other land	218.2055	NE	NE						NE	NE	NE	
G. Harvested wood products	-67.4476											
H. Other	NE											
5. Waste	**14.6448**	**58.2582**	**0.1985**						**0.1465**	**2.5663**	**2.9935**	**0.0052**
A. Solid waste disposal	NA, NO	48.4691							NA, NO	NA, NO	2.9269	
B. Biological treatment of solid waste		0.0578	0.0035						NO, NE	0.0081	NO, NE	
C. Incineration and open burning of waste	14.6448	0.3001	0.0053						0.1465	2.5582	0.0566	0.0052
D. Wastewater treatment and discharge		9.4312	0.1897						NA, IE	NA, IE	0.0100	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**148.2788**	**0.0058**	**0.0048**						**0.5821**	**0.3478**	**0.1423**	**0.0470**
Aviation	148.2788	0.0058	0.0048						0.5821	0.3478	0.1423	0.0470
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	2122.7228											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.9477**									
Indirect CO_2	**90.1477**											

Annex 1-29: Inventory Year - 2018

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**8522.2288**	**117.0395**	**5.7168**	**194.4750**	**0.0403**	**NO**	**0.0001**	**NO**	**18.0570**	**159.6446**	**96.4462**	**4.5109**
1. Energy	**8426.8382**	**34.7321**	**0.3830**						**15.9767**	**154.4533**	**23.3603**	**3.7006**
A. Fuel combustion Reference approach	8258.6476											
Sectoral approach	8425.1725	10.6318	0.3830						15.9767	154.4533	22.7246	3.7006
1. Energy industries	3177.3538	0.0579	0.0059						5.0572	2.2137	0.1477	0.0567
2. Manufacturing industries and construction	748.6264	0.0412	0.0058						1.2726	1.7293	0.5219	1.0791
3. Transport	2529.5979	0.5024	0.1334						3.2503	17.1884	2.0927	0.0056
4. Other sectors	1946.2502	10.0301	0.2376						6.3540	133.0922	19.9404	2.3520
5. Other	23.3443	0.0002	0.0004						0.0427	0.2297	0.0219	0.2073
B. Fugitive emissions from fuels	1.6657	24.1003	0.0000						NO	NO	0.6357	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.6657	24.1003	0.0000						NO	NO	0.6357	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**763.3854**	**NO**	**NO**	**194.4750**	**0.0403**	**NO**	**0.0001**	**NO**	**1.9325**	**2.5146**	**70.1179**	**0.8052**
A. Mineral industry	590.9800								1.8391	1.4895	0.0185	0.7607
B. Chemical industry	NO	NO	NO						NO	NO	0.0155	NO
C. Metal industry	20.2133	NO	NO	NO	NO	NO	NO	NO	0.0657	0.8586	0.0267	0.0303
D. Non-energy products from fuels and solvent use	151.1808	NO	NO						0.0273	0.1534	64.9072	0.0136
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				194.4750	NO	NO	NO	NO				
G. Other product manufacture and use	1.0114	NO	NO	NO	0.0403	NO	0.0001	NO	0.0004	0.0132	0.4597	0.0007
H. Other									NO	NO	4.6903	NO
3. Agriculture	**43.3624**	**23.4494**	**4.5750**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		20.6560										
B. Manure management		2.7933	1.0372								NO	
C. Rice cultivation		NO										
D. Agricultural soils			3.5378									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	43.3624											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**-725.6453**	**0.0068**	**0.5550**						**0.0046**	**0.1654**	**NO, NE**	
A. Forest land	-1969.3582	0.0059	0.0003						0.0037	0.1334	NO, NE	
B. Cropland	1487.3577	0.0009	0.0000						0.0009	0.0321	NO	
C. Grassland	-440.1513	NE	NE						NE	NE	NE	
D. Wetlands	-82.8253	NE	NE						NE	NE	NE	
E. Settlements	21.6217	NO, NE	0.5546						NO, NE	NO, NE	NO, NE	
F. Other land	321.2138	NE	NE						NE	NE	NE	
G. Harvested wood products	-63.5037											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**14.2880**	**58.8512**	**0.2038**						**0.1432**	**2.5112**	**2.9680**	**0.0051**
A. Solid waste disposal	NA, NO	48.9422							NA, NO	NA, NO	2.9025	
B. Biological treatment of solid waste		0.0521	0.0031						NO, NE	0.0073	NO, NE	
C. Incineration and open burning of waste	14.2880	0.2931	0.0051						0.1432	2.5039	0.0553	0.0051
D. Wastewater treatment and discharge		9.5637	0.1955						NA, IE	NA, IE	0.0102	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**170.4060**	**0.0071**	**0.0058**						0.6507	0.5113	0.1537	0.0540
Aviation	170.4060	0.0071	0.0058						0.6507	0.5113	0.1537	0.0540
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	3567.9567											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.9592**									
Indirect CO_2	**143.8072**											

Annex 1-30: Inventory Year - 2019

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Net CO_2 emissions / removals	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3	NO_x	CO	NMVOC	SO_2
	(kt)			(kt CO_2 equivalent)			(kt)					
Total national emissions and removals	**9526.1314**	**104.6462**	**5.8123**	**229.9469**	**0.0403**	**NO**	**0.0001**	**NO**	**18.3641**	**144.0928**	**90.3206**	**5.2391**
1. Energy	**8577.9507**	**25.1886**	**0.3826**						**16.3122**	**138.9236**	**20.6159**	**4.4574**
A. Fuel combustion Reference approach	8428.3196											
Sectoral approach	8576.3417	9.3549	0.3826						16.3122	138.9236	20.1359	4.4574
1. Energy industries	3120.4282	0.0561	0.0057						4.9637	2.1725	0.1449	0.0468
2. Manufacturing industries and construction	715.9769	0.0380	0.0052						1.2738	1.5227	0.4795	0.9228
3. Transport	2611.5823	0.4983	0.1390						3.4499	17.8412	2.1766	0.0058
4. Other sectors	2105.4914	8.7623	0.2323						6.5829	117.1622	17.3134	3.2791
5. Other	22.8629	0.0002	0.0004						0.0418	0.2250	0.0215	0.2030
B. Fugitive emissions from fuels	1.6090	15.8337	0.0000						NO	NO	0.4800	NO
1. Solid fuels	NO	NO	NO						NO	NO	NO	NO
2. Oil and natural gas and other emissions from energy production	1.6090	15.8337	0.0000						NO	NO	0.4800	NO
C. CO_2 Transport and storage	NO											
2. Industrial processes and product use	**760.7727**	**NO**	**NO**	**229.9469**	**0.0403**	**NO**	**0.0001**	**NO**	**1.9016**	**2.3347**	**66.6202**	**0.7768**
A. Mineral industry	600.3437								1.8306	1.5265	0.0188	0.7430
B. Chemical industry	NO	NO	NO						NO	NO	0.0168	NO
C. Metal industry	15.7926	NO	NO	NO	NO	NO	NO	NO	0.0513	0.6704	0.0209	0.0237
D. Non-energy products from fuels and solvent use	143.5292	NO	NO						0.0186	0.1047	61.3724	0.0093
E. Electronic industry				NO	NO	NO	NO	NO				
F. Product uses as substitutes for ODS				229.9469	NO	NO	NO	NO				
G. Other product manufacture and use	1.1072	NO	NO	NO	0.0403	NO	0.0001	NO	0.0011	0.0331	0.5033	0.0008
H. Other									NO	NO	4.6880	NO
3. Agriculture	**39.6306**	**20.3296**	**4.6832**						**NO**	**NO**	**NE, NO**	
A. Enteric fermentation		17.6658										
B. Manure management		2.6637	0.9345								NO	
C. Rice cultivation		NO										
D. Agricultural soils			3.7488									
E. Prescribed burning of savannas		NO	NO						NO	NO	NO	
F. Field burning of agricultural residues		IE	IE						IE	IE	NO, NE	
G. Liming	NO											
H. Urea application	39.6306											
I. Other carbon-containing fertilizers	NO, NE											
J. Other	NO	NO	NO						NO	NO	NO	
4. Land use, land-use change and forestry	**133.8653**	**0.0157**	**0.5420**						**0.0105**	**0.3774**	**NO, NE**	
A. Forest land	-1950.6476	0.0141	0.0008						0.0090	0.3206	NO, NE	
B. Cropland	1789.8845	0.0017	0.0000						0.0015	0.0568	NO	
C. Grassland	-293.2923	NE	NE						NE	NE	NE	
D. Wetlands	-82.8099	NE	NE						NE	NE	NE	
E. Settlements	116.5030	NO, NE	0.5412						NO, NE	NO, NE	NO, NE	
F. Other land	611.7881	NE	NE						NE	NE	NE	
G. Harvested wood products	-57.5604											
H. Other	NE	NE	NE						NE	NE	NE	
5. Waste	**13.9120**	**59.1123**	**0.2044**						**0.1397**	**2.4571**	**3.0845**	**0.0049**
A. Solid waste disposal	NA, NO	49.2635							NA, NO	NA, NO	3.0203	
B. Biological treatment of solid waste		0.0559	0.0034						NO, NE	0.0078	NO, NE	
C. Incineration and open burning of waste	13.9120	0.2858	0.0050						0.1397	2.4493	0.0540	0.0049
D. Wastewater treatment and discharge		9.5071	0.1961						NA, IE	NA, IE	0.0102	
E. Other	NO	NO	NO						NO	NO	NO	
6. Other	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Memo items:												
International bunkers	**151.5015**	**0.0055**	**0.0051**						**0.6236**	**0.4162**	**0.1199**	**0.0480**
Aviation	151.5015	0.0055	0.0051						0.6236	0.4162	0.1199	0.0480
Navigation	NO	NO	NO						NO	NO	NO	NO
Multilateral operations	**NO**	**NO**	**NO**						**NO**	**NO**	**NO**	**NO**
CO_2 emissions from biomass	2963.2154											
CO_2 captured	NO											
Long-term storage of C in waste disposal sites	NE											
Indirect N_2O			**0.9924**									
Indirect CO_2	**136.1265**											

Annex 2: Nationally Appropriate Mitigation Actions considered, planned and ongoing in the Republic of Moldova

The actions are presented based on the information available in the draft Low Emission Development Programme of the Republic of Moldova until 2030 and the Action Plan for its implementation (2021), in the Second Biennial Update Report of the Republic of Moldova to UNFCCC (2019), in the Fourth National Communication of the Republic of Moldova to UNFCCC (2018), the results achieved under the UNDP Project "Low-Emission Development Capacity Building Program"(LECB Program) (2014-2016), as well as in other relevant sources (draft amendment to GD no.689/2018 amending the capacity limits for RES, EBRD, WB, FVC projects, etc.).

Mitigation action 1: Construction of capacities for producing electricity and heat from renewable sources

Description	Nature of the action	Energy production from RES
	Sector	Electric power
	GHG	CO_2, CH_4
	Quantitative targets	- installed capacity of 460 MW and 1.4 billion kWh of electricity produced from RES by 2025; - installed capacity of 700 MW and 1.87 billion kWh of electricity produced from RES by 2030.
	Progress indicators	- RES capacity in operation, MW - electricity produced by RES, MWh - GHG emissions reductions, CO_2 tons eq.
Methods		- application of fixed tariffs and cap prices; - annual tenders for building, capacities pre-established for each type of RES: wind, solar, hydro, biogas, singas and direct combustion.
Assumptions		- wind energy technical potential – 9,000 MW[385]; - maximum potential of biogas sources - 150 MW; - hydro energy technical potential - 5 MW.
Goals		- increasing energy security; - GHG emissions reduction.
Undertaken steps		- in 2007 the Law on Renewable Energy was approved; - in 2009 the Methodology for calculating the Feed-in tariffs was approved; - in 2013, the Energy Strategy of the Republic of Moldova until 2030 was published; - in 2013 the Government approved the National Action Plan on renewable energy for 2013-2020; - in 2016, the Law on promoting Use of Energy from Renewable Energy Sources was approved; - in 2017, the Methodology for calculating fixed tariffs and prices for electricity produced by eligible producers from renewable energy sources was approved[386]; - on March 26, 2018, ANRE approved Feed-in tariffs for wind farms, biogas plants, hydro plants and photovoltaic plants for electricity production; - in 2020, fixed tariffs and cap prices for electricity produced from renewable sources were approved.
Planned steps		Amendment of the Government Decision on approval of capacity limits, maximum quotas and capacity categories in the field of renewable energy, project developed in 2020 and subject to public consultation[387].
Implementation progress	Environmental achievements	- By the end of 2019, the total installed capacity of power plants producing energy from renewable sources was 41.8 MW, except for the existing HPPs for which the support scheme does not apply. The total energy produced from RES was 67.43 million kWh; In 2020, the status of eligible producer was confirmed by ANRE[388] for the capacity of 35,631 - MW to be installed by the eligible producers.
	Estimated emission reductions	- minimum 844,536 tons CO_2 by 2025; - maximum 1,126,048 tons CO_2 by 2030.

Mitigation action 2: Construction of electrical interconnections with the ENTSO-E power system

Description	Nature of the action	Increasing the capacity to import electricity from neighboring countries, which would also serve to export and transit electricity
	Sector	Electric power
	GHG	CO_2
	Quantitative targets	- increasing electricity import capacity up to 870 MW from ENTSO-E by 2030; - electricity import capacity up to 4.5 billion kWh per year.
	Progress indicators	- interconnections capacity with Romania, MW - the amount of electricity imported from ENTSO-E, MWh - GHG emission reductions, CO_2 tons equivalent
Methods		- construction and commissioning of the first 400 kV asynchronous interconnection with Romania by the end of 2024[389], through the back-to-back station to be installed at the Vulcanesti power station of the transmission system operator "Moldelectrica" S.E. - construction of 2, 400 kV interconnection with Romania by 2025-2027; - promoting the platform for the competitive sale of electricity, by 2024.
Assumptions		- average increase in electricity demand - 2.1%/year; - Romania will have electricity generation capacities, including from RES, sufficient for export to the Republic of Moldova until 2030; - Ukrainian and CTEM suppliers will be able to participate competitively in the sale of energy on the electricity market in the Republic of Moldova;
Goals		- increasing energy security; - ensuring competition on the electricity market, currently non-existing; - GHG emissions reduction.

[385] V. Rachier, I. Sobor, A. Chiciuc, Assessment of Wind Energy Resource of Moldova. Meridian Ingineresc, No. 2, 2014, pp. 23-29. ISSN 1683-853X.
[386] ANRE Decision no. 375 of 28.09.2017 on approval of the Methodology for calculating fixed tariffs and prices for electricity produced by eligible producers from renewable energy sources, Official Gazette No. 390-395 / 1988of 10.11.2017.
[387] < https://particip.gov.md/ro/document/stages/projectul-hotararii-guvernului-pentru-modificación-hotararii-guvernului-nr-6892018-cu-privire-la-approvarea-limitelor-de-capacitate-cota- maximum-and-capacity-categories-in-the-field-of-electricity-from-renewable-sources-until-the-year-2020/7841 >
[388] < http://www.anre.md/registrul-producatorilor-eligibili-3-339 >
[389] <https://mepiu.md/rom/noutati/deschiderea-ofertelor-pentru-procuarea-servciilor-de-constructie-a-lea-vulcanesti-chisinau>

Undertaken steps		- The Energy Strategy of the Republic of Moldova until 2030 established that one of the electricity supply scenarios is construction of interconnections with the Romanian electricity system for asynchronous operation through back-to-back stations; - The World Bank's study of 2013-2015, justified importing electricity to Moldova from ENTSO-E, instead of building power plants in the country, the latter option to be decided by the electricity market; - in 2015 the Government approved the Roadmap in the electricity sector for the period 2015-2030; - in 2015 the design of the respective interconnections started; - in December 2017, the Agreement between the Republic of Moldova, the EBRD, the EIB, the WB and the EU on granting of loans and the grant for financing the construction of the back-to-back Vulcan station and the transmission power lines was signed; - at the beginning of November 2020, the bids opening meeting for the international tender for purchasing of design, construction and installation services for the 400 kV high voltage transmission power line Vulcanesti-Chisinau[390], the duration of the works being estimated at approximately 42 months, from the time the contract is signed.
Planned steps		- establishing the form of ownership and management of interconnections; - launching the tender for construction of interconnections, by 2021; - creation of the Electricity Market Operator, with already approved Electricity Market Rules.
Implementation progress	Environmental achievements	At the request of the Government of the Republic of Moldova, the WB conducted a study that economically justified the feasibility of the solution to cover the demand for electricity by import of electricity
	Estimated emission reductions	- at least 10% of CO_2 emissions under the WEM scenario, measured at regional level.

Mitigation action 3: Promoting efficient technologies in the manufacturing and construction industry

Description	Nature of the action	Reducing energy intensity
	Sector	Manufacturing and construction industry
	GHG	CO_2 , CH_4 , N_2O
	Quantitative targets	- maximum 64.89 kt CO_2 by 2030
	Progress indicators	- modern technologies implemented, units; - reductions in GHG emissions, CO tons $_2$ eq.
Methods		- state support in launching advantageous credit lines (including with a grant component) by donor financial institutions (EBRD, EIB, FVC, etc.); - developing and promoting smart specialization.
Assumptions		- at least 20% of small and medium companies will implement energy efficiency projects, 50% by 2030.
Goals		- reducing energy intensity in manufacturing and construction industry; - GHG emissions reduction.
Undertaken steps		- in 2014, the Republic of Moldova - EU Association Agreement was signed[391]; - in 2018 the EU4Bussiness project for the implementation of the Moldova-EU Association Agreement, financed by the EBRD, was launched[392]; - in 2018, the Law on Energy Efficiency no.139, which provides for the mandatory implementation of energy efficiency/energy management measures for large companies, was passed; - in 2019 the Government approved the National Action Plan on Energy Efficiency for 2019-2021, GD no. 698; - in 2016, the Low Emission Development Strategy of the Republic of Moldova until 2030 was approved in 2017, the Program for promotion of "green" economy in the Republic of Moldova for the years 2018-2020 and the Action Plan for its implementation were approved. During 2012-2017, a large number of companies applied for support provided under the European programs MoSEFF and GGF TAF, due to which advanced production technologies were implemented.
Planned steps		- In the end of 2020, the GEFF (Moldova Green Economy Finance Facility) project was launched, financed by the EBRD for the period 2020-2024, which will stimulate the use of "gold" class technologies, with significantly higher efficiency than those currently used; - The EU4Bussiness project financed by the EBRD has extended its duration for the period 2021-2022; - The Government will approve the ECNP in 2021 according to the requirements of the Energy Community, which will require a decrease in energy intensity in all sectors of the economy.
Implementation progress	Environmental achievements	- Currently more than 300 companies have implemented production technologies modernization projects under the EU4Bussiness project, which have reduced their CO_2 emissions by at least 30%; - During 2012-2017, energy efficiency projects were implemented with the support of the European programs MoSEFF and GGF TAF, which resulted in implementation of advanced production technologies, thus ensuring CO_2 emissions reduction by at least 15%.
	Estimated emission reductions	- maximum 64.89 kt CO_2 by 2030

[390] <https://mepiu.md/rom/noutati/deschiderea-ofertelor-pentru-procurarea-servciilor-de-constructie-a-lea-vulcanesti-chisinau>
[391] <http://dcfta.md/continutul-acordului-de-asociere-dintre-rm-si-ue>
[392] <https://eu4business.eu/moldova>

Mitigation action 4: Reducing GHG emissions in construction sector

Description	Nature of the action	Development of the legislative and regulatory framework, enhancing energy efficiency, promotion of RES
	Sector	Energy
	GHG	CO_2, CH_4, N_2O
	Quantitative targets	- unconditional reduction, of GHG emissions from the building sector by 77% by 2030, and conditional reduction of GHG by 80% compared to 1990[393]; - renovation of 1%/year of identified and selected public buildings, with an area of 4,251 m^2, which will generate approximately 59.75 toe energy savings annually[394]; - primary energy savings in 2021 of 21.52 ktep[395] in the residential and public sector;
	Progress indicators	- legislative and regulatory acts in the field of construction developed and approved annually; - building codes developed and approved annually; - share of rehabilitated buildings in the total housing stock,%; - energy saved annually, GJ/year (MWh / year); - total capacity of installed biomass boilers, MW; - area of the installed solar collectors; - substituted solar energy, MWh/year; - thermal power of the installed heat pumps, MW; - GHG emission reductions, kt CO_2 equivalent
Methods		1. Development and approval[396] of the regulatory framework on energy performance of buildings, the secondary legal framework related to Law no.139/2018 on Energy Efficiency, the National Plan for increasing the number of buildings with almost zero energy consumption, the Building Renovation Strategy, etc.; 2. Implementation of the energy savings M&V tool; 3. Promotion of energy performance contracts and energy service companies (ESCOs); 4. Assessing the energy efficiency potential; 5. Training and education, including consultancy programs in energy, research, awareness-raising activities; 6. Establishing and implementing financial incentives for[397]: a) improving energy efficiency in residential buildings; b) improving energy efficiency in the public construction sector. 7. Promotion of NAMA; 8. Promoting energy efficiency in the heat distribution system by installing individual thermal points, replacing the vertical heating system with the horizontal one, with separate metering in each apartment, equipping the heating system with regulation/automation elements with the possibility of regulating air temperature in the rooms[398].
Assumptions		1) Continuation of existing financing projects in the field of energy performance of buildings; 2) After merging the EEE with the EFF, the financing of energy efficiency projects in the public sector will continue; 3) Lending to the residential and public sector by local commercial banks.
Goals		- development and implementation of national programs and action plans on improving the energy performance of buildings[399]; - establishing and implementing financial incentives for: implementing measures to improve the energy performance of existing buildings, their units and elements; promoting the construction of new buildings with almost zero energy consumption and promoting the transformation of existing buildings into buildings with almost zero energy consumption[400]; - use of renewable energy sources; - increasing energy security; - reducing energy consumption costs; - GHG emissions reduction.
Undertaken steps		- In 2015, Law no. 128 on Energy performance of buildings[401] was approved. The clauses regarding ventilation, cooling and lighting came into force in 2017; - The Action Plan on the harmonization of technical regulations and national standards in the field of constructions with European legislation and standards for the years 2014-2020 was adopted[402]. - In 2013, more than 100 EU standards in the field of energy performance of buildings were adopted, and after 2013 several new regulations were adopted, others being in the process of adoption; - Reorganization of the AEE by merging with FEE[403]; - On August 17, 2018, the Law no. 139 on Energy Efficiency[404] came into force; - 57 residential blocks with 3117 apartments have autonomous central heating with thermal energy consumption savings up to 30%[405].
Planned steps		- Development and adoption of the Building Renovation Strategy; - Development and approval of the energy saving validation system; - Launching of new tenders by the Energy Efficiency Agency to finance eligible projects.
Implementation progress	Environmental achievements	- About 1200 renovation and/or endowment subprojects with a total cost of 29 million Euro[406]. - Under the EU Energy and Biomass Project II in Moldova in 2015-2018[407]: 79 biomass heating systems and 49 solar energy based hot water production systems installed in public institutions; 121 schools, kindergartens, community centers, hospitals have modern biomass heating systems; 523 households and micro-enterprises are heated with green energy; 30 companies assemble or produce biomass boilers locally and offer them to the beneficiaries; etc. - primary energy savings in 2018 in the building sector were 75.09 ktoe[408]
	Estimated emission reductions	136.5 kt CO_2 eq. in 2019-2021 resulting from the expected energy reductions[409] 893.2 kt CO_2 eq. by 2030[410]

[393] The draft Low Emissions Development Strategy of the Republic of Moldova until 2030.
[394] National Action Plan on Energy Efficiency for 2019-2021. Government Decision no.698 of 27.12.2019. Official Gazettenr.7-13 from 17.01.2020
[395] Based on the National Action Plan on Energy Efficiency for 2019-2021. Government Decision no.698 of 27.12.2019. Official Gazette nr.7-13 of 17.01.2020
[396] Based on the National Action Plan on Energy Efficiency for 2019-2021. Government Decision no.698 of 27.12.2019. Official Gazette nr.7-13 of 17.01.2020
[397] Based on the National Action Plan on Energy Efficiency for 2019-2021. Government Decision no.698 of 27.12.2019. Official Gazette nr.7-13 of 17.01.2020
[398] Termoelectrica SA <https://www.termoelectrica.md/ro_RO/dezvoltare/pti-distributia-pe-orizontala/>
[399] Law on Energy Performance of Buildings, No.128 of 11.07.2014. Official Gazette nr.297-309 of 10.10.2014
[400] Law on Energy Performance of Buildings, No.128 of 11.07.2014. Official Gazette nr.297-309 of 10.10.2014
[401] Law on Energy Performance of Buildings, No.128 of 11.07.2014. Official Gazette nr.297-309 of 10.10.2014
[402] On Harmonization of technical regulations and national standards in the field of construction with European legislation and standards. Government Decision no. 933 of 12.11.2014. Official Gazette nr.340-343 of 14.11.2014
[403] On the organization and functioning of the Energy Efficiency Agency. Government Decision no.45 of 30.01.2019. Official Gazette nr.38-47 of 18.02.2019
[404] Law on Energy Efficiency, no.139 of 19.07.2018. Official Gazette nr.309-320 of 17.08.2018
[405] <https://www.termoelectrica.md/ro_RO/dezvoltare/realizari/>
[406] <http://mediu.gov.md/images/documente/starea_mediului/rapoarte/nationale/p7_Anuarul_IES_2009.pdf>
[407] Energy and Biomass (phase 2). <https://www.md.undp.org/content/moldova/ro/home/projects/moldova-energy-and-biomass-project2.html>
[408] Based on the National Action Plan on Energy Efficiency for 2019-2021. Government Decision no.698 of 27.12.2019. Official Gazette nr.7-13 of 17.01.2020.
[409] Based on the National Action Plan on Energy Efficiency for 2019-2021. Government Decision no.698 of 27.12.2019. Official Gazette nr.7-13 of 17.01.2020.
[410] Government Decision no.1470 of 30.12.2016 on approval of the Low Emissions Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. Official Gazette nr.85-91/222 of 24.03.2017.

Mitigation action 5: Reducing GHG emissions in heat production, transmission and distribution

Description	Nature of the action	Development of the legislative and regulatory framework, enhancing energy efficiency, promotion of RES
	Sector	Energy
	GHG	CO_2, CH_4, N_2O
	Quantitative targets	- Unconditional reduction, by 2030, of GHG emissions from the energy sector by 74% and conditional GHG emissions reduction up to 82% compared to 1990[411].
	Progress indicators	- legislation and regulatory framework developed and approved; - database on thermal energy sources; - plans for production of thermal energy in cogeneration mode developed and approved; - global energy demand of the country, ktep; - GHG emissions reductions, CO_2 tons eq.
Methods		1. Assessment of the national energy efficiency potential; 2. Training and education, including consultancy programs in the field of energy, research, awareness-raising activities; 3. Replacement of existing thermal points with individual thermal points; 4. Reducing losses in the distribution network; 5. Promoting the refurbishment of heat plants into modern mini-CHPs; 6. Installation of condensing economizers on existing boilers.
Assumptions		- the second project to improve the efficiency of the centralized heat supply system, worth US$ 100 million, will be carried out in 2020-2024 at "Termoelectrica SA"[412]
Goals		- promoting efficient cogeneration depending on the useful heat demand; - creation of databases for monitoring heat consumption and planning; - favoring the optimization of heat production and distribution. The actions included in this measure refer to the energy efficiency of the centralized heat delivery system in un. Chisinau and un. Balti municipalities. - mobilizing efforts and planning the efficiency of the thermal energy system, - reducing operational costs; - improving services; - increasing energy security; - modernization of heat plants and energy distribution system; - GHG emissions reduction.
Undertaken steps		- at "Termoelectrica" SA: modernization of the internal heat distribution system by installing 900[413] Individual Thermal Points, including installation of about 500 ITPs in residential buildings and public institutions in the capital city[414]; - modernization of about 135 km of heat pipes over 30 years old, by replacing them with modern, pre-insulated and energy efficient pipes; - replacement of 1300 heat meters and 1600 hot water meters with modern ultrasonic meters; - in 2020 „CET-Nord" SA allocated 33.8 million MDL for renovation and modernization of the production equipment and of the thermal networks, two times more compared to 2019[415]. Among the implemented measures - modernization of the main thermal network of about 1.7 km[416]; - implementation at "CET-Nord" SA of ISO standards: ISO 9001: 2015 which aims to increase the overall efficiency of the enterprise; ISO 50001: 2018 which allows the establishment, implementation, maintenance and improvement of the energy management system; ISO 14001: 2015 environmental management system implemented leads to: reducing energy consumption, increasing the efficiency of using products, processes and providing services; reducing costs by using raw materials more efficiently and improving performance; use of renewable resources[417]; - was: a) restored the hot water supply system at "CET-Nord" SA. Since 2019, the heat supplier has advanced technologies for supplying thermal energy for water heating[418]; b) built the cogeneration plant for electricity and heat production equipped with 4 Jenbacher internal combustion natural gas – based engines[419]; installed 169 individual thermal points in 130 residential buildings[420].
Planned steps		- Improving energy performance of centralized heat supply systems by optimizing the heat production, distribution and supply related processes, especially in the Centralized Heat Supply Systems (SACET) in Chisinau and Balti with primary energy savings of approx. 5.91 ktoe during 2019-2021.
Implementation progress	Environmental achievements	- primary energy savings related to the thermal energy sector in 2017-2018 are about 1.44 ktoe[421];
	Estimated emission reductions	13.88 kt CO_2 eq. in 2019-2021, based on the estimated energy reductions

Mitigation action 6: Biofuels in the transport sector

Description	Nature of the action	Renewable sources in transport
	Sector	Transport
	GHG	CO_2
	Quantitative targets	- 10% share of biofuels in total fuels used in the country
	Progress indicators	- amount of biofuels used; - GHG emissions reduction, CO_2 tons equivalent.
Methods		- motivation for sale and consumption of biofuels; - monitoring purchase of biofuels by car owners; - monitoring import of biofuels; - monitoring of rapeseed exports; - creation of MRV bodies dedicated to the actual consumption of biofuels; - publicity and training.
Assumptions		- by 2020 consumption of biofuels was 38.5 ktoe, including 11.7 ktoe bioethanol and 26.8 ktoe biodiesel; - until 2020 no biofuel production in the country for own consumption.
Goals		- increasing energy security; - reducing GHG emissions.

[411] Draft Government Decision on approving the Low Emission Development Strategy of the Republic of Moldova until 2030.
[412] <https://www.termoelectrica.md/ro_RO/dezvoltare/realizari/>
[413] <https://www.termoelectrica.md/ro_RO/dezvoltare/realizari/>
[414] < https://www.termoelectrica.md/ro_RO/termoelectrica-investeste-in-modernizzazione-sistemului-de-termoficare-in-124-de-blocuri-locative-si-34-de-cladiri-administrative/ >
[415] <https://www.cet-nord.md/ro/press-center/373-din-prima-sursa-interviu-cu-igor-savin-director-tehnic-al-cet-nord-sa>
[416] <https://www.cet-nord.md/ro/press-center/news/329-cet-nord-sa-modernizeaz-o-re-ea-termic-magistral-de-1-7-km>
[417] <https://www.cet-nord.md/ro/press-center/news/362-cet-nord-sa-a-ini-iat-implementarea-standardelor-iso>
[418] <https://www.cet-nord.md/ro/press-center/news/332-economise-te-contract-nd-serviciul-de-aprovizizare-cu-ap-cald-de-la-cet-nord -sa>
[419] <https://www.cet-nord.md/ro/press-center/news/256-cet-nord-utilizeaz-echipament-modern-n-producerea-energiei-termice-i-electrice>
[420] <https://www.cet-nord.md/ro/press-center/news/256-cet-nord-utilizeaz-echipament-modern-n-producerea-energiei-termice-i-electrice>
[421] Based on the National Action Plan on Energy Efficiency for 2019-2021. Government Decision no.698 of 27.12.2019. Official Gazette nr.7-13 of 17.01.2020

Undertaken steps		- the Moldovan-German company "Bio-Compani-Raps" has been operating in Lipcani since 2006; - The Energy Strategy until 2030 (2013) provides for 10% of biofuel blends in the amount of fuel sold by 2020; - in 2013 the Government approved the National Action Plan on Renewable Energy for 2013-2020, according to which the planned contribution of biofuels to reaching the 10%target of energy from renewable sources in energy consumption in transport by 2020 will be ensured entirely on the basis of imports, while the domestic contribution will only become relevant if it can compete with import prices; - in 2018 the Government approved the Program for promoting "green" economy for 2018-2020 and the Action Plan for its implementation, which among the actions includes integration of environmental provisions related to encouraging the use of alternative fuels and new technologies in all types of transport in the transport policies .
Planned steps		- development and approval of the secondary regulatory framework.
Implementation progress	Achieved results:	- biofuels were not used in the country, though 887.05 tons of rapeseed were processed in 2009, with subsequent extraction of more than 261.5 tons of biofuel, for export[422].
	Emission reductions	50 kt CO_2 by 2030

Mitigation action 7: Electric buses in Chisinau

Description	Nature of the action	Electric public transport, Chisinau
	Sector	Transport
	GHG	CO_2, N_2O, CH_4
	Quantitative targets	- within 10 years, 100% of the diesel buses in Chisinau replaced with other with electric motors.
	Progress indicators	- number of public transport units replaced; - GHG emission reductions, CO_2 tons equivalent.
Methods		- monitoring the procurement of public transport units with electric motors; - publicity and training.
Assumptions		- by 2030 all diesel buses in Chisinau will be replaced by other with electric motors
Goals		- increasing energy security; - GHG emissions reduction; - reducing local pollution, including noise pollution; - reducing the frequency of human diseases caused by air pollution.
Undertaken steps		- the amendments operated to the Fiscal Code, starting with the year 2020, exempted vehicles with electric engine from VAT; - in 2018, the Program for promoting the "green" economy in the Republic of Moldova for 2018-2020 was published.
Planned steps		- development and approval of the secondary regulatory framework, amendments to the existing normative framework
Implementation progress	Achieved results:	Launching of the project "Facilitating Green Public Investment in Moldova: Implementing the Clean Public Transport Program", funded under the European Union for the Environment (EU4Environment) program.
	Emission reductions	5.5 kt CO_2 by 2030

Mitigation action 8: Co-incineration of alternative fuels in the clinker kiln and partial substitution of clinker at Lafarge Ciment (Moldova)

Description	Nature of the action	Co-incineration of alternative fuels (biomass and solid municipal waste) in the clinker kiln, aimed at producing energy from the waste generated during cement production, and partial substitution of clinker at Lafarge Ciment (Moldova), member company of the LafargeHolcim Group
	Sector	Industrial processes and product use
	GHG	CO_2
	Quantitative targets	The member companies of LafargeHolcim Group set their goal to reduce net CO_2 per ton of cement produced by 40% by 2030[423], compared to 1990
	Progress indicators	- total quantities of cement and clinker produced annually, thousands of tons/year; - the specific amount of clinker used to produce cement, q/q; - total fuel consumption used in cement production, TJ/year; - CO_2 emissions from cement production process, thousand tons/year; - CO_2 emissions from burning fuel in the cement production process, thousands of tons/year; - trend of the default emission factor value, tons CO_2 from burning fuel/ton of cement; - trend of the default emission factor value, tons CO_2 process /ton of cement; - trend of the default emission factor value, total tons CO_2 (combustion + process)/ton of cement.
Methods		- CO_2 combustion emissions and, respectively, projected CO_2 combustion emissions from cement production, were calculated by Tier 1 methodology available in the IPCC Guide 2006, Vol. 2, Chapters 1 and 2; - CO_2 process emissions and, respectively, projected CO_2 process emissions from production of cement, were calculated by Tier 2 methodology available in the IPCC Guide 2006, Vol. 3, Chapter 2; - MRV for CO_2 mitigation measures from clinker production.
Assumptions		With reference to Lafarge Cement (Moldova), the following outputs are expected: 2025 - 800 thousand tons of cement, 2030 - 1100 thousand tons of cement (or the level of cement production in 1990 - 1100 thousand tons of cement); specific consumption of clinker per ton of cement: 2025 - 0.750 t / t, 2030 - 0.700 t/t; with reference to historical fuel consumption during 1990-1995 and 2015-2019, the company used massive oil coke (petcoke), consumption of which varied between 112.1 in 1990 and 32.1 kt in 2019, during 1995-2019 natural gas is used and in combination with other fuels, but natural gas consumption has fallen considerably from 85.4 million m^3 in 2007 up to 0.8 million m^3 in 2019, as a result of the high price of this energy source; since 2008 the company has started consuming coal (anthracite), including as a result of the lower price compared to natural gas, and its consumption varied between 26 and 81 kt over 2008-2019; it is acknowledged that in the short term the company will continue to use coal, but later this type of fuel will be replaced by natural gas, which is more harmless in terms of environmental pollution due to lower carbon content and waste. In the period 2009-2017 the company used rubber waste (used tires), and its consumption varied between 2 and 37 kt, while during 2015-2017, oil sludge was also used, its consumption varying between 4.0 and 10.7 kt) .

[422] <http://mediu.gov.md/images/documente/starea_mediului/rapoarte/nationale/p7_Anuarul_IES_2009.pdf>
[423] LafargeHolcim <https://www.lafargeholcim.com/our-climate-pledge>

Goals	- focusing on alternative fuels, with the following priorities: management of alternative energy resources; increasing industrial and operational capacity and management of permits and local communities; - implementation of the Commitment "Zero net carbon emissions, science-based objective", signed by LafargeHolcim on September 21, 2020, in New York; - by 2030, the LafargeHolcim group sets out its ambition to increase CO_2 mitigation targets , by reducing the intensity of emissions from cement production, from about 800 kg CO_2 net emissions per tone of cement produced in 1990, up to 475 kg CO_2 net emissions per tone of cement produced in 2030, based on an investment roadmap of about 160 million Swiss francs; - reduction of specific CO_2 emissions per ton of cement announced by the LafargeHolcim Group for 2030 is 40% less than in 1990.
Undertaken steps	The following were approved: - National Energy Efficiency Program for 2011-2020, GD No. 833/2011[424], - Energy Strategy of the Republic of Moldova until 2030, GD No. 102/2013[425], - Waste management strategy of the Republic of Moldova for 2013-2027, GD No. 248/2013[426], - The Environmental strategy for 2014-2023 and the Action Plan for its implementation, GD No. 301/2014[427], - The Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation, GD no. 1470/2016[428] (Specific objective 4 involves an unconditional reduction, by 2030, of GHG emissions from the industrial sector by 45% and a reduction of conditional GHG emissions by 56% compared to 1990, and measure 4.4 of the Action Plan for the Strategy implementation, specifies substitution of clinker in cement production); - The efforts of the LafargeHolcim group to reduce net CO_2 emissions per ton of cement produced resulted in 21.7%[429] reduction by the end of 2010 , 24% reduction by the end of 2015, and by 27%[430] by the end of 2019 compared to the 1990 reference year; - In order to honor its environmental sustainability commitment, the LafargeHolcim Group has developed new types of cement, such as CEMFORT.[431], with a lower clinker content than in traditional products[432, 433], as well as hydraulic binders (ROADMIX, FILLER) for road infrastructure projects, new products have been created to better meet customers' needs. Recently, eco-friendly ECOPact concrete has been launched on the market, which allows carbon-neutral construction and Susteno basic circular cement; - On 16.11.2017 Lafarge Ciment (Moldova) inaugurated an Innovation Center[434] in Chisinau, which is part of LafargeHolcim's international network of construction research laboratories, created to capitalize on the Group's global experience and technical know-how to develop construction solutions adapted to the unique characteristics of local markets; 200 engineers work in Lyon in the Group's Research Center, looking for optimal solutions to anticipate and meet customer expectations and needs to meet the challenges of the 21st century, their effort already recognized through more than 280 patents. The new Innovation Center in Chisinau is the channel through which modern solutions and technologies born in Lyon reach the local consumer. Some solutions have already been spread on the Moldovan market.
Planned steps	By 2030, the LafargeHolcim group will: - accelerate the use of its low or neutral carbon footprint products, such as ECOPact, which allows carbon-neutral construction and Susteno, the basic circular cement, and will continue to develop new types of cement with a lower clinker content than in traditional products; - intensify the use of calcined clay and will develop cements with new binders; - recover 100 million tons of waste and by-products as energy sources and raw materials; - double the usability of waste-derived fuels in the production process, to achieve a substitution rate of 37%; - reach 550 kg CO_2 net emissions per ton of cement by 2022, respectively 457 kg CO_2 net emissions per ton of cement produced by 2030; - operate its first zero-carbon production unit. The target of reducing CO_2 intensity up to 475 kg per ton of cement produced by 2030 is to be achieved due to the following activities: - *Reducing clinker content by up to 68%:* the reduction of primary carbon emissions will be achieved by changing the clinker-cement ratio; - *Wider use of waste derived fuels to achieve a 37% substitution rate.* Implementing the circular economy approach will contribute to achieving the target of reducing carbon intensity in the types of cement produced, by replacing fossil fuels with waste-based pre-treated, recyclable and biomass fuels in the operation of cement production kilns; - *Alternative raw materials:* The use of alternative sources of decarbonized raw materials is a key to reducing CO_2 intensity per ton of cement produced; - *Carbon capture and storage*: The production of cement with zero net carbon emissions will require the efficient capture and use or storage of carbon (Carbon Capture and Usage or Storage or CCUS). The LafargeHolcim Group is currently piloting over twenty projects implementing CCUS technology in Europe and North America. Over the next 10 years, CCUS technologies will be explored to reach cost-effective solutions that the cement industry needs to achieve its proposed carbon neutrality target by 2050; The target to reduce the intensity of emissions from the purchase of electricity up to 13 kg CO_2 per ton of cement produced by 2030 (or by 65% compared to 2018), will be achieved due to the following activities: - *Residual heat recovery* : Currently, five waste heat recovery units are operated in four countries, with a plan to triple their number in two stages by 2030; - *Expanding the renewable energy portfolio:* by collaborating with clean energy producers. The target to reduce emissions from transportation of finished product will be achieved due to the following activities: - *Optimization of transport networks* : through the "Network Optimization Modeling Tool" implemented in 7 countries; - *Optimization of routes and loads by better logistics and distribution*; - *Optimizing the car fleet to reduce traditional fuel consumption*; - *Optimizing fossil fuel consumption*.

[424] Government Decision no. 833 of 10.11.2011 on the National Energy Efficiency Program 2011-2020. Published: 18.11.2011 in the Official Gazette no. 197-202, Art. no: 914 <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=340940.

[425] Government Decision no. 102 of 05.02.2013 on the Energy Strategy of the Republic of Moldova until 2030. Published: 08.02.2013 in the Official Gazette no. 27-30, Art. no: 146. <http://lex.justice.md/md/346670/>

[426] Government Decision no. 248 of 10.04.2013 on the approval of the Waste Management Strategy in the Republic of Moldova for 2013-2027. Published: 12.04.2013 in the Official Gazette no. 82 Art. no: 306. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=347341>

[427] Government Decision no. 301 of 24.04.2014 on approval of the Environmental Strategy for the years 2014-2023 and of the Action Plan for its implementation. Published: 06.05.2014 in the Official Gazette no. 104-109, Art. no: 328. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=352740>

[428] Government Decision no. 1470 of 30.12.2016 on approval of Low Emissions Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. Published: 24.03.2017 in the Official Gazette no. 85-91, Art. no. 222. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=369528>

[429] <http://www.lafarge.md/wps/portal/md/7_3-TheNews_Detail?WCM_GLOBAL_CONTEXT=/wps/wcm/connectlib_md/Site_md/AllPR2/PressRelease_1327993713495/PR_Header>

[430] <https://www.lafargeholcim.com/our-climate-actions-today>

[431] Lafarge Cement Plant (Moldova) (2017), CEMFORT is a Portland cement composite with fast curing (R) and high workability. The main constituents are the Portland Clinker between 65–79% and the addition of limestone with a high category in the proportion of 21–35%. <http://docplayer.ru/51293331-Cement-pentru-betoane.html>

[432] Lafarge Cement Plant (Moldova) (2017), CEM II AS 32.5R Cement is a Portland type composite cement for ordinary concrete with high initial strength and high workability. The main constituents are clinker between 80-94% and a mixed addition of 6-20%. <http://www.lafarge.md/wps/portal/md/2_3_A-Detail?WCM_GLOBAL_CONTEXT=/wps/wcm/connectlib_md/Site_md/AllProductDataSheet/ProductDatasheet+Example_1413538963872/Prod

[433] Lafarge Cement Plant (Moldova) (2017), CEM I 42.5R Cement is a Portland type cement for extra hard concrete. It is a cement without addition, with high initial strength for concrete, with fast hardening. The main constituents are Portland clinker (95-100%) and minor components (0-5%). <http://www.lafarge.md/wps/portal/md/2_3_A-Detail?WCM_GLOBAL_CONTEXT=/wps/wcm/connectlib_md/Site_md/AllProductDataSheet/ProductDatasheet+Example_1308902180501/PRO

[434] Lafarge Cement Plant (Moldova) (2017), Press release of 16.11.2017. Lafarge Moldova inaugurates an Innovation Center in Chisinau. <http://www.lafarge.md/wps/portal/md/7_2-LatestNews_Detail?WCM_GLOBAL_CONTEXT=/wps/wcm/connectlib_md/Site_md/AllPR/PressRelease_1511126081427/PR_RO>

Implementation progress	Achieved results:	- LafargeHolcim Group has reduced its net emissions per ton of cement produced from around 0.800 tons of CO_2 net emissions per ton of cement in 1990, up to 0.561 tons of CO_2 net emissions per ton of cement produced in 2019; - In 2019, about 21% of the energy needed is produced from alternative fuels, low carbon fuels and biomass; in 2019, the LafargeHolcim group recovered about 48 million tons of waste, being recognized as one of the global leaders in sustainable waste management solutions, contributing to the conservation of the planet's finite resources; - LafargeHolcim group, reduced energy consumption per ton of clinker produced from 4,532 MJ in 1990, to 3,526 MJ in 2019; compared to 1990, specific energy consumption increased three times slower compared to the increase in cement production; - The group's products currently use on average about 29% alternative constituents to replace clinker (0.710 tons of clinker per 1 ton of cement produced), one of the lowest average levels of clinker content in the cement industry worldwide; - With reference to the Lafarge Cement plant (Moldova), during 1990-2019, the cement production decreased by 42.1%, from 1100.3 thousand tons to 637.3 kt; clinker production decreased by 37.6%, from 866.7 kt to 540.7 kt; energy consumption decreased by 44.9%, from 3881.2 TJ to 2393.8 TJ; the specific consumption of clinker per ton of cement increased by 7.7%, from 0.788 t/t to 0.848 t/t; the implied emission factor expressed in tons of CO_2 from combustion per TJ, decreased by 0.2% from 97.5 t CO_2/TJ up to 97.3 t CO_2/TJ; the implied emission factor expressed in tons CO_2 from combustion per ton of cement, was reduced by about 5.1%, from 0.344 t CO_2/t cement in 1990 up to 0.326 t CO_2/t cement in 2019; the implied emission factor, total t CO_2 (combustion + process) per ton of cement, increased by about 1.3%, from 0.769 t CO_2/t cement in 1990 to 0.779 t CO_2/t cement in 2019.
	Emission reductions	- Reduction of total CO_2 emissions (fuel combustion and process) from cement production at Lafarge Cement plant (Moldova), in the WEM scenario, as compared to the 1990 level, with circa 40% by 2030.

Mitigation action 9: Implementation of the energy management system, promotion of energy efficiency and increasing the share of glass shards in charge at "Chisinau Glass Factory" SE

Description	Nature of the action	Increasing energy efficiency and recycling glass shards
	Sector	Industrial processes and product use
	GHG	CO_2
	Quantitative targets	- Reduction by 2030 of CO_2 combustion emissions per ton of glass by 70% compared to 1990; - Reduction by 2030 of CO_2 process emissions per ton of glass by 30%, compared to the weighted average reported in 2011-2017 by increasing the share of glass shards in charge.
	Progress indicators	- total quantities of glass produced annually, thousands of tons/year; - total fuel consumption used to produce glass, TJ/year; - CO_2 process emissions from glass production, thousands of tons/year; - CO_2 combustion emissions in glass production process, thousands of tons/year; - trend of the default emission factor value, tons CO_2 from combustion/ton of glass; - trend of the default emission factor value, tons CO_2 from process/ton of glass; - trend of the default emission factor value, total tons CO_2 (combustion + process)/ton of glass.
Methods		- CO_2 combustion emissions and respectively, projected CO_2 combustion emissions from glass production calculated by Tier 1 methodology available in the IPCC Guide 2006, Vol. 2, Chapters 1 and 2; - CO_2 process emissions and respectively, projected CO_2 process emissions from glass production calculated by Tier 2 methodology available in the IPCC Guide 2006, Vol. 3, Chapter 2; - MRV for CO_2 mitigation measures from glass production of.
Assumptions		- With reference to "Chisinau Glass Factory" SE, the following outputs are expected: 2020 - about 62 thousand tons of glass, 2025 - about 70 kt of glass, 2030 - about 85 kt of glass (or amount close to glass production of 2001 - 86 kt of glass and 2002 - 85 kt of glass); it is expected to increase the share of glass shards of in charge: in 2020 - up to 35% or 21.7 kt, in 2025 - up to 40% or 28 kt, in 2030 - up to 50% or 42.5 kt (for comparison, in 2019 the share of glass shards in charge was 24.1% or about 14.7 kt); natural gas consumption in 2020 will be about 355.7 TJ, in 2025 - about 393.7 TJ, and in 2030 - about 430.1 TJ; the implied emission factor values of CO_2 combustion emissions in 2020 will be 321.8 kg CO_2 per ton of glass, in 2025 - 315.6 kg CO_2 per ton of glass, in 2030 - 283.9 kg CO_2 per ton of glass (for comparison: in 1990 - 1003.3 kg CO_2 per ton of glass, in 2000 - 969.1 kg CO_2 per ton of glass, in 2005 - 854 kg CO_2 per ton of glass, in 2010 - 494.1 kg CO_2 per ton of glass, in 2019 - 322.9 kg CO_2 per ton of glass); the implied emission factor values of CO_2 process emissions in 2020 will be 130 kg CO_2 per ton of glass, in 2025 - 120 kg CO_2 per ton of glass, in 2030 - 100 kg CO_2 per ton of glass (for comparison: in 2013 - 150.0 kg CO_2 per ton of glass, in 2014 - 155.8 kg CO_2 per ton of glass, in 2015 - 149.8 kg CO_2 per ton of glass, in 2019 - 151.7 kg CO_2 per ton of glass).
Goals		- focusing on energy efficiency measures, defining the following priorities for the company: efficient management of energy resources and increasing industrial and operational capacity; - ensuring further enterprise development based on increased production efficiency; - implementation of the investment program aimed at: increasing export of products based on glass products competitiveness; increasing production efficiency as a result of carrying out partial repairs of the glass melting furnace, capital repairs of the glass shaping machines, modernization of the electricity transmission line; capital repairs of technological equipment, etc.; - by 2030 reduction: of specific CO_2 combustion emissions per ton of glass by 70% compared to 1990; with about 30% of CO_2 emissions per ton of glass, compared to the weighted average reported in 2011-2019, by increasing the share of glass shards in charge.
Undertaken steps		The following were approved: - National Energy Efficiency Program for 2011-2020, GD No. 833/2011[435] - The National Action Plan on Energy Efficiency for 2013-2015, GD no. 113/2013[436] - The National Action Plan on Energy Efficiency for 2016-2018, GD no. 1471/2016[437] - The National Action Plan on Energy Efficiency for 2019-2021, GD no. 698/2019[438] - Energy Strategy of the Republic of Moldova until 2030, GD no. 102/2013[439] - Waste Management Strategy in the Republic of Moldova for 2013-2027, GD no. 248/2013[440], - The Environmental Strategy for 2014-2023 and the Action Plan for its implementation, GD no. 301/2014[441], Government Decision no. 381 of 01.08.2019 on approval of the National Program on Research and Innovation for 2020-2023 and of the Action Plan on its implementation[442] - Government Decision no. 561 of 31.07.2020 on approval of the Regulation on packaging and packing waste[443] - The Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation, GD no. 1470/2016[444] (Specific objective 4 stipulates unconditional reduction, by 2030, of GHG emissions from the industrial sector by 45% and conditional reduction of GHG by 56% compared to 1990, and measure 4.1 of the Action Plan for Strategy implementation, provides for the implementation of the Energy Management System and the National Standard SM ISO 50001: 2012 in 39 industrial enterprises in the country, at the same time, measure 4.3 of the Action Plan for Strategy implementation, provides for promotion of energy efficiency in the industrial sector); - Compared to 1990, by the end of 2015 specific CO_2 reductions per ton of glass was 68.7%, and by the end of 2019 - about 67.8%; - planned investments during 2016-2020 - 5,474 million Euro, including - 1,974 million Euro from own financial sources; 3,500 million Euro from financial means granted by financial institutions.

[435] Government Decision no. 833 of 10.11.2011 on the National Energy Efficiency Program 2011-2020. Published: 18.11.2011 in the Official Gazette no. 197-202, Art. no. 914 <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=340940>

[436] Government Decision no. 113 of 07.02.2013 on approval of the National Action Plan on Energy Efficiency for 2013-2015. Published: 15.02.2013 in the Official Gazette no. 31-35, Art. no. 158. <https://www.legis.md/cautare/getResults?doc_id=47102&lang=ro>

[437] Government Decision no. 1471 of 30.12.2016 on approval of the National Action Plan on Energy Efficiency for 2016-2018. Published: 31.03.2017 in the Official Gazette no. 92-102, Art. no.: 257. <https://www.legis.md/cautare/getResults?doc_id=111780&lang=ro>

Planned steps		- implementation of the Energy Management System (EnMS) and the National Standard SM ISO 50001: 2012; - promoting energy efficiency; - increasing the share of glass shards in charge; - completion of the 2016-2020 Investment Program implementation.
Implementation progress	Achieved results:	- Compared to 1990, "Chisinau Glass Factory" SE has reduced specific CO_2 emissions by 68.7% by the end of 2015 and by 67.8% - by the end of 2019.
	Emission reductions	- Reducing total CO_2 emissions by about 75 thousand tons of CO_2 by 2030, compared to the 1990 reference level.

Mitigation action 10: Soil conservation and fertility enhancement

Description	Nature of the action	Sustainable practices in agricultural soil cultivation
	Sector	Agriculture, agricultural soils
	GHG	N_2O, CO_2
	Quantitative targets	Use of chemical fertilizers: - nitrogen: 90.0-99.9 thousand tons by 2035; - natural organic: 4.2-4.9 million tons by 2035. Use of green manures, equivalent to mineral fertilizers: 2100-2800 thousand tons by 2035 Area of conservation agriculture: 400-500 thousand hectares by 2035
	Progress indicators	- amount of chemical fertilizers used; - amount of organic fertilizers of animal origin used; - amount of green manure introduced into the soil; - area of farmlands including conservation agriculture lands; - area of lands under sidereal and legume crops.
Methods		- appropriate implementation of the Land Improvement Program aimed at ensuring sustainable management of soil resources for 2021-2025 and the Action Plan for its implementation for 2021-2023[445], GD no. 864/2020; - motivating the development of conservation agriculture; - use of "no-till" and "mini-till" technologies; - publicity and training on sustainable agriculture; - conservation agriculture MRV; - Tier 1 methodology for calculating direct and indirect N_2O emissions, projected direct and indirect N_2O emissions from farmlands, available in the IPCC Guidelines 2006, Volume 3, Chapter 11; - Tier 2 methodology for calculating direct and indirect CO_2 emissions, projected direct and indirect CO_2 emissions from farmlands, available in the IPCC Guidelines 2006, Volume 4, Chapter 2, alternatively calculated using a nationally specific methodology, equivalent to a Tier 3 methodology (Banaru, 2000)[446]
Assumptions		- for green manures (autumn peas as an intermediate crop) the following basic parameters were taken into account: average humidity of the green mass - 80%; average nitrogen content in the green mass - 0.8%; average productivity - 20 t/ha; the coefficient of transition to manure with bedding - 1.4 (by content of nitrogen 1 ton of green mass of peas is equivalent to 1.4 tons of cattle manure with bedding); - introduction of intermediate crops as green manure will be carried out in parallel with the implementation of conservation agriculture tillage system, based on "no-till" and "mini-till" technologies; - the surveys were carried out based on the information available in the Land Reclamation and Soil Fertility Enhancement Program (Part II. Soil Fertility Enhancement), GD no. 841/2004[447], Soil Conservation and Fertility Enhancement Program for 2011-2020, GD no. 626/2011, Action Plan on implementation of the Soil Conservation and Fertility Enhancement Program for 2014-2016, GD no. 138/2014, Action Plan on implementation of the Soil Conservation and Fertility Enhancement Program for 2017-2020, GD no. 554/2017, respectively in the National Agricultural and Rural Development Strategy for 2014-2020, GD No. 409/2014[448] and the Action Plan on implementation of the National Agricultural and Rural Development Strategy for 2014-2020, GD no. 742/2015, respectively in the Land Improvement Program aimed at ensuring sustainable management of soil resources for 2021-2025 and the Action Plan on its implementation for 2021-2023[449], GD no. 864/2020; - the total amount of mineralized nitrogen was determined in accordance with the "Method for estimating GHG emissions from arable soils" (Banaru, 2000); - on the conservation agriculture areas, the plant residues from the basic crop, in proportion of 75-90% shall remain in the field for the formation of mulch.
Goals		- achieving a neutral or slightly positive balance of carbon and humus in soil by 2030; - increasing soil productivity without eroding it; - limiting growth trends and reducing direct GHG emissions (N_2O and CO_2) from agricultural soils.

[438] Government Decision no. 698 of 27.12.2019 on approval of the National Action Plan on Energy Efficiency for 2019-2021. Published: 17.01.2020 in the Official Gazette no. 7-13, Art. 12. <https://www.legis.md/cautare/getResults?doc_id=119890&lang=ro>
[439] Government Decision no. 102 of 05.02.2013 on the Energy Strategy of the Republic of Moldova until 2030. Published: 08.02.2013 in the Official Gazette no. 27-30, Art. no. 146. <http://lex.justice.md/md/346670/>
[440] Government Decision no. 248 of 10.04.2013 on approval of the Waste Management Strategy of the Republic of Moldova for 2013-2027. Published: 12.04.2013 in the Official Gazette no. 82 art. No: 306. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=347341>
[441] Government Decision no. 301 of 24.04.2014 on approval of the Environmental Strategy for 2014-2023 and of the Action Plan for its implementation. Published: 06.05.2014 in the Official Gazette no. 104-109, art. No: 328. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=352740>
[442] Government Decision no. 381 of 01.08.2019 on approval of the National Program on Research and Innovation for 2020-2023 and of the Action Plan on its implementation. Published: 16.08.2019 in the Official Gazette no. 256-259 art. 506. <https://www.legis.md/cautare/getResults?doc_id=115747&lang=ro>
[443] Government Decision No. 561 of 31.07.2020 for approval of the Regulation on packaging and packing waste. Published: 21-08-2020 in the Official Gazette no. 212-220 Art. 743. <https://www.legis.md/cautare/getResults?doc_id=122773&lang=ro>
[444] Government Decision no. 1470 of 30.12.2016 on approval of the Low Emissions Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. Published: 24.03.2017 in the Official Gazette no. 85-91, Art. no. 222. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=369528>
[445] The Land Improvement Program aimed at ensuring sustainable management of soil resources for 2021-2025 and the Action Plan on its implementation for 2021-2023, approved at the Government meeting of December 9, 2020. <https://gov.md/sites /default/files/document/attachments/subiect-04_3.pdf>
[446] Banaru, Anatol (2000), Methodology for estimating GHG emissions from arable soils. In the collection of works "Climate Change. Research, Studies, Solutions". Ministry of Environment and Spatial Planning / UNDP Moldova. „Bons Offices" SRL Chisinau, 2000. pp. 115-123.
[447] Government Decision no. 841 of 26.07.2004 on approval of the Land Reclamation and Soil Fertility Enhancement Program (Part II. Soil Fertility Enhancement). Published: 13.08.2004 in the Official Gazette no. 138-146, Art. no: 1066. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=305055>
[448] Government Decision no. 409 of 04.06.2014 regarding approval of the National Agricultural and Rural Development Strategy for 2014-2020. Published: 10.06.2014 in the Official Gazette no. 152, Art. no: 451. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=353310>
[449] The Land Improvement Program aimed at ensuring sustainable management of soil resources for 2021-2025 and the Action Plan for its implementation for 2021-2023, approved at the Government meeting of December 9, 2020. <https://gov.md/sites /default/files/document/attachments/subiect-04_3.pdf>

Undertaken steps		The following have been approved and are in the process of implementation: - The Soil Conservation and Fertility Enhancement Program for 2011-2020, GD no. 626/2011 - National Development Strategy "Moldova 2020", Law no. 166/2012[450]; - The Environmental Strategy for 2014-2023 and the Action Plan for its implementation, GD No. 301/2014[451]; National Agricultural and Rural Development Strategy for 2014-2020. 409/2014; - The Action Plan for implementation of the National Agricultural and Rural Development Strategy for 2014-2020, GD no. 742/2015; - The Action Plan on implementation of the Soil Conservation and Fertility Enhancement Program for 2014-2016, GD no. 138/2014; - Rural Program of Economic Resilience - Inclusive Climate (IFAD VI) for 2014-2020[452]; - Financing agreement between the Government of the Republic of Moldova and the European Commission on implementation of the ENPARD Moldova Program - support for agriculture and rural development, promulgated by the Decree of the President of the Republic of Moldova No. 1815 of 12.11.2015[453]; - The Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation, GD no. 1470/2016[454]; - The Action Plan on implementation of the Soil Conservation and Fertility Enhancement Program for 2017-2020, GD no. 554/2017; - Rural Resilience Program (IFAD VII) for 2017-2023[455]; - The program for promoting the "green" economy in the Republic of Moldova for 2018-2020 and the Action Plan for its implementation, GD no. 160/2018[456]; - The Action Plan on implementation of the National Agricultural and Rural Development Strategy updated for 2018-2020, GD no. 785/2018[457].
Planned steps		1) Full implementation of: - The Land Improvement Program aimed at ensuring sustainable management of soil resources for 2021-2025 and the Action Plan for its implementation for 2021-2023[458], GD no. 864/2020; - Regulation on conditions and procedure for granting subsidies in advance for land improvements investment projects for implementation of the Land Improvement Program aimed at ensuring sustainable management of soil resources for 2021-2025[459], GD no. 985/2020; - Capacity Building Program for Rural Transformation (IFAD VIII) for 2021-2026[460]; 2) Development and approval of the long-term secondary policy, legislative and regulatory framework, including the National Conservation Agriculture Development Program.
Implementation progress	Achieved results:	- the State provides financial incentives for procurement of agricultural machinery needed for advanced soil cultivation technologies (the amount of support for agricultural machinery and equipment is conventional calculated as 25% cost compensation (per unit), but not exceeding 300 thousand MDL per beneficiary, while for "no-till" and "mini-till" technologies, the amount of support is calculated as 30% cost compensation per unit, but not exceeding 500 thousand MDL per beneficiary); according to the GD no. 455 of 21.06.2017 on allocation of the funds of the National Fund for Agriculture and Rural Development (NFARD), the Fund accumulated 1 billion MDL in 2020, or by 5.2% more than in 2019, when 950 million MDL were accumulated, which shows a clear trend for increase from year to year. The largest share of grant applications were for: subsidizing investments in *development of post-harvest and processing infrastructure* - 626 applications, the amount of requested subsidy - 399.3 million lei (33.8% of the total); *establishment, modernization of perennial plantations and deforestation of unproductive ones* - 1408 applications for subsidies worth 225.0 million lei (19.1% of the total); *subsidizing agricultural machinery and equipment including for mini-till and no-till* technologies - 2246 requests worth 245.8 million lei (20.8% of the total); *development of the livestock sector* - 314 requests, out of which 251 requests for stimulating investments in renovation of animal husbandry farms (84.0 million lei) and 63 requests worth 20.7 million lei for purchase of breeding animals; *stimulating the crediting of agricultural producers* : 2263 requests worth 112.4 million lei (10% of the total)[461]; The total number of applicants for purchasing "no-till" and "mini-till" equipment through NFARD in 2016 was 121; the total amount applied for – 20,901 million MDL; the total number of beneficiaries - 107; the total amount authorized by the Agency for Intervention and Payments in Agriculture - 18,165 million MDL; the area of agricultural lands cultivated according to "no-till" / "mini-till" technology was 60,634 thousand ha; - In 2017 - 54.4 million lei granted to 217 beneficiaries; 101.4 thousand ha cultivated; - In 2018 - 63.7 million lei granted to 278 beneficiaries; 133,524 thousand ha cultivated; - In 2019 - 11.6 million lei granted to 73 beneficiaries; 51,984 thousand ha cultivated; - According to the National Bureau of Statistics of the Republic of Moldova and the State Statistical Service of the Ministry of Economic Development of UATSN, the amount of nitrogenous chemical fertilizers applied to soil evolved in the period 1990-2019 as follows: 1990 - 92.1 kt of active substance, 1995 - 10.5 kt, 2000 - 10.2 kt, 2005 - 16.1 kt, 2010 - 20.6 kt, 2011 - 25.0 kt, 2012 - 34.1 kt, 2013 - 42.1 kt, 2014 - 61.1 kt, 2015 - 38.7 kt, 2016 - 43.4 kt, 2017 - 55.7 kt, 2018 - 64.3 kt and 2019 - 77.2 kt. The trend towards growing consumption of nitrogenous mineral fertilizers is expected to continue in the coming period; - According to the information available in the "National Inventory Report: 1990-2019. Greenhouse Gas Sources and Sinks in the Republic of Moldova "(2021), the amount of natural organic fertilizers applied to soil (mainly cattle, swine and poultry manure with straw bedding) evolved during 1990 -2019 as follows: 1990 - 9.74 million tons, 1995 - 5.96 million tons, 2000 - 3.72 million tons, 2005 - 3.67 million tons, 2010 - 3.27 million tons, 2011 - 2.99 million tons, 2012 - 2.77 million tons, 2013 - 2.63 million tons, 2014 - 2.86 million tons, 2015 - 2.78 million tons, 2016 - 2.87 million tons, 2017 - 2.73 million tons, 2018 - 2.44 million tons, 2019 - 2.20 million tons. Based on the evolution of livestock and poultry numbers in the RM, consumption of natural organic fertilizers is expected to decrease by 2035.
	GHG emissions	- Reduction of total N_2O emissions from agricultural soils by 2035, compared to the level recorded in the reference year, in the scenario with existing measures - with about 128 kt CO_2 equivalent, and in the scenario with additional measures - with about 160 kt CO_2 equivalent.

[450] Law no. 166 of 11.07.2012 on approval of the National Development Strategy "Moldova 2020". Published: 30.11.2012 in the Official Gazette no. 245-247, Art. no: 791. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=345635>. Amended by Law no. 121 of 03.07.2014 on amendment and completion of the Annex to Law no. 166 of July 11, 2012 for approval of the National Development Strategy "Moldova 2020". Published [: 03.10.2014 in the Official Gazette no. 293-296, Art. no: 603. <http://lex.justice.md/md/354876/>

[451] Government Decision no. 301 of 24.04.2014 on approval of the Environmental Strategy for the years 2014-2023 and of the Action Plan for its implementation. Published: 06.05.2014 in the Official Gazette no. 104-109, Art. no: 328. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=352740>

[452] Rural Program for Economic and Inclusive Climate Resilience (IFAD VI) 2014-2020. <https://www.ucipifad.md/programe/programe-in-derulare/proiectul-de-rezilienta-rurala-ifad-vii/>

[453] Decree of the President of the Republic of Moldova No. 1815 of 12.11.2015 on promulgation of the Law for the ratification of the Financing Agreement between the Government of the Republic of Moldova and the European Commission on the implementation of the ENPARD Moldova Program - support for agriculture and rural development. Published: 27.11.2015 in the Official Gazette no. 317-323, Art. no: 575. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=361905>

[454] Government Decision no. 1470 of 30.12.2016 on approval of the Low Emissions Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. Published: 24.03.2017 in the Official Gazette no. 85-91, Art. no: 222. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=369528>

[455] Rural Resilience Program (IFAD VII) 2017-2023. <https://www.ucipifad.md/programe/programe-in-derulare/programul-rural-de-rezilienta-economico-climatica-incluziva-ifad-vi/>

[456] Government Decision no. 160 of 21.02.2018 on approval of the Program for promotion of the "green" economy in the Republic of Moldova for 2018-2020 and of the Action Plan for its implementation. Published: 02.03.2018 in the Official Gazette no. 68-76, art. No: 208. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=374523>

[457] Government Decision no. 785 of 01.08.2018 on approval of the amendments that are operated in some Government Decisions. Published: 28.09.2018 in the Official Gazette no. 366-376, Art. no: 962. <https://www.legis.md/cautare/getResults?doc_id=108950&lang=ro>

[458] The Land Improvement Program aimed at ensuring sustainable management of soil resources for 2021-2025 and the Action Plan for its implementation for 2021-2023, approved at the Government meeting of December 9, 2020. <https://gov.md/sites /default/files/document/attachments/subiect-04_3.pdf>

[459] Government Decision on approval of the Regulation on conditions and procedure for granting subsidies in advance for land improvement investment projects aimed at implementing the Land Improvement Program in to ensure sustainable management of soil resources for 2021-2025, approved at the Government meeting of 22 December 2020 (topic of discussion no. 66). <https://gov.md/ro/content/sedinta-guvernului-din-22-decembrie-2020-ora-1600>

[460] Capacity-building program for the transformation of the rural area (IFAD VIII) 2021-2026, <https://www.ucipifad.md/noutati/parliament-a-ratificat-un-nou-acord-de-finantare-cu-fondul- international-for-agricultural-development />, ratified by Law no. 194 of 19.11.2020 for the ratification of the Financing Agreement between the Republic of Moldova and the International Fund for Agricultural Development for "Improving Capacities for Rural Transformation (IFAD VIII)" Project implementation, published on 18.12.2020 in the Official Gazette no. 329-331, Art. 199 <https://www.legis.md/cautare/getResults?doc_id=124253&lang=ro>

[461] Agency for Intervention and Payments for Agriculture (2020), Analytical Report for 2019 on management of financial means allocated to the national fund for agriculture and rural development. P. 44. <http://aipa.gov.md/ro/rapoarte>

Mitigation action 11: Improving livestock and poultry populations in the Republic of Moldova

Description	Nature of the action	Creating more productive livestock and poultry
	Sector	Agriculture, animal husbandry
	GHG	CH_4
	Quantitative targets	By 2035: - cattle 70-80 thousand heads; - sheep 430-440 thousand heads; - goats 100-105 thousand heads; - swine 400-405 thousand heads; - poultry 9.75-10.00 million heads.
	Progress indicators	- livestock and poultry numbers; - productivity.
Methods		- publicity and training for promoting highly productive livestock and poultry breeds; - introducing and breeding highly productive livestock and poultry breeds; - subsidizing promotion of new highly productive livestock and poultry breeding technologies, based on the provisions of Law no. 276 of 16.12.2016 on the principles of subsidizing agricultural producers[462], through the Public Institution "Agency for Intervention and Payments in Agriculture" (AIPA), which is responsible for the efficient management of the National Agriculture and Rural Environment Development Fund (NFARD), respectively under GD no. 455 of June 21, 2017 on the distribution of funds provided by the National Fund for Agricultural and Rural Development[463], in particular for the sub-measure 1.4 "Stimulating investments for operation and technological upgrading of livestock farms" or increasing productivity, competitiveness and ensuring food security by stimulating technological organization and upgrading of livestock farms, and by sub-measure 1.5. "Stimulating procurement of breeding animals and maintaining their genetic pool" or increasing productivity, competitiveness and ensuring food security by stimulating livestock improvement; - MRV of mitigation of GHG emissions from the livestock sector; - Tier 1 and Tier 2 calculation methodologies for CH_4 emissions, respectively for projected CH_4 emissions from enteric fermentation, available in the IPCC Guidelines 2006, Volume 4, Chapter 10.
Assumptions		the downward trend in livestock and poultry populations in the Republic of Moldova is expected to slow down by 2025; according to the National Dairy Sector Development Program of the Republic of Moldova for 2020-2025 and the Action Plan for its implementation for the years 2020-2022[464], the average productivity of dairy cows is expected to increase to 6200 kg per year by 2025; thus, during 2025-2030, the productivity level in the livestock sector of the Republic of Moldova could be similar to the one in countries with a transition economy in Eastern Europe included in Annex I to UNFCCC, respectively emission factors will have similar values to default emission factors used for assessing CH_4 emissions from enteric fermentation specific to Eastern European countries.
Goals		Ensuring agro-food security, including efficient low-emissions productivity for meat, milk and eggs.
Undertaken steps		The following documents have been approved and are under implementation: - the Dairy Cattle Breeding Program of the Republic of Moldova for 2014-2020[465]; - the Sheep and Goats Breeding Program of the Republic of Moldova for 2014-2020[466]; - the National Strategy for Agricultural and Rural Development 2014-2020. GD no.409/2014[467] and the Action Plan on implementation of the National Strategy for Agricultural and Rural Development for 2014-2020, GD no. 742/2015[468], the updated National Strategy for Agricultural and Rural Development for 2014-2020 and the Action Plan for implementation of the National Strategy for Agricultural and Rural Development for 2018-2020, GD no. 785/2018[469]; - the Environmental Strategy for 2014-2023 and the Action Plan for its implementation, GD No. 301/2014[470]; - the FAO Project "Development of the National Strategy and Action Plan for Animal Genetic Resources and the Dairy Cows Genetic Improvement Program"[471]; Law no. 276 of 16.12.2016 on the principles of subsidizing agricultural producers[472]; - the Low-emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation, GD No. 1470/2016[473]; - Government Decision no. 455 of 21.06.2017 on the distribution of the funds from the National Fund for Agricultural and Rural Development[474]; - Government Decision no. 836 of 18.11.2020 on approval of the Regulation on granting direct payments per animal[475].
Planned steps		- Approval of the Draft Law on Animal Husbandry (new version)[476]; - Approval of the Draft National Program for the development of the dairy sector in the Republic of Moldova for the years 2017-2025[477].

[462] Law no. 276 of 16.12.2016 on the principles of subsidizing agricultural producers. Published: 03.03.2017 in the Official Gazette no. 67-71, Art. no: 93. <https://www.legis.md/cautare/getResults?doc_id=122915&lang=ro>
[463] Government Decision no. 455 of 21.06.2017 on the distribution of funds from the National Fund for Agricultural and Rural Development. Published: 23.06.2017 in the Official Gazette no. 201-213, Art. no: 537. <https://www.legis.md/cautare/getResults?doc_id=123859&lang=ro>. Amended by the Government Decision No. 772 of 21.10.2020 amending some Government Decisions Published: 24.10.2020 in the Official Gazette no. 278, Art. no: 909. <https://www.legis.md/cautare/getResults?doc_id=123697&lang=ro>
[464] The National Dairy Sector Development Program of the Republic of Moldova 2020-2025 and the Action Plan regarding its implementation for 2020-2022. <http://particip.gov.md/proiectview.php?l=ro&idd=7741>
[465] The Dairy Cattle Breeding Program of the Republic of Moldova for 2014-2020, approved for implementation by the Animal Husbandry and Veterinary Commission of the Technical-Scientific Council of the Ministry of Agriculture and Food Industry of the Republic of Moldova, Minutes no.2 of 17.10.2013. Focsa, V., Constandoglo, A. Chisinau, "Print-Caro" 2013, 22 p., ISBN 978-9975-56-122-8.
[466] The Sheep and Goat Breeding Program of the Republic of Moldova for 2014-2020, approved for implementation by the Animal Husbandry and Veterinary Commission of the Technical-Scientific Council of the Ministry of Agriculture and Food Industry of the Republic of Moldova, Minutes no.3 of 18.12.2013. Masner, O., Liutcanov, P., Evtodienco, S., Danuta, A. Chisinau, "Print-Caro" 2014, 34 pp. ISBN 978-9975-56-197-6.
[467] Government Decision no. 409 of 04.06.2014 on approval of the National Strategy for Agricultural and Rural Development for 2014-2020. Published: 10.06.2014 in the Official Gazette no. 152, Art. no. 451. <https://www.legis.md/cautare/getResults?doc_id=110039&lang=ro>
[468] Government Decision no. 742 of 21.10.2015 on approval of the Action Plan for the implementation of the National Strategy for Agricultural and Rural Development for 2014-2020. Published: 30.10.2015 in the Official Gazette no. 297-300, Art. no. 835. <https://www.legis.md/cautare/getResults?doc_id=110254&lang=ro>
[469] Government Decision no. 785 of 01.08.2018 on approval of the amendments operated to some Government Decisions (GD no. 409/2014 on approval of the National Strategy for Agricultural and Rural Development for 2014-2020 and GD no. 742/2015 on approval of the Action Plan for the implementation of the National Strategy for Agricultural and Rural Development for the years 2014-2020). Published: 28.09.2018 in the Official Gazette no. 366-376, Art. no. 962. <https://www.legis.md/cautare/getResults?doc_id=108950&lang=ro>
[470] Government Decision no. 301 of 24.04.2014 on approval of the Environmental Strategy for 2014-2023 and of the Action Plan for its implementation. Published: 06.05.2014 in the Official Gazette no. 104-109, Art. no. 328. <https://www.legis.md/cautare/getResults?doc_id=114539&lang=ro>
[471] FAO project Development of the National Strategy and Action Plan for Animal Genetic Resources and the Dairy Cows Genetic Improvement, <http://www.madrm.gov.md/ro/content/moldova-%C3%AE%C8%99i-consolideaz%C4%83-sectorul-cre%C8%99terii-vacilor-de-lapte-cu-suportul-fao>, <http://maia.gov.md/ro/categorii/proiecte-de-asistenta-externa-sectorul-agroalimentar>
[472] Law no. 276 of 16.12.2016 on the principles of subsidizing agricultural producers. Published: 03.03.2017 in the Official Gazette no. 67-71, Art. no. 93. <https://www.legis.md/cautare/getResults?doc_id=122915&lang=ro>
[473] Government Decision no. 1470 of 30.12.2016 on approval of the Low Emissions Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. Published: 24.03.2017 in the Official Gazette no. 85-91, Art. no. 222. <https://www.legis.md/cautare/getResults?doc_id=114408&lang=ro>
[474] Government Decision no. 455 of 21.06.2017 on distribution of funds from the National Fund for Agricultural and Rural Development. Published: 23.06.2017 in the Official Gazette no. 201-213, art. No: 537. <https://www.legis.md/cautare/getResults?doc_id=123859&lang=ro>. Modified by Government Decision No. 772 of 21.10.2020 regarding the modification of some Government decisions no. 772 of 21.10.2020. Published: 24.10.2020 in the Official Gazette no. 278, Art. no. 909. <https://www.legis.md/cautare/getResults?doc_id=123697&lang=ro>
[475] Government Decision no. 836 of 18.11.2020 on approval of the Regulation on granting direct payments per animal. Published on 02.12.2020 in the Official Gazette no. 318, Art. No. 992. <https://www.legis.md/cautare/getResults?doc_id=124163&lang=ro >
[476] The Draft Law on Animal Husbandry (new version). Published for consultation by the State Chancellery on 18 March 2020: <https://cancelaria.gov.md/ro/content/cu-privire-la-aprobarea-proiectului-de-lege-zootehniei-238madrm2020>
[477] The Dairy Cattle Breeding Program of the Republic of Moldova 2020-2025 and the Action Plan for its implementation in 2020-2022. <http://particip.gov.md/proiectview.php?l=ro&idd=7741>

Implementation progress	Achieved results:	- The means of the National Fund for Agricultural and Rural Development (NFARD) amounted to about 1 billion lei by 2020, by 5.2% higher than in 2019 - 950 million lei, showing a clear increasing trend from year to year; - The number of funding applications to the Public Institution "Agency for Intervention and Payments in Agriculture" (AIPA) increased by 1.2% in 2019, which is by 89 applications more than in the previous year (in 2011 there were 1088 beneficiaries of subsidies, in 2012 - 4457, in 2013 - 4012, in 2014 - 5133, in 2015 – 3801, in 2016 - 4321, in 2017 - 5643, in 2018- 7416, in 2019 - 7505); - In 2019, 251 applications for financial support worth 83.6 million lei were submitted for the refurbishing and technological upgrading of: 49 cattle farms, 12 sheep and goats farms, 10 swine farms, 34 poultry farms, 138 bee farms, 8 rabbit/other fur animals farms. In order to subsidize agricultural producers from the state budget, AIPA authorized payment for 111 applications for financial support worth 38.9 million lei, with the remaining amount to be authorized from NFARD sources for 2020 as a result of exhaustion of funds; - For comparison, in 2018, 217 applications for financial support worth 55.8 million lei were submitted for refurbishing and technological upgrading of: 41 cattle farms, 11 sheep and goats farms, 12 swine farms, 28 poultry farms, 126 bee farms, 9 rabbit/other fur animals farms; - In 2019, a total of 251 livestock farms were re-equipped and upgraded (for comparison, 215 farms in 2018, 153 farms in 2017, 86 farms in 2016, 67 farms in 2015, 111 farms in 2014 and 64 farms in 2013); - In 2019, 20.6 million lei were requested for subsidizing: 656 cattle, 946 sheep, 464 swine, and 3335 bee families; AIPA authorizing for payment 9.5 million lei, the remaining amount to be authorized from NFARD sources for 2020 as a result of the exhaustion of funds; - For comparison, in 2018, 13.1 million lei were requested for the subsidization of 263 cattle, 93 goats, 1011 sheep, 683 swine and 4360 queen bees; - According to the National Bureau of Statistics of the Republic of Moldova and the State Statistical Service of the Ministry of Economic Development of UATSN, the population of domestic animals and poultry evolved in the period 1990-2019 as follows: the total population of cattle decreased by about 86.7%, from 1060.7 thousand heads in 1990 to 141.2 thousand heads in 2019; the population of dairy cows decreased by about 77.2%, from 395.2 thousand heads in 1990 to 90.2 thousand heads in 2019; the population of other cattle decreased by about 92.3%, from 665.5 thousand heads in 1990, to 51.0 thousand heads in 2019; the sheep population decreased by about 56.9%, from 1244.8 thousand heads in 1990 to 536.1 thousand heads in 2019; the population of goats increased by about 311.7%, from 37.1 thousand heads in 1990, to 152.7 thousand heads in 2019; the population of swine decreased by about 76.8%, from 1850.1 thousand heads in 1990 to 428.4 thousand heads in 2019; the population of rabbits increased by about 16.5%, from 283.0 thousand heads in 1990 to 329.7 thousand heads in 2019; the herd of poultry decreased by about 54.9%, from 24,625 million heads in 1990 to 11,116 million heads in 2019.
	Emission reductions	Reduction of methane emissions from category 3A "Enteric fermentation" under the WEM scenario, compared to the level reported in the reference year - by about 1.8 Mt CO_2 equivalent, respectively under the WAM scenario - by about 1.9 Mt CO_2 equivalent by 2035.

Mitigation action 12: Manure management enhancement

Description	Nature of the action	Efficient manure management
	Sector	Agriculture, animal husbandry
	GHG	CH_4, N_2O
	Quantitative targets	Increasing the share of large livestock and poultry farms owned by agricultural enterprises and peasant farms (farmers), in the total number of livestock and poultry in all types of farms in the Republic of Moldova, in 2035 compared to the current state (year 2019), as follows: - cattle: 80.0% compared to 14.9%; - dairy cows: 75.0% compared to 6.3%; - other cattle: 85.0% compared to 31.3%; - swine: 80.0% compared to 57.8%; - sheep and goats: 35.0% compared to 2.8%; - poultry: 55.0% compared to 38.1%.
	Progress indicators	- number of large farms - amount of manure treated in large farms
Methods		- developing policies for concentrating livestock and poultry in large farms; - motivating the development of animal and poultry breeding on large farms; - employing modern animal and poultry breeding technologies on large farms to mitigate GHG emissions from animal husbandry sector; - Tier 1 and 2 calculation methodologies for CH_4 emissions, and projected CH_4 emissions from manure management, available in the IPCC Guidelines 2006, Volume 4, Chapter 10.
Assumptions		- gradual transition to efficient and sustainable manure management practices by 2030; - in accordance with the National Dairy Cattle Breeding Program of the Republic of Moldova 2020-2025 and the Action Plan for its implementation for 2020-2022[478], it is anticipated that the average productivity of dairy cows will increase to 6200 kg per year by 2025; thus, during 2025-2030, the productivity level in the livestock sector of the Republic of Moldova could be similar to the one in countries with a transition economy in Eastern Europe included in Annex I to UNFCCC, respectively emission factors will have similar values to default emission factors used for assessing CH_4 emissions from manure management specific to the Eastern European countries with economies in transition included in Annex I to the UNFCCC;
Goals		- the production of animals and birds at the level of efficiency registered in the EU countries; - the application of efficient and sustainable animal manure management technologies in order to reduce environmental pollution and greenhouse gas emissions.
Undertaken steps		The following documents have been approved and are under implementation: - the National Energy Efficiency Program 2011-2020, GD No. 833/2011[479]; - the Energy Strategy of the Republic of Moldova until 2030, GD No. 102/2013[480]; - the Waste Management Strategy of the Republic of Moldova for 2013-2027, GD No. 248/2013[481]; - the Dairy Cattle Breeding Program of the Republic of Moldova for 2014-2020; - the Sheep and Goats Breeding Program of the Republic of Moldova for 2014-2020; - the National Strategy for Agricultural and Rural Development for 2014-2020. GD No.409/2014[482] and the Action Plan for the implementation of the National Strategy for Agricultural and Rural Development for 2014-2020, GD No. 742/2015[483], the updated National Strategy for Agricultural and Rural Development for 2014-2020 and the Action Plan for the implementation of the National Strategy for Agricultural and Rural Development for 2018-2020, GD No. 785/2018[484]; - The Environmental Strategy for 2014-2023 and the Action Plan for its implementation, GD No. 301/2014[485]; - FAO Project "Development of the National Strategy and Action Plan for Animal Genetic Resources and the Dairy Cows Genetic Improvement Program"[486]; - Law no. 276 of 16.12.2016 on the principles of subsidizing agricultural producers[487]; - the Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation, GD No. 1470/2016[488]; - Government Decision no. 455 of 21.06.2017 on the distribution of the funds from the National Fund for Agricultural and Rural Development[489]; - Government Decision no. 836 of 18.11.2020 on approval of the Regulation on direct payments per animal[490].

[478] The Dairy Cattle Breeding Program of the Republic of Moldova 2020-2025 and of the Action on its implementation for 2020-2022. <http://particip.gov.md/proiectview.php?l=ro&idd=7741>
[479] Government Decision No.833 of 10.11.2011 on the National Energy Efficiency Program 2011-2020. Published: 18.11.2011 in the Official Gazette no. 197-202, Art. no. 914 <https://www.legis.md/cautare/getResults?doc_id=110334&lang=ro>
[480] Government Decision no. 102 of 05.02.2013 on the Energy Strategy of the Republic of Moldova until 2030. Published: 08.02.2013 in the Official Gazette no. 27-30, Art. no. 146. <https://www.legis.md/cautare/getResults?doc_id=68103&lang=ro/>

Planned steps		- Approval of the Draft Law on Animal Husbandry (new version)[491]; - Approval of the Draft National Dairy Cattle Breeding Program of the Republic of Moldova for the 2017-2025[492].
Implementation progress	Achieved results:	- The funds of the National Fund for Agricultural and Rural Development (NFARD) amounted to about 1 billion lei in 2020, which is 5.2% higher than in 2019 - 950 million lei, with a clear trend of increase from year to year; - The number of applications for funding to the Public Institution "Agency for Intervention and Payments for Agriculture" (AIPA) increased by 1.2% in 2019; - In 2019, 251 applications for financial support worth 83.6 million lei were submitted for refurbishing and technological upgrading of: 49 cattle farms, 12 sheep and goats farms, 10 swine farms, 34 poultry farms, 138 bee farms, 8 rabbit / other fur animals farms; In order to subsidize agricultural producers from the state budget, AIPA authorized payment for 111 applications for financial support worth 38.9 million lei, with the remaining amount to be authorized from NFARD sources for 2020 as a result of exhaustion of funds ; - For comparison, 217 applications for financial support worth 55.8 million lei were submitted in 2018 for refurbishing and technological upgrading of: 41 cattle farms, 11 sheep and goats farms, 12 swine farms, 28 poultry farms, 126 bee farms, 9 rabbit/other fur animals farms; - In 2019, a total of 251 livestock farms were re-equipped and upgraded (for comparison, 215 farms in 2018, 153 farms in 2017, 86 farms in 2016, 67 farms in 2015, 111 farms in 2014 and 64 farms in 2013); - In 2019, 20.6 million lei were requested for subsidizing: 656 cattle, 946 sheep, 464 swine, and 3335 bee families; AIPA authorizing for payment 9.5 million lei, the remaining amount to be authorized from NFARD sources for 2020 as a result of the exhaustion of funds; - For comparison, in 2018, 13.1 million lei were requested for the subsidization of 263 cattle, 93 goats, 1011 sheep, 683 swine and 4360 queen bees; - According to the National Bureau of Statistics of the Republic of Moldova and the State Statistical Service of the Ministry of Economic Development of UATSN, the population of domestic animals and poultry evolved in the period 1990-2019 as follows: the total population of cattle decreased by about 86.7%, from 1060.7 thousand heads in 1990 to 141.2 thousand heads in 2019; the population of dairy cows decreased by about 77.2%, from 395.2 thousand heads in 1990 to 90.2 thousand heads in 2019; the population of other cattle decreased by about 92.3%, from 665.5 thousand heads in 1990, to 51.0 thousand heads in 2019; the sheep population decreased by about 56.9%, from 1244.8 thousand heads in 1990 to 536.1 thousand heads in 2019; the population of goats increased by about 311.7%, from 37.1 thousand heads in 1990, to 152.7 thousand heads in 2019; the population of swine decreased by about 76.8%, from 1850.1 thousand heads in 1990 to 428.4 thousand heads in 2019; the population of rabbits increased by about 16.5%, from 283.0 thousand heads in 1990 to 329.7 thousand heads in 2019; the herd of poultry decreased by about 54.9%, from 24,625 million heads in 1990 to 11,116 million heads in 2019; - the share of large livestock and poultry farms owned by agricultural enterprises and peasant farms (farmers) decreased considerably over 1990-2019: cattle - from 81.8% in 1990 to 14.9% in 2019, dairy cows- from 74.9% in 1990 to 6.3% in 2019, other cattle - from 86.0% in 1990 to 31.3% in 2019, swine - from 81.0% in 1990 to 57.8% in 2019, sheep and goats -from 35.9% in 1990 to 2.8% in 2019, poultry - from 53.5% in 1990 to 38.1% in 2019; - the share of manure management systems specific to large farms, which contribute to the generation of CH_4 emissions to a greater extent has shrunk, similarly to liquid manure management systems - in dairy cattle the share of manure management systems decreased from 24% of the total in 1990 to about 2.1% of the total in 2019; in other cattle it decreased from 34.0% in 1990 to about 13.5% in 2019, and in swine the share of manure management systems decreased from 73% in 1990 to about 52.4% in 2019; - the share of solid manure management systems, which is less responsible for generating CH_4 emissions, has increased: in dairy cattle - from 70.0% of the total in 1990 to 72.9% of the total in 2019; in other cattle - from 62.0% in 1990 to 64.5% in 2019, and in swine - from 27.0% in 1990 to 47.6% in 2019.
	Emission reductions	Reduction of methane emissions from category 3B "Manure Management" under the WEM scenario compared to the level recorded in the reference year, is by circa 1.2 Mt CO_2 equivalent by 2035, and by circa 1.3 Mt CO_2 equivalent by 2035 under the WAM scenario.

Mitigation action 13: Expansion of wooded areas

Description	Nature of the action	Afforestation of new land
	Sector	LULUCF
	GHG	CO_2
	Quantitative targets	Expansion of wooded areas, increase by thousands of hectares: - maximum 32-85 by 2030; The volume of the harvested wood mass, increase thousand m^3: - maximum 127-292 by 2030.
	Progress indicators	- wooded areas; - the volume of the harvested wood mass;
Methods		- identification of new areas for afforestation; - integrated planning on a national and local scale, providing planting and technical material, ensuring methodological and technologic inputs, design, on-the-field-field implementation, etc.; - creation of highly productive and ecologically stable stands; - implementation of the Action Plan on expansion of wooded areas; - MRV for expansion of wooded areas and the amount of harvested wood.

[481] Government Decision no. 248 of 10.04.2013 on the approval of the Waste Management Strategy in the Republic of Moldova for the years 2013-2027. Published: 12.04.2013 in the Official Gazette no. 82 Art. no. 306. <https://www.legis.md/cautare/getResults?doc_id=114412&lang=ro>

[482] Government Decision no. 409 of 04.06.2014 regarding the approval of the National Strategy for Agricultural and Rural Development for 2014-2020. Published: 10.06.2014 in the Official Gazette no. 152, Art. no. 451. <https://www.legis.md/cautare/getResults?doc_id=110039&lang=ro>

[483] Government Decision no. 742 of 21.10.2015 for the approval of the Action Plan on implementation of the National Strategy for Agricultural and Rural Development for 2014-2020. Published: 30.10.2015 in the Official Gazette no. 297-300, Art. no. 835. <https://www.legis.md/cautare/getResults?doc_id=110254&lang=ro>

[484] Government Decision No. 785 of 01.08.2018 on approving amendments operated to some Government Decisions (amending GD no. 409/2014 on approval of the National Strategy for Agricultural and Rural Development for 2014-2020 and GD No. 742/2015 on approval of the Action Plan for the implementation of the National Strategy for Agricultural and Rural Development for 2014-2020). Published on 28.09.2018 in the Official Gazette No. 366-376, Art. No: 962. <https://www.legis.md/cautare/getResults?doc_id=108950&lang=ro>

[485] Government Decision no. 301 of 24.04.2014 on approval of the Environmental Strategy for 2014-2023 and of the Action Plan for its implementation. Published: 06.05.2014 in the Official Gazette no. 104-109, Art. no. 328. <https://www.legis.md/cautare/getResults?doc_id=114539&lang=ro>

[486] FAO project "Development of the National Strategy and Action Plan for Animal Genetic Resources and the Dairy Cows Genetic Improvement Program" <http://www.madrm.gov.md/ro/content/moldova-%C3%AE%C8%99i-consolideaz%C4%83-sectorul-cre%C8%99terii-vacilor-de-lapte-cu-suportul-fao>, <http://maia.gov.md/ro/categorii/proiecte-de-asistenta-externa-sectorul-agroalimentar>

487 Law no. 276 of 16.12.2016 on the principles of subsidizing agricultural and rural development. Published: 03.03.2017 in the Official Gazette no. 67-71, Art. no. 93. <https://www.legis.md/cautare/getResults?doc_id=122915&lang=ro>

[488] Government Decision no. 1470 of 30.12.2016 on approval of the Low Emissions Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation. Published: 24.03.2017 in the Official Gazette no. 85-91, Art. no. 222. <https://www.legis.md/cautare/getResults?doc_id=114408&lang=ro>

[489] Government Decision no. 455 of 21.06.2017 on distribution of funds of the National Fund for Agricultural and Rural Development. Published: 23.06.2017 in the Official Gazette no. 201-213, art. No: 537. <https://www.legis.md/cautare/getResults?doc_id=123859&lang=ro>. Amended by Government Decision No. 772 of 21.10.2020 on amendments operated to some Government Decisions No. 772 of 21.10.2020. Published: 24.10.2020 in the Official Gazette no. 278, Art. no. 909. <https://www.legis.md/cautare/getResults?doc_id=123697&lang=ro>

[490] Government Decision no. 836 of 18.11.2020 on approval of the Regulation on direct payments per animal. Published: 02.12.2020 in the Official Gazette no. 318, art. No: 992. <https://www.legis.md/cautare/getResults?doc_id=124163&lang=ro>

[491] Draft Law on Animal Husbandry (new version). Published for consultation by the State Chancellery on March 18, 2020: <https://cancelaria.gov.md/ro/content/cu-privire-la-aprobarea-proiectului-de-lege-zootehniei-238madrm2020>

[492] The Drat National Dairy Cattle Breeding Program of the Republic of Moldova 2020-2025 and of the Action Plan for its implementation for 2020-2022. <http://particip.gov.md/proiectview.php?l=ro&idd=7741>

Assumptions		- national emission factors used to assess annual biomass growths and losses in forests; - afforestation will be implemented on 4.5% of rarities, 10.4% in gaps and wastelands, 21.6% in stands affected by calamities, 5.4% on non-regenerated parquets, 20.5% on wood sectors subject to exploitation until 2020 and 37.6% on other lands;
Goals		- attain the afforestation level of about 15% of the country's territory, appropriate for a healthy ecosystem, which is currently 11.2%; - increase CO_2 removals.
Undertaken steps		The following were approved: - the State Program for Forest Regeneration and Afforestation for 2003-2020, the National Areas Extension Plan for 2014-2018, the National Strategy for Agricultural and Rural Development for 2014-2020; the Environmental Strategy for 2014-2023 and the Action Plan for its implementation.
Planned steps		- develop and approve the Plan for funding the implementation of the State Program for Forest Regeneration and Afforestation; -approve subsequent Action plans, following after 2018; - promote the NAMA project "Afforestation of degraded lands, impracticable for agriculture" developed within the LECB project and registered in the UNFCCC NAMA Registry in 2016.
Implementation progress	Environmental achievements	- regenerated forest areas increased from 3.3 kha in 2006 to approx. 5 kha in 2013; - the area of the forest vegetation covered lands decreased from 7.5 kha in 2006 to 0.1 kha in 2013 [1)];
	Emissions removals	By 2030, maximum 414 kt CO_2 eq.

Mitigation action 14: Soil Conservation Project in Moldova

Description	Nature of the action	Afforestation of degraded lands
	Sector	LULUCF
	GHG	CO_2
	Quantitative targets	Afforestation of degraded land on 20,291 hectares.
	Progress indicators	- wooded areas; - the volume of the harvested wood mass; - the amount of reduced certified GHGs.
Methods		- identification of new areas for afforestation; - integrated planning on a national and local scale, providing planting and technical material, methodological and technological inputs, design, on-the- field implementation, etc.; - creation of highly productive and ecologically stable stands; - the GHG removal potential was calculated according to the approved CDM methodology AR-AM0002 "Re-afforestation of degraded lands by afforestation / re-afforestation" (UNFCCC, 2009); - media coverage and training on sustainable natural resource management; - MRV expansion of wooded areas.
Assumptions		- to estimate annual growths and losses of biomass in forests, the country specific emission factors have been calculated/developed; - the species for planting are selected according to the criteria of matching with the soil, climate and adaptability characteristics; - afforestation of degraded land will improve soil condition; - increasing access to wood resources and non-wood forest products.
Goals		- attain the afforestation level of about 15% of the country's territory, appropriate for a healthy ecosystem, which is currently 11.2%; - re-including 20.3 kha of eroded and unproductive lands in the general productive circuit; - increase GHG removals (CO_2).
Undertaken steps		The following documents were approved: - the State Program for Forest Regeneration and Afforestation for 2003-2020, the National Areas Extension Plan for 2014-2018, the National Strategy for Agricultural and Rural Development for 2014-2020; the Environmental Strategy for 2014-2023 and the Action Plan for its implementation. - the Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation.
Planned steps		- replanting within the SCPM the areas initially unsuccessful or destroyed by various natural disasters (1,133 ha); - ensuring the appropriate management for the newly created forests; - monitoring according to the project methodology and reporting the emission reductions achieved under the PSCM.
Implementation progress	Environmental achievements	- SCPM project documents development: PDD and Monitoring Plan; - planting and care of 20.3 kha of forest crops; - registration of the SCPM at the CDM Secretariat (2009); - international monitoring and certification of 864 kt CO_2 eq. GHG emission reductions during 2002-2012; - monitoring of 1,205 kt CO_2 eq. GHG emission reductions during 2012-2016 (2016-2017).
	Emissions removals	About 3,600 kt CO_2 eq. by 2022

Mitigation action 15: Development of the communal forestry sector in the Republic of Moldova

Description	Nature of the action	Afforestation of degraded lands
	Sector	LULUCF
	GHG	CO_2
	Quantitative targets	Afforestation of degraded land on 8,469 hectares.
	Progress indicators	- the area of actually wooded lands; - the volume of the harvested wood mass; - the amount of GHG emission reductions achieved and certified.
Methods		- identification of new areas for afforestation; - integrated planning on a national and local scale, providing planting and technical material, methodological and technological inputs, design, on-the- field implementation, etc.; - creation of highly productive and ecologically stable stands; - the GHG removal potential was calculated according to the approved CDM methodology AR-AM0002 "Re-afforestation of degraded lands by afforestation / re-afforestation" (UNFCCC, 2009); - media coverage and training on sustainable natural resource management; - MRV of expansion of wooded areas.

Assumptions		- to estimate annual growths and losses of biomass in forests, the country specific emission factors have been calculated/developed; - the species for planting are selected according to the criteria of matching with the soil, climate and adaptability characteristics; - afforestation of degraded land will improve soil condition; - increasing access to wood resources and non-wood forest products.
Goals		attain the afforestation level of about 15% of the country's territory, appropriate for a healthy ecosystem, which is currently 11.2%; - re-including 8.5 thousand ha of eroded and unproductive lands in the general productive circuit; - employment of agroforestry practices; - introduction of participatory forest and grassland management practices; - increase GHG removals (CO_2).
Undertaken steps		The following documents were approved: - the State Program for Forest Regeneration and Afforestation for 2003-2020, the National Areas Extension Plan for 2014-2018, the National Strategy for Agricultural and Rural Development for 2014-2020; the Environmental Strategy for 2014-2023 and the Action Plan for its implementation; - the Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation.
Planned steps		- replanting the areas within PDSFCM initially unsuccessful or destroyed by various natural disasters (326 ha); - ensuring the appropriate management for the newly created forests; - monitoring according to the project methodology and reporting the emission reductions achieved in the framework PDSFCM.
Implementation progress	Environmental achievements	- elaboration of project documents for PDSFCM: PDD and Monitoring Plan; - planting and care of 8.5 kha of forest crops; - registration of PDSFCM at the CDM Secretariat (2012); - monitoring and certification international GHG emission reductions in volume of 328 kt CO_2 eq. for the period 2006-2013; - monitoring GHG emission reductions in a volume of 367 kt CO_2 eq. for the period 2013-2018.
	Emissions removals	By 2035: about 1,200 kt CO_2 eq.

Mitigation action 16: Rehabilitation of forest belts for protection of agricultural fields in the southern part of the Republic of Moldova

Description	Nature of the action	Rehabilitation of forest belts to protect agricultural fields
	Sector	LULUCF
	GHG	CO_2
	Quantitative objectives	Rehabilitation of forest belts for protection of agricultural fields on 2,242 hectares.
	Progress indicators	- the area of the rehabilitated forest protection belts; - the area of the protected agricultural adjacent lands; - the volume of the harvested wood mass; - the amount of reduced GHG emissions, achieved and certified.
Methods		- integrated planning on a national and local scale, providing planting and technical material, methodological and technological inputs, design, on-the- field implementation, etc.; - creation of forest protection belts with multiple protection functions; - the GHG removal potential was calculated according to the approved CDM methodology AR-AM0002 "Re-afforestation of degraded lands by afforestation / re-afforestation" (UNFCCC, 2009); - media coverage and training on sustainable management of natural resources, including forest belts to protect agricultural fields (104 events); - MRV on the process of rehabilitation and maintenance of forest belts.
Assumptions		- a sample of markets (43 PP) was placed to establish annual biomass growths and losses in rehabilitated forest protection belts; - the species for planting are selected according to the criteria of matching with the soils, climate and adaptability characteristics; - rehabilitation of forest protection belts will ensure protection of the neighboring agricultural lands; - increasing access to wood resources and non-wood forest products.
Goals		- ensuring the appropriate degree of protection for agricultural lands with forest belts - 4%, which is currently 1.7% or 30.7 kha; - curbing the degradation processes of the adjacent agricultural lands; - employment of agroforestry practices; - increasing GHG removals (CO_2).
Undertaken steps		The following were approved: - the Land Reclamation and Soil fertility Enhancement Program for 2003-2010 and 2011-2020, the National Areas Expansion Plan for 2014-2018, the National Strategy for Agricultural and Rural Development for 2014-2020; the Environmental Strategy for 2014-2023 and Action Plan for its implementation; the Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation.
Planned steps		- replanting of areas initially unsuccessful or destroyed by various natural disasters; - ensuring proper management for rehabilitated forest protection belts; - monitoring the emission reductions due to rehabilitated forest protection belts.
Implementation progress	Environmental achievements	- rehabilitation of forest belts for protection of agricultural fields on 2,242 hectares; - monitoring 43.04 kt CO_2 eq. GHG emission reductions during 2014-2016.
	CO_2 emissions removals	About 430.44 kt CO_2 eq. by 2034

Mitigation action 17: Afforestation of degraded lands, riparian areas and protection curtains in the Republic of Moldova

Description	The nature of the action	Land afforestation
	Sector	LULUCF
	GHG	CO_2
	Quantitative targets	- afforestation of degraded lands on 45,000 hectares; - afforestation of riparian strips on 15,000 hectares; - creation of belts for the protection of agricultural fields on 1,500 hectares.
	Progress indicators	- wooded areas; - the volume of the harvested wood mass.

Methods		- identification of new areas for afforestation; - integrated planning on a national and local scale, providing planting and technical material, methodological and technological inputs, design, on-the- field implementation, etc.; - creation of highly productive and ecologically stable stands; - the GHG removal potential was calculated according to the approved CDM methodology AR-AM0002 "Re-afforestation of degraded lands by afforestation / re-afforestation" (UNFCCC, 2009); - media coverage and training on sustainable natural resource management; - MRV of the process of expanding wooded areas.
Assumptions		- to estimate annual growths and losses of biomass in forests, the country specific emission factors have been calculated/developed; - the species for planting are selected according to the criteria of matching with the soil, climate and adaptability characteristics; - afforestation of degraded land will improve soil condition.
Goals		- attain the afforestation level of about 15% of the country's territory, appropriate for a healthy ecosystem, which is currently 11.2%; - increase GHG removals (CO_2).
Undertaken steps		The following were approved: - the State Program for Forest Regeneration and Afforestation for 2003-2020, the National Areas Extension Plan for 2014-2018, the National Strategy for Agricultural and Rural Development for 2014-2020; the Environmental Strategy for 2014-2023 and the Action Plan for its implementation. - the Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation.
Planned steps		Subsequent promotion of the NAMA document on afforestation of degraded lands, riparian areas and protection belts in the Republic of Moldova.
Implementation progress	Environmental achievements	The NAMA document on afforestation of degraded lands, riparian areas and protection belts in the Republic of Moldova was developed in pre-feasibility study format.
	CO_2 emissions removals	About 2,000 kt CO_2 eq. by 2030

Mitigation action 18: Smart climate management of forests and grasslands

Description	The nature of the action	Land afforestation, grasslands rehabilitation
	Sector	LULUCF
	GHG	CO_2
	Quantitative targets	- afforestation of degraded lands on 1,500 hectares; - afforestation of riparian strips on 320 hectares; - creation of belts for protection of agricultural fields on 560 hectares; - rehabilitation of forest protection belts on 750 ha; - rehabilitation of degraded grasslands on 1,000 ha.
	Progress indicators	- wooded area; - the area of the rehabilitated forest protection belts; - the area of improved grasslands; - the amount of CO_2 removed.
Methods		- identification of new areas for afforestation; - integrated planning on a national and local scale, providing planting and technical material, methodological and technological inputs, design, on-the-field implementation, etc.; - creation of highly productive and ecologically stable stands; - creation of highly productive and multifunctional grasslands; - MRV.
Assumptions		- to estimate annual growths and losses of biomass in forests, the country specific emission factors have been calculated/developed; - the species for planting are selected according to the criteria of matching with the soil, climate and adaptability characteristics; - afforestation of degraded land will improve soil condition
Goals		- rehabilitation of forest protection belts and degraded grasslands; - planting new forest protection belts; - attain the afforestation level of about 15% of the country's territory, appropriate for a healthy ecosystem, which is currently 11.2%; - increase in CO_2 removals.
Undertaken steps		The following were approved: - the State Program for Forest Regeneration and Afforestation for 2003-2020, the National Areas Extension Plan for 2014-2018, the Low Emission Development Strategy of the Republic of Moldova until 2030 and Action Plan for its implementation , the Climate Change Adaptation Strategy until 2020.
Planned steps		- development of environmental management plans; - selection of LPAs in the central and southern areas of the country, considered to be more vulnerable to climate change; - evaluation of plots of land for afforestation or for the creation/rehabilitation of forest protection curtains.
Implementation progress	Environmental achievements	The actions described are the component part of the climate change adaptation project of the Republic of Moldova.
	CO_2 emissions removals	Circa 50 kt CO_2 eq. annually

Mitigation action 19: Improving eroded land by conversion to pastures

Description	The nature of the action	Conversion of moderately and heavily eroded lands into pastures
	Sector	LULUCF
	GHG	CO_2
	Quantitative targets	- conversion of 40,000 ha of moderately and heavily eroded land into pastures.
	Progress indicators	- moderately and heavily eroded land surface transformed into pastures; - amount of fodder mass for animals produced on the eroded land converted into pastures; - amount of CO_2 removed.

Methods		- identification of new areas with eroded soils for improvement / rehabilitation; - integrated planning on a national and local scale, providing planting and technical material, methodological and technological inputs, design, on-the- field implementation, etc.; - special technologies were developed and tested in UNDP projects "Clima-East: Sustainable Management of Pastures and Forests in the First National Park of the Republic of Moldova (Orhei National Park) to demonstrate the benefits of mitigation and adaptation measures to climate change for local communities" and "Integrating Biodiversity Conservation Priorities into Territorial Planning Policies and Land Use Practices in Moldova".
Assumptions		- country specific emission factors were used to assess annual biomass increases on the newly created pastures; - for improvement works (sowing) the grass species will be selected based on soils matching criteria, climate and the adaptability characteristics; - the conversion of eroded (degraded) lands will improve the condition of eroded soils.
Goals		- increasing the share of land covered with meadows to 22% of the country's territory, which currently is about 12%; - quantitative and qualitative increase of the feed mass for cattle; - the re-inclusion of 40.0 kha of eroded and poorly productive lands in the general productive circuit; - increase GHG (CO_2) removal capacity.
Undertaken steps		The following were approved: - the Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation; - Regulation on grazing and mowing, GD no. 667/2010; - the Environmental Strategy of the Republic of Moldova for 2014-2023 and the Action Plan for its implementation, GD No. 301/2014; - the Strategy on Biological Diversity of the Republic of Moldova for 2015-2020 and the Action Plan for its implementation, GD No. 274/2015; - the National Strategy for Sustainable Development of the Agribusiness in the Republic of Moldova (2008-2015), GD No. 282/2008.
Planned steps		- primary assessment of eroded land plots for improvement by conversion to pastures; - development of improvement projects for eroded and poorly productive lands by creating pastures; - selection of LPAs in the central and southern areas of the country, regarded as more vulnerable to climate change; - ensuring appropriate management for newly created pastures.
Implementation progress	Environmental achievements	The actions described are part of a new project to adapt to climate change.
	CO_2 emissions removals	Circa 555 kt CO_2 eq. by 2030

Mitigation action 20: Management of degraded agricultural lands by implementing erosion control measures and eroded soils cultivation methods

Description	The nature of the action	Sustainable management of eroded agricultural land
	Sector	LULUCF
	GHG	CO_2
	Quantitative goals	- remediate the eroded arable soils on slopes, increase fertility, and sequestrate carbon in soils. - minimize fertile soil losses up to the maximum allowable limit - 5 t/ha; - stable crops yields on arable lands on slopes; - stop the liquid and solid leakage intensity on the slopes and prevent compaction; - implement anti-erosion measures on 865 kha of eroded agricultural lands; - stop degradation (compaction) on the eroded soils, by restoration.
	Progress indicators	- the area of eroded agricultural lands improved by anti-erosion measures; - the area of eroded agricultural land with restored fertility; - the amount of CO_2 removed.
Methods		Anti-erosion protection measures for arable land include measures aimed at surface runoff regulation, agricultural techniques retaining water in the soil, optimizing soil compaction, crop rotation and crop rotation. For lands with 2° gradient: 1) hoeing crops - 60%, cereal crops - 20%; legumes - 15%, fodder crops - 5%; 2) straw crops - 50%, hoe crops - 50%; 3) hoeing crops - 50%; other - 50%, annual cereals and leguminous cereals planted in strips with a maximum width of 200 m; For lands with 2-5° gradient the crops are planted in 100-150 m width strips, which including 50% hoeing crops, 25% - cereal crops, 5% - perennial grasses; 20% - legumes and fodder crops; For lands with 5-8° gradient - 30% hoeing crops, 40% cereal crops, 20% legumes and fodder crops, 10% perennial grasses. The crops are planted in strips up to 100 m wide and grassed buffer strips 4-5 m wide. Slopes with a more than 8^0 gradient should not be included in the category of arable land, these slopes are used for perennial plantations (orchards and vineyards) and pastures. On sloping lands, where it is not possible to permanently sow herbaceous species (herbing), crops are alternated with protective plants and grassy strips along the length of the curves. For lands consolidation and protection, earth waves, agricultural terraces, smooth banks or level fencing are built. In order to calculate CO_2 emission reductions, two methodologies will be used: - Tier 1 methodology available in the IPCC Guidelines 2006 (Vol. 4 - Chapter 2 - Tier 3 methodology to determine the carbon balance in agricultural soils to estimate GHG emissions (Banaru, 2000)[493]
Assumptions		- develop the sloping arable land distribution schemes, taking into account the geomorphological, pedoclimatic and erosion risk factors; - implement "no-till" and "mini-till" soil conservation systems on at least 160 kha, with incorporation of green manure into the soil according to pre-set periodicity[494];
Goals		- stop erosion and compaction of eroded soils on 865 kha; - achieving carbon and humus balance in the soil by 2030; - increasing soil productivity avoiding its degradation and compaction; - reduction of GHG emissions.
Undertaken steps		The following documents were approved: - The Soil Conservation and Fertility Enhancement Program for 2011-2020 and the Action Plan for its implementation (2017-2020); - The list of sites and necessary financial means for 2018 to implement the Action Plan on implementation of the Soil Conservation and Fertility Enhancement Program for 2017-2020. - Technical Regulations "Soil Protection Measures in Agricultural Practices"[495], HG no. 1157/2008; - National Strategy for Agricultural and Rural Development for the years 2014-2020; - Environmental Strategy for 2014-2023 and Action Plan for its implementation.
Planned steps		- develop and approve Action Plans and Agricultural Practices Guidelines for eroded soil management.

[493] Banaru, Anatol (2000), Method for determining greenhouse gas emissions from arable soils. In the collection of works "Climate Change. Research, Studies, Solutions ". Ministry of Environment and Spatial Planning / UNDP Moldova. „Bons Offices" SRL Chisinau, 2000, pp. 115-123.
[494] Government Decision No.1470 of 30.12.2016 on approval of the Low Emission Development Strategy of the Republic of Moldova until 2030 and of the Action Plan for its implementation. Published: 24.03.2017 in the Official Gazette no. 85-91, Art. no. 222.
[495] Technical Regulations "Soil Protection Measures in Agricultural Practices". GD No. 1157 of 13.10.2008. Official Gazette No.193-194, Art.1195

Implementation progress	Environmental achievements	- anti-erosion sustainable management (including "no-till" and "mini-till" practices) is already used on 35,000 ha of agricultural land;
	CO_2 emission reductions / removals	By 2030, humus content in eroded soils will increase, and entail the following GHG emissions reduction (indirect calculations): - by 50%, 149 kt CO_2 equivalent - for poorly eroded soils (humus - 2.97%); - by 30%, 114 kt CO_2 equivalent - for moderately eroded soils (humus - 2.28%); - by 15%, 91 kt CO_2 equivalent - for heavily eroded soils (humus - 1.82%).

Mitigation action 21: Planting energy forest crops

Description	The nature of the action	Planting energy forest crops
	Sector	LULUCF
	GHG	CO_2
	Quantitative targets	- planting of fast-growing forest crops on 5,000 hectares
	Progress indicators	- forested areas; - the volume of the harvested wood mass.
Methods		- identification of new areas for afforestation; - integrated planning on a national and local scale, providing planting and technical material, methodological and technological inputs, design, on-the- field implementation, etc.; - creation of highly productive and ecologically stable stands; - the GHG removal potential was calculated according to the approved CDM methodology AR-AM0002 "Re-afforestation of degraded lands by afforestation/re-afforestation" (UNFCCC, 2009); - media coverage and training on fast-growing species management, managed in small production cycles (10-15 years); - MRV of expanding wooded areas.
Assumptions		- to estimate annual growths and losses of biomass in forests, the country specific emission factors have been calculated/developed; - fast-growing species, managed in small production cycles (10-15 years) will be selected for planting;
Goals		- reducing the pressure on existing forests; - increase CO_2 removals.
Undertaken steps		The following were approved: - the State Program for Forest Regeneration and Afforestation for 2003-2020, the Climate Change Adaptation Strategy of the Republic of Moldova until 2020 and the Action Plan for its implementation, National Strategy for Agricultural and Rural Development for 2014-2020; Environmental Strategy for 2014-2023 and Action Plan for its implementation; The Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation.
Planned steps		Extension and implementation of the Climate Change Adaptation Strategy of the Republic of Moldova until 2020 and of the Action Plan for its implementation.
Implementation progress	Environmental achievements	So far, in the Republic of Moldova there are only a few energy willow plantations, which occupy an area of up to 50 ha.
	CO_2 emission removals	By 2030: about 210 kt CO_2 eq.

Mitigation action 22: Rehabilitation of forest belts for protection of agricultural fields in the central and northern areas of the Republic of Moldova

Description	The nature of the action	Rehabilitation of forest belts for protection of agricultural fields
	Sector	LULUCF
	GHG	CO_2
	Quantitative targets	Rehabilitation of forest belts for protection of agricultural fields on 2,242 hectares.
	Progress indicators	- area of the rehabilitated forest protection belts; - area of the protected adjacent agricultural lands; - the volume of the harvested wood mass; - the amount of GHG emission reductions achieved and certified.
Methods		- integrated planning on a national and local scale, providing planting and technical material, methodological and technological inputs, design, on-the- field implementation, etc.; - creation of highly productive and ecologically stable stands; - the GHG removal potential was calculated according to the approved CDM methodology AR-AM0002 "Re-afforestation of degraded lands by afforestation / re-afforestation" (UNFCCC, 2009); - media coverage and training on sustainable management of natural resources, including forest belts for protection of agricultural fields (104 events); - MRV on the process of rehabilitation and maintenance of forest belts.
Assumptions		- to estimate annual growths and losses of biomass in rehabilitated forest protection belts a sample of markets (43 PP) will be placed; - the species for planting are selected according to the criteria of matching with the soil, climate and adaptability characteristics; - rehabilitation of forest protection belts will ensure protection of the neighboring agricultural lands; - increasing access to timber resources and non-timber wood products.
Goals		- attaining the appropriate degree of farmland protection by forest protection belts - 4%, which currently is 1.7% or 30.7 thousand ha; - curbing the degradation processes of the adjacent agricultural lands; - employment of agroforestry practices; - increase the amount of GHG removal (CO_2).
Undertaken steps		The following documents were approved: -the Land Reclamation and Soil Fertility Enhancement Program for 2003-2010 and 2011-2020, the National Areas Extension Plan for 2014-2018, the National Strategy for Agricultural and Rural development for 2014-2020; the Environmental Strategy for 2014-2023 and the Action Plan for its implementation; the Low-Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation.
Planned steps		- rehabilitation of forest belts for protection of agricultural fields on 2,200 ha; - protection of the adjacent agricultural lands by the forest belts (about 60 kha); - monitoring expected GHG emission reductions during 2021-2023 – 43.0 kt CO_2 eq.
Implementation progress	CO_2 emission removals	About 430.0 kt CO_2 eq. by 2041.

Mitigation action 23: Adaptation of forest and pastoral ecosystems in the Republic of Moldova to climate change

Description	The nature of the action	Land afforestation, pastures rehabilitation, ecological reconstruction of forests
	Sector	LULUCF
	GHG	CO_2
	Quantitative targets	- creation of new forests adapted to climate change on 18,200 ha; - extension on new forest belts for protection of agricultural fields and riparian areas on 1,190 ha; - rehabilitation of forest belts for protection of agricultural fields and waters on 2,800 ha; - adapting the production of forest seed and planting material to climate change evolution; - ecological reconstruction of unsuitable and climate change vulnerable stands on 6,650 ha; - optimizing the forest roads network in the context of reducing the carbon footprint in the forestry sector; - revitalization of the fire-protection systems in forests and other types of forest vegetation; - rehabilitation of degraded pastures on 2,100 ha.
	Progress indicators	- wooded area; - the area of rehabilitated forest protection curtains; - the area of improved pastures; - length of optimized forest roads; - the area of forests with revitalized fire-protection systems; - the amount of CO_2 removed.
Methods		- identification of new territories for afforestation; - integrated planning on a national and local scale, providing planting and technical material, methodological and technological inputs, design, on-the- field implementation, etc.; - creation of highly productive and ecologically/climatically stable stands; - creation of highly productive and multifunctional pastures; - MRV.
Assumptions		- in order to establish the annual increases and losses of biomass in forests, the national emission factors were calculated / elaborated; - for planting the species will be selected according to the criteria of matching with the soils, climate and adaptability characteristics; - grass species and appropriate technologies are selected for grassland improvement; - afforestation of new lands and creation of forest protection belts will improve the soils condition.
Goals		- rehabilitation of forest protection belts and degraded pastures; - planting new forest protection belts; - attain the afforestation level of about 15% of the country's territory, appropriate for a healthy ecosystem, which is currently 11.3%; - increase in CO_2 removals.
Undertaken steps		The following documents were approved: - the State Program for Regeneration and Afforestation of the Forest Fund Lands for 2003-2020, the National Areas Extension Plan for 2014-2018, the Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation, the Climate Change Adaptation Strategy until 2020.
Planned steps		- development of afforestation and/or rehabilitation projects; - selection of LPAs, regarded to be more vulnerable to climate change; - evaluation of plots of land for afforestation or for the creation/rehabilitation of forest protection belts.
Implementation progress	Environmental achievements	The described actions are part of the Climate Change Adaptation project of the Republic of Moldova.
	CO_2 emission removals	About 210 kt CO_2 eq. annually.

Mitigation action 24: Prevention and mitigation of the effects caused by local flash floods and floods

Description	The nature of the action	Land afforestation, rehabilitation of forest belts, development of forest and silvopastoral management plans
	Sector	LULUCF
	GHG	CO_2
	Quantitative targets	- afforestation of lands within the riparian waters protection areas on 658 ha; - rehabilitation of forest belts for protection of agricultural fields and waters on 214 ha; - creation of wetlands on 72 ha; - development of forest arrangements on 3,274 ha; - development of silvopastoral arrangements on 10,214 ha.
	Progress indicators	- wooded area; - the area of the rehabilitated forest protection belts; - developed forestry and silvopastoral arrangements; - the amount of CO_2 removed.
Methods		- identification of new areas for afforestation; - integrated planning on a national and local scale, providing planting and technical material, methodological and technological inputs, design, on-the- field implementation, etc.; - creation of highly productive and ecologically/climatically stable stands; - creation of highly productive and multifunctional pastures; - MRV.
Assumptions		- to estimate annual growths and losses of biomass in forests, the country specific emission factors have been calculated/developed; - for planting the species will be selected according to the criteria of matching with the soils, climate and adaptability characteristics; - grass species and breeding technologies will be selected for silvopastoral arrangements; - afforestation of new lands and creation of forest protection belts will improve the soils condition.
Goals		- rehabilitation of forest protection belts and degraded pastures; - planting new forests and protective forest belts; - attain the afforestation level of about 15% of the country's territory, appropriate for a healthy ecosystem, which is currently 11.3%; - increase in CO_2 removals.

Undertaken steps		The following documents were approved: - the State Program for Regeneration and Afforestation of the Forest Fund Lands for 2003-2020, the National Areas Extension Plan for 2014-2018, the Low Emission Development Strategy of the Republic of Moldova until 2030 and the Action Plan for its implementation, the Climate Change Adaptation Strategy until 2020.
Planned steps		- development of afforestation and/or rehabilitation projects; - elaboration of forestry and silvopastoral arrangements; - selection of LPAs, regarded to be more vulnerable to climate change; - evaluation of plots of land for afforestation or for the creation/rehabilitation of forest protection belts.
Implementation progress	Environmental achievements	The described actions are part of the Climate Change Adaptation project of the Republic of Moldova.
	CO_2 emission removals	About 14 kt CO_2 eq. annually

Mitigation action 25: Primary collection and storage of waste in urban and rural areas

Description	The nature of the action	Efficient management of solid household waste
	Sector	Waste
	GHG	CH_4
	Quantitative targets	- setting up 8 regional solid waste primary collection and storage systems; - waste management services provided in urban and rural areas; - construction of 8 regional deposits by 2035; - construction of 22 transfer stations; - construction of 23 recyclable waste sorting stations; - construction of 25 biodegradable waste composting stations; - provision of about 40,000 containers and 165 transport units with a capacity of 24 m^3 and 20 transport units with a capacity of 10 m^3 for waste collection.
	Progress indicators	- number of maintained solid waste deposit sites; - amount of recycled waste; - amount of composted waste; - amount of waste stored in each deposit site.
Methods		- design and implementation of 8 regional systems for primary collection and storage of solid waste - construction of power plants based on biogas created in SWDs, a total of 7 units - MRV of biogas generated and used to produce electricity
Assumptions		- Starting with 2030 when the waste management infrastructure will be built at regional level, all recyclable plastic, metal, glass and paper waste will be collected and recycled at about 7-8% rate of the total waste; - the share of biodegradable composted waste will reach about 2-4% of the total weight of generated waste; - electricity produced from landfill biogas will be fed into the grid.
Goals		- ensuring a high quality environment; - minimizing health risks; - reducing raw material for production of paper, glass, plastic and metals; - significant reduction in CH_4 emissions in the atmosphere.
Undertaken steps		The following documents were approved: - the Waste Management Strategy of the Republic of Moldova for 2013-2027, the Environmental Strategy for 2014-2023 and the Action Plan for its implementation; - The German company GIZ has completed the feasibility studies for the development of the primary waste collection and storage systems in urban and rural areas for 3 of the 8 regions of the country. For 5 regions, feasibility studies were initiated, but were not completed due to non-selection of land for the location of regional SWDs; - The draft NAMA document "Production of electricity from biogas created at the Cahul landfill, with the extension of the project for the regional waste Cahul-Cantemir-Taraclia", was developed and registered in the UNFCCC NAMA Registry.
Planned steps		- Development and approval of the Action Plan on the primary collection and storage of waste in urban and rural areas; - Identifying the sources of financing primary waste collection and storage systems in urban and rural areas; - Media, awareness and training on the importance of recyclable waste selection; - On October 18, 2019, a loan agreement of 100 million euro was signed between the European Investment Bank and the Government of the Republic of Moldova to improve solid waste management services in the country. The loan will be provided in several installments, with the first installment of 25 million Euro. This Agreement aims to implement the Waste Management Strategy of the Republic of Moldova for 2013-2027, involving projects aimed at upgrading and developing solid waste management systems and facilities in eight regions of our country. The projects will provide settlements with new collection systems, mechanical-biological waste treatment facilities and new regional sanitary SWDs for the whole country. The regional SWDs will be equipped with biogas recovery systems, as it will contribute to the reduction of GHG emissions and therefore to the achievement of the determined national contribution, according to the provisions of the Paris Agreement.
Implementation progress	Environmental achievements	- the SWDs locations negotiated and established in three regions of the country; - in June 2020, the Financing Agreement between the Republic of Moldova and the European Investment Bank on implementation of the "Solid Waste Project in the Republic of Moldova", amounting to 25 million Euro, was ratified.
	Emission reductions	About 313 kt CO_2 equivalent/year by 2035

Mitigation action 26: Improving access to centralized sanitation services

Description	The nature of the action	Expanding and improving sanitation services
	Sector	Wastewater treatment
	GHG	CH_4, N_2O
	Quantitative targets	Connecting 85% of urban population and 50% or rural population to sewerage systems by 2030
	Progress indicators	- built sanitation systems; - the number of the population connected to wastewater collection and treatment systems.

Methods		- decentralization of public water supply and sanitation services and creation of viable regional operators; - promoting sewerage systems based on calculated agglomerations, to optimize investment and investments induced operating costs; - development and implementation of the necessary water supply and sanitation plans in each community, along with a priorities setting methodology; - feasibility studies and technical documentation for construction, repairs of waste water treatment plants and sewerage networks; - development of a water supply and sanitation investment project based on the recommendations made in feasibility studies regarding identification, mobilization and employment of the internal or external financing sources; - improving the related legal and regulatory framework.
Assumptions		- increasing budget support for the sector, both from the state budget and from the local budgets revenues; - ensuring the legal and institutional framework which will allow an enabling environment for increasing the investments absorption capacity; - water supply and sanitation services tariffs which take into account the consumers payment capacity; - in rural areas development of the new drinking water supply infrastructure will be accompanied by the waste water infrastructure or any suitable alternative sanitation infrastructure.
Goals		- gradually ensuring access to safe water and adequate sanitation for all settlements and population of the Republic of Moldova; - improving health and quality of life, as well as the economic development of the country; - reducing CH_4 emissions and N_2O in the atmosphere;
Undertaken steps		The following documents were approved: - the Water Supply and sanitation strategy (2014 - 2028), the National Program for the implementation of the Protocol on Water and Health in the Republic of Moldova for 2016-2025, and underway Action Plan for 2018-2028 on regionalization of water supply and sewerage service; - a series of sector relevant projects were signed and launched ("Strengthening the institutional framework in the water supply and sanitation sector in the Republic of Moldova", phase III of the Water and Sanitation Project (ApaSan) in the Republic of Moldova, "Harmonization of legislation with Directive 91/271 / EEC on urban waste water treatment", etc.); - The financing agreement was signed with the KfW Development Bank (Germany) for the implementation of the project "Water supply and sewerage in Cahul district", as well as other projects relevant for Cahul district - the Cooperation Agreement was signed between the MARDE, the Austrian Development Agency and the local authorities of Cantemir District to improve sanitation conditions; - Initiated the development of the Inland Waterways Strategy; - The German company GIZ has developed Regional Sectoral Water Supply and Sewerage Programs for all regions of the country;
Planned steps		- Updating Action plans; - Updating the regulatory framework; - Strengthening the capacities of the implementing institutions; - Identification of additional funding sources.
Implementation progress	Results	- the amended Law no. 303/2013 on Public Water Supply and Sewerage Service; - the amended GD 950/2013 on approval of the Regulation on requirements for collection, treatment and discharge of wastewater in sewerage and/or emission systems in urban and rural areas; - the amended GD 199/2014 on approval of the Water Supply and Sanitation Strategy (2014 - 2030); - the project "Rehabilitation of the water supply system in Nisporeni district" enabled putting into operation the water treatment plant for water from the Prut river in Grozesti village, and building the 16.8 km long main aqueduct and 101.8 km of distribution networks; - the project "Access to water and sewerage in the settlements of the Nirnova river basin" is being implemented, which provides for ensuring access to water supply and sewerage services by creating a Community Development Association; - During 2017 the Regional Development Agency (RDA) implemented the following projects: • RDA North - "Drinking water supply and sewerage services in Risipeni and Bocsa villages and social-cultural institutions (Falesti district)"; • RDA South - "Construction of the sewerage system in the Valul lui Traian village and upgrading the treatment plant in Causeni town"; "Construction of the sewerage system in the Rosu village, Cahul district" • RDA Center – "Main aqueduct for the villages Bardar and Rusestii Noi (stage II) and sewerage network for Ialoveni town"; "Improving the quality of life of rural population by construction of drinking water and sewerage systems, regionalization of communal services in the villages of the riverside of Lapusnita river, Hancesti district"; "Construction of the district treatment plant and development of the public sewerage and wastewater treatment system at inter-community level, Nisporeni district". - The ApaSan project carried out 2 projects: treatment plant in Truseni village, Chisinau municipality and 2 water closets at a summer camp in Cahul municipality. - 145 km of water supply networks, 30 km of sewerage networks and 5 treatment plants were built from FEN sources; - GIZ carries out regional projects to modernize water supply and sewerage services.
	CH_4 emission reductions	About 108.3 kt CO_2 equivalent by 2030 as compared with 1990 year level About 121.4 kt CO_2 equivalent by 2035 as compared with 1990 year level

Annex 3: List of NAMAs requesting implementation support, registered in the UNFCCC NAMA Register

Note: All NAMAs of the Republic of Moldova requesting implementation support can be accessed from the website of the Public Institution "Environmental Projects Implementation Unit" (PI "EPIU") of the Ministry of Agriculture, Regional Development and Environment (MARDM): <http://clima.md/lib.php?l=en&idc=278>, as well as from the UNFCCC NAMA Registry website: <http://www4.unfccc.int/sites/nama/SitePages/NamaImplementation.aspx>:

NS-274: Promotion of small capacity CHPs

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=185&viewOnly=1>

NS-275: Promotion of heat pumps

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=186&viewOnly=1>

NS-276: Promotion of wind sources

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=187&viewOnly=1>

NS-277: Use of solar energy for domestic hot water production

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=188&viewOnly=1>

NS-278: Promoting efficient lighting

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=189&viewOnly=1>

NS-279: Hybrid and electric buses and minibuses in Chisinau

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=190&viewOnly=1>

NS-280: Clinker replacement for cement production

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=191&viewOnly=1>

NS-281: Reduction of GHG emissions in enteric fermentation by including dried grape pomace in cattle rations

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=192&viewOnly=1>

NS-282: Implementation of the conservation tillage system

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=193&viewOnly=1>

NS-283: Afforestation of degraded lands, riparian areas and protection belts

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=194&viewOnly=1>

NS-284: Use of energy willow for heat production

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=195&viewOnly=1>

NS-285: Promoting energy from waste

<http://www4.unfccc.int/sites/nama/_layouts/un/fccc/nama/NamaSeekingSupportForImplementation.aspx?ID=196&viewOnly=1>