ITALIAN MINISTRY OF ENVIRONMENT AND ENERGY SECURITY

Italy

Fifth Biennial Report

under the United Nations Framework Convention on Climate Change








December 2022

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1. Introduction

This document is the fifth Biennial Report (BR) of Italy under decision 2/CP.17 of the Conference of the Parties under the UNFCCC.

As defined in the UNFCCC biennial reporting guidelines for developed country Parties[1], the information is structured into:

- Information on greenhouse gases (GHG) emissions and trends and the GHG inventory including information on Italian national inventory arrangements (section 2);
- Quantified economy wide emission reduction target (section 3);
- Progress in achievement of the quantified economy-wide emission reduction targets (section 4);
- Projections (section 5) and
- Provision of financial, technological and capacity building support to developing countries (section 6, 7).

Tabular information as defined in the common tabular format (CTF) for the UNFCCC biennial reporting guidelines for developed country Parties (UNFCCC decision 19/CP.18) are enclosed in the report and have been officially submitted to the UNFCCC secretariat. For the CTF submission, the electronic reporting facility provided by the UNFCCC Secretariat has been used as required by UNFCCC decision 19/CP.18.

[1] Annex I to UNFCCC decision 2/CP.17

2. Information on GHG emissions and trends[2]

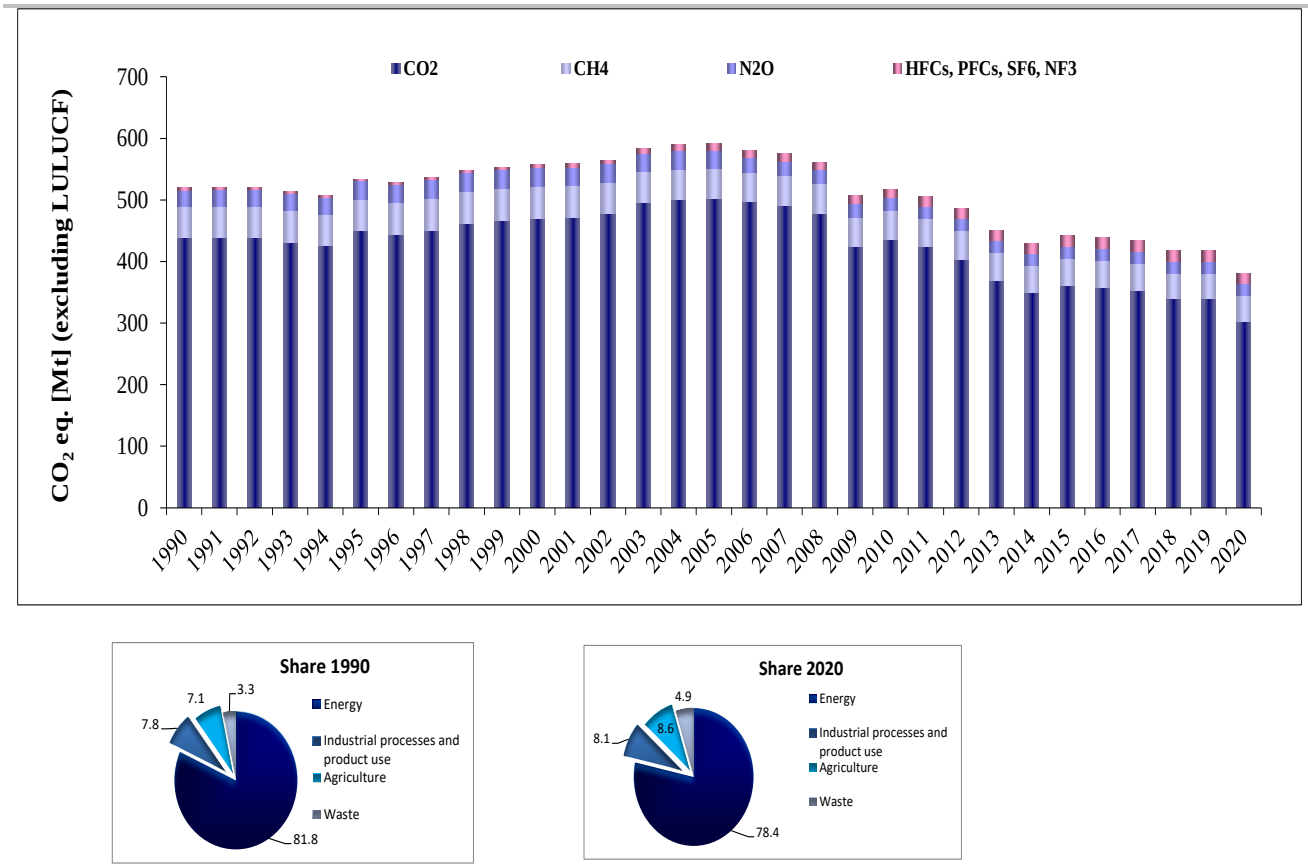
2.1 Summary information on greenhouse gas emissions and trends

Italy's total greenhouse gas emissions, excluding emissions and removals from land use, land use change and forestry (LULUCF) decreased by 26.7% between 1990 and 2020, from 520 million tons (Mt) of CO_2-equivalent in 1990 to 381 Mt of CO_2-equivalent in 2020.

The share of the different sectors, in terms of total emissions, remains nearly unvaried over the period 1990-2020. The energy sector is the largest contributor to national total GHG emissions with a share, in 2020, of 78.4%, followed by agriculture and industrial processes and product use, accounting for 8.6% and 8.1%, respectively, of total emissions, and waste contributing with 4.9%.

Figure 1 illustrates the national trend of greenhouse gases for 1990-2020, expressed in CO_2-equivalent terms and the percentage share by sector.

Figure 2.1: Trend of total GHG emissions excluding LULUCF and share by sector (1990-2020) (Gg CO_2 eq.)

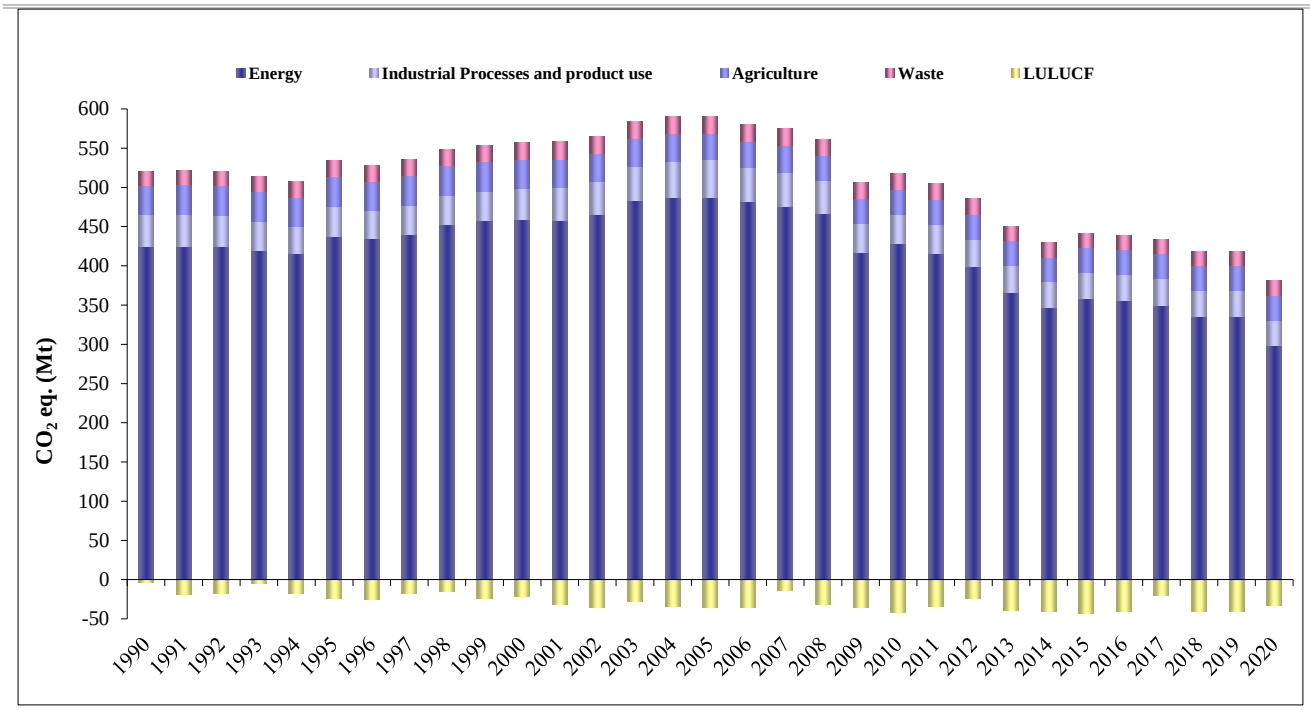


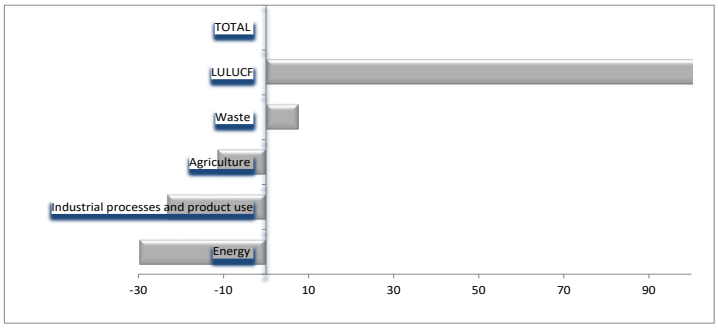
Considering emissions and removals from LULUCF, total GHG emissions and removals decreased from 516 Mt of CO_2-equivalent in 1990 to 349 Mt of CO_2-equivalent in 2020 (-32.4% in the period).

Figure 2 illustrates the national trend of greenhouse gases for 1990-2020, including the LULUCF sector, expressed in CO_2-equivalent terms and and the percentage difference from 1990 to 2020 by sector.

[2] Author: Daniela Romano

Figure 2.2: Trend of total GHG emissions including LULUCF (1990-2020) (Gg CO_2 eq.) and difference from 1990 to 2020 (%)





The most important greenhouse gas, CO_2, which accounted for 79.3% of total emissions in CO_2 equivalent in 2020, showed a decrease by 31.2% between 1990 and 2020.

In the energy sector, in particular, CO_2 emissions, in 2020, are 29.6% lower than in 1990. CH_4 and N_2O emissions were equal to 11.2% and 5.1%, respectively, of the total CO_2 equivalent greenhouse gas emissions in 2020. CH_4 levels have decreased by 13.4% from 1990 to 2020, while N_2O has decreased by 28.4%. As for the other greenhouse gases, HFCs account for 4.2% of total emissions, PFCs and SF_6 are equal to 0.2% and 0.1% of total emissions, respectively; the weight of NF_3 is about 0.01%.

It should be noted that, from 2008, the economic recession has had a remarkable influence on the production levels affecting the energy and industrial process sectors, but on the other hand, an increase of the use of renewable sources (hydro and wind) and advance in energy efficiency was also observed. The last year of the time series is a special year, the pandemic situation due to Covid-19 has led to a sharp fall in emissions but also a slowdown in economic growth.

As for CO_2, emissions in the 1990s essentially mirrored energy consumption. A decoupling between the curves is observed only in recent years, mainly because of the substitution of fuels with high carbon contents by methane gas in the production of electric energy and in industry; in the last years, the increase in the use of renewable sources has led to a notable reduction of CO_2 intensity.

The relevant sectors in terms of emissions are energy production and transport, contributing to more than half of total national levels. For the transport sector, GHG emissions show a decrease in 2020, with respect to 1990, equal to -16.4%. After a peak in 2007, due to an increase in goods and passenger movements, emissions from the transport sector show a decrease mainly explained by the economic crisis contributing to the reduction of movements and by the penetration in the market of low energy consumption vehicles.

Emissions from energy industries show a reduction of 40.6% in 2020 with respect to 1990, in spite of an increase in the thermoelectric energy production (from 178.6 TWh to 181.3 TWh) and electric energy consumption (from 218.7 TWh to 238.8 TWh).

The time series of electricity production clearly shows that although the specific carbon content of the kWh generated in Italy has constantly improved over the years, total CO_2 emissions have raised till 2006 due to the even bigger increase of electricity production. The decreasing trend, from 2006, results from an increase in energy production from renewable sources, combined with a further reduction in the use of oil products for electricity production. In the last years, the decrease is even more accentuated because of the economic recession. Specifically, in 2015, an increase in fuel consumption and CO2 emissions is observed as a consequence of the increase of national energy demand which has been fulfilled by an increase of energy production in the natural gas fuelled plants because of a reduction of energy production from Hydroelectric plants.

In the period 1990-2020, emissions from energy consumption in the residential and commercial sector have increased by 0.3%. A shift from oil products to natural gas is observed along the time series. But it should be also noted that the use of natural gas for energy production and heating was already in place in the first nineties; so the increase of emission levels in the nineties is to be attributed to the increasing number of buildings and their heating systems, as well as the occurrence of singular annual climatic features, as observed in 2005 due to exceptionally cold weather conditions. CH_4 and N_2O emissions also increase in the period, due to the growing use of woody biomass and biogas for heating and, in the agriculture sector, for heating and aquaculture plants.

Finally, for the manufacturing industry, emissions have decreased by 50.3% from 1990 to 2020. The decrease is driven by the shift from the use of fuel oil to natural gas for energy and heat production; in the last years, a further decrease is observed due to the reduction of industrial production levels.

For the industrial processes and product use sector, emissions decreased by 23.2% in 2020 with respect to 1990. The trend is mainly driven by the sharp reduction of N_2O emissions from the chemical industry (-98.1%) due to the installation of abatement technologies in adipic and nitric acid production plants and, in the last years, of CO_2 from mineral products for the economic recession, and in particular for the decrease of cement production. On the other side, a notable increase of F-gas emissions, is observed especially for the use of HFCs in refrigeration and air conditioning systems, together with their use in pharmaceutical aerosol.

In the agriculture sector, emissions have decreased by 11.4% from 1990 to 2020. The main reduction is observed in emissions from enteric fermentation (-13.0%) and manure management (-18.9%) because of a reduction in animal population, specifically cattle and dairy cattle; the reduction is also due to a less extensive use of fertilisers affecting the emissions from agricultural soils (-3.9%). In addition, in the last years, the recovery of biogas from manure management to be used for energy purposes has become a relevant practice.

Finally, emissions from the waste sector have increased by 7.7% between 1990 and 2020. The trend is mainly driven by the increase in emissions from solid waste disposal (16.8%); in fact, in spite of the decrease of the solid waste disposed of on land as a consequence of waste management policies and the increase in the methane-recovered percentage, emissions are also influenced by the composition of the waste and site conditions. This increase is counterbalanced by the decrease of emissions from wastewater treatment (-19.3%) due to a reduction in wastewater production in some industrial sectors.

Considering total GHG emissions with emissions and removals from LULUCF, emission and removals levels show a decrease of 32.4% from 1990 to 2020. The energy sector accounts, in 2020, for 72.3% of total emissions and removals, as absolute weight, followed by, agriculture (7.9%), LULUCF which contributes with 7.8%, industrial processes and product use and waste (8.1% and 4.9%, respectively). Total removals, in CO_2 equivalent, in the LULUCF sector, show a high variability in the period, with CO_2 accounting for

98.0% of the sector. The key driver for the rise in removals is the increase of carbon stock changes from forest land (the area reported under forest land remaining forest land has increased by 23.0%); but it should be noted that the trend is remarkable influenced by the annual area burned by fires

Further information on greenhouse emissions and trend is detailed in chapter 2 of the National Inventory Report 2022, Italian Greenhouse Gas Inventory 1990-2020.

2.2 National inventory arrangements

The Legislative Decree 51 of March 7th 2008 instituted the National System for the Italian Greenhouse Gas Inventory, following the requirements set in the article 5.1 of the Kyoto Protocol and in according to the Decision n°280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol. The last one has been replaced in 2013 by the regulation n°525/2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change. As indicated by art. 14 bis of the Legislative Decree, the Institute for Environmental Protection and Research (ISPRA), former Agency for Environmental Protection and Technical Services (APAT) is the single entity in charge of the preparation and compilation of the national greenhouse gas emission inventory. The Ministry for the Environment is responsible for the endorsement of the inventory and for the communication to the Secretariat of the Framework Convention on Climate Change and the Kyoto Protocol.

In order to complete the institutional framework, the 'National Registry for Carbon sinks', instituted by a Ministerial Decree on 1st April 2008, is part of the Italian National System. It includes information on lands subject to activities under Article 3.3 and Article 3.4 and related carbon stock changes. In agreement with the Ministerial decree art.4, the Ministry for the Environment is responsible for the management of the National Registry for Carbon sinks. ISPRA is responsible for the preparation of emission and removals estimates for the LULUCF sector and for KP LULUCF supplementary information under art.7.1 of the Kyoto Protocol. A detailed description on the registry and additional information on activities under Article 3.3 and Article 3.4 is reported in the National Inventory Report (ISPRA, 2022).

Moreover, in the context of the Kyoto Protocol commitments and its amendment ('Doha amendment') for the second Commitment Period (2013-2020), Italy adopted, in 2016, the Law N. 79/2016, "Ratification of the Doha amendment to the Kyoto Protocol", which establishes, according to article 12 of 525/2013/EU (the Monitoring Mechanism Regulation), the National system for policies, measures and emissions projections. ISPRA is also responsible of this system and, in cooperation with MASE, collects all the information and data from the competent Ministries. Article 1 of the Decree implementing law N. 79 (9 December 2016), reports the list of information and data that are to be sent by the competent ministries to MASE and ISPRA and the timing for providing such information. With the establishment of this system, there has been a strengthening of roles and obligations for statistical data flow, some of which are useful for the inventory scope.

ISPRA is the national entity with overall responsibility for the national inventory of Italy, including the Kyoto protocol obligations.

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The Institute prepares annually a document that describes the national system including all updated information on institutional, legal and procedural arrangements for estimating emissions and removals of

greenhouse gases and for reporting and archiving inventory information. The reports are publicly available at http://emissioni.sina.isprambiente.it/inventario-nazionale/.

The Italian National System, currently in place, is fully described in the document *National Greenhouse Gas Inventory System in Italy*[3].

Since the Fourth Biennial Report no changes have occurred in the national inventory arrangements.

[3] ISPRA, 2018. National Greenhouse Gas Inventory System in Italy. Year 2018. http://www.sinanet.isprambiente.it/it/sia-ispra/serie-storiche-emissioni

CTF Table 1 Greenhouse Gas Emissions (kt CO_2 eq)

Greenhouse gas emissions	***1990***	***1995***	***2000***	***2005***	***2010***	***2015***	***2020***	***Change from 1990 to latest reported year***
		kt CO_2 eq						***%***
CO_2 emissions excluding net CO_2 from LULUCF	439,550	449,826	470,487	502,255	436,117	361,163	302,279	-31.2
CO_2 emissions including net CO_2 from LULUCF	433,760	424,689	447,965	466,084	393,802	317,479	269,190	-37.9
CH_4 emissions excluding CH_4 from LULUCF	49,390	51,417	51,913	49,205	47,341	44,112	42,780	-13.4
CH_4 emissions including CH_4 from LULUCF	50,676	51,720	52,628	49,504	47,691	44,376	43,043	-15.1
N_2O emissions excluding N_2O from LULUCF	27,209	29,433	30,270	29,281	20,331	18,867	19,471	-28.4
N_2O emissions including N_2O from LULUCF	28,065	30,311	30,965	29,911	20,761	19,194	19,896	-29.1
HFCs	444	927	2,489	7,619	12,055	15,403	15,876	3,475.7
PFCs	2,907	1,492	1,488	1,940	1,520	1,688	539	-81.5
Unspecified mix of HFCs and PFCs	NO,NA	25	25	25	25	25	23	100.0
SF_6	408	680	604	550	394	472	264	-35.3
NF_3	NA,NO	77	13	33	20	28	16	100.0
Total (excluding LULUCF)	**519,908**	**533,876**	**557,291**	**590,908**	**517,804**	**441,759**	**381,248**	**-26.7**
Total (including LULUCF)	**516,260**	**509,920**	**536,177**	**555,667**	**476,268**	**398,666**	**348,847**	**-32.4**

CTF Table 1 Greenhouse Gas Source and Sink Categories (kt CO_2 eq)

Greenhouse gas source and sink categories	***1990***	***1995***	***2000***	***2005***	***2010***	***2015***	***2020***	***Change 1990-2020***
		kt CO_2 eq						***%***
1. Energy	425,298	437,938	459,631	487,640	428,903	358,776	298,900	-29.7
2. Industrial Processes and Product Use	40,422	38,316	39,123	47,211	36,964	33,233	31,049	-23.2
3. Agriculture	36,900	37,649	36,682	34,192	31,555	31,207	32,685	-11.4
4. Land Use, Land-Use Change and Forestry[b]	-3,648	-23,956	-21,113	-35,241	-41,536	-43,093	-32,401	788.2
5. Waste	17,289	19,974	21,854	21,864	20,382	18,544	18,614	7.7
6. Other	NO	NO	NO	NO	NO	NO	NO	-
Total (including LULUCF)	**516,260**	**509,920**	**536,177**	**555,667**	**476,268**	**398,666**	**348,847**	**-32.4**

CTF Table 1 CO_2 Source and Sink Categories (kt)

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
			kt					%
1. Energy	**409,193**	**421,520**	**443,876**	**472,743**	**413,894**	**345,646**	**288,014**	**-29.61**
A. Fuel combustion (sectoral approach)	405,145	417,517	440,614	470,186	411,517	343,072	285,902	-29.43
1. Energy industries	136,941	139,941	144,273	159,227	136,885	105,486	81,353	-40.59
2. Manufacturing industries and construction	90,772	88,969	94,893	90,786	68,900	54,552	44,879	-50.56
3. Transport	100,319	111,531	121,443	126,616	114,172	104,890	84,462	-15.81
4. Other sectors	76,042	75,580	79,169	92,324	90,908	77,684	74,583	-1.92
5. Other	1,071	1,496	837	1,233	652	459	625	-41.64
B. Fugitive emissions from fuels	4,048	4,002	3,262	2,557	2,377	2,574	2,113	-47.81
1. Solid fuels	0	0	0	0	0	0	NO,NA	
2. Oil and natural gas and other emissions from energy production	4,047	4,002	3,262	2,557	2,377	2,574	**2,113**	**-47.80**
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NO	NO	0.00
2. Industrial Processes and Product Use	**29,335**	**27,281**	**25,832**	**28,718**	**21,666**	**14,960**	**13,668**	**-53.41**
A. Mineral industry	20,720	20,240	20,749	23,305	17,341	11,203	9,780	-52.80
B. Chemical industry	2,524	1,584	1,356	1,635	1,362	1,220	1,358	-46.18

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
			kt					%
C. Metal industry	4,378	3,903	2,305	2,419	1,834	1,563	1,439	-67.14
D. Non-energy products from fuels and solvent use	1,712	1,554	1,421	1,359	1,128	975	1,091	-36.30
E. Electronic industry								
F. Product uses as ODS substitutes								
G. Other product manufacture and use	NO	NO	NO	NO	NO	NO	NO	0.00
H. Other	NA	NA	NA	NA	NA	NA	NA	0.00
3. Agriculture	**510**	**567**	**571**	**564**	**381**	**458**	**503**	**-1.27**
A. Enteric fermentation								
B. Manure management								
C. Rice cultivation								
D. Agricultural soils								
E. Prescribed burning of savannas								
F. Field burning of agricultural residues								
G. Liming	1	1	2	14	18	14	10	636.38

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
			kt					%
H. Urea application	465	512	525	507	335	425	472	1.53
I. Other carbon-containing fertilizers	44	54	44	42	28	20	21	-50.84
J. Other	NO	NO	NO	NO	NO	NO	NO	0.00
4. Land Use, Land-Use Change and Forestry	**-5,790**	**-25,137**	**-22,522**	**-36,171**	**-42,316**	**-43,684**	**-33,089**	**471.50**
A. Forest land	-17,852	-31,122	-26,004	-34,667	-36,257	-39,385	-30,261	69.51
B. Cropland	1,631	570	-586	-1,937	-909	572	-33	-102.04
C. Grassland	4,179	-2,155	-1,977	-6,364	-9,537	-9,535	-7,364	-276.23
D. Wetlands	NE,NO	5	8	8	130	130	32	100.00
E. Settlements	6,640	8,272	6,491	7,291	4,400	4,446	5,207	-21.58
F. Other land	NO	NO	NO	NO	NO	NO	NO	0.00
G. Harvested wood products	-388	-706	-454	-503	-142	89	-669	72.39
H. Other	NO	NO	NO	NO	NO	NO	NO	0.00
5. Waste	**512**	**458**	**208**	**230**	**177**	**99**	**93**	**-81.89**
A. Solid waste disposal	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	NO,NA	0.00
B. Biological treatment of solid waste								

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
			kt					%
C. Incineration and open burning of waste	512	458	208	230	177	99	93	-81.89
D. Waste water treatment and discharge								
E. Other	NO	NO	NO	NO	NO	NO	NO	-
6. Other (as specified in the summary table in CRF)	**NO**	**NO**	NO	**NO**	**NO**	**NO**	**NO**	**-**
Memo items:								
International bunkers	**8,739**	**9,886**	**12,101**	**15,301**	**15,714**	**15,225**	**9,351**	**7.01**
Aviation	4,285	5,799	7,954	8,483	8,809	9,567	3,788	-11.59
Navigation	4,454	4,087	4,147	6,818	6,905	5,659	5,563	24.91
Multilateral operations	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**-**
CO_2 emissions from biomass	**14,177**	**16,974**	**19,182**	**23,618**	**42,588**	**45,618**	**44,837**	**216.26**
CO_2 captured	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**-**
Long-term storage of C in waste disposal sites	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**-**
Indirect N_2O								
Indirect CO_2 (3)	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**-**

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
			kt					%
Total CO_2 equivalent emissions without LULUCF	439,550	449,826	470,487	502,255	436,117	361,163	302,279	-31.23
Total CO_2 equivalent emissions with LULUCF	433,760	424,689	447,965	466,084	393,802	317,479	269,190	-37.94
Total CO_2 equivalent emissions, including indirect CO_2, without LULUCF	439,550	449,826	470,487	502,255	436,117	361,163	302,279	-31.23
Total CO_2 equivalent emissions, including indirect CO_2, with LULUCF	433,760	424,689	447,965	466,084	393,802	317,479	269,190	-37.94

CTF Table 1 CH_4 Source and Sink Categories (kt)

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
				kt				%
1. Energy	**460.1**	**442.4**	**413.6**	**379.4**	**386.7**	**338.1**	**266.8**	**-42.0**
A. Fuel combustion (sectoral approach)	97.7	108.0	98.7	92.0	126.4	120.2	112.0	14.6
1. Energy industries	9.1	8.4	6.5	6.0	4.9	5.1	4.7	-48.2
2. Manufacturing industries and construction	6.7	6.9	6.0	6.5	5.7	11.2	11.0	64.6
3. Transport	36.2	40.6	30.8	20.3	12.4	9.0	6.7	-81.6
4. Other sectors	45.6	51.9	55.2	59.2	103.3	94.7	89.5	96.1
5. Other	0.2	0.2	0.1	0.2	0.1	0.1	0.1	-54.1
B. Fugitive emissions from fuels	362.3	334.4	314.9	287.4	260.3	217.9	154.8	-57.3
1. Solid fuels	5.3	3.0	3.9	3.6	3.4	2.1	1.0	-80.5
2. Oil and natural gas and other emissions from energy production	357.0	331.4	311.0	283.8	256.9	215.8	153.8	-56.9
C. CO_2 transport and storage								
2. Industrial Processes and Product Use	**5.2**	**5.4**	**2.9**	**3.0**	**2.4**	**1.7**	**1.4**	**-73.6**
A. Mineral industry								

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
				kt				%
B. Chemical industry	2.5	2.7	0.3	0.2	0.2	0.2	0.1	-94.1
C. Metal industry	2.7	2.7	2.6	2.7	2.2	1.5	1.2	-55.0
D. Non-energy products from fuels and solvent use	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	NO,NA	0.0
E. Electronic industry								
F. Product uses as ODS substitutes								
G. Other product manufacture and use	NO	NO	NO	NO	NO	NO	NO	0.0
H. Other	NA	NA	NA	NA	NA	NA	NA	0.0
3. Agriculture	**891.9**	**880.4**	**854.9**	**789.9**	**770.6**	**759.0**	**771.2**	**-13.54**
A. Enteric fermentation	622.6	616.0	605.1	531.7	515.4	521.4	541.4	-13.04
B. Manure management	193.7	184.3	182.9	187.4	181.7	170.2	165.9	-14.36
C. Rice cultivation	75.1	79.6	66.3	70.1	72.9	66.7	63.3	-15.69
D. Agricultural soils	NE	NE	NE	NE	NE	NE	NE	0.00
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	0.00
F. Field burning of agricultural residues	0.6	0.6	0.6	0.6	0.6	0.6	0.6	-0.26
G. Liming								

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
				kt				%
H. Urea application								
I. Other carbon-containing fertilizers								
J. Other	NO	NO	NO	NO	NO	NO	NO	0.00
4. Land Use, Land-Use Change and Forestry	**51.4**	**12.1**	**28.6**	**12.0**	**14.0**	**10.6**	**10.5**	**-79.6**
A. Forest land	23.8	4.8	12.4	5.0	4.4	6.5	5.8	-75.6
B. Cropland	0.2	0.1	0.1	0.1	0.0	0.1	0.1	-35.5
C. Grassland	27.4	7.2	16.1	6.9	9.5	3.9	4.6	-83.4
D. Wetlands	NO	NO	NO	NO	NO	NO	NO	0.0
E. Settlements	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	NO,NE	-
F. Other land	NO	NO	NO	NO	NO	NO	NO	-
G. Harvested wood products								
H. Other	NO	NO	NO	NO	NO	NO	NO	-
5. Waste	**618.4**	**728.5**	**805.1**	**795.9**	**734.0**	**665.7**	**671.9**	**8.6**
A. Solid waste disposal	488.2	604.9	688.0	680.1	622.5	561.3	570.1	16.8
B. Biological treatment of solid waste	0.2	0.4	1.9	3.7	4.6	4.8	4.5	2310.6
C. Incineration and open burning of waste	2.0	2.3	2.2	2.5	2.3	2.3	2.2	11.7

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
				kt				%
D. Waste water treatment and discharge	128.0	120.8	113.0	109.7	104.6	97.2	95.0	-25.8
E. Other	NO	NO	NO	NO	NO	NO	NO	-
6. Other (as specified in the summary table in CRF)	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	-
Total CH_4 emissions without CH_4 from LULUCF	**1,976**	**2,057**	**2,077**	**1,968**	**1,894**	**1,764**	**1,711**	**-13.4**
Total CH_4 emissions with CH_4 from LULUCF	**2,027**	**2,069**	**2,105**	**1,980**	**1,908**	**1,775**	**1,722**	**-15.1**
Memo items:								
International bunkers	**0.4**	**0.4**	**0.4**	**0.7**	**0.7**	**0.6**	**0.6**	**24.8**
Aviation	0.0	0.0	0.0	0.1	0.1	0.1	0.0	24.0
Navigation	0.4	0.4	0.4	0.6	0.7	0.5	0.5	24.9
Multilateral operations	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**-**
CO_2 emissions from biomass								
CO_2 captured								

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
				kt				%
Long-term storage of C in waste disposal sites								
Indirect N_2O								
Indirect CO_2 (3)								

CTF Table 1 N_2O Source and Sink Categories (kt)

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
				kt				%
1. Energy	**15.45**	**17.98**	**18.17**	**18.16**	**17.93**	**15.70**	**14.15**	**-8.41**
A. Fuel combustion (sectoral approach)	15.41	17.94	18.13	18.11	17.89	15.67	14.12	-8.35
1. Energy industries	1.60	1.61	1.58	1.87	1.68	1.59	1.09	-31.69
2. Manufacturing industries and construction	4.49	3.92	4.46	5.02	3.77	2.69	2.36	-47.59
3. Transport	3.25	5.85	5.42	3.82	3.51	3.20	2.71	-16.50
4. Other sectors	5.84	6.34	6.53	7.12	8.80	8.13	7.91	35.45
5. Other	0.23	0.21	0.14	0.29	0.13	0.06	0.05	-78.02
B. Fugitive emissions from fuels	0.04	0.04	0.04	0.04	0.04	0.03	0.03	-31.60
1. Solid fuels	NA	NA	NA	NA	NA	NA	NA	0.00
2. Oil and natural gas and other emissions from energy production	0.04	0.04	0.04	0.04	0.04	0.03	0.03	-31.60
C. CO_2 transport and storage								
2. Industrial Processes and Product Use	**24.16**	**25.84**	**28.85**	**27.69**	**4.11**	**2.06**	**2.11**	**-91.27**
A. Mineral industry								
B. Chemical industry	21.54	23.35	25.54	25.03	2.09	0.49	0.40	-98.14
C. Metal industry	NA	NA	NA	NO	NO	NO	NO	0.00

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
				kt				%
D. Non-energy products from fuels and solvent use	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	NO,NA	0.00
E. Electronic industry								
F. Product uses as ODS substitutes								
G. Other product manufacture and use	2.62	2.49	3.31	2.66	2.02	1.57	1.71	-34.77
H. Other	NA	NA	NA	NA	NA	NA	NA	0.00
3. Agriculture	**47.29**	**50.57**	**49.46**	**46.58**	**39.97**	**39.51**	**43.30**	**-8.44**
A. Enteric fermentation								
B. Manure management	9.51	9.08	8.79	8.09	7.82	7.04	6.97	-26.67
C. Rice cultivation								
D. Agricultural soils	37.76	41.48	40.66	38.48	32.13	32.46	36.31	-3.85
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	0.00
F. Field burning of agricultural residues	0.01	0.01	0.01	0.01	0.01	0.01	0.01	4.77
G. Liming								
H. Urea application								
I. Other carbon-containing fertilizers								

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
				kt				%
J. Other	NO	NO	NO	NO	NO	NO	NO	0.00
4. Land Use, Land-Use Change and Forestry	**2.87**	**2.95**	**2.33**	**2.12**	**1.44**	**1.10**	**1.43**	**-50.34**
A. Forest land	0.01	0.00	0.00	0.00	0.00	0.00	0.00	-75.60
B. Cropland	0.25	0.39	0.14	0.14	0.14	0.00	0.05	-78.72
C. Grassland	0.86	0.23	0.50	0.22	0.30	0.12	0.14	-83.39
D. Wetlands	NO	NO	NO	NO	NO	NO	NO	0.00
E. Settlements	1.70	2.25	1.65	1.72	0.97	0.97	1.22	-28.25
F. Other land	NO	NO	NO	NO	NO	NO	NO	0.00
G. Harvested wood products								
H. Other	NO	NO	NO	NO	NO	NO	NO	-
5. Waste	**4.42**	**4.38**	**5.10**	**5.83**	**6.22**	**6.04**	**5.79**	**31.05**
A. Solid waste disposal								
B. Biological treatment of solid waste	0.07	0.16	0.68	1.33	1.69	1.75	1.64	2,302.05
C. Incineration and open burning of waste	0.12	0.12	0.09	0.09	0.08	0.07	0.07	-46.24
D. Waste water treatment and discharge	4.22	4.10	4.33	4.41	4.46	4.23	4.08	-3.33
E. Other	NO	NO	NO	NO	NO	NO	NO	-

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020
				kt				%
6. Other (as specified in the summary table in CRF)	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**-**
Total direct N_2O emissions without N_2O from LULUCF	**91.31**	**98.77**	**101.58**	**98.26**	**68.23**	**63.31**	**65.34**	**-28.44**
Total direct N_2O emissions with N_2O from LULUCF	**94.18**	**101.72**	**103.91**	**100.37**	**69.67**	**64.41**	**66.77**	**-29.11**
Memo items:								
International bunkers	**0.23**	**0.27**	**0.35**	**0.41**	**0.42**	**0.41**	**0.25**	**6.14**
Aviation	0.12	0.17	0.25	0.24	0.25	0.26	0.11	-11.34
Navigation	0.11	0.10	0.10	0.17	0.17	0.14	0.14	24.89
Multilateral operations	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**-**
CO_2 emissions from biomass								
CO_2 captured								
Long-term storage of C in waste disposal sites								
Indirect N_2O	**10.33**	**9.57**	**7.57**	**6.48**	**4.66**	**3.52**	**3.00**	**-70.91**
Indirect CO_2 (3)								

CTF Table 1 Emissions of HFCs, PFCs, SF6, NF3 (kt CO2 eq)

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020 %
Emissions of HFCs and PFCs - (kt CO_2 eq.)	**3,351**	**2,444**	**4,002**	**9,584**	**13,601**	**17,116**	**16,438**	**390.6**
Emissions of HFCs - (kt CO_2 eq.)	**444**	**927**	**2,489**	**7,619**	**12,055**	**15,403**	**15,876**	**3,475.7**
HFC-23	0.03	0.03	0.01	0.02	0.03	0.03	0.02	-20.1
HFC-32	NA,NO	NO,NA	0.00	0.15	0.31	0.49	1.19	100
HFC-41	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
HFC-43-10mee	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
HFC-125	NO,NA	0.01	0.09	0.55	1.01	1.40	1.70	100
HFC-134	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
HFC-134a	NO,NA	0.26	1.04	1.91	2.30	2.54	2.56	100
HFC-143	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
HFC-143a	NO,NA	0.01	0.10	0.44	0.77	1.01	0.78	100
HFC-152	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
HFC-152a	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
HFC-161	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
HFC-227ea	NO,NA	0.00	0.04	0.16	0.30	0.39	0.41	100
HFC-236cb	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-

Greenhouse gas source and sink categories	1990	1995	2000	2005	2010	2015	2020	Change 1990-2020 %
HFC-236ea	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
HFC-236fa	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
HFC-245ca	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
HFC-245fa	NA,NO	NA,NO	NA,NO	0.14	0.23	0.30	0.26	100
HFC-365mfc	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
Unspecified mix of HFCs - (kt CO_2 eq.)	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
Emissions of PFCs - (kt CO_2 eq.)	2,907	1,492	1,488	1,940	1,520	1,688	539	-81.5
CF_4	0.32	0.18	0.18	0.24	0.20	0.22	0.07	-78.3
C_2F_6	0.05	0.01	0.01	0.01	0.00	0.00	0.00	-96.5
C_3F_8	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00	100
C_4F_{10}	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	-
c-C_4F_8	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00	100.0
C_5F_{12}	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	0.0
C_6F_{14}	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	0.0
C10F18	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	0.0
c-C3F6	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	0.0
Unspecified mix of PFCs - (kt CO_2 eq.)	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NO,NA	NO,NA	0.0

Greenhouse gas source and sink categories	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**Change 1990-2020**
								%
Unspecified mix of HFCs and PFCs - (kt CO_2 eq.)	**NA,NO**	**24.97**	**24.97**	**24.97**	**24.97**	**24.97**	**19.6**	**100**
Unspecified mix of HFCs and PFCs - (kt CO_2 eq.)	NO,NA	24.97	24.97	24.97	24.97	24.97	19.6	100
Emissions of SF_6 - (Gg CO_2 eq.)	**408**	**680**	**604**	**550**	**394**	**472**	**264**	**-35.3**
SF_6	0.02	0.03	0.03	0.02	0.02	0.02	0.01	-35.3
Emissions of NF_3 - (kt CO_2 eq.)	**NA, NO**	**77**	**13**	**33**	**20**	**28**	**16**	**100**
NF_3	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00	100

3. Quantified Economy-wide Emission Reduction Target (QEERT)[4]

3.1 Italy's quantified economy-wide emission reduction target

Under the UNFCCC, the EU and its Member States committed to achieving a joint quantified economy-wide greenhouse gas emission reduction target of 20% below the 1990 level by 2020 ("the Cancun pledge[5]"). It is therefore a joint pledge with no separate targets for Member States under the Convention. The UK remains part of the joint EU 2020 target together with the 27 EU Member States. The LULUCF sector is excluded from the target under the Convention, while emissions from outgoing international flights are included.

CTF Table 2 (a) Description of quantified economy-wide emission reduction target: base year

Party	**Italy***	
Base year /base period	1990	
Emission reduction target	% of base year/base period	% of 1990 20.00
Period for reaching target	BY-2020	

*As this target under the convention has only been submitted by EU-28 and not by each of its Member States (MS), there are no specified convention targets for single MS. Due to this, Italy as part of the EU-28, takes on a quantified economy-wide emission reduction target jointly with all Member States

In Table 2(b) gases and sectors covered for the emission reduction are reported; the target covers the gases CO_2, CH_4, N_2O, HFCs, PFCs and SF_6.

CTF Table 2(b) Description of quantified economy-wide emission reduction target: gases and sectors covered

Gases covered		**Base year for each gas (year):**
CO_2		1990
CH_4		1990
N_2O		1990
HFCs		1990
PFCs		1990
SF_6		1990
NF_3		NA
Other Gases (specify)		
Sectors covered[1]	Energy	Yes
	Industrial processes and product use	Yes
	Agriculture	Yes
	Waste	Yes
	LULUCF[2]	No
	Other Sectors (specify)	

[1] international aviation is included under the EU ETS scope

[2] LULUCF: *land use, land-use change and forestry*

[4] Author: Marina Vitullo

[5] https://unfccc.int/sites/default/files/resource/docs/2011/sb/eng/inf01r01.pdf

The global warming potential values considered are those reported in the 4thAR of the IPCC as adopted in the UNFCCC reporting guidelines for national GHG inventories of Annex I Parties and as adopted under the EU Monitoring Mechanism Regulation (see Table 2(c)).

CTF Table 2(c) Description of quantified economy-wide emission reduction target: global warming potential values (GWP)

Gases	GWP values
CO_2	4th AR
CH_4	4th AR
N_2O	4th AR
HFCs	4th AR
PFCs	4th AR
SF_6	4th AR
Other Gases (specify)	

The EU Convention pledge does not include emissions/removals from Land Use, Land-Use Change and Forestry (LULUCF), but it is estimated, for Italy, to be a net sink over the relevant period. The emission inventory also includes information on emissions and removals from LULUCF in accordance with relevant reporting commitments under the UNFCCC. Accounting for LULUCF activities only takes place under the Kyoto Protocol.

CTF Table 2(d) – Description of quantified economy-wide emission reduction target: approach to counting emissions and removals from the LULUCF sector

Role of LULUCF	LULUCF in base year level and target	Excluded
	Contribution of LULUCF is calculated using	-

EU target under the second commitment period of the Kyoto Protocol

The EU, its Member States, the UK, and Iceland have agreed to fulfil jointly their quantified emission limitation and reduction commitments under Article 3 of the Kyoto Protocol for the second commitment period of the Kyoto Protocol. The Union, its Member States (including the UK) and Iceland agreed to a quantified emission reduction commitment that limits their average annual emissions of greenhouse gases during the second commitment period (2013-2020) to 80% of the corresponding sum of their base year emissions[6]. This commitment is reflected in the Doha Amendment, which entered into force on 31/12/2020. The terms of the joint fulfilment are laid down in Council Decision (EU) 2015/1339 and the joint fulfilment agreement[7] between the European Union, its Member States (including the UK) and Iceland concerning second commitment period of the Kyoto Protocol. The target under the Kyoto Protocol covers the gases CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 and NF_3[8] and includes the following sectors: Energy, Industrial Processes and Product Use, Agriculture, Waste. Differently from the EU target under UNFCCC, the emissions from the international aviation are excluded. The joint fullfiment of the Kyoto Protocol commitments also provides that each member applies the articles 3.3 and 3.4 of the Kyoto Protocol and decisions agreed thereunder individually. This implies that the LULUCF accounting has been carried out by Italy according the KP accounting rules. The global warming potential values considered are those reported in the 4th AR of the IPCC.

[6] to compare the emissions over the period 2013-2020, base year emissions need to be multiplied by eight
[7] https://unfccc.int/sites/default/files/resource/Agreement%20Notification_EU%20Joint%20fulfilment_E_.pdf
[8] Italy has chosen the year 1995 as the base year for the NF_3 emissions

To assess the EU's greenhouse gas emission reduction commitment, the EU, its Member States and Iceland have submitted their Initial reports[9] to facilitate the calculation of the assigned amounts under second commitment period of the Kyoto Protocol based on the year 1990[10]. The assigned amount of each Member State is determined in accordance with the terms of the joint fulfilment agreement; specifically, the assigned amount for Italy is fixed, based on Annex II to Commission Decision 2013/162/EU and as adjusted by Commission Implementing Decision 2013/634/EU. The assigned amount of Italy for the second commitment period has been determined and amount to 2,410,291,421 t CO_2 eq.

3.2 The EU target compliance architecture

3.2.1 The 2020 Climate and Energy Package

The EU has jointly fulfilled its UNFCCC target and implemented it internally through EU legislation in the 2020 EU Climate and Energy Package, adopted in 2009. In the package, the EU introduced a clear approach to achieving the 20% reduction in total GHG emissions from 1990 levels, by dividing the effort between the sectors covered by the EU Emissions Trading System (EU ETS) and the sectors under the Effort Sharing Decision (ESD). Binding national targets were set for Member States under the Effort Sharing Decision. The achievement of EU internal compliance under the 2020 Climate and Energy Package including the national targets under the ESD is not subject to the UNFCCC assessment of the EU's joint commitment under the Convention.

Legally binding target trajectories for the period 2013-2020 are enshrined in both the EU-ETS Directive (Directive 2003/87/EC and respective amendments) and the Effort Sharing Decision. These legally binding trajectories define the national annual target pathway, from 2013 to 2020, to reduce EU GHG emissions by 20% in 2020 compared to 1990. The Effort Sharing Decision has set annual national emission targets for all Member States for the period 2013-2020 for those sectors[11] not covered by the EU emissions trading system (ETS), expressed as percentage changes from 2005 levels. The target included in the Effort Sharing Decision for Italy is equal to a GHG emissions reduction by 13% compared to 2005 levels, in all the sectors not covered by ETS. Under the ESD, EU Member States report annually their greenhouse gas emissions for the period 2013-2020. The European Commission reviews the emissions and checks that Member States comply with their annual limits (so-called annual emission allocations, AEAs).

The Climate and Energy Package allows Certified Emission Reductions (CERs) and Emission Reduction Units (ERUs) to be used for compliance purposes, subject to several restrictions in terms of origin and type of project and up to an established limit. In addition, the legislation foresees the possible recognition of units from new market mechanisms. Under the EU ETS the limit is up to 50% of the required reduction below 2005 levels. In the sectors not covered by the ETS, annual use shall not exceed to 3% of each Member States' non-ETS greenhouse gas emissions in 2005. A limited number of Member States, including Italy, may use an additional 1%, from projects in LDCs or SIDS subject to conditions. The use of these units under the ETS Directive and the Effort Sharing Decision is subject to the limits specified above which do not separate between CERs and ERUs but include additional criteria for the use of CERs.

Italy has not acquired AAUs for compliance purpose to achieve its target and has not used international market-based mechanisms to achieve its emission reduction target under the Convention; according to the review process, the notation key "NA" has been included in the relevant CTF Tables 2(e)I and 2(e)II as well as in CTF Table 4(b). Taking in account that the EU Convention pledge does not include emissions/removals from LULUCF, in Table 4 time series of total GHG emission without LULUCF has been reported.

[9] The Initial reports and the review reports are available at the UNFCCC site: https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-kyoto-protocol/second-commitment-period/initial-reports
[10] https://unfccc.int/sites/default/files/resource/EU_2.pdf
[11] transport, buildings, agriculture, non-ETS industry and waste sectors

CTF Table 2(e)I Description of quantified economy-wide emission reduction target: market-based mechanisms under the Convention

Market-based mechanisms under the Convention	***Possible scale of contributions (estimated kt CO_2 eq)***
CERs	NA
ERUs	NA
AAUs[i]	NA
Carry-over units[j]	NA
Other mechanism units under the Convention (specify)[d]	NA

CTF Table 2(e)II Description of quantified economy-wide emission reduction target: other market-based Mechanisms

Other market-based mechanisms (Specify)	**Possible scale of contributions (estimated kt CO_2 eq)**
NA	NA

4. Progress in achievement of QEERT[12]

4.1 National decision-making process related to climate change policies

With the Decree Law 22/2021, converted with amendments into Law 55/2021, the MASE inherits the competences of the former Ministry of the Environment and is enriched with new competences that are closely linked to the ecological transition process, mainly related to the energy sector. Thus, its functions concern the sustainable development, the protection of biodiversity, ecosystems and the marine-coastal heritage, the safeguarding of land and water, policies to combat climate change and global warming, energy efficiency and the circular economy, integrated waste cycle management, the remediation of Sites of National Interest, the environmental assessment of strategic works, combating air-acoustic-electromagnetic pollution and the risks arising from chemical products and genetically modified organisms. In relation to the energy sector, MASE was assigned the competences for energy and mining policy, previously assigned to the Ministry of Economic Development.

Furthermore, Art. 4 of the Decree Law 22/2021 establishes, at the Presidency of the Council of Ministers, the Inter-Ministerial Committee for Ecological Transition (CITE) with the task of ensuring the coordination of national policies for ecological transition and related programming.

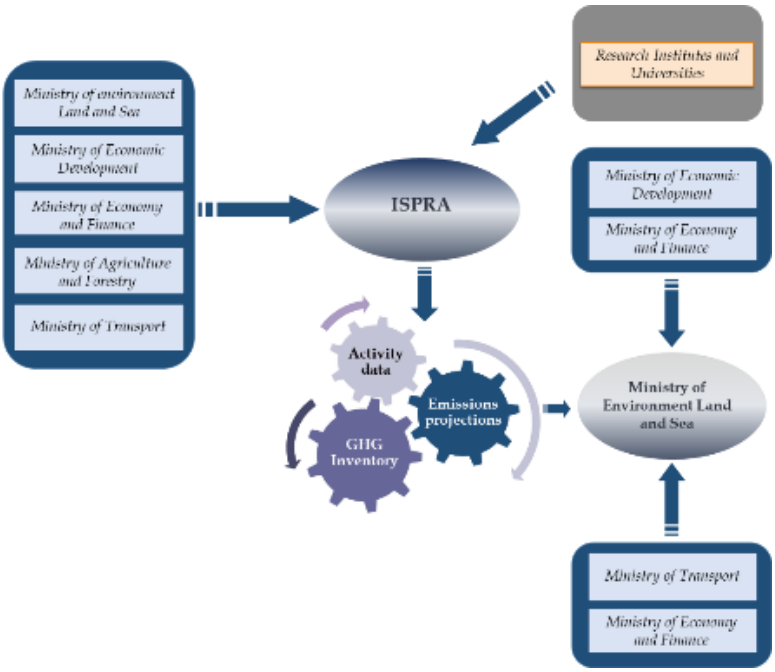
The CITE has the task of approving the Plan for the Ecological Transition, in order to coordinate policies on the reduction of climate-changing gas emissions, sustainable mobility, hydrogeological instability and soil consumption, water resources and related infrastructures, air quality and circular economy. The Plan for the Ecological Transition (Pte) has been approved with CITE Resolution No. 1 of 8 March 2022. Besides, since 2011, the MASE, in consultation with other relevant ministries, is responsible for preparing a report on the status of implementation of GHG emission reduction commitments and emission trends and projections. The report is attached to the Economic and Financial Document (DEF), approved annually by the Government.

4.2 Monitoring and evaluation of progress with climate policies and measures

In 2016, in the context of the Kyoto Protocol commitments and its amendment (Doha amendment) for the second Commitment Period (2013-2020), the national system for policies, measures and emissions projections has been established, with the Law n. 79/2016, "Ratification of the Doha amendment to the Kyoto Protocol", in line with art. 12 of the European Union's Greenhouse Gas Monitoring Mechanism. ISPRA is responsible for this system and, in cooperation with the Ministry of Environment and Energy Security (MASE), collects all the information and data from the competent Ministries. Figure 4.1 shows the data flow in the National system for emission inventories, emission projections, and climate change policies.

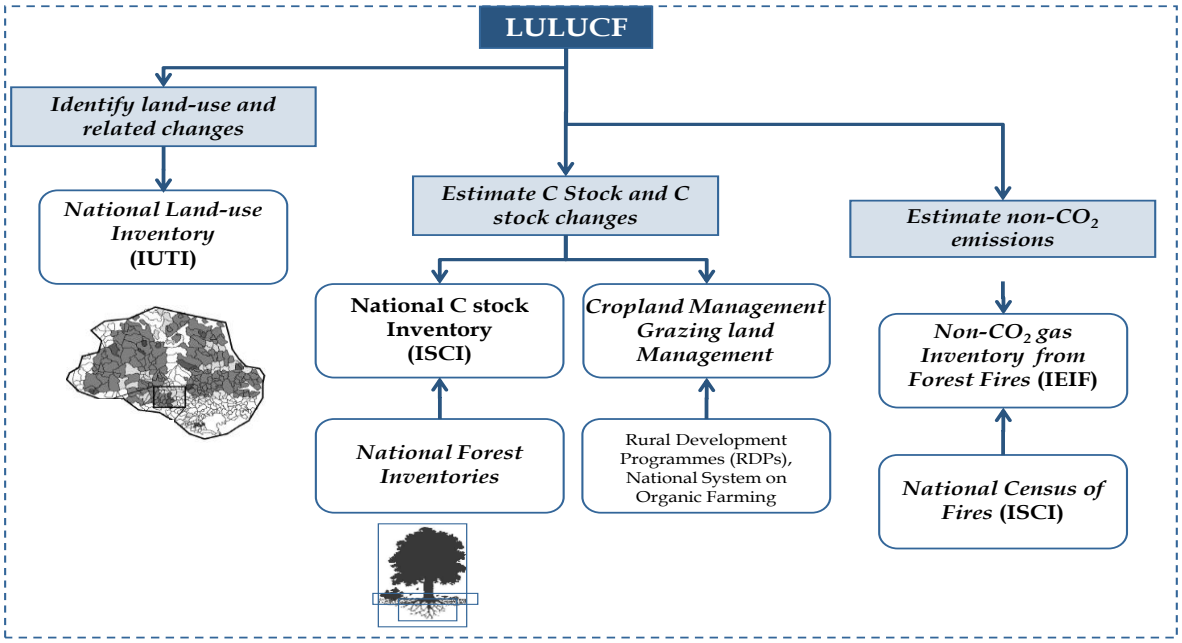
[12] Authors: Monica Pantaleoni, Marina Colaiezzi, Eleonora Di Cristofaro, Andrea Gagna, Emanuele Peschi, Ernesto Taurino, Marina Vitullo

Figure 4.1 - National system for emission inventories, emission projections and climate change policies



To be noted that the national system for emission inventories, emission projections and climate change policies includes a national legislative arrangement specifically related to the implementation of activities under the Article 3.3 3.3 and Article 3.3 3.4 of the Kyoto Protocol, i.e., the national registry for carbon sinks. The 'National Registry for Carbon sinks', instituted by a Ministerial Decree on 1st April 2008, is part of the Italian National System and includes information on lands subject to activities under Article 3.3 and Article 3.4 and related carbon stock changes. In agreement with the Ministerial decree art.4, the Ministry for the Environment is responsible for the management of the National Registry for Carbon sinks. The Decree also provides that ISPRA and the State Forestry Service are involved by the Ministry as technical scientific support for specific activities as defined in the relevant protocol. ISPRA is responsible for the preparation of emission and removals estimates for the LULUCF sector and for KP LULUCF supplementary information under art.7.1 of the Kyoto Protocol. Following an update of the abovementioned Ministerial Decree, in 2013, the Institute for Services on Agricultural and Agro-food Market (ISMEA) has been designated for the technical coordination of the section related to cropland and grazing land management of the National Registry of Carbon Sinks. A detailed description on the registry and additional information on activities under Article 3.3 and Article 3.4 is reported in the National Inventory Report (ISPRA, 2022).

Figure 4.2 – The national registry for carbon sinks



In addition, following the election of the 3.3 and 3.4 activities and on account of an in-depth analysis on the information needed to report LULUCF under the Kyoto Protocol, a Scientific Committee (Comitato di Consultazione Scientifica del Registro dei Serbatoi di Carbonio Forestali), constituted by the relevant national experts, has been established by the MASE in cooperation with the MASAF. Following the election of Cropland Management and Grazing land Management activities under article 3.4 of the Kyoto Protocol, the MASE jointly with the MASAF has established a Committee of National experts at institutional and scientific level, that deals with all issues related to reporting and coordination of activities related to LULUCF.

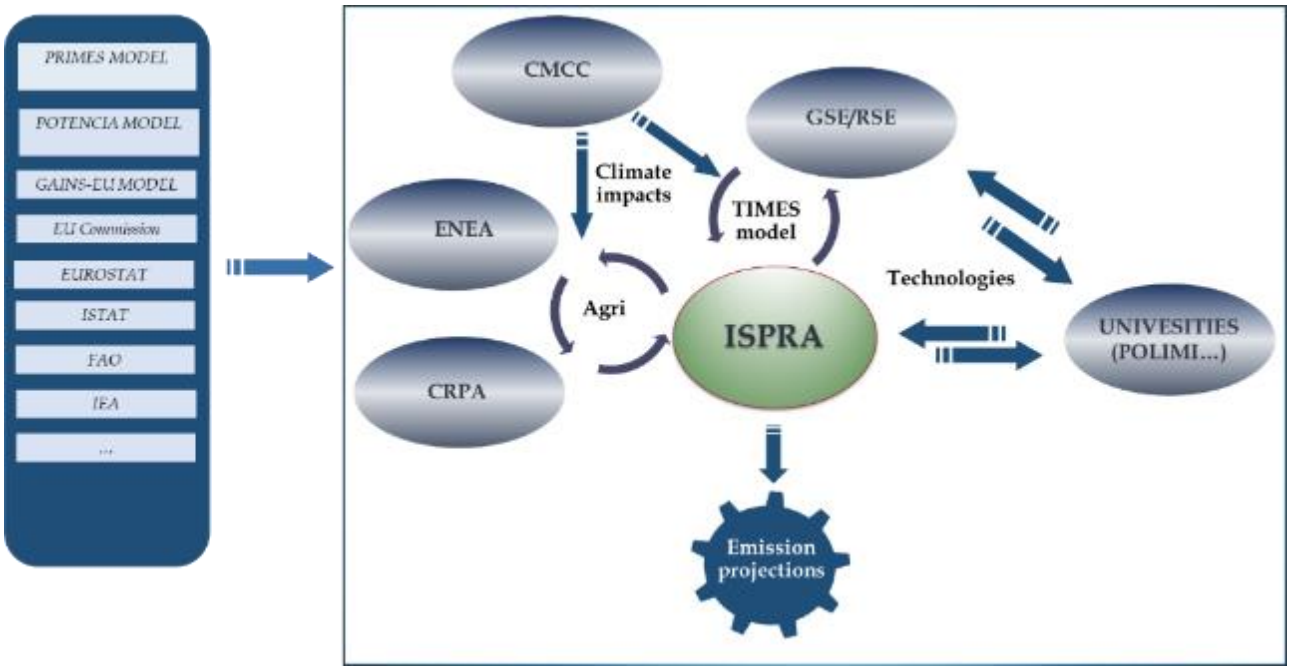
The abovementioned national legislative arrangements and administrative procedures in place for the implementation of activities under Article 3.3 and Article 3.4 of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources. The areas of land subject to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (in particular, afforestation and reforestation and forest management) include the forest areas designated primarily for the conservation of biological diversity (3,265 kha in 2020). Historical management practices in the Italian forests have been guided by the Legislative Decree n. 227[13] of 18 May 2001, although the design and implementation of specific guidelines has been carried out at regional level since, according to the Italian Constitutional Law, the forest management is a regional competence. From 2008 onward, such guidance has been further elaborated in the Framework Program for the Forestry Sector (Programma Quadro per il Settore Forestale - PQSF) for the protection, enhancement and sustainable management of the national forest patrimony in compliance with the commitments undertaken at international and European level. Such goals are to be achieved within 4 area of action: bioeconomy, conservation, including conservation and enhancement of the forest carbon stocks, rural and social development, socio-recreational and educational functions and public awareness. With the entry into force of the Testo unico in materia di Foreste e Filiere forestali (TUFF), article 6, the National Forest Strategy[14] has been established, in continuation of the above-mentioned PQSF (paragraph 1, Article 6, Legislative Decree 3 April 2018, n. 34). Finally, the National Strategy for Biodiversity[15], consistently with the EU Biodiversity Strategy to 2020, explicitly links biodiversity with the need to mitigate and adapt to climate change, aiming at sustainable management of the terrestrial ecosystem and the enhancement of the role of carbon sequestration.

[13] The Legislative Decree n. 227/2001 provides 5 general guidance on forest management: protect forest ecosystem functions, genetic resources, water basins and landscape; avoid conversion of forest land to other uses of land, and where occurring apply compensative; reforestations with endemic species; avoid conversion from forest stands to coppices; avoid clearcut; conserve biodiversity, including true conservation of old trees and dead wood.
[14] https://www.reterurale.it/foreste/StrategiaForestaleNazionale
[15] https://www.mite.gov.it/sites/default/files/archivio/allegati/biodiversita/Strategia_Nazionale_per_la_Biodiversita.pdf

As shown in Figure 4.3, to collect data and information needed for the evaluation of policies and the emission scenario regarding all sectors, ISPRA has established a wider network with other entities through temporary agreements and collaborations that can be activated when needed. Hereby more information is provided about the other entities reported in Figure 4.3:

- CRPA (Centro Ricerche Produzioni Animali), Research Centre on Animal Production, supports ISPRA in the fields of agricultural food production. Its activity is mainly focused on research, and establishment and management of services with the aim of promoting technical, economic, and social progress in the livestock farming sector and promoting the spread of the most advanced forms of environmentally friendly agriculture. In 1996, CRPA became a joint stock-holding company with the public sector as its majority shareholder, http://www.crpa.it/
- ENEA is the Italian National Agency for New Technologies, Energy and Sustainable Economic Development, https://www.enea.it/
- CMCC is a foundation which has been established in 2005 with the financial support of the Italian Ministry of University and Research, and the Ministry of the Environment. Its mission is to investigate and model climate system and its interactions with society, https://www.cmcc.it/
- GSE is a State owned company working on energy efficiency and renewables, www.gse.it
- RSE carries out research into the field of electrical energy with a special focus on national strategic projects funded through the Fund for Research into Electrical Systems. RSE is a total publicly-controlled Company owned by GSE, http://www.rse-web.it/
- POLIMI is the Polytechnic of Milan, which provides studies relating to the production, conversion, transport and use of energy.

Figure 4.3 - Process for selecting assumptions, methodologies, and models for projections



The MASE is part of the National System and it is also supervising the dataflow pursuant to Decree 9/12/2016. Moreover, projections and PaMS evaluation is part of a specific Annex to the Economy and Financial Document (DEF), updated annually by the Ministrer of ecological transition and adopted by the

Government[16]. The DEF outlines the objectives that the multiannual state budget intends to pursue and defines the scope within which to build the annual budget. The aim of the DEF is to enable Parliament to know in advance the Government's economic and financial policy lines; the latter is politically committed to drawing up the next annual budget in accordance with the criteria arising from the parliamentary debate. DEF is usually adopted each year in March or April.

Monitoring and evaluation of progress on policies and measures to cut greenhouse emissions are also reported in documents submitted, every two years, by Member States to the European Commission under the Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, which repeals the former Regulation (EU) No 525/2013 on a mechanism for monitoring and reporting greenhouse gas emissions.

4.3 Action taken and planned to achieve Italy's QEERT

In the most recent years, actions taken by Italy to mitigate climate change have been driven by the commitments taken under:

- the Kyoto Protocol and its amendment (Doha amendment);
- the European Climate and Energy Package for the period 2013-2020;
- the EU NDC, the European 2030 Climate and Energy Framework and Clean energy for all Europeans package for the period 2021-2030.

Pursuant to Regulation (EU) 2018/1999 of the European Parliament and of the Council on the Governance of the Energy Union and Climate Action, at the end of 2019 Italy has submitted to the European Commission the first integrated National Energy and Climate plan. The plan is the result of a common effort of the Ministry of Economic Development, the Ministry of Environment and the Ministry of Infrastructures and Transportation and it is largely based on data and information provided by ISPRA (linked to the Ministry of Environment), GSE, a State-owned company which promotes and supports renewable energy sources and energy efficiency and RSE, a company owned by GSE focused on research on energy production, distribution and consumption.

This section gives a description of the main policies and measures that have had or are expected to have a direct or indirect effect on the reduction of greenhouse gas emissions in Italy. The potential emissions reduction has been assessed up to 2030 at sectoral level. The policies and measures hereinafter described are divided into two types:

- Measures implemented by 31st December 2019;
- Measures planned.

The measures envisaged as planned are consistent with the ones reported in the National Energy and Climate plan. The impact assessment is not available for policies and measures individually, but at sectoral level. For each sector a table of mitigation actions is reported. CTF table 3 is the summary of all the sector specific tables. Some planned measures have been reported in more than one sector, anyway the effect assessed in terms of greenhouse gas emissions reduction is the one expected in the specific sector.

In 2020 and 2021, Italy adopted some new measure to face the effects of COVID-19 pandemic. One of the most important tools is the "National Recovery and Resilience Plan" (NRRP), adopted in July 2021, which includes several measures to tackle climate change and to purse sustainable economic growth towards an inclusive, climate resilient and net-zero emissions future. The Plan envisages investments and a consistent reform package, with €191.5 billion in resources being allocated through the Recovery and Resilience Facility and €30.6 billion being funded through the Complementary Fund. The NRRP has been developed around three strategic axes shared at EU level: digitalization and innovation, ecological transition, and social inclusion. It aims at repairing the economic and social damage caused by the pandemic crisis, contributing to addressing the structural weaknesses of the Italian economy, and leading the country along a path of ecological, environmental and just transition.

[16] https://www.dt.mef.gov.it/modules/documenti_it/analisi_progammazione/documenti_programmatici/def_2021/Allegato_Transizione_Ecologica.pdf

Approximately 40 percent of the total financial resources are allocated for ecological transition. The largest allocation of resources has been earmarked for Mission 2 "Green Revolution and Ecological Transition," amounting to 59.06 billion euros (31.05% of the total amount of the Plan) in order to implement measures on the following issues:

- incentives for energy efficiency in buildings (Superbonus),
- increasing the share of energy produced from renewables and innovation in the industrial supply chain, including hydrogen,
- smart grids strengthening,
- promotion of energy communities and self-consumption,
- development of biomethane and agro-voltaics,
- sustainable mobility with the strengthening of cycling, the development of mass rapid transport, the renewal of the rail and bus fleet and the installation of electric charging infrastructure,
- sustainable agriculture and circular economy.

In order to guarantee coherence with the EU submission, which relies on data provided by EU Member States in March 2021, the NRRP policies and measures have not been taken into account in the present Chapter nor in Chapter 5.

Policies and measures listed in the following sections are grouped according to the sector affected.

4.4 EU policies

The Climate and Energy Package for the period 2013-2020

The 8th and 9th March 2007 conclusion of the European Council named "Integrated Energy and Climate Change Package" (IECCP) committed the European Member States to achieve by 2020 the following targets:

- 20% reduction of EU GHG emissions compared to 1990.
- 20% reduction in energy use to be achieved by improving energy efficiency.
- 20% use of renewable energy
- 10% use of biofuels in the transport sector.

This comprehensive set of legislation acts, also known as the 'Climate and Energy package' or "20/20/20 package", was agreed at EU level to reach those objectives and is being implemented. The most relevant European legislation acts are:

- 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 and amending and subsequently repealing directive 2001/77/EC and 2003/30/EC: this Directive also splits the 20% renewable target between the EU Member States. According to that, by 2020 the 17% of the national final energy consumption of Italy should come from renewable sources.
- Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the community: this Directive revises and strengthens the EU Emissions Trading Scheme (EU ETS) already in place since 2005, which commits to an overall EU reduction of 21% of emissions compared to 2005 levels from the industrial sector.
- Decision n. 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 (ESD): by 2020 Italy shall reduce the GHG emissions by 13% compared to 2005 levels, in all the sectors not covered by the EU ETS, such as transport, civil, agriculture and waste sectors.
- Directive 2012/27/EC 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/EC: this Directive establishes a common framework of measures for the promotion of energy efficiency within the Union in order to ensure the achievement of the Union's 2020 20 % headline target on energy efficiency and to pave the way for further energy efficiency improvements beyond that date.

To track progress and assess compliance with the targets set by Directive 2009/29/CE and by Decision 406/2009/CE, starting from the year 2013 national emissions and projections have to be divided into two main sectors: EU ETS and all other sectors (non-ETS).

The Directive 2003/87/EC established an Emissions Trading Scheme (EU-ETS), as the instrument to fulfil the EU reduction target under the Kyoto protocol for what concerns the industrial sector. Its application started with a first 'pilot' phase as of 2005 to 2007, unlinked to the reaching of the Kyoto commitment, and then applied from 2008-2012 in order to contribute to the reaching of the Kyoto target. This directive had been amended by the Directive 2008/101/CE to include the aviation sector and by Directive 2009/29/CE, which introduces substantive changes in the scheme for stationary installations during the period 2013-2020. One of the most important changes relates to the EU wide cap-setting procedure, as the new system is no longer based on national-cap setting but on a single EU-wide declining cap. National and international aviation, including only flights between airports located in the European Economic Area (EEA), has been included in ETS starting from 2012. For the third trading period (2013-2020) EU ETS sectors, covering almost 45% of EU GHG emissions[17], had to reduce their emissions at least by 43% compared to 2005 levels[18]. The reduction target was not distributed at Member State level; therefore, an assessment of emissions of operators subject to ETS at national level is only possible ex post.

According to the above-mentioned Decision No 406/2009/EC (Effort Sharing Decision or ESD), Italy had to reduce to reduce its GHG emissions by 13% compared to 2005 levels, in all the sectors not covered by ETS, such as transport, buildings, agriculture, non-ETS industry, and waste sectors. On 26th March 2013, the European Commission adopted a Decision (2013/162/EU) on determining Member States' annual emissions allocation for the years from 2013 to 2020. As shown in

Table 4.1 Italy has overachieved its targets.

NF_3 emissions do not fall under either ETS or Effort Sharing until 2020.

Table 4.1 – ESD targets for Italy 2013 – 2020

	2013	2014	2015	2016	2017	2018	2019	2020
ITALY ESD Target - Decision 1471/2017 EU and Decision 634/2013 EU	308.2	306.2	304.2	302.3	298.3	295.8	293.4	291.0
ITALY Effort Sharing Emissions	283.6	274.4	283.4	282.1	275.9	280.8	275.0	254.0
Overachievment	-24.6	-31.8	-20.8	-20.2	-22.4	-15.0	-18.4	-37.0

The 2030 EU Climate & Energy Framework and Clean energy for all Europeans package

On 12 December 2015, UNFCCC Decision 1/CP.21 adopted the Paris Agreement, a new international agreement aimed at reducing GHG emissions with a view of *"holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change"* (Article 2.a, Paris Agreement).

Decision 1/CP.21 also welcomes the submission of Intended Nationally Determined Contributions (INDCs). The European Union submitted an INDC committing its Member States to reduce its overall GHG emissions by at least 40% by 2030, compared to 1990 levels. The EU INDC, which was translated into a NDC following the ratification and entry into force of the Paris Agreement, is in line with the 2030 EU Climate and Energy Framework, defined in October 2014. In this framework, the European Union set the following binding targets to be reached by 2030:

- at least 40% reduction in GHG emissions compared to 1990 (compared to 2005 levels, -43%, for EU ETS sectors and -30% for ESD sectors);
- at least 27% of energy consumption from renewable sources;

[17] https://ec.europa.eu/clima/sites/clima/files/factsheet_ets_en.pdf
[18] http://www.consilium.europa.eu/it/policies/climate-change/reform-eu-ets/

- at least 27% of energy efficiency improvements[19].

New Regulations and Directives[20] have been adopted at EU level to effectively implement the NDC and the EU Climate and Energy Framework. In particular, the 40% greenhouse gas target is implemented through the update of the EU ETS, while the non-ETS target has been translated into individual binding targets for Member States with Regulation (EU) 2018/842, and Regulation (EU) 2018/841, setting the LULUCF target. In this way, all sectors will contribute to the achievement of the 40% target by both reducing emissions and increasing removals.

The most relevant European legislation acts are:

- Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU) 2015/1814
- Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013
- Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU
- Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council
- Commission Delegated Regulation (EU) 2021/268 of 28 October 2020 amending Annex IV to Regulation (EU) 2018/841 of the European Parliament and of the Council as regards the forest reference levels to be applied by the Member States for the period 2021-2025
- Commission Implementing Decision (EU) 2020/2126 of 16 December 2020 on setting out the annual emission allocations of the Member States for the period from 2021 to 2030 pursuant to Regulation (EU) 2018/842 of the European Parliament and of the Council

As in the previous phases, the ETS reduction will be applied uniformly with an EU wide emissions cap that will decrease annually by 2.2% up to 2030.

On the other hand, the new Effort Sharing Regulation, as a follow-up of the previous EU Effort Sharing Decision (ESD), assigned to Italy a 33% emission reduction target in non-ETS sectors to be achieved by 2030 compared to 2005 levels

The Commission Implementing Decision (EU) 2020/2126 set out the annual emission allocations of the Member States for the period from 2021 to 2030. The target for Italy is reported in table Table 4.2.

Table 4.2 – ESR 2020-2030 tagets for Italy

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
ITALY ESR Target	273,5	268,8	264,0	259,3	254,6	249,8	245,1	240,3	235,6	230,9

In December 2019, the European Council endorsed the objective of making the EU climate-neutral by 2050, in line with the Paris Agreement. The long-term strategy has been submitted to the UNFCCC in March 2020. On this basis, in December 2020 the European Consilium updated the NDC by increasing its climate

[19] https://ec.europa.eu/clima/policies/strategies/2030_en
[20] https://energy.ec.europa.eu/topics/energy-strategy/clean-energy-all-europeans-package_en

ambition, endorsed a binding EU target for a net domestic reduction of at least 55% in greenhouse gas emissions by 2030 compared to 1990. To reach that target the European Commission proposed a comprehensive and interconnected set of new directives and regulations, known as the "fit for 55%" package.

In November 2022, the Council and the European Parliament reached a provisional political agreement on stronger emission reduction targets for member states under the Effort Sharing Regulation. The provisional deal endorses an EU-level GHG reduction target of 40% compared to 2005, by 2030, for the sectors not covered by the EU-ETS. For Italy, the proposal increases the national reduction target to 43.7%.

The other policies in the "fit for 55%" package are still under discussion. Since the formal adoption is still pending, the Policies and Measures presented in this Chapter as well as the projections presented in Chapter 5 do not include the effect of the "fit for 55%" package.

4.5 Policies in the Energy sector

4.5.1 Energy supply

4.5.1.1 Incentives for the promotion of electricity production by renewables

The measures for the electricity generation are aimed at supporting the installation of new plants and preservation and upgrading of the existing plants. Economic, regulatory, planning, informational and administrative measures are calibrated on the basis of the type of intervention (new construction or reconstruction), the size of plants and the state of development of technologies.

- *Facilities for individual and collective self-consumption: regulatory and economic measures*

The framework by which general system charges are collected from electricity tariffs, which was introduced in 2018 as part of the adjustment plan referred to in the EU framework on state aid for energy and the environment, constitutes, in itself, a general regulation that favours instantaneous self-consumption; in fact, the structure of the collection tariff provides for the application of variable parts (€/MWh) on the energy taken from public networks.

Work will also be done for the evolution of the on-site exchange mechanism (which allows the use of the grid as storage), in favour of a premium recognized to plants on the basis of the share of self-consumed energy.

In all cases, the promotion of single self-consumption is aimed mainly at distributed systems for which, moreover, the simplicity and automaticity of support mechanisms are preferable to other instruments, in terms of complexity and costs.

Additional instruments to support self-consumption, both individual and collective, are:

- enhancement of obligations for minimum share of renewable sources in new buildings or buildings undergoing major renovations;
- gradual extension of the obligation of minimum share of renewable sources (which, as mentioned, is currently provided only for new buildings or those undergoing major renovations) to existing buildings, starting with certain categories such as warehouses used for production activities and tertiary buildings.

These two points are also connected with similar measures referring to thermal renewables.

- *Measures for small installations*

Additional measures, functional to facilitate both self-consumption where possible, and the construction of small systems that feed production into the electricity grid where self-consumption is not technically and economically feasible, are planned:

- simplified procedures for the construction, commissioning and management of plants;
- extension of the use of PAS (Procedura Abilitativa Semplificata, simplified enabling procedure), which at present can be used for individual installations with power between a few tens and a few hundred kW;

- promotion of the installation of photovoltaic systems on existing agricultural structures that do not fall within the definition of a building, including through the introduction of the concept of rural building for access to support measures;
- allow the aggregation of small systems for the purposes of participation in procedures to access to incentives on energy fed into the grid (see section on contracts for difference);
- specific incentive tariffs, for cases in which self-consumption is not feasible, and provided that there is accessible potential of some significance and prospects for the containment of costs and incentives themselves; of particular interest is the combined production of electricity and heat from waste and residues from the agro-industrial sector, to valorise the waste itself and optimize production cycles, with minority shares of raw materials from second harvest (in the case of biogas plants, moreover, benefits can also be obtained in terms of digestate utilization, of importance in areas vulnerable to nitrates);
- introduce premiums for the construction of photovoltaic plants whose modules are installed to replace roofing containing asbestos.

The first operational tool for incentivizing (also) small plants is the July 4, 2019 Decree, which takes effect in the first period of the 2012-30 decade, particularly for the purpose of meeting the first interim target of the trajectory of the renewable targets.

- *Renewable energy communities*

In order to avoid inefficiencies in the development of the grid itself, renewable energy communities will be promoted as a priority by enhancing the existing electricity grid and.

Energy communities can also be a tool to support the economies of small municipalities, which are often rich in renewable resources, and on the other hand, to provide opportunities for local production and consumption of renewable energy even in those contexts where self-consumption is technically difficult. On this perspective, renewable energy communities will also be able to play an important function in terms of local consensus for the authorization and construction of plants and infrastructure.

The economic promotion of energy communities will be ensured through direct support mechanisms on production, including from multiple facilities (similar to the general mechanisms for production support) and on locally consumed energy.

The promotion of renewable energy communities is pursued through information tools on locally available resources (including making use of the pathway for the identification of eligible areas discussed below) and the opportunities offered by support instruments. The development of standard tools for the establishment and management of communities and for the enhancement of energy production will also be considered. In local contexts where it will be possible and convenient, the enhancement by communities of thermal energy from renewables will also be promoted.

- *Contracts for difference to be introduced into following competitive bidding*

The tried-and-tested competitive bidding mechanisms will continue to be used, adopting a neutrality approach among groups of technologies with similar structures and cost levels, possibly with safeguard mechanisms where technologies nevertheless deemed necessary to achieve the objectives are systematically losing out. The tenders will be aimed at concluding contracts for difference based on the total value of the tariff recognized following the conduct of the procedure, according to the "two-way" criterion (i.e., recognition of the difference between the tariff and the market price of electricity where the difference is positive; restitution by the producer where the same difference is negative). This mechanism will be the main tool to encourage the construction of new plants, but it could also be considered to support integral reconstructions and upgrades of existing plants, should long-term contracts and administrative simplifications prove insufficient.

Competition between groups of technologies with a similar cost structure is envisaged: thus, new wind and photovoltaic plants (to which the largest quotas are allocated), form a single group, in which the two types of plant compete on the basis of economic criteria only (if they have a capacity of 1 MW or more), or environmental and economic criteria if they are smaller than 1 MW. The same is true for the other group, in which hydroelectric plants compete on the same basis along with sewage gas plants, albeit with technological safeguard mechanisms. In particular, for registry installations (below 1 MW), solutions with high environmental value are favoured, such as a specific quota for PV on roofs with asbestos replacement or installation in areas of low environmental value, such as closed and restored landfills. Installations

coupled with charging stations are also favoured, intending to give further impetus to electric mobility and smart and vehicle-to-grid charging technologies. Where self-consumed energy exceeds 40 percent of production, a specific premium is provided, which can also be an impetus for the spread of storage systems. In addition, aggregation of installations is encouraged through a specific priority criterion. Finally, it will be possible to opt for all-inclusive tariffs up to 250 kW.

- *Power Purchase Agreements (PPAs)*

Italy intends to widely promote the use of this instrument, to be placed side by side with contracts for difference, with regulations that encourage investors to enter into Power Purchase Agreements (PPAs) with parties interested in purchasing the energy that the plant will produce over a sufficiently long time interval to ensure the amortization of the investment required to build a new generation plant, or to rebuild or upgrade an existing plant. The July 4, 2019 Ministerial Decree stipulated that, within 180 days of its entry into force, regulations for the establishment of a market platform for long-term trading should be established. To this end, a study has already been launched to investigate what is the legal, regulatory and technical environment for widespread use of PPAs. The need for the study stems from the fact that the renewable sources with the greatest residual potential (solar and wind) are now usable at suitably low costs.

However, for these sources, the cost of energy production is overwhelmingly attributable to the initial investment and not to the operating costs, as is the case for conventional plants, on which the current electricity market structure is still based. As a result of the study, it is intended to arrive at a reference nomenclature, the definition of possible types of PPAs and their minimum elements for contracting, with an examination of the needs of the various parties involved (large consumers, traders, aggregators, producers, lenders), as well as the identification of any barriers to be removed, whether of a legislative or regulatory nature. The ultimate goal is to encourage the spread of such contractual schemes without resulting in burdens on the state and consumers.

In a first phase, the possibility of the state providing an "initial push" will be evaluated, through pilot projects under the National Action Plan on Green Purchases of the Public Administration and procurement procedures for energy supplies through tenders carried out by Consip, a public company whose mission is to make the use of public resources more efficient and transparent, providing administrations with tools and skills to manage their purchases and stimulate companies to compete with the public system.

At the same time, it is counted on fostering dialogue between the parties, first through the qualification of the projects of production facilities by promoting the aggregation of potential demand, particularly of small and medium-sized enterprises, then, by promoting the participation of aggregators of potential demand, particularly of small and medium-sized enterprises and purchasing consortia/groups representing end customers, as also emerged in the PNIEC consultation process; it is also intended to promote the aggregation of the supply of energy producers even with different technologies.

As mentioned above, a contribution to the development of PPAs will come from the Ministerial Decree of July 4, 2019: in fact, this decree provides that the Manager of Energy Markets (GME) will prepare a framework for the creation of a market platform for the long-term trading of energy from renewable sources, to promote the trading of production from newly built renewable source plants, fully reconstructed or reactivated, subject to an upgrading or refurbishment intervention, which came into operation after January 1, 2017 and which do not benefit from incentives on the energy produced. Non-economic forms of support are provided, such as the qualification of plants (by the GSE), the removal (by ARERA) of any regulatory barriers, as well as an update of the rules on the guarantee of origin, to allow its cancellation also directly by end users. Preliminarily from the stipulation of PPAs, a contribution of renewable energy of at least 0.5 TWh additional in each year is expected.

- *Burden sharing among Regions and identification of areas suitable for plant construction*

The achievement of the objectives on renewables, particularly in the electricity sector, is entrusted mainly to wind and photovoltaics, which require adequate areas and surfaces. Notwithstanding the fact that for PV, surfaces in built-up areas, previously compromised areas and areas that cannot be used for other purposes will be prioritized, the sharing of national objectives with the Regions will be pursued by defining a national regulatory framework which will establish criteria (shared with the Regions) on the basis of which the Regions themselves will proceed to define the areas suitable and unsuitable for the installation of renewable energy plants. This framework shall also be consistent with the requirements for the protection

of agricultural and forest areas, cultural heritage and landscape, air quality and water bodies. In this regard, spatial dislocation of existing plants, availability of primary renewable resources, demand dislocation, grid constraints and grid development potential will be adequately considered. The identification of these areas will also be aimed at the coordinated development of plants, electricity grid and storage systems, with simpler and faster permitting procedures.

- *Existing plants*

Specific measures of noneconomic nature for revamping and repowering of existing plants include:

- simplified authorization procedures for revamping or repowering intervention;
- the establishment of basic conditions and limits in compliance with which simpler interventions (e.g., replacement of plant components, which do not alter the layout and committed land) can be carried out with mere communication;
- promote the conversion of certain types of plants that at the end of the incentive period should prove uncompetitive in the market, in favor of plants that are more functional to the needs of the system in the path of energy transition (e.g. conversion to biomethane of biogas plants)

This last option appears more complex for smaller plants, for which, especially in the agricultural sector, efficient forms of support compatible with EU state aid rules will be promoted in order to safeguard production. The biogas plants in question must also be functional for the efficient use of livestock manure, with a view to the smooth functioning of the circular economy. Specific measures for hydroelectric concessions are described in the following para 4.5.1.5.

4.5.1.2 Smaller islands as test projects for higher levels of penetration of renewables and for electrification of consumption

Italy has already started a process for the gradual coverage of the requirements of smaller islands not interlinked with energy from renewable sources. In this context, the Ministerial Decree of 14 July 2017 defined specific targets for the coverage of consumption with locally available renewable energy sources for each island. The Decree establishes specific incentives whose entity is defined by ARERA Decision No 558 of 6 November 2018 and is commensurate to the avoided fuel cost. The aim is to promote, for these islands:

- the modernisation of electricity networks, to allow a higher penetration of renewables;
- the implementation of pilot projects, designed to increase the use of renewables through the use of storage systems, development of electric transport, integration of the electric system with the island's water systems and with the scalable demand on the island.

In order to promote the implementation of the Ministerial Decree of 14 July 2017, the Call for Proposals "Innovative Integrated Projects for the Small Non-Interconnected Islands" was launched on 28 October 2020. 10 million euros were allocated for projects that demonstrate, in compliance with the conditions of security and continuity of supply, to reduce the conventional fossil fuels annual electricity production. Furthermore, the Decree No. 340 of July 14, 2017 launched a Call for Proposals, with a total budget of 15 million euros, aimed at implementing an integrated program on energy, climate and transport in small islands.

4.5.1.3 Cogeneration

Cogeneration is currently supported by incentive schemes, rewarding the production of both heat and electricity. In particular, all cogeneration plants benefit from the White Certificate system, while cogeneration from renewable energy sources are additionally entitled to receive incentive to reward the green electricity produced. In this sector, Italy already has a historically high use in the industrial sector, with many existing plants from medium to large size.

In the field of high-efficiency cogeneration, in accordance with the provisions of the Directive (EU) 2018/2002 amending Directive 2012/27/EU on energy efficiency, further measures of a regulatory nature will be introduced in addition to the incentive scheme in force, in order to facilitate this technology that has significant potential of primary energy savings. Public support can point to the development of new facilities,

in particular of small dimensions, but especially should aim to the revamping of existing installations, structures and technologies towards higher-yielding processes.

4.5.1.4 Coal phase out

Italy has planned to ban coal for electricity production from 2025. This measure is implemented taking into account an adequate capacity replacement, the development of the electricity grid and the high penetration of renewable sources.

In order to reduce energy prices for businesses and to avoid employment crises in areas where coal-fired power plants are scheduled to be shut down, Paragraph 8 of Article 23 of Legislative Decree No. 47/2020, as amended by Budget Law No. 178/2020, provides that:

- the annual portion of revenues from EU ETS auctions in excess of 1 billion euros, is allocated, to the maximum overall extent of 100 million euros for the year 2020 and 150 million euros annually starting from the year 2021, to the Industrial Sector Energy Transition Fund, with the allocation of a portion of up to 10 million euros to the financing of decarbonization and energy efficiency measures in the industrial sector
- the remaining portion, to the purposes referred to in paragraph 2 of Article 29, i.e., financial measures in favour of companies in sectors or subsectors considered to be exposed to a high risk of carbon leakage due to indirect costs related to GHG emissions transferred to electricity prices, as well as, for up to 20 million euros annually for the years 2020 to 2024, to the Fund for Employment Conversion in Territories where coal-fired power plants are located.

4.5.1.5 Hydroelectric concessions

Law No 12 of 11 February 2019 converting Decree-Law No 135 of 14 December 2018 gives the Regions authority in the area of existing large concessions. If there is no overriding public interest conflicting with the hydroelectric use, the Regions can grant concessions for large-scale diversions of water for electricity production to operators that meet the following criteria:

a) minimum improvements in terms of energy, production power and production potential to be achieved from the diversion, conveyance, regulation and supply of water and from the installations for generating, transforming and connecting electricity, with reference to the national strategic objectives on energy security and renewable energy sources. This includes the possibility of equipping the infrastructure with water storage facilities to promote the integration of renewables in the energy market.

b) minimum thresholds in terms of environmental improvement and rehabilitation of catchment areas, in line with the catchment area planning instruments provided for in Directive 2000/60/EC on water policy. These determine a compulsory minimum share of any revenues deriving from the allocation to be channelled into financing the measures contained in district management plans or plans for the environmental protection and rehabilitation of the bodies of water affected by the diversion. This measure is considered as planned.

Table 4.3 – Implemeted policies and measures in the energy supply

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Incentives for the promotion of electricity production by renewables	Incentives for the electricity production by renewable from wind on shore, photovoltaic, hydroelectirc and residual gas	Energy Supply	Increase in renewable energy	Economic	National	2019	Ministry of economic development and Ministry of environment (National government)
Incentives for the promotion of electrical and thermal renewables in the small islands	Electricity network upgrade to have higher renewable penetration. Pilot projects regarding renewable productions, storage systems, development of electrical transport, integration of the electrical system with the water system	Energy Supply	Increase in renewable energy	Economic	Local	2020	Ministry of economic development and Ministry of environment (National government)
White certificates - Cogeneration	Supporting CHP and district heating plants	Energy Supply	Efficiency improvement in the energy and transformation sector (Energy Supply)	Economic	National	2015	GSE- Manager for Energy Service(National government)
Coal phase-out	Ban coal use for electricity production from 2025	Energy Supply	Switch to less carbon-intensive fuels	Regulatory	National	2019	Ministry of economic development (National government)

Table 4.4 – Planned policies and measures in the energy supply

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Energy production and transformation	**Promotion and support to the renewable energy sources**	**Energy Supply**	**Increase in renewable energy and increase in renewable energy in the heating and cooling sector**	**Regulatory; Economic**	**National**			**24800**
Revision of the regulations for the allocation of hydroelectric concessions	The auction procedures for the existing concessions will be integrated in the territorial planning, considering other uses of water, on the basis of homogeneous rules at national level, also in terms of fees. Procedures will transparently privilege the redevelopment of the plants, in order to ensure the useful storage capacity and increase the producibility, in compliance with environmental constraints.	Energy Supply	Increase in renewable energy	Regulatory	National	2022	Ministry of economic development (National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Renewables in existing and new buildings	Extension and improvement of the obligation to integrate renewables into existing and new buildings	Energy Supply	Increase in renewable energy	Regulatory	National	2022	Ministry of economic development and Ministry of environment (National government)	
Incentives to electrical and thermal renewables use in the small islands	Electricity network upgrade to have higher renewable penetration. Pilot projects regarding renewable productions, storage systems, development of electrical transport, integration of the electrical system with the water system	Energy Supply	Increase in renewable energy	Economic	National	2022	Ministry of economic development , GSE-Manager for Energy Service(National government)	

4.5.2 Energy consumption by industries and buildings

4.5.2.1 National Fund for Energy Efficiency

Legislative Decree no. 102/2014 has established the National Fund for energy efficiency. The Fund aims to support energy efficiency measures implemented by companies and the Public Administration on buildings, plants and production processes. The financed interventions are aimed at reducing energy consumption in industrial processes, building and expanding district heating networks and/or for district cooling, making public services and infrastructures more efficient, including public lighting, as well as for the energy upgrading of buildings. The management of the Fund is entrusted to Invitalia SpA (the National Agency for inward investment and economic development, owned by the Italian Ministry of Economy and Finance), based on a specific agreement with the Ministry of Economic Development and the Ministry of technological transition. With the interministerial decree of 5 April 2019, the operating procedures for the presentation of applications were approved and the legal forms and conditions of admissibility, the assessment process and the procedures for granting and disbursing subsidies were therefore identified. In May 2019 the Fund became operational. The Fund has a revolving nature and is divided into two sections:

- a section for the provision of guarantees on individual financing operations that covers the 30 percent of the resources that annually flow into the Fund;
- a section for granting subsidized loans that covers the 70% of the resources that annually flow into the Fund.

4.5.2.2 Energy audits in companies

Article 8 of Legislative Decree No. 102 of July 4, 2012, in paragraphs 1 and 3, identifies, which entities are obliged (large enterprises and energy-intensive enterprises) to perform the Energy audits, by December 5 of each year since 2015. In addition, the program provides for the co-financing of 50% of the cost of energy audits in SMEs by the State and Regions.

15 million euros per year have been allocated for the co-financing program of diagnoses of SMEs in the period 2014-2020. For the period 2021-2030 another 15 million euros per year have been allocated for the ISO50001 management systems financing program.

4.5.2.3 Impresa 4.0

The Impresa 4.0 National Plan is an evolution of the Industria 4.0 Plan, which, from 2017 to 2020, provided measures incentivizing digital transformation to facilitate business innovation.

The Impresa 4.0 Plan incorporates some innovations established by the Budget Law 2020 (Law No. 160 of December 27, 2019) for the purpose of accompanying small and medium-sized enterprises on the path to digital and technological transformation. In particular, the following measures are recalled:

- "bonus capital goods" for which the Budget Law 2020 allocates 540 million: the measure facilitates investments to purchase or acquire on lease plant and machinery, industrial and commercial equipment, capital goods for productive use, hardware, software and digital technologies. To support the innovation of micro and small enterprises in the South (Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia, Sardinia and Sicily), the increase in the state contribution rises from 30 percent to 100 percent, up to a total limit of 60 million euros, of which 15 million euros are earmarked for machinery used in production processes with low environmental impact, to improve the eco-sustainability of products and production processes;
- new tax credit for investment in capital goods that replaces hyper and super depreciation, and provides for a different concessional percentage depending on the type of investment:
- hyper depreciation is replaced by a tax credit for the purchase of innovative machinery related to Industry 4.0 with two facilitation parameters:
    - 40% of expenditure for investments up to 2.5 million;
    - 20% for investments between 2.5 and 10 million;

- investments in digital services and software are eligible for the Tax Credit at 15 percent of the cost, for a maximum threshold of € 700,000;
- tax credit replaces super depreciation for investments in capital goods equal to 6% of the cost, and for a maximum amount of 2 million euros;
- tax credit for investments in technological innovation activities aimed at production: recognizes 10% of the relevant calculation base, taken net of other subsidies or contributions received on the same eligible expenses, up to a maximum amount of 1.5 million euros, to all those new or improved production activities, concerning tangible and intangible goods, services and processes provided that they differ from the previous ones in terms of characteristics, technological capabilities, eco-compatibility, or other factors relevant to the various production sectors;
- tax credit on expenses incurred for technological and digital training of employees, for which150 million euros are allocated and recognized to the extent of:
    - 50% of eligible expenses in the annual maximum limit of 300,000 € for small businesses;
    - 40% in the annual maximum limit of 250,000 € for medium-sized enterprises;
    - 30% in the annual maximum limit of 250,000 € for large enterprises.

4.5.2.4 *Energy efficiency and renewables in residential buildings through tax deductions for building renovations and energy upgrading*

Tax deductions for energy renovation of buildings were introduced in Italy by the 2007 Finance Act and are still active. This is a voluntary mechanism, whereby individuals or businesses may deduct, respectively from their personal (IRPEF) or corporate (IRES) income tax, a percentage of the expenditure incurred for certain types of energy upgrading works on existing buildings. The type of measures currently in place are:

- Ecobonus: tax deductions for energy saving in buildings. Different deduction rates are envisaged based on the intervention carried out, in order to better link the economic benefit to the energy savings that can be achieved
- Bonus casa: 50% of tax deduction for the "recovery" of the building stock

The budget allocated for these measures is around 2.2 billion €.

Furthermore, as indicated in the "NRRP" section, the Law Decree No. 34 of May 19, 2020 established the so-called "Superbonus" in Article 119. The "Superbonus" incentivizes energy and seismic upgrading interventions in residential buildings. Support is provided in the form of a tax deduction, deferred over 5 years, in favour of those who carry out the intervention. Eligible costs are those of design and implementation of the intervention, in the proportion of 110%, which the taxpayer benefits from directly or by opting for other financial instruments (so-called "assignment of credit" and "invoice discount"), so as to address the problem of high initial investment costs. These instruments provide for the tax credit accrued over the 5-year period to be transferred to the supplier who discounts it directly on the invoice (i.e., construction companies, designers, or more generally the general contractor), reducing the cost of the initial investment, or to a financial institution, which will advance the necessary capital. In order to ensure that energy upgrading interventions are classifiable as medium level according to Recommendation (EU) 2019/786, the minimum condition of a double energy class step (corresponding to a 40% primary energy saving compared to ex-ante) has been introduced. To this end, "leading" (higher savings) and "trailing" interventions were introduced, the latter being allowed only if carried out in conjunction with at least one leading intervention.

4.5.2.5 *Minimum energy performance requirements for buildings*

The directive 2002/91/CE on Energy Efficiency introduced stricter energy requirements and promoted the diffusion of renewable energy sources in the building sector. The directive also required the provision of energy performance certificates when buildings are constructed, sold or rented out. The directive has been transposed by legislative decree 102/2005 subsequently amended by legislative decree 311/2006 to strengthen buildings thermal demand requirements. Subsequently, the Directive 2010/31/EC on the

European Energy Performance of Buildings Directive (EPBD) (transposed into national law with the decree 63/2013) defines mandatory standards for new buildings. In particular, article 9 foresees that by 31 December 2020 all new buildings will be nearly zero- energy buildings and after 31 December 2018 new buildings occupied and owned by public authorities will be nearly zero-energy buildings. The transposition of this directive has raised the requirement on new buildings and made it consistent in all regions. An important contribution to energy efficiency in buildings will also come from the application of the Inter-ministerial Decree 26 June 2015 "Application of energy performance calculation methodologies and definition of minimum requirements and requirements for buildings" that envisages the construction of near-zero energy buildings starting from 2021.

4.5.2.6 Conto termico

With Italian Ministerial Decree of 28 December 2012, the Conto Termico was introduced, an incentive for promoting the production of renewable thermal energy and, at the same time, to permit access by public sector bodies to energy-efficient building works and installations. The Thermal Account became operational in July 2013. In relation to production of heat from renewable sources, one or more interventions, carried out by public authorities and by private individuals, are incentivized. The budget allocated for this measure is 300 million €.

An update of the mechanism is envisaged starting 2023 so this measures in reported also as planned.

4.5.2.7 Energy upgrading program for the Central Public Administration (PREPAC)

The Interministerial Decree of 16 September 2016 has defined how to implement the Energy Requalification Program of the Central Public Administration (PREPAC), with a specific focus on identification and selection of interventions that can be admitted to financing and on needs of Pas in terms of information and technical assistance. In order to access the funding, the Public Administrations must develop proposals for intervention for the energy requalification of the buildings. In the period 2014 – 2020 355 million euros have been allocated for the program.

PREPAC will continue in the period 2021-2030, taking into account the experience gained during the start-up phase of the mechanism.

4.5.2.8 Efficient public lighting system

An energy efficiency program has been set up for the public administration starting from the public lighting. With the 2018 Budget law, public administration shall reshape public lighting networks by 31 December 2023, with a reduction in electricity consumption of at least 50% compared to the average consumption of 2015-2016. The main planned measures are replacement of light sources, installation of consumption monitoring systems and more efficient use. The budget allocated for this measure is 300 million €.

4.5.2.9 Mandatory integration of energy from renewable sources in buildings

Mandatory integration of energy from renewable sources in buildings Annex 3 of Legislative Decree No 28 of 2011, transposing the RED Directive, identifies obligations to integrate energy from renewable sources in new buildings or in buildings subject to major renovation, in force from 31 May 2012. The requirements are currently fixed in terms of percentages (increasing per year) of coverage with renewable energy sources of the building's energy requirement for providing heating, cooling and domestic hot water services. In particular, it is envisaged that in the case of new buildings or buildings subject to major renovation, installations for the production of thermal energy have to be designed and created so as to guarantee compliance with coverage, with energy produced from installations powered by renewable sources, of 50% of expected consumers of domestic hot water and of the following percentages of expected consumers of domestic hot water, heating and cooling. Where it is technically impossible to meet the obligation to cover the energy requirements of buildings undergoing first-level restructuring, the possibility for the owner to install the mandatory percentage in another building, including a building owned by others, or transfer it to the local authority will be assessed. In such cases, the local authority could then build up sufficient

quotas suitable for interventions on public buildings will be assessed, as long as this is compatible with the obligations deriving from the Directive on the energy efficiency of buildings.

On the basis of the results of the measures described above, and consistent with the measures for electric renewables, the step will be considered of introducing a mandatory minimum quota also for several categories of existing buildings, including tertiary buildings.

4.5.2.10 Fondo Rotativo Kyoto – "The Kyoto Fund"

The Kyoto Fund established by Law No. 296 of December 27, 2006, finances, through the granting of low-interest loans, measures for the reduction of GHGs emissions. Management of the Fund is entrusted, by law, to Cassa Depositi e Prestiti Spa, which is responsible, in particular, for its economic-financial aspects (stipulation of contracts, disbursement of amounts, collection of instalments).

Article 9 of Decree Law No. 91 of June 24, 2014, allocated 350 million euros from the Fund to the energy upgrading of publicly owned school buildings, including kindergartens and universities. The energy efficiency interventions financed ensure an improvement of at least two "energy classes," corresponding to consumption savings of about 20-25 percent. The call for applications was launched in June 2015 and ended on December 31, 2018, with a commitment of resources of about 150 million euros, related to interventions on more than 300 buildings. In addition, 435 energy diagnoses, worth a total of about 2.5 million euros, were eligible for subsidies.

The 2019 Budget Law extended the possibility of accessing Kyoto Fund financing to publicly owned sports facilities and healthcare facilities as well. To this end, a new call has been launched from the remaining uncommitted resources (200 million euros). Funded projects must achieve an improvement in the building's energy efficiency parameter of at least two classes, which corresponds to a reduction in consumption of around 25-30 percent.

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Table 4.5 Implemented policies and measures in the energy consumption by industries and buildings

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
White certificates – Industry	Supporting electric energy saving in the industry sector	Energy Consumption	Efficiency improvement in industrial end-use sectors (Energy Consumption)	Economic	National	2009	GSE- Manager for Energy Service(National government)
National Industry 4.0 Plan (Impresa 4.0)	Tax breaks and reductions to stimulate companies - micro, small and medium-sized enterprises and innovative startups - to invest in innovation.	Energy Consumption	Efficiency improvement in industrial end-use sectors (Energy Consumption)	Fiscal	National	2019	Ministry of economic development (National government)
"Ecobonus" and "Bonus casa"	Supporting of energy saving and renewables in existing buildings through tax deduction.	Energy Consumption	Efficiency improvements of buildings	Fiscal	National	2008	Ministry of economy and finance(National government)
Energy audits in companies	Co-financing of energy audits in SMEs; adoption of energy management systems compliant with ISO 50001 standards; extension to energy-intensive businesses in the gas sector and correlation of the benefit to the execution of energy efficiency interventions	Energy Consumption	Efficiency improvement in industrial end-use sectors	Regulatory	National	2014	ENEA - Italian National agency for new technologies, Energy and sustainable economic development(Research institutions)

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Minimum energy performance requirements for buildings	Application of the minimum energy performance requirements for buildings. These requirements apply to public and private buildings, whether they are new buildings or existing buildings subject to restructuring	Energy Consumption	Efficiency improvements of buildings	Regulatory	National	2006	Ministry of economic development (National government)
Thermal account	Incentives for small-scale energy efficiency measures in buildings and production of thermal energy from renewable sources	Energy Consumption	Efficiency improvements of buildings and in services/ tertiary sector	Economic	National	2012	Ministry of economic development , GSE- Manager for Energy Service(National government)
Efficient public lighting system	Obligation to make public lighting system more efficient	Energy Consumption	Demand management/reduction	Regulatory	National	2020	Ministry of economic development and Ministry of environment (National government)
Energy program for the Central Public Administration (PREPAC)	Support to Public Administration buildings	Energy Consumption	Efficiency improvement in services/ tertiary sector	Economic	National	2020	Ministry of economic development and Ministry of environment (National government)
Kyoto Fund Review	Extension of the granting subsidized loans for financing energy efficiency in sport facilities and health buildings	Energy Consumption	Efficiency improvements of buildings	Economic	National	2020	Ministry of economic development and Ministry of environment (National government)

Table 4.6 Planned policies and measures in the energy consumption by industries and buildings

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Energy efficiency, renewables and electrification in the industrial sector	**Increase energy efficiency and renewable energy production in the industrial sector**	**Energy Consumption**	**Efficiency improvement in industrial end-use sectors**	**Economic; Regulatory; Fiscal**	**National**			**4600**
White certificates (Certificati bianchi) mechanism with upgrading	Update and widen mechanism to support energy savings	Energy Consumption	Efficiency improvement in industrial end-use sectors	Economic	National	2022	GSE- Manager for Energy Service(National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Energy audits in companies	Co-financing of energy audits in SMEs; adoption of energy management systems compliant with ISO 50001 standards; extension to energy-intensive businesses in the gas sector and correlation of the benefit to the execution of energy efficiency interventions	Energy Consumption	Efficiency improvement in industrial end-use sectors	Regulatory	National	2021	ENEA - Italian National agency for new technologies, Energy and sustainable economic development(Research institutions)	
National Industry 4.0 Plan	Update Tax breaks and reductions to stimulate companies - micro, small and medium-sized enterprises and innovative startups - to invest in innovation.	Energy Consumption	Efficiency improvement in industrial end-use sectors	Fiscal	National	2021	Ministry of Economic Development(National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Energy efficiency, renewables and electrification in the civil sector	**Increase energy efficiency and renewable energy production and emission reduction in the civil sector**	**Energy Consumption**	**Efficiency improvements of buildings, increase in renewable energy in the heating and cooling sector, demand management/reduction, efficiency improvement in services/ tertiary sector**	**Economic; Regulatory; Fiscal**	**National**			**9300**
White certificates (Certificati bianchi) mechanism with upgrading	Update and widen mechanism to support energy savings	Energy Consumption	Efficiency improvements of buildings (Energy Consumption)	Economic	National	2022	GSE- Manager for Energy Service(National government)	
Thermal account (Conto termico) mechanism with upgrading	Update of the incentive schemes for small-scale energy efficiency measures in buildings and production of thermal energy from renewable sources	Energy Consumption	Efficiency improvements of buildings	Economic	National	2023	Ministry of economic development , GSE-Manager for Energy Service(National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Renewables in existing and new buildings	Extension and improvement of the obligation to integrate renewables into existing and new buildings	Energy Consumption	Increase in renewable energy in the heating and cooling sector	Regulatory	National	2022	Ministry of economic development and Ministry of environment (National government)	
Efficient public lighting system	Extension of obligation to make public lighting system more efficient	Energy Consumption	Demand management/reduction	Regulatory	National	2022	Ministry of economic development and Ministry of environment (National government)	
Energy upgrading program for the Central Public Administration (PREPAC)	Support to upgradings in Public Administration buildings will be strengthened, in order to play a guide role for the entire economic sector.	Energy Consumption	Efficiency improvement in services/ tertiary sector	Economic	National	2022	Ministry of economic development and Ministry of environment (National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
"Superbonus 110%"	Increase the propensity towards radical interventions on the building through efficiency improvements and renewables for energy generation and consumption.	Energy Consumption	Efficiency improvements of buildings	Fiscal	National	2021	Ministry of economic development and Ministry of environment (National government)	

4.5.3 Transport

4.5.3.1 Emission standard for new vehicles

The Regulation (EU) No 2019/631 of the European Parliament and of the Council of 17 April 2019 setting CO2 emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011.

From 1 January 2020, this Regulation sets an EU fleet-wide target of 95 g CO2/km for the average emissions of new passenger cars and an EU fleet-wide target of 147 g CO2/km for the average emissions of new light commercial vehicles registered in the Union, as measured until 31 December 2020 in accordance with Regulation (EC) No 692/2008 together with Implementing Regulations (EU) 2017/1152 and (EU) 2017/1153, and from 1 January 2021 measured in accordance with Regulation (EU) 2017/1151.

From 1 January 2025, for the average emissions of the new passenger car fleet and of the new light commercial vehicles fleet, shall apply an EU fleet-wide target equal to a 15 % reduction of the target in 2021.From 1 January 2030, for the average emissions of the new passenger car fleet, shall apply an EU fleet-wide target equal to a 37.5 % reduction of the target in 2021 and equal to a 31% for the average emissions of the new light commercial vehicles fleet.

4.5.3.2 Incentives to biomethane and other advanced biofuels

Promotion of biogas and advanced biofuels for the performance obligation existing for blending of fossil fuels with biofuels. To monitor the quantity of biofuels supplied to the Italian market, are created certificates known as "Certificati Immissione in Consumo (CIC)" (Ministerial Decree 2 March 2018), that are tradable through a dedicated platform. The incentive fee is charged to the obliged parties (oil companies that introduce fossil fuels for consumption) and does not affect the electricity and gas bills. This incentive system is expected to cover the expected demand for methane in road transport with biomethane, corresponding to around 1.1 billion m3 per year.

4.5.3.3 Certification of biofuel sustainability

Biofuel sustainability certification systems measure and verify environmental performance of fuels throughout all major stages of the product life cycle, production, fuel production, and end use including feedstock. This is in accordance with-Italian National Biofuels and Bioliquids Sustainability Certification System (“Sistema Nazionale di Certificazione della sostenibilità dei biocarburanti e dei bioliquidi”), established by the Decree of 23 January 2012 of the Italian Ministry of Environment.

4.5.3.4 Implementation of the RED II with specific obligations on biofuels and other renewable

This Directive, approved by European Parliament on 13 November 2018, establishes a common framework for the promotion of energy from renewable sources. It sets a binding Union target for the overall share of energy from renewable sources in the Union's gross final consumption of energy in 2030, equal to 32%. The Commission’s original proposal did not include a transport sub-target, which has been introduced by co-legislators in the final agreement: Member States must require fuel suppliers to supply a minimum of 14% of the energy consumed in road and rail transport by 2030 as renewable energy. Moreover, fuels used in the aviation and maritime sectors can opt in to contribute to the 14% transport target but are not subject to an obligation. It also lays down rules on financial support for electricity from renewable sources and establishes sustainability and greenhouse gas emissions saving criteria for biofuels, bioliquids and biomass fuels.

4.5.3.5 Renewal of public vehicles

1. The National Strategic Plan for Sustainable Mobility allocated 3.7 billion euros (200 million euros for 2019 and 250 million euros for each of the years 2020 to 2033) + 185 million from the 2019 investment fund (L.145/2018 art. 1 c. 95). The resources are earmarked for regions (2.2 billion), metropolitan cities and municipalities over 100 inhabitants (1.287 billion), and municipalities with high PM10 and nitrogen

dioxide pollution (398 million in 2019-2023).

2. Renewal of public vehicles for passenger transport (renewal of the fleet used for local public transport) in the Regions of the Po Valley Basin. With the Prime Minister's Decree of November 28, 2018, the government allocated resources from the Fund for Investment and Infrastructural Development of the Country referred to in Article 1, Paragraph 1072, of Law No. 205 of December 27, 2017, allocating 180 million euros to the Ministry of Environment for the renewal of the road-based rolling stock used for Local Public Transport for the period 2018-2022 in the Regions of the Po Valley Basin. These are specifically electric, hybrid and CNG buses, and electric boats for the integration and replacement of the existing fleet, and the measure is part of the national strategy for improving air quality. Allocated resources: €180 million.
3. Obligation for public administrations to purchase vehicles using alternative fuels: the target is to accelerate the implementation set out in paragraph 10 of Article 18 of Italian Legislative Decree 257/2016 (transposition of the DAFI directive). Public administrations (national and local level) must ensure that at least 30% (by 2022), 50% (by 2025) and 85% (by 2030) of the vehicles purchased must be electric and hybrid with off-vehicle charging, powered by methane and hydrogen, and electricity and methane in the case of buses.

4.5.3.6 Renewal of private passenger vehicles

1. Incentives to buy more efficient vehicles and with lower GHG emissions: Promoting and supporting renewal of car fleet with low carbon fuels, speed up the replacement of vehicle fleet with new vehicles, including CNG and LPG cars
2. Strengthening of charging networks in the country to promote the spread of electric-powered vehicles. Multiple policies regarding this measure have been implemented, namely:
    a. Law Decree No. 83 of June 22, 2012, on Urgent Measures for the Growth of the Country converted into Law No. 134 of August 7, 2012, Article 17 - septies provided for the National Infrastructure Plan for the Recharging of Electric Energy Powered Vehicles (PNIRE), which was approved by DPCM of September 26, 2014, updated by DPCM April 16, 2016. Allocated resources: €10 million (Article 4, paragraph 7-bis, of Decree-Law No. 32 of April 18, 2019, converted, with amendments, by Law No. 55 of June 14, 2019).
    b. With the Prime Minister's Decree of June 11, 2019, the government allocated the fund referred to in Article 1, paragraph 95 of Law No. 145 of December 30, 2018, allocating 500 million euros to the Ministry of Environment for the strengthening of urban and highway charging networks in the country to encourage the spread of electric-powered vehicles. Allocated resources: 50 million euros.
    c. By Decree Law No. 104 of August 14, 2020, converted with amendments by Law No. 126 of October 13, 2020, with particular reference to Article 74, paragraph 3, a fund with an allocation of 90 million euros for the year 2020 was established in the budget of the Ministry of Economic Development, aimed at providing contributions for the installation of infrastructure for charging electric vehicles carried out by individuals in the exercise of business, arts and professions, as well as by persons liable to corporate income tax (IRES). Allocated resources: 90 million euros.

4.5.3.7 Regulatory measures

1. Refueling points for alternative fuels (DAFI): an increase of charging points (public and private) for electric vehicles from the current 2,900, approximately, up to at least 6,500 in 2020, an increase of CNG supply station from the current number of around 1,100 to around 2,400 in 2030, an increase of LNG supply station from the current number of a few dozen to around 800 in 2030.
2. Replacement of vehicles used for the transport of good: Decree 122/2018 provides incentives for purchasing commercial vehicles with alternative motorisation for transport of goods

4.5.3.8 Infrastructural measures

The Budget Law for 2017 provided for the establishment of a fund , with an allocation of 1,900 million euros for the year 2017, 3,150 million euros for the year 2018, 3,500 million euros for the year 2019 and 3,000 million euros for each of the years from 2020 to 2032, to ensure the financing of investment and infrastructure development of the country in the areas of expenditure related to, among other things, transportation, road, sustainable mobility, road safety, upgrading and accessibility of railway stations. Ministerial Decree No. 360 of 6/8/2018 provided for the allocation of the fund intended for the completion of mass rapid transport interventions, allocating 1.4 billion euros for this purpose. The fund was refinanced by the Stability Law for 2018, in the amount of €800 million for the year 2018, €1,615 million for the year 2019, €2,180 million for each of the years 2020 to 2023, €2,480 million for the year 2024, and €2,500 million for each of the years 2025 to 2033.

4.5.3.9 Modal shift of freight transport

1. Marebonus: provides for incentives to be given to road transport companies for adopting combined road-sea modes of transport.
2. Ferrobonus: provides for incentives to be given to road transport companies for adopting combined road-rail modes of transport.
3. National Logistics Platform: development of the National Logistics Platform with the aim to provide services to all logistics and transport operators through an increase of interconnection and facilitation of data management.

4.5.3.10 Modal shift of passenger transportation (mobility management measures)

Decree-Law No. 111 of October 14, 2019, in Article 2, paragraph 2, as amended by Article 229 of Decree-Law No. 34 of May 19, 2020, finances projects for the creation, extension, modernization and retrofitting of local public transport lanes and bike lanes, authorizing a total expenditure of 40 million euros. The measure is reserved for municipalities with a population of more than 50,000 inhabitants, or by one or more neighboring municipalities also in associated form referring to a territorial area with a population of more than 50,000 inhabitants for the implementation of a single work, affected by EU infringement procedures No. 2014/2147 of July 10, 2014 and No. 2015/2043 of May 28, 2015 for Italy's non-compliance with its obligations under Directive 2008/50/EC on air quality. The main goals of the measure are:

1. development of mobility for cyclists through cycle paths;
2. promoting shared mobility (bike, car and motorbike sharing with low or zero)
3. integration between sustainable mobility services (for example, parking structures for bicycles or car and bike sharing services close to public transport stops) and interchange parking
4. promotion of smart working tools
5. promotion of car-pooling
6. development of ITS (traffic management, infomobility, smart roads).
7. Electric Road System (ERS): promotion of initiatives for potential electrification of the highway network using ERS technologies.

4.5.3.11 Renewal of vehicles for freight transport

Promoting and supporting renewal of HDV and LDV fleet with low carbon fuels, speed up the replacement of vehicle fleet with new vehicles powered by alternative fuels, including CNG and LNG.

4.5.3.12 Urban Plans for Sustainable Mobility – PUMS

All metropolitan cities, municipalities with more than 100,000 inhabitants and for cities with high levels of PM10 and/or nitrogen dioxide pollution (also with a population of fewer than 100,000 inhabitants), should prepare a PUMPS by 2021. Municipalities with more than 50.000 inhabitants should prepare a PUMS by 2025. Decree of the Ministry of Infrastructure and Transport of August 4, 2017 establishes guidelines for urban sustainable mobility plans, with the explicit purpose of encouraging homogeneous and coordinated application throughout the country.

4.5.3.13 Sustainable Urban Mobility Incentive Program (PrIMUS)

The Sustainable Urban Mobility Incentive Program (PrIMUS), adopted in 2019, is aimed at municipalities with at least 50,000 inhabitants and provides 15 million euros for sustainable urban mobility actions on three themes: development of cycle infrastructure, sharing mobility and mobility management activities.

4.5.3.14 Support to LNG penetration in heavy freight transport (maritime and road) through taxation

The development of LNG for navigation maritime and inland, as well as for road transport deriving from the Alternative Fuel Directive (DAFI) was taken into account. In detail, the directive DAFI (2014/94/UE) establishes a common framework of measures for the deployment of low carbon fuels infrastructure in the Union in order to minimize dependence on oil and to mitigate the environmental impact of transport. This Directive sets out minimum requirements for the building-up of recharging points for electric vehicles and refuelling points for natural gas (LNG and CNG) and hydrogen, to be implemented by means of Member States' national policy frameworks, as well as common EU technical specifications for such recharging and refuelling points.

4.5.3.15 Experimental mobility voucher program

Law Decree No. 111 of October 14, 2019 (so-called "DL Clima"), in Article 2, paragraph 1, establishes the fund called "Experimental mobility voucher program." The measure is reserved for residents in municipalities affected by EU infringement procedure No. 2014/2147 of July 10, 2014 and No. 2015/2043 of May 28, 2015 for non-compliance with obligations under Directive 2008/50/EC who, from October 15, 2019 to May 18, 2020 and from January 1, 2021 to December 31, 2021, scrap cars homologated up to euro 3 class or motorcycles homologated up to euro 2 and euro 3 two-stroke class. These individuals are granted a mobility voucher of 1,500 euros per car or 500 euros per scrapped motorcycle. This voucher can be used within three years to purchase, including for cohabiting persons, local and regional public transport subscriptions and bicycles, including pedal-assisted bicycles.

Following the epidemiological emergency from COVID-19 and in relation to the measures to be activated in view of the inevitable and relevant changes that mobility in urban and metropolitan areas will undergo, Art. 229 of Decree-Law No. 34 of May 19, 2020 (the so-called "Relaunch Decree") made amendments to Art. 2, paragraphs 1 and 2 of Decree-Law 111/2019, providing incentives for sustainable forms of mobility alternative to local public transport that guarantee the right to mobility of people in urban areas. Specifically, it provides for, from May 4 to December 31, 2020, the recognition to all people over 18 years of age residing in regional capitals, metropolitan cities, provincial capitals or municipalities with a population of more than 50.000 inhabitants, of a "mobility voucher," equal to 60 percent of the expenditure incurred and in any case not exceeding 500 euros, from May 4, 2020 until December 31, 2020, for the purchase of bicycles, including pedal-assisted bicycles, as well as vehicles for personal mobility with predominantly electric propulsion, such as segways, hoverboards, scooters and monowheels or for the use of shared mobility services for individual use excluding those by means of motor vehicles.

4.5.3.16 Experimental projects for the implementation of school transportation service

Decree Law No. 111 of October 14, 2019 (the so-called "climate decree"), in Article 3, authorizes the total expenditure of 20 million euros for the financing of investments necessary for the execution of experimental projects for the realization of school transport service for state and municipal kindergarten children and

state schools of the first cycle of education with hybrid or electric means of transport, selected by the Ministry of Environment based on the size of the number of students involved and the estimated reduction of air pollution. The measure is reserved for municipalities with a population over 50,000 affected by EU infringement procedures No. 2014/2147 of July 10, 2014 and No. 2015/2043 of May 28, 2015 for Italy's non-compliance with its obligations under Directive 2008/50/EC on air quality.

4.5.3.17 Aviation and marine bunker fuels

According to Article 2.2 of the Kyoto Protocol on aviation and marine bunker fuels, each Annex I Party shall identify the steps it has taken to promote and/or implement any decisions by the International Civil Aviation Organisation (ICAO) and International Maritime Organisation (IMO) to limit and reduce associated emissions.

As part of the European Union, Italy supported the European Commission's proposal to incorporate aviation into the EU Emissions Trading System (ETS), which was approved in 2008 (Directive 2008/101/CE). In order to prevent negative effects on the EU's relationship with other countries, it urged that implications in the area of international law, by ICAO, should be taken into account. Directive 2008/101/CE sets a cap for CO2 allowances and establishes that a certain quantity of allowances is allocated through auctioning. In order to prevent double regulation and not prejudge the ICAO process, the ETS directive is currently applied to flights leaving and departing in airports located in the European Economic Area (EEA).

As regards the maritime sector, on 28 June 2013 the European Commission adopted a Communication21 setting out a strategy to progressively include GHG emissions from maritime transport into EU's policy for reducing its overall emissions. The strategy consists of the following consecutive steps:

1. establishing a system for monitoring, reporting and verifying (MRV) of CO2 emissions;
2. setting reduction targets for the maritime transport sector, in particular, a reduction in carbon intensity of international shipping (to reduce CO2 emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008); and that total annual GHG emissions from international shipping should be reduced by at least 50% by 2050 compared to 2008;
3. applying further measures, including market-based instruments, in the medium to long term.

Relating to the first of these three steps, the Commission proposed a Regulation22 of the European Parliament and of the Council establishing an EU-wide MRV system for large ships.

This proposal addresses emissions released by ships above 5,000 gross tons during their voyages from the last port of call to a port under the jurisdiction of a Member State, and from a port under the jurisdiction of a Member State regardless of their flag. According to the proposed Regulation, ship owners will have to monitor and report the verified amount of CO2 emitted by their ships on voyages to, from and between EU ports. Owners will also have to provide certain other information, such as data to determine the ships' energy efficiency. These rules are designed to support a staged approach towards setting global energy efficiency standards for existing ships, as supported by several members of the International Maritime Organisation, and it is proposed that they start applying from 1 January 2018.

An impact assessment of the economic effects on third countries of this proposal concluded that based on the pass-through of costs and savings in maritime transport and on the price building mechanisms in different sectors, measurable increases of commodity prices (with transport costs being only an insignificant

[21]Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Integrating maritime transport emissions in the EU's greenhouse gas reduction policies. COM (2013) 479 final.

[22]Proposal for a Regulation of the European Parliament and of the Council on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport and amending Regulation (EU) No 525/2013. COM (2013) 480 final.

element of the commodities' prices) are expected to have minor effects[23]. In the impact assessment, several policy options – from an MRV system to levies and to emission trading schemes – were assessed.

Given the large cost-effective abatement potential of the sector, the above-mentioned emission reductions would lead to net cost savings for the maritime transport sector. Other expected impacts are the creation of additional jobs in shipyards and the maritime supply industry as well as health benefits due to reduced emissions of SO_X, NO_X and particulate matter.

[23]Impact Assessment – Part 1 Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport and amending Regulation (EU) No 525/2013. Commission staff working document SWD (2013) 237 final/2.

Table 4.7 Implemented policies and measures in the transport sector

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Emission standard for new vehicles	Fleet update	Transport	Efficiency improvements of vehicles	Regulatory	National	2019	Ministry of economic development (National government)
Incentives to biomethane and other advanced biofuels	Biofuels promotion: consumption in the transport sector of bio-methane and about advanced biofuels through the conversion of refineries and / or traditional biodiesel plants	Transport	Low carbon fuels/electric cars	Economic	National	2020	Ministry of economic development (National government)
Implementation of the RED II with specific obligations on biofuels and other renewables	This Directive establishes a common framework for the promotion of energy from renewable sources. It sets a binding Union target for the overall share of energy from renewable sources in the Union's gross final consumption of energy in 2030. It also provides that 14% of the energy consumed in road and rail transport by 2030 shall be renewable energy.	Transport	Low carbon fuels/electric cars	Regulatory	National	2020	Ministry of economic development (National government)

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Certification of biofuel sustainability	Biofuel sustainability certification systems measure and verify environmental performance of fuels throughout all major stages of the product life cycle, production, fuel production, and end-use including feedstock.	Transport	Low carbon fuels/electric cars	Regulatory	National	2020	Ministry of economic development (National government)
Sustainable Urban Mobility Incentive Program (PrIMUS)	The Sustainable Urban Mobility Incentive Program (PrIMUS) is aimed at municipalities with at least 50,000 inhabitants and provides 15 million euros for sustainable urban mobility actions on three themes: development of cycle infrastructure, sharing mobility and mobility management activities.	Transport	Improve sustainable urban mobility	Planning	National	2020	Ministry of economic development (National government)
National Infrastructural Plan for the recharging of electricity powered vehicles – PNIRE	The PNIRE (National Plan for Electric charging Infrastructure), adopted by the Ministry of Infrastructures and Transport, has as its object the construction of infrastructure networks for recharging vehicles powered by electricity.	Transport	Electric road transport	Planning	National	2019	Ministry of Infrastructures and Transports (National government)

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
	It also defines the guidelines to guarantee the unitary development of the recharge service vehicles powered by electricity in the national territory.						
Infrastructure upgrading (regional rail transport and rapid mass transport systems)	Increase of high capacity and high speed rail networks	Transport	Modal shift to public transport or non-motorized transport	Planning	National	2018	Ministry of Infrastructures and Transports(National government)

Table 4.8 Planned policies and measures in the transport sector

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Energy efficiency, renewables and electrification in the transport sector	**Increase energy end-use efficiency, support biofuels and other fuels with low environmental impact, support intermodality and emission reduction**	**Transport**	**Low carbon fuels/electric cars, modal shift to public transport or non-motorized transport, electric road transport, modal shift in freight transport**	**Regulatory; Planning; Economic**	**National**			**24200**
Certification of biofuel sustainability	Biofuel sustainability certification systems measure and verify environmental performance of fuels throughout all major stages of the product life cycle, production, fuel production, and end use including feedstock.	Transport	Low carbon fuels/electric cars	Regulatory	National	2022	Ministry of Economic Development , Ministry of environment and Ministry of Agricultural and Forestry	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Infrastructure upgrading (regional rail transport and rapid mass transport systems)	Increase of high capacity and high speed rail networks	Transport	Modal shift to public transport or non-motorized transport	Planning	National	2024	Ministry of Infrastructures and Transports (National government)	
Urban Plans for Sustainable Mobility - PUMS	A Sustainable Urban Mobility Plan has as its central goal improving accessibility of urban areas and providing high-quality and sustainable mobility and transport to, through and within the urban area.	Transport	Modal shift to public transport or non-motorized transport	Planning	National	2021	Ministry of Infrastructures and Transports (National government)	
Renewal of public transport vehicles	Renewal of public vehicles for passenger transport (renewal of the fleet used for local public transport)	Transport	Low carbon fuels/electric cars, electric road transport	Economic	National	2021	Ministry of Infrastructures and Transports (National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Renewal of private passenger vehicles (incentives to buy more efficient vehicles and with lower GHG emissions, regulatory measures, alternative fuel refueling points - DAFI)	Promoting and supporting renewal of car fleet with low carbon fuels, speed up the replacement of vehicle fleet with new vehicles, including CNG and LPG cars.	Transport	Low carbon fuels/electric cars, electric road transport	Economic	National	2021	Ministry of Infrastructures and Transports (National government)	
Modal shift of passenger transportation (mobility management measures)	Modal shift from private cars to public transport, car-pooling, bikes and walking	Transport	Modal shift to public transport or non-motorized transport	Economic	National	2022	Ministry of Infrastructures and Transports (National government)	
Modal shift in freight transport	Marebonus and Ferrobonus incentive to shift goods away from road	Transport	Modal shift in freight transport	Planning	National	2022	Ministry of Infrastructures and Transports (National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Support to LNG penetration in heavy freight transport (maritime and road) through taxation	The development of LNG for navigation maritime and inland, as well as for road transport deriving from the DAFI directive.	Transport	Low carbon fuels/electric cars	Regulatory	National	2022	Ministry of Infrastructures and Transports (National government)	
Renewal of vehicles for freight transport	Promoting and supporting renewal of HDV and LDV fleet with low carbon fuels, speed up the replacement of vehicle fleet with new vehicles powered by alternative fuels, including CNG and LNG.	Transport	Low carbon fuels/electric cars	Economic	National	2022	Ministry of Infrastructures and Transports (National government)	

4.6 Policies in non-Energy Sectors

4.6.1 IPPU

As regards IPPU sector no new measures have been implemented or planned after the previous National Communication.

4.6.2 Agriculture

In defining the scenarios to 2030, account was taken of the study carried out by the Centro Ricerche Produzioni Animali (CRPA) on behalf of ISPRA in 2018[24]. The study assumed the dissemination of measures to reduce ammonia and nitrous oxide emissions, as provided for in the Industrial Emissions Directive (IED), the Nitrates Directive and the Nitrates Action Programmes, in the Air Plans and the Rural Development Programmes (RDP) of the Po Valley regions. The measures considered are related to interventions on animal feeding (considering low protein diets), animal housing, storage (including treatment of manure in anaerobic digestion plants for biogas production) and manure spreading for cattle, pig and poultry livestock categories. These measures are also contained in the 'Guidelines for the reduction of atmospheric emissions from agricultural and livestock activities', published in 2016 by the Ministry of Agricultural and Forestry (MASAF). Similar reduction measures have also been included in the "National Indicative Code of Good Agricultural Practices for the Control of Ammonia Emissions", prepared by MASAF as an annex to the National Air Pollution Control Programme drawn up under the National Emission Ceilings Directive (NEC Directive 2016/2284/EU), approved by decree of the President of the Council of Ministers of 23 December 2021. After 2030, no further emission reduction measures are considered, so the assumption for the year 2030 is kept constant until 2050, with no change.

In the agricultural sector, ammonia emissions are considered in addition to GHG emissions as they have nitrogen as a common emission source. This implies that ammonia reduction measures will in many cases also reduce nitrous oxide emissions. Protein-reduced feeding techniques reduce the nitrogen ingested by animals and consequently the nitrogen excreted, reducing ammonia emissions but also nitrous oxide emissions, in the various stages of manure management. Reduced ammonia emissions at housing and storage result in less ammonia nitrogen being lost to the atmosphere and a consequent reduction in indirect nitrous oxide emissions from the storage and treatment of livestock manure, calculated on the basis of the fallout to soil from the nitrogen forms. However, these reductions lead to an increase in the nitrogen available for agronomic spreading, which subsequently leads to an increase in nitrous oxide emissions. Finally, in the manure spreading phase, measures to reduce ammonia emissions result in less ammonia nitrogen loss and a consequent decrease in indirect nitrous oxide emissions from spreading.

On the basis of policies encouraging the use of biomethane and biogas (Ministerial Decree of 2 March 2018 on biomethane; Ministerial Decree of 23 June 2016 on biogas for electricity production), an increase in the percentage of cattle, pig and poultry manure sent to anaerobic digesters for biogas production has been assumed. This technique of manure management results in a reduction of methane emissions at storage. In 2020 the estimated amount of livestock manure going to digesters is about 14% of the total manure produced and it is assumed that this percentage will become 40% in 2030, based on the mentioned incentive system for electricity production from biogas and biomethane production.

The next scenarios to be defined will need to consider a range of emission reduction measures laid out in national and European policy documents, such as the Common Agricultural Policy National Strategic Plan 2023-2027 (PSN), the National Recovery and Resilience Plan (PNRR), and the European Farm to Fork (F2F) strategy. Italy completed during 2022 the definition of the PSN, which will be sent to the European Commission in a short time, which provided for the application of the new common agricultural policy (CAP) from January 1, 2023. The PSN defines the actions to be taken to support the primary sector to address climate and environmental challenges. The Plan includes measures to reduce emissions from livestock and soil management, indicating for each measure the funding, description of the technique to be adopted, and eligibility criteria for beneficiaries. The PNRR envisages an investment of 1.92 billion euros for the measure bearing on the development of biomethane and the promotion and dissemination of environmentally friendly practices at the biogas production stage in order to reduce the use of synthetic fertilizers, increase

[24] Study to assess the effects on emissions of ongoing transformations in the livestock sector, by CRPA, Reggio Emilia, 2018

the supply of organic matter in soils, and create consortium hubs for the centralized treatment of digestates and effluents with the production of fertilizers of organic origin. The F2F strategy has as one of its goals to reduce nutrient losses by at least 50 percent, while ensuring that soil fertility does not deteriorate; this will reduce fertilizer use by at least 20 percent by 2030.

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Table 4.9 Implemented policies and measures in agriculture

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Rationalization in the use of nitrogen fertilizer	Interventions on animal feeding (considering low protein diets), animal housing, storage (including treatment of manure in anaerobic digestion plants for biogas production) and manure spreading for cattle, pig and poultry livestock categories.	Agriculture	Reduction of ammonia and nitrous oxide emissions	Regulatory / Planning	Po Valley region	2007	Ministry of Agricultural and Forestry (National government)
Recovery of biogas from animal storage system	Increase in the percentage of cattle, pig and poultry manure sent to anaerobic digesters for biogas production	Agriculture	Reduction of methane emissions	Planning	National	2007	Ministry of economic development (National government)

4.6.3 Waste

Emissions reduction in the waste sector in the past was mainly related to the improvement of waste management regarding the composition of waste disposed to landfills. In fact, the Landfill European Directive 1999/31/EC has been transposed at the national level by Legislative Decree 13 January 2003 n. 36 and applied to Italian landfills since July 2005. This has implied a continuous updating of the regulatory system. The Ministry of Environment has issued some decrees (Legislative Decree 30 December 2008, n. 208 and Ministerial Decree 25 June 2015) on the waste acceptance criteria in landfills since the composition of these waste is strongly changed and is still evolving. measures to promote the recycling of organic waste (Italian Prime Ministerial Decree of 7 March 2016) and other waste (End of Waste decrees) consistent with the updating of the relevant legislation.

According to the Directive 2008/98/EC on waste Italy is taking the necessary measures to achieve the recycling of municipal waste to a minimum of 55 %, 60% and 65% by weight by 2025, 2030 and 2035 respectively.

Furthermore, the European Commission adopted the new circular economy action plan (CEAP) in March 2020. It targets how products are designed, promotes circular economy processes, encourages sustainable consumption, and aims to ensure that waste is prevented and the resources used are kept in the EU economy for as long as possible. It introduces legislative and non-legislative measures targeting areas where action at the EU level brings real added value.

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Table 4.10 Implemented policies and measures in waste

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Increase separate collection of urban waste	Recycling of municipal waste to a minimum of 55 %, 60% and 65% by weight by 2025, 2030 and 2035 respectively	Waste	Compliance with separate collection targets and reduction of biodegradable waste disposed of into landfills	Regulatory	National	2008	Regions

4.6.4 F-gases

Italy has already taken actions to reduce HFCs, in line with the objectives of Kigali Amendment, by adopting in 2014 the EU Regulation 517/2014 on fluorinated greenhouse gases, transposed into a national decree in 2018 by the Decree of the President of the Republic 16 November 2018, n. 146.

Because of this, the sectors that use HFCs in their products and appliances need technological innovations as the case of Italy where many companies have been developing advanced technological solutions aimed at mitigating the greenhouse effects and complying with EU Regulation 517/2014.

In order to achieve the targets of the EU Regulation 517/2014 Italian companies are focusing on research and development of new technologies in the sectors using HFCs or alternatives. Although Italy is no longer a producer of refrigerants, however Italian companies stand out worldwide as leading companies in the investigated sectors because they are able to produce innovative technologies and customize their product according to customer needs, climatic conditions and local conditions. In many sectors, Italy has already made the leap in technology with the aim to be in line also with the potential targets of the revision of the EU Regulation.

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Table 4.11 Implemented policies and measures in industrial processes

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Use of F-gas	Research and development of new technologies in the sectors using HFCs or alternatives	Industrial processes	To reduce HFCs	Regulatory	Nationale	2018	National government

4.6.5 Land use, land-use change and forestry (LULUCF)

The emissions and removals from LULUCF sector are excluded from Effort Sharing Decision n. 406/2009/EC and are not included in the 2020 target. Following the entry into force of the Paris Agreement, the European Union set a binding target to cut its emissions by at least 40% below 1990 levels by 2030, including the Land Use, Land-Use Change and Forestry (LULUCF) sector. The LULUCF Regulation (EU) 2018/841 defines the LULUCF target at European and national scale. For the period from 2021 to 2025, each Member State shall ensure that emissions do not exceed removals, calculated as the sum of total emissions and removals on their territory in the land accounting categories (i.e. *afforested land, deforested land, managed cropland, managed grassland, managed forest land*). For 2026 to 2030 period, a LULUCF target for Italy has been set to -35.8Mt CO2 eq.

The LULUCF Regulation sets requirements for the accounting of emissions and removals for the period 2021-2025, in relation to the following land accounting categories:

- afforested[25] and deforested[26] land
- managed cropland[27], managed grassland[28], and managed wetlands[29]
- managed forest land

For the 2026-2030, the national target has to be compared with the total sum of greenhouse gas emissions and removals from the land reporting categories: *forest land; cropland; grassland; wetlands; settlements; other land; harvested wood products; other; atmospheric deposition; nitrogen leaching and run-off*.

In addition, the Effort Sharing Regulation (EU) 2018/842 includes a flexibility provision which allows for a limited use of net removals from certain LULUCF accounting categories, while ensuring no debits occur in the LULUCF sectors, to account for Member State compliance towards the targets in the non-ETS sectors if needed. The proposed cap, for Italy, is about 11 Mt for the entire period 2021-2030.

The Italian National Forestry Accounting Plan, prepared in accordance with paragraph 3 of article 8 of the LULUCF Regulation, includes the Forest Reference Level (FRL), for the period from 2021 to 2025.

Under the Kyoto Protocol, forest is defined by Italy using the same definition[30] applied by the Food and Agriculture Organization of the United Nations for its Global Forest Resource assessment (FAO FRA 2000). This definition is consistent with definition given in Decision 16/CMP.1. Italy has elected cropland management (CM) and grazing land management (GM) as additional activities under Article 3.4 for the second commitment period of the Kyoto Protocol (2013-2020); following Decision 2/CMP.7 forest management (FM) is a mandatory activity to be accounted for under Article 3.4. Detailed description of activity data and methodologies used to estimate emissions and removals from activities subject to the article 3.3 and article 3.4 of the Kyoto Protocol is reported in the National Inventory Report (ISPRA, 2022).

Measures have been not currently implemented or planned.

The EU Convention pledge does not include emissions/removals from Land Use, Land-Use Change and Forestry (LULUCF). The emission inventory includes information on emissions and removals from LULUCF in accordance with relevant reporting commitments under the UNFCCC. Accounting for LULUCF activities only takes place under the Kyoto Protocol. According to the review process the notation key "NA" has been included in Table 4(a)I of the CTF.

For transparency further information on the counting of emission and removals from LULUCF under the Kyoto Protocol, as resulting from the relevant table of the CRF, has been included in table 4(a)II of the CTF although not relevant for the achievement of the quantified emission reduction target under the Convention.

[25] land use reported as *cropland, grassland, wetlands, settlements, or other land, converted to forest land*
[26] land use reported as *forest land converted to cropland, grassland, wetlands, settlements, or other land*
[27] *cropland remaining cropland; grassland, wetlands, settlements or other land, converted to cropland; cropland converted to wetlands, settlemenst or other land*;
[28] *grassland remaining grassland; cropland, wetlands, settlement or other land, converted to grassland; grassland converted to wetlands, settlements or other land*
[29] *wetlands remaining wetlands; settlements or other land, converted to wetlands; wetlands converted to settlements or other land*
[30] Forest is a land with following threshold values for tree crown cover, land area and tree height: a. a minimum area of land of 0.5 hectares; b. tree crown cover of 10 per cent; c. minimum tree height of 5 meters.

4.7 Cross Cutting policies

4.7.1 The White Certificates system

The White Certificates or Energy Efficiency Titles (EETs) system represents a cross cutting policy aimed at promoting energy efficiency and delivering emissions reductions in end-use energy sectors: industrial, residential, service. A Ministerial Decree firstly introduced the system on 24th April 2001.

In December 2012, the so called "White Certificate Decree" was issued. The new decree defines the criteria, the conditions and the procedures to implement energy efficiency measures in end-use energy. The Decree has also transferred, from 2013, competences concerning the management, assessment and certification of energy saving projects carried out under white certificates system to a State owned company (Gestore dei Servizi Energetici – GSE).

The certification of energy savings produced by each project is made via the issue of Energy Efficiency Titles (EETs) where one EET is equivalent to one Mtoe.

In the 2017 and 2018 two decrees have fixed annual energy saving targets for the period 2017-2020.

For the period 2021-2024 the annual targets for the energy distributors set by the decree adopted in 2020 are:

- 0.45 MTEE in final use of electricity and 0.55 MTEE in final use of natural gas for 2021;
- 0.75 MTEE in final use of electricity and 0.93 MTEE in final use of natural gas for 2022;
- 1.05 MTEE in final use of electricity and 1.30 MTEE in final use of natural gas for 2023;
- 1.08 MTEE in final use of electricity and 1.34 MTEE in final use of natural gas for 2024.

4.8 Other policies at local level

4.8.1 Global Covenant of Mayors for Climate and Energy

The Global Covenant of Mayors is the result of the merging between the world's main initiatives of cities and local governments committed to undertake a transition towards a low emission and climate resilient economy. On October 15th, 2015, the Covenant of Mayors and the Mayors Adapt initiatives merged into the New Covenant of Mayors for Climate and Energy. In the framework of the Global Covenant of Mayors for Climate and Energy, signatories are requested to set targets for 2030 and to undertake the preparation and submission of a Sustainable Energy and Climate Action Plan (SECAP) to turn their commitment into specific actions, measures and projects. The SECAP is the key document in which the Global Covenant signatory outlines how it intends to reach its CO_2 reduction target and adaptation actions and/or strategies by 2030, also outlining means and provisions to achieve the targets, as well as time frames and assigned responsibilities. The Covenant of Mayors was an initiative launched by the European Commission to endorse and support the voluntary efforts deployed by local authorities in the implementation of sustainable energy policies[31].

4.9 Costs analysis

Budget regulations and laws often have to comply with specific requirements regarding timing, resources and administrations responsible for the expenditures, and it is not always possible to provide a detailed description of the costs borne by the public system. Where available, the budget allocations for each PaM are reported in the specific paragraphs.

4.10 Summary of policies and measures

A summary of implemented and planned measures is reported in the tables below

31 https://eu-mayors.ec.europa.eu/en/home

Table 4.4.12- Summary of implemented policies and measures

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Incentives for the promotion of electricity production by renewables	Incentives for the electricity production by renewable from wind on shore, photovoltaic, hydroelectirc and residual gas	Energy Supply	Increase in renewable energy	Economic	National	2019	Ministry of economic development and Ministry of environment (National government)
Incentives for the promotion of electrical and thermal renewables in the small islands	Electricity network upgrade to have higher renewable penetration. Pilot projects regarding renewable productions, storage systems, development of electrical transport, integration of the electrical system with the water system	Energy Supply	Increase in renewable energy	Economic	Local	2020	Ministry of economic development and Ministry of environment (National government)
White certificates - Cogeneration	Supporting CHP and district heating plants	Energy Supply	Efficiency improvement in the energy and transformation sector (Energy Supply)	Economic	National	2015	GSE- Manager for Energy Service (National government)
Coal phase-out	Ban coal use for electricity production from 2025	Energy Supply	Switch to less carbon-intensive fuels	Regulatory	National	2019	Ministry of economic development (National government)

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
White certificates – Industry	Supporting electric energy saving in the industry sector	Energy Consumption	Efficiency improvement in industrial end-use sectors (Energy Consumption)	Economic	National	2009	GSE- Manager for Energy Service (National government)
National Industry 4.0 Plan (Impresa 4.0)	Tax breaks and reductions to stimulate companies - micro, small and medium-sized enterprises and innovative startups - to invest in innovation.	Energy Consumption	Efficiency improvement in industrial end-use sectors (Energy Consumption)	Fiscal	National	2019	Ministry of economic development (National government)
"Ecobonus" and "Bonus casa"	Supporting of energy saving and renewables in existing buildings through tax deduction.	Energy Consumption	Efficiency improvements of buildings	Fiscal	National	2008	Ministry of Finance (National government)
Energy audits in companies	Co-financing of energy audits in SMEs; adoption of energy management systems compliant with ISO 50001 standards; extension to energy-intensive businesses in the gas sector and correlation of the benefit to the execution of energy efficiency interventions	Energy Consumption	Efficiency improvement in industrial end-use sectors	Regulatory	National	2014	ENEA - Italian National agency for new technologies, Energy and sustainable economic development (Research institutions)

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Minimum energy performance requirements for buildings	Application of the minimum energy performance requirements for buildings. These requirements apply to public and private buildings, whether they are new buildings or existing buildings subject to restructuring	Energy Consumption	Efficiency improvements of buildings	Regulatory	National	2006	Ministry of economic development (National government)
Thermal account	Incentives for small-scale energy efficiency measures in buildings and production of thermal energy from renewable sources	Energy Consumption	Efficiency improvements of buildings and in services/ tertiary sector	Economic	National	2012	Ministry of economic development , GSE- Manager for Energy Service(National government)
Efficient public lighting system	Obligation to make public lighting system more efficient	Energy Consumption	Demand management/reduction	Regulatory	National	2020	Ministry of economic development and Ministry of environment (National government)
Energy program for the Central Public Administration (PREPAC)	Support to Public Administration buildings	Energy Consumption	Efficiency improvement in services/ tertiary sector	Economic	National	2020	Ministry of economic development and Ministry of environment (National government)
Kyoto Fund Review	Extension of the granting subsidized loans for financing energy efficiency in sport facilities and health buildings	Energy Consumption	Efficiency improvements of buildings	Economic	National	2020	Ministry of economic development and Ministry of environment (National government)

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Emission standard for new vehicles	Fleet update	Transport	Efficiency improvements of vehicles	Regulatory	National	2019	Ministry of economic development (National government)
Incentives to biomethane and other advanced biofuels	Biofuels promotion: consumption in the transport sector of bio-methane and about advanced biofuels through the conversion of refineries and / or traditional biodiesel plants	Transport	Low carbon fuels/electric cars	Economic	National	2020	Ministry of economic development (National government)
Implementation of the RED II with specific obligations on biofuels and other renewables	This Directive establishes a common framework for the promotion of energy from renewable sources. It sets a binding Union target for the overall share of energy from renewable sources in the Union's gross final consumption of energy in 2030. It also provides that 14% of the energy consumed in road and rail transport by 2030 shall be renewable energy.	Transport	Low carbon fuels/electric cars	Regulatory	National	2020	Ministry of economic development (National government)

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Certification of biofuel sustainability	Biofuel sustainability certification systems measure and verify environmental performance of fuels throughout all major stages of the product life cycle, production, fuel production, and end-use including feedstock.	Transport	Low carbon fuels/electric cars	Regulatory	National	2020	Ministry of economic development (National government)
Sustainable Urban Mobility Incentive Program (PrIMUS)	The Sustainable Urban Mobility Incentive Program (PrIMUS) is aimed at municipalities with at least 50,000 inhabitants and provides 15 million euros for sustainable urban mobility actions on three themes: development of cycle infrastructure, sharing mobility and mobility management activities.	Transport	Improve sustainable urban mobility	Planning	National	2020	Ministry of economic development (National government)
National Infrastructural Plan for the recharging of electricity powered vehicles – PNIRE	The PNIRE (National Plan for Electric charging Infrastructure), adopted by the Ministry of Infrastructures and Transport, has as its object the construction of infrastructure networks for recharging vehicles powered by electricity .	Transport	Electric road transport	Planning	National	2019	Ministry of Infrastructures and Transports (National government)

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
	It also defines the guidelines to guarantee the unitary development of the recharge service vehicles powered by electricity in the national territory.						
Infrastructure upgrading (regional rail transport and rapid mass transport systems)	Increase of high capacity and high speed rail networks	Transport	Modal shift to public transport or non-motorized transport	Planning	National	2018	Ministry of Infrastructures and Transports (National government)
Rationalization in the use of nitrogen fertilizer	Interventions on animal feeding (considering low protein diets), animal housing, storage (including treatment of manure in anaerobic digestion plants for biogas production) and manure spreading for cattle, pig and poultry livestock categories.	Agriculture	Reduction of ammonia and nitrous oxide emissions	Regulatory / Planning	Po Valley region	2007	Ministry of Agricultural and Forestry (National government)

Name of PaM	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy
Recovery of biogas from animal storage system	Increase in the percentage of cattle, pig and poultry manure sent to anaerobic digesters for biogas production	Agriculture	Reduction of methane emissions	Planning	National	2007	Ministry of economic development (National government)
Increase separate collection of urban waste	Recycling of municipal waste to a minimum of 55 %, 60% and 65% by weight by 2025, 2030 and 2035 respectively	Waste	Compliance with separate collection targets and reduction of biodegradable waste disposed of into landfills	Regulatory	National	2008	Regions
Use of F-gas	Research and development of new technologies in the sectors using HFCs or alternatives	Industry	To reduce HFCs	Regulatory	National	2018	National government

Table 4.4.13- Summary of planned policies and measures

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Energy production and transformation	**Promotion and support to the renewable energy sources**	**Energy Supply**	**Increase in renewable energy and increase in renewable energy in the heating and cooling sector**	**Regulatory; Economic**	**National**			**24800**
Revision of the regulations for the allocation of hydroelectric concessions	The auction procedures for the existing concessions will be integrated in the territorial planning, considering other uses of water, on the basis of homogeneous rules at national level, also in terms of fees. Procedures will transparently privilege the redevelopment of the plants, in order to ensure the useful storage capacity and increase the producibility, in compliance with environmental constraints.	Energy Supply	Increase in renewable energy	Regulatory	National	2022	Ministry of economic development (National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Renewables in existing and new buildings	Extension and improvement of the obligation to integrate renewables into existing and new buildings	Energy Supply	Increase in renewable energy in the heating and cooling sector	Regulatory	National	2022	Ministry of economic development and Ministry of environment (National government)	
Incentives to electrical and thermal renewables use in the small islands	Electricity network upgrade to have higher renewable penetration. Pilot projects regarding renewable productions, storage systems, development of electrical transport, integration of the electrical system with the water system	Energy Supply	Increase in renewable energy	Economic	National	2022	Ministry of economic development, GSE-Manager for Energy Service (National government)	
Energy efficiency, renewables and electrification in the industrial sector	**Increase energy efficiency and renewable energy production in the industrial sector**	**Energy Consumption**	**Efficiency improvement in industrial end-use sectors**	**Economic; Regulatory; Fiscal**	**National**			**4600**

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
White certificates (Certificati bianchi) mechanism with upgrading	Update and widen mechanism to support energy savings	Energy Consumption	Efficiency improvement in industrial end-use sectors	Economic	National	2022	GSE- Manager for Energy Service (National government)	
Energy audits in companies	Co-financing of energy audits in SMEs; adoption of energy management systems compliant with ISO 50001 standards; extension to energy-intensive businesses in the gas sector and correlation of the benefit to the execution of energy efficiency interventions	Energy Consumption	Efficiency improvement in industrial end-use sectors	Regulatory	National	2021	ENEA - Italian National agency for new technologies, Energy and sustainable economic development (Research institutions)	
National Industry 4.0 Plan	Update Tax breaks and reductions to stimulate companies - micro, small and medium-sized enterprises and innovative startups - to invest in innovation.	Energy Consumption	Efficiency improvement in industrial end-use sectors	Fiscal	National	2021	Ministry of Economic Development (National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Energy efficiency, renewables and electrification in the civil sector	**Increase energy efficiency and renewable energy production and emission reduction in the civil sector**	**Energy Consumption**	**Efficiency improvements of buildings, increase in renewable energy in the heating and cooling sector, demand management/reduction, efficiency improvement in services/ tertiary sector**	**Economic; Regulatory; Fiscal**	**National**			**9300**
White certificates (Certificati bianchi) mechanism with upgrading	Update and widen mechanism to support energy savings	Energy Consumption	Efficiency improvements of buildings (Energy Consumption)	Economic	National	2022	GSE- Manager for Energy Service (National government)	
Thermal account (Conto termico) mechanism with upgrading	Update of the incentive schemes for small-scale energy efficiency measures in buildings and production of thermal energy from renewable sources	Energy Consumption	Efficiency improvements of buildings	Economic	National	2023	Ministry of economic development, GSE-Manager for Energy Service (National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Renewables in existing and new buildings	Extension and improvement of the obligation to integrate renewables into existing and new buildings	Energy Consumption	Increase in renewable energy in the heating and cooling sector	Regulatory	National	2022	Ministry of economic development and Ministry of environment (National government)	
Efficient public lighting system	Extension of obligation to make public lighting system more efficient	Energy Consumption	Demand management/reduction	Regulatory	National	2022	Ministry of economic development and Ministry of environment (National government)	
Energy upgrading program for the Central Public Administration (PREPAC)	Support to upgradings in Public Administration buildings will be strengthened, in order to play a guide role for the entire economic sector.	Energy Consumption	Efficiency improvement in services/ tertiary sector	Economic	National	2022	Ministry of economic development and Ministry of environment (National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
"Superbonus 110%"	Increase the propensity towards radical interventions on the building through efficiency improvements and renewables for energy generation and consumption.	Energy Consumption	Efficiency improvements of buildings	Fiscal	National	2021	Ministry of economic development and Ministry of environment (National government)	
Energy efficiency, renewables and electrification in the transport sector	**Increase energy end-use efficiency, support biofuels and other fuels with low environmental impact, support intermodality and emission reduction**	**Transport**	**Low carbon fuels/electric cars, modal shift to public transport or non-motorized transport, electric road transport, modal shift in freight transport**	**Regulatory; Planning; Economic**	**National**			**24200**
Certification of biofuel sustainability	Biofuel sustainability certification systems measure and verify environmental performance of fuels throughout all major stages of the product life cycle, production, fuel production, and end use including feedstock.	Transport	Low carbon fuels/electric cars	Regulatory	National	2022	Ministry of Economic Development, Ministry of Environment and Ministry of Agricultural and Forestry	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Infrastructure upgrading (regional rail transport and rapid mass transport systems)	Increase of high capacity and high speed rail networks	Transport	Modal shift to public transport or non-motorized transport	Planning	National	2024	Ministry of Infrastructures and Transports (National government)	
Urban Plans for Sustainable Mobility - PUMS	A Sustainable Urban Mobility Plan has as its central goal improving accessibility of urban areas and providing high-quality and sustainable mobility and transport to, through and within the urban area.	Transport	Modal shift to public transport or non-motorized transport	Planning	National	2021	Ministry of Infrastructures and Transports (National government)	
Renewal of public transport vehicles	Renewal of public vehicles for passenger transport (renewal of the fleet used for local public transport)	Transport	Low carbon fuels/electric cars, electric road transport	Economic	National	2021	Ministry of Infrastructures and Transports (National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Renewal of private passenger vehicles (incentives to buy more efficient vehicles and with lower GHG emissions, regulatory measures, alternative fuel refueling points - DAFI)	Promoting and supporting renewal of car fleet with low carbon fuels, speed up the replacement of vehicle fleet with new vehicles, including CNG and LPG cars.	Transport	Low carbon fuels/electric cars, electric road transport	Economic	National	2021	Ministry of Infrastructures and Transports (National government)	
Modal shift of passenger transportation (mobility management measures)	Modal shift from private cars to public transport, car-pooling, bikes and walking	Transport	Modal shift to public transport or non-motorized transport	Economic	National	2022	Ministry of Infrastructures and Transports (National government)	
Modal shift in freight transport	Marebonus and Ferrobonus incentive to shift goods away from road	Transport	Modal shift in freight transport	Planning	National	2022	Ministry of Infrastructures and Transports (National government)	

Name of PaM or group of PaMs	Short description	Sector affected	Objective	Type of policy Instrument	Geographical coverage	Start year of implementation	Entities responsible for implementing the policy	GHG emissions reductions for year 2030 (kt CO2-equivalent per year)
Support to LNG penetration in heavy freight transport (maritime and road) through taxation	The development of LNG for navigation maritime and inland, as well as for road transport deriving from the DAFI directive.	Transport	Low carbon fuels/electric cars	Regulatory	National	2022	Ministry of Infrastructures and Transports (National government)	
Renewal of vehicles for freight transport	Promoting and supporting renewal of HDV and LDV fleet with low carbon fuels, speed up the replacement of vehicle fleet with new vehicles powered by alternative fuels, including CNG and LNG.	Transport	Low carbon fuels/electric cars	Economic	National	2022	Ministry of Infrastructures and Transports (National government)	

4.11 Summary of policies and measures no longer in place

Compared to the previous BR4, there are no policies and measures that are no longer in place. Policies and measures reported as implemented in BR4 either are still in place or have been updated to include more binding targets for the forthcoming years.

4.12 Minimization of adverse effects in accordance with art.2 paragraph 3 of the Kyoto Protocol

Each Annex I Party shall also provide information on how it strives to implement policies and measures under Article 2 of the Kyoto Protocol in such a way to minimize adverse effects, including adverse effects of climate change, effects on international trade, and social environmental and economic impacts on other Parties under Article 4, paragraphs 8 and 9, of the Convention, taking into account Article 3 of the Convention.

The Kyoto Protocol was adopted in pursuit of the ultimate objective of the Convention, and hence its full implementation is intended to contribute to preventing dangerous anthropogenic interference with the climate system. Ambitious mitigation goals are necessary to ascertain a future for all countries.

Adverse impacts on developing countries are reduced if global temperature increase is limited below to 2 degrees Celsius, if dependence on fossil fuels decreases, and if Annex I Parties are able to develop low-carbon energy systems and reduce fossil fuel consumption.

The European Union actively undertakes a large number of activities bringing positive impacts on third countries and their ability to tackle climate change, specifically through capacity building and technology transfer activities.

Climate policies in Italy are formulated and implemented in a way that minimise the potential adverse impacts on specific sectors of economic activity, industrial sectors or other Parties to the Convention, including the adverse effects on the international trade, social, environmental and economic impacts in developing countries. As concerns domestic action, mitigation measures included in the national climate change strategy do not focus exclusively on CO_2 from fossil fuels, but cover all sectors of economic activity which are related with GHG emissions or with carbon sinks.

Furthermore, Italy has ensured that measures implemented to increase the differentiation of energy sources do not contradict the full liberalization of its energy markets. In particular, the promotion of natural gas consumption improves the safety of energy supply of the country, while new commercial relationships are developed with those countries from which natural gas is imported (e.g. Russia, Algeria, etc.).

Other policies and measures might have potential positive impacts on third countries[32]. The flexible mechanisms under the Kyoto Protocol, as tools incorporated into the Protocol to share efforts in reducing greenhouse gases, ensure that investment is made where the money has optimal GHG-reducing effects, thus ensuring minimal impact on the world economy and enhancing the development of new commercial relationships between developed and developing countries. At European level, changes to subsidies under the EC Common Agricultural Policy (CAP) now link payments to environmental, food safety and animal welfare standards, not to agricultural production volume. This encourages responsible agricultural practices. In addition, expectations are that the worldwide use of biomass in the energy supply will increase considerably in the coming decades. Countries and producers will see opportunities for new activities; at the same time, there is a growing concern that this must not be at the expense of other important values for nature, environment and society. To accommodate these feelings, criteria will be needed that indicate whether biomass has been produced in a responsible manner.

[32] For more information please see the chapter 13 Information on minimization of adverse impacts in accordance with Article 3, paragraph 14 of the National Inventory Report 2017.
http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/10116.php

Updated information on the minimization of adverse impacts in accordance with art.3 paragraph 14 of the Kyoto Protocol is reported in the National Inventory Report transmitted to the UNFCCC in the framework of the 2022 annual inventory submission.

5. Projections[33]

5.1 Introduction

In the most recent years, actions taken by Italy to mitigate climate change have been driven by the commitments taken under the Kyoto Protocol and its amendment (Doha amendment), the European Climate and Energy Package (for the period 2013-2020), the EU NDC, and the European 2030 Climate and Energy Framework and Clean energy for all Europeans package for the period 2021-2030.

Pursuant to Regulation (EU) 2018/1999 of the European Parliament and of the Council on the Governance of the Energy Union and Climate Action, in 2020 Italy submitted the first integrated national energy and climate plan (NECP) to the European Commission. The plan is the result of a common effort of the former Ministrys of Economic Development, of Environment and of Infrastructures and Transport and it is largely based on data and information provided by ISPRA, GSE and RSE. The plan was finalized in December 2019, but the analytical process has started in 2016 under the Head of Government Office.

In 2021, pursuant article 17 of the Regulation (EU) 2018/1999, new GHG emission projections were calculated and submitted to the European Commission using updated historic data and macroeconomic and demographic drivers. The present National Communication is based on the NECP, but emission projections have been updated to be consistent with the parameters updated in June 2020 used by the European Commission for draft PRIMES 2020 Reference scenario. The base year for the projections is 2020, even though only provisional data were available when projections have been calculated, in order to include, as far as possible, the effects of the COVID-19 pandemic. WM scenario considers the policies and measures implemented before December 31st, 2019.

The scenarios have been calculated with the partial equilibrium model TIMES (The Integrated MARKAL-EFOM1 System / EFOM Energy Flow Optimization Model), a model generator for local, national or multi regional economies finalized to the analysis of whole energy systems (electricity generation and consumption, heat distribution, transports, industries, civil, etc.). The model belongs to the family of MARKAL (Market Allocation, http://www.iea-etsap.org/web/Markal.asp) models, the so-called "3e models" (energy, economy, environment), and was developed by the International Energy Agency (IEA) under the program Energy Technology Systems Analysis Program (ETSAP). This model is recognized by the International Panel on Climate Change (IPCC).

The energy system thus simulated is composed by a number of different sectors and subsectors (e.g., electricity production, industrial activities, residential buildings, etc.), each one consisting of a set of technologies connected by input-output linear relationships. Inputs and outputs can be energy carriers, materials, emissions, or requests for services. TIMES is a bottom-up, demand-driven model in which each technology is identified by technical and economic parameters and the production of a good is conditioned to the effective demand by end-users.

The structure of energy scenarios is defined by variables and equations determined by input data constituting the regional database. The database contains qualitative and quantitative data describing the interaction between different components of the energy system.

TIMES identifies the optimal solution to provide energy services at the lowest cost, producing simultaneously investments in new technologies or using more intensively the available technologies in each region defined by the user. For example, an increase in electricity demand for residential use can be satisfied with a more intensive use of available power plants or through the installation of new power plants. Model choices are based on the analysis of technological characteristics of available alternatives, the cost of energy supply and environmental criteria and bounds.

CO_2 emissions are directly calculated by the model implemented by ISPRA using the IPCC "reference approach" methodology and national emission factors. The modelling approach avoids, in principle, the so called "double counting effect" for the implementation of policies, so the model evaluates the impacts and

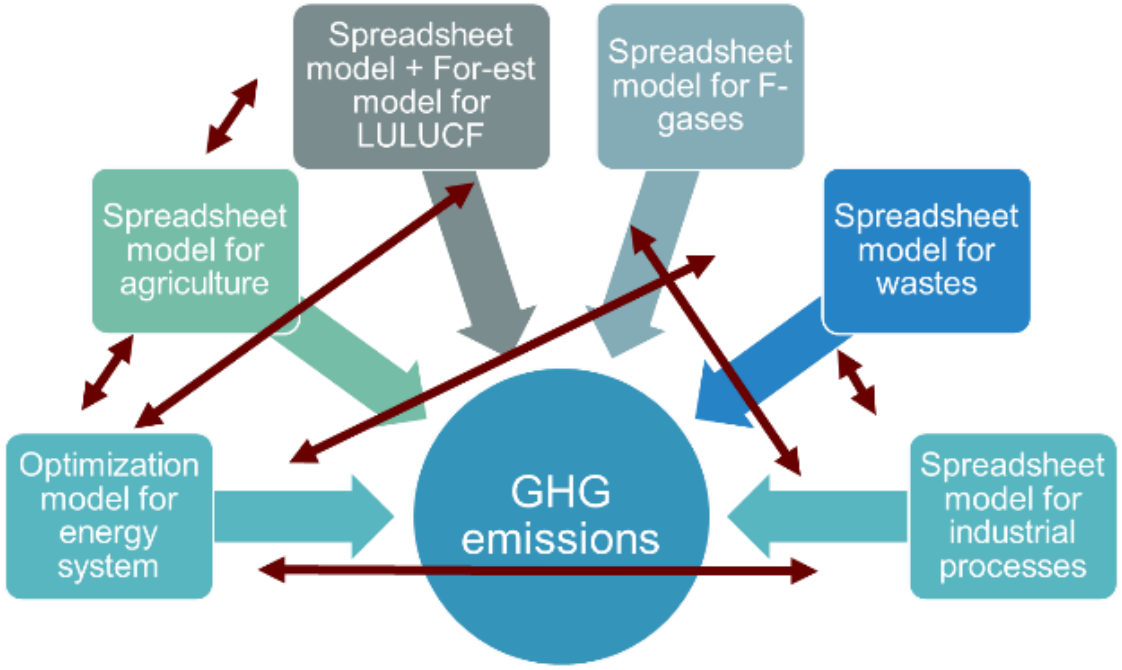
[33] Author: Antonio Caputo, Emanuele Peschi

interactions among measures as a package. The model outcomes indicate the mix of technologies and primary emission sources fulfilling the commodity demands of the reference scenario at the lowest possible cost.

The emissions from non-energy sources and other energy related GHGs different from CO_2 have been evaluated by a family of spreadsheet models used by ISPRA for the National Communications to UNFCCC.

The overall GHG emissions and the share between ETS and non-ETS sectors are the results of the mentioned models implemented by ISPRA (Figure 5.1).

Figure 5.1 – The modeling system implemented by ISPRA for emission projections



The "With Additional Measures" (WAM) scenario, calculated with the same methodology of WM scenario, considers all the Policies and Measures foreseen in the NECP that were not yet implemented before 2020 (see Table 4.4.12 and Table 4.4.13).

The "Without Measures" (WOM) scenario could not be included, as most data on PaMs are not available starting from 1990. Moreover, since many structural changes occurred in the period 2000-2007, linked to economical and technological changes as well as to fuel shifts, it is not possible to determine how the Italian system would have evolved without those changes. In this regard, fuel shifts toward low carbon fuels for electricity generation (since 1990 there has been a steady increase of natural gas share and a corresponding decrease of oil products share) as well as the introduction of combined cycle plants, since 2000, are among the most important factors that make it impossible to evaluate how the national emissions would have evolved without any measure.

As reported in paragraph **Errore. L'origine riferimento non è stata trovata.**, Italy adopted new policies and measure in 2020 and 2021 to face the effects of COVID-19 pandemic. The "National Recovery and Resilience Plan" (NRRP) was adopted in July 2021, and includes several measures to tackle climate change and to purse sustainable economic growth towards an inclusive, climate resilient and net-zero emissions future.

The Plan envisages investments and a consistent reform package, with €191.5 billion in resources being allocated through the Recovery and Resilience Facility and €30.6 billion being funded through the Complementary Fund. The NRRP has been developed around three strategic axes shared at EU level: digitalization and innovation, ecological transition, and social inclusion. It aims at repairing the economic and

social damage caused by the pandemic crisis, contributing to addressing the structural weaknesses of the Italian economy, and leading the country along a path of ecological, environmental and just transition.

In order to guarantee coherence with EU submission, which relies on data provided by EU Member States in March 2021, the NRRP policies and measures have not been taken into account in the definition of WM and WAM scenario described in this Chapter. Anyway, in order to give a preliminary overview of the effects that can be espected, a synthesis of the analysis conducted at national level in May 2022 is provided in paragraph **Errore. L'origine riferimento non è stata trovata.**.

5.2 WM scenario

5.2.1 Main assumptions

The WM scenario was elaborated in 2021 and projections include all PaMs implemented or adopted up to the end of 2019. The base year for projections is 2020. The projected years are from 2025 to 2050 with 5-year pace. The main assumptions of the scenario can be summarized as follow:

- GDP: economic growth from 2015 to 2020 with average annual rate of -1.32%. For the period 2020-2025 the average annual rate is +2.41%, for period 2025-2030 is +0.30%, and for period 2030-2050 is 0.54%;
- energy: increase of efficiency in finale uses and renewable sources toward EU 2030 targets;
- population: decrease with average annual rate of -0.24% in the period 2015-2050.

The scenario considers a slow recovery from the economic crisis that has hit all national activities, and it also considers the development of low carbon technologies and efficiency improvement. The main driving variables used for projections of demand for energy services in the end-use sectors, as well as for activity levels of the industrial processes, are:

- industry: gross value added (GVA) and, for some sub-sectors, physical productions;
- tertiary: GVA;
- residential: demographic trends (mainly population and number of households), increase in the number of appliances per household and growing demand for summer cooling;
- electricity generation: continuation of the ongoing growth of renewable sources;
- transport: dynamics of active population (along with assumptions about mobility per capita) and goods exchange, fleet renewal according to historic market trends.

5.2.1.1 General Economic Parameters

General economic parameters used for the scenario are those provided by the draft EU reference scenario for Italy in December 2020.

Table 5.1 shows actual and projected values for GDP and GVA.

As already mentioned, the GDP is assumed to be reduced from 2015 to 2020 with an average year rate of -1.32%, at it is expected to recover at +0.78% yearly up to 2040. The GDP value for 2020 considers the effect of lockdown due to SARS-Cov2 pandemic. As for value added from productive sectors, a higher recovery for services is projected as compared to industry after 2020. In future years, tertiary sector is expected to continue growing at higher rate than industry, further increasing its role in the Italian economy.

Table 5.2 shows the energy and carbon international prices according to the suggested projections by European Commission. The prices show increasing trends for all the commodities. The increase in carbon price is particularly steep during the periods 2015-2030 (average annual rate 9.4%) and 2030-2040 (5.9% yearly), while the foreseen growth for energy prices is much slower (average annual rate from 0.4% for natural gas to 4.1% for oil in the period 2015-2040).

Table 5.1 – Actual (up to 2015) and projected GDP, and GVA

billion € 2016 constant prices basis	2015	2020	2025	2030	2035	2040	2050
GDP	1,683	1,574	1,773	1,800	1,813	1,837	2,003
Average annual rate (%)		-1.32%	2.41%	0.30%	0.14%	0.27%	1.04%
GVA – industry	239	236	259	260	260	262	278
Average annual rate (%)		-0.26%	1.88%	0.08%	0.04%	0.10%	0.72%
GVA – construction	65	61	69	71	71	72	79
Average annual rate (%)		-1.36%	2.57%	0.36%	0.17%	0.32%	1.12%
GVA – tertiary	1,136	1,061	1,204	1,226	1,236	1,256	1,379
Average annual rate (%)		-1.36%	2.57%	0.36%	0.17%	0.32%	1.12%
GVA – agriculture	35	33	34	34	34	34	34
Average annual rate (%)		-0.73%	0.14%	-0.03%	0.00%	0.00%	0.31%

Table 5.2 – Energy and carbon international prices

		2015	2020	2025	2030	2035	2040	2050
Coal prices	€ 2016 / GJ	1.8	1.8	2.7	2.9	3.1	3.3	3.5
Oil prices	€ 2016 / GJ	6.0	6.6	11.8	14.0	15.1	16.2	16.6
Gas prices	€ 2016 / GJ	7.5	3.5	5.7	6.0	6.8	8.2	8.6
Carbon price	€ 2016 / t CO_2	7.8	25	28	30	40	53	84

Table 5.3 – Actual (up to 2015) and projected GVA and Average annual rate (%) for industrial sectors

billion € 2016 constant prices basis	2015	2020	2025	2030	2035	2040	2050
GVA Iron and steel	5.10	5.58	5.95	5.94	5.93	5.92	6.00
Average annual rate (%)		1.79%	1.31%	-0.06%	-0.02%	-0.04%	0.18%
GVA Non ferrous metals	2.65	2.72	2.93	2.94	2.93	2.93	2.95
Average annual rate (%)		0.51%	1.54%	0.00%	-0.01%	-0.03%	0.08%
GVA Fertilisers/inorganic chemicals	1.88	1.91	1.93	1.89	1.88	1.85	1.71
Average annual rate (%)		0.27%	0.22%	-0.39%	-0.13%	-0.27%	-0.98%
GVA Petrochemicals	2.49	2.84	2.96	2.95	2.95	2.96	3.06
Average annual rate (%)		2.63%	0.88%	-0.08%	0.00%	0.04%	0.34%
GVA Other chemicals/ cosmetics	6.65	6.65	7.12	7.18	7.22	7.29	7.99
Average annual rate (%)		-0.01%	1.38%	0.19%	0.09%	0.21%	1.08%
GVA Pharmaceuticals	8.99	9.89	10.01	10.18	10.27	10.46	11.51
Average annual rate (%)		1.93%	0.25%	0.32%	0.18%	0.37%	1.13%
GVA Cement and derived products	2.26	2.11	2.39	2.43	2.44	2.47	2.73
Average annual rate (%)		-1.36%	2.48%	0.30%	0.12%	0.25%	1.22%
GVA Ceramics, bricks, etc.	2.74	3.03	3.26	3.30	3.30	3.32	3.44
Average annual rate (%)		1.98%	1.50%	0.24%	0.04%	0.10%	0.32%
GVA Glass production	2.21	2.32	2.44	2.47	2.48	2.51	2.70
Average annual rate (%)		0.95%	1.07%	0.23%	0.09%	0.18%	0.92%
GVA Other non metallic minerals	2.33	2.08	2.35	2.38	2.39	2.41	2.54

billion € 2016 constant prices basis	2015	2020	2025	2030	2035	2040	2050
Average annual rate (%)		-2.18%	2.46%	0.20%	0.07%	0.16%	0.58%
GVA Paper and pulp production	5.18	5.10	5.24	5.26	5.28	5.31	5.68
Average annual rate (%)		-0.34%	0.56%	0.06%	0.07%	0.15%	0.78%
GVA Printing and publishing	4.24	4.44	4.68	4.71	4.72	4.75	5.09
Average annual rate (%)		0.92%	1.06%	0.13%	0.05%	0.13%	0.83%
GVA Food, drink and tobacco	27.28	28.01	29.73	30.10	30.27	30.61	33.15
Average annual rate (%)		0.53%	1.20%	0.25%	0.11%	0.23%	0.93%
GVA Textiles	24.29	19.43	22.39	21.99	21.84	21.62	20.86
Average annual rate (%)		-4.37%	2.88%	-0.36%	-0.13%	-0.20%	-0.36%
GVA Engineering	101.86	102.95	114.69	115.33	115.59	116.17	124.70
Average annual rate (%)		0.21%	2.18%	0.11%	0.05%	0.10%	0.87%
GVA Other industries	38.60	36.61	40.62	40.80	40.89	41.06	43.58
Average annual rate (%)		-1.05%	2.10%	0.09%	0.04%	0.08%	0.69%

5.2.1.2 Population and transport

The population grew significantly from 2005 to 2015 with annual average rate of 0.49% and started to decline from 2015 to 2020 with annual rate -0.19%. The declining trend is expected all along the time series untill 2050. In forthcoming years, the difference with the previous submission is noticeable with a growing divergence (Table 5.4).

Table 5.4 – Population

	2015	2020	2025	2030	2035	2040	2050
BR4	60,796	61,193	62,232	63,327	64,416		
Present WM/WAM	60,796	60,233	59,583	58,941	58,341	57,711	55,860

The next table shows the number of persons per household adopted for GHG projections in residential sector.

Table 5.5 – Inhabitants per household

	2015	2020	2025	2030	2035	2040	2050
BR4	2.35	2.33	2.31	2.29	2.27		
Present WM/WAM	2.35	2.31	2.42	2.40	2.37	2.35	2.29

Table 5.6 shows data of transport demand for passengers, freights, domestic navigation, and air traffic. The expected activity scenario for transport shows a sharp decline in 2020 due to the mentioned lockdown. After 2020 projections show a steady growth up to 2050. The transport demand decreases up to 2020 compared to 2015 with annual rate of -4.3% for passengers while show a weak growth of 0.24% for goods. After 2020, up to 2050, the annual growth rate is around 1.2% for passengers and goods, with a much steeper increase until 2025 because of the end of the pandemic.

Table 5.6 – Transport demand for passengers and freights

				2015	2020	2025	2030	2035	2040	2050
WM	**Passenger**	Road	billion pass-km	820.2	670.7	875.2	877.1	885.4	898.1	919.6
		Rail	billion pass-km	59.5	31.7	60.3	64.8	66.5	68.1	72.4
		Domestic aviation	Number of Landing and Take-Off cycle (LTO)	380.6	121.0	383.2	434.1	471.5	512.2	567.8
		International aviation	Number of Landing and Take-Off cycle (LTO)	325.4	115.7	366.3	416.3	457.6	497.6	558.2
		Total	**billion pass-km**	**876.8**	**702.4**	**935.5**	**941.9**	**951.9**	**966.1**	**992.0**
	Freight	Road	billion ton-km	124.9	144.5	168.3	183.8	190.1	196.2	208.6
		Rail	billion ton-km	20.8	20.5	24.1	25.9	26.9	27.7	29.0
		Domestic navigation (inland waterways and national maritime)	billion ton-km	51.2	44.6	59.8	61.1	61.8	62.6	65.2
		Total	**billion ton-km**	**207.1**	**209.6**	**252.3**	**270.8**	**278.8**	**286.5**	**302.8**

5.2.2 Consumption of primary and final energy

The gross inland consumption of energy (GIC), estimated according to the methodology adopted by Eurostat, is expected to be about 138.7 Mtoe in 2030 with an average yearly decrease rate of -0.8% since 2015. After the further fall in 2020 and the rebound effect in 2025 the projected gross inland consumption shows constant decrease to 124.6 Mtoe up to 2050.

GIC started to decrease since 2005, before the economic crisis, while in the period 1990-2005 it has constantly increased with an annual average equal to +1.7%. The share of natural gas increased constantly since 1990 counterbalancing the corresponding decrease of oil share. Since 2007 it is also evident the growing role of renewable energies (Figure 5.2).

Figure 5.2– Fuel mix of GIC, historic data

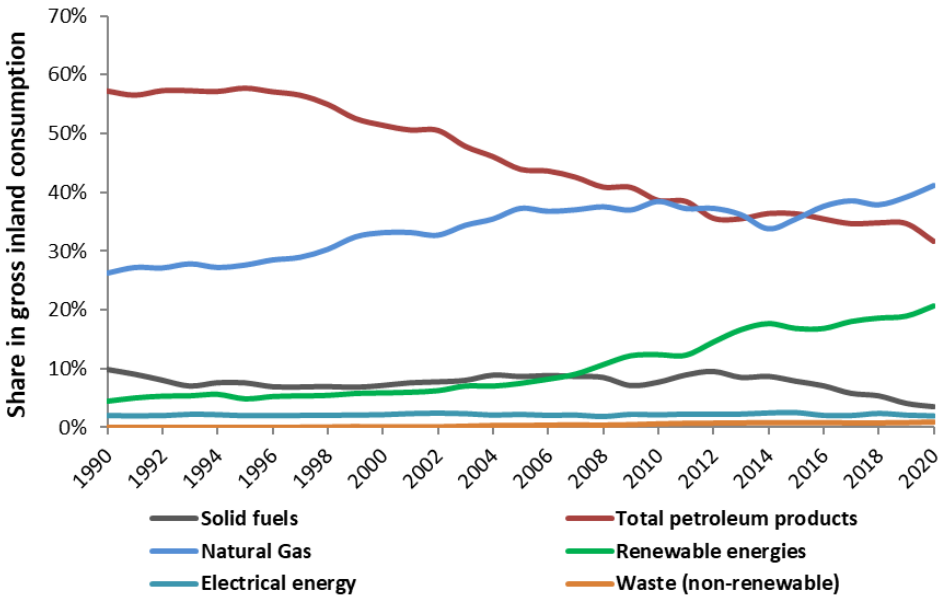
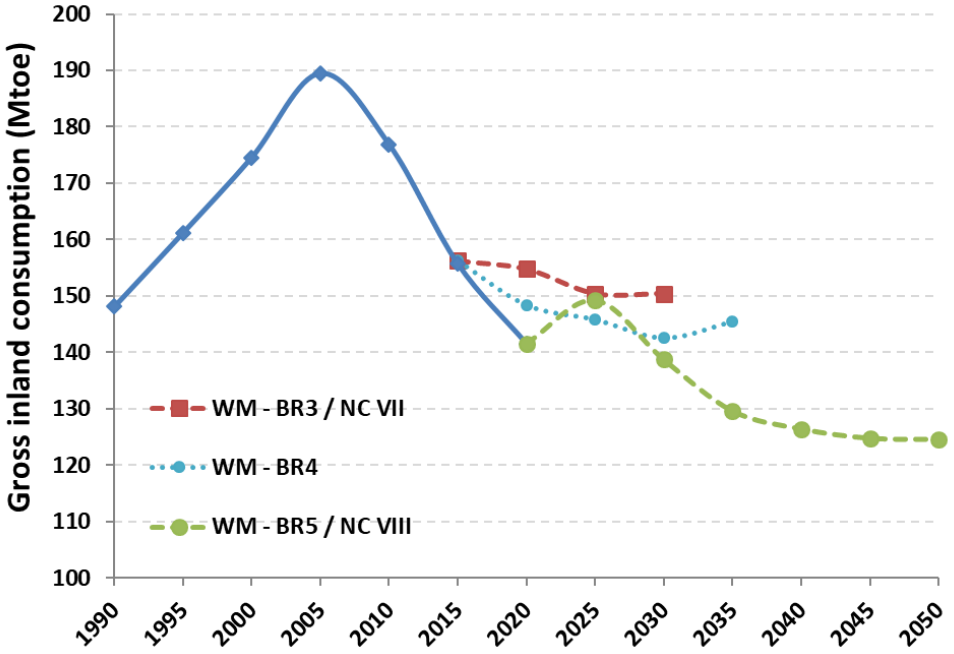


Figure 5.3 shows the projections of GIC according to the present submission compared to previous one (BR4 and BR3/NC7). Relevant changes can be observed in the estimated total energy consumption between the previous projections and the last one due to updated data for base year and adoption of new measures. The most relevant changes occurred in 2020 following the measures adopted to slow down the diffusion of SARS-Cov2 pandemic followed by the rebound effect in the next years.

Figure 5.3 - Actual and projected gross inland consumption, Mtoe



Source: ISPRA

5.2.3 GHG Emissions

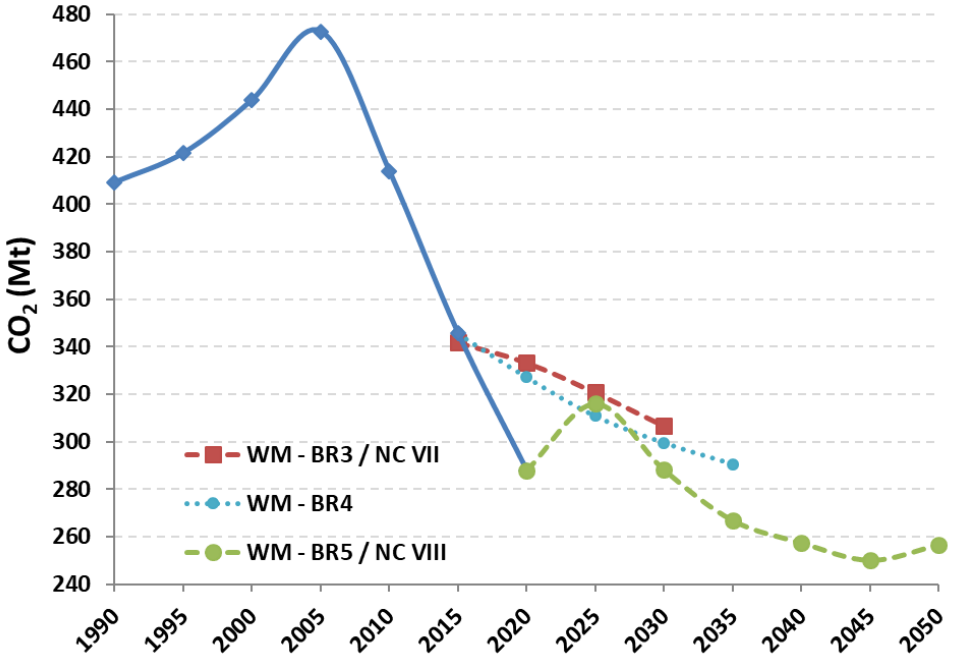
Based on the above-mentioned parameters, the model jointly computes energy supply and CO_2 emissions, while other GHGs and non-energy GHG emissions are calculated on the basis of the estimated evolution of activity data and emission factors. Emissions up to 2020 are the inventory data as submitted to UNFCCC in 2022.

As can be seen in Figure 5.4, remarkable emission reductions already occurred up to 2020. The reduction of emissions is due to many factors, some of them structural and other only temporary. The most important for historical data are:

- increasing share of renewable in the energy mix, due to development of photovoltaic production and diffusion of biomass for heating;
- increased efficiency of electricity generation, with the entry into service of many combined cycle plants;
- reduced fuel consumption in transportation due to high fuel prices and low activity levels;
- sharp reduction of energy consumption in industrial sector due to the economic crisis and structural changes in production;
- increase in efficiency of final end-use devices.

As for the emission projected it is evident further reductions in comparison with previous projections due to updated data for base year, adoption of new measures, and the effects of lockdown on 2020 due to the SARS-Cov2 pandemic followed by the rebound effect in the next five years.

Figure 5.4 – Actual and projected CO2 emissions from energy sector



Note: net emission are the physical emissions in the Italian territory excluding the emission reductions due to flexible mechanism.

Source: ISPRA

Table 5.7 shows the WM scenario projections up to 2050. Emissions are disaggregated by source of emissions sector. The rebound effect is particularly evident for the transport sector where, without appropriate policies, private cars will play a major role as a consequence of the pandemic.

Table 5.7 - WM Scenario's GHG emissions, disaggregated by source ($MtCO_2$ eq.)

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040	2050
FROM ENERGY USES, of which:	**425.3**	**437.9**	**459.6**	**487.6**	**428.9**	**358.8**	**298.9**	**328.0**	**299.6**	**277.7**	**267.7**	**266.9**
Energy industries	137.6	140.6	144.9	159.9	137.5	106.1	81.8	76.3	75.7	79.7	80.2	85.8
Industry	92.3	90.3	96.4	92.4	70.2	55.6	45.9	50.6	49.0	47.9	46.3	46.2
Transport	102.2	114.3	123.8	128.3	115.5	106.1	85.4	116.6	95.3	75.9	72.9	66.2
Residential and Commercial	69.8	69.2	73.6	86.7	88.0	74.8	71.3	68.3	64.0	58.6	55.8	54.4
Agriculture (energy use)	9.1	9.6	8.9	9.3	8.1	7.7	7.9	8.1	8.1	8.5	5.5	7.7
Other	14.3	13.9	12.0	11.1	9.6	8.5	6.6	8.1	7.5	7.1	7.0	6.6
FROM OTHER SOURCES, *of* which:	**94.6**	**95.9**	**97.7**	**103.3**	**88.9**	**83.0**	**82.3**	**72.6**	**66.7**	**61.4**	**58.6**	**55.2**
Industrial Processes + F-gas	40.4	38.3	39.1	47.2	37.0	33.2	31.0	29.7	26.4	23.5	21.8	21.1
Agriculture	36.9	37.6	36.7	34.2	31.6	31.2	32.7	28.2	28.0	27.1	27.2	26.4
Waste	17.3	20.0	21.9	21.9	20.4	18.5	18.6	14.6	12.2	10.8	9.6	7.8

TOTAL	**519.9**	**533.9**	**557.3**	**590.9**	**517.8**	**441.8**	**381.2**	**400.6**	**366.3**	**339.1**	**326.3**	**322.1**

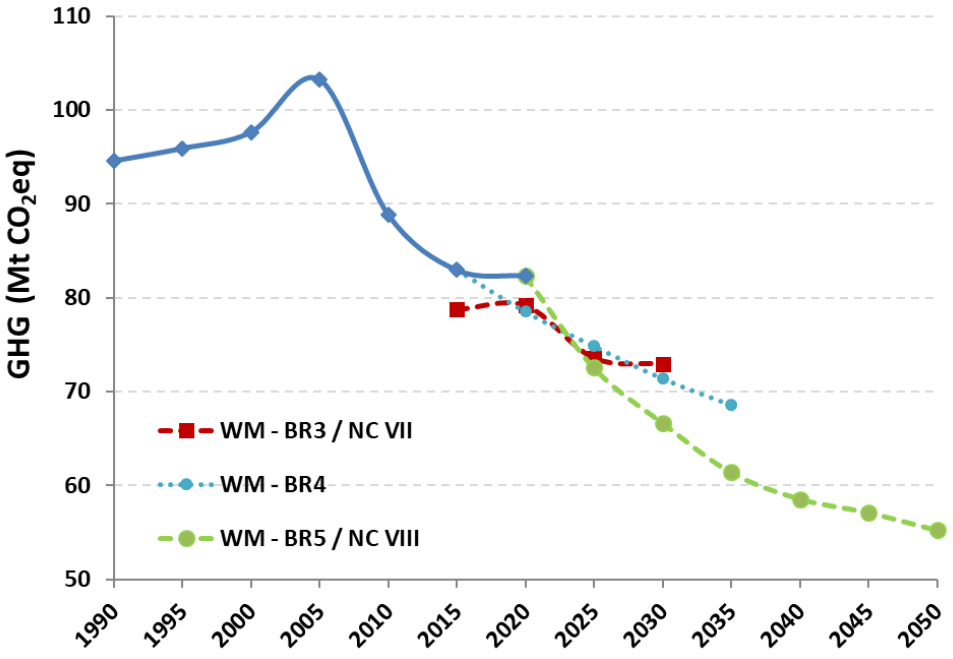
Source: ISPRA

Sector by sector analysis for the period 2020 – 2050 shows that:

- a small emissions reduction in energy industries is projected (-2%) mainly due to power production; in this subcategory, emissions are directly linked to the electricity production by fossil fuels, that outpaced the efficiency improvements up to 2008; the relevant expansion of renewable production after 2008 contributed to the emissions reduction. The emissions trend observed in the projected years is the result of increasing production offset by further increasing thermoelectric efficiency, renewable share, and fuel shift toward low carbon fuels as natural gas;
- the projected emissions from transport will decrease by 22% as results of implemented measures, notwithstanding the increasing transport demand;
- emissions from residential and commercial show a relevant decrease (-21.8%) mainly due to the efficiency increase of buildings; the emissions increase in the past is mainly linked to the expansion of services and residential building stock (second and third houses); increased house size and higher indoor temperature played an important role. In projection years, planned policies have a significant effect and are successful in curbing emissions;
- industrial emissions register a deep decrease in the period 2005–2020 (-50.4% for energy emissions and 34.2% for industrial processes); this reduction is due in part to the contraction of economic activities and in part to the structural change and increase of efficiency, whose effects can be seen in the projected emissions too. Indeed, after 2020 industrial emissions show a decreasing trend with increasing GVA;
- emissions from waste sector show the highest rate of reduction among sectors (-48.7% in 2040 compared to 2020) mainly due to the decrease of waste disposal in landfills.

In Figure 5.5 the emissions of CO2 from non-energy sectors and other GHGs (CH_4, N_2O, and NF_3) from energy and non-energy sectors are reported. It can be noted that emissions reduction was sharp between 2005 and 2020 (-20.3%). According to the scenario, the projected emissions will further decrease by 28.9% from 2020 up to 2040 as result of emissions reduction for all sectors.

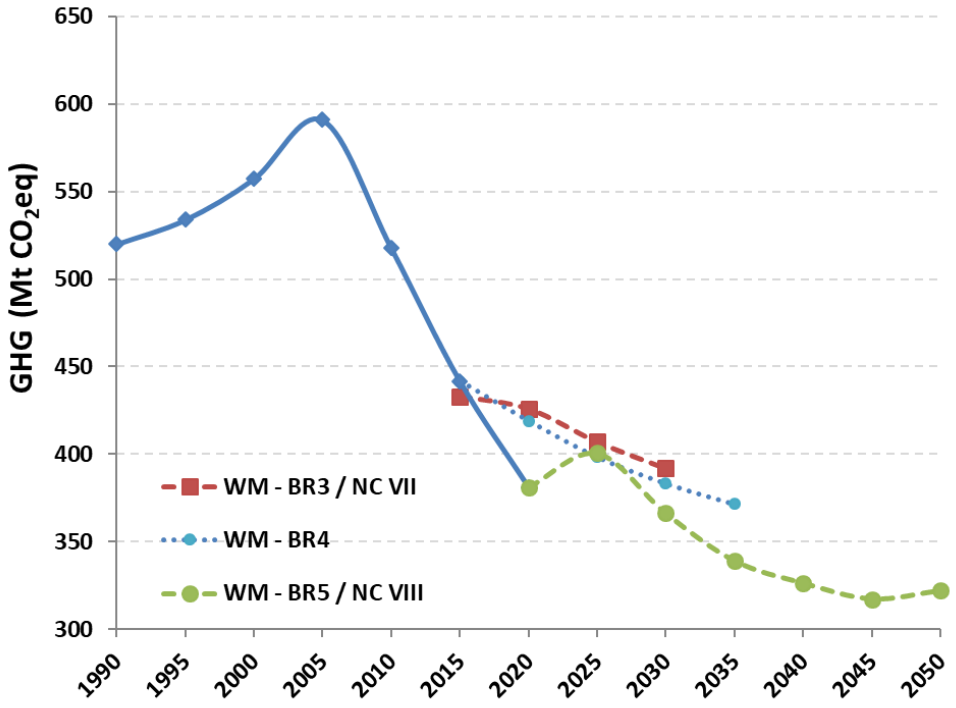
Figure 5.5 - Actual and projected emissions of CO2 from non-energy sectors and other GHGs from energy and non-energy sectors.



Source: ISPRA

The resulting trend in total GHGs emissions is reported in Figure 5.6. The current WM scenario is compared with the ones reported in the previous two submissions.

Figure 5.6 – Actual and projected total GHG emissions (Mt CO2 eq.)



Source: ISPRA

Table 5.8 reports emissions by gas expressed as CO_2eq. Along the time series CO_2 emissions are about 83% of total emissions. It is worth noting the sharp reductions of methane, and HFCs emissions in the period 2020-2040, amounting to 30% and 70% respectively. As previously noted, the methane emissions contraction is mainly due to the waste sector. The decreasing emissions of HFCs are mainly due to the implementation of the European Regulation n. 517/2014 on F-gases.

Table 5.8 – WM Scenario's GHG emissions from 1990 to 2030, disaggregated by gas ($MtCO_2$ eq.)

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040	2050
CO_2	439.5	449.8	470.5	502.3	436.1	361.2	302.3	330.6	302.8	281.6	272.2	272.7
CH_4	49.4	51.4	51.9	49.2	47.3	44.1	42.8	38.6	36.0	33.6	32.3	29.8
N_2O	27.2	29.4	30.3	29.3	20.3	18.9	19.5	16.5	15.9	15.3	14.9	14.8
HFCs	0.4	0.9	2.5	7.6	12.1	15.4	15.9	13.0	9.7	6.7	4.9	3.0
PFCs	2.9	1.5	1.5	1.9	1.5	1.7	0.5	1.6	1.6	1.6	1.6	1.6
Un-specified mix of HFCs & PFCs	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
SF_6	0.4	0.7	0.6	0.5	0.4	0.5	0.3	0.3	0.3	0.3	0.3	0.3
NF_3	0.0	0.08	0.01	0.03	0.02	0.03	0.02	0.0	0.0	0.0	0.0	0.0
TOTAL	**519.9**	**533.9**	**557.3**	**590.9**	**517.8**	**441.8**	**381.2**	**400.6**	**366.3**	**339.1**	**326.3**	**322.1**

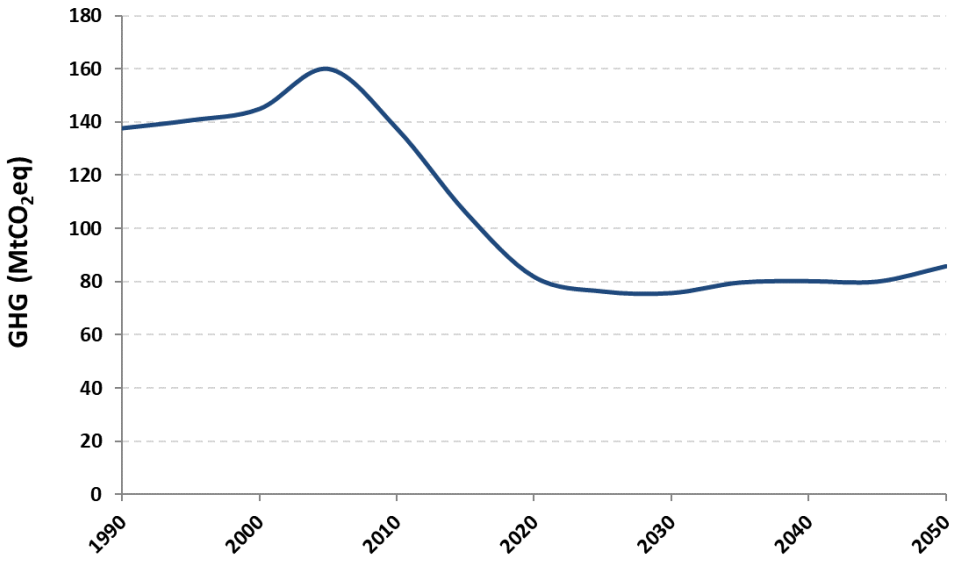
% change from base year, total emissions	2.7%	7.2%	13.7%	-0.4%	-15.0%	-26.7%	-22.9%	-29.4%	-34.6%	-37.1%	-38.0%

Source: ISPRA.

5.2.4 Energy industries

According to IPCC guidelines, the energy industries subcategory includes the electricity production from fossil fuels, refineries and the production of coke and of electricity from coal gases in integrated steel plants. Emissions due to self-generated and self-consumed electricity are not included in the energy industries as they are included among industrial emissions. The emissions from self-generated and self-consumed electricity were relevant in the past, but in recent years they amount to less than 10% of emissions from total electricity production. The emissions from refineries are relevant, but the lower consumption of fossil fuels by transport foreseen in the next years will reduce the refineries activity. Moreover, the production of coke only accounts for small quantities of emissions, so the projected emissions from the energy industry sector are mainly linked to electricity production. As shown in Figure 5.7, between 1990 and 2005 a noticeable increase in emissions of 16.2% has been registered by energy industries, about 1% yearly. From 2005 to 2015, emissions sharply decreased at an average annual rate of -4%. The declining trend in the last years is mainly driven by a reduced activity in the years of economic crisis and an increasing share of renewable sources to produce electricity. A significant role is also played by increasing fossil fuels efficiency for electricity generation and, for 2020, the lockdown of economic activities due to the SARS-Cov2 pandemic. A further slight decrease of emissions is expected up to 2030 with recovery up to 2040 with an annual average rate around 0.6% in the decade. The stable trend of emissions starting from 2020 is due to the balancing effect of increasing electricity generation and increasing share of renewable sources. Lesser contribute is expected by efficiency factor due to limited scope remaining for technologies to increase the energy generation efficiency and for fossil fuel switch to gas.

Figure 5.6 – Energy industries actual and projected GHG emissions (Mt CO2 eq.)



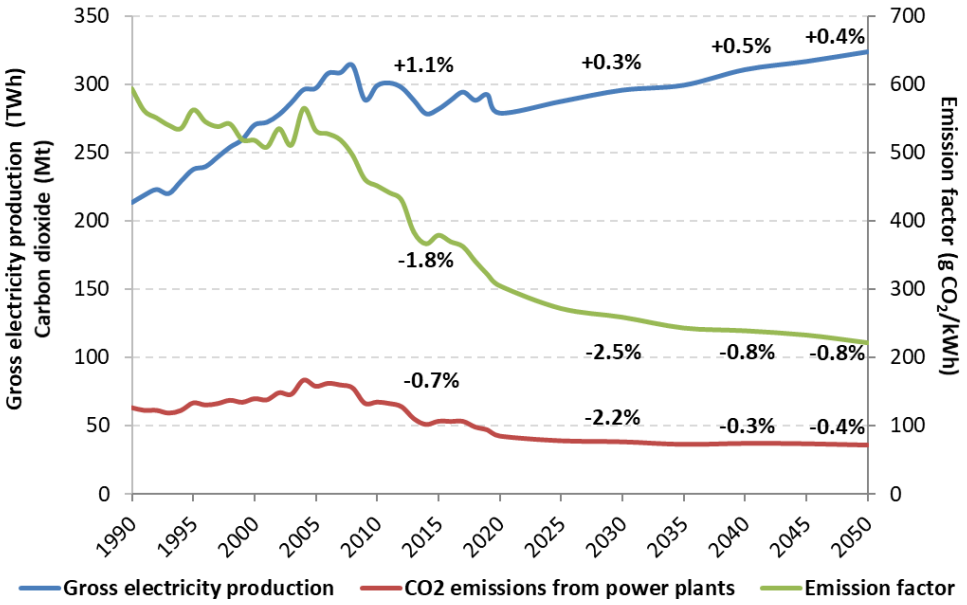
Source: ISPRA

5.2.4.1 Electricity production

Data considered in this paragraph concern all electricity generation plants, including those plants usually dedicated to the supply of electricity and heat to sectors different from 1.A.1.a (Public electricity and heat production). Historical data show a decoupling between CO2 emissions from power plants and electricity

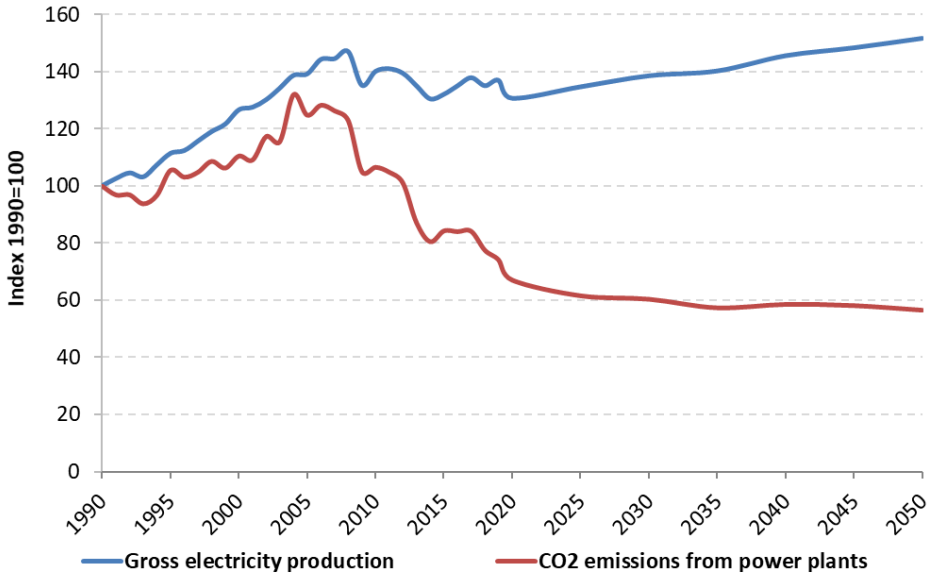
production (Figure 5.8 and Figure 5.9). Since 1990, the electricity production increased constantly up to 2008 with an average annual rate higher than CO_2 emissions. The average growth rate of gross electricity production amounted to 2.2% per year from 1990 to 2008, doubling the growth rate of CO_2 emissions (1.2% per year) and thus showing a relative decoupling for the two parameters. From 2008 to 2014, the electricity production dropped down for the economic crisis (-2.0% per year for gross electricity production and -6.8% per year for CO_2 emissions). In the same period, it is evident how the decoupling between electricity production and CO_2 emissions becomes absolute as respective trends continue diverging. Such effect is mainly due to the sharp development of renewable sources in the period. The oscillating values after 2009 up to 2020 are due to continuous recovery and fall of economy.

Figure 5.7 – Electricity production and CO2 emissions from power plants. Average annual rates are reported for the periods 1990-2015, 2015-2030, 2030-2040, and 2040-2050



Source: ISPRA

Figure 5.8 – Electricity production and CO2 emissions from power plants relative trends from 1990

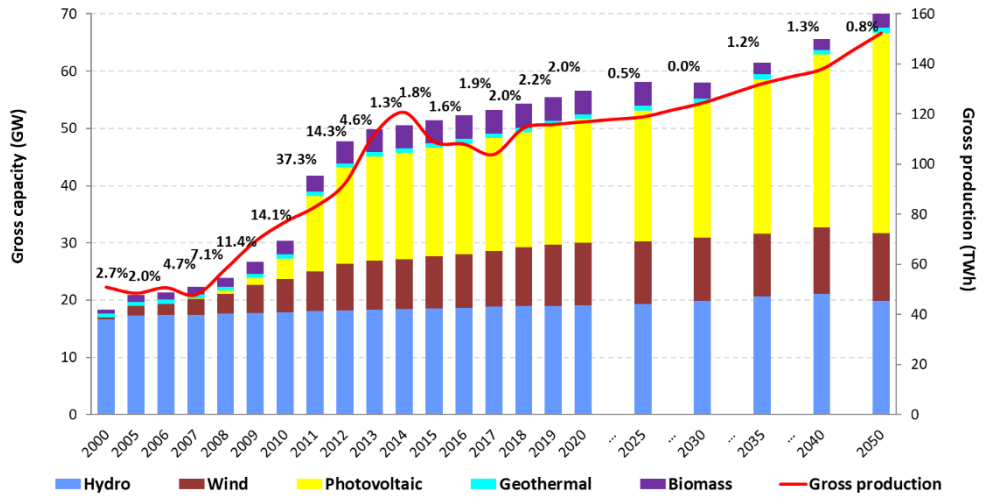


Source: ISPRA

The decoupling between electricity generation and atmospheric emissions, particularly evident since 2004, is mainly due to fuel shift toward lower carbon content fuels, and relevant increase in electricity production efficiency. Since 2007, the increasing share of renewable sources was the most relevant factor contributing to the decoupling trend (Figure 5.9).

According to WM scenario, the expected increase in electricity demand will be covered by a strong increase in installed renewable sources power. The installed capacity in 2020 was 56.6 GW, with an average growth rate of 5.2% per year from 2000 to 2010 and 6.4% per year in the following years up to 2020. From 1990 to 2008, hydropower was the most relevant renewable source; after 2008, other sources have become more and more relevant. Since 2013, the annual rate of new installed capacity has shown a slowdown, while the electricity production has registered a downturn mainly due to the sharp reduction of hydropower share (**Errore. L'origine riferimento non è stata trovata.**). The installed renewable capacity projected for 2030 and 2040 are about 58 GW and 65.7 GW respectively, mainly due to the increase of photovoltaic.

Figure 5.9 – Renewable contribution to gross electricity production. The percentage represents the annual average power rate



Source: ISPRA

Total gross efficient power capacity, including renewables, increased from 102.3 GW in 2008 to 128.6 GW in 2013, with a renewable share of 23.3% and 36.8%, respectively. Since 2008 up to 2013, renewable power represents the main component of new installations (26 GW out of 26.3 GW). Since 2011, a growing decommissioning of thermal capacity has been registered (about 18 GW). In 2020, the gross efficient power capacity is 119.1 GW with 47.5% being from renewables.

The growth of renewable share has been mostly affected by photovoltaic and wind capacity. As concerns the electricity generation from renewable sources, the 2020 target assigned to Italy under European commitments is 26.4%, expressed as percentage of renewables on gross final consumption of electricity, including the import share of electricity. Such target is overachieved since 2011, and the 2020 share of renewables was 38.1% of gross final consumption of electricity[34].

In calculating the contribution of hydropower and wind, the effects of climatic variation are smoothed through the use of a normalization rule according to Directive 2009/28/EC. The increase of renewable electricity production is foreseen to continue in the next years. Projections show that renewable electricity production will amount to about 124.4 TWh in 2030 and 137.8 TWh in 2040, out of total generation of 295.4 and 310.4, respectively.

5.2.4.2 Refineries

The level of activity of the refineries is strictly linked to the activity of the transport sector (about 80% of final energy consumption ad 60% of GIC of total petroleum products from 2010 to 2020) whose energy needs still rely mainly on oil products.

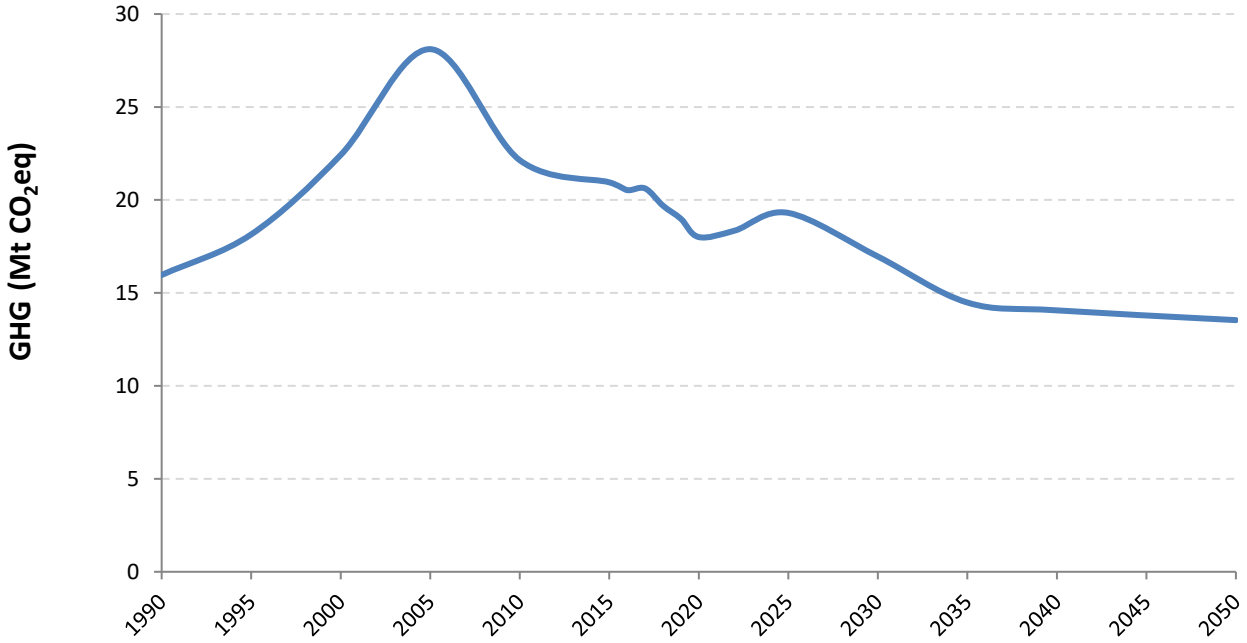
During the past decade, under the economic crisis, the transport subcategory has been heavily affected, thus leading to a reduction of the activity of refineries too, which also led to a reduction of the number of operating plants.

An upward trend in emission levels was observed from 1990 to 2010 explained by the increasing quantities of crude oil processed and by the complexity of processes used to produce more environmentally friendly transportation fuels and to reduce the production of residual fuel oil. The increase in complexity resulted in an increase of energy consumption with the installation of deep conversion units or integrated gasification units, which can use heavy residuals to produce electricity, heat and hydrogen.

[34] EUROSTAT, Data Shares (renewables), 2022 http://ec.europa.eu/eurostat/web/energy/data/shares

Liquid fuel consumptions have reached a plateau in 2010 and are now in a downward trend that is expected to continue because of the reduction of the final demand of oil products in the transport sector, especially until 2035. In the longer-term other sectors demand of oil products will sustain the activity, and the emissions, of refineries.

Figure 5.10 – CO2 emissions from refineries



5.2.5 Final uses of energy

The next table reports historical data and projections for final uses of energy according to Eurostat current methodology updated in January 2019.

Table 5.9 - Final energy consumption (Mtoe)

	2005	2010	2015	2020	2025	2030	2035	2040	2050
Total final uses	131.5	123.1	112.1	103.1	116.8	108.3	100.7	99.5	99.7

The scenario shows a sharp reduction of final energy consumption after 2015, followed by rebound effect in 2025 and further decrease in the next years up to 2040. Comments to data are provided in the sector-by-sector analysis.

5.2.5.1 Manufacturing industries and construction

According to section 1.A.2 of CRF, the industrial sector considered herein includes manufacturing industries and construction. Reference is made only to emissions connected to energy use, excluding process emissions reported in section 2.A-C of CRF.

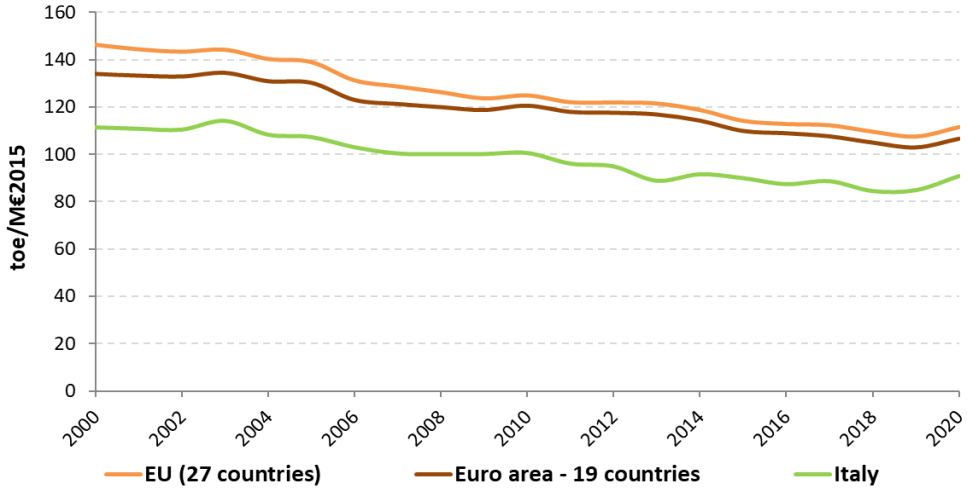
Table 5.10 reports the projections for final energy consumption in industry (Mtoe) for WM scenario, while the emission trend is reported in Figure 5.12.

A primary tool to reduce the emissions of greenhouse gases is by improving the level of energy efficiency of the industrial processes. The 2018 International Energy Efficiency Scorecard, issued by the American Council for an Energy-Efficient Economy (ACEEE), assigned the first position to Italy, together with Germany among 25 nations globally, with scores assigned according to quantitative and qualitative parameters, including efficiency indicators and policies aimed at reducing consumption. The last edition of the International Energy Efficiency Scorecard, issued by ACEEE on 1st April 2022, reported for Italy the drop of four ranks mainly due to buildings section, but Italy managed to rank within the top five, after France, UK, Germany, and the Netherlands. According to Eurostat data, Italy stands well below the average energy intensity among EU27 (-15.6%) and Euro area countries (-24.9%). Figure 5.11 shows the energy intensity of the industrial sector calculated as the ratio between the final consumption in industry sector for energy and non-energy use and the GVA for Industry and Construction estimated according to latest Eurostat methodology.

Table 5.10 – Final energy consumption in industry sector (Mtoe)

	2005	2010	2015	2020	2025	2030	2035	2040	2050
Industry	37.2	29.0	24.9	23.9	23.5	23.4	23.4	22.4	23.0

Figure 5.11 – Energy intensity of industrial activities in Italy and EU



Source: ISPRA on EUROSTAT data

Manufacturing industries and construction have gone through a period of consumption reduction, driven by the economic crisis but also by improvements of industrial activities, which has led to a reduction of emissions as well.

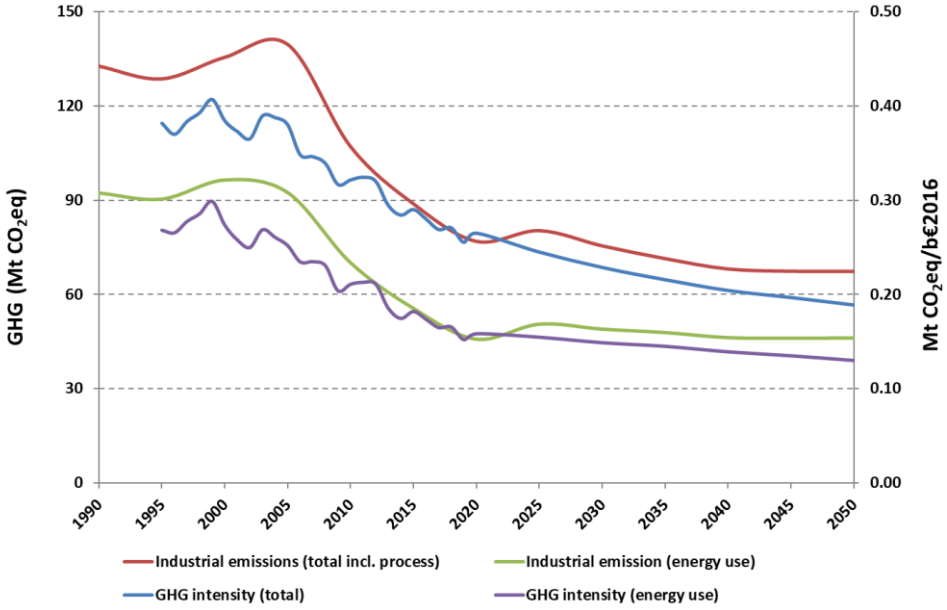
Indeed, it is essential to remark that the carbon intensity of energy uses of industry has also decreased steeply since 1995. This shows that the observed reduction of emissions is not only due to lower consumption but also to structural changes in the sector (less energy intensive activities as mechanical, food, specialized chemicals manufacture, and other light industries are playing a major role) and to the increase of efficiency.

Further improvements remain technically feasible, although they represent a real challenge for those sectors which have already reached high levels of efficiency with respect to the biggest economies in the European Union, mainly for energy intensive subsectors as steel, cement, tiles, paper. Those subsectors are included in the EU–ETS and international competition concerns are addressed at the EU level, with the evaluation of the possibility of "carbon leakage" and the adjustment of emission allowances prices for sectors involved.

Figure 5.12 shows GHG emissions from energy consumption in industry and the GHG intensity of the sector as well total emissions and intensity including emissions generated from industrial processes. Compared to

energy intensity, GHG intensity has decreased steeply due to the change in industrial structure and fuel mix, where natural gas, electricity and derived heat have increased their shares. For the projected years, further fuel switches from more carbon intensive fuels to natural gas are unlikely. Future improvements are mainly expected from moderate increases in efficiency and electrification of activities. Looking at total emissions from the industrial sector the decrease is more evident reflecting a continuous change in the production structure.

Figure 5.12 – Trends of GHG emissions and intensity for Manufacturing industries and construction



Source: ISPRA

5.2.5.2 Transport

In line with the IPCC Guidelines, the transport category includes road and railway transportations, domestic air traffic, the national amount of international air flights (landing and take-off) and coastal navigation, as well as the consumptions in the harbour from ships travelling in international voyages.

The next table reports historical data and projections for final use of energy. Starting from 2015, energy consumption decreases up to 2020 and will rebound up in 2025. After 2025 the projected energy consumption shows a decreasing trend with average annual rate of -1.17% per year up to 2040.

Table 5.11 – Trends of final energy consumption for transport

	2005	2010	2015	2020	2025	2030	2035	2040	2050
Transport	41.8	38.6	36.4	29.0	44.3	37.9	32.6	32.4	33.0

GHG emissions from transport registered a strong historical growth from 1990 to 2007 (+26.8%). Following the economic downturn, the trend has changed direction registering a reduction of 18% in the period 2007-2015. The declining trend of the sector is confirmed up to 2017 (-5% with reference to 2015) while 2018 and 2019 show a new increase of emissions (+4.5% in 2019 with reference to 2017) followed by the fall down in 2020 (-18.9% with reference to 2019) due to the lockdown measures to contrast the SARS-CoV-2 pandemic. Projected emissions are expected to increase up to 2025 as rebound effect for the end of the pandemic which will especially affect the private cars use. After 2025 up to 2050, emissions reduction of 43.3% is expected.

Road transport accounts for almost the totality of sector emissions (92.1% in 2020). Passenger transport is responsible for about 66% of emissions, while goods and other fuel uses account for the balance. The application of the Regulation (EU) No 2019/631, which set CO_2 emission performance standards for new passenger cars and new light commercial vehicles, will overcompensate the increasing demand of transport resulting in a decreasing trend of projected emissions.

Table 12 shows historical and projected emissions related to fuels sold to ships and aircrafts for international transport. For international aviation, after the fall down in 2020 the emissions are expected to increase (+260.5% in the period 2020-2050). The same trend is foreseen for international maritime transport, projected emissions show a steady increase up to 2040 (+46.1% since 2020) followed by a decrease in 2050 (-22%).

Table 5.12 – Emissions from international bunkers (Mt CO_2 eq).

	2005	2010	2015	2020	2025	2030	2035	2040	2050
Aviation	8.6	8.9	9.6	3.8	11.2	11.8	12.5	13.2	13.7
Marine	6.9	7.0	5.7	5.6	7.4	7.8	8.0	8.2	6.4

Source: ISPRA

5.2.5.3 Other sectors

The next table reports historical data and projections for energy final consumption in services, residential and agriculture.

Table 5.13 – Final energy consumption in other sectors (Mtoe)

	2005	2010	2015	2020	2025	2030	2035	2040	2050
Services	15.1	17.0	15.4	16.6	16.6	16.6	15.4	16.0	16.1
Residential	33.9	35.4	32.5	30.7	29.5	27.5	26.1	26.2	24.7
Agriculture	3.0	2.7	2.7	2.8	2.9	2.9	3.2	2.5	2.9

The sectors are characterized by the following features:

- agriculture: moderate penetration of gas in the agricultural sector results in slight decrease of CO2eq missions from energy uses (from 7.9 Mt in 2020 to 7.7 Mt in 2050 going through a slight increase of emissions in the period 2020-2035);
- buildings (residential and tertiary): the main driver in the residential sector is the number of families, while for services the main driver is the value added. It is expected a slight yearly increase of total square meters for buildings, both residential and services. The increase in heating demand will be offset by the estimated natural gas expansion, by higher electricity penetration, and by the expected efficiency gains according to the National Plan for Energy Efficiency and minimal standards for buildings. As for building renovations, an annual average rate of 0.37% has been considered. Another parameter taken into account to elaborate the energy demand of heating and cooling is the anomaly climate index. The index projections are ISPRA elaboration starting from data of the Euro Mediterranean Center on Climate Change[35] under the EURO-Cordex project[36].Such effects will result in emission reductions (from 70.6 Mt CO_2eq in 2020 to 54.4 Mt CO_2eq in 2050).

[35] https://www.cmcc.it/
[36] https://www.euro-cordex.net/index.php.en

The residential and services sectors show a decrease of energy consumption from 2020 to 2050 (-24.2% and -3.1% respectively).

5.2.6 Emissions from non-energy sectors

In **Errore. L'origine riferimento non è stata trovata.**, GHG emissions from non-energy sectors are reported. As can be noted, a sharp emissions reduction is registered between 2005 and 2015. This reduction is due to the effect of the following factors (in order of importance):

- implementation on N_2O emission control in the adipic acid and nitric acid production;
- reduction of emissions from landfills due to decreased waste disposal in landfills (especially the organic fraction) and to increased recovery of methane;
- reduction of other process emissions due to a reduction of related industrial production;
- increase of recovery of animal wastes for biogas production.

According to available data, emissions slowly declined in the period 2015-2020 and show further slightly decreases from 2020 onward. The overall trend represents the contribution of different rate of reductions for all the underlying sectors.

5.2.6.1 Projections of emissions from industrial processes

Emission projections for industrial processes rely on the same main assumptions on GVA and physical production used for the calculation of final energy consumption of the industrial sector. Emission factors for processes have been considered constant for the whole time series assuming that no new processes and additional measures will be implemented.

Projections for Aluminium production and Fluorochemical Production have been derived from information communicated directly from industry on the basis of the present situation: for what concern Aluminium production, if at first there was a plan to restart, actually there are no perspectives of a reopening of the plant in Portovesme that has stopped the production in 2012. Regarding the production of HCFC22 used as the input for the TFM (tetrafluoroethylene monomer) that has been then used to produce different fluoropolymers and fluoroelastomers, the Company Solvay has communicated that the production if HCFC22 will remain almost constant.

About semiconductor manufacturing, projections have been derived from agreements subscribed by the European Semiconductor Industry Association. The Italian semiconductor industry has predicted a 30% reduction of PFC emissions in 2025 compared to 2010 emissions. In 2040 a further 5% reduction is expected. PFC emissions reduction technologies that are applied in factory operations include: manufacturing process optimisation (reducing the amount of PFCs that are used and emitted), using alternative process PFC chemistries with lower global warming potential where possible, and installing abatement equipment systems.

For SF_6 used in magnesium and aluminium foundries and for solvent and F-gases substitutes for ozone depleting substances and other product use, projections are based on the achievement of the objectives established by the European Regulation n. 517/2014 on F-gases (F-gases Regulation), and by the Kigali Amendment. In Table 5.14 F-gases projections up to 2050 by sector are reported.

For solvents, future trends have been estimated extrapolating most recent data and considering the implementation of the European Directive 2010/75/EC regarding the reduction of VOC emissions due to the use of solvent (Industrial Emissions Directive) and the European Directive 2004/42/EC on the limitation of emissions of VOC due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products (Deco Paint Directive).

Table 5.14 – F-gases emissions by sector ($MtCO_2$ eq.)

	2005	2010	2015	2020	2025	2030	2035	2040	2050

Chemical industry	1.572	1.302	1.553	0.418	1.479	1.479	1.479	1.479	1.479
Metal industry	0.293	0.118	0.010	0.005	0.006	0.006	0.006	0.006	0.006
Electronics industry	0.303	0.207	0.247	0.217	0.179	0.181	0.183	0.185	0.192
Product Uses as Substitutes for ODS	7.588	12.042	15.382	15.861	12.967	9.687	6.670	4.899	2.953
Other Product Manufacture and Use	0.412	0.347	0.425	0.216	0.260	0.244	0.229	0.218	0.218
Total	10.168	14.016	17.617	16.717	14.891	11.597	8.567	6.787	4.848

The scenario includes the reduction of N_2O emissions from the nitric acid production obtained with the adoption of the most advanced technologies to be applied to the main existing nitric acid production plants by 2015 (installation of selective catalytic reduction systems for the treatment of process gases).

Emission estimates consider the six direct greenhouse gases under the Kyoto Protocol (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) plus nitrogen trifluoride (NF_3) which contribute directly to climate change owing to their positive radiative forcing effect.

The resulting GHG emission projections up to 2050 are reported in Table 5.15. The decrease of industrial processes emissions is connected to the decreasing use of substitutes of ozone depleting substances, the other emissions being almost stable (around 1.5 $MtCO_2$ eq. increase after 2020).

Table 5.15 – Emission scenario by sector from industrial processes and solvent use ($MtCO_2$ eq.)

	2005	2010	2015	2020	2025	2030	2035	2040	2050
Industrial Processes	47.2	37.0	33.2	31.0	29.7	26.4	23.5	21.8	21.1

Source: ISPRA

5.2.6.2 Projections of emissions from agriculture

GHG emission figures from the agriculture sector are updated and improved thanks to different national research studies[37]. Methodologies for the preparation of national inventories under the Convention on Long-Range Transboundary Air Pollution and the United Nations Framework Convention on Climate Change are kept consistent[38].

Between 1990 and 2020, GHGs emissions from the agriculture sector have decreased by 11.4%. Emission trends are due to the reduction in activity data such as the number of animals, the cultivated surface and crop production and use of nitrogen fertilizers, and the changes in manure management systems, mainly linked to Common Agricultural Policy (CAP) measures[39]. Emission projections are estimated with the same model used for the preparation of the national emission inventory. To estimate the number of different animal categories, a model has been developed by ENEA[40], which every year estimates emission scenarios for air

[37] NIR 2022, Chapter 5. Italian Greenhouse Gas Inventory 1990-2020 - National Inventory Report 2022 https://www.isprambiente.gov.it/it/pubblicazioni/rapporti/italian-greenhouse-gas-inventory-1990-2020-national-inventory-report-2022

[38] ibidem

[39] Rural Development Plans (RDPs) from Italy are available at URL: https://ec.europa.eu/agriculture/rural-development-2014-2020/country-files/it_en

[40] ENEA, 2006. Valutazione del potenziale di riduzione delle emissioni di ammoniaca. Rapporto Finale. ENEA UTS- PROT, Unità Inquinamento Atmosferico. Settembre 2006.

pollutants using specific models[41]. For the use of fertilizers, ENEA assumptions are based on the European Fertilizer Producers Association (Fertilizers Europe) forecast until 2030. From 2030 onwards, the value has been varied according to the projections of the utilised agricultural area. For estimates of agricultural land and production, see the next section Projections of emissions from the LULUCF sector.

In Table 5.16, the assumptions adopted for synthetic fertilizers consumption and application of manure to agricultural soils are shown. A decrease of 16% of the major N input to agricultural soils has been estimated in 2020 with respect to 2005 due to a 26% reduction in the consumption of synthetic fertilizers (accounting for 38% of total nitrogen inputs in 2005) and an 1% increase of the application of manure to agricultural soils (accounting for 22% of total nitrogen inputs in 2005).

Table 5.16 – Assumptions used for estimating GHG emission projections from synthetic fertilizers consumption and N input from application of manure

Major N input to agricultural soils (kt nitrogen*)	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2050**
N input from application of synthetic fertilizers	517.9	577.5	485.6	481.9	473.7	469.9	461.1
N input from application of manure	461.3	469.2	459.8	466.7	450.8	453.3	436.4
Total consumption of N fertilizers	**979**	**1047**	**945**	**949**	**925**	**923**	**898**

* Nitrogen content in synthetic and organic fertilizers

Source: ISPRA

In Table 5.17, assumptions for the main animal categories (cattle, swine, sheep and poultry) are shown. The CAP 2014-2020 has conditioned herd sizes over the years, for example with the milk quota reform; we will see in the future how the new CAP 2023-2027[42] will contribute to changes in the agricultural sector.

Table 5.17 – Assumptions used for GHG emissions projections with respect to the number of animals

Animal category (kheads)	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2050**
Dairy cattle	1826	1638	1771	1765	1603	1598	1472
Non-dairy cattle	3955	4355	3708	3696	3515	3503	3206
Swine	7149	7034	6920	6769	6565	6546	6270
Sheep	8675	8543	8767	8975	9268	9409	9660
Poultry	177392	178907	178892	179726	180457	181789	185566

Source: ISPRA

[41] D'Elia, I., Peschi, E., 2016. How National integrated air quality models can be used in defining environmental policies: the revision of the NEC directive. ENEA Technical Report, RT/2016/30/ENEA. https://iris.enea.it/retrieve/dd11e37c-d7b8-5d97-e053-d805fe0a6f04/RT-2016-30-ENEA.pdf; D'Elia, I., Piersanti, A., Briganti, G., Cappelletti, A., Ciancarella, L., Peschi, E., 2018. Evaluation of mitigation measures for air quality in Italy in 2020 and 2030. Atmospheric Pollution Research, 9, 977-988.

[42] The European Commission provided for the application of the new common agricultural policy (CAP) from January 1, 2023.

In Table 5.18, GHG emission projections are shown. A slightly downward trend is observed from 2025 onwards. In 2030, emissions from the sector are reduced by 18% compared to 2005 and in 2050 by 23%. In 2030 and 2050, the largest reductions are in the manure management and agricultural soil categories, which account for about 20% and 30% of annual emissions, respectively. The manure management category decreases by 29% and 35% and the agricultural soils category falls by 32% and 34% in the years 2030 and 2050 compared to 2005.

Table 5.18 – Emissions projections for the agriculture sector ($MtCO_2$ eq.)

	2005	2010	2015	2020	2025	2030	2035	2040	2050
Agriculture	34.2	31.6	31.2	32.7	28.2	28.0	27.1	27.2	26.4

Source: ISPRA

5.2.6.3 Projections of emissions from the LULUCF sector

The driving forces for projections are the activity data linked to the LULUCF sector; in particular, those related to forest land, cropland and grassland constitute the key variables to project emissions by sources and removals by sinks. Compliant to the requirements set out by Regulation (EU) 2018/841[43], the GHG emissions and removals have been estimated and projected considering the different land transitions among the six land use categories as occurring in Italy (e.g., forest land to settlements, cropland to grassland, cropland to wetlands, etc.).

The land use and land use changes have been projected to 2050, as shown in Figure 5.13, on the bases of historical trends and considering:

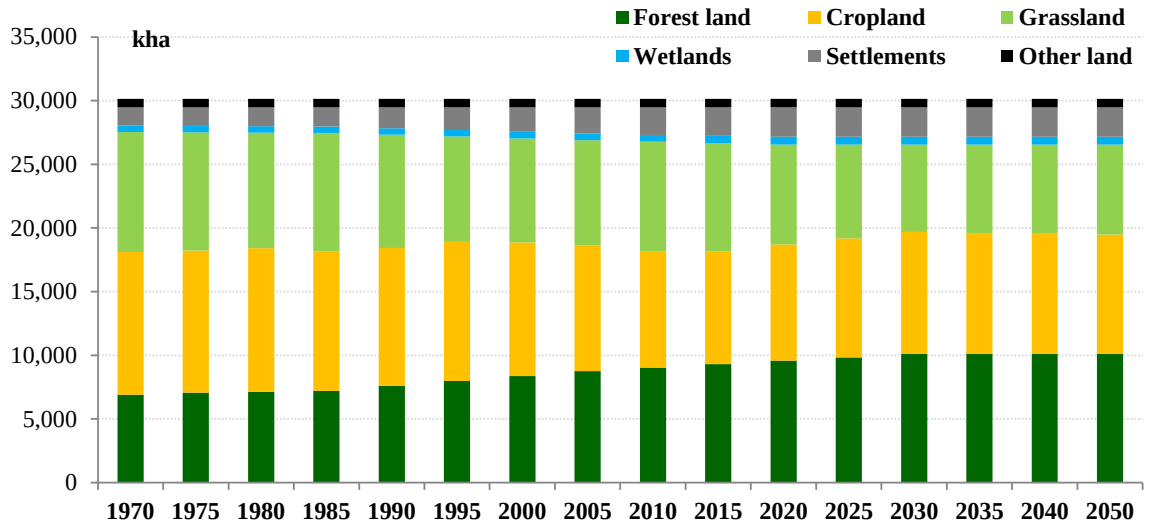
- for agricultural areas, a growing trend is assumed until 2040 and, thereafter, a stabilization[44]; the trend is determined by the increase in cereal areas and by the decrease of woody and industrial crops;
- for the grazing land[45], a decrease is foreseen, consequent to the reduction of grazing animals;
- in line with the goal of limiting land consumption, the settlements area is assessed to not expand compared to current levels while the forest area grows until 2030 and then remains constant.

Figure 5.13 - Trends of area for the land use categories

[43] Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework (LULUCF Regulation), and amending Regulation (EU) 525/2013 and Decision 529/2013/EU

[44] To project the activity data, the percentage change rates resulting from the FAO scenarios for Italy were used, applied to the historical series, for the macro-categories wood crops, cereals, industrial crops and other (legumes, vegetables, tubers), included in the cropland category. The projections of agricultural areas were developed starting from the FAO scenarios (FAO Global Agriculture Perspectives System (GAPS) in FAO. 2018. The future of food and agriculture - Alternative pathways to 2050 Rome; FAO Global Perspectives Studies. Data for 1961–2011 from FAO, 2016a; data for 2030 and 2050 from Alexandratos and Bruinsma, 2012), elaborated for Italy with the GAPS model (Global Agriculture Perspectives System) and calibrated with FAOSTAT data (FAOSTAT Food Balance Sheets: http://www.fao.org/faostat/en/#data/FBS/report) for the period 2011-2013; the estimates for the period 2030-2050 are were carried out with data produced by Alexandratos, N. and J. Bruinsma 2012 (World agriculture towards 2030/2050: the 2012 revision. ESA Working paper No. 12-03. Rome, FAO).

[45] The estimates are based on the 2012-2017 average of the head / hectare ratio (head consistency (LU) on total grazing land.



Source: ISPRA

Consistently with the National Forestry Accounting Plan[46], an increase of harvesting activities has been assumed, up to a maximum of 40-45% of the annual increment, starting from the current estimated use of 33% (RAF[47], 2019). Furthermore, the projections of activity data for cropland and grassland categories consider the different management practices[48]; additional information on management practices and estimation process are available in the *Italian Progress report on LULUCF action under the art. 10(2) of Decision 529/2019*[49] and in the National Inventory Report 2022[50].

The GHG emissions and removals, reported in **Errore. L'origine riferimento non è stata trovata.**, have been estimated by multiplying the projected areas, under each land use subcategory (i.e. land remaining land and land converted to other land use), by and Implied Carbon Stock Factor (ICSF), deduced from the historical data of emissions and removals and land use areas (1990-2019).

Table 5.19 – Emissions for LULUCF categories ($MtCO_2$ eq.)

	2005	2015	2020	2025	2030	2035	2040	2050
LULUCF	**-35.24**	**-43.09**	**-32.40**	**-34.34**	**-33.89**	**-30.00**	**-36.67**	**-36.66**
Forest land	-34.54	-39.22	-30.12	-34.88	-36.18	-37.29	-37.22	-37.09
Cropland	-1.89	0.58	-0.01	2.09	3.63	5.35	5.28	5.31
Grassland	-6.13	-9.40	-7.21	-4.77	-3.78	0.29	-5.57	-4.48
Wetlands	0.01	0.13	0.03	0.14	0.14	0.14	0.14	0.14
Settlements	7.80	4.74	5.57	4.26	4.02	3.78	3.50	3.35
Other Land	NO	NO	NO	0.00	0.00	0.00	0.00	0.00
Harvested wood products	-0.50	0.09	-0.67	-1.17	-1.71	-2.25	-2.79	-3.87

Source: ISPRA

[46] National Forestry Accounting Plan (NFAP) Italy: https://www.minambiente.it/sites/default/files/archivio/allegati/clima/nfap_final_resubmission_2019_clean.pdf

[47] RAF Italia 2017-2018 - Rapporto nazionale sullo stato delle foreste e del settore forestale in Italia (2019), Rete Rurale Nazionale (RRN 2014-2020), Compagnia delle Foreste, Arezzo, ISBN 9788898850341.

[48] The following management practices have been considered: *organic farming, sustainable agriculture, conservation practices, set-aside, ordinary agriculture, natural grazing land, managed grazing land, organic grazing land.*

[49] Italian Progress report on LULUCF action under the art. 10(2) of Decision 529/2013/EU: http://www.sinanet.isprambiente.it/it/sia-ispra/serie-storiche-emissioni/italy-progress-report-on-lulucf-article-10-2-of-dec-529-update-2020/view

[50] http://emissioni.sina.isprambiente.it/inventario-nazionale/

5.2.6.4 Projections of emissions from waste

The following projections have been prepared in conformity with most recent inventories and evaluations on the implementation of mitigation measures. The driving forces for projections estimations are especially activity data linked to the whole waste sector and the reduction of biodegradable waste in landfills. In particular, the municipal waste cycle has been studied, analysing its evolution through the years on the basis of actions that have already been put into effect.

The total amount of annual waste production has been estimated on the basis of official population forecasts provided by the National Institute of Statistics (ISTAT). Starting from the production, waste fluxes have been analysed on the basis of the following waste management options: separate collection, recycling, landfilling, incineration, mechanical biological treatments, anaerobic digestion and composting.

Focusing on recycling and other options, national circumstances are quite in line with the European average, as reported in Table 5.20. Waste production in 2020 is almost equal to the European average while waste management is slightly lower; among the waste management technologies, energy recovery is lower than the European average due to the historical difficulty of the population to accept the plants while composting is above average also because the industrial sector in Italy is well developed (ISPRA, 2022).

Table 5.20 – The waste cycle in Italy and Europe in 2020

	Waste produced (kg/inh.)	Waste managed (kg/inh.)	Percentage of urban waste treated				
			Recycling	Energy recovery	Composting and anaerobic digestion	Incineration	Landfills
UE 27	517	509	31%	26%	18%	0%	24%
Italy	487	443	30%	21%	26%	1%	22%

Source: ISPRA

The extremely accentuated difference between the different areas of the country is slowly smoothing out, with southern Italy also exceeding 50% of separate waste collection with respect to the waste produced. Compared to 2019, in 2020 the percentage of the regions of southern Italy grew by 3.0 points, that of the central regions by 1.4 points and that of the northern regions by 1.2 points. Governmental efforts aimed to the improvement of waste management lead to an optimistic outlook for the fulfilment, by the deadlines, of the commitments for reuse and recycling set up by the current legislation (50% by weight within 2020 - Directive 2008/98/EC) being equal to 54.4[51]% in 2020 and for the future targets set by the most recent directive 2018/851 / EU (55% by 2025, 60% by 2030 and 65% by 2035).

Table 5.21 – Emissions for the waste sector ($MtCO_2$ eq.)

	2005	2010	2015	2020	2025	2030	2035	2040	2050
Waste sector	21.9	20.4	18.5	18.6	14.6	12.2	10.8	9.6	7.8

Source: ISPRA

Regarding landfills, the total amount of waste disposed into landfills will vary according to the actual trend, whereas the composition of waste has varied because of the compliance with the separate collection target. Thanks to the efforts made by the government in cooperation with local authorities, the amount of biodegradable waste disposed into landfills has fallen sharply in recent years and is totally complying with the

[51] calculated according to method 2 indicated by Directive 2008/98/EC

target of landfill directive (D.lgs. 36/2003) resulting in 59 kg_{waste}/inh.*year in 2020, well below the target set by legislation for 2018 (81 kg_{waste}/inh.*year). It is assumed that the share of landfill gas collected will reach 60% in 2030.

Furthermore, from 2010, each municipal waste incinerator is equipped with an energy recovery system and only industrial waste could still be treated without energy recovery. Emissions from incinerators with energy recovery are reported in the energy sector, while emissions from incinerators without energy recovery are reported in the waste sector. The total amount of waste incinerated will increase in line with the current trend. Finally, the amount of waste treated in Mechanical biological treatment plants will increase in line with the strategy to pre-treat waste to obtain a bio-stabilized product to dispose to landfills and a dry-fraction to burn in waste-to-energy facilities. As a consequence of this waste cycle projection, biological waste treated in composting and anaerobic digestion plants will also increase following the trend. According to these projections a 48% reduction can be expected in 2040 with respect to 2020 in overall greenhouse gas emissions from the waste sector, expressed in terms of CO_2 equivalent, essentially as a result of a reduction in methane emissions from landfills.

5.3 WAM Scenario

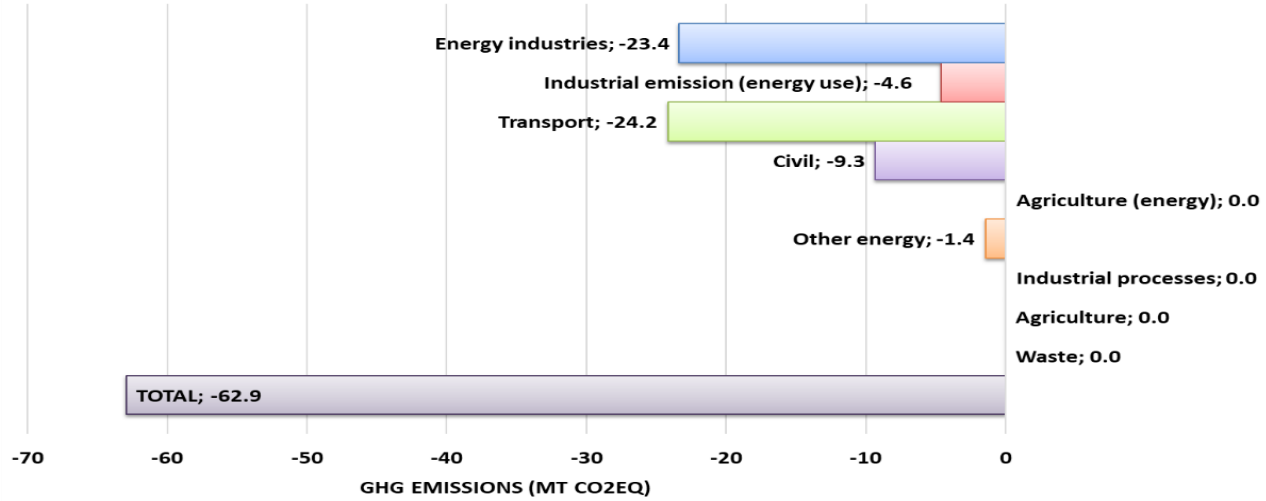
The WAM scenario was elaborated with the same main assumptions and base year adopted for WM scenario and considering the policies and targets set up in the NECP. The national efficiency target to be achieved in 2030 is set to -0.8% per year of final energy consumption, while the renewable share target is set to 30% of final energy consumption in 2030. The plan also provides a list of planned PaMs aiming to reach the targets as intense modal swift in passenger transport, 6 million BEV and PHEV fleet, a target share of at least 55% in 2030 of energy from renewable sources in gross electricity consumption, strong increase in the renovation rate in the civil sector, etc. Figure 5.14 shows the differences between WAM and WM scenario at 2030 for each sector.

Table 5.22 – WAM Scenario's GHG emissions, disaggregated by source ($MtCO_2$ eq.)

	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040	2050
FROM ENERGY USES, of which:	**425.3**	**437.9**	**459.6**	**487.6**	**428.9**	**358.8**	**298.9**	**269.5**	**236.7**	**207.9**	**190.8**	**171.1**
Energy industries	137.6	140.6	144.9	159.9	137.5	106.1	81.8	63.4	52.3	52.8	52.7	50.7
Industry	92.3	90.3	96.4	92.4	70.2	55.6	45.9	47.3	44.4	41.8	40.3	38.8
Transport	102.2	114.3	123.8	128.3	115.5	106.1	85.4	81.6	71.1	53.2	43.6	30.9
Residential and Commercial	69.8	69.2	73.6	86.7	88.0	74.8	71.3	61.9	54.7	46.2	43.5	41.3
Agriculture (energy use)	9.1	9.6	8.9	9.3	8.1	7.7	7.9	8.4	8.1	8.5	5.5	5.0
Other	14.3	13.9	12.0	11.1	9.6	8.5	6.6	6.9	6.1	5.4	5.1	4.4
FROM OTHER SOURCES, *of* which:	**94.6**	**95.9**	**97.7**	**103.3**	**88.9**	**83.0**	**82.3**	**72.6**	**66.7**	**61.4**	**58.6**	**55.2**
Industrial Processes + F-gas	40.4	38.3	39.1	47.2	37.0	33.2	31.0	29.7	26.4	23.5	21.8	21.1
Agriculture	36.9	37.6	36.7	34.2	31.6	31.2	32.7	28.2	28.0	27.1	27.2	26.4
Waste	17.3	20.0	21.9	21.9	20.4	18.5	18.6	14.6	12.2	10.8	9.6	7.8
TOTAL	**519.9**	**533.9**	**557.3**	**590.9**	**517.8**	**441.8**	**381.2**	**342.0**	**303.3**	**269.3**	**249.3**	**226.3**

Source: ISPRA

Figure 5.14 - WAM – WM GHG emissions (Mt CO2 eq.) difference, year 2030



The more noticeable differences can be seen in the energy industries and in the transport sectors. For transport this outcome is due to the effects of the following planned measures:

- increase of electric vehicle fleet from near zero in 2015 to about 6 million in 2030;
- modal optimization: car sharing, carpooling and shared taxi initiatives for passenger transport;
- infrastructures: extension and modernization of the local railway network;
- alternative fuels: development of LNG in the maritime transport and heavy goods vehicle sector.

Table 5.23 – WAM Scenario's, transport demand for passengers and freights

				2015	2020	2025	2030	2035	2040	2050
WAM	Passenger	Road	billion pass-km	820.2	670.7	752.2	847.5	826.8	806.6	767.9
		Rail	billion pass-km	59.5	31.7	48.5	74.2	76.6	79.0	84.1
		Domestic aviation	Number of Landing and Take-Off cycle (LTO)	380.6	121.0	383.2	434.1	471.5	512.2	567.8
		International aviation	Number of Landing and Take-Off cycle (LTO)	325.4	115.7	366.3	416.3	457.6	497.6	558.2
	Freight	Road	billion ton-km	124.9	144.5	149.8	168.4	169.6	170.3	171.9
		Rail	billion ton-km	20.8	20.5	25.2	30.9	30.7	30.5	30.1
		Domestic navigation (inland waterways and national maritime)	billion ton-km	51.2	44.6	59.8	61.1	61.8	62.6	65.2

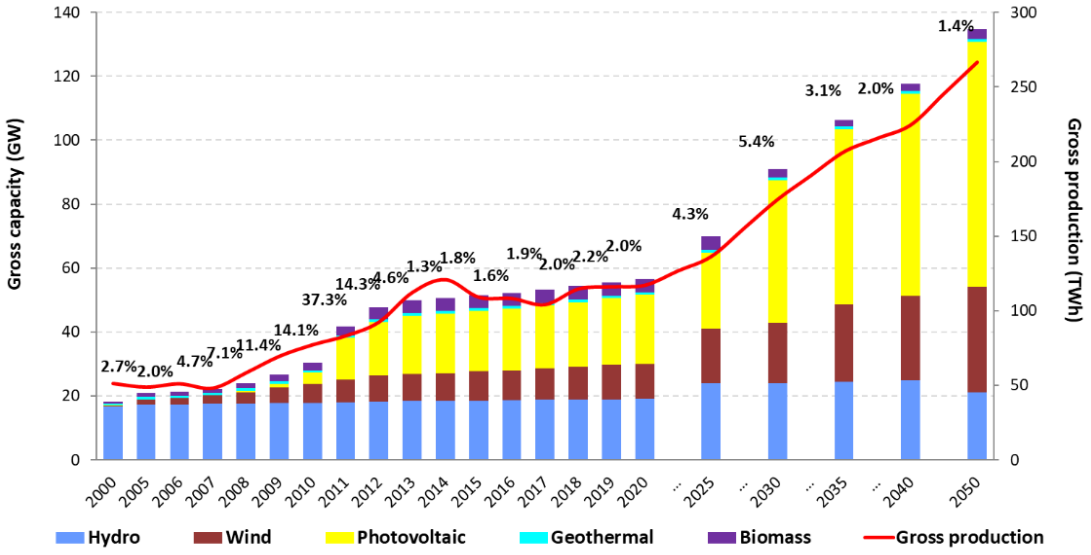
The modal split remains substantially unchanged up to 2020 for passengers, whereas a significant increase in railway / ship goods transport is expected in the future. From 2020 to 2030, an increase of passenger-km in railway and public transport is foreseen.

For the civil sector the emission reduction is due to the increase of the rate of renovation (the deep renovation rate in the WAM scenario in equal to 0.8%) and the electrification of heating systems with a penetration of heat pumps both in the domestic and service sector.

For energy industries the main role is played by power sector with the planned target of 55% share of energy from renewable sources in gross electricity consumption in 2030. Such target would be achieved boosting

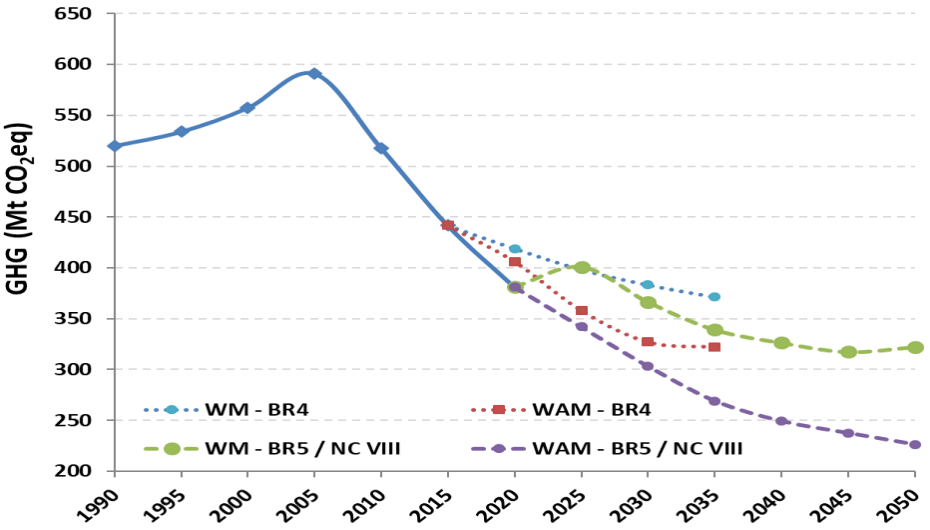
wind and photovoltaic power capacity as showed in Figure 5.15. The increasing trend of new installation will go on after 2030. As for wind capacity a share of off-shore plants is planned too, about 2 GW in 2040. Further description of the effects of PaMs is provided in the chapter 4.

Figure 5.15 – Renewable contribution to gross electricity production in WAM scenario. The percentage represents the annual average power rate.



As can be seen in Figure 5.16 the additional measures allow further reduction of GHG emissions starting from 2025. The WAM projected emissions for 2040 are 23.6% below the level of WM scenario due to a decrease of energy related emissions for all sectors except for the energy use in agriculture. At the moment, no measures are planned for no energy sectors. The total impact of additional measures determines a reduction of GHG emissions of -34.6% in 2040 with reference to 2020 level to be compared with -14.4% for WM scenario.

Figure 5.16 – Actual and projected GHG emissions (Mt CO2 eq.)



Source: ISPRA

5.4 Projection results and emissions targets

Errore. L'origine riferimento non è stata trovata. summarizes the GHG emissions in both WM and WAM scenarios up to 2050. Targets for Effort sharing, covering the period 2013-2030, are also reported (see paragraph 4.4).

Targets up to 2020 have been achieved, while according to the WM scenario there is a sizeable distance from targets set to for the period 2021-2030. At present, final target for 2030 is set to -33% compared to 2005 level as reported in Commission Implementing Decision (EU) 2020/2126 of 16 December 2020. On November 8, 2022, the Council and the European Parliament reached an interim political agreement on stricter emission reduction targets for Member States under the Effort Sharing regulation. Pending formal adoption, the provisional agreement endorses an EU-wide GHG emission reduction target of 40% by 2030 compared to 2005 levels. For Italy, the target corresponds to a 43.7% reduction, to be achieved through a progressive annual reduction set by year-specific maximum allowances from 2021 to 2030. The new allowances have not been defined yet. A LULUCF target for Italy equal to -35.8 $MtCO_2eq$ have also been included in the revision of EU Regulation 841/2018, currently under negotiation.

Table 5.24 – National GHGs emission scenarios and targets (Mt CO2 eq.) under EU legislation

	1990	2005	2020	2025	2030	2035	2040	2050
National emissions without LULUCF WM	519.9	590.9	381.2	400.6	366.3	339.1	326.3	322.1
National emissions without LULUCF WAM				342.0	303.3	269.3	249.3	226.3
Effort Sharing emissions WM			254.0	273.4	240.8	210.5	198.2	188.9
Effort Sharing emissions WAM				231.3	205.2	172.9	154.2	134.3
Effort Sharing targets[1]			291.0	254.6	226.9			
Distance from Effort Sharing targets WM			-37.0	18.8	13.9			
Distance from Effort Sharing targets WAM				-23.3	-21.7			
LULUCF emissions and removals (WM/WAM)[2]	-3.6	-35.2	-32.4	-34.3	-33.9	-30.0	-36.7	-36.7

[1] Target up to 2020 by the Effort Sharing Decisions (ESD) 406/2009/EC, 2030 target set up according to Effort Sharing Regulation (ESR) 2018/842. NF3 emissions are included into the ESR target for the post-2020 period.
[2] No policies are in place for the LULUCF sector; therefore, for the LULUCF sector, WM and WAM scenarios coincide

Source: ISPRA

CTF Table 5: Summary of key variables and assumptions used in the projections analysis

		Historical											Projected	
Key underlying assumptions	Unit	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2025	2030
Population	thousands						60,795.61					60,233.17	59,582.98	58,940.84
GDP	billion € 2016						1,674.13					1,574.23	1,773.00	1,800.06
GVA – industry	billion € 2016						238.77					235.64	258.69	259.79
GVA – construction	billion € 2016						65.36					61.02	69.28	70.53
GVA – tertiary	billion € 2016						1,136.00					1,060.57	1,204.20	1,226.01
GVA – agriculture	billion € 2016						34.57					33.34	33.57	33.52
Carbon price	€ 2016 / t CO2						7.80					25.00	28.00	30.00
Coal prices	€ 2016 / GJ						1.80					1.80	2.70	2.90
Oil prices	€ 2016 / GJ						6.00					6.60	11.80	14.00
Gas prices	€ 2016 / GJ						7.50					3.50	5.70	6.00
WEM Passenger (MMR 2021)	billion pass-km						940.00					702.43	935.47	941.95
WEM Freight (MMR 2021)	billion ton-km						219.00					209.57	252.30	270.80
WAM Passenger (MMR 2021)	billion pass-km						940.00					702.43	921.74	903.35
WAM Freight (MMR 2021)	billion ton-km						219.00					209.57	260.38	262.05
Inhabitants/Household (MMR 2021)							2.35					2.31	2.42	2.40
Dairy cattle	head x 1000						1,826.48					1,776.07	1,770.87	1,765.31
Non-dairy cattle	head x 1000						3,954.86					3,809.73	3,707.63	3,695.99
Sheep	head x 1000						7,148.53					6,955.23	6,920.04	6,768.86
Swine	head x 1000						8,674.79					8,701.14	8,767.17	8,974.92
Poultry	head x 1000						177,391.67					178,156.69	178,891.78	179,726.11
N input from application of synthetic fertilizers	kt N						517.85					489.28	485.61	481.94
N input from application of manure	kt N						455.66					448.20	459.82	466.70
N fixed by N-fixing crops	kt N						165.62					139.09	136.78	134.12
N in crop residues returned to soils	kt N						176.71					151.84	153.30	154.43

CTF Table 6(a): Information on updated greenhouse gas projections (with measures)

		GHG emissions and removals								GHG emission projections - Scenarios	
										With measures	
GHG emissions projections	Unit	Base year (1990)	1990	1995	2000	2005	2010	2015	2019	2020*	2030
Sector											
Energy	kt CO_2 eq	230,829.43	230,829.43	233,337.53	239,427.93	266,936.25	243,210.85	197,073.37	179,767.54	167,608.33	155,273.58
Transport	kt CO_2 eq	102,190.61	102,190.61	114,288.73	123,830.21	128,259.94	115,527.34	106,068.64	105,321.91	85,435.97	95,268.49
Industry/industrial processes	kt CO_2 eq	132,699.77	132,699.77	128,627.12	135,496.44	139,655.44	107,129.08	88,866.83	83,976.88	76,905.18	75,479.63
Agriculture	kt CO_2 eq	36,899.54	36,899.54	37,648.70	36,682.43	34,192.12	31,555.19	31,206.67	31,353.65	32,684.53	27,988.77
Forestry/LULUCF	kt CO_2 eq	-3,647.75	-3,647.75	-23,956.02	-21,113.14	-35,241.38	-41,535.82	-43,092.59	-40,679.76	-32,401.01	-33,890.13
Waste management/waste	kt CO_2 eq	17,288.59	17,288.59	19,974.37	21,853.62	21,864.46	20,381.59	18,543.57	17,932.24	18,613.95	12,240.22
Other Sectors											
Gases											
CO_2 emissions including net CO_2 from LULUCF	kt CO_2 eq	433,760.01	433,760.01	424,689.24	447,965.20	466,084.28	393,801.74	317,478.71	297,856.18	269,189.98	268,412.01
CO_2 emissions excluding net CO_2 from LULUCF	kt CO_2 eq	439,549.84	439,549.84	449,826.11	470,487.19	502,255.44	436,117.44	361,163.18	339,233.21	302,278.60	302,786.69
CH_4 emissions including CH_4 from LULUCF	kt CO_2 eq	50,675.96	50,675.96	51,719.82	52,627.65	49,504.08	47,691.08	44,376.44	42,185.32	43,042.57	36,298.13
CH_4 emissions excluding CH_4 from LULUCF	kt CO_2 eq	49,389.98	49,389.98	51,417.07	51,913.39	49,204.75	47,340.84	44,112.22	41,982.45	42,780.07	36,002.24
N_2O emissions including N_2O from LULUCF	kt CO_2 eq	28,065.01	28,065.01	30,311.14	30,964.66	29,911.01	20,760.69	19,194.28	19,251.12	19,896.24	16,053.31
N_2O emissions excluding N_2O from LULUCF	kt CO_2 eq	27,208.91	27,208.91	29,433.04	30,270.07	29,280.56	20,331.05	18,866.63	18,756.73	19,471.13	15,864.67
HFCs	kt CO_2 eq	444.00	444.00	951.62	2,513.91	7,644.13	12,080.39	15,428.06	16,894.27	15,899.11	9,727.00
PFCs	kt CO_2 eq	2,906.86	2,906.86	1,492.31	1,488.50	1,939.95	1,520.39	1,688.33	1,027.55	538.62	1,560.99
SF_6	kt CO_2 eq	408.35	408.35	679.72	604.31	550.00	393.79	472.25	440.17	264.14	309.11
NF_3	kt CO_2 eq	0.00	0.00	76.57	13.26	33.38	20.17	28.42	17.84	16.31	0.00
Other gases											
Total with LULUCF [f]	kt CO_2 eq	516,260.19	516,260.19	509,920.43	536,177.49	555,666.83	476,268.25	398,666.49	377,672.46	348,846.95	332,360.56
Total without LULUCF	kt CO_2 eq	519,907.94	519,907.94	533,876.45	557,290.63	590,908.21	517,804.06	441,759.07	418,352.22	381,247.96	366,250.70

*Emission inventory data

CTF Table 6(c): Information on updated greenhouse gas projections (with additional measures)

		GHG emissions and removals								GHG emission projections - Scenarios	
										With additional measures	
GHG emissions projections	Unit	Base year (1990)	1990	1995	2000	2005	2010	2015	2019	2020*	2030
Sector											
Energy	kt CO_2 eq	230,829.43	230,829.43	233,337.53	239,427.93	266,936.25	243,210.85	197,073.37	179,767.54	167,608.33	121,141.58
Transport	kt CO_2 eq	102,190.61	102,190.61	114,288.73	123,830.21	128,259.94	115,527.34	106,068.64	105,321.91	85,435.97	71,098.00
Industry/industrial processes	kt CO_2 eq	132,699.77	132,699.77	128,627.12	135,496.44	139,655.44	107,129.08	88,866.83	83,976.88	76,905.18	70,851.24
Agriculture	kt CO_2 eq	36,899.54	36,899.54	37,648.70	36,682.43	34,192.12	31,555.19	31,206.67	31,353.65	32,684.53	27,988.77
Forestry/LULUCF	kt CO_2 eq	-3,647.75	-3,647.75	-23,956.02	-21,113.14	-35,241.38	-41,535.82	-43,092.59	-40,679.76	-32,401.01	-33,890.13
Waste management/waste	kt CO_2 eq	17,288.59	17,288.59	19,974.37	21,853.62	21,864.46	20,381.59	18,543.57	17,932.24	18,613.95	12,240.22
Other Sectors											
Gases											
CO_2 emissions including net CO_2 from LULUCF	kt CO_2 eq	433,760.01	433,760.01	424,689.24	447,965.20	466,084.28	393,801.74	317,478.71	297,856.18	269,189.98	207,476.64
CO_2 emissions excluding net CO_2 from LULUCF	kt CO_2 eq	439,549.84	439,549.84	449,826.11	470,487.19	502,255.44	436,117.44	361,163.18	339,233.21	302,278.60	241,851.32
CH_4 emissions including CH_4 from LULUCF	kt CO_2 eq	50,675.96	50,675.96	51,719.82	52,627.65	49,504.08	47,691.08	44,376.44	42,185.32	43,042.57	34,900.26
CH_4 emissions excluding CH_4 from LULUCF	kt CO_2 eq	49,389.98	49,389.98	51,417.07	51,913.39	49,204.75	47,340.84	44,112.22	41,982.45	42,780.07	34,604.37
N_2O emissions including N_2O from LULUCF	kt CO_2 eq	28,065.01	28,065.01	30,311.14	30,964.66	29,911.01	20,760.69	19,194.28	19,251.12	19,896.24	15,455.67
N_2O emissions excluding N_2O from LULUCF	kt CO_2 eq	27,208.91	27,208.91	29,433.04	30,270.07	29,280.56	20,331.05	18,866.63	18,756.73	19,471.13	15,267.03
HFCs	kt CO_2 eq	444.00	444.00	951.62	2,513.91	7,644.13	12,080.39	15,428.06	16,894.27	15,899.11	9,727.00
PFCs	kt CO_2 eq	2,906.86	2,906.86	1,492.31	1,488.50	1,939.95	1,520.39	1,688.33	1,027.55	538.62	1,560.99
SF_6	kt CO_2 eq	408.35	408.35	679.72	604.31	550.00	393.79	472.25	440.17	264.14	309.11
NF_3	kt CO_2 eq	0.00	0.00	76.57	13.26	33.38	20.17	28.42	17.84	16.31	0.00
Other gases											
Total with LULUCF [f]	kt CO_2 eq	516,260.19	516,260.19	509,920.43	536,177.49	555,666.83	476,268.25	398,666.49	377,672.46	348,846.95	269,429.68
Total without LULUCF	kt CO_2 eq	519,907.94	519,907.94	533,876.45	557,290.63	590,908.21	517,804.06	441,759.07	418,352.22	381,247.96	303,319.82

*Emission inventory data

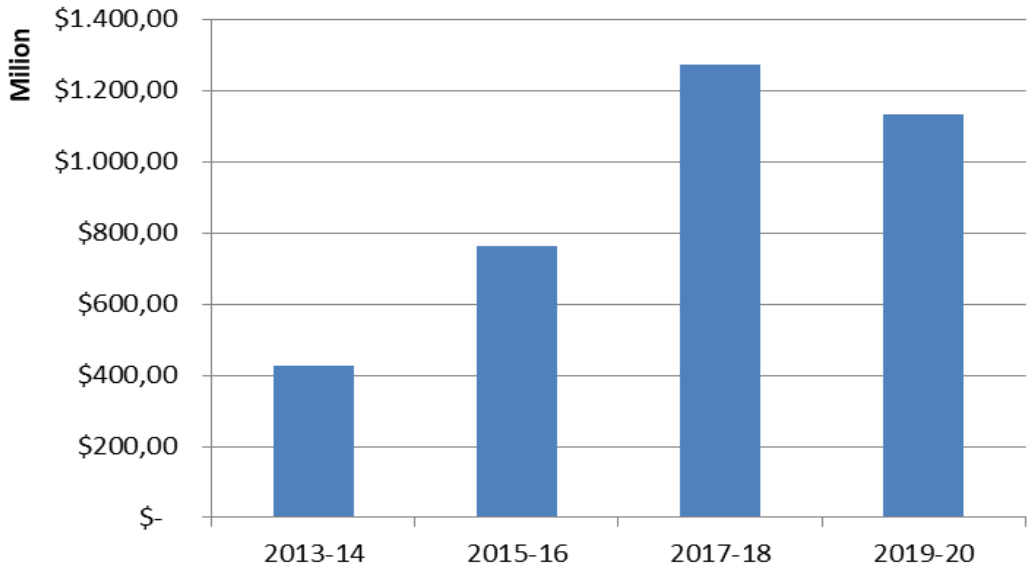
6. Financial resources and transfer of technology, including information under art. 10-11 of Kyoto Protocol[52]

6.1 Provision of New and additional resources

Italy is keeping up efforts to scale-up its international climate finance and will continue to do so. Our total climate finance in the period 2019-2020 increased substantially compared to the levels of 2013-2014 and 2015-2016 biennia, while, with respect to of the previous reporting period 2017-2018, the amount slightly decreased, though maintaining the magnitude of the significant contribution reached in the previous biennium. Reporting methodology employed is the same from 2015, increasing comparability of figures over time[53]. In the current biennium, 2019-2020 Italy reports only public support provided to non-Annex I Parties, with no component related to private finance mobilized through public interventions.

Total public climate specific support that is currently being reported amounts, for the biennium **2019-2020,** to **1.13 billion** US dollars. The total public climate specific support for the period 2013-2020 amounts to **3.6 billion** US dollars.

Figure 6.1 – Italian international climate finance, 2013-2020 (million USD)



Source: Ministry of Environment and Energy Security

Most of the Italian public climate specific support is classified as **Official Development Assistance** (ODA), as defined by the Development Assistance Committee of the Organization for Economic Cooperation and Development (OECD-DAC)[54], through financial instruments of grants and concessional loans. Italy also

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[53] The information included in this chapter is consistent with the requirements contained in the UNFCCC Annex I reporting guidelines on national communications
[54] Official development assistance flows are defined as those flows to countries and territories on the DAC List of ODA Recipients and to multilateral development institutions which are:

i. provided by official agencies, including state and local governments, or by their executive agencies; and
ii. each transaction of which:
    - is administered with the promotion of the economic development and welfare of developing countries as its main objective; and
    - is concessional in character. In DAC statistics, this implies a grant element of at least:
        - 45 per cent in the case of bilateral loans to the official sector of LDCs and other LICs (calculated at a rate of discount of 9 per cent).

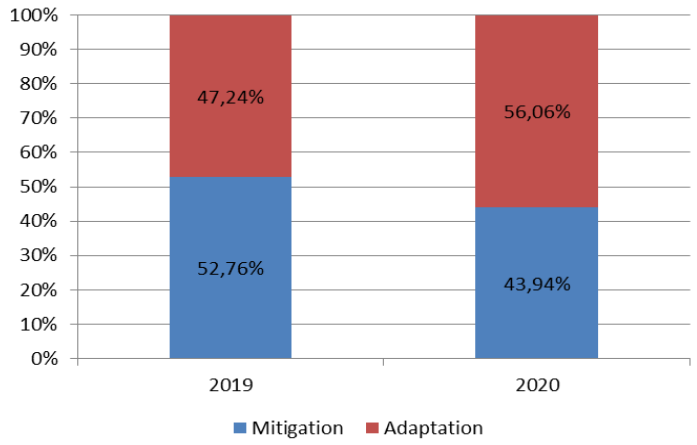
extends climate specific non-export credit Other Official Flows, which however constitutes less than 1% of the total over the period 2017-2020, through financial instruments of loans and equities.

Italy is aware of the importance of grants to support non-Annex I countries in implementing the objectives of the Convention and the Paris Agreement. In 2019-2020, the share of grants over the total public climate finance provided has been 86.3%. However, Italy did not commit to the use of specific instruments in extending its climate finance. In fact, the choice of financial instruments should be tailored to the needs at activity and country level, and depends on a range of factors, such as the climate objective (mitigation and adaptation projects present different needs of grant resources), the level of income of the recipient country, the vulnerability of the beneficiary, the main purpose of the project (mainstreaming climate action in development projects vs climate-specific funding), the robustness of the enabling environment, the level of development of financial markets and ease of access to debt resources.

6.2 Support provided to non-Annex I Parties for mitigation and adaptation activities

In the provision of public financial resources, Italy aims to strike a fair balance between mitigation and adaptation over time. The adaptation component in 2019-2020 represents 52.4% of the total public climate finance addressing mitigation and adaptation, (considering cross-cutting activities equally allocated between the two objectives). Italy thus maintains at least 50/50 allocation between mitigation and adaptation support advocated by several non-Annex I countries, and with a peak in favour of adaptation of 56% in 2020. However, Italy did not commit to a fixed share of allocation of climate finance to either mitigation or adaptation, as it would potentially undermine the necessary consideration of needs and priorities of partner countries. Thus, Italy considers to be a fair balance of funds between mitigation and adaptation the allocation which best responds to the needs and priorities of recipient countries.

Figure 6.2 – Italian public climate finance by climate theme, crosscutting evenly allocated between mitigation and adaptation support, 2019-2020 (percentages)



Source: Ministry of Environment and Energy Security

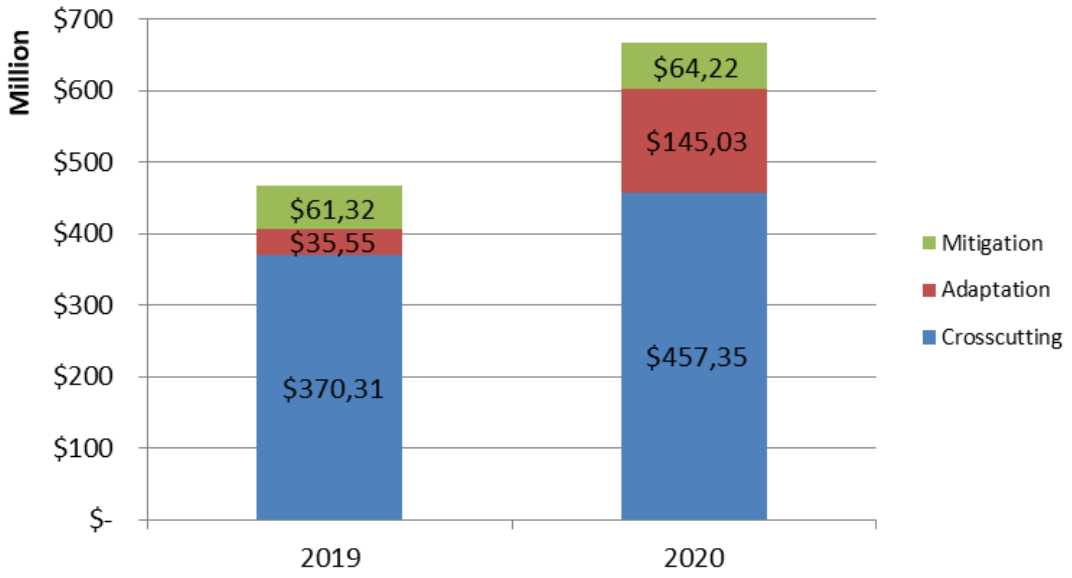
In this context, the Italian development cooperation aims at effectively mainstreaming environmental and climate results into its activities. Since 2015, the Italian Government continues allocating additional financial

- 15 per cent in the case of bilateral loans to the official sector of LMICs (calculated at a rate of discount of 7 per cent).
- 10 per cent in the case of bilateral loans to the official sector of UMICs (calculated at a rate of discount of 6 per cent).
- 10 per cent in the case of loans to multilateral institutions (calculated at a rate of discount of 5 per cent for global institutions and multilateral development banks, and 6 per cent for other organisations, including sub-regional organisations).

Loans whose terms are not consistent with the IMF Debt Limits Policy and/or the World Bank's Non-Concessional Borrowing Policy are not reportable as ODA. From https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/officialdevelopmentassistancedefinitionandcoverage.htm

resources to the international development cooperation. On top of these resources, the commitment of Italy to tackle climate change and related support to developing countries is strongly expressed in Decree nr.30 (DLGS n.30 13/03/2013). In fact, this latter defines the criteria for the allocation of the proceeds from auctioning of greenhouse gas emission allowances. In particular, it is established that at least 50% of those proceeds should be used to reduce greenhouse gas emissions; to adapt to the impacts of climate change; to fund research and development for reducing emissions and promote adaptation; to develop renewable energies and increase energy efficiency; to contribute to the Global Energy Efficiency and Renewable Energy Fund and to the Adaptation Fund; to provide for measures to avoid deforestation and facilitate adaptation in developing countries. The proceeds from auctioning of greenhouse gas emission allowances has been allocated as described above by the Italian Ministry of Environment, starting from 2015. These resources represent additional public climate financial resources to developing country Parties.

Figure 6.3 – Italian public climate finance by climate theme, with crosscutting in evidence, 2019-2020 (million USD)



Source: Ministry of Environment and Energy Security

An integrative approach to environment and development has been adopted in development actions run by the **Ministry of Foreign Affairs and International Cooperation (MFA)**, housing the traditional development cooperation originally focused on social and economic challenges. In this light, efforts have been aimed at environmental compliance, integration, and mainstreaming in all sorts of programmes and financing, resulting in adding a climate change component in more than 300 initiatives. The specific approach by MFA cooperation is therefore characterized by the integration of climate change in the 2030 Development Agenda. Target integration sectors are mainly: agriculture, food security, smart cities, biodiversity conservation, water, energy, off grid power, reforestation and biodiversity in general, land recovery and combating desertification, seas and fishing, disaster risk management, sustainable marketing supply chains, wetlands, waste. Geographical distribution reflects not only mitigation and adaptation, but also the need to address destabilization patterns in areas where environmental fragility overlaps socio-economic and/or governance weakness.

Italy classifies a significant share of its support provided to non-Annex I countries as **cross-cutting**: on average, the 73.8% of international climate finance is categorized as cross-cutting between 2019 and 2020. Italy considers as cross-cutting every activity addressing both mitigation and adaptation, as well as those activities in which mitigation and adaptation components are mainstreamed into projects in a range of sectors, especially agriculture. Italy considers **key to address climate action in synergy with other objectives**: this maximizes impact on the ground, especially when it comes to adaptation actions, which necessarily (and

increasingly) should be embedded into infrastructure, agriculture and other sectors on the ground. Moreover, most of the multilateral inflow contributions (apart from the specific funds such as the Adaptation Fund) are categorized as cross-cutting.

6.3 National approach for tracking of the provision of financial, technological and capacity-building support to non-Annex I Parties

The methodological approach for tracking and reporting of the provision of financial, technological and capacity-building support to non-Annex I Parties, is included in the relevant section 7.3 of the 8th National Communication of Italy to the UNFCCC. There is no change of methodology in the figures reported in the National Communication and in the Biennial Report, also considering that years covered by the two reports overlap. Note that the paragraph in the National Communication pertaining the tracking methodology on private finance mobilized through public intervention is not relevant for the current biennial report, as long as no figures on private finance mobilized through public interventions is reported for the biennium 2019-2020. The reason behind not providing data on private finance mobilized through Italian public interventions for climate action lies in the evolution of the data collection system for these figures. In fact, for the years 2015-2018, the MASE collected ad-hoc data through a pilot study, conducted with the support of the Italian research center Euro-mediterranean Centre on Climate Change (CMCC). From the year 2019 onwards, the collection of these data has been integrated in the OECD CRS data collection system, not only for climate purposes but for all development finance. However, for Italy the systematic collection of these amounts remains challenging for a range of reasons, one of them being the difficulties in creating institutional capacities in centralized and decentralized entities in the application of complex methodologies as those related to estimation of private finance mobilized; thus, no additional data relevant to climate change for 2019-2020 biennum was reported through the OECD CRS system. Italy will put additional effort in improving its data collection and institutional capacity in view of providing a more complete reporting under the future Biennial Transparency Reports.

6.4 Provision of new and additional resources

Provided that there is no common definition or understanding on what is to be considered "new and additional" resources to be provided, Italy generally considers new and additional all resources that are newly committed and/or disbursed through the different channels and from the different sources that constitutes the diverse landscape of climate finance on an annual basis. Thus, all reported figures are considered new and additional for the biennium 2019-2020.

In particular, it is to be reminded that environmental challenges are closely interlinked, and climate change is affected, and directly and indirectly affects, all dimensions of our environment, as well as human and ecosystem health. Italy is well aware of this, and in the provision and mobilization of its resources Italy reflects this reality of mutually supportive and synergistic objectives in the environmental realm.

Italy thus actively pursues mainstreaming and integration into the broader support to developing countries for the 2030 Agenda of the objectives of mitigating and adapting to climate change, as well as reducing and managing risks related to climate change and actions to avert, minimize and address loss and damage from the impacts of climate change.

Also taking into account the priorities and needs expressed by developing countries in the dialogue with Italian providers, Italy would consider detrimental as well as meaningless for the effective implementation of the goals of the Paris Agreement any attempt to discern development and climate finance, especially in the provision and mobilization of support implying the realization of projects on the ground, in particular when it comes to adaptation actions. Italy is aware that what counts is the impact of the actions on the ground, rather than reporting and accounting modalities of climate finance; and impacts can be maximized if resources are pursuing more than one goal, as the 2030 Agenda taught us from 2015 onwards. Italy is undertaking effort to increase levels of development finance, together with improving mainstreaming and integration of climate action in development finance. Considering the above, this ensures no displacement in the provision of climate and development finance, just mutual reinforcements. This vision is what we consider in line with the spirit of the UNFCCC and the Paris Agreement, which also asks all Parties to pursue the consistency of all

finance flows with mitigation and adaptation objectives and the provision of climate finance in the context of meaningful mitigation action and transparency on implementation.

6.5 Italian cooperation for mitigation and adaptation action in non-Annex I countries

During the biennium 2019-20, the former **Italian Ministry of Environment and Energy Security, MASE** has continued its efforts for the pursuit of the objectives of the Paris Agreement and of the 2030 Sustainable Development Agenda that aims the integration of the economic, social, environmental and institutional pillars. Priority interest was given to the African Continent and to the countries most vulnerable to climate change impacts such as the Small Islands Developing States (SIDS).

In particular, the reporting period 2019-2020 can be divided into two distinct phases:

The first one, **from January 2019 to February 2020**, is characterized for the continuation of the international cooperation activities that MASE has launched in the previous years. The main scope was to support mitigation and adaptation initiatives, instrumental for the implementation of countries' Nationally Determined Contributions (NDCs) and National Climate Change Adaptation Strategies (NAPs). The promotion of renewable energy and energy efficiency, as in BR4, remained priority areas of action. Facilitating access to climate finance, providing capacity building, and promoting technology transfer were among the preferred types of activities.

At the same time, MASE gradually shifted its method of operation towards a more systemic approach. It asked for a closer collaboration and coordination with the Italian Ministry of Foreign Affairs and International Cooperation (MAECI) and the local diplomatic representations. The overall aim was to promote a more structured and efficient system of planning, management, and control, enhancing synergies between the interventions carried out by the different Italian institutions. This new model was meant to replace the former grant-logic with a collaboration-between-equals approach, taking into account the strategic implications on the Italian national system, possibilities to activate economies of scale, and the careful evaluation on the concrete, efficient and effective use of public contributions, also in terms of environmental impacts.

in June 2019, the Ministry implemented a change in its tasks and responsibilities, proposing the reorganization of its offices. However, the objectives remained in continuity with the activities launched in the previous years, among which: raising air quality levels and the fight against climate change, focusing on sustainable mobility, renewables/energy efficiency, decarbonization and on the participation of citizens, institutions and enterprises.

The second phase, **from February to December 2020**, is characterized by the arrival of the COVID-19 pandemic and the huge difficulties in carrying out planned activities. The critical global situation, led to the suspension of several activities including capacity building and on-site missions that had to be reprogrammed.

On August 2020, MASE launched a process of renovating its areas of action to sustainable development, which took shape in the Action of Address and Planning for International Environmental Cooperation 2020-2022 adopted. The reference framework for cooperation was expanded, encompassing, besides UNFCCC, also the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD), as well as the 2030 Agenda for Sustainable Development.

This process translated in terms of multilateral cooperation, in strengthening the support of Italy primarily to energy programs, as energy access and access to finance.

This fact led also into a phase of negotiation of new cooperation agreements which were launched during 2020. Indeed, since their standard duration is five years, many MoUs signed in previous years were approaching their expiry date. The new proposed agreements not only expanded the scope of cooperation, but also increased the importance of criteria such as transparency, traceability, efficiency, effectiveness, and ownership of the initiatives promoted, in line with MASE's Actions of Address for the triennium 2020-2022.

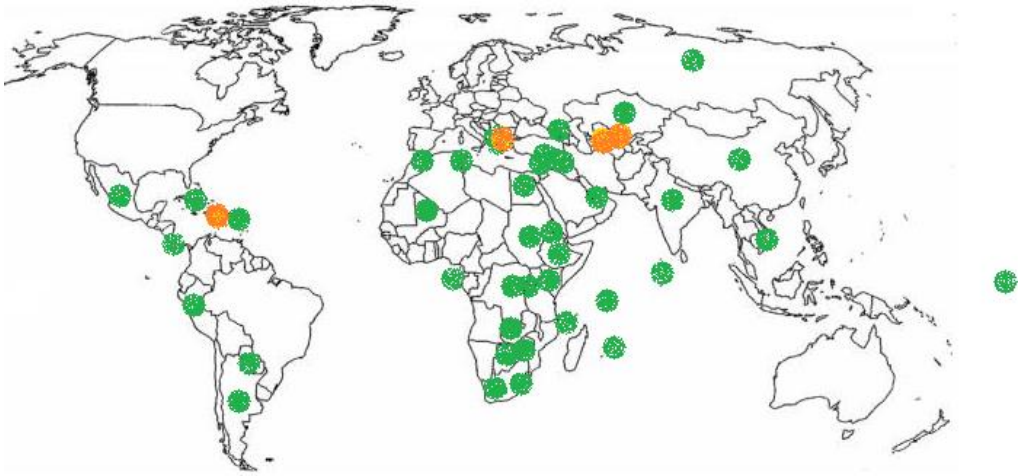
MASE embarked also on a process of structuring the workflow in specific and recognized phases, with specific supporting documents guiding the submission, monitoring, reporting and evaluation of each single initiative to be funded. The objective was to rationalize the work phases, chronologically identified by both parties, so that they were clear and explicit for all the actors; define and share with partnering countries, self-explanatory

templates in order to ensure a standard quality of documents for different project phases and finally, incorporate new and improved procedures in the workflow that regulates relations between MASE and partner countries.

In terms of bilateral cooperation promoted by MASE, it continued increasing them through the signature of **4 new MoUs** that together with the remaining **48 still in force made a total of 52 MoUs**. The scope was to support mitigation and adaptation actions, to facilitate access to climate finance, to provide capacity building and technology transfer. The strategy underlying the identification of priority countries, defined jointly with the Ministry of Foreign Affairs and International Cooperation, the Italian Agency for Cooperation and Cassa Depositi and Prestiti, continued to give priority to the Sub-Saharan Countries (Botswana, Congo DRC, Eswatini, Ethiopia, Djibouti, Lesotho, Kenya, Mali, Rwanda, South Africa, Sudan, Zambia, Union of the Comoros, Sao Tomè and Principe) and a minor quantity of other territories, such as: MENA region (Kazakhstan, Russian Federation, Albania, Montenegro, Georgia, Morocco, Tunisia, Egypt, Palestine, Jordan, Lebanon), Eastern Europe region (Kurdistan -Iraq-, Arab Emirates), Central/Latin America region (Argentina, Costa Rica, Cuba, Mexico, Paraguay, Perù), Asian region (Maldives, Seychelles, Mauritius, India, China, Vietnam) and two Partnerships (PSIDS, CARICOM).

Some priority sectors of cooperation have been confirmed and additional areas have been added, namely: management of extreme events, promotion of renewable energy/energy efficiency, water resources management, protection of biodiversity/reduction of environmental degradation, waste management/circular economy, air quality, forest degradation, land rehabilitation/soil improvement.

Figure 6.4 - Bilateral cooperation agreements in force in 2019-2020



- **Countries with previously signed agreements:** Botswana, Congo DRC, Eswatini, Ethiopia, Djibouti, Lesotho, Kenya, Mali, Rwanda, South Africa, Sudan, Zambia, Argentina, CARICOM, Costa Rica, Cuba, Mexico, Paraguay, Peru, Kazakhstan, Russian Federation, Albania, Montenegro, Georgia, Morocco, Tunisia, Egypt, Palestine, Jordan, Lebanon, Kurdistan (Iraq), United Arab Emirates, Maldives, Union of Comoros, Seychelles, Sao Tome and Principe, Mauritius, PSIDS, India, China, Vietnam
- **Countries with new agreements signed**: Dominican Republic, Uzbekistan, Turkmenistan Serbia.

Source: Ministry of Environment and Energy Security

The 4 new MoUs continued to be governed by the framework documents that regulate the cooperation activities such as: *Rules of Procedures and Guiding Principles.* In addition, a detailed *Medium-Term Work Plan* was elaborated. All projects and programs financed in this context were proposed by the Counterparties and reflected their priorities and objectives, including NDCs and other relevant climate change and national environmental strategies.

Regarding the projects approved within the precedent 48 MoUs signed in the period 2015-2018, they continued their implementation, described in detail in the paragraph titled "*Bilateral cooperation with developing countries".*

This process promoted also the revision of previous agreements between MASE and the United Nations organisations among which, **UNDP Africa Centre for Climate and Sustainable Development (ACSD)**.

The purpose of ACSD is to promote greater effectiveness, synergies and complementarity of ongoing initiatives in Africa related to climate change impacts, environmental degradation on agricultural production, food security, water availability, as well as on stability and economic growth of the region. The objective is also to promote the transition to a new energy model of the African Countries. Since 2018, ACSD has supported MASE in the implementation of cooperation activities in the field of **climate change vulnerability, desertification and biodiversity conservation**. To this regard, ACSD has strengthen the role of Italy in the Sahel region.

As stated in the Programming Document 2017-2019 of MFA, MASE has focused additional interest on specific areas such as: the conservation and sustainable use of the oceans, seas and marine resources (SDG's 14), the protection, restoration and promotion of the terrestrial ecosystem, sustainably manage of forests and fight against desertification/land degradation, loss of biological diversity (SDG 15) and on the renewable energy sector.

Specifically, MASE is currently committed to the implementation of activities through the strengthening of existing partnerships with the Small Pacific Islands, the Caribbean, the Maldives and the Comoros, favoring the involvement of the private sector together with the local communities and sharing experiences acquired at national level. The growing attention to the conservation of the marine ecosystem and its resources is rooted among in the need to implement adaptation strategies for the most vulnerable populations to climate change. In this context, MASE, at the request of the developing Small Islands, is carrying out projects centered on the climate-oceans link, bringing together the activities of rural electrification with the protection of the oceans. The electrification of the fishing centers of the remote islands has made it possible to achieve results of energy security and mitigation and, at the same time, to strengthen small local fishing communities by encouraging sustainable fishing for small scale and supporting the food security of local populations, as well as the conservation of marine and coastal habitats, for an ecological, economic and social resilience.

In the energy sector, Italy boasts some qualifying elements linked to its industrial and entrepreneurial history, to which the experiences of civil society and the scientific and training skills developed by the world of research and universities are added. Based on the heritage of experience and knowledge of actors of partner countries, the Italian Cooperation intends to promote a clear process innovation, centered on three thematic lines with a fourth transversal accompanying element necessary for the sustainability of the interventions:

- appropriate and sustainable technologies for local contexts;
- new models for autonomous income-generating energy activities that can be rooted in territorial contexts (BOP Model), social and cooperative entrepreneurship) grafts on adequate financed mechanisms to support the emerging forms of entrepreneurship;
- support the development of enabling policies and regulatory mechanisms that lead to a modernization of energy governance, interpreting specific needs and local needs;
- strengthen the local level and encourage empowerment through the development of on-site technical and managerial skills and abilities and training at different levels: schools, universities, vocational courses and vocational training courses and entrepreneurial development including institutional and political advocacy.

The geographical areas that have, due to the consolidated and diversified Italian presence, favorable area of application of these lines, are the southern area of the Mediterranean (North Africa), Eastern and Southern Africa (Mozambique and South Africa) and some countries of Central and Western Africa (Congo, Nigeria, Ghana) where the main Italian companies have been operating in the last decade, in synergy with the actors of the civil society and the research communities.

6.6 Delivery mechanisms, allocation channels and programmes

The Italian Climate Fund - In 2020, Italy is in the process of establishing the Italian Climate Fund ((which will be established through Law No. 234 in 2021 with the purpose to finance interventions in favour of mitigation and adaptation action in countries that are recipients of official development assistance identified by the Development Assistance Committee of the Organization for Economic Cooperation and Development (OECD-DAC). The Fund's interventions are carried out, in accordance with the aims and guiding principles of Law No. 125 of August 11, 2014, and the guidelines of Italy's foreign policy. As announced by the Italian government in 2021 at the G20 Summit and COP26, the Fund is endowed with 840 million euros per year for each of the years 2022 to 2026, and aims at mobilizing 1.4 billion per year for 5 years in climate finance to developing countries. Therefore, the Italian Climate Fund will be a significant national public instrument for contributing to the achievement of Italy's commitments on climate finance in favour of developing countries.

6.6.1 Multilateral Cooperation on climate change

MASE' international cooperation activity is also carried out through cooperation agreements with international financial institutions to promote cooperation programs and projects in developing countries. Thanks to the agreements signed with multilateral development banks, the Ministry is committed to strengthening the capacities of countries to identify or prepare climate change resilience projects. The aim is to promote the scale-up of programs and projects in line with bilateral cooperation agreements and to develop frameworks for mobilizing funding, also involving the private sector.

Between 2019 and 2020, the Italian multilateral environmental activities were carried out in several organizations or programmes, such as: the World Bank Group (WB), the Green Climate Fund (GCF), the Global Environment Facility (GEF), the Adaptation Fund (AF), the Food and Agriculture Organisation (FAO), the Initiative Climate Action Transparency (ICAT), REDD+ implementation, the African Development Bank (ADB) and the Inter-American Development Bank. Multilateral International cooperation of MASE has been strengthened through its participation in funds and programs promoting renewable energy, energy efficiency and resilience to climate change. Some examples of this specific multilateral cooperation are from: World Bank and the International Finance Corporation -IFC- (*Clean Energy Access Program Trust Fund, Promoting Africa's Green and Climate Resilient Development Program and the Communication for Climate Change Multidonor Trust Fund* – CCC); from the African Development Bank –ADB- (*Africa Climate Change Fund and Sustainable Energy Fund for Africa*) and from the Interamerican Development Bank –IDB- (*Supporting the Sustainable Energy Facility for the Eastern Caribbean*). For the implementation of the UNFCCC commitments, MASE contributes to the Green Climate Fund, the Adaptation Fund and UNEP, the program inquiry into the design of a sustainable financial system.

A substantial share of climate finance requirements was expected to be met by International Financial Institutions (IFIs) and other multilateral initiatives. At COP21 in Paris, six **multilateral development banks** (African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank and World Bank Group), committed to substantially increase their support for climate change mitigation and adaptation by providing policy, advisory, financial, and technical support in favour of countries politically committed to a transition towards a lower carbon and more climate resilient future.

These six multilateral development banks (MDBs) have set specific and differentiated targets for increasing climate finance and for leveraging finance from other sources. These pledges contribute to the US$100 billion a year commitment by 2020 for climate action in developing countries.

The Ministry of Economy and Finance (MEF) of Italy is the shareholder of the MDBs of which Italy is a member. It is also a donor and provides concessional and grant resources to **multilateral development funds** (African Development Fund, Asian Development Fund, International Development Association, International Fund for Agricultural Development, Special Development Fund) through replenishment cycles. In this capacity, the MEF oversees progress towards those targets in the governing bodies of the institutions. Italy's climate finance figure includes multilateral flows, based on inflows to multilateral institutions, calculated as a percentage of the Italian annual contribution to multilateral development banks and funds weighted for the

share of climate-related outflows and targets. In 2019 and 2020, approximately 35 per cent of the MEF contribution to these institutions may be imputed to climate finance.

In 2019 the Ministry expanded the Clean Energy Access Program Trust Fund with the **International Finance Corporation (IFC)**, approving the following programs:

- *Global energy access through solar market development in off-grid and bad grid sectors*

  It promotes the sustainable growth of the off-grid solar market through the development of the off-grid lighting market in rural, urban and peri-urban areas that do not have access to electricity.

- *Off-grid energy PPP program in Sub-Saharan Africa*

  It supports public-private partnerships in sub-Saharan Africa in order to create favorable environments for private investment in renewable energy and to foster private sector participation in the design and supply of off-grid and mini-grid renewable energy.

- *Renewable Energy Market development in Africa*

  It promotes the renewable energy market and supports companies and governments to facilitate investments in clean technologies.

MASE also continued its support to the Communication for Climate Change Multi-Donor Trust Fund (MDTF), with the aim of promoting communication and awareness-raising activities in favor of sustainable development. Thanks to this support, the Connect4Climate (C4C) network was launched in 2013 and a global platform was created to promote climate change awareness. Many successful activities were completed under each of the three components of the MDTF: Support to Operations, Research and Capacity Building and Advocacy and Fund Leveraging.

From running global youth competitions, to building a knowledge network of more than 400 partners, to supporting World Bank operations across the African continent, to organizing highprofile and mass public outreach events C4C has grown to be an influential program advocating for climate action to end poverty and promoting climate solutions through diverse and creative means to help promote shared prosperity. ety groups, international organizations, Enterprises, media, universities, etc.).

In the period 2019-2020, the Ministry also pursued its support to the **World Bank Group (WB)** through the Program "Promoting Africa's Green and Climate Resilient Development (AGREED)**"**, to help African countries to prepare and seek financing for programs and projects contributing to the implementation of the National Determined Contributions (NDCs). The governments of the beneficiary countries are supported in the identification of possible funding and in the preparation of projects and programs through technical assistance and capacity building activities.

At the same time, MASE expanded its geographical areas of collaboration beyond Africa to the whole world and added in Africa, a component on the promotion of renewable energy.

Through the energy component, the Ministry promoted the spread of renewable energy, energy efficiency and the participation of the private sector. Priority has been given to technical assistance in support of investments and activities related to renewable energy on and off grid, energy efficiency, storage systems and integration of non-programmable renewable energy (VRE).

In particular, the following projects in the African countries have been approved:

• *AGREED AFRICA GIS*: the aim is the collection of geospatial data for the identification of areas suitable for the development of mini grids, with case studies in Lesotho and Botswana.

• Facilitating Private Sector Investments in Utility-Scale Renewable Energy in Ethiopia: the scope is to facilitate private sector investments in large-scale renewable energy in Ethiopia through technical assistance on renewable energy transactions and political dialogue to improve the investment framework.

• Renewable Energy Development in Kenya: the aim is to help Kenya develop renewable energy resources to implement the strategy of universal access to high quality and affordable electricity. Legal, regulatory and institutional framework, solar and wind strategy analysis have been supported.

• Scaling Up Renewable Energy and Closing the Access Gap in eSwatini: the aim is to support the mobilization of private sector financing for the development of renewable energy production.

• Technical assistance for green recovery of the electricity sector in Sudan: support the transition of the Sudanese energy sector towards a sustainable path from a financial and environmental point of view.

• Scale-up private-sector led off-grid electrification in Ethiopia: feasibility study on the development of off-grid electrification.

• Zanzibar Readiness for Renewable Energy and Battery Storage: support the design, preparation and implementation of the first renewable energy power plant in Zanzibar through private sector participation.

• Support to Biodiversity management to increase returns from Landscape Investments in Ethiopia: feasibility study on the development of the value chain for local crops, in particular on Durum wheat and to promote green corridors.

• Integrated Coastal Zone Management in Morocco. Feasibility study on integrated coastal zone management for the Rabat - Sale Kenitra region.

• Enhancing climate resilience through Nature-Based Solutions in Rwanda: feasibility study on the management of natural resources (wetlands) of the city of Kigali and on the promotion of nature tourism.

The **Green Climate Fund (GCF)** is the global fund created to support the efforts of developing countries to respond to the challenge of climate change. It seeks to promote a paradigm shift to low-emission and climate-resilient development, taking into account the needs of nations that are particularly vulnerable to climate change impacts. By the end of 2020 the Fund's portfolio consisted of 159 public and private sector funding proposals, which request a total GCF funding of USD 7.3 billion to support projects and programmes totaling USD 23.4 billion, when taking co-financing into account.

The GCF approvals demonstrate how the Fund aims to balance projects approvals between mitigation and adaptation as well as between different regions at the same time taking into account the most vulnerable developing countries, including LDCs, SIDS and African States.

Italy is a strong supporter of the Green Climate Fund (GCF), as the key multilateral vehicle for helping developing countries adapt to climate change and follow low-carbon development pathways. In 2014, at the GCF donor conference, Italy pledged to contribute to the first capitalization of the Fund with 250 million euro, which have been disbursed by the Italian Ministry for the Environment through the period 2015-2020. Additionally, at the High-Level Pledging Conference of the Green Climate Fund's First Replenishment (GCF-1) convened on 24 and 25 October 2019 in Paris, Italy pledged further 300 million euro to contribute to the GCF resource mobilization for the 2020-2023 period, which are disbursed by MASE in line with the provision of the 2019 Budget Law n. 196/2019 (art. 1, para 96).

The Ministry of Economy and Finance (MEF) of Italy is the member of, and the financial contributor to, the **Global Environment Facility (GEF)**. The GEF was established in 1991 and provides funding to developing countries and countries with economies in transition. The funding comes in the form of grants and concessional funding and covers the incremental or additional costs associated with transforming a project with national benefits into one with global environmental benefits (GEBs). In fiscal year 2020 (July 2019-June 2020), GEF's net commitments increased to USD 1.2 billion. The GEF project portfolio has reached USD 4.4 billion, with 890 projects. The distribution of projects highlighted an emphasis on biodiversity and climate change. Over 80% of the projects involved countries in Africa, Asia, Latin America and the Caribbean. Separately, Least Developed Countries (LDCs) and Small Island Developing States (SIDS) account for 15% and 6% of the portfolio respectively.

Financial contributions to GEF are replenished every four years by donor countries (GEF Replenishment). Italy, via the Ministry of Economy and Finance (MEF) is a donor of the GEF Trust Fund since its establishment. MEF contributed to the Sixth and the Seventh Replenishment with the amount of 92 million euros for each replenishment, representing a share of around 3.3% of total pledges. GEF-6 covers the period July 2014 – June 2018 and GEF-7 covers the period July 2018 – June 2022.

Since 2015, Italy is a contributor to the **Adaptation Fund (AF)** through MASE. The AF provides finance to projects that help vulnerable communities in developing countries to adapt and build resilience to the effects of climate change while providing an innovative direct access modality that allows accredited national institutions in developing countries to access financing and manage projects directly. Since 2015, Italy provided contributions totaling 51 million euro. These contributions helped the Fund to assist vulnerable communities' efforts in developing countries to adapt to climate change and surpassing its fundraising target of USD 90 million per year both in 2017 and 2018. Furthermore, MASE is working in synergy with the Adaptation Fund Secretariat and National Implementing Agencies in order to scale up AF's projects through its bilateral cooperation programmes and activities. Italy is the only one contributor Party who has started the scale up AF's project. In the context of the bilateral cooperation with the Ministry of Environment, Forest and Climate Change of Ethiopia, in fact, MASE provides USD 4.2 million of funding to support the implementation of a 3 years' project called "Climate Smart Integrated Rural Development", as a complementary initiative that builds on the project financed by the Adaptation Fund in 2017 in Ethiopia. In particular, its main purpose is to manage the risks from recurring droughts, floods, both from current risks and under future climate change – through an integrated water, agriculture and natural resource management approach. This approach is complemented with a climate resilient livelihoods diversification programme. The project is targeted in two climate sensitive and vulnerable pastoralist areas of Ethiopia such as Afar and Somali regions.

The Ministry and **Cassa Depositi e Prestiti**, the Italian development bank, established a common platform called "Climate & Sustainable Development Italian Platform", with the aim of pooling the resources of both institutions to support environmental cooperation projects and initiatives.

In the reporting period, MASE continued supporting the **FAO International Alliance on Climate-Smart Agriculture (IACSA Project)** that contributes to SDG 15.3 by strengthening the resilience of local communities to climate change and desertification through mechanisms that incentivise investment in the rehabilitation of degraded land in some regions of the Sahel.

In 2019, the initiative developed a series of knowledge products at the global level and in the country pilot projects. Furthermore, it organized events, teleconferences and webinars and produced videos and training courses, including seven e-learning courses, in collaboration with FAO's e-learning academy. For the generation of the knowledge products, IACSA included many partners from within and outside FAO. Through successfully supporting the creation and operations of GACSA and knowledge management on CSA, the IACSA project has been of crucial importance for international coordination and collaboration on CSA.

The **EU–Central Asia Platform on Environment and Water Cooperation (WGECC),** established in 2009, with Italy as the lead country, is the reference framework for the cooperation between EU and Central Asian countries in the field of environment, water, and climate change. The Platform is a framework for implementing the EU–CA Cooperation on water and environment, based on the EU Strategy for Central Asia agreed with the CA countries. The priorities for the Platform were first agreed upon at the third EU–Central Asia High-Level Conference in Rome in 2009 and subsequently confirmed at the High-Level Conferences in Bishkek (2013), Milan (2015), and Tashkent (2019).

In May 2019, the European Commission and the High Representative of the Union for Foreign Affairs and Security Policy issued the Joint Communication on a new EU Strategy on Central Asia entitled "The EU and Central Asia: New Opportunities for a stronger partnership". Adopted by the Council of the European Union on 17 June 2019, the Strategy defines three interconnected priorities on Resilience, Prosperity and Working together and has specific objectives on "Enhancing Environmental, Climate and Water Resilience".

The **International Alliance on Climate-Smart Agriculture Project (IACSA)** has been implemented by FAO since April 2014 and is funded by MASE. The project contributes to SDG 15.3 by strengthening the resilience of local communities to climate change and desertification through mechanisms that incentivise investment in the rehabilitation of degraded land in some regions of the Sahel. The contribution aims to support the dialogue on "market mechanisms" and Article 6 development activities under the UNFCCC. Also, it contributes explicitly to the GACSA (Global Alliance on Climate Smart Agriculture) and its enlargement, supporting the Knowledge Action Group and the GACSA Facilitation Unit (Secretariat).

In 2019-2020 IACSA focused on the promotion of strategic partnerships, pilot projects and climate-smart agriculture initiatives in cooperation with several developing countries. In particular pre-feasibility studies for

Climate Smart Agriculture project initiatives in Botswana and Ecuador were developed. To this regard, on-site visits were done in these countries, with a stop in 2020 due to the worldwide pandemic. In fact, the implementation of the second phase of the project was much longer than planned, which was a matter of adaptive management to changes in project scope and the impact of the COVID pandemic in 2020.

Italy continued supporting the **Initiative Climate Action Transparency (ICAT),** the aim of which is working with developing countries to strengthen capacity to assess climate actions (in the context of their NDC's) and report their progress in line with the Paris Agreement enhanced transparency framework, based on individual country needs.

In 2020-2022, despite the challenges posed by the COVID-19 pandemic, the implementation of the country' work plan has continued in most of the countries, and most of the counterparts showed commitment to achieving the project outcomes. Work plans were finalized, and work was initiated for the first phase in nine countries: Antigua & Barbuda, Botswana, Chad, Chile, Cuba, Fiji, Liberia, Nigeria, and Zimbabwe. In the countries where the work plans and budgets were already completed, implementation progressed. Introductory and scoping discussions with Eswatini on a work plan advanced. In two countries, the Dominican Republic and Ghana, work plans and budgets were developed and agreed upon for the second phase of deepened engagement and work initiated. Another work plan for a second phase was developed for India.

The adaptation work covers the inclusion and expansion of support to adaptation-focused transparency arrangements under the Paris Agreement. Work under the second phase was a continuation of the activities and the results achieved in the initial phase of adaptation, which aimed at scoping the relevant sectors, focus areas, and cross-cutting issues based on the specific needs of Bangladesh, Dominican Republic, India, Kenya and South Africa. ICAT collaborated with five implementing partners with recognized expertise in climate action transparency: Greenhouse Gas Management Institute (GHGMI), the Italian Environmental Protection and Research Institute (ISPRA), New Climate Institute (NCI), World Resources Institute (WRI) and the UNEP-DTU Partnership (UDP).

In 2021, MASE has sent the second financial contribution which amounts to 5 million Euro for the years 2021-2026 to the ICAT trust fund, managed by UNOPS, to contribute to the work plan activities , including the assistance to beneficiary countries, the development and application of crosscutting and sectorial methodologies' toolbox , the communication strategy and others. ISPRA, the technical branch of MASE, is involved as ICAT implementing partner both in the definition of the methodological toolbox and in the in-country capacity building activities that are carried on.

CBIT aims to assist developing countries in meeting the enhanced requirements for transparency of action and support under the Paris Agreement and it supports national institutions to plan, coordinate, implement and monitor policies, strategies and programs to enhance transparency and report on progress made in implementing Nationally Determined Contributions (NDCs). Moreover, CBIT provides access to tools and applications to facilitate the use of improved methodologies and guidelines, as well as country-specific training. In addition, it facilitates activities such as peer exchange programs to help share experiences and expertise between countries.

In the framework of the **Global Bioenergy Partnership (GBEP),** was developed in 2019-2020 the *Implementation Guide for the Global Bioenergy Partnership Sustainability Indicators for Bioenergy*, to complement and enhance the first edition of *the Global Indicators for Bioenergy*. The main activities that were decided for the implementation were:

- elaboration of a tool to facilitate the collection of data for the measurement of sustainability indicators on bioenergy production;
- organization of the Eighth Bioenergy Week, to be held in Addis Ababa, Ethiopia, in collaboration with the African Union and the United Nations Economic Commission for Africa (postponed to 2021 due to COVID-19);
- organization of the Ninth Bioenergy Week to be held in Paraguay;
- collection of good practices on the link between the use of woody biomass and the use of residues for soil restoration;
- collection of good practices on second-generation fuels;
- organization of seminars on biogas;

- organization of events to strengthen the role of bioenergy in the context of the bioeconomy;
- activities dedicated to young people such as the "GBEP Youth Award" and the development of teaching material in bioenergy material for students of various ages.

In April 2019, MASE agreed to provide a contribution to **UNCCD** for the realization of the Project "Creating lands of opportunity: Transforming livelihoods through landscape restoration in the Sahel". The initiative aims at strengthening the resilience of communities in Burkina Faso, Ghana and Niger to climate change and desertification through the rehabilitation of degraded lands, while creating income-generating activities. Among the expected results, there is the restoration of estimated 20.000 hectares of degraded lands and 300.000 beneficiaries from the social impacts of new sustainable sources of income.

On 1 April 2019, MASE also signed an Agreement for a Trust Fund with the **UN Organization for Industrial Development (UNIDO**), aimed at realizing the Project "Fostering international partnerships between companies and/or institutions operating in the energy and environment sectors". The project aims at supporting the commercialization and scale-up of sustainable energy and environmental technologies and projects in Small and Medium-sized Enterprises (SMEs) in 7 partner countries in Africa, Asia and Latin America, through capacity-building and facilitation of access to finance. It operates through two main interrelated approaches. On the one side, UNIDO provides technical assistance to SMEs to identify and develop high-impact innovations and investment projects in SMEs in the sustainable energy and environment sector, on the other side, it facilitates investment, commercialization and trade opportunities through international partnerships and collaboration.The following paragraphs provide a description of the most relevant initiatives foreseen by the bilateral cooperation in the biennial 2019-20 as a result of the signature of 4 new MoU's and the implementation of project proposals developed within the 48 MoU's previously signed.

In order to provide a framework of cooperation and facilitate and strengthen collaboration in areas of climate change, forestry and forest-related sectors such as agriculture and energy, with the ultimate goal of enhancing, strengthening and accelerating sustainable forest management, in July 2017, MASE signed a new agreement with UNDP regarding the **REDD+ implementation** and **REDD+ results**. The specific areas of cooperation are Ecuador, Ghana and Myanmar and activities are the following:

- Foster a close collaboration to support the countries in engaging in REDD+ under the UNFCCC, in enhancing capacities for the implementation of REDD+ and related safeguards, in addressing the drivers of deforestation and forest degradation, in creating and enhancing institutional capacity in the forestry, environment sector and green growth based on technical cooperation, training, research / knowledge and technological support and transfer;
- Support the countries to submit REDD+ projects and programmes to the GCF, as well as their implementation, through the provision of skills, expert knowledge transfer, best practices, political support and international recognition for efforts made and results achieved;
- Support the countries in coordinating the negotiations and implementation of public-private partnerships and agreements with international corporations involved in commodities supply chains and forest-related sectors.

6.6.2 Regional cooperation

Following the signature of the Paris Agreement, Italy is working to fight climate change by supporting the **Sustainable Energy Fund for Africa (SEFA)** and the **African Climate Change Fund (ACCF)**, hosted and managed by the **African Development Bank**.

In late December 2015, MASE joined the Sustainable Energy Fund for Africa (SEFA) with a total contribution of 7.4 million Euro to support small and medium-scale private sector projects in the renewable energy and energy efficiency sectors in Africa. At the end of 2019 SEFA was transformed into a larger and more catalytic platform to accelerate the clean energy transition in Africa. SEFA's overarching objective is to contribute to universal access to affordable, reliable, sustainable, and modern energy services for all in Africa, in line with the United Nations' Sustainable Development Goal 7 (SDG 7).

SEFA's toolbox includes both technical assistance grants and concessional finance instruments for projects across three focal areas:

- Green Baseload for increasing the penetration of renewable energy in power systems, with a strong focus on power system stability, and delivering alternatives to fossil fuel baseload generation options;
- Green Mini-Grids for accelerating electricity access for underserved populations with renewable energy-based mini-grid systems;
- Energy Efficiency for improving the efficiency of energy services delivered through a variety of technologies and business models, also including clean cooking and pico-solar technologies.

In 2020, and for the first time in SEFA's almost decade-long existence, over USD 50 million was approved for projects, all of them with a huge potential to deliver impact.

The first batch of concessional investments was deployed to the COVID-19 Off-Grid Recovery Platform, a blended finance initiative to avail relief and recovery capital to energy access businesses, Spark+ Clean Cooking Fund, the first Africa-focused investment fund to support the clean cooking sector, and the Africa Renewable Energy Fund II, a private equity initiative developing and investing in baseload solutions involving hybrid projects (hydro/solar) as well as battery.

On the technical assistance front, grants were approved for large multi-country TA initiatives such as the Africa Mini-Grid Acceleration Programme and the Desert-to-Power G5 Sahel TA Programme, and for country-specific programmes such as the Renewable Energy Programme in Algeria and the Morocco SuperESCO development.

In 2017, MASE made a contribution of 4.7 million Euro to support the **Africa Climate Change Fund (ACCF)**. The Italian commitment has triggered the conversion of the ACCF to a multi-donor trust fund and allowed to launch the second call for proposals to strengthen access to climate finance and pilot a variety of innovative adaptation approaches in line with African countries' nationally determined contributions (NDCs) and national adaptation plans (NAPs). The Fund's pipeline will expand its operations to respond to evolving climate finance needs on the continent, including into areas of opportunity including engaging private sector in financing adaptation, scaling up local and municipal climate finance, empowering women and youth entrepreneurs in low-carbon sectors, and piloting innovations in climate-smart agriculture.

In 2020, the Fund successfully mobilized additional resources of about $9,274 million. This brought the total amount of resources mobilized for the Fund to $24.64 million. In March 2020, the ACCF launched five of the seven projects approved in 2019 from the second call for proposals.

On a multilateral level, Italy is the European Leading Country for the **EU-Central Asian Platform on Environment and Water Cooperation**, for the cooperation between EU and Central Asian countries in the field of environment, water, and climate change.

The Platform is a framework for implementing the EU–CA Cooperation on water and environment, based on the EU Strategy for Central Asia agreed with the CA countries. The priorities for the Platform were first agreed upon at the third EU–Central Asia High-Level Conference in Rome in 2009 and subsequently confirmed at the High-Level Conferences in Bishkek (2013), Milan (2015), and Tashkent (2019).

Between 2019 and 2020, Italy continued to assure with in-kind support for the steering of the **EU-Central Asia Working Group on Environment and Climate Change (WGECC)**. Since February 2020, the WGECC has been co-chaired by the European Commission and MASE. The Working Group saw the participation of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.

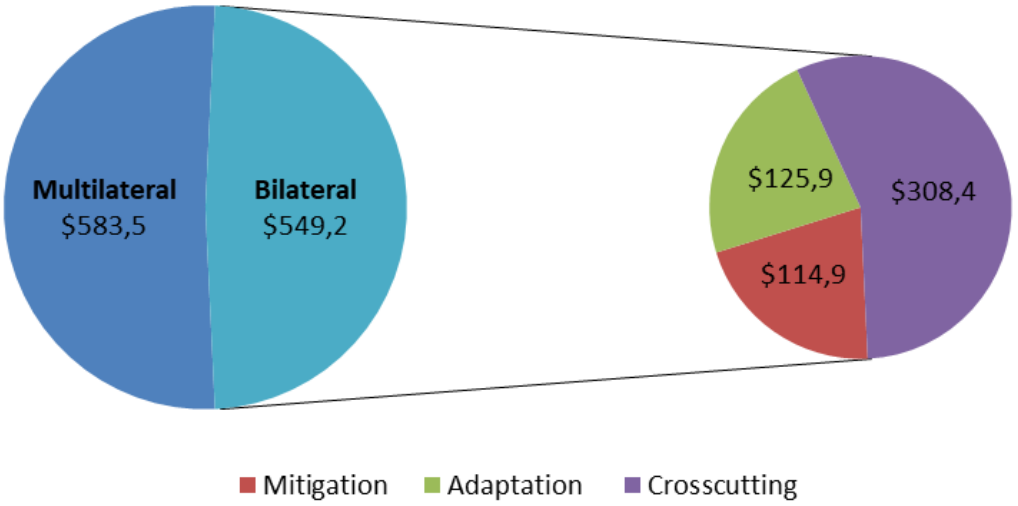
6.6.3 Bilateral cooperation with developing countries

Inspired by the objectives of the Paris Agreement and its long-term goals as well as the Sustainable Development Goals, Italy is strongly engaged to continue the activities mentioned in the Forth Biennial Report (BR4). Taking into account the initiatives undertaken in the previous years and the new commitments under the UNFCCC, CBD and UNFCCD the bilateral cooperation stretches across all continents and regions: **Africa, Mediterranean region, Small Islands Developing States, Asia, Central and Eastern European and**

Central and Latin America. Particular focus has been given to the countries that are most vulnerable to the effects of climate change such as **the African countries and the Small Islands Developing States**.

Italy cooperates through projects and activities both specifically addressed to combat climate change and mainstreaming climate, biodiversity and land degradation into those activities. In terms of figures, climate-related bilateral cooperation with developing countries[55] in the last biennium 2019-2020 amounts to **549,2 million USD**[56].

Figure 6.5 – Italian public climate finance by channel of delivery and climate theme, 2019-20 (million USD)



Source: Ministry of Environment and Energy Security

It is worth mentioning the MASE will strengthen the cooperation activities with the **Sahel Countries.** The MASE' cooperation policy in the Sahel, to be drawn up in partnership with the countries concerned, will be geared towards tackling the climate change effects, the root causes of the extreme poverty and towards creating the grass-root conditions for economic opportunity and human development to flourish. In this connection, MASE agreed to provide a contribution to UNCCD for the realization of an initiative that aims at strengthening the resilience of communities in the **Sahel Region** (Burkina Faso, Ghana and Niger) to climate change and desertification through the rehabilitation of degraded lands, while creating income-generating activities.

The following paragraphs provide a description of the most relevant initiatives foreseen by the bilateral cooperation in the biennial 2019-20 as a result of the signature of 4 new MoU's and the implementation of project proposals developed within the 48 MoU's previously signed. The activities reflect the needs and priorities of developing countries' Counterparties included the Nationally Determined Contributions (NDCs) and other relevant climate change and development strategies and enhanced the country ownership.

Cooperation in the Asian region

MASE started the Sino-Italian Cooperation Program for Environmental Protection (SICP) with the People's Republic of China, nearly twenty years ago. Over the years, SICP has involved numerous Chinese central and local government entities. In 2018 the climate policy responsibility was shifted to the newly Ministry of Ecology and Environment (MEE) that assumed responsibility for leading and coordinating China's international

[55] Definition according to the DAC list of ODA recipients, 2018.
[56] All figures exclude private grants.

climate negotiations efforts and coordinating domestic climate policy among ministries. In the framework of SICP, over 200 project lines have been carried out for the environmental monitoring and management. Among these, 70 were related to climate change activities and objectives of the Paris Agreement and the UNFCCC, while the rest were useful to create an enabling environment for mitigation and adaptation measures. Project formulation has been entrusted to a permanent Sino-Italian task force made up of experts from MASE, Chinese Ministries and Agencies, Scientific Institutions, Italian and Chinese Universities. This task force constitutes the Program Management Offices (PMO) based in Beijing and Shanghai.

Of particular relevance to the purpose of this report, is the Sino-Italian Advanced Training Program, a capacity-building program for Chinese policy makers technicians, academics, young ans professionals. In the timeframe between 2019 and 2020, the Sino Italian Capacity Building for environmental protection (SICAB) advanced training course took place, providing an in-depth overview of climate change, the global and European policy framework devised to tackle climate change and the main scientific currently available instruments and methods for the production of high-resolution climate scenarios.

During the reference period, over 300 participants from all the provinces of China took part in the training program, with a total of 14 courses (in Italy and China). Table 1 summarizes the contents of the of the trainings/courses, the Recipient institutions and date/place where they were carried out.

Table 6.1 - Recipient institutions of the trainings and content of training courses of the Sino Italian Capacity Building for environmental protection (SICAB) program, 2019

Recipient Institution	Content of the training	Period	Place
Beijing Municipality Bureau of Environment and Ecology	Environmental management and climate change	2019	Italy
Shanghai Municipality – Bureau of Environment and Ecology	Soil and groundwater pollution and climate change	2019	Italy
Ministry of Environment and Ecology (DCC)	Climate Scenarios, Adaptation, and Mitigation Policies	2019	China
Minisitry of Environment and Ecology (FECO)	Soil and groundwater pollution and control	2019	China
Ministry of Industry and Information technology	Industrial Energy Efficiency Capacity Building and Experiences Exchanges	2019	China
Ministry of Environment and Ecology	Nuclear waste management	2019	Italy
Ministry of Environment and Ecology (DCC)	Climate scenarios, adaption and mitigation policies	2019	Italy
Ministry of Environment and Ecology (FECO)	Environmental protection and sustainable development in soil and groundwater pollution prevention and control	2019	Italy
Ministry of Environment and Ecology	Nuclear Waste Management	2019	China
Beijing Municipality – Bureau of Environment and Ecology	Environmental Management and Climate Change	2019	China

Recipient Institution	Content of the training	Period	Place
Shanghai Municipality – Bureau of Environment and Ecology	Smart city and sustainable mobility	2019	China
Ministry of Science and Technology	Science, technology, innovation and green growth	2019	China
Ministry of Industry and Information Technology	Energy Efficiency in Industry	2019	Italy
Ministry of Science and Technology	Science, Technology, Innovation and Green Growth	2019	Italy

Source: Ministry of Environment and Energy Security

Socialist Republic of Viet Nam

Under the framework of the MoU with the Vietnamese Ministry of Natural Resources and Environment, the Project "*Set up and implementation Geo-Information System for Climate Change Vulnerability, Risk Assessment and Environment monitoring for Vietnam*" was approved in September 2020 with a total Budget of €3,500,000. The objective of the initiative is to implement a Geo-Information System in Viet Nam for the purpose of monitoring and assess the impacts of and vulnerability to Climate Change in Viet Nam based on remote sensing technology. The initiative includes the development of three case studies: "Saltwater intrusion assessment", "Wetland ecological system monitoring" and "Subsidence monitoring in urbanized areas".

Cooperation in the Middle East and North Africa region

In **MENA Region**, MASE' cooperation has strengthened its effort to address all 2030 Agenda priority sectors relating to climate change. MASE' cooperation in the region is coherent with the national and international environmental objectives. Projects are mainly related to support Partners in implementing their NDC's by operating on energy, natural resources management, green jobs, climate smart agriculture, biodiversity. Capacity building, institutional building and technology transfer are the three pillars of MASE' action in the Region.

Egypt

MASE signed on December 2015 a MoU with the Egyptian Ministry of the Environment with the aim to promote sustainable development and protecting the environment.

Lebanon

In the framework of the MoU signed with the Lebanese Center for Energy Conservation (LCEC) two projects were approved:

- Heat Pump project Phase 1. This project provides support to the Lebanese government in addressing the climate change mitigation challenges presented in the INDC under the UNFCCC by introducing "heat pump" technologies in the heating, domestic hot water production and cooling sectors (for residential and tertiary applications mainly) through know-how and technology transfer. This support will include capacity building and technology transfer activities.

  Duration: December 2016 - December 2020

  Total Budget: €2,550,831

  MASE contribution: €1,976,766

- Maximizing energy savings from energy efficient home appliances. The project emerges in response to the latest NEEAP (National Energy Efficiency Action Plan 2016-2020) that set a target of 1.5 TWh

of savings to be achieved by 2020. This includes 149 GWh of savings in buildings, of which 55.6 GWh from energy efficient equipment. In order to achieve these savings, the LCEC has defined various energy efficiency initiatives to be implemented for the period 2016- 2020. Among them, there is the use of energy efficient equipment. The project consists of the distribution of rebates to end-users directly or through local retailer shops to incentivize the purchase of highly energy-efficient equipment. The new financing mechanism targets directly end-users and increases the environmental awareness of the wider public.

Duration: August 2018- August 2021

Total Budget: €1,799,375

MASE contribution: €1,619,375

Central Bank of Lebanon

On 12 December 2016, MASE signed a MoU with Central Bank of Lebanon on Sustainable Development Finance for a value of 5 million euros in order to promote a financial mechanism to facilitate, through the Lebanese commercial banking system, an easy financing line for projects in the field of renewable energies and energy saving which could also attract Italian SME's with competencies in such field, fostering the involvement of the private sector in general.

Morocco

On 2016 MASE and the Ministry delegate in charge of Environment of the Kingdom of Morocco - SEDD signed a MoU, with the aim to promote sustainable development initiatives. During the reference period, 4 projects are being implemented:

- Programme intégré d'éducation à l'environnement et au développement durable dans les établissements scolaires. The project is embedded in the National Program for Environmental Education launched by SEDD, in partnership with the local Ministry of Education, on raise awareness on sustainable development. The project aims to green schools by promoting the use of environmentally sound technologies.
  Duration: October 2018 - November 2020
  Total Budget: € 2,072,727
  MASE contribution: € 327,000
- Mise en place de la filière de valorisation des déchets de construction et de démolition dans la Commune de Marrakech. The project aims to produce a feasibility study for the establishment of a Construction and Demolition Waste collection - pre-treatment and recovery center in the Marrakesh municipality. The main activities are the preparation of a call for the selection of centre managers; assistance in the creation of the centre; organization of awareness seminars and capacity building on ecological waste management.
  Duration: July 2018 –January 2020
  Total Budget: € 337,983.92
  MASE cofunding: € 62,284.78
- Programme de Promotion de l'entreprenariat vert. The project is dedicated to the promotion of the green entrepreneurship providing trainings opportunities for young entrepreneurs to evolve their projects and access to funding sources.
  Duration: July 2018 –July 2020
  Total Budget: €533,869.57
  MASE cofunding: € 177,956.52
- Gestion intégrée des zones côtières de la Région Rabat-Salé-Kenitra.
  Duration: February 2019- April 2021
  Total Budget: € 6,550,000
  MASE contribution: € 2,000,000

Palestine

On 2016, MASE and the Palestinian Environmental Quality Authority (EQA) signed a MoU with the aim to encourage and develop cooperation in the field of environmental protection and sustainable development. During the reference period, the following project is being implemented:

Revision and updating of the National Biodiversity Strategy of Palestine and related Action Plan and Preparing the Sixth National Report. The main objective of the project is to respond to the overall goals of both the CBD and the UNFCCC. In addition, the project will contribute to protect and conserve the Palestinian biodiversity and protected areas through updating the National Strategy on Biodiversity and its Action Plan (NSBAP), including the development of the Sixth National Report on biodiversity.

Duration: April 2019 - April 2021

Total Budget: € 241,000

MASE contribution: € 203,250

Tunisia (Ministry of Energy, Mines and Renewable Energy)

On 2017 MASE and the Ministry of Energy, Mines and Renewable Energy (now Ministry of Industry and SMEs - MIPME) signed a MoU with the aim to promote renewable energies and energy efficiency initiatives with an Italian contribution of 2,000,000 Euros. During the reference period, the following 3 projects are being implemented:

- Promo-Isol Establishment of a financing mechanism for the promotion of thermal insulation roofs in the individual housing - Fase I. The project consists of the roofs' thermal insulation for 65 000 individual housing, of which two thirds of the existing housings and one third of the new housings. It has the objective of reducing heating and cooling energy consumption in individual homes, reducing significant GHG emissions and creating jobs.
  Duration: 24 months
  Budget: € 2,143,400
  MASE cofunding: € 1,072,400
- Implementation Project of a specialized unit in testing compliance and energy performance lighting devices. The project is dedicated to support Tunisia's transition strategy towards efficient lighting and replacement of inefficient technologies will lead to energy savings and spending reduction.
  Duration: 24 months
  Budget: € 549,700
  MASE contribution: € 393,700
- PROMO-FRIGO -Establishment of a financing mechanism to replace refrigerators older than 10 years – Phase I. The project is dedicated to pilot action to replace 10 000 refrigerators over the period of 2 years. The PROMO-FRIGO project consists of replacing 400,000 refrigerators over 10 years old in the period 2019-2023 with appliances of energy class 1 and 2, by encouraging households to rationalize their electricity consumption. This component complements the regulatory system concerning the obligation to certify and display the energy performance of domestic appliances.
  Duration: 24 months
  Budget: € 1,549,700
  MASE contribution: 513,700

Tunisia (Ministry of Agriculture, Water Resources and Fisheries)

On 2018 MASE and the Ministry of Agriculture, Water Resources and Fisheries of the Tunisian Republic (TMAWRF) signed a MoU on promoting sustainable development in the sector of Agriculture, Ecosystems, Water Resources and Fisheries. During the reference period, the following 2 projects are being implemented:

- Renewable Energy for Agricultural and Rural Development. The project aims to support the development of solar-powered systems for irrigation, water production and drinking water (water treatment through desalination and phytodepuration processes). A capacity-building component will be realized by training young graduates, with the aim of promoting the growth of small and medium enterprises in the renewable energy sector. The activities will involve the Regions of Kasserine, Gafsa, Sidi Bouzid, kairouan, Sousse and Sfax in the south-central part of the country.
  Duration: January 2019 – March 2021

Budget: € 2,195,800
MASE contribution: 1,973,000

- Implementing Climate-Smart Agriculture practices in Tunisia. The project aims to achieve effective and lasting solutions for land use, through the maximum performance of water resources and the minimum energetic consumption in pilot agricultural areas, through the promotion of "green" technologies and techinques; the installation of a photovoltaic power plant is also planned to supply the pumping stations of drinking water.
  Duration: October 2020 – April 2023
  Budget: € 2.560.000,00
  MASE contribution: € 2.304.000,00

Jordan

On March 2018, MASE and the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF) signed a MoU in the field of climate change and sustainable development. During the reference period, the following project is being implemented:

- Installation of Solar PV Systems for Municipalities in the Hashemite Kingdom of Jordan. The objective of the project is to install up to 100 solar systems in public facilities, averaging 30 kilowatts peak (kWp) each, in Jordan's Municipalities. The goal is to reduce electricity costs, while at the same time protecting the environment by reducing carbon emissions and fulfill Jordan's NDCs obligations according to UN/ Paris agreement.
  Duration: June 2019 - June 2022
  Total Budget: € 4,028,700
  MASE contribution € 3,622,100

Table 6.2 - Provision of capacity-building support (Period 2018-2019)

Country/MoU	Areas of cooperation
Jordan Technical Agreement on sustainable development cooperation in the field of climate change adaptation and mitigation between MASE and the Jordan renewable energy and energy efficiency fund (JREEEF) operating under the Ministry of energy and mineral resources of the Hashemite Kingdom of Jordan (MEMR)	The objective of this TA is to reinforce bilateral cooperation between MASE and JREEEF in the field of climate change and sustainable development, on the basis of equality, reciprocity and mutual benefit. Within this cooperation the environmentally sound technology transfer and the capacity building activities are in the field of: renewable energy and energy efficiency measures; implementation of research and development on low-carbon technologies through the private sector engagement; implementation of the measures identified in the Intended Nationally Determined Contributions (NDCs) and in particular in the INDC that the Hashemite Kingdom of Jordan has submitted to the UNFCCC in November 2016 and which became a NDC in 2017 and the development of innovative financial measures and economic instruments for the renewable energies and energy efficiency measures.
Kurdistan Regional Government of Iraq Technical Arrangement on co-operation in the field of environmental protection and sustainable development between MASE and the Ministry of transportation and communications of the Kurdistan regional government of Iraq	The Parties will cooperate through capacity building activities in the field of: • Systematic observation of the climate system. • Provision of climate services in support of sustainable development, health and safety of population. • Early warning systems and emergency preparedness. • Climate change adaptation and mitigation. • Impacts of climate change on agriculture and food security. • Management of water resources. • Development of data archives related to climate change and data rescue of historical climate data. Ongoing project: "Supporting in Implementing the TA on Sustainable Development Cooperation in the field of Climate Change Adaptation and Mitigation". The project aims at facilitating the implementation of the Agreement and the participation of the Counterpart to international meetings.

Country/MoU	Areas of cooperation
Lebanon Technical Agreement on Sustainable development Cooperation between MASE And the Lebanese Centre for Energy Conservation (LCEC)	Activities are focused on the following priority sectors: Mitigation measures and policy support; Mitigation measures and technology transfer; Mitigation measures and Innovative financial market schemes. On 28 July 2016 a medium-term Work Plan has been approved focusing on three aspects: innovation of energy policies; promotion of sustainable and low carbon emission technologies; innovative financial policies to support energy efficiency and renewable energies. Capacity building activities: "Heat Pump project Phase 1" (December 2016 - December 2020) provides support to the Lebanese government in addressing the climate change mitigation challenges presented in the INDC under the UNFCCC by introducing "heat pump" technologies in the heating, domestic hot water production and cooling sectors (for residential and tertiary applications mainly) through know-how and technology transfer in line with the European legislation and Montreal Protocol for the phasing out of the high global warming potential refrigerant gases (fluorinated greenhouse gases- including hydrofluorocarbons - HFCs). This support will include capacity building and technology transfer activities. Public and Private actors have been involved in the development of the project. Partners of the project: Lebanese Center for Energy Conservation (LCEC), MASE, Lebanese Ministry of Energy and Water, Central Bank of Lebanon, Lebanese Standards Institution (LIBNOR).
Morocco Technical Arrangement on Environmental Protection and sustainable development cooperation between MASE and the Ministry delegate in charge of the Environment of the Kingdom of Morocco	Under this TA the priority sectors of cooperation activities are: • Strengthening the implementation of the mitigation and adaptation measures envisaged by the National Voluntary Contributions (NDC), including through technical assistance to feasibility studies for pilot projects on mitigation and the establishment of a monitoring, reporting and verification system NDCs at national level. • Capacity building and dissemination of experiences and knowledge at the national and regional level on mitigation and adaptation to climate change. • Reinforcement of the national policy of integrated management, at a technical level, of coastal areas. • Strengthening of education on the environment and on sustainable development The approved Work Plan and related projects focused on some priority areas of cooperation among which Capacity building and dissemination of practices and knowledge at national and regional level on mitigation and adaptation to climate change and strengthening of education on environment and sustainable development
Tunisia Technical Agreement on cooperation in the field of Energy, Climate Change, Environmental Protection and Sustainable Development between MASE and the Ministry of Energy, Mines and Renewable energy of the Tunisian Republic	The purpose of the agreement signed on 9 February 2017 is to strengthen the effort to combat climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote secure, clean and efficient energy, to stimulate the transition towards sustainable low carbon economy and to implement adaptation actions and opportunities to protect the environment and natural resources. Bilateral activities in Tunisia are supported by MEDREC (the Mediterranean Renewable Energy Center), established by MASE in 2004.

Country/MoU	Areas of cooperation
Tunisia Technical Arrangement on cooperation in the field of sustainable development between the Ministry of Environment and Energy Security of the Italian Republic (MASE) and the Ministry of Agriculture, Water Resources and Fisheries of the Tunisian Republic (TMAWRF)	The purpose of this Agreement on sustainable cooperation is to enable and support the implementation of actions aimed at reducing greenhouse gas emissions and climate change vulnerability and building resilience through the strengthening and coordination of efforts to combat global climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote solutions combining two pillars: climate change adaptation and mitigation, underpinning sustainable management of agricultural production systems water resources and fisheries.

Cooperation on climate change in Central and Latin America

In the reporting period, MASE continued its cooperation activities in the framework of the 7 MoUs signed between 2016 and 2018 (Argentina, Costa Rica, Cuba, Mexico, Paraguay, Peru, and the CARICOM States). At the end of 2020, MASE transmitted to its Counterparties of Argentina, Costa Rica, Mexico, Peru and to the CARICOM States draft texts to negotiate new Agreements, because of the forthcoming expiry of previous MoUs as well as of the reorganization of MASE's bilateral cooperation. Information on the MoUs signed with Cuba and CARICOM States are included in the section 6.6.4 on cooperation with countries most vulnerable to climate change below.

Additionally, in 2019 MASE signed a new MoU with the Ministry of Environment and Natural Resources of the Dominican Republic and began the negotiation of a new agreement with the Ministry of the Environment of Chile.

Argentina

In the framework of the MoU signed between MASE and the Ministry of the Environment and Sustainable Development (MAyDS) the following initiative has been approved:

Strengthening Fire Early Warning and Statistics Systems in Argentina. The scope is to improve information management, early warning, and public communications of the Argentine fire management service. More specific and detailed information on land use change, people lifestyles and climate change will be provided to develop new fire management strategies. At the same time, new technologies allowing to anticipate high fire-risk situations and efficiently communicate with the local population will be acquired.

Date of approval: 27 August 2018

Budget: € 1,818,588,

Funded by MASE: € 880,175

Status: In the reference period, the detailed Project Document was elaborated. Field implementation has not yet started.

Costa Rica

In the framework of the MoU signed between MASE and the Ministry of the Environment and Energy (MINAE) the following initiative has been approved:

- *Costa Rica Inter-municipal Project for Organic Waste Management: Towards zero waste*

Date of presentation: 12 December 2019 (not approved)

Status: The initiative is currently under revision by MINAE

Peru

In the framework of the MoU signed between MASE and the Ministry of the Environment (MINAM) the following initiative was being implemented in the reporting period:

- *Strengthening NDCs in Perù*. The objective is contributing to the achievement of transformational change by addressing enabling conditions to implement adaptation and mitigation commitments as tools for delivering sustainable and equitable climate-resilient development. The project addresses the priority sectors identified in Peru's NDC: agriculture, forests, other land use and land use change (AFOLU), and water resources. It adopts an inclusive approach that incorporates the three levels of government (national, regional, local) as well as participation from academia, civil society, private sector and international cooperation. It also integrates gender and intercultural approaches.
  Date of approval: 12 December 2018
  Budget: € 2.300.000
  Funded by MASE € 2.000.000
  Status: ongoing

Cooperation with Central and Eastern European countries

Serbia

On 29th October 2019, the MoU with the Serbian Ministry of Agriculture and Environmental Protection was signed in Belgrade. The aim of this Memorandum is to implement the environmental cooperation between Italy and Serbia in order to coordinate efforts to combat global climate change and its adverse effects, promoting the transition to a sustainable economy for the protection environmental and natural resources of the Republic of Serbia.

Uzbekistan and Turkmenistan

On the bilateral level, MASE has signed in 2019 a MoU on cooperation in the field of climate change vulnerability, risk assessment, adaptation and mitigation respectevely with Ministry of Agriculture and Environment Protection of Turkmenistan and the State Committee on Ecology and environmental Protection of Uzbekistan. In the framework of the Memorandum with Uzbekistan, on 3rd April 2019 the Joint Committee approved the following project:

- "Supporting the implementation of the Memorandum of Understanding on Cooperation in the Fields of Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation". The purpose of this project is to ensure financial support for the participation of Uzbek experts in international events and bilateral meetings, including COP25 and COP26, giving them the opportunity to learn about and take part in international negotiations on the topic of climate change.

Union of the Comoros

In 2015 MASE and the Ministry of Production, Environment, Energy, Industry and Craftsmanship of the Union of the Comoros signed a MoU for cooperation on vulnerability to climate change, risk assessment, adaptation and mitigation. In 2019, within the approved project Integrated Plan for the management of urban waste in the Union of Comoros, training courses were organized for local personnel responsible for waste management and the first shipment of equipments for the construction of the biogas plant took place. In particular, the project aims to build an integrated urban solid waste management system and to develop a national model based on circular economy. In this paradigm, the waste will be treated as an economic resource, enhancing the recovery and recycling of materials and waste that currently ends up in landfills. The project also aims at creating new job opportunities in the sectors of green economy and material recovery.

Scientific cooperation

MASE is also strongly committed to support programme on scientific research and technology transfer in strategic areas, like China, in collaboration with noteworthy research centre. These projects are dedicated to improve these regions capacity to tackle climate change by fostering research.

In the framework of the Sino-Italian Cooperation Program for Environmental Protection (SICP) several scientific and technological research projects have been implemented, in collaboration with the National Development and Reform Commission, the Chinese Ministry of Science and Technology, the main Chinese

scientific institutions, Chinese Municipalities, companies and prestigious universities, such as Tsinghua University in Beijing, Tongji University in Shanghai and Jiaotong University in Shanghai.

Within the framework of Agreement on Scientific and Technological Cooperation between the Government of the Italian Republic and the Government of the People's Republic of China, MASE co-funded in 2016 the project "Remediation of Old Landfills for Environmental sustainability and final Sink (ROLES)", which is on-going at Tsinghua University and University of Padova.

The project is to advance scientific research and technology related to old landfill remediation by using modern concepts such as environmental sustainability by keeping diffused, long-term, and greenhouse gas emissions under control, stabilization and immobilization of long impacting hazardous substances, final sink for elements, recovery of resources.

In the framework of the scientific and technological co-operation with **South-Africa** (in partnership with the Italian Ministry of Foreign Affairs) for the years 2018-2020, MASE has approved two projects in the thematic area 'Blue Economy" and "Water Management":

- Genomics for a Blue Economy (Stazione Zoologica Anton Dohrn – Napoli);
- Integration of High Power Energy Storage Systems for Sustainable Water and Renewable Sources Management (University of Bologna).

The budget allocated for years 2018-2020 has been €300,000.

In the framework of the scientific and technological co-operation with **India** (in partnership with the Italian Ministry of Foreign Affairs), in 2017 and 2018, MASE has approved four projects.

In particular, three projects in the thematic area 'Energy and environment, with particular focus on clean technologies for energy, resources utilization efficiency and soil remediation', i.e.

- Development of catalysts to obtain bio-fuels through Fischer-Tropsch synthesis from synthesis gas derived from biomass.
- Sustainable development of membrane electro bioreactors (eMBRs) for the reuse of waste water and the production of green energy from alternative sources (Bio WaR AGE)
- Advanced environmental monitoring system, based on photonics, for more effective prevention of landslides and structural failure risks
- one project in the thematic area of 'Industrial Research in the field of water technology', i.e. 'Study and development of innovative system to monitor and reduce concentrations of oils and heavy metals in industrial waste water'.

The budget allocated for years 2017 and 2018 has been €200,000

6.6.4 Assistance to developing country Parties that are particularly vulnerable to climate change

Bilateral co-operation initiatives from the Ministry of Environment and Energy Security

Cooperation on climate change in the Sub-Saharan African region

Africa continues to be a priority within the Italian development cooperation activities. In 2019 and 2020, apart from the MoUs on sustainable development already in execution, negotiations with several other countries were carried out to extend MASE environmental cooperation activities in the region (Burkina Faso, Botswana, Rwanda, Lesotho, Mozambique, Cameroon, Ciad, Niger, Nigeria and Mauritania).

Democratic Republic of Congo (DRC)

In November 2016, MASE signed a MoU on cooperation in the field of climate change vulnerability, risk assessment, adaptation and mitigation with the Ministry of Environment, Nature Conservation and Sustainable

Development of the Democratic Republic of Congo. During the reference period, MASE supervised the implementation of the following 3 initiatives:

- "*Bukavu Green Community as pioneers of an integral and sustainable development in Democratic Republic of Congo*". The project has three main goals: to ensure access to energy by installing solar systems serving public buildings in places with limited access to electricity; to offer high-level training about renewables to local experts; to start cooperatives in the solar power sector.
  MASE contribution: EUR 999.478
- "*Systèmes décentralisés hors réseau basé sur les sources renouvelables*". The project intends to promote access to energy and drinking water using renewable sources in North Ubangi and Kongo Central provinces.
  MASE contribution: EUR 834.690
- "*Sustainable Energy Services for Rural DRC*". Project aimed at providing clean, reliable, and economical electricity to two villages in the island of Idjwi in South Kivu, through the installation of a photovoltaic-hydroelectric hybrid plant.
  MASE contribution: EUR 1.015.401

Eswatini

In May 2017, MASE signed a MoU on cooperation in the field of climate change and sustainable energy with the Ministry of Tourism and Environmental Affairs of the Kingdom of Eswatini. During the reference period, MASE supervised the implementation of the following 2 initiatives:

- "*Fossil fuel free and green building of the Raleigh Fitkin Memorial Hospital*". The project objective is the energy requalification of the Raleigh Fitkin Memorial Hospital, ensuring its energy self-sufficiency and the reduction of climate-altering emissions.
  MASE contribution: EUR 2.204.372
- "*Strengthen Swaziland early warning system and climate services*". The project aims at enhancing the national weather forecast and alert system through installation of new meteorological and hydrometric stations; equipment of the Department of Meteorology with advanced forecasting systems; adoption of a Common Alerting Protocol at the national level.
  MASE contribution: EUR 970.880

Ethiopia

In November 2016, MASE signed a MoU on cooperation in the field of mitigation and adaptation to climate change with the Ministry of Environment, Forest and Climate Change of the Federal Democratic Republic of Ethiopia. During the reference period, MASE supervised the implementation of the following 2 initiatives:

- "*Sustainable Water Supply System in Rural Areas of Somali and Afar Regional States of Ethiopia*". The project aimed at providing solar-powered water pumping systems in 22 villages in the regional states of Somali and Afar. The diesel engines currently used for pumping water will be replaced.
  MASE contribution: EUR 1.237.697
- "*Climate Smart Integrated Rural Development Project in the Pastoralist area of Ethiopia*". The project goal is to foster adaptation of rural communities to climate change, in particular to floods and recurrent droughts, through an integrated approach to water, agriculture and natural resources management. The target villages are in Somali and Afar regions.
  MASE contribution: EUR 4.256.485

Lesotho

In April 2016, MASE signed a MoU on cooperation in the field of Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation with the Ministry of Energy and Meteorology of the Kingdom of Lesotho. During the reference period, MASE supervised the implementation of the following initiative:

- "*Renewable energy potential maps for Lesotho*". The project intends to realize a mapping of the energy potential of the major renewable sources in the territory (solar, wind, water), to provide Lesotho with a cartographic tool for proper investment planning.

  MASE contribution: EUR 1.205.000

Rwanda

In November 2016, MASE signed a MoU on cooperation in the field of climate change vulnerability, risk assessment, adaptation and mitigation with the Ministry of Natural Resources of the Republic of Rwanda. During the reference period, MASE supervised the implementation of the following initiatives:

"*Sustainable urban wetlands development within Kigali City*". The project intends to strengthen the competences of Rwandan institutions in planning and management of urban wetlands, waste management and Environmental Impact Assessment processes. The project also contributes to the restoration of 134 hectares of wetlands in urban and peri-urban areas of Kigali.
MASE contribution: EUR 1.016.000
"*Contribution Agreement with the Global Green Growth Institute (GGGI) on Climate Change Vulnerability, Mitigation & Adaptation in Rwanda*". The objective of the agreement is to support the Rwandan Government in NDCs and green growth strategy implementation through technical assistance for projects development; the strengthening of private sector engagement and business-to-business exchange; capacity building and knowledge sharing.
MASE contribution: EUR 300.000

Sudan

In November 2016, MASE signed a MoU on cooperation in the field of climate change vulnerability, risk assessment, adaptation and mitigation with the Ministry of Environment, Physical Development and Natural Resources of the Republic of Sudan. During the reference period, MASE supervised the implementation of the following initiative:

- "*Solar pumps for sustainable livelihood*". Project aimed at promoting water supply for irrigation and access to drinking water in 10 villages of the Nile River State and of North Kordofan, through the introduction of solar-powered water pumping systems not connected to the grid.

  MASE contribution: EUR 1.115.147

Cooperation on climate change in Central and Latin America

Cuba

In the framework of the MoU signed between MASE and the Ministry of Science, Technology and the Environment (CITMA) the following 2 of the 3 initiatives approved, were being implemented in the reporting period:

- *Strengthening the Cuban Marine Meteorological System (Maritime Surveillance).* The scope is to improve the efficacy of the Cuban Marine Meteorological System to address extreme events and the spillage of oil derivatives from ships in the Caribbean Sea, and introducing new hydro-meteorological and environmental services, through the acquisition of high-resolution satellite data and capacity-building.
  Date of approval: 31 January 2018
  Budget: € 1.204.216 funded by MASE
  Status: ongoing
- *Feasibility study on central coast front of the city of Havana: adaptation proposals for the climate change challenges (Engineering Solution Malecón).* The aim is to identify and propose, through field research, modelling and technical, economic and environmental feasibility studies, possible engineering solutions to improve Havana coast front's level of protection against current and future climate change risks, especially coastal erosion.
  Date of approval: 31 January 2018
  Budget: € 1.856.184 funded by MASE
  Status: ongoing
- *Improve national capacities for the introduction and use of innovative and advanced technologies and tools that strengthen vulnerability, risk, adaptation and mitigation assessments of climate change in Cuban marine ecosystems (EcoAtlas).* The objective is strengthening national capacities to apply

innovative methodologies for the elaboration of habitat maps to support monitoring, surveillance and early warning systems, and to evaluate the sea energy potential as renewable energy source
Date of approval: 31 January 2018
Budget: € 1.055.545
Funded by MASE: € 1.055.545
Status: field implementation to be started.

CARICOM States

In the framework of the MoU signed between MASE and the CARICOM States (Antigua and Barbuda, The Bahamas, Belize, Dominica, Grenada, Guyana, Haiti, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname) the following initiatives were being implemented (with different status on the progress of work) in the reporting period.

Table 6.3 – Details of environmental cooperation projects by MASE in CARICOM, 2019-2020

COUNTRY	PROJECT	FUNDS by MASE (USD)	STATUS
Antigua and Barbuda	Electric School Bus Pilot	625,000	Ongoing
	Grid Interactive Solar PV-Systems of Schools and Clinics in Antigua	825,000	Ongoing
	Construction of Wind Turbine bases	150,000	Approved but not yet started
Bahamas	Retrofitting of the Anatol Rodgers High School	667,652	Concluded
	Identification and implementation of Bahamas' nationally determined contributions - retrofitting of T.G. Glover Primary Primary School	956,498	Approved but not yet started
Belize	Reducing the Carbon footprint of S. Ignacio and five surrounding Villages in the Cayo District	1,150,000	Near to be concluded
	Pilot iniziative for the construction of a "Green" Ministerial Facility and supporting Transport System	1,000,000	Approved but not yet started
Dominica	Installation of a 75 KW grid-tied with battery backup Solar PV System at the DOWASCO Sewer Treatment Plant	491,050	Near to be concluded
	Installation of a Renewable Energy Powered Back-Up Water Supply System for the City of Roseau in Dominica	610,000	Approved but not yet started
Grenada	Extending water availability to the rural areas of Carriacou using SWRO Desalinization powered by a PV Renewable Energy System	1,850,000	Ongoing
	To extend the availability of reliable and safe potable water to the rural areas of Carriacou - Phase 2	-	Approved, integrated in the phase 1 project
Guyana	Transitioning to national energy security: Bartica as a model Green Town	650,000	Concluded
	Transition to National Energy Security: Bartica as a Model Green Town (Phase II)	675,000	Approved but not yet started
Haiti	Retrofitting the Northwest Administrative Complex Building with a Photovoltaic System	750,000	Approved but not yet started
St. Kitts and Nevis	The piloting of the Public-school bus transportation system for St. Kitts using Renewable Energy	564,000	Ongoing

COUNTRY	PROJECT	FUNDS by MASE (USD)	STATUS
	Building Climate Change resilience by enhancing water security in St. Kitts and Nevis	770,000	Approved but not yet started
St. Lucia	Solar Carport and electric vehicle	486,675	Ongoing
	Building Resilience to Climate Change through the Promotion of Sustainable Energy Usage in St. Lucia Schools	1,000,000	Approved but not yet started
St. Vincent and the Grenadines	Extending water availability to Port Elizabeth using SWRO Desalinization powered by a PV Renewable Energy System	1,250,000	Ongoing
	Procure and Install Water Distribution Lines and Meters from Port Elizabeth Salt Water Reverse Osmosis (SWRO)	891,909	Approved but not yet started
Suriname	Renewable Energy Projects for the Interior of Suriname	950,000	Approved but not yet started
GRAND TOTAL		**16,312,784**	

Source: Ministry of Environment and Energy Security

Cooperation in the Asia-Pacific region

Pacific Small Island Developing States

The Partnership with the Pacific Small Island Developing States has been launched fifteen years ago to implement a cooperation programme for addressing the key global challenges related to climate change: adaptation to the adverse effects of climate change and mitigation of harmful emissions generated by energy utilization.

Today, the Partnership is four donors (Italy, Austria, Luxemburg and Spain) and fourteen Pacific SIDS parties (Cook Islands, Fiji, Kiribati, Micronesia, Marshall Islands, Nauru, Niue, Solomon Islands, Palau, Papua New Guinea, Samoa, Tonga, Tuvalu and Vanuatu) and it has significantly broadened the scope of its activities to include pressing priorities identified in the Paris Agreement.

The Italy's PSIDS partnership has been extended until 2023 with an additional investment of $15 million to enhance the scope of the activities to be financed under the terms of the MoU governing the Pacific SIDS/Italy and to make the Partnership fully instrumental to the implementation of the SAMOA Pathway with particular reference to:

- Develop conservation measures for coastal and marine areas affected by the negative impacts of climate change, especially those that are particularly significant for their biodiversity and for providing ecosystem services;
- Strengthen the national managerial and organizational capacity as well as governance in the areas of protection and conservation of marine biodiversity;
- Develop protected areas;
- Develop programmes and projects that enhance ecosystem resilience and increase the contribution of biodiversity to carbon stocks through conservation and restoration measures;
- Develop measures to minimize and address the impacts of ocean acidification.

Table 6.4 – Summary of projects supported by the MASE in the reporting period 2019-2020

n	State	Project's title	JC	budget
ENERGY-BASED ADAPTATION				
1	Kiribati	Outer Island Fish Centre Solar Panel System Phase 2	JC 11 (2017)	764.838,00 USD
2	Kiribati	School PV off-grid system for school and village community	JC 14 (2020)	821.998,00 USD
3	Tuvalu	Tuvalu Photovoltaic Electricity Network Integration Project (TPENIP) Phase 2	JC 12 (2018)	427.100,00 USD
4	Papua New Guinea	Sustainable water supply end electricity supply project – Feasibility Study	JC 12 (2018)	75.000,00 USD
CAPACITY BUILDING				
5	Micronesia	Proposal to support the development of the Federated State of Micronesia's updated nationally determined contribution	JC 14 (2020)	325.000,00 USD
6	Nauru	Support the development of the Republic of Nauru's updated nationally determined contribution	JC 12 (2018)	275.000,00 USD
7	Palau	Support the development of the Republic of Palau's updated nationally determined contribution	JC 13 (2019)	275.000,00 USD
8	Tonga	2019 TONGA Fellowship on the Environment and Ocean (TFEO)	JC 12 (2018)	373.352,00 USD
WATER AND FOOD SECURITY				
9	Kiribati	Sustainable water supply systems for vulnerable rural communities	JC 12 (2018)	728.180,00 USD
10	Micronesia	Enhancing water security and climate resilient food for the displaced atoll Communities in Yap State	JC 11 (2017)	948.750,00 USD
11	Palau	Increasing Palau's resilience to extreme drought events: taking action for long-term adaptation to the impacts of climate change	JC 10 (2016)	800.000,00 USD
12	Vanuatu	Irrigation for a Resilient and Sustainable Agriculture	JC 10 (2016)	244.336,00 USD
13	Vanuatu	Increasing access to safe secure and sustainable water supply in Vanuatu	JC 12 (2018)	785.726,00 USD
MARINE PROTECTED AREAS AND OCEAN-BASED ECONOMY				
14	Kiribati	Strengthening Phoenix Islands Protected Areas & Creation of Related Marine Protected Areas in Kiribati	JC 11 (2017)	730.800,00 USD
15	Palau	Palau National Marine Sanctuary: Education and Awareness (Legacy Project)	JC 11 (2017)	400.000,00 USD
16	Palau	Phase 2 of the PNMS Project: Examining the potential effects of the climate change on the distribution, long-	JC 12 (2018)	660.000,00 USD

		term movement and local fisheries productivity of pelagic and nearshore resources in the PNMS		
17	Tonga	Strengthening Protected Areas Management in the Kingdom of Tonga	JC 11 (2017)	746.650,00 USD
18	Vanuatu	A National Marine Spatial Plan for Vanuatu – including a network of Marine Protected Area	JC 12 (2018)	914.945,00 USD

Source: Ministry of Environment and Energy Security

Maldives

According to MoU on climate change, vulnerability, risk assessment adaptation and mitigation, signed with the Ministry of the Environment and Energy of the Republic of Maldives, three projects have been implemented between 2019 al 2020, namely:

- "OpERATE - Ocean Energy Resources Assessment for Maldives". The main objective is to perform a detailed assessment of the energy potential residing in 214 marine currents in the Maldivian archipelago, and to individuate technological solutions to exploit it. The project includes the following activities: development (for the first time) of high-resolution three-dimensional models of the marine circulation in the Maldivian Archipelago and in some of the atolls to be selected; use of the numerical models to characterize in detail the variability of the circulation in the area, and to individuate the sites that are most interesting for energy extraction; deployment of instruments for measuring the currents in the selected sites; evaluation of the energy potential of the most favourable sites.
  Budget: € 866,245
- "WAVE4M - Development of a sea state forecasting system for the Maldivian Archipelago". The main objective is to develop an operational wave forecast model for the Maldivian Archipelago, and to consistently provide boundary conditions through two main activities: the development and verification of the regional wave model and the creation of an operating system that produces daily forecasts on the state of the sea.
  Budget: € 605,270
- "Implementation of an Integrated Meteorological and Climatological Information and Decision Support System at the Maldives Meteorological Service (MMS)". The main objective is to strengthen the Maldives network of meteorological monitoring, early warning and disaster prevention. The project represents the completion of the setting up of the MMS laboratories system for the integrated management of all meteorological and oceanographic data, upgrading the warning and information dissemination systems, thus constituting a valid support for decision makin, strengthening the national institutional framework on disaster risk reduction and climate resilience.
  Budget: € 903,745

6.7 Italian cooperation on mitigation and adaptation addresses the needs of non-Annex I Parties

In the reporting period, MASE continued its bilateral cooperation on climate change vulnerability, risk assessment, mitigation and adaptation with countries in Africa, Asia and Pacific, Mediterranean, Latin America and the Caribbean, and Central and Eastern Europe, through a bilateral cooperation governance mechanisms which is based on the dialogue between partner countries and a strong ownership component of the beneficiary.

In terms of bilateral cooperation, the expansion and update of its approach facilitated a new phase of negotiation of cooperation agreements which was launched at the end of 2020. The governance mechanism based on the Memoranda of Understanding (MoUs) described in NC7 was confirmed. Through the establishment of a Joint Committee (JC) general direction to the collaboration are provided, as well the approval of work programs and budget, the supervision and support to the cooperation activities - by taking stock and assessing the implementation and progress of approved projects - and, finally, financial decisions

over such activities. To complement this approach and ensure that the implemented activities are in line with the expected results, periodical site visits of national experts to monitor and assess activities on the ground continued to be carried out. Indeed, since their standard duration is five years, many MoUs signed in previous years were approaching their expiry date. The new proposed agreements not only expanded the scope of cooperation, but also increased the importance of criteria such as transparency, traceability, efficiency, effectiveness, and ownership of the initiatives promoted, in line with MASE's Actions of Address for the year 2019 and the triennium 2019-2021 and for the for the year 2020 and the triennium 2020-2022.

All financed projects and programs are proposed by the counterparts and reflected priorities and objectives included in the Nationally Determined Contributions (NDCs) and other relevant climate change and development strategies. MASE spread its cooperation activities across all continents and regions: Africa, Middle East and North Africa (MENA), Small Islands Developing States (SIDS), Asia, Central and Eastern Europe, and Central/Latin America, confirming the Sub-Saharan Countries and the SIDS as the priority areas.

6.8 Technology development and transfer support

Enhancing climate technology development and transfer to developing countries for adaptation and mitigation actions and increase energy efficiency is crucial for addressing the global challenges of energy security, climate change and economic development with the aim to improve resilience to climate change and to reduce GHG emissions.

In recent years, as indicated in the above specific paragraph on bilateral cooperation, Italy has significantly intensified the number of Memorandum of Understanding with developing countries to implement projects related to mitigation and adaptation measures, which foresee the transfer of technologies according to the needs and specific circumstances of the receiving countries. All the projects implemented, under implementation or planned, consider knowledge transfer and adequate and specific training courses for the installation and maintenance of the equipment (soft technologies) in addition to the essential transfer of technologies (hard technologies).

During the implementation phase of each relevant project, endogenous people are constantly involved in the installation and operation start-up of the plants. Following this phase, tailored training programmes are organized to ensure proper control, function and routine maintenance.

With regard to reporting and monitoring activities, the Guiding Principles for the bilateral cooperation Mechanism foresee that each project shall be monitored, through the production of periodic reports, financial and technical evaluations approved by the Joint Committee, including, as appropriate, field missions and on-site visits The JC supervises the projects, assessing the technology transfer, the realization of training courses and the implementation of all activities to facilitate the development of the policies, regulations, and overall institutional framework in the developing countries that is required to enhance technology transfer. The Parties annually prepare a report on the activities under the MoU and a third independent party carries out a final audit within six months of termination or expiration of the MoU. With regards to the private sector involvement, as a general approach, when drafting the bilateral cooperation agreements, IMEES investigates the potential contribution of the private sector, mainly technologies core and expertise, and tailors their rules in the technical and practical implementation of the projects. In particular, IMEES uses two different ways of involving the private sector. The first consists in publishing on the Ministry's website calls for interest for a specific sector and for a country or a region before organizing the technical missions and defining the needs with the beneficiary country. The second concerns the identification of companies holding specific technologies to implement projects already established with the receiving countries. Finally, IMEES organizes seminars, workshops and events related to bilateral cooperation and technology transfer, involving companies from the pertinent sectors and organizing business-to-business meetings.

In 2019 and 2020, there are no information on success and failure stories related to technology transfer activities to be reported. Some technology transfer activities reported as examples in some sectors and distributed over different geographical areas are shown in table 10 on Provision of support for technology development and transfer.

6.9 Capacity building

Enhancing the ability of individuals, organizations and institutions in developing countries to identify, plan and implement ways to mitigate and adapt to climate change is critical to enabling developing countries to pursue their objectives for sustainable development in a climate-friendly manner.

The common objectives of capacity building activities of Italian cooperation agreements are: to strengthen and coordinate efforts to combat global climate change, to support mechanisms for regional climate change vulnerability and risk assessment, to promote clean and efficient energy ensuring energy security, to stimulate and disseminate the transition towards a sustainable low-carbon economy through technology development and transfer, to implement adaptation actions and opportunities to protect the environment and natural resources. Among the instruments of intervention, a major role is played by technology transfer as widely presented in the previous paragraph, with the involvement of the private actors, in several sectors such as energy, transport, industrial or urban management. For further information on the most relevant capacity building initiatives supported by the Italian Ministry of Environment and Energy Security, please refer to the following chapter 7.

As a recent development to support global youth mobilization on climate change, the Italian Ministry of Environment and Energy Security subscribed a memorandum of understanding with the United Nations Secretariat on Climate Change (UNFCCC) to establish a capacity building programme open to all young people with particular reference to those from developing countries.

The aim of this new program called "Youth4Capacity" is to help develop the capacities of young people on climate change, also seeking to address the links between climate action and the implementation of the Sustainable Development Goals and the three Rio Conventions, in order to provide young beneficiaries with the capacity and knowledge to develop and implement actions in support of integrated and complementary approaches to support climate action in the context of sustainable development.

The programme has been officially presented and launched on August 31, 2022, in Libreville, Gabon on the occasion of the Africa Climate Week organized by the local government in collaboration with UNFCCC, UNDP and World Bank, in order to achieve the above objectives, focusing on activities such as: targeted virtual events, webinars, in person training sessions during Regional Climate Weeks and other relevant events organized by the UNFCCC Secretariat and a "Tutoring Program", in collaboration with the Youth4Climate Initiative, developed by the Italian Government in collaboration with UNDP will be designed and implemented by the UNFCCC secretariat with the contribution of the Italian Government.

7. Capacity-building support to developing country Parties[57]

During the biennium 2020-2021 the Italian Government has tried to reaffirm its commitment to strengthen the Italian development cooperation and to set up a path for a gradual realignment of annual appropriations allocated to it, such as to put Italy in line with the commitments taken at international level. The need is reiterated to ensure, with a multi-year perspective, gradual increases in the appropriations allocated to state administrations for development cooperation interventions, in line with the provisions of art. 30 of Law no. 125 of 2014. At the same time, the need to promote greater coordination of public policies in the field of international cooperation is reaffirmed, with the aim of improving the quality and coherence of Italy's action on Official Development Assistance (ODA) by enhancing, in particular, the tools provided by Law no. 125/2014.

The global crisis generated by the pandemic COVID-19 has hindered the path towards the achievement of sustainable development goals, in particular in those areas where progresses were already limited as reported in the United Nations Report "The Sustainable Development Goals – 2020[58]". For the three year 2020[59]-2022 the indication of the expenditure targets is included in the Economic and Financial Documents (DEF) 2020 and 2021. The intermediate targets of expenditure indicated for the three-year 2018-2020 were respectively 0.27% of Gross National Income in 2018, 0.28% in 2019 and 0.30% in 2020.

In 2020 Italian Public Development Aid (APD) amounted to 3.7 billion, equal to 0.22% of the Gross National Income (GNI), percentage equivalent to that achieved in 2019 with a decline compared to 2018, when the ratio was 0.25. Taking into account these data, the Government confirmed the wish for an alignment of Italy with international standards on ODA, committing to a path towards the goal of 0.7% of GNI set in 2015 by the 2030 Agenda for Sustainable Development. It was reiterated the need to continue to assure adequate increases of resources intended for development cooperation activities in order to assure from our Country the achievement of the objectives set both at international level and within the Law 125/2014. The specific approach by the Ministry of Foreign Affairs and International Cooperation (MAECI) is therefore characterized by the integration of climate change in 2030 Development Agenda.

At a global level 2015 and 2016 have marked for the Development a crucial step characterized by the Launch of the new UN Agenda 2030 and of its 17 Sustainable Development Goals. At Italian level at this consideration, a new cooperation framework added starting from the new Law 125/2014 in which cooperation becomes a qualifying element for the whole foreign policy of the Country and in which, to the role of the most traditional actors like civil society organisations and of the territorial cooperation, other experiences and expertise coming from university and research and the private sector are called for an increasingly proactive contribution. In such a perspective it is essential to reconsider the link between the society challenges represented by the SDGs including the needs that emerge from them, and the combination university –research.

Through the promotion of appropriate development models, able to create autonomous development and to favor the elaboration of local knowledge, the scientific research can become a strategic tool for the sustainable growth. The enhancing of scientific knowledge and human and institutional capacity building in management and planning are essential objectives for promoting innovation, development and technology transfer. It assures involvement and ownership in the Country Partner and at the same time it enhances relations between the scientific, technical and academic communities and our Country.

The development cooperation as a true "*strategic investment*", which promotes the programming of resources over a three-year period, is part of the "*political vision*" of the new infrastructure for the Italian Cooperation reinforced by the starting of activities, in 2016, of the Italian Agency for Development Cooperation (AICS) and of Cassa Depositi e Prestiti (CDP) in its new role of Financial Institution for Development Cooperation. The new governance structure of the Italian Cooperation Law 125/2014 provides for new methods and actors to increase development cooperation activities towards selected countries on

[57] Authors: Sandra Moscone (ISPRA), Antonella Ceccarelli (ISPRA)
[58] The Sustainable Development Goals Report: 2020 https://unstats.un.org/sdgs/report/2020/The-Sustainable-Development-Goals-Report-2020.pdf
[59] Documento di economia e Finanza 2022: https://www.dt.mef.gov.it/export/sites/sitodt/modules/documenti_it/analisi_progammazione/documenti_programmatici/def_2022/DEF-2022-Programma-di-Stabilita_PUB.pdf

the basis of interventions divided into three macro areas: poverty reduction, economic development, and **management of climate change**.

Law 125/2014[60] has re-launched the **Italian development cooperation** marking a fundamental turning point from the drastic reduction in resources for development cooperation over the years of the financial crisis. Under the new system, the Ministry of Foreign Affairs and International Cooperation provides guidance in the definition of cooperation policies, while the Italian Development Cooperation Agency, established following the reform, is in charge of implementing policies. This Law provided for a gradual increase in resources for development cooperation over a three-year period as stated in the Three-Year Programming Document 2016-2018 of the Italian Ministry of Foreign Affairs and International Cooperation – MAECI[61]. The subsequent Three-Year Programming Documents [62] 2019-2021 and 2021-2023 confirm the above-mentioned strategic guidelines, provide an update about developments in Europe and in the Country and deepen some priorities on which Public Development Cooperation will focus on during the Three Year Period. Climate Change is still among the key intervention sectors of the development cooperation for the years 2020-2021. The 2021-23 Programming and Policy Planning Document which nears the end of the three-year cycle defines the action objectives to follow up on the recommendations contained in the OCSE-DAC peer Review Report of Italy in 2019.

According to the last **OCSE-DAC (Development Assistance Committee) Peer Review on Italian cooperation** (March 2019), the first[63] after the approval of Law 125/2014, Italy's performance on transborder issues like climate change, environment, security, finance and trade is good overall. Italy actively supports global sustainable development, in particular where it links international engagement with domestic expertise. Italy shows good practice in enabling multi-stakeholder efforts as multi-stakeholder partnerships are at the heart of Italian development co-operation. Stakeholders were fully involved in coordinating and drafting new guidance on energy and development. Italy maintains a solid field presence and has grounded experience in fragile and crises countries. Of Italy it has been appreciated the spirit of the new Law 125/2014 which has put international development co-operation at the core of Italian foreign policy, improving transparency and accountability, the commitment on multilateral, the propensity for and emphasis on stakeholder's participation and the capacity to acquire a leadership in some areas (es. Cultural heritage and agriculture). Overall, the outcome is encouraging.

Updated information from OECD about Italy Development Cooperation will be provided with the next peer Review which will occur in 2026. The next peer review in 2026 gives Italy some time to implement new policies and show how greater flexibility and higher ODA volumes have been bolstered by a new corps of public servants for development. Italy is continuing to lead important development issues at this critical juncture and tries to continue to work in areas where it faces on-going challenges. The OCSE-DAC mid-term Review[64] which occurred in 2022 has reported an encouragement by the progress made by Italy to address the DAC's 2019 recommendations, and the widespread attention given to the OECD DAC peer review process across all actors of Italian development co-operation. In 2021 Italy's development co-operation aimed to promote sustainable agriculture, access to clean water, sustainable energy, education, work dignity and gender equality. Total official development assistance (ODA) (USD **6.0** billion, preliminary data) increased in 2021[65], representing **0.28%** of gross national income (GNI). ODA increased exceeded COVID-19 vaccine donations. The Key priorities are established in the Three-year programming and Policy Document 2021-2023 of MFA , including a focus on 20 priority countries, of which 10 are least developed countries (LDCs).

[60] Legge 11 agosto 2014, n. 125 Disciplina generale sulla cooperazione internazionale per lo sviluppo http://www.gazzettaufficiale.it/eli/id/2014/08/28/14G00130/sg

[61] Cooperazione Internazionale per lo Sviluppo - Documento Triennale di Programmazione e di Indirizzo 2016-2018 (MAECI) http://www.esteri.it/mae/resource/doc/2017/03/doc_triennale_2016-2018_-_finale_approvato.pdf

[62] Three Year Programming & Policy Planning Document (PPPD) 2017-2019 (MAECI) https://www.esteri.it/mae/resource/doc/2018/07/pro_triennale_2017-2019_en.pdf

[63] Italy has been a member of the DAC since 1961 and was last reviewed in 2014 [55] Decreto legislativo 13 Marzo 2013 n.30 (https://www.minambiente.it/sites/default/files/archivio/normativa/dlgs_13_03_2013_30.pdf)

[64] OCSE-DAC mid-term review 2022: https://www.oecd.org/dac/peer-reviews/DAC-mid-term-Italy-2022.pdf

[65]https://www.oecd-ilibrary.org/sites/37f92091-en/index.html?itemId=/content/component/5e331623-en&_csp_=b14d4f60505d057b456dd1730d8fcea3&itemIGO=oecd&itemContentType=chapter

Its geographical focus is primarily on the African continent and the Middle East, but also Cuba and El Salvador.

In 2022 the National Audit "Corte dei Conti" Report commends AICS (Italian Agency for Development Cooperation) and the fact that it was able to take over solid partnerships and projects from DGCS with civil society, administrations, regions and municipalities, plus European Union delegated co-operation. The report also cites some challenges, such as the excessive fragmentation of initiatives, multiplicity of competitive grant procedures, lack of policies or guidelines, and weak monitoring and evaluation systems. These conclusions reinforce some of the findings from the 2019 DAC Peer Review of Italy. The next peer review will look at the extent to which new country strategies allow for the more programmatic approaches, rather than more fragmented project-type interventions that correspond to the modalities in place. Data from 2019 and 2020 combined show that 38% of bilateral ODA is project-type assistance, and less than half (17%) is provided through specific programmes or pooled funding arrangements.

On top of financial resources allocated by the Italian Government to the development cooperation, the commitment of Italy to tackle climate change and related support to developing countries as strongly expressed in Decree no.30 (DLGS n.30 13/03/2013[55]). In the provision of public financial resources, Italy aims to strike a fair balance between mitigation and adaptation over time.

Pursuant to Law 125/2014, since 2018 the Italian Ministry of Foreign Affairs calls for a National Public Conference, every three years to favor the participation of Italian citizens in defining development cooperation policies. The National Development Cooperation Conference convened by the Minister of Foreign Affairs and International Cooperation CO-OPERA is co-organized by the Directorate General for Development Cooperation of the Ministry of Foreign Affairs and International Cooperation (MAECI) and the Italian Agency for Development Cooperation also including the National Council for Development Cooperation. It is a participative process opened to public and to all citizenship, the Conference Program is the result of close consultation with all Italian Cooperation actors, beginning with civil society organizations and their representative networks (AOI, CINI, and Link2007). The discussions are focused on the most pressing issues with the highest representatives from Italian and international institutions, ranging from food insecurity to poverty, wars and the climate emergency, pandemics, inequalities, and human rights violations. CO-OPERA conference 2022 focused on the 5 P's of 2030 Agenda of Peace, People, Prosperity, Planet and Partnership. Five primary categories, spawned by the UN 2030 Agenda, are interconnected and, ideally, will provide a gauge of the state of development cooperation and the paths forward, especially in light of two events that have distinguished the last two years: the pandemic and the conflict in Ukraine.

In the Three-Year 2021-2023 Programming and Policy Document of MFA the priority Countries of Italian cooperation are 20 and respectively: 11 in Africa, 4 in the middle-east area, 1 in the Balkans, 2 in Asia, 2 in America. Of these countries the following 10 are classified by OCSE-DAC like Less Developed Countries: Ethiopia, Somalia, Sudan, Burkina Faso, Afghanistan, Myanmar, Mozambique, Mali, Niger and Senegal.

Priority countries for development cooperation:

- MEDITERRANEAN AFRICA: Egypt, Tunisia;
- EAST AFRICA: Ethiopia, Kenya, Somalia, Sudan;
- WEST AFRICA: Burkina Faso, Mali, Niger, Senegal;
- SOUTHERN AFRICA: Mozambico;
- MIDDLE EAST: Iraq, Lebanon, Palestine, Jordan;
- BALKANS: Albania;
- LATIN AMERICA AND CARIBBEANS: Cuba, El Salvador;
- ASIA: Afghanistan, Myanmar.

Starting from the Paris Agreement, the Italian Ministry for Environment (MASE) has signed more than 50 Cooperation Agreements on Climate Change, aimed at carrying out actions for mitigation and adaptation in emerging and developing countries where CO_2 emissions have reached high levels and require targeted

interventions. The promotion of renewable energy and energy efficiency remained priority areas of action. Facilitating access to climate finance, providing capacity building, and promoting technology transfer were among the preferred types of activities.

In terms of bilateral cooperation, a new phase of negotiation of cooperation agreements was launched at the end of 2020. Many MoUs signed in previous years were approaching their expiry date, the new proposed agreements not only expanded the scope of cooperation, but also increased the importance of criteria such as transparency, traceability, efficiency, effectiveness, and ownership of the initiatives promoted, in line with MASE's Actions of Address for the triennium 2020-2022. The reference framework for cooperation was expanded, encompassing, besides UNFCCC, also the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD), as well as the 2030 Agenda for Sustainable Development.

Italy's bilateral programming consists mainly of project-type interventions. The funds provided by the environmental cooperation of the Italian Ministry for Environment (MASE) were focused mainly on three geographical areas: Sub-Saharan Countries, North Africa/Middle East area (MENA) and Small Island Development States (SIDS/PSIDS). The main objective is to strengthen the bilateral cooperation through effective partnerships in the spirit of Law 125/2014. During the period 2020-2021, the bilateral cooperation activities promoted by MASE, which during the previous years were continuing increasing, following to the spread of the Covid-19 pandemic, have come to a temporary halt in particular in February 2020. Specific initiatives such as capacity building and training have been postponed and technical missions have been cancelled due to lockdowns both in Italy and in the partner countries. Readjustments of Work Plans and shift to virtual modality and remote working have subsequently allowed a partial resumption of some activities, the consequences of the pandemic have had a high impact on the overall cooperation.

The post Covid-19 scenario confirmed the strategic vision of the Italian cooperation: to promote solid and equal relations founded on the principles of interdependence and partnership and encourage the sustainable development creating opportunities and enhancing Italy's expertise and encouraging multilateral and bilateral collaboration in every area. A medium short- term vision which has like time horizon and reference the 2030 Agenda. Priority was given to initiatives aimed at promoting a sustainable ecological model to improve the access to clean water and economical and sustainable energy systems. Priority was given to those countries with which Italy has built over the time strict relations of development cooperation, those Countries where Italy intends to assure a continuity and stability of action, without of course excluding the possibility to intervene in other geographic areas. Climate change and other aspects like pandemic have enhanced the importance of some macro-areas within Priority and non priority Countries that have been considered in a synergic way with a regional approach.

The common objectives of capacity building activities of Italian cooperation agreements are: to strengthen and coordinate efforts to combat global climate change, to support mechanisms for regional climate change vulnerability and risk assessment, to promote clean and efficient energy ensuring energy security, to stimulate and disseminate the transition towards a sustainable low-carbon economy through technology development and transfer, to implement adaptation actions and opportunities to protect the environment and natural resources.

Among the instruments of intervention, a major role is played by technology transfer as widely discussed in the previous chapter, with the involvement of the private actors, in several sectors such as energy, transport, industrial or urban management.

With regard to environmental intervention lines, including sustainable energy development, MASE operates jointly with MFA focusing its environmental support action towards those Countries most exposed to the effects of global warming: the small developing islands and developing countries, especially in those low-income countries with less resilience capacity and less ability to fight climate change effects. The main intervention sectors are:

- management of extreme events;
- promotion of renewable energy and energy efficiency;
- management of water resources;

- waste management;
- promotion of air quality;
- contrast to forest degradation;
- requalification of soil and land;
- sustainable mobility.

During the biennium 2020-2021 MASE cooperation has continued its efforts for the achievement of the Paris Agreement and the 2030 Sustainable Development Agenda aiming at the integration of the economic, social, environmental and institutional pillars. Italy has contributed to the definition of a new European consensus on Development bringing to that context its vision on the themes deemed to be of priority importance.

A priority interest was given to the African Continent being at the top of European and international political Agenda. Italy continued to support EU action aimed at giving relevance and importance to Africa by investing in an equal and multidimensional partnership. On the occasion of the G7 Environment in Bologna (June 2017) Italy announced the launch of the **Africa Centre for Climate and Sustainable development (ACSD)** in order to facilitate voluntary exchange of information and activities in support of the African Countries. The main objective is also to promote the transition of the African Countries to a new energy model. During the biennium 2018-2020 ACSD supported MASE in the implementation of cooperation activities in the field of climate vulnerability, desertification and biodiversity conservation.

The **international cooperation activity carried out by MASE** is very diversified both bilaterally and multilaterally. All projects and programmes financed in this context have been proposed by developing countries and reflect priorities and objectives.

In **Asia**, in the framework of the long-standing cooperation between MASE and the numerous Chinese institutions, a new knowledge approach consolidated on the base of the previous experience and in the light of the new political and economic role of China within the international community. The signing of a **Joint Declaration on the re-launch of the Sustainable Development and Environmental Partnership** with the Chinese Ministry of Environmental Protection is the result of a strengthened cooperation on a new basis, with the contribution of private investments and a greater involvement of companies, in particular in the development and exchange of experiences and best practices in the field of innovative and low-carbon technologies.

The investments in low-carbon, sustainable and high quality infrastructure are a focus of the Belt and Road Initiative (BRI) development strategy[66]. In order to ensure global climate goals are met, this initiative needs to bring cost-effective new low-carbon methods to developing countries and avoid outdated polluting technologies. China is proposing a holistic implementation of the BRI, covering a number of broad aspects that will be important for achieving the 2030 sustainable development goals. The development of a global energy interconnection and the achievement of green and low-carbon development is one of the aspects of this much broader approach.

Italian cooperation activities in the framework of the Sino-Italian Cooperation Program for Environmental Protection (SICP) between the former Italian Ministry for the Environment now Ministry of Environment and Energy Security and the former Chinese Ministry for Environmental Protection (MEP) now Ministry of Ecology and the Environment continued regularly until 2020. In over 20 years the cooperation agreement implemented hundreds of projects in support of China's Sustainable Development, thus becoming a model for bilateral cooperation with joint initiatives implemented in the field of mitigation and adaptation to climate change, transfer and promotion of low-carbon technologies, studies and research as scientific support to decision-making. However, the Sino-Italian Cooperation activities halted in March 2020, due to the COVID-19 pandemic.

Since 2003, MASE has promoted an Advanced Training Program on Environmental Management and

Sustainable Development aimed at technicians, academics, young professionals and decision-makers from Chinese administrations, universities and companies: the **Sino Italian Capacity Building for**

[66] https://www.oecd.org/finance/Chinas-Belt-and-Road-Initiative-in-the-global-trade-investment-and-financelandscape.pdf

Environmental Protection - SICAB. This high-level training program is supported by the Italian Ministry for the Environment within the SINO-ITALIAN cooperation program for environmental protection (SICP), it has been launched in 2017 and it concluded in March 2022.

Within SICAB several training courses have been provided by a professional consortium led by the **Politecnico di Milano** both in Italy and in China. From February 2018 to December 2021, 28 courses were organized. Even if during the COVID-19 pandemic SICAB had to stop, it concluded in March 2022 also achieving its goal, that was to identify training as an essential tool to support the protection and the management of the environment and the fight against climate change, facilitating exchange of activities, best practices and Knowledge by promoting cooperation projects also technological and industrial. About 1.300 participants from all the provinces of China took part in the training programme on mitigation and adaptation to climate change in the perspective of a green and sustainable growth. The consortium includes Euro-Mediterranean Center on Climate Change, Italy China Foundation, Fondazione Politecnico di Milano and Sapienza University of Rome. The training modules aimed at strengthening the planning capacity of the representatives of the central and local Chinese institutions in the field of environmental issues that have been deemed as a priority in the Chinese agenda including climate change.

After the reforms of 2018, which marked the beginning of a new chapter for China in its battle for blue skies with the launch of China's second air pollution action plan in 2018, the National Development and Reform Commission's climate change and carbon emission responsibilities shifted to the Ministry of Ecology and Environment. The Three-year Action Plan indicates that China's management of air pollution and climate change are coming together. The plan calls explicitly for "large reductions in total emissions of major pollutants in coordination with reduction in emissions of greenhouse gases." The Three-year Action Plan (2018-2020 - The Three-Year Action Plan for Winning the Blue Sky War Plan[67]') continued to strengthen end-of-pipe treatment, but also to take more detailed measures on the sources of pollution and structural issues, including transitions in energy, industrial and transportation. The year 2020 marked the final year of China's three-year battle to bring back blue skies. Great efforts have gone into the green transformation of energy generation and consumption to mitigate pollution from fossil fuels. Pollution prevention and control were intensified. The total emissions reduction target for major pollutants was surpassed. Meanwhile, various technological breakthroughs in air pollution control have further helped China make blue skies a regular occurrence. By 2035, purely electric automobiles are likely to become the mainstream in the sales of new ones, while automobiles in public transportation will be exclusively electrified, according to a development plan released by the State Council approved on March 2021.[68], the 14th Five-Year Plan for Economic and Social Development (2021–2025) [69]and Long-Range Objectives through the Year 2035.

In 2018 a **Memorandum of Understanding between MASE and the University of Tongji on the Sino-Italian Center for Sustainability (SICES)** was signed with a duration of five years. The Center aims at enhancing the collaboration between Italian Research centers and Chinese Research center on Greener Cities, to promote research and capacity building in the following sectors: Climate Change Adaptation/Mitigation, Energy Efficiency/Renewable Energy, Resource Efficiency/Circular Economy. This cooperation aims at promoting SICES as a center of excellence for the research and innovation on the development of green technologies and solutions for Green Cities and in advancing in Sustainable Development. The main objectives are to improve the urban environment quality to tackle climate change, wellbeing and health in cities and to actively participate in global environmental governance through China-Italy cooperation in the framework of several national and international development scenarios and strategies including the Paris Agreement.

In **Central Asia**, MASE continued cooperation in the field of Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation with **Uzbekistan** to promote clean and efficient energy, to stimulate and disseminate the economic and technological transformation to low emissions and Green Economy. Recognizing green economy as a regional priority and the importance of building resilience, security and prosperity to improve awareness, environmental quality and human health, on November 2019, after a negotiation process, an agreement also with **Turkmenistan** was signed. MASE is providing technical

[67] Blue Sky Battle Plan (http://www.gov.cn/zhengce/content/2018-07/03/content_5303158.htm)
[68] 14th five-year plan for economic and social development and longrange objectives through the year 2035 of the people's republic of china (https://en.ndrc.gov.cn/policies/202203/P020220315511326748336.pdf)
[69] https://www.adb.org/sites/default/files/publication/705886/14th-five-year-plan-high-quality-development-prc.pdf

assistance and boosting opportunities for entry into the Middle Eastern market of Italian companies operating in the "green economy" sectors.

In **South-East Asia**, MASE continued cooperation with **Vietnam** to strengthen and coordinate the efforts, to combat global climate change and address its adverse effects through the development of the National Spatial Data Infrastructure. The first Joint Committee Meeting was held in Katowice in December 2018 and the following thematic priority areas of cooperation have been identified: climate change adaptation and mitigation, remote sensing application and water resources management. In 2020 under the framework of this MoU with the Vietnamese Ministry of Natural Resources and Environment, the Project "Set up and implementation Geo-Information System for Climate Change Vulnerability, Risk Assessment and Environment monitoring for Vietnam" was approved with the aim of implementing a Geo-Information System in Viet Nam to monitor and assess the impacts of and vulnerability to Climate Change based on remote sensing technology. Agreements are also being negotiated with Myanmar, Philippines, Indonesia and Malaysia.

In **Middle East** technical Agreements continued also with the **United Arab Emirates** and with **Jordan** in which the transfer of technologies and the capacity building aim to ensure the involvement of the private sector focused on renewable energy and energy efficiency measures.

As already highlighted in the previous chapters of this Biennial Report, **Africa** has become a top priority in the Italian strategy for development cooperation. Capacity building activities in this context are focused to support national strategies to face the high climate change vulnerability that often prevents African countries from consolidating their economic growth and addressing its environmental consequences above all to promote an effective and sustainable growth of the energy sector taking into account the availability of renewable energy sources (sun, wind, rivers) in many Sub-Saharan African countries.

In **North Africa**, MASE has a long cooperation program with **Egypt, Tunisia and Morocco** focused on the promotion of renewable energies, the dissemination of financial mechanisms for the use of solar heating and the support to multi-level governance for a more efficient use of water resources.

MASE is continuing cooperation agreements with **Kenya and Zambia** to promote secure, clean and efficient energy in order to strengthen and coordinate the efforts to combat global climate change, address its adverse effects and reduce vulnerability, to protect the environment and natural resources, and to stimulate the transition towards a sustainable low-carbon economy. Cooperation activities will continue to prioritize the management and treatment of water and the promotion of energy efficiency and renewable energy. Negotiation activities to sign new MoUs or renew expiring Agreements were carried on with several other countries, agreements are also being negotiated with Cameroon, Chad, Mauritania, Mozambique, Niger and Nigeria.

In **Central and Latin America**, besides the bilateral agreements already launched by MASE with Argentina, Costa Rica, Cuba, Mexico and Peru, new Memoranda of Understanding have been signed with **Dominican Republic and Paraguay** in 2018 and 2019. Capacity building activities in these countries are focused on: renewable energy and energy efficiency, management of environmental risks resulting from global climate change (Cuba); sustainable management of forests, biodiversity preservation, energy efficiency and sustainable integrated water management (Paraguay).

Developing Small Islands are a group of Countries particularly vulnerable to climate change, posing a challenge to development, with strong implications for poverty, conflict and social cohesion. In this area enhanced action and international cooperation on adaptation is needed to enable and support the implementation of adaptation activities aimed at reducing vulnerability and building resilience.

MASE has also an ongoing wide cooperation program with 11 of the 14 CARICOM countries (**Antigua and Bermuda, Bahamas, Belize, Dominica, Grenada, Guyana, Haiti, St. Kitts and Nevis, St. Vincent and the Grenadines, St. Lucia, Suriname**) for the implementation of projects on weather alert systems, energy efficiency and the promotion and use of renewable energy, sustainable water management and sustainable transport. From 2018 to present 6 new projects have been approved (most of which yet to be started), to be implemented in the states of Antigua and Barbuda, Bahamas, Belize, Dominica, Grenada, Guyana, Haiti, St. Lucia, St. Vincent and the Grenadines, St. Kitts and Nevis, Suriname.

MASE cooperates also with the **Small Islands of the Indian Ocean – Maldives, Mauritius, Seychelles and the Union of the Comoros**, with the implementation of projects on data management for better governance of meteorological risk, renewable energy and energy efficiency, integrated water management and treatment, including desalination.

The **Pacific Small Islands (Cook Islands, Fiji, Kiribati, Micronesia, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Tonga, Tuvalu, and Vanuatu**), through specific projects on climate change adaptation, protection against climate vulnerability and variability, mitigation of harmful emissions, promotion of renewable energy, especially in rural areas, and for the protection of oceans and their ecosystems. To date, 14 beneficiaries are participating in the cooperation program. The priorities expressed by the PSIDS governments are largely focused and aimed at the creation of resilient societies, in the effort to face and prevent the risks deriving from climate change. The Cooperation Program envisaged two macro areas of intervention, **Sustainable Energy** and **Climate Change Adaptation**, which respond to the needs of mitigation, adaptation and contrast of the effects of climate change through the protection of terrestrial and marine ecosystems, with particular attention over the years to small vulnerable communities in rural areas and remote islands.

Multilateral Cooperation on climate change - Between 2018 and 2019, the Italian multilateral environmental activities were carried out in several organizations or programmes, such as: the World Bank (WB), the Green Climate Fund (GCF), the Global Environment Facility (GEF), the Adaptation Fund (AF), the Food and Agriculture Organisation (FAO), the Initiative Climate Action Transparency (ICAT), REDD+ implementation, the African Development Bank (ADB) and the Inter-American Development Bank.

Multilateral International cooperation of Italian Ministry for the Environment has been strengthened through participation in funds and programs promoting renewable energy and energy efficiency and resilience to climate change such as through the African Development Bank (Africa Climate Change Fund and Sustainable Energy Fund for Africa). For the implementation of the UNFCCC commitments, MASE contributes to the Green Climate Fund, the Adaptation Fund and, through the Global Environment Facility (GEF), supports the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF). Through the World Bank, it supports the Communication for Climate Change Multidonor Trust Fund (CCC). For the implementation of the Montreal Protocol, MASE participates in the Multilateral Ozone Fund, the financial mechanism for the protection of the ozone layer and supports the Climate and Clean Air Coalition Initiative (CCAC), which promotes the exchange of information and best practices to implement measures to reduce emissions of methane, hydrofluorocarbons and black carbon. In the period 2019-2020 in order to help African countries to prepare and seek financing for programs and projects contributing to the implementation of the National Determined Contributions (NDCs) communicated to the UNFCCC, MASE also pursued its support to the World bank (WB) through the program "Promoting Africa's Green and Climate Resilient Development (AGREED).

On August 2022 the Italian Ministry of Environment subscribed a memorandum of understanding with the **United Nations Secretariat on Climate Change (UNFCCC)** to establish a capacity building programme open to all young people with particular reference to those from developing countries, among the partnerships signed by the Youth4Climate initiative to support the activities and global youth mobilization. The aim of this new program called **"Youth4Capacity"** is to help develop the capacities of young people on climate change, also seeking to address the links between climate action and the implementation of the Sustainable Development Goals and the three Rio Conventions, in order to provide young beneficiaries with the capacity and knowledge to develop and implement actions in support of integrated and complementary approaches to support climate action in the context of sustainable development.

The program, was officially presented and launched on August 31, 2022, in Libreville, Gabon on the occasion of the Africa Climate Week organized by the local government in collaboration with UNFCCC, UNDP and World Bank, in order to achieve the above objectives, focusing on the following activities to be designed and implemented by the UNFCCC secretariat with the contribution of the Italian Government:

a) Targeted virtual events, webinars or training sessions, to be developed in collaboration with international and regional partners and, where appropriate, in collaboration with the Paris Committee for Capacity Building (PCCB) and its network and in the context of the Glasgow work program on Action for Climate Empowerment. These events would also allow for a greater understanding of the actual needs and capacity

gaps of young people in different regions and would provide a space for the exchange of lessons learned and experience on capacity building between representatives from the global south, together with actors from the north of the world, with the premise that there are opportunities for mutual learning and capacity building among young people in developing and developed countries.

b) Capacity building events in presence during Regional Climate Weeks and other relevant events organized by the UNFCCC Secretariat. These could be training sessions structured around the main topics, tools, technologies, etc. at the regional level over a series of days. These events could also benefit from collaboration with the PCCB and its network and relevant activities being implemented under the Glasgow Work Program on Climate Empowerment Action.

c) A "Tutoring Program", in collaboration with the Youth4Climate Initiative, developed by the Italian Government in collaboration with UNDP, aimed at putting young people in contact with experts from non-party stakeholders through Ted Talk in person and / or virtual methods, where young people will be able to gain first-hand insights, knowledge and inspiration from experts representing various sectors such as the private sector, influencers, NGOs, academia, research organizations, etc. This mentoring program would benefit from the network and work already undertaken by the UNFCCC Secretariat as it relates to global climate action.

d) The design and implementation of awareness channels, to promote the theme of the fight against climate change, activities relevant to strengthening the capacities of young people, including, but not limited to, the Youth4Climate initiative through social media, to provide a space for young people from the north and south of the world and other actors to exchange experiences, lessons and knowledge on capacity building.

The initiative Youth4Capacity stipulated additional partnerships in which partners were contacted with a request to contribute in at least one of the following ways: Support for the selection process for individual grants; Support the mentoring and training process; Financial or in-kind support.

Among the voluntarily and multi-stakeholder partnership, since November 2015, Italy is party and donor of the **Initiative for Climate Action Transparency (ICAT)**. This Initiative is working with developing countries to strengthen capacity to assess climate actions (in the context of their NDC's) and report their progress in line with the Paris Agreement, based on individual country needs. The Initiative supports in country capacity development programmes through training modules on measurement, reporting and verification (MRV) of policies and actions, and knowledge sharing of good practice and lessons learned. ICAT was created as an unincorporated multi-stakeholder partnership by the Children's Investment Fund Foundation (CIFF); ClimateWorks Foundation (CWF); the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU); and the Italian Ministry for the Environment. The implementing partners are currently the UNEP-CCC (UN environment programme copenaghen climate centre), former UNEP DTU Partnership (UDP), World Resources Institute (WRI), the Italian Institute for Environmental Protection and Research (ISPRA), GHG Management Institute, and Aether. In 2018 a Contract Agreement between ISPRA and UNEP-DTU was signed (duration 18 months and renewed up to March 2013) for capacity building activities on the themes of transparency and reporting of the commitments undersigned by the Parties as established in the Paris Agreement (art 13) in 11 beneficiary Countries (Argentina, Belize, Botswana, China, Cuba, Ethiopia, , Maldives, Sudan, Tunisia,Vietnam and Zimbabwe). ISPRA has supported capacity building activities transferring acquired experience in the field of accounting and reporting of the greenhouse gas emissions. Specific training initiatives have been addressed to officers and to key stakeholders of beneficiary countries. Scoping missions occurred in almost all the countries, with opening workshops and detailed discussion of workplans with the relevant stakeholders and experts. Where these in country missions were not possible (Botswana, Cuba, Sudan, Zimbabwe), they were conducted remotively. Since the beginning of the COVID-19 pandemic and the accompanying restrictions enacted by the international community, all support has been provided remotely but it overally worked very good. Some problems occurred for countries with limited internet access but with an improvement over time. Four countries have already ended the project (Belize, China, Vietnam and Zimbabwe) and some of them will join a second phase of the project.

Table 9 of the CTF provides details of the above mentioned capacity building intervention activities implemented by Italy which are grouped by geographical areas.

CTF Table 9 Provision of capacity-building support (Period 2018-2019)

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
CENTRAL AND LATIN AMERICA				
MoU between MASE and the Ministry of the Environment and Sustainable development of the Republic of Argentina (signed in Buenos Aires on 8 May 2017 – 5 years)	**Argentina**	Technology transfer & technical assistance Mitigation and Adaptation	The purpose of this Mou is to strengthen and coordinate the efforts to combat global climate change and address its adverse effects, to support mechanisms for vulnerability and regional risk assessment related to climate change, to encourage and communicate low-emission economic and technological transformation, to ensure energy security, to implement adaptation actions and opportunities to protect the environment and the natural resources in Argentina. It provides for capacity building on UNFCCC mechanisms and its related instruments and on monitoring and reporting of climate issues such as mitigation and adaptation. The Medium- Term Work Plan was approved in 2018. Its objectives are to identify and select activities and projects consistent with the general objectives of the MoU, with the intention to make a substantial contribution to the implementation of both adaptation and mitigation actions, to proper address and manage the current and future impacts of climate change in Argentina. The measures for the implementation of activities also encompass institutional enhancement, capacity building on human resources and inter-institutional coordination for planning and management on adaptation to the climate change, as well as the sharing of resources, technologies and information, exchanging of experiences, best practices, trainees and personnel. The main areas of cooperation at interest are: • Improvement in Climate Data Collection, Management and Forecasting: development of early warning systems, data monitoring, recording and acquisition for vulnerability and risk assessment to climatic change; • Energy sector: development of renewable energy sources and enhancement of energy efficiency; • Sustainable forest management: promotion of sustainable forests management within local communities, forest restoration, deforestation and forest degradation; • Agricultural sector: promotion of sustainable agriculture and livestock;	https://www.mite.gov.it/pagina/argentina https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/schede_progetto/scheda_progetto_Strengthening_fire_early_warming_and_statistics_systems_Argentina.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
			• Transport sector: promotion of an efficient and low carbon emission transport system In the framework of the MoU, the following project was approved and is currently under implementation: *Strengthening Fire Early Warning and Statistics Systems in Argentina*, with a duration of 24 months and a budget of € 1,181,588, of which € 880,175 funded by MET. The main goals of the project are to strengthen the early warning national system on forest fire and to establish an online National Registry of Fire Statistics; to aware the population of the importance of forest fire prevention.	
Memorandum of understanding on Cooperation in the field of Climate Change Vulnerability, Risk Assessment Adaptation and Mitigation, between MASE and the Ministry of Science, Technology and Environment (CITMA) of the Republic of Cuba **(Signed in Havana on 14 July 2017 – 5 years)**	**Cuba**	Technology development & transfer Adaptation and Mitigation	This MoU intends to strengthen cooperation to combat climate change and address its adverse effects, to support mechanisms for reducing climate change vulnerability and strengthening risk assessment, to promote clean and efficient energy, to stimulate the economic and technological transformation towards sustainable development in ensuring energy security and creating adaptation actions and opportunities to protect the environment and natural resources. Priority areas of cooperation are: • collection, analysis, and dissemination of meteorological and sea-level data; • support to the implementation, monitoring, reporting and communication of NDCs; • enhancement of capacities for the implementation of mechanisms under the UNFCCC and its related instruments; • support to engineering projects related to adaptation to climate change, particularly in the coastal zone; • stimulation and dissemination of the economic and technological transformation to low emission development; • promotion and development of the use of renewable energies, in order to achieve the target established by both countries in their DCs; • development of public education and awareness campaigns on mitigation and adaptation to global climate change; • exchange of human resources and technical cooperation with other global climate change initiatives with countries in the region, in particular with small island developing and Coastal States;	https://www.mite.gov.it/pagina/cuba-1 https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/MoU_Cuba_Eng_11072017.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/schede_progetto/scheda_progetto_soluciones_ingenieras_malecon.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
			• development of capacities for regional research activities, including impact and adaptation modeling. The Medium-Term Work Plan was approved in Nov. 2017. Its objectives are to identify, select and plan activities and projects consistent with the MoU general scope, to strengthen and coordinate efforts to combat climate change adverse effects and to implement mechanisms for regional climate change vulnerability and risk assessment, adaptation and mitigation in the Republic of Cuba. It focuses on the following areas: • Early Warning Systems, data monitoring, recording and acquisition for vulnerability and risk assessment of the Cuban coastal zone to climatic change; • Use of computational tools and numerical models to assess scenarios in coastal areas vulnerable to sea-level rise due to climate change and/or flooding by extreme weather events; • Resilience and adaptation/mitigation actions in coastal areas, particularly linked to coastal protection-restoration and tourism development; • Assessment of Renewable Energy availability and needs in Cuba; • Strengthening disaster risk governance and national capacities for disasters prevention, mitigation, preparedness Projects approved within this MoU include: • . "*Improve national capacities for the introduction and use of innovative and advanced technologies and tools that strengthen vulnerability, risk, adaptation and mitigation assessments of climate change in Cuban marine ecosystems*", approved in 2018. The project, yet to be started, aims at applying new technologies for habitat mapping to support the monitoring, surveillance and early-warning systems, and at evaluating the sea-energy potential in Cuba; • Feasibility study on central coast front of the city of Havana: adaptation proposals for the climate change challenges (Engineering Solution Malecón), aimed at identifying possible engineering solutions to improve Havana coast front's level of protection against current and future climate change risks, especially coastal erosion	

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of Understanding on Cooperation in the field of Climate Change Vulnerability, Risk Assessment Adaptation and Mitigation between MASE and Ministry of the Environment and Energy of the Republic of Costa Rica (MINAE) (signed in Rome on 27 May 2016 – 5 years)	**Costa Rica**	Technology development & transfer Technical assistance	The MoU promotes coordinated efforts to contrast climate change, encouraging the realization of systems for risk assessment through the promotion of clean energy for the economic and technological transformation towards low-carbon systems. The cooperation activities aim at addressing the drivers of deforestation and land degradation, the reduction of deforestation and forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks. Capacity building and technology transfer is focused on monitoring and reporting on the following climate issues: • mitigation and adaptation • integrated management of maritime and coastal areas • sustainable mobility and transport • integrated water management and urban waste management Within this cooperation joint projects, exchange of information, exchange of experts as well as joint workshops and meetings have been implemented. The Medium Term Work Plan of the MoU was approved in 2018, focusing on the following areas: • Enhancement of energy efficiency and conservation, promotion of nonconventional renewable energies; • Promotion of electro mobility of private and public transport to develop low carbon towns resilient at climate change; • Reduction of emissions in the forestry sector, in particular from deforestation, and promotion of a sustainable forest management (REDD+); • Promotion of sustainable and low carbon agricultural practices; • Enhancement of waste regulatory framework to reduce GHG emissions and promotion of proper waste collection and treatment in urban areas; • Strengthening of the disaster risk governance and national capacities for disasters prevention, mitigation and preparedness, to address environmental concerns and risks, resulting from global climate change; • Integrated management of water resources The activities will be implemented through capacity building and sharing of resources, technologies and information.	https://www.mite.gov.it/pagina/costa-rica-0 https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/mou_cambiamento_climatico_italia_costa_rica_27052016.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of Understanding on Cooperation in the field of Biodiversity, Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation between MASE and the Ministry of Environment and Natural Resources of the United Mexican States (SEMARNAT) signed in Rome on 20 July 2016, 5+5 years	**Mexico**	Technology transfer Adaptation and Mitigation	The purpose of this MoU is to strengthen and coordinate the efforts for mainstreaming biodiversity in key sectors, to combat global climate change adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to stimulate and disseminate the economic and technological transformation to low emissions, to implement adaptation actions and opportunities to protect the environment, ecosystems, biodiversity and ecosystem services in Mexico. The Medium Term Work Plan of the MoU focuses on the following areas: • Enhancement of capacities for the implementation of UNFCCC Mechanisms and instruments (i.e. Paris Agreement); • Climate change mitigation and adaptation in biodiversity, forestry and natural protected areas; Further areas of interest might be envisaged in waste and water sectors. The activities will be implemented through capacity building measures, exchange of experiences, trainees and personnel, sharing of resources, technologies and information	https://www.mite.gov.it/pagina/mexico https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/mou_italia_messico_luglio2016_eng.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/work_plan_messico_03032017_eng.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
MoU on Cooperation in the field of Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation between MASE and the Ministry of Environment and Sustainable Development of the Republic of Paraguay (MADES) signed in Rome on 7 November 2018, 5 years	**Paraguay**	Technology transfer & technical assistance Mitigation and Adaptation	The purpose of this MoU is to strengthen and coordinate the efforts to combat global climate change'sadverse effects, to support mechanisms to reduce climate change vulnerability and enhance risk assessment, to promote secure, clean and efficient energy and to stimulate the transition towards a sustainable low-carbon economy through the implementation of adaptation actions and opportunities to protect the environment and natural resources. Priority areas of cooperation are: • collection, analysis and dissemination of data relevant to the observation of climate change and the measurement of its impacts on the potentially vulnerable economic sectors including strengthening of the early warning System and the risk assessment; • support for implementation, monitoring, reporting and communication of the Nationally Determined Contributions (NDCs); • sustainable management of forests including reduction of deforestation and forest degradation (REDD+), support to reforestation and afforestation programs providing the enhancement of forest carbon stocks; • promotion of sustainable integrated water management; • promotion and development of renewable energies (solar, wind and biomass); biodiversity preservation and reduction of environmental degradation; • promotion of sustainable crop and livestock production practices for greater food security and greenhouse gas emissions reduction, also through the application of the climate-smart agriculture approach (CSA); • exchange of human resources, technical cooperation and information with other global climate change initiatives; • stimulation and dissemination of the economic and technological transformation for low-carbon, sustainable development.	https://www.mite.gov.it/pagina/paraguay-0 https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/MoU_Paraguay_eng_08112018.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of Understanding on Cooperation in the field of Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation between the Ministry of the Environment of Perù (MINAM) and MASE **(Signed in Rome on 18 July 2016)**	**Peru**	Technology development & transfer and technical assistance Adaptation and Mitigation	The purpose of this MoU is to combat climate change effects, promote clean energy and economic and technological transformation towards low emission development, ensure energy security, protect the environment and natural resources and promote adaptation policies. The activities will be implemented through: • joint projects • capacity building, technology transfer and technical assistance • exchange of information and materials; • exchange of experts, delegations visits and trainees • joint organization of workshops, seminars or other meetings • joint participation of experts to events and projects • promotion of private sector participation and activities to implement Public Private Partnership initiatives. The Medium Term Work Plan objectives are: • to strengthen and coordinate efforts to combat global climate change and address its adverse effects; • to support mechanisms to reduce climate change's impact and variability, increasing the adaptive capacity and disaster risk management, providing better resilience to vulnerable sectors; • to support the key sectors emission reduction activities to drive the low emission of greenhouse gases to promote the development transformation process, in the framework of the Paris Agreement; • to stimulate and disseminate the economic and technological transformation to low emissions; • to implement adaptation actions and opportunities to protect the environment and the natural resources. The intention is to make a substantial contribution to the implementation of both adaptation and mitigation actions, to proper address and manage the current and future impacts of climate change in Peru. The foreseen lines of interventions are: • Information for risk management in the face of the effects of climate change; • generate enabling conditions to implement the NDCs in adaptation and mitigation; • implementation for prioritized NDCs in adaptation and mitigation; • environmental governance in prioritized sectors in mitigation and adaptation.	http://www.minambiente.it/pagina/peru https://www.minambiente.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/mou_peru_18072016.pdf https://www.minambiente.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/Peru_piano_lavoro.pdf https://www.minambiente.it/pagina/seconda-riunione-del-comitato-congiuntoapprovato-il-progetto https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/schede_progetto/2021_11_15_scheda_progetto_peru_NDC.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
			Within the MoU, the project "Supporting NDC's implementing in Peru" was approved in 2018 and is currently under implementatoin, with a total budget of 2.300.000 Euros, of which 2.000.000 Euros financed by MET. It aims at strengthening Peruvian environmental management system in order to restrain the damage caused by increasing extreme weather events. Specifically, the project aims at integrating and implementing the NDC's environmental adaptation and mitigation tools for achieving a sustainable, fair and resilient development, thus involving the entire population. The expected results are: • improved and up-to-date information for NDC implementation, to make it available to national and sub-national stakeholders, in particular on the climatic situation of glaciers, glacial lakes, wetlands, river basins and related carbon impact in these priority areas; • improved coordination for NDC implementation, by developing the capacity to integrate climate risk management into public investments; • implementation of NDCs at sub-national level in the agricultural, forestry and land use (AFOLU) sectors, for the purpose of mitigation and adaptation to protect the priority area of Selva Central (training of technicians and farmers, creation of public-private partnerships).	
Memorandum of Understanding on Cooperation in the field of Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation between the Ministry of the Environment and Natural Resources of the Dominican Republic (SEMARENA) and MASE (Signed in Rome on 15 February 2019, 5 years)	**Dominican Republic**	Technical assistance & technology transfer Mitigation and Adaptation	The purpose of this MoU is to strengthen and coordinate the efforts to combat global climate change adverse effects, to support mechanisms to reduce climate change vulnerability and enhance risk assessment, to promote secure, clean and efficient energy and to stimulate the transition towards a sustainable low-carbon economy through the implementation of adaptation actions and opportunities to protect the environment and natural resources. Cooperation will focus, in particular, on the following areas: • collection, analysis and dissemination of climate change observation data, and measurement of its impacts on potentially vulnerable economic sectors; • support for the implementation, monitoring, reporting and communication of NDCs; • elaboration of national policies and special programs for coastal zone management, disaster management, impact assessment and community level mitigation and adaptation measures; • promotion of integrated AND sustainable water management; • promotion and development of renewable energies; • promotion of sustainable agricultural production and farming practices and application of the "climate smart agriculture" (CSA) approach;	https://www.mite.gov.it/pagina/dominican-republic https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/mou_rep_dominicana_inglese.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
			• conservation of biodiversity and reduction of environmental degradation; • sustainable waste management; • sustainable forest management including reduction of deforestation and forest degradation (REDD +), support to reforestation and afforestation programs providing the enhancement of forest carbon stocks; • exchange of human resources, technical cooperation and information with other global climate change initiatives; • promotion and dissemination of economic and technological transformation for sustainable low-carbon development	

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
SMALL ISLAND DEVELOPING STATES (SIDS)				
Cooperation Program Italy-Pacific Small Island Developing States (PSIDS) 2007 – ongoing (extended until 2023)	**Pacific Small Island - Cook Islands, Fiji, Kiribati, Micronesia, Marshall Islands, Nauru, Niue, Solomon Islands, Palau, Papua New Guinea, Samoa, Tonga, Tuvalu, Vanuatu**	Technology development & transfer Adaptation and mitigation	The cooperation activities with the Pacific Small Island Developing States (PSIDS) are developed in the framework of a partnership launched in 2007, with the signature of a 1st MoU, then extended through subsequent addenda, the last of which was signed in 2019.To date, 14 beneficiaries are participating in the program. The Cooperation Program is divided into two macro areas of action (Sustainable Energy; Climate Change Adaptation) that fall within the mitigation, adaptation and contrast of climate change effects through the protection of terrestrial and marine ecosystems, paying particular attention to small vulnerable communities in rural areas and in remote islands. The activities contribute to the achievement of the Agenda 2030 Sustainable Development Goals. SDG 13 Climate Action is implemented as a priority. The projects approved address both mitigation and adaptation issues in a homogeneous way and some of them respond to both needs. Part of the projects focus on the training of young officials from local governments, in line with Article 11 of the Paris Agreement, to strengthen their skills in negotiation and implementation of international agreements on oceans and climate and the national capacity in the framework of the Paris Agreement and the 2030 Agenda for Sustainable Development, The Programme includes among others, the following capacity building/technology transfer projects: • UNFCCC "Capacity Award Programme to Advance Capabilities and Institutional Training in one Year (CAPACITY) for 5 years (2018 – 2022); • Tonga Fellowship on Sustainable Development 2020 Government of Tonga (Tonga): training of 1 young officer; • Tonga "2019 Tonga Fellowship on the Environment and Ocean (TFEO)"; • Support the development of the federate States of Micronesia's updated nationally determined contribution for 2020 (Micronesia); • Increasing Palau's resilience to extreme drought events: taking action for long term adaptation to the impacts of climate change: • Phase II of the Palau National Marine Sanctuary (PNMS) Project: Examining the potential effects of climate change on the distribution, long-term movements and local fisheries productivity of pelagic and nearshore resources in the PNMS;	https://www.mite.gov.it/pagina/isole-del-pacifico https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/amendment_n_4_isole_pacifico.pdf https://www.mite.gov.it/pagina/gli-ambiti-della-cooperazione https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/schede_progetto/isole_pacifico/2021_11_15_Scheda_Progetto_Tonga.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/schede_progetto/isole_pacifico/2021_11_15_Scheda_progetto_Micronesia.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/schede_progetto/isole_pacifico/03_2019/12.palau_increasing_resilience_to_extreme_drought_events.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/schede_progetto/isole_pacifico/07_2019/psids_micronesia_enhancing_water_security.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
			• Support the development of the Republic of Palau's updated Nationally Determined Contribution for 2020; • Enhancing Water Security and Climate Resilient Food Systems for the displaced atoll communities in Yap (Micronesia) • Support the development of the Republic of Nauru's updated nationally determined contribution for 2020.	
Memorandum of Understanding on Co-Operation on Climate Change Vulnerability, Adaptation and Mitigation between MASE and the Governments of Antigua and Barbuda, the Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and Grenadines, Suriname,	**CARICOM/ Antigua and Barbuda, Bahamas, Belize, Dominica, Grenada, Guyana, Haiti, St. Kitts and Nevis, St. Vincent and Grenadines, St. Lucia, Suriname**	Adaptation and Mitigation	So far, 11 CARICOM Countries signed the MoU: Antigua and Barbuda, Bahamas, Belize, Dominica, Grenada, Guyana, Haiti, St. Kitts and Nevis, St. Vincent and Grenadines, St. Lucia, Suriname. The MoU aims at facilitating the development and implementation of instruments under UNFCCC aiming at greenhouse gas emission reduction. Ares of cooperation include: • adaptation to climate change, and protection from the vulnerability to sea level rise and climate variability in the region; • identification, implementation, reporting and assessment of the Intended Nationally Determined Contributions; • development and dissemination of the use of renewable energies; • transfer of scientific and technical knowledge and experience, and technology transfer; • exchange of experts, scientists and researchers; • enhancing capacities for the implementation of Mechanisms under the UNFCCC and its related instruments; • promotion of joint ventures between the private sectors of the Parties. The Work Plan is broken down in two Programmes: • The **Sustainable Energy Programme**, articulated in five subprogrammes: 1. Development of climate change adaptation measures 2. identification, implementation, reporting and assessment of the Intended Nationally Determined Contributions 3. Assessment of energy requirements and strengthening of energy policies and action plans 4. Rural Electrification 5. Development of renewable energy sources	https://www.mite.gov.it/pagina/caricom-countries https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/protocollo_intesa_paesi_caricom.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/Caricom_Emendamento.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Trinidad and Tobago signed in 2015, 2016, 2018 by 11 countries out of 15 of the CARICOM area, 5 years			• The **Climate Change Adaptation Programme,** including two subprogrammes: 1. Risks Reduction from extreme weather events; 2. Protection and conservation of marine and terrestrial ecosystems and biodiversity From 2018, 6 new projects have been approved, to be implemented in the states of Antigua and Barbuda, Bahamas, Belize, Dominica, Grenada, Guyana, Haiti, St. Lucia, St. Vincent and the Grenadines, St. Kitts and Nevis, Suriname	
Memorandum of Understanding on Cooperation for the Development of Renewable Energy Sources and Mitigation and Adaptation to Climate Change in the Caribbean Region between MASE and the Caribbean Community Climate Change Centre (5Cs) **signed in Rome on 20 November 2015 – 5 years**	**CARICOM Climate Change Centre (5C) (Belize)**	Technology development & transfer Mitigation and Adaptation	The MoU with the Caribbean Community Climate Change Centre (5C) intends to support the implementation of the MoU between MET and CARICOM Countries to help them to implement projects and initiatives adopted by the Joint Committee. The cooperation activities aims at enhancing regional capabilities for responding effectively to climate change adverse effects in the region, also providing technical support for climate change mitigation and adaptation, including the development and use of renewable energy sources, and support mechanisms for building adaptation capacity and resilience to climate change vulnerability, including disaster risk assessment and reduction, and the development of conservation measures that minimize and address the impact of climate change and other anthropogenic activities on coastal and marine ecosystems. In the implementation of such programmes, projects and activities, consideration is given to the participation of the public and private sectors and, where necessary, universities, scientific and technical research bodies and NGOs within Italy and CARICOM Member States.	https://www.mite.gov.it/pagina/caricom-countries https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/protocollo_intesa_cccc_belize_novembre_2015.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/addendum_MOU_MATTM_5C_07112017_OpenSource.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of understanding on Cooperation in the field of Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation between MASE and the Ministry of the Environment and Energy of the Republic of Maldives Signed in Paris on 9th December 2015 (5 years)	**Maldives**	Technology development & transfer Adaptation and Mitigation	The main objective of this MoU is to strengthen and coordinate the efforts to combat global climate change adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote clean and efficient energy, to stimulate and disseminate the economic and technological transformation to low emission Development in ensuring energy security and creating adaptation actions and opportunities to protect the environment and natural resources. Cooperation activities and projects will focus on the following thematic priorities: improving meteorological risk management through early warning systems; supporting water management and treatment, also through desalinization; promoting renewable energy, strengthening technical capacities of local experts working in the field of environmental management through environmental education and training activities. This cooperation includes, among others, the following technology transfer projects: • *Ocean Energy Resources Assessment for Maldives (OpERATE)* - it aims at assessing the energy potential of the marine currents of the Maldivian archipelago, identifying technological solutions for its exploitation as renewable energy source, thus contributing to SDGs 7 and 13; • *Enhancing weather and climate monitoring and data management capacity of the Maldives Meteorological Service for reducing vulnerabilities of climate change in the Maldives* – Ended in 2019, it aimed at strengthening national adaptation capacity and building a climate resilient infrastructure	https://www.mite.gov.it/pagina/maldives https://www.mite.gov.it/sites/default/files/archivio/allegati/trasparenza_valutazione_merito/SVI/allegati/07_12_2016/MOU%20maldive.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/piano_azione_maldive_marzo2016.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/schede_progetto/maldive/2_ocean_energy_resources_assessment_maldives.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/schede_progetto/maldive/concluso_maldive_enhancing_weather_and_climate_momnitoring_and_data_management_capacity_pf_mms_rev.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of understanding on Cooperation in the field of Renewable Energy, Construction Energy Efficiency and Climate Change between MASE and the Ministry of Energy and Public Utilities of the Republic of Mauritius Signed in Port Louis on 12 February 2018 (5 years)	**Mauritius**	Technology transfer & technical assistance Adaptation and mitigation	The objective of this MoU is to promote and develop scientific, technical and economic relations in the fields of renewable energy, construction energy efficiency and climate change, on both aspects of mitigation and adaptation The areas of cooperation include, among others: • renewable energy technology, including but not limited to wind, solar, waste to energy, wave energy and biomass and training in energy efficiency; • training activities, exchange of experts and information on renewable energy and energy efficiency ,and climate change, related policies, legal framework, regulation, scientific research • training programs, seminars and scientific visits; • promotion of latest and new technologies in the fields of Renewable Energy and Energy Efficiency; • sustainable and integrated water management, to meet the needs of the population, water use efficiency, and development of solar powered water pumping systems; • sustainable waste management	https://www.mite.gov.it/pagina/mauritius-0 https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/MOU_Mauritius_Italy.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of understanding on Cooperation in the field of Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation between MASE and the Ministry of Public Works, Infrastructures Natural Resources and Environment of the Democratic Republic of Sao Tome and Principe **Signed in Katowice on 11 December 2018 (5 years)**	**São Tomé and Príncipe**	Technology transfer & technical assistance Adaptation and Mitigation	The purpose of this MoU is to strengthen and coordinate the efforts to combat global climate change and its adverse effects, to support mechanisms to reduce climate change vulnerability and enhance risk assessment, to promote secure, clean and efficient energy and to stimulate the transition towards a sustainable low-carbon economy through the implementation of adaptation actions and opportunities to protect the environment and natural resources. The areas of cooperation include: • collection, analysis and dissemination of data in order to observe and measure the impact of climate change on potentially vulnerable economic sectors, including strengthening of early warning system and risk assessment; • support for the implementation, monitoring, reporting and communication of the Nationally Determined Contributions (NDCs); • development of national policies and special programs for coastal zone management, disaster management, impact assessment and and adaptation measures at local level; • promotion and development of renewable energies; • biodiversity preservation and reduction of environmental degradation; • promotion of sustainable integrated water management; • promotion of Climate-Smart Agriculture (CSA) practices; • sustainable waste management; • exchange of human resources, technical cooperation and information with other global climate change initiatives; • stimulation and dissemination of the economic and technological transformation for low-carbon, sustainable development	https://www.mite.gov.it/pagina/sao-tome-and-principe https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/MOU_rep_dem_sao_tome_principe_eng.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of understanding on Cooperation in the field of Sustainable Energy for Climate Change Adaptation and Mitigation between MASE and the Ministry of Environment, Energy and Climate Change (MEEC) of the Republic of Seychelles **Signed in Victoria on 14 February 2018 (5 years)**	**Seychelles**	Technology transfer & technical assistance Adaptation and Mitigation	The objective of this MoU is to promote secure, clean and efficient energy in order to strengthen and coordinate the efforts to combat global climate change adverse effects and reduce vulnerability, to protect the environment and natural resources, and to stimulate the transition towards a sustainable low-carbon economy The cooperation will focus on the following areas of common interest: - support for the definition and implementation of policies, regulations and strategies related to renewable energy, to achieve the emission reduction target adopted by the Republic of Seychelles; - promotion and development of renewable energies, in particular solar, wind, biomass and hydroelectric sources; - monitoring and support for the implementation of the Nationally Determined Contributions; - promotion of energy efficiency; - installation of off-grid systems in order to supply electricity to remote areas that do not have access to the electricity grid; - promotion of the economic and technological transformation for low-carbon, sustainable development - resources sharing, technical co-operation and information exchange with other global climate change initiatives, in particular in Small Island Developing States	https://www.mite.gov.it/pagina/seychelles-0 https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/MoU_Seychelles_Final.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of Understanding on cooperation in the field of climate change vulnerability, risk assessment, adaptation and mitigation between MASE and the Ministry of Adaptation and Mitigation between MASE and the Ministry of Production, Environment, Industry and Handcrafts (VPMAPEATU) of the Union of Comoros **Signed in Paris on 9 December 2015 (5 years)**	**Union of Comoros**	Technology development & transfer Adaptation and Mitigation	The main objective of this MoU is to strengthen and coordinate the efforts to combat global climate change adverse effects. Adaptation actions are aimed at reducing vulnerability and building resilience, taking into account the urgent and immediate needs of this developing country that is particularly vulnerable. This cooperation aims also to promote clean and efficient energy; to stimulate and disseminate the economic and technological transformation to low emission development in ensuring energy security and creating adaptation actions and opportunities to protect the environment and natural resources The promotion of renewable energies is considered of priority importance to achieve the objectives defined by the government of Comores, as well as the development of programs and policy to contrast soil degradation and for waste management. The areas of cooperation include: • collection, analysis, and dissemination of meteorological and sea level data relevant to the observation and measurement of climate change impact on the potentially vulnerable sectors of the region's economies, such as: agriculture, health and tourism; • identification and communication of the Intended Nationally Determined Contributions • enhancement of capacities for the implementation of Mechanisms under the UNFCCC and its related instruments • sustainable waste management; • promotion of the economic and technological transformation to low emission development in ensuring energy security and creating adaptation actions and opportunities; • promotion and development of the use of renewable energies; • development of public education and awareness campaigns on mitigation and adaptation to global climate change; • resources sharing, technical co-operation and information exchange with other global climate change initiatives, in particular in Small Island Developing States	https://www.mite.gov.it/pagina/union-comoros https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/MoU_Comore_dicembre2015.pdf https://www.mite.gov.it/sites/default/files/archivio/allegati/trasparenza_valutazione_merito/SVI/programma_medio_termine_comore.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Sustainable Energy Facility for the Easter Caribbean Expanded (SEF-Expanded) **(2019-2027)** **GCF Decision B.14/17 of 27 Sept. 2016**	**5 Eastern Caribbean countries (Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines, InterAmerican Development Bank IDB)**		The goal of the SEF-Expanded programme is to contribute to the diversification of the energy matrix in five Eastern Caribbean Countries. SEF-Expanded is a comprehensive effort to reduce carbon emissions, lessen dependence on fossil fuels, and minimize the cost of power generation and electricity tariffs by promoting geothermal power in the five Eastern Caribbean nations. As a result of the SEF-Expanded programme, these five Caribbean countries will improve their energy security, promote their competitiveness, and enhance their fiscal and macro-economic stability. It will also aid in institutional strengthening and capacity building for those 5 countries. The SEF-Expanded project has a total value of 85.6 million $, and is divided into 3 main components: development of geothermal plants and transmission lines, capacity building and exploratory drilling. It is executed under the auspices of the Caribbean Development Bank (CDB) and the funding includes US$ 80 million in concessional loans, contingent recovery grants and grants from the Green Climate Fund (GCF) for the 3 components, as well as US$ 5.6 million for geothermal exploration drilling, in grants from the Republic of Italy's Ministry for the Environment who joined the programme in 2018.	https://www.mite.gov.it/notizie/al-il-progetto-sef-expanded https://www.iadb.org/en/news/idb-and-cdb-expand-sustainable-energy-facility-sef-eastern-caribbean https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp020-idb-dominica-grenada-saint-kitts-and-nevis-saint-lucia-and-saint-vincent-and.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
EUROPE AND CENTRAL ASIA				
Memorandum of Understanding on cooperation in the field of climate change vulnerability, risk assessment, adaptation and mitigation between MASE and the Ministry of Environmental Protection of the Republic of Serbia **Signed in Belgrade on 29 October 2019 (5 + 5 years)**	**Serbia**	Technology transfer & technical assistance Adaptation and Mitigation	The purpose of this MoU is to strengthen the cooperation between the two countries in order to coordinate efforts to combat global climate change adverse effects, to support mechanisms to reduce climate change vulnerability and enhance risk assessment, to promote secure, clean and efficient energy, to stimulate the transition towards a sustainable low-carbon economy and to implement adaptation actions and opportunities to protect the environment and natural resources. Cooperation will focus in particular, in the following areas: • collection, analysis and dissemination of meteorological and hydrological data relevant to the observation and measurement of climate change impact on the potentially vulnerable economic sectors; • implementation, monitoring, reporting and communication of the Nationally Determined Contributions (NDCs); • measures to strengthen capacities of the local communities and regions to combat global climate change adverse effects and to join to the Covenant of Mayors initiative; • measures to enhance vulnerable biodiversity ecosystems, preservation and promotion of integration of climate change adaptation best practices, strategies and methodologies into conservation planning frameworks, in consideration of species and ecosystems responses, and vulnerability to past and future anthropogenic climate change; • e) reduction of deforestation and forest degradation, enhancement of forest carbon stocks and sustainable management of forests and the wood supply chain; • f) improvement of sustainable integrated water management, in line with EU Directives 2000/60 and 2007/60; • g) promotion and development of renewable energies in order to achieve the target established by the Republic of Serbia; • h) sustainable waste management.	https://www.mite.gov.it/pagina/serbia-0 https://www.mite.gov.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/mou_serbia2019.pdf

			Activities will be implemented through: • joint projects; • capacity building, technology transfer and technical assistance; • exchange of information on environment, including programs, publications, expertise and study results; • exchange of experts and trainees, delegation visits; • joint workshops, seminars and other meetings; • promotion of private sector participation and activities to implement Public Private Partnerships; • improved cooperation with local communities, NGOs and civil society with regard to programs and initiatives in the field of environment, climate change and sustainable development; • enhancement of public education and awareness campaigns on measures for climate change mitigation and adaptation; • - development of fund raising capacities with regard to global climate resilience and sustainable development.	

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
ASIA/MIDDLE EAST				
Memorandum of Understanding on Sustainable Development between the Ministry for the environment of the Italian republic and the Ministry of climate change and environment of the United Arab Emirates (signed in New York on 24 September 2018 - ongoing)	**United Arab Emirates**	Adaptation and Mitigation	The objective of this Memorandum of Understanding (MoU) is to reinforce bilateral cooperation between the Parties in the fields of climate change and sustainable development, on the basis of mutual benefit. Under this MoU the transfer of technologies and the capacity building activities aim to ensure the involvement of the private sector. The identified areas of cooperation are: implementation of the measures for mitigation and adaptation to climate change, as identified in the "Nationally Determined Contribution" that the United Arab Emirates has submitted to the UNFCCC on 22 October 2015; stimulation and dissemination of policies and tools to encourage economic diversification and technological transformation towards a sustainable economy; identification and implementation of climate change adaptation measures and new sustainable development opportunities in the field of urban planning and land development, buildings and construction, transport, renewable energy, energy efficiency and resource efficient and cleaner production; - identification and implementation of policies and technical solutions for sustainable farming, fisheries, food processing, landscaping, biodiversity conservation and tourism in the hyperarid environment; identification and implementation of policies and technical solutions to air quality, noise monitoring and controlling, chemicals management and waste management; transfer of technologies and capacity building, aiming to ensure the involvement of the private sector; foster technical cooperation and information exchange.	https://www.minambiente.it/pagina/emiratiarabi
Sino-Italian Cooperation Program for Environmental Protection (SICP) between Italian Ministry for the	**China**	Technology development & transfer Multiple areas	The Cooperation Program between China and Italy, especially dedicated to Climate Change, has been launched on March 2011 with the aims to start a joint program of activities addressing mitigation and adaptation to climate change, transfer and promotion of low-carbon technologies, studies and researches as scientific support to decision making. The cooperation program includes activities for training and capacity building Programs on Climate Change and Sustainable	http://www.minambiente.it/pagina/cina

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Environment and People's Republic of China (launched in 2011)			Development. The training aims at providing Chinese participants with theoretical instruments and practical cases on Italian and European experiences in the field of environmental protection and climate change. The Chinese Institutions involved are: Ministry of Science and Technology (MoST), Chinese Academy of Social Sciences (CASS), Ministry for Environmental Protection (MEP), Beijing Metropolitan Environmental Protection Bureau (BMEPB), Shanghai Environmental Protection Bureau (SEPB), Tianjin Science & Technology Commission (TSTC) e la National Development and Reform commission (NDRC), and from 2013 the Ministry for Industry and Information Technology (MIIT). Specific courses have been organized in the field of climate change and sustainable development related issues: - Capacity building on climate change - Climate change: policy, conventions and statistical systems - Environmental management and sustainable development - Eco-cities - Industrial Energy Efficiency - Sustainable Development: Innovation of Science Technology and Management for Ecological Environment - Air and water pollution prevention and control - Eco –management Strategies and Policies - High-Technology and Science Parks for Sustainable Development - Innovation of Enterprises Green Technologies The capacity building activities halted in 2020.	

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of Understanding between The Ministry for the Environment of the Italian Republic (MASE) And the University of Tongji on SICES (signed in Shanghai on 18 May 2018, duration three years)	**China**	Adaptation and Mitigation	The objective of this MoU is the establishment of the Sino-Italian Center for Sustainability (SICES) supported by MASE and the University of Tongji (Tongji). The Center aims at enhancing the collaboration between Italian Research centers and Chinese Research center on Greener Cities to promote research and capacity building in Climate Change Adaptation/Mitigation, Energy Efficiency/Renewable Energy, Resource Efficiency/Circular Economy sectors.	https://www.minambiente.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/protocollo_tongji.pdf
SINO ITALIAN CAPACITY BUILDING FOR ENVIRONMENTAL PROTECTION (SICAB)	**China**	Adaptation and Mitigation	The Sino Italian Capacity Building for Environmental Protection SICAB is a high-level training program supported by the Italian Ministry for the Environment within the SINO-ITALIAN cooperation program for environmental protection (SICP). Since 2003, MASE promotes an Advanced Training Program on Environmental Management and Sustainable Development aimed at technicians, academics, young professionals and decisionmakers from Chinese administrations, universities and companies. It focuses on the planning capacity of the representatives of the central and local Chinese institutions in the field of environmental issues that have been deemed as a priority in the Chinese agenda, specifically: – climate change – sustainable development – environmental management – pollution of air, water, soil and urban areas: prevention and management – waste management and disposal -green economy and resource efficiency	https://www.sicab.net/en/programme/sicab/ https://www.fondazionepolitecnico.it/wp-content/uploads/2022/03/sicab-comunicato-finale.pdf fondazioneitaliacina.it/en/la-fondazione/area-news/fondazione/2022/03/1070/

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
			With the aim of deepening relevant and innovative aspects in the contest of mitigation and adaptation to climate change in the perspective of a green and sustainable growth the following training courses have been organized: • CLIMATE CHANGE AND ECOSYSTEM (online, nov-dic 2021) • SCIENCE, TECHNOLOGY, INNOVATION AND GREEN GROWTH (online, dic 2021) ** • Climate Scenarios, Adaptation and Mitigation Policies (Como, 15-29 Sept 2019) • Environmental Management and Climate Change (Beijing, 16-18 Oct 2019) • Climate Scenarios and Adaptation and Mitigation Policies (Guanzhou, June 2019) • Soil and Groundwater Pollution and Climate Change (Como, June 2019) ** • CLIMATE SCENARIOS AND ADAPTATION AND MITIGATION POLICIES, (Como, Dec 2018)	
Memorandum of Understanding on co-operation in the field of climate change vulnerability, risk assessment, adaptation and mitigation between MASE and the Ministry of Natural Resources and Environment of the Socialist Republic of Viet Nam (Signed in Hanoi on 5 June 2018,	**Viet Nam**	Mitigation and Adaptation	This MoU aims to strengthen and coordinate the efforts to combat global climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, and to coordinate the efforts of adaptation to the global climate change, promoting measures and techniques aimed to protect the environment and natural resources and to enhance the regional and local resilience in Viet Nam. Priority areas of cooperation are: climate change adaptation and mitigation, remote sensing application, water resources management and the enhancement of capacities for the development of the National Spatial Data Infrastructure. In May 2021 the second meeting of the joint committee was organized in videoconference due to COVID-19 pandemic restrictions, with the aim of presenting and sharing the guidelines and priorities of the Strategy for the environmental international cooperation of the Ministry of the Environment	https://www.minambiente.it/pagina/vietnam

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
duration five years - ongoing)			for the three-year 2020-2022, focusing on: sustainable development cooperation; the three Rio Conventions regarding climate change; loss of biodiversity and desertification. Within this MoU In 2020 the Project "Set up and implementation Geo-Information System for Climate Change Vulnerability, Risk Assessment and Environment monitoring for Vietnam" was approved with the aim of implementing a Geo-Information System in Viet Nam to monitor and assess the impacts of and vulnerability to Climate Change based on remote sensing technology.	
Memorandum of Understanding on cooperation in the field of energy between MASE and the Ministry of New and Renewable Energy of the Republic of India (signed in New Delhi on 30 October 2017 ongoing)	**India**	Adaptation and Mitigation	This MoU for the cooperation in the energy sector is focused on two main areas of cooperation: promotion of the production and utilization of renewable energy from solar power, wind energy, hydroelectric and biomass; elaboration of new technologies in the energy field, especially for the energy storage. Cooperation activities include capacity building through training and education. In the frame of the scientific and technological cooperation between Italy and India the Ministry for Foreign Affairs and International Cooperation and the Indian Ministry of science and technology launched a call to collect joint projects for the years 2021-2023 also on climate change.	https://www.minambiente.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/MOU_India.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Technical Agreement on sustainable development cooperation in the field of climate change adaptation and mitigation between the Ministry for the environment of the Italian republic (MASE) and the Jordan renewable energy and energy efficiency fund (JREEEF) (signed in Rome on 21 march 2018, duration five years, - ongoing)	**Jordan**	Adaptation and Mitigation	The objective of this TA is to reinforce bilateral cooperation between MASE and JREEEF in the field of climate change and sustainable development, on the basis of equality, reciprocity and mutual benefit. Within this cooperation the environmentally sound technology transfer and the capacity building activities are in the field of: renewable energy and energy efficiency measures; implementation of research and development on low-carbon technologies through the private sector engagement; implementation of the measures identified in the Intended Nationally Determined Contributions (NDCs) and in particular in the INDC that the Hashemite Kingdom of Jordan has submitted to the UNFCCC in November 2016 and which became a NDC in 2017 and the development of innovative financial measures and economic instruments for the renewable energies and energy efficiency measures. Projects: Installation of Solar PV Systems for Municipalities in the HashemiteKingdom of Jordan June 2019 – June 2022 Activities: • Training for technicians of municipalities for plants maintenance • Monitoring with field visits • Information and communication activities.	https://www.mite.gov.it/pagina/giordania

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of understanding between MASE and the Ministry of Environment and Natural Resources Protection of Georgia (signed in Bonn on 15 November 2017, duration five years)	**Georgia**	Adaptation and Mitigation	This MoU aims to strengthen and coordinate the efforts, to combat global climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote clean and efficient energy, to stimulate and disseminate the economic and technological transformation to low carbon emissions and to implement adaptation actions and opportunities to protect the environment and natural resources in Georgia. The intention is to make substantial contribution to the implementation of both adaptation and mitigation actions to proper address and manage the current and future impacts of climate change in Georgia. The WP focuses on the following areas of interest: - forestry - water management - renewable energy and energy efficiency - agriculture and air protection. This bilateral cooperation includes capacity building activities with particular attention to technical assistance aimed to enable the environment for private investments, including the introduction of appropriate measures within the policies and regulatory framework of the Parties. Joint activities focus also on environmental education and training programme as well as on technical assistance to strenghten access to funds from International Financial Institutions (IFIs). In the framework of this cooperation, two projects feasibility studies have been implemented focusing on air pollution and on the integrated management system of the Mktari river basin.	http://www.minambiente.it/pagina/georgia

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
MoU between MASE and The Ministry of Energy of the Republic of Kazakhstan (Signed in Astana, on 4 September 2017, duration 5 years)	**Kazakhstan**	Adaptation and Mitigation	The purpose of this Memorandum of Understanding (MoU), within the competencies of the Signatories, is to strengthen and coordinate the efforts to combat global climate change and address its adverse effects, to support mechanisms to reduce climate change vulnerability and risk assessment, to promote clean and efficient energy, to stimulate transition towards a sustainable low- carbon economy and to implement adaptation actions and opportunities to protect the environment and natural resources in the Republic of Kazakhstan. A capacity building project has been launched within the implementation of the Memorandum of Understanding assuring the financial and technical support of kazachian experts for the participation to the most important international environmental events and to bilateral meetings including the Italian Event ECOMONDO Green Technology EXPO 2019-2020, COP 25 (2019), 26 (2020).	https://www.minambiente.it/pagina/kazakistan
Technical Arrangement on co-operation in the field of environmental protection and sustainable development between the Ministry for	**Iraq**	Adapation and Mitigation	Through this Technical Arrangement the Parties will encourage and develop cooperation in the field of environmental and climate protection and sustainable development on the basis of equality, mutual benefits and in accordance with their laws and regulations, taking into consideration their environmental and climate policies. The Parties will cooperate through capacity building activities in the field of: • Systematic observation of the climate system; • Provision of climate services in support of sustainable development, health and safety of population; • Early warning systems and emergency preparedness;	https://www.minambiente.it/pagina/kurdistan-iraq

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
the environment of the Italian republic and the Ministry of transportation and communications of the kurdistan regional government of Iraq (signed in Rome on 20 july 2017, duration five years)			• Climate change adaptation and mitigation; • Impacts of climate change on agriculture and food security; • Management of water resources; Development of data archives related to climate change and data rescue of historical climate dataWithin this Mou the following projects have been implemented:" - "Supporting in Implementing the TA on Sustainable Development Cooperation in the field of Climate Change Adaptation and Mitigation". The project aims at facilitating the implementation of the Agreement and the participation of the Counterpart to international meetings. - "Enhancement of Kurdistan Automatic Weather Observation network" :this project aims at improving the metereoligical network in Kurdistan with the installement of 52 automatic meteo station and 3 measurement discharge stations without contact. The project includes exchange of competencies and the management of training courses both in the Italian metereological service and at local level.	
Memorandum of Understanding on Cooperation in the Field of Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation between MASE and the Ministry of Agriculture and the protection of the Environment of Turkmenistan **signed in Rome on 7 November 2019,**	**Turkmenistan**	Adaptation and Mitigation	The Memorandum of Understanding between Italy and the Turkmen Republic aims to strengthen and coordinate actions to combat global climate change and address its negative effects.The Agreement provides in particular that the parties collaborate, through joint projects, technology transfer, exchange of information and experts, joint organization of workshops, seminars and meetings. Capacity building activities are provided or the implementation of mechanisms within the UNFCCC and related tools together with educational campaigns and awareness raising on mitigation and adaptation to climate change.	https://www.mite.gov.it/pagina/turkmenistan-1

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
duration five years (ongoing)				
MoU on Cooperation in the field of Climate Change Vulnerability, Risk Assessment, Adaptation and Mitigation between the Ministry for the environment of the Italian republic and the State committee for ecology and environmental protection of the Republic of Uzbekistan (signed in Tashkent, on 24 January 2019, ongoing)	**Uzbekistan**	Adaptation and Mitigation	The main objectives of this Memorandum of Understanding, within the respective competences of the Parties are: to strengthen and coordinate the efforts, to combat global climate change and address its adverse effects; to support mechanisms for regional climate change vulnerability and risk assessment; to promote clean and efficient energy; to stimulate and disseminate the economic and technological transformation to low emissions and Green Economy; to implement adaptation actions and opportunities and to protect the environment and natural resources in the Republic of Uzbekistan. The Parties will cooperate in the analysis of the impact of climate change on the environment, in the implementation, monitoring and communication of the NDCs, the reduction of the biodiversity loss and the enhancement of capacities for the implementation of Mechanisms under the UNFCCC and related documents for the 2030 Agenda for Sustainable Development. Capacity building will be addressed to climate change adaptation at national and local levels. Joint cooperation will focus on the development of public education and awareness campaigns on environmental protection, to mitigation and adaptation to climate change, to air quality and land quality monitoring, on integrated management of ecosystems in water bodies and coastal areas, on sustainable management of protected areas, on integrated waste management and to support the preparation and implementation of disaster risk reduction action plans under the Sendai Framework for Disaster Risk Reduction 2015-2030. The cooperation between the Parties will be conducted through joint projects, capacity building, technology transfer and technical assistance including the exchange of experts and trainees, the organization of delegation visits, workshops, seminars or other meetings. The promotion of private sector participation and activities for the development of Public-Private Partnerships are also included as well as the enhancement of cooperation with the non-governmental	https://www.minambiente.it/pagina/uzbekistan

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
			organizations with regard to programs and initiatives in the field of environment and sustainable development and development of fundraising capacities with regard to global climate and sustainable development.	
AFRICA/MED REGION				
MoU on co-operation in the field of climate change vulnerability, risk assessment, adaptation and mitigation between MASE and the Ministry of Environment, wildlife and tourism of the Republic of Botswana (signed in Paris on 11 December 2015, duration five years expired in December 2020)	**Botswana**	Technology development & transfer Adaptation and Mitigation	The purpose of the Memorandum of Understanding now expired, but subject to a negotiation phase ended in December 2021, is the strengthening of the efforts to combat climate change and address its adverse effect in the Republic of Botswana. Among the areas of co-operation: • Enhancement of capacities for the implementation of Mechanisms under the UNFCCC and its related instruments; • Simulation and dissemination of the economic and technological transformation towards low emission development in ensuring energy security and creating adaptation actions and opportunities • Development of public education and awareness campaigns on mitigation and adaptation to global climate change. The cooperation is carried out through the following means: - implementation of joint projects - capacity building - technology transfer technical assistance	http://www.minambiente.it/pagina/botswana

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
MoU on Cooperation in the field of Climate Change vulnerability, risk assessment, adaptation and mitigation between MASE and the Ministry of Environment, Nature Conservation and sustainable Development of the Democratic Republic of the Congo (signed in Marrakech on 17 November 2016, duration five years)	**Congo**	Technology development & transfer Adaptation and Mitigation	The Memorandum of Understanding is aimed at strengthening and coordinating the efforts to combat global climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote clean and efficient energy, to stimulate and disseminate the economic and technological transformation to low emission Development in ensuring energy security and creating adaptation actions and opportunities to protect the environment and natural resources. Areas of cooperation: Forestry sector; Agricultural sector; Energy efficiency. Cooperation activities will include, among others, realization of joint projects, capacity building, technology transfer and technical assistance. Ongoing Projects: • "Sustainable Energy Services for Rural DRC" (ongoing, April 2019-April 2022); Outputs in progress: 80 entrepreneurs trained for commercial and financial activities in the energy sector; 15 public officials in renewable energies and rural electrification trained . • "Decentralized networks of off-grid systems based on Renewable Energy" • "Sources and energy efficiency measures" (not yet launched, date to be defined) On 27 Sptember 2021 with the sixth Meeting of the Joint Committee which occured in videoconference was launched the negotiation of the new MoU on Cooperation in the field of sustainable development which include several cooperation areas.	http://www.minambiente.it/pagina/repubblica-democratica-del-congo
MoU on Cooperation in the Field of Climate Chance Vulnerability, Risk Assessment, Adaptation and Mitigation between MASE and the Ministry of Habitat, Planning and Environment	**Djibouti**	Technology development & transfer Adaptation and Mitigation	The general objectives of the MoU between MASE and the Ministry of Habitat, Planning and Environment of the Republic of Djibouti are: • to strengthen and coordinate efforts to combat global climate change and address its adverse effects • to implement adaptation actions and opportunities to protect the environment and natural resources The intention is to make a substantial contribution to the implementation of both adaptation and mitigation actions, to proper address and manage the current and future impacts of climate change	http://www.minambiente.it/pagina/gibuti

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
of the Republic of Djibouti (signed in Marrakech on 17 November 2016, duration five years)			in Djibouti. The Work Plan has identified the following areas of cooperation : • Environmental governance on mitigation and adaptation activities • Development of renewable energies and increase of energy efficiency • Promotion of sustainable agricultural practices • Integrated management of water resources Projects: - A Nearly Zero Emission Sustainable Building in the University of Djibuti (not yet launched, date to be defined. Planned activities: Training of personnel; drafting of a study with proposals of measures and legislative schemes to boost the use of renewable sources, the energy efficiency and the waste recycle. - Renewable Energy Potential Assessment in Djibouti. (not yet launched, date to be defined). This project will produce a Study on the potential of solar power, wind energy and geothermal energy in Gibuti.	
MoU on environmental protection and sustainable development cooperation between MASE and the Egyptian Ministry of Environment, (signed in Paris on 8 December 2015, duration six years)	**Egypt**	Technology development & transfer Adaptation	This MoU is intended to develop programmes, initiatives and projects dealing with prevention and/or reduction of environmental pollution, environmental preservation and sustainable development. In particular the cooperation between the Parties will be conducted by means of Capacity building, technology transfer and technical assistance in: promoting measures of adaptation to climate change, with particular linkages to land management, water resources, coastal zone management and sea-level rise; enhancing public awareness, raising activities on climate change and water quality management aimed to enhance local authorities and strengthen the administrative decentralization process . The Work Plan has identified the following priority areas of cooperation Management of protected areas • Production of energy from renewable sources • Sustainable management of the waste cycle Initiatives to promote sustainable public transports	https://www.minambiente.it/pagina/egitto

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
			• Capacity building activities	
Technical Agreement on Co-Operation in the field of Mitigation and Adaptation to Climate Change between MASE and the Ministry of the Environment, Forest and Climate Change of the Federal Democratic Republic of Ethiopia (signed in Marrakech on 18 November 2016, duration five years)	**Ethiopia**	Capacity building, training and awareness raising Adaptation and Mitigation	The purpose of this Technical Agreement is to strengthen and coordinate the efforts to combat global climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote clean and efficient energy, to stimulate and disseminate the economic and technological transformation to low emission development, to ensure energy security and to create adaptation actions and opportunities to protect the environment and natural resources. The cooperation is carried out, among others, in the following areas of common interest: • Promotion of good practices exchange, resources sharing, technical co- operation and information exchange with other global climate change initiatives; • Development of fund raising capacities with regard to environmental issues and climate diplomacy; • Development of research activities, also at regional level, including research on the impact of climate change and on the nexus between migration and climate change; • Development of public education and awareness campaigns on mitigation and adaptation to global climate change. • On 29 April 2021 with the fifth Meeting of the Joint Committee which occured in videoconference was launched the negotiation of the new MoU on Cooperation in the field of sustainable development which include several cooperation areas.	http://www.minambiente.it/pagina/etiopia

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Memorandum of Understanding on cooperation in the field of sustainable energy for climate change adaptation and mitigation between the Ministry of energy and petroleum (MOEP) of the Republic of Kenya and the Ministry for the environment (MASE) of the Italian Republic (signed in Nairobi on 23 January 2018, duration five years)	**Kenya**	Mitigation and Adaptation	The objective of this MoU, within the competences of the Signatories, is to promote secure, clean and efficient energy in order to strengthen and coordinate the efforts to combat global climate change, address its adverse effects and reduce vulnerability, to protect the environment and natural resources, and to stimulate the transition towards a sustainable low-carbon economy. Areas of cooperation: • support to the implementation, monitoring, reporting and communication of the Nationally Determined Contributions (NDCs) in the renewable energy sector; • support to the development and implementation of policies, strategies and plans in the sustainable energy sector in order to achieve the emission reduction target adopted by the Republic of Kenya; • promotion and development of renewable energies, in particular hydropower, geothermal, biomass, wind and solar; • enhancement of energy efficiency; • promotion and deployment of renewable energy technologies for off-grid rural electrification as decentralized systems; • stimulation and dissemination of the economic and technological transformation for low-carbon, sustainable development. Cooperation activities include capacity–building, exchange of information and documents related to renewable energy and environment, including programs, publications, expertise and study results, joint organization of workshops, seminars and enhancement of public education and awareness campaigns on measures for adaptation to climate change. In the implementation of the programs, projects and activities, consideration will be given to the participation of the public, private and non-profit sectors, including, where appropriate, universities, scientific and technical research bodies, non-governmental organizations, as well as institutions on both sides.	https://www.minambiente.it/pagina/kenya
MoU on Co-operation in the field of	**Lesotho**	Technology development & transfer	The purpose of this Memorandum of Understanding is to strengthen and coordinate the efforts to combat global climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote clean	http://www.minambiente.it/pagina/lesotho

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
climate change vulnerability, risk assessment, adaptation and mitigation Between MASE and the Ministry of Energy and Meteorology of the Kingdom of Lesotho, (signed in NY on 21 April 2016- 21 April 2021, duration five years)		Adaptation and Mitigation	and efficient energy, to stimulate and disseminate the economic and technological transformation to low emission Development in ensuring energy security and creating adaptation actions and opportunities to protect the environment and natural resources. Cooperation activities are addressed to: • enhancement of capacities for the implementation of Mechanisms under the UNFCCC and its related instruments; • development of public education and awareness campaigns on mitigation and adaptation to global climate change; • capacity building for monitoring, reporting on climate issues, such as mitigation and adaptation and will be implemented , among others, by the following means: - realization of joint projects; - capacity building, technology transfer and technical assistance. The approved Work Plan has identified the following intervention lines : • Promotion and development of renewable energies Development of a national system for the measurement, communication and verification of greenhouse gas; • actions to tackle the deforestation process and the degradation of wooded areas in synergy with the UN REDD+ Programme Within this MoU two joint projects have been launched : - "Renewable energy potential maps for Lesotho" Within this project capacity building activities include the training of Local Officers and operators on the use of GIS (Geographic Information System) tools for the implementation of a GIS database for a better management and planning of renewable energies, thus contributing to the achievement of the SDGs and the Paris Agreement - "Energy refurbishment of four health centers in Lesotho": this project promoted energy efficiency actions for buildings and the installement of systems for the production of electric energy and heat from renewable energies, improving access to energy, air quality and services and the reduction of management costs.	

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MoU on cooperation in the field of climate change vulnerability, risk assessment, adaptation and mitigation between MASE and the Ministry of the Environment, Reclamation and Sustainable Development of the Republic of Mali (signed in Bonn, on November 16, 2017, duration five years)	**Mali**	Technology development & transfer Adaptation and Mitigation	The Memorandum of Understanding is aimed at strengthening and coordinating the efforts to combat global climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote clean and efficient energy, to stimulate and disseminate the economic and technological transformation to low emission Development in ensuring energy security and creating adaptation actions and opportunities to protect the environment and natural resources. The Areas of cooperation include: - the collection, analysis and dissemination of data related to the observation of climate change and the measurement of its impact on potentially vulnerable economic sectors; - support for the implementation, monitoring, reporting and communication of Voluntary National Contributions (NDC); - promotion of renewable energy and energy efficiency; - promotion of the practices of Climate Smart Agricultural (CSA); - sustainable forest management, including the reduction of deforestation and forest degradation and the enhancement of afforestation / reforestation; - sustainable and integrated water management. These activities aimed at strengthening skills, technical assistance, exchange of experts, organization of workshops and dedicated seminars, encouraging the involvement of the private sector and cooperation between universities and research centers in the two countries. The Work Plan has not been approved yet. On 8 May in Bonn was held the first meeting of the Joint Committee where Mali government (the counterparty) expressed a particular interest for energy efficiency projects of public organizations and water management.	http://www.minambiente.it/pagina/mali
Technical Arrangement on Environmental Protection and Sustainable Development Cooperation	**Morocco**	Mitigation and Adaptation	Under this TA the priority sectors of cooperation activities are: - Strengthening the implementation of the mitigation and adaptation measures envisaged by the National Voluntary Contributions (NDC), including through technical assistance to feasibility studies for pilot projects on mitigation and the establishment of a monitoring, reporting and verification system NDCs at national level;	http://www.minambiente.it/pagina/marocco

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Between MASE And and the Ministry delegate in charge of the Environment of the Kingdom of Morocco (signed in NY on 21 April 2016-21 April 2021, duration five years)			- Capacity building and dissemination of experiences and knowledge at the national and regional level on mitigation and adaptation to climate change; - Reinforcement of the national policy of integrated management, at a technical level, of coastal areas; - Strengthening of education on the environment and on sustainable development The approved Work Plan and related projects focused on some priority areas of cooperation among which Capacity building and dissemination of practices and knowledge at national and regional level on mitigation and adaptation to climate change and strengthening of education on environment and sustainable development . The "Project for the energy efficiency of the University Hospital Centre Ibn Rochd in Casablanca" including local training activities for technicians in order to assure a correct and efficient maintenance of plants on the long term carried out in Casablanca concluded. Ongoing project in 2020 and outputs: • **Supporting Secretary of State in charge of Sustainable Development (SEDD) in Implementing the Technical Agreement:** maroccain delegation participation to Ecomondo international Fair on Green Technologies • **Programme intégré d'éducation à l'environnement et ou devéloppement durable dans les établissements scolaires:** shools involved like beneficiaries of demonstrative actions, new environmental club, training of professionals and laboratories, teaching aids, teaching and informative material provided. • **Mise en place de la filière de valorisation des déchets de construction et de démolition / Commune de Marrakech:** capacity building activities on the ecological management of waste • **Programme de Promotion de l'entreprenariat vert**: training of young entrepreneurs, development of a platform for the sharing of green economy information, the publication of a guide for the ecological entrepreneurship.	

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
MoU on Cooperation in the field of Climate Change vulnerability, risk assessment, adaptation and mitigation between MASE and the Ministry of Natural Resources of the Republic of Rwanda (signed in Marrakech on 15 November 2016 , duration five years)	**Rwanda**	Technology development & transfer Adaptation and Mitigation	The purpose of this MoU is to strengthen and coordinate the efforts to combat global climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote clean and efficient energy, to stimulate and disseminate the economic and technological transformation to low emission Development in ensuring energy security and creating adaptation actions and opportunities to protect the environment and natural resources. The Work Plan approved in November 2017 focuses, among others, on the following areas of interest: • Climate change coordination: putting in place climate change policies and Strategies, Access to the means of implementation like climate finance, Technology and Capacity building, Greenhouse gases inventory and climate Negotiations • Energy sector: promotion and development of renewable energies and enhancement of energy efficiency. In particular, with regard to Access to the means of implementation, training workshops and meetings to build capacity of all stakeholders in Rwanda (Public, private, NGOs and Researchers) and exchange visits to share experience between specialized public and private Institutions from Rwanda and Italy were planned. Capacity building activities are focused on : support to climate change policy and strategies, to climate negotiation and to means of implementation; • strengthening of technologies and capacity; • greenhouse gas inventory. • promotion and development of renewable energies and promotion of energy efficiency; In the frame of the project "Sustainable Urban Wetlands Development within Kigali City" (July 2018 – July 2020) administrative officers and entrepreneurs have been trained on environmental impact assessment processes for the management of wetlands and urban waste In order to support the Rwandan Government in identifying and promoting projects and technology transfer opportunities and also to provide ad hoc capacity building activities within this MoU, on 15 January 2018 MASE signed **an agreement with Global Green**	http://www.minambiente.it/pagina/ruanda

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			Growth Institute (GGGI) Within this Agreement two online webinars and b2b between companies have been organized on 3rd and 6th of June 2020 in cooperation with the Italian Ministry for Ecological Transition and Africa Affairs. The aim was to investigate and promote Rwanda ecouraging the transfer of green technologies and the implementation of knowledge platform for italian and rwanda private companies. On 11 November 2020 during the sixth Meeting of the Joint Committee (online) has been launche dthe negotiation phase of the New MoU on Cooperation in the field of sustainable development with several areas of interest.	
Memorandum of Understanding between the Guateng provincial Government of the Republic of South Africa and Regione Emilia-Romagna of the Republic of Italy (signed on 18 October 2016-18 October 2021, duration five years)	**South Africa/ Guateng Province**	Technology transfer Mitigation and Adaptation	Gauteng Province and Emilia-Romagna Region cooperation aims at enhancing growth. Cooperation projects focus on water resources management and on the development of services for applied meteorology to contrast climate change as well as the development of scientific programs among Universities, in particular with the University of Pretoria to develop cooperation on the exchange of good practices opening at new research, education and training outlooks in the areas of agriculture and agri-food, climate changes and renewable energy. An annual bilateral summit involves the respective Chambers of Commerce, trade associations, universities, research and training centres. Mutual visit of delegations facilitate synergies with stakeholders, civil society, institutions and the public and private sector for the achievement of the goals. Chambers of Commerce, trade associations, universities, research and training centres. Mutual visit of delegations facilitate synergies with stakeholders, civil society, institutions and the public and private sector for the achievement of the goals.	MoU Emilia Romagna Region-Guateng Province : https://goo.gl/mNez8h https://fondieuropei.regione.emilia-romagna.it/coop-internazionale/notizie/2020/novembre/cooperazione-fra-europa-e-sudafrica

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
MoU on cooperation in the field of climate change vulnerability, risk assessment, adaptation and mitigation between MASE and the Ministry of Tourism and Environmental Affairs of the Kingdom of Swaziland (signed in Bonn on 17 May 2017, , duration five years)	**Swaziland**	Adaptation Mitigation	The purpose of this Memorandum of Understanding is to strengthen and coordinate the efforts to combat global climate change and address its adverse effects, to support mechanisms to reduce climate change vulnerability and enhance risk assessment, to promote clean and efficient energy, to stimulate the transition towards a sustainable low-carbon economy; to implement adaptation actions and opportunities to protect the environment and natural resources In the Work Plan signed in Johannesburg on July 4th 2017, selected activities and projects were identified with the aim to make a substantial contribution to the development and implementation of both adaptation and mitigation actions, to proper address and manage the current and future impacts of climate change in Swaziland, focusing on the promotion of sustainable practices and climate smart agriculture, integrated water management and the promotion of renewable energies and energy efficiency. Ongoing projects: • "Fossil fuel free and green building of the Raleigh Fitkin Memorial Hospital" for the reduction of greenhouse gas emissions CO_2 and energy consumption. Redevelopment of the Hospital as a case study to promote in the rest of the Country, both in the public and the private sector. Capacity building activities include the training of professionals is for the ordinary management of the satellite systems. (2018-2020) • "Mitigation and Adaptation Actions in the Civil Sector: a Demonstrative Experience in the MENT Buildings" for the promotion of the development of renewable energies also through the implementation of demonstrative inetrventions (2018-2020)	http://www.minambiente.it/pagina/swazilan d

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Technical Agreement on cooperation in the field of Energy, Climate Change, Environmental Protection and Sustainable Development between MASE and the Ministry of Energy, Mines and Renewable energy of the Tunisian Republic (MISME) (signed in Rome on 9 February 2017, duration five years	**Tunisia**	Technology development & transfer Adaptation	The purpose of the agreement signed on 9 February 2017 is to strengthen the effort to combat climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote secure, clean and efficient energy, to stimulate the transition towards sustainable low carbon economy and to implement adaptation actions and opportunities to protect the environment and natural resources. The Work Plan of activities includes: • the promotion of renewable energy and energy efficiency; • the implementation, monitoring and communication of NDC (Nationally Determined Contributions); • capacity building, technology transfer and technical assistance; • integrated coastal zone management; • Sustainable waste management • Enhancement of public education and awareness campaigns on measures or adaptation to climate change. Bilateral activities in Tunisia are supported by MEDREC (the Mediterranean Renewable Energy Center), established in 2004 in Tunis by MASE. Ongoing projects: - Promo-Isol – Establishment of a financing mechanism for the promotion of thermal 225nsulation roofs in the individual housing – Fase I. - Implementation project of a specialized unit in testing compliance and energy performance lighting devices. - PROMO-FRIGO – Establishment of a financing mechanism to replace refrigerators older then 10 years - Fase I. - Supporting and implementing Technical Agreement on cooperation in the field of energy, climate change, environmental protection and sustainable development.	http://www.minambiente.it/pagina/tunisia

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
Technical Arrangement on cooperation in the field of sustainable development between The Ministry for the Environment of the Italian Republic (MASE) and the Ministry of Agriculture, Water Resources and Fisheries of the Tunisian Republic (MAWRF) (signed in Rome on 30 May 2018, duration five years - ongoing)	**Tunisia**	Adaptation and Mitigation	The purpose of this Agreement on sustainable cooperation is to enable and support the implementation of actions aimed at reducing greenhouse gas emissions and climate change vulnerability and building resilience through the strengthening and coordination of efforts to combat global climate change and address its adverse effects, to support mechanisms for regional climate change vulnerability and risk assessment, to promote solutions combining two pillars: • climate change adaptation and mitigation, underpinning sustainable management of agricultural production systems • water resources and fisheries This Agreement intends to contribute to the objectives of emission reduction and adaptation to climate change set out by the Tunisian Government (Nationally Determined Contributions - NDCs) through projects in the field of agriculture, fishing, water resources and ecosystems. The cooperation between the Signatories will be conducted by the following means: - realization of joint projects; - capacity building, technology transfer and technical assistance; - exchange of information and documents, including programs, publications, expertise and study results; - exchange of experts, delegation visits and trainees; - joint organization of workshops, seminars and other meetings; - promotion of private sector participation and activities to implement Public Private Partnership initiatives; - realization of common research and development programs/projects; - support of multi-stakeholder innovation platforms (hubs) which gather policy makers, development agencies, civil society and the private sector with researchers and research institutions. The Work Plan of this Agreement focuses on the promotion of a sustainable tourism through the CSA (Climate Smart Agriculture) that is the FAO approach supported by Italy which strengthens the link between food security and climate adaptation policies and greenhouse gas emission policies.	https://www.minambiente.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/mou_tunisia.pdf

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
			Ongoing projects: • Implementing Climate - smart agricolture practices in Tunisia (ICAPT) • Renewable Energy for Agricultural and Rural Development in Tunisi. • Supporting in Implementing the Technical Arrangement on Sustainable Development Cooperation in the field of Climate Change Adaptation and Mitigation.	
Memorandum of Understanding on cooperation in the field of climate change vulnerability, risk assessment, adaptation and mitigation between planning the Ministry for the environment of the Italian republic and the government of the Republic of Zambia, acting through the Ministry of national development (signed in Rome on 30 November	**Zambia**	Adaptation and Mitigation	The objectives of this MoU are to develop systematic weather and climate observations and climate change research and to transfer technology for climate change early-warning systems. This cooperation aims at strengthening and coordinating the efforts to combat global climate change and address its adverse effects, to support mechanisms to reduce climate change vulnerability and enhance risk assessment, to implement adaptation actions and opportunities to protect the environment and natural resources, to promote secure, clean and efficient energy and to stimulate the transition towards a sustainable lowcarbon economy. Capacity building activities focus on the promotion of Climate Smart Agricultural (CSA) practices, of renewable energies and energy efficiency including off-grid renewable energy technologies for rural electrification as decentralized systems, in order to achieve the target established by the Republic of Zambia as well as the promotion of the sustainable use of resources. On 17 September 2020 the Joint Committee Meeting met for the first time. During the meeting the documents regulating the cooperation together with the project "Upgrade of the Lundazi Green village project – Magodi Solar (photo-voltaic) mini-grid" have been approved.	https://www.minambiente.it/pagina/zambia

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2018, duration 5 years)				
MULTILATERAL COOPERATION				
Memorandum of Understanding between the Italian Ministry of the Enviroment (MASE) and the United Nations Secretariat on Climate Change (UNFCCC)	**Youth4Capacity** Training Programme **31 August 2022**	Adaptation and Mitigation	Among the partnerships signed by the Youth4Climate initiative to support the activities and global youth mobilization, the Italian Ministry of Environment subscribed a memorandum of understanding with the United Nations Secretariat on Climate Change (UNFCCC), to establish a capacity building programme open to all young people with particular reference to those from developing countries. The aim of this new program called "Youth4Capacity" is to help develop the capacities of young people on climate change, also seeking to address the links between climate action and the implementation of the Sustainable Development Goals and the three Rio Conventions, in order to provide young beneficiaries with the capacity and knowledge to develop and implement actions in support of integrated and complementary approaches to support climate action in the context of sustainable development.	https://unfccc.int/topics/capacity-uilding/workstreams/youth4capacity
Initiative for Climate Action Transparency (ICAT), a multistakeholder partnership by the Children's Investment Fund Foundation (CIFF); Climate Works Foundation (CWF); the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety	from Africa: Algeria, Angola, Botswana, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Ethiopia, Ghana, Guinea, Kenya, Liberia, Morocco, Mozambique, Nigeria, Niger, Rwanda, Senegal, South Africa, Sudan, Tanzania, Tunisia, Zimbabwe from Asia:	Adaptation and Mitigation	In November 2015 the Ministry for the Environment, adhered to the Initiative for Climate Action Transparency (ICAT). The Ministry has contributed with 10 million Euro to the ICAT trust fund, managed by UNOPS, to assist different beneficiary countries. ISPRA (the Italian Institute for Environmental protection and research), the technical branch of MASE, is involved as ICAT implementing partner both in the definition of the methodological toolbox and in the in-country capacity building activities which have been carried out from 2020 and will last until 2023. ISPRA provides support and capacity building to 11 beneficiary countries (Argentina, Belize, Botswana, China, Cuba, Ethiopia, Maldives, Sudan, Tunisia, Vietnam, Zimbabwe). ICAT is a voluntarily and multilateral initiative to which adhere both Donor Countries and non-governmental actors. This initiative was founded to respond to the critical need to support improved transparency and capacity building under the Paris Agreement. ICAT integrates guidance, capacity building and knowledge sharing to engage countries in the use of a common framework to assess the	https://www.minambiente.it/pagina/unops-initiative-climate-action-transparency-icat

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(BMU); and the Italian Ministry for the Environment (MASE); 2015-ongoing	Bangladesh, Cambodia, China, India, Indonesia, Maldives, Philippines, Sri Lanka, Thailand, Viet Nam from Latin America & Caribbean: Argentina, Belize, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Kazakhstan, Mexico, Peru, Trinidad & Tobago, Turkmenistan, Uzbekistan		impacts of their policies and actions and report progress, fostering greater transparency, effectiveness and ambition. The Initiative will improve the availability and quality of data and enable countries to promote efficient, cost-effective policies. ICAT will also provide a platform for countries to share lessons learned and build mutual confidence in their climate actions. The initiative is working with developing countries to strengthen capacity to assess climate actions (in the context of their NDCs) and report their progress in line with the Paris Agreement, based on individual country needs. ICAT works closely with governments, along with public agencies, higher education institutions and civil society bodies, to strengthen institutional arrangements, processes and procedures. The initiative supports in-country capacity development programmes through training modules on measurement reporting and verification (MRV) of policies and actions. Development and Immigration WP priorities: 1) Clarity on NDC and NDC action indicators for tracking progress and achievement; 2) Improvement of existing MRV mechanisms to incorporate new indicators; 3) Clarity and formalized roles, mandates and tasks of the institutions involved in MRV; 4) Enhanced capacity and tools for MRV. **Botswana** – official counterpart: Meteorological Services department WP priorities: 1) Assessment of the existing MRV needs and gaps; 2) Training for data collection for LULUCF sector; 3) establishing the basis to strengthen national institutional arrangements. **China** – official counterpart: Ministry of Ecology and Environment WP priorities: 1) Creating sustainable institutional arrangement to support high-quality compliance with international transparency rules and requirements; 2) Fully migrating to the 2006 IPCC guidelines and new updates; 3) Improve the MRV of methane emissions. **Cuba** – official counterpart: Ministry of Environment, Technology and Science WP priorities: 1) NDC update and development of a low carbon development strategy for 2030, in relation to the energy and transport sectors. 2) Assess the cost-effectiveness of mitigation policies and actions with a view to enhance the NDC tracking and reporting **Ethiopia** – official counterpart: Ministry of Environment, Forestry and Climate Change	

Programme or project title	Recipient country/ region	Targeted area	Description of programme or project	Comments
			WP priorities: TBD **Maldives** – official counterpart: Ministry of Environment Waste management WP priorities: 1) Data collection and management for waste management MRV; 2) Capacity building for MRV purposes of stakeholders involved in waste management; 3) Creating enabling environment for continuous data reporting and sharing , and regular mail communications and calls to discuss new developments. **Sudan**– official counterpart: National Council for the Environment WP priorities: Use of ICAT Guidance to track NDC implementation in the transport and energy sectors. **Tunisia**– official counterpart: Ministry of local affairs and the Environment WP priorities: TBD **Vietnam** – official counterpart: Ministry of Natural Resources and Environment WP priorities: 1)Tracking progress of NDC implementation at sector levels and aligning data collection systems with MRV/transparency at national level through the GHG inventory system. 2) Integrated assessment of NDC and SDG implementation at both sector and national levels, using ICAT methodologies. **Zimbabwe**– official counterpart: Ministry of local affairs and the Environment Results and any kind of material on the countries support can be found at the address: https://climateactiontransparency.org/our-work/country-supports/.	

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Pan-African Support to Geological Sciences and Technology Africa-EU Partnership (PanAfGeo-2) 12 geological Surveys of Europe including the Italian Geological Survey (Italian Instiute for Environmental Protection and Research ISPRA).	PanAfGeo2" project	Adaptation and Mitigation	"PanAfGeo2" project for "Pan-African Support to the EuroGeoSurveys-Organisation of African Geological Surveys (EGS-OAGS) Partnership" is a project which supports the training of geoscientific staff from African Geological Surveys through the development of an innovative training programme. It aims to increase African-owned geological knowledge and skills for sustainable mineral exploitation and related infrastructures, and natural disaster prevention and mitigation. PanAfGeo is co-funded by the European Commission (Directorate-General of Development and International Cooperation) and by a Consortium of 12 European Geological Surveys coordinated by the French Geological Survey (BRGM) including Italian Geological Service. PanAfGeo-2 supports the professional skills of geoscientific staff from African Geological Surveys through innovative training programmes. The enhanced skills of the trainees will allow for a more effective and knowledgeable host organisation which can support local, national, regional and international missions. The African Geological Surveys support national, regional and international policy making and subsequently, the promoting of sustainable resource management and tackling of climate change can be enhanced at numerous levels. PanAfGeo-2 is central in building a strong and broad ranged collaboration between EuroGeoSurveys and the Organisation of African Geological Surveys.	Home – PanAfGeo - PanAfGeo (eurogeosurveys.org)