Egypt's First Biennial Transparency Report

30th December 2024

FOREWARD

In the spirit of our commitment to fostering a sustainable future and addressing the challenges posed by climate change, I am honored to present Egypt's First Biennial Transparency Report (BTR) under the Paris Agreement. This report serves as a cornerstone of our dedication to transparency, accountability, and international cooperation in our efforts to mitigate climate change and adapt to its impacts.

The Paris Agreement represents a pivotal moment in the global fight against climate change, uniting nations in a collective effort to limit the rise in global temperatures and build resilience against environmental challenges. As a signatory to this historic accord, Egypt acknowledges the importance of transparent reporting and information sharing, which enhances trust among nations and strengthens our capacity to implement effective climate policies.

This BTR provides a comprehensive overview of Egypt's climate initiatives, including an updated Greenhouse Gas (GHG) Inventory, progress toward achieving our Nationally Determined Contribution (NDC), mitigation strategies, and Adaptation Communication. Furthermore, it details the support we have received in this critical endeavor. It reaffirms our commitment to the principles of equity and the necessity for climate action that addresses our nation's specific needs and circumstances.

Though we face numerous challenges, including socioeconomic factors and the unique vulnerabilities of our ecosystems, Egypt is committed to pursuing an inclusive and resilient transition to a low-carbon economy. This report outlines our progress, ambitious goals, and the strategies we are implementing to address climate change at national, regional, and global levels.

I would like to take this opportunity to express my heartfelt appreciation to the dedicated team of experts and key players involved whose relentless efforts have been instrumental in preparing this report. Their expertise and commitment have ensured the quality and accuracy of the information it contains.

As we present this report to the international community, I am reminded that our efforts must continue to evolve. We are called to embrace innovation, foster sustainable practices, and collaborate closely with our global partners in pursuit of shared climate goals. Only through cooperation, we can achieve the transformative change necessary to ensure a sustainable and prosperous future for generations to come.

We warmly invite all stakeholders, including governments, civil society organizations, and the private sector, to engage with this report and share their invaluable feedback. I invite you to explore this report and join us on our ongoing journey toward environmental sustainability, resilience, and climate-safe practices. Your insights are essential as we work to enhance our climate action strategies and improve future reporting efforts.

Yours sincerely,

H.E. Dr. Yasmine Fouad
Minister of the Environment, Arab Republic of Egypt

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UNITS OF MEASUREMENT

FISCAL YEAR (FY)
1st July- 30th June

Currency Equivalents
10th December 2024
(Central Bank of Egypt)

1 US Dollar (USD) = 50.4094 Egyptian Pound (EGP)
1 Euro (EUR) = 53.0610 Egyptian Pound (EGP)

Units of Measurement	
CO_2e	Carbon Dioxide Equivalent
EGP	Egyptian Pound
Gg	Giga Gram
$GgCO_2e$	Giga gram Carbon Dioxide Equivalent
gm/kWh	Grams per kilowatt-hour
GWh	Gigawatt-hour
km	Kilometer
kWh	Kilowatt-hour
m^3/day	Cubic meters per day
MCM	Million Cubic Meters
Million SCF/year	Million Standard Cubic Feet/Year
MJ/ton	Megajoule per Ton
Mtoe	Million Ton of Oil Equivalent
MW	Megawatt
MWh	Megawatt-hour
tCO_2	Tons Carbon Dioxide
USD	United States Dollar

LIST OF ACRONYMS AND ABBREVIATIONS

AAI	African Adaptation Initiative
AFD	Agence Française de Développement
AFOLU	Agriculture, Forestry, and Other Land Use
AIIB	Asian Infrastructure Investment Bank
APG	Associated Petroleum Gases
BAU	Business-as-Usual
BRT	Bus Rapid Transit
BTR1	Egypt's First Biennial Transparency Report
BUR1	Egypt's First Biennial Update Report
CAPMAS	Central Agency for Public Mobilization and Statistics
CBAM	Carbon Border Adjustment Mechanism
CBOs	Community-Based Organizations
CFA	Climate Finance Accelerator
CIB	Commercial International Bank
CNG	Compressed Natural Gas
COP	Conference of the Parties
CSOs	Civil Society Organizations
DAPP	Danish-Arab Partnership Programme
DDR	Disaster Risk Reduction
EBRD	European Bank for Reconstruction and Development
EDCs	Electricity Distribution Companies
EEAA	Egyptian Environmental Affairs Agency
EEHC	Egyptian Electricity Holding Company
EEIP	Energy Efficiency Improvement Programme
EETC	Egyptian Electricity Transmission Company
EFF	Extended Fund Facility
EGGSP	Egypt Electricity and Green Growth Support Programme
EIB	European Investment Bank

EPAP	Egyptian Pollution Abatement Programme
ESG	Environmental, Social, and Governance
EU	European Union
ESTP	Egypt’s Sustainable Tourism Portal
EU-NIP	EU-Neighborhood Investment Platform
EV	Electric Vehicle
FAST	Food and Agriculture for Sustainable Transformation
FAO	Food and Agriculture Organization
FIT	Feed in Tariff
FRA	Financial Regulatory Authority
FY	Fiscal Year
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEFF	Green Economy Financing Facility in Egypt
GFDRR	Global Facility for Disaster Reduction and Recovery
GHG	Greenhouse Gases
GHGI	Greenhouse Gas Inventory
GIZ	German Agency for International Cooperation
GSI	Green Sustainable Industries
GWP	Global Warming Potential
HBRC	Housing and Building Research Center
HFCs	Hydrofluorocarbons
HFO	Heavy Fuel Oil
HSR	Electric High Speed Rails
HVAC	Heating, Ventilation, and Air Conditioning
ICZMP	Egypt’s Integrated Coastal Zone Management Plan
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change

IPPU	Industrial Processes and Product Use
IRENA	International Renewable Energy Agency
ISES	Integrated Sustainable Energy Strategy
ITMOs	Internationally Transferred Mitigation Outcomes
JBIC	Japan Bank for International Cooperation
JETP	Just Energy Transition Partnerships
LECZ	Low Elevation Coastal Zones
LED	Light Emitting Diode
LFO	Light Fuel Oil
LRT	Light Rail Transit
LULUCF	Land Use, Land-Use Change, and Forestry
M&E	Monitoring and Evaluation
MBT	Mechanical and Biological Treatment
MBDT	Mainstreaming Biodiversity in Egypt’s Tourism Project
MDF	Medium Density Fiberboard
MEPS	Minimum Energy Performance Standard
MoERE	Ministry of Electricity and Renewable Energy
MoPMR	Ministry of Petroleum and Mineral Resources
MPG	Modalities, Procedures, and Guidelines
MRV	Monitoring, Reporting, and Verification
MSW	Municipal Solid Waste
NAC	New Administrative Capital
NAP	Egypt’s National Adaptation Plan
NAT	National Authority for Tunnels
NBE	National Bank of Egypt
NC4	Fourth National Communication
NDCs	Nationally Determined Contributions
NEEAP	National Energy Efficiency Action Plan
NREA	New and Renewable Energy Authority
NREAP	National Renewable Energy Action Plan
NSWMP	National Solid Waste Management Programme

NUCA	New Urban Communities Authority
NUP	National Urban Policy
ODS	Ozone Depleting Substances
OUDA	Organization for Urban Development and Agriculture
PDP	Participatory Development Programme in Urban Areas
PFCs	Perfluorocarbons
PPP	Public Private Partnership
PV	Photo Voltaic
QA	Quality Assurance
QC	Quality Control
RCSF	Regional Center for Sustainable Finance
RDF	Refuse Derived Fuel
RE	Renewable Energy
RFI	Rapid Financing Instrument
SADS	Egypt's Sustainable Agricultural Development Strategy 2030
SAIL	Sustainable Agriculture Investments and Livelihoods Project
SDGs	Sustainable Development Goals
SESSDS	Sharm El-Sheikh Sustainable Development Strategy
SFC	Specific Fuel Consumption
SHIP	Solar Heating in Industrial Processes
SMEs	Small and Medium Enterprises
SRAT	Systematic Risk Assessment and Investment Prioritization Tool
STAR	Sustainable Transformation for Agricultural Resilience Programme
TACCC	Transparency, Accuracy, Competence, Comparability, and Consistency
T&D	Transmission & Distribution
TFSC	Transforming Financial Systems for Climate
TSFE	Sovereign Fund of Egypt
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention for Climate Change

UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
VAT	Value Added Tax
WMRA	Waste Management Regulatory Authority
WWTP	Wastewater Treatment Plant

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Executive Summary[1]

As the world faces unprecedented challenges posed by climate change, countries are increasingly recognizing the necessity of transparent and accountable reporting mechanisms to assess their climate actions and commitments. In this context, Egypt has taken significant steps to align its national policies with international agreements, particularly the Paris Agreement and the United Nations Framework Convention on Climate Change (UNFCCC). Egypt's First Biennial Transparency Report (BTR1) marks a critical milestone in the nation's journey toward effective climate governance, showcasing its commitment to transparency and climate action.

The BTR1 provides a detailed overview of Egypt's national circumstances and institutional frameworks related to climate change. It includes the national greenhouse gas emissions inventory, progress tracking for the implementation and achievement of Egypt's Nationally Determined Contributions (NDC), adaptation measures to address climate vulnerabilities, and the financial, technological, and capacity-building support required and received. The report highlights Egypt's commitment to fostering an inclusive approach by engaging diverse stakeholders, such as government entities, civil society, and local communities. Through enhanced collaboration, Egypt aims to promote social equity and ensure that climate action strategies are responsive to local needs and contexts.

National Circumstances

Egypt, spanning one million square kilometers, is bordered by the Mediterranean Sea to the north, Sudan to the south, the Red Sea to the east, and Libya to the west. Egypt's rich biodiversity encompasses deserts, wetlands, and coastal ecosystems, supporting 22 habitat groups and over 2,300 species. However, this biodiversity faces significant threats, including habitat destruction, excessive hunting, pollution, and climate change. Despite these challenges, biodiversity remains vital to Egypt's economy, particularly through ecotourism and natural resource-dependent industries.

Egypt has a hot, arid desert climate, characterized by two main seasons: a mild winter from November to April and a hot summer from May to October. Seasonal temperatures vary with prevailing winds. Along the coast, average winter lows reach 14°C, while summer highs peak at 30°C. In the inland deserts, temperatures fluctuate between 7°C at night and 43°C during the day. Egypt is also subject to *khamsin* winds —hot storms that can cause temperature spikes of up to 20°C within hours. The country receives minimal annual rainfall, mostly concentrated along the Mediterranean coast. Water resources are scarce due to high evaporation rates and the absence of permanent surface water.

Since 2016, Egypt has implemented substantial macroeconomic and structural reforms, yet significant challenges persist. The COVID-19 pandemic, global economic disruptions, and geopolitical tensions have hampered recent progress. Between 2015 and 2024, transformative changes—such as the Egyptian Pound's devaluation in November 2016—triggered short-term economic shocks and inflation surges. To stabilize the economy, Egypt sought additional IMF assistance, including a Rapid Financing Instrument in 2020 and a $3 billion Extended Fund Facility (EFF) loan in 2022. However, successive currency devaluations in 2022 and 2023

[1] All information and data included in this report and the tables are provisional and subject to approvals.

renewed inflationary pressures and expanded public debt. While GDP growth peaked at 6.6% in 2021/2022, it slowed to 4.2% in 2023/2024. Although a gradual recovery is anticipated, Egypt faces widening budget deficits and substantial external financing needs.

As of January 1, 2024, Egypt's population stands at 105,914,499. This rapid population growth poses challenges for food security, health, education, employment, and overall quality of life. Addressing these pressures requires adaptive policies that promote sustainable resource management and economic resilience. Water scarcity poses a severe and growing challenge for Egypt, as total water demand has exceeded the Nile River's supply since the late 1970s. Rapid population growth and economic development have exacerbated this stress, with the Nile providing 98% of Egypt's renewable water resources. By 2050, Egypt's population is projected to reach 160 million, placing even greater pressure on the country's limited water reserves. The annual per capita renewable water supply is steadily declining, while climate change is expected to intensify these challenges further. Agriculture as a cornerstone of food security and the national economy is particularly vulnerable. Recent global events, such as the coronavirus pandemic, have heightened food insecurity, underscoring the sector's fragility.

Nevertheless, Egypt is implementing a range of mitigation strategies to combat climate change and ensure long-term sustainability. The government is gradually phasing out subsidies and increasing electricity tariffs to promote energy efficiency and sustainability. Significant investments are being made in renewable energy projects, alongside efforts to reduce fuel consumption through energy sector reforms. Egypt is also expanding its public transportation networks and modernizing railway systems to lower emissions and improve urban mobility. Additionally, the country is prioritizing energy efficiency enhancements and transitioning towards renewable fuels to reduce greenhouse gas emissions. Urbanization strategies emphasize sustainable development, improved public transport systems, and the establishment of smart cities. In the tourism sector, Egypt is undergoing a green transformation through initiatives like the *Mainstreaming Biodiversity in Egypt's Tourism* project and the *Egyptian Sustainable Tourism Portal*, both of which promote environmentally sustainable practices. Moreover, the government has implemented a *Waste Management Regulation Law* to further reduce emissions and manage waste effectively.

Institutional Arrangements

Egypt ratified the UNFCCC in 1994 as a non-Annex I Party and signed the Paris Agreement in April 2015, with parliamentary ratification in June 2017. The Ministry of Environment (MoE), established in 1997, oversees environmental affairs through the Egyptian Environmental Affairs Agency (EEAA). The Climate Change Unit, created in 1996, was upgraded to the Central Department for Climate Change (CCCD) in 2009 to strengthen national climate governance. The National Climate Change Council (NCCC), formed in 2015 to address climate challenges at national and international levels. Additionally, Egypt has established a legal framework comprising of laws and regulations aimed at conserving the environment, promoting sustainable development, and addressing climate change.

NationalG HG I nventory

Egypt's National Inventory covers the time-series from 1990 to 2022. The estimates presented here were developed following Annex I guidelines of the decision, using methodologies outlined in the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (IPCC 2006), and applying Global Warming Potentials (GWPs) as defined in the IPCC Fifth Assessment Report (AR5), specifically from the Contribution of Working Group I. The Common Reporting Format (CRF) tables in this submission were generated by the CRF Reporter [AR5] software and submitted via the UNFCCC submission portal, in accordance with Annex II requirements.

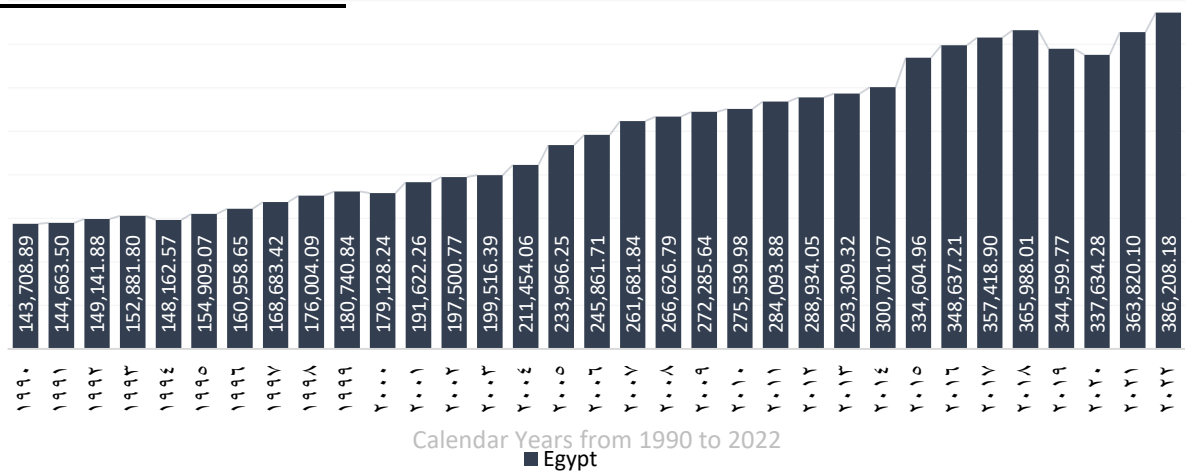
The greenhouse gas (GHG) data includes estimated emissions for the primary direct GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF_6). These emissions are reported across the following sectors: Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry, and Other Land Use (AFOLU), and Waste.

The sum of CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 emissions converted to CO_2 equivalents multiplied by their respective global warming potential (GWP). The GWP is a coefficient by means of which greenhouse gas effects of a given gas are made relative to those of an equivalent amount of CO_2. The coefficients (100-year time horizon) are drawn from the Fifth Assessment Report (2013) issued by the IPCC. Key category analysis was carried out in accordance with the 2006 IPCC Guidelines (Approach 1 and Approach 2 level/trend assessment), for all of the inventory categories.

The chart below illustrates Egypt's total GHG emissions over a 33-year period, measured in gigagrams of CO_2 equivalent (Gg CO_2 e). From 1990 to 2022, there is a steady upward trajectory in emissions, reflecting growth in economic activities, industrialization, and population increase. The total GHG emissions rose from approximately 143,708.89 Gg CO_2 e in 1990 to 386,208.18 Gg CO_2 e in 2022, marking an increase of 169% over the period and a difference of 242,710 Gg CO2e. Between 2015 and 2022, emissions grew from 334,604.96 Gg CO_2 e to 386,208.18 Gg CO_2 e, an increase of 13%. A notable drop in emissions occurred during the COVID-19 pandemic, decreasing from 344,599 Gg CO_2 e in 2019 to 337,634 Gg CO_2 e in 2020, reflecting a 2% reduction, likely due to reduced economic activity and energy demand.

Egypt 2022

386,208	$GgCO_2$
386,208,181	$mtCO_2e$
3.48	$mtCO_2e$/capita
184.4	$GgCO_2e$/GDP (B.EGP)



Years	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
Egypt	143,709	179,128	233,966	334,605	348,637	357,419	365,988	344,599	337,634	363,820	386,208

The distribution of emissions among gases (CO_2 , CH_4 , N_2O, HFCs, PFCs, and SF_6) highlights the dominance of CO_2 , which accounts for the largest share of emissions (75.89%) due to its association with energy production and industrial processes. Methane (CH_4) is the second-largest contributor (13.72%), predominantly from the AFOLU sector (e.g., enteric fermentation and rice cultivation). Nitrous oxide (N_2O) emissions (7.35%), largely linked to agricultural soil management and fertilizers, exhibit consistent growth. Hydrofluorocarbons (HFCs) and other fluorinated gases emerge in later years due to industrial applications and refrigeration technologies, reflecting technological evolution and industrialization. Similar to the total emissions trend, individual gases also exhibit a decline during the pandemic period (2019–2020), aligning with reduced industrial and agricultural activities.

The sectoral contributions to total GHG emissions have evolved over the reporting period. The energy sector's share increased from 57% in 1990 to 66% in 2022, while the IPPU sector rose from 8% to 13%. The waste sector maintained a relatively stable share of 13% to 10%, and the AFOLU sector decreased from 22% to 11%. In 2022, the breakdown of GHG emissions showed the energy sector as the largest contributor at 66%, followed by IPPU at 13%, AFOLU at 11%, and the waste sector at 10%. This distribution emphasizes the dominance of the energy sector, with significant contributions from industrial and agricultural and waste activities.

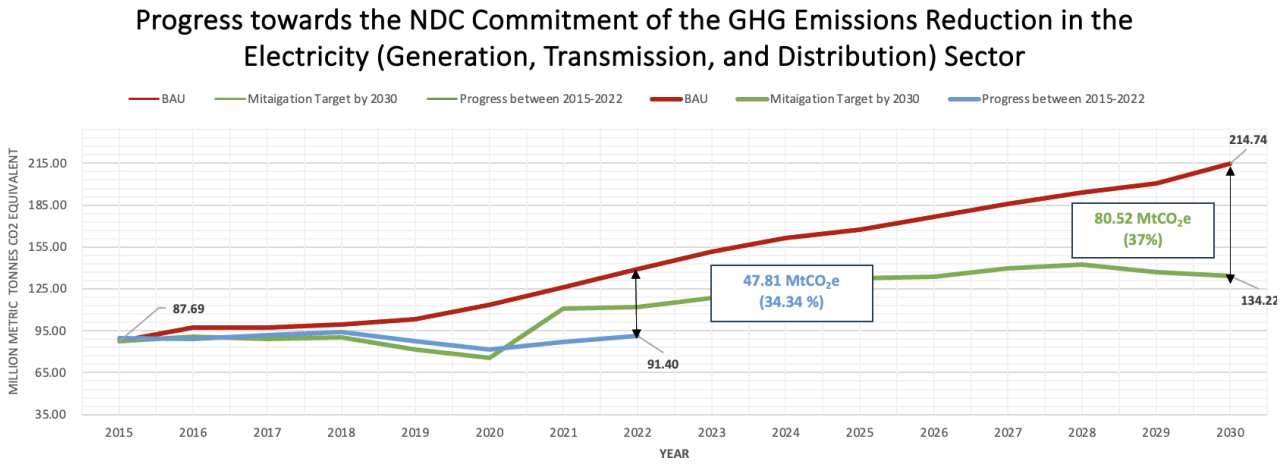
Key category analysis was carried out in accordance with the 2006 IPCC Guidelines (Approach 1 and Approach 2 level/trend assessment), for all of the inventory categories. In the level assessment, key categories are defined as those that, when aggregated in descending order of magnitude, collectively account for 95% of the total contribution from all sources and sink categories to the national inventory level. This approach ensures that the most significant sources and sinks are identified and prioritized, providing a clear focus for inventory efforts.

The Central Agency for Public Mobilization and Statistics (CAPMAS) will remain the primary entity for collecting nationally aggregated data for estimating GHG emissions from all sectors. Data shall be collected using questionnaires that are disseminated directly to all sector classification, both in the public and private sector. Recommendations were provided in order to improve the quality of the current inventory process.

NDCP rogress T racking

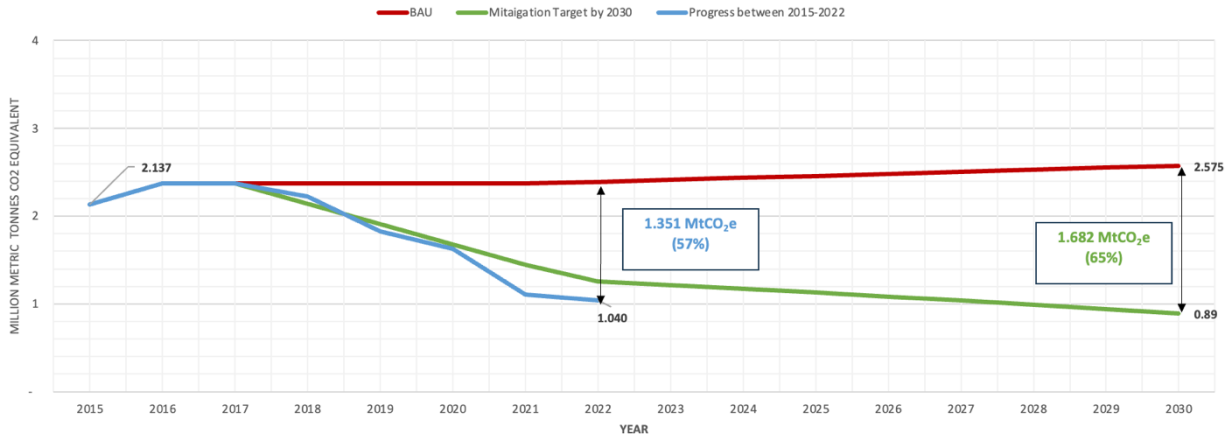
Egypt's GHG emission reduction target is 37% in Electricity Sector, 65% in Oil & Gas Sector (associated gases), and 7 % in Transport Sector relative to the BAU emission projections in 2030. The reporting period starts in 2015 (BAU reference year) till end of year 2030. These targets were submitted to the UNFCCC on 24th June 2023, as the second update of Egypt's Nationally Determined Contribution (NDC). Egypt has made notable advancements towards its NDC target for the latter three sectors as shown in the graphs below.

Egypt has achieved remarkable success in transitioning to low carbon pathway in the electricity sector (generation, transmission, and distribution) with a substantial GHG emission reduction of **47,810 GgCO2e in 2022**, with a **decrease of 34.34% in emissions** compared to BAU levels for that same year. Egypt's electricity sector is advancing steadily towards the **2030 target of 37%** overall GHG emission reduction.



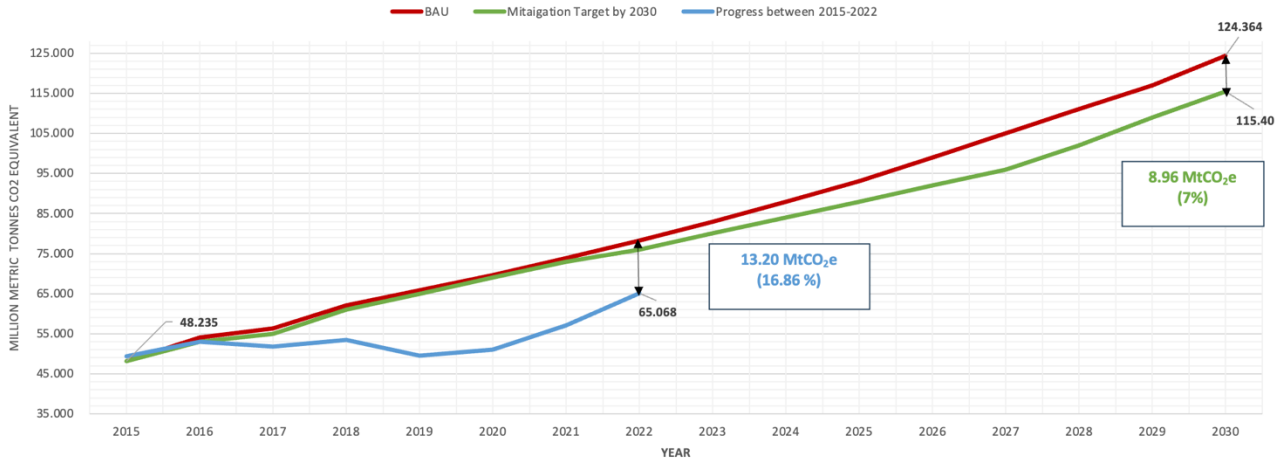
Egypt has made significant progress in the recovery and utilization of associated gases produced from crude oil fields. Efforts in the oil and gas sector have resulted in a cumulative GHG emission reduction of **1,351 Gg CO2e in 2022**, with a **decrease of 57% in emissions** compared to BAU levels for that same year. The associated gases subsector of Egypt's Oil & Gas industry is on track to achieve the **2030 target of a 65%** overall GHG emission reduction, with significant progress already made.

Progress towards the NDC Commitment of the GHG Emissions Reduction in the Oil and Gas (Associated Gases Subsector)



Egypt has achieved outstanding success to adopt more sustainable low carbon modes of transport with a substantial **13,200 GgCO2e in 2022** with a **decrease of 16.86% of emissions** compared to BAU levels for that same year. This has surpassed the **2030 target of 7%** overall GHG emission reduction. This positive trend was since 2015 and continued till 2022 due to multiple policy interventions, such as energy subsidy reform program, and other influencing factors that led to behavioral changes in road transport.

Progress towards the NDC Commitment of the GHG Emissions Reduction in the Transport Sector



In the **industry sector**, policies and measures to decarbonize cement production, increase energy efficiency, and promote eco-industrial parks are ongoing. The **buildings sector** is focused on energy efficiency enhancements, such as LED lighting, rooftop solar PV, and green building initiatives. Meanwhile, the **tourism sector** has embraced renewable energy and energy efficiency measures in hotels and resorts. Efforts in **waste management** include enhancing infrastructure, increasing recycling rates, and utilizing waste as a renewable energy source. Across these sectors, while many initiatives are ongoing or completed, sustained investment, technical advancements, and policy enforcement remain critical to fully realizing the 2030 NDC goals.

Climate Change Impacts and Adaptation

Over the past 30 years, temperatures have risen in Egypt, particularly in summer, while annual precipitation has declined by 22%, worsening water scarcity and increasing flash floods. Climate projections indicate significant warming by the end of the century, with temperatures rising by 2.1°C to 5.7°C under high-emission scenarios, alongside longer dry spells and more intense rainfall, posing challenges for water resources, agriculture, and public health.

The Nile Delta is among the world's most vulnerable areas to climate change, driven by reliance on the Nile River for agriculture, industry, fisheries, and energy. Rising temperatures, water deficits, and reduced rainfall threaten water availability. In 2019, the ND-GAIN Index ranked Egypt 107 out of 181 countries highlighting its vulnerability. Impacts are evident in water scarcity, agricultural irrigation, and public health, with intensified heat waves and risks to vulnerable populations. Along the Mediterranean coast, rising sea levels and land subsidence increase the risk of inundation and shoreline erosion.

Natural hazards like sea-level rise, flash floods, dust storms, and storm surges threaten human lives and infrastructure, causing nearly 1,500 deaths and $346.7 million in damages over the past 20 years. Critical infrastructure and key sectors—including agriculture, fisheries, tourism, and health—face disruptions from heat stress, water scarcity, and extreme weather. Socially, low-income communities, women, children, and the elderly are most affected due to limited adaptive capacity, poor infrastructure, and urban planning. Women in rural areas face food and water insecurity, while the elderly are particularly vulnerable to extreme weather.

To address these risks, Egypt requires adaptation measures such as climate-resilient infrastructure, public health campaigns, and energy-efficient designs to mitigate the impacts of climate change on society and the economy. Priority actions include strengthening cooperation among governmental bodies, local communities, NGOs, and the private sector to develop comprehensive and effective solutions. By leveraging collaboration, Egypt can enhance adaptive capacities across sectors, ensuring that responses are equitable, inclusive, and informed by both local and scientific expertise.

Collaborations with international organizations like the UN Environment Programme and the Global Environment Facility have informed national adaptation strategies, such as the National Adaptation Plan (NAP) and pilot projects focused on sustainable agricultural practices and water resource management. Egypt's efforts in ICZM and disaster risk reduction have highlighted the importance of incorporating adaptation actions at different governance levels. Cooperation across local, national, regional, and international levels has emphasized water conservation, renewable energy projects, and transboundary water management. Egypt has also made significant progress in strengthening scientific research and institutional capacities, improving early warning systems, vulnerability assessments, and developing robust monitoring and evaluation frameworks.

Financial, Technology Development and Transfer, and Capacity Building Needed and Received

Egypt faces financial, technological, and capacity-building challenges, but international cooperation, technological innovation, and strong governance offer opportunities to advance sustainable development and climate resilience. Egypt recognizes the importance of global partnerships in advancing its climate efforts. Notably, the implementation of NDC is conditional on receiving financial and technical support from the international community. This highlights the critical link between global assistance and Egypt's ability to meet its climate commitments, emphasizing the importance of adequate funding and technology transfer to enhance its climate action.

This BTR1 presents a clear and transparent account of the support received by Egypt in the areas of finance, technology transfer, and capacity building; highlights the impact of international support on Egypt's climate action efforts; and identifies gaps and needs for further support to enhance Egypt's climate change response.

The information presented in this BTR1 covers the period from January 2022 to 6th June of 2024, providing a comprehensive picture of the support landscape during this timeframe.

Chapter 1: National Circumstances and Institutional Arrangements

1.1 Geophysical Characteristics

Egypt spans an area of about one million square kilometers and is located between 22° and 32° North and 24° and 37° East. The majority of the country lies within the vast desert belt that stretches eastward from Africa's Atlantic coast across the continent and into Southwest Asia. To the north, Egypt borders the Mediterranean Sea, with Sudan to the south, the Red Sea to the east, and Libya to the west. The Nile Valley and Delta were formed over thousands of years by the sediments and deposits of the Nile River, until the construction of the High Aswan Dam in 1968. Only 35,000 km² of the country's total land area is cultivated and permanently settled. Egypt's geological history has shaped four major physical regions: the Nile Valley, Nile Delta, Western Desert, Eastern Desert, and Sinai Peninsula (Ministry of Water Resources & Irrigation, 2013).

Figure 1: Country Profile the Arab Republic of Egypt (State Information Service, 2023)

Egypt's biodiversity spans diverse ecosystems, including deserts, wetlands, and coastal areas, supporting twenty-two habitat groups such as the Nile Valley, Red Sea ecosystems, and the Sinai mountains. The country is home to a rich biodiversity, hosting over 2,300 plant species, 111 mammal species, 480 bird species, and a vibrant marine life with more than 1,000 fish species and 200 coral species. Additionally, between 700,000 and one million migratory birds pass through the country twice a year, during their spring and autumn migration between Europe and Africa. However, this biodiversity is under threat from excessive hunting, habitat destruction, pollution, and the impacts of climate change, endangering species such as the Sinai Tiger and coral reefs. Coastal zones, which house 20% of the population and major industries, are facing significant pressures from tourism, overfishing, and rising desertification. Despite these challenges, biodiversity remains vital to Egypt's economy, particularly through ecotourism and natural resource-based industries (UNDP, 2021).

1.2 Climate Profile

Egypt has a hot and dry desert climate with two main seasons: a mild winter from November to April and a hot summer from May to October. The primary differences between the seasons are variations in daytime temperatures and the prevailing winds (World Bank, 2021).

1.2.1 Temperature

Egypt's daytime temperatures vary with the seasons and are influenced by prevailing winds. In the coastal regions, winter temperatures average a minimum of 14°C (November to April), while summer maximums reach around 30°C (May to October). In the inland desert areas, temperatures can vary dramatically, especially during the summer, ranging from 7°C at night to 43°C during the day. In winter, desert temperatures fluctuate less, but can drop to 0°C at night and rise to 18°C during the day. Between 1901 and 2013 temperatures in Egypt increased by an average of 0.1°C per decade. The rate accelerated between 2000 and 2020 with a temperature increase averaging 0.38°C per decade, which was higher than the world average (0.31°C per decade). As a result, the number of cooling degree days (CDDs) increased dramatically – by around 300 during 2000-2020 – while winter heating needs declined by over 50 heating degree days (HDDs) in the same period. The increasing frequency and intensity of heatwaves in Egypt are driving higher energy demand for cooling, straining the power grid and requiring significant investment in energy infrastructure. Additionally, the reliance on fossil fuels for electricity generation increases greenhouse gas emissions, complicating Egypt's efforts to meet its NDC commitments. Addressing these challenges necessitates strategic planning, emphasizing renewable energy adoption and enhanced energy efficiency. UNEP's recent study shows that 50% of all electricity is already being consumed for air conditioning during the peak summer months in Cairo (IEA, 2023).

Egypt also experiences hot windstorms, known as "khamsin," which carry sand and dust across the northern coast of Africa. These storms typically occur between March and May, and can raise temperatures by 20°C in just two hours, lasting for several days (World Bank, 2021).

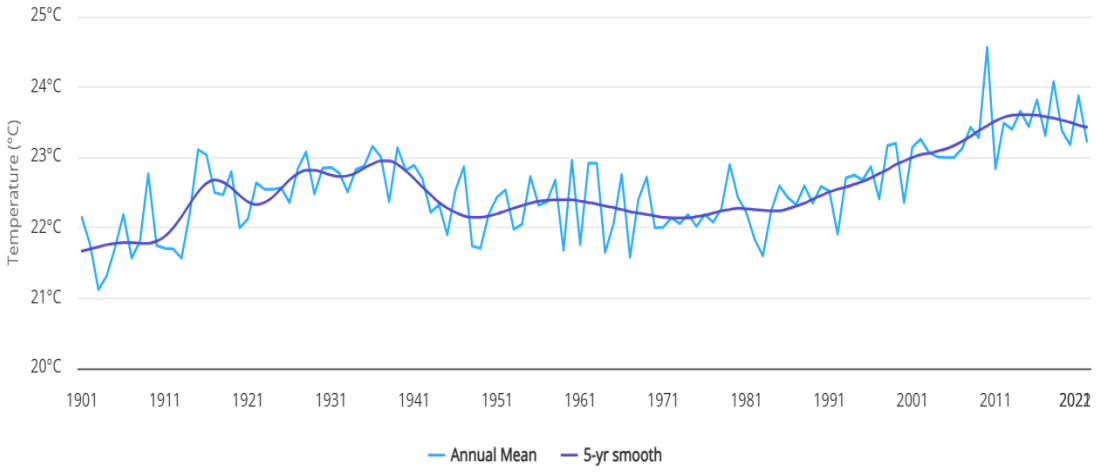


Figure 2: Observed Annual Average Mean Surface Air Temperature (World Bank, 2021)

1.2.2 Precipitation

Egypt is an extremely arid country, receiving very little annual precipitation. Most of the rainfall occurs along the coast, with Alexandria receiving the highest amount at approximately 200 mm per year. Although Alexandria has relatively high humidity, the sea breeze helps moderate the moisture levels. Precipitation decreases south, with Cairo receiving just over 10 mm of rainfall annually. Although Cairo experiences humidity during the summer months, areas south of the city receive only trace amounts of rainfall. However, these areas can suddenly experience extreme precipitation events, leading to flash floods. Sinai receives more rainfall than other desert areas and is dotted with numerous wells and oases, which support small population centers that were once key focal points on trade routes. Water drains from the main plateau toward the Mediterranean Sea, providing enough moisture to allow some agriculture in the coastal area, particularly near Al Arish. However, the country's high evaporation rate, coupled with the near absence of permanent surface water in large parts of the region, makes water a highly scarce resource. Primary challenges are centered around water resource availability, changing precipitation patterns, and increasing population demands.

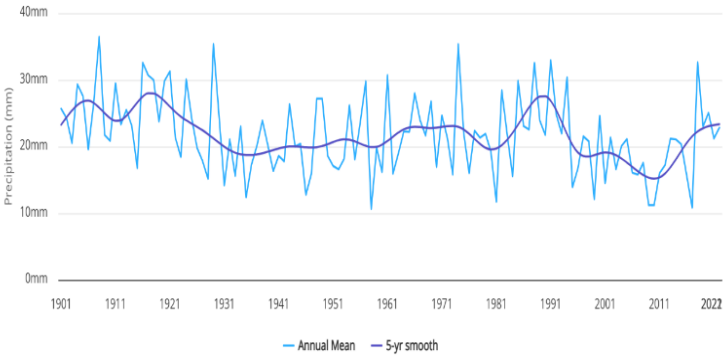


Figure 3: Observed Annual Precipitation of Arab Republic of Egypt for 1901-2022 (World Bank, 2021)

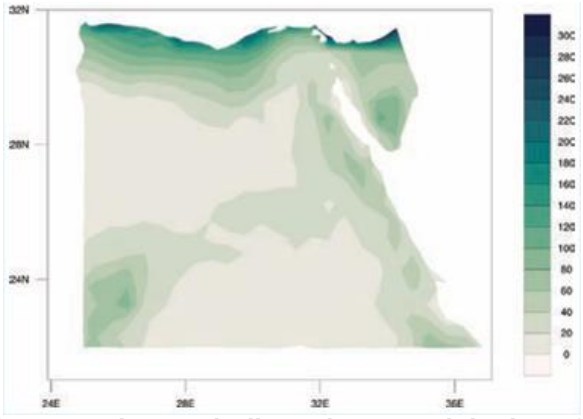


Figure 4: Observed Climatology Precipitation of Arab Republic of Egypt for 1901-2020 (World Bank, 2021)

1.3 Socioeconomic Profile

1.3.1 Population and Demographics

As of January 1, 2024, Egypt's total population is 105,914,499, consisting of 51,472,894 females and 54,441,605 males. The male-to-female ratio is 105.8 males for every 100 females. By 2050, Egypt is projected to be among the countries contributing most significantly to global population growth. The areas along the Nile River and its Delta are among the world's most densely populated, while the vast desert regions remain sparsely populated or uninhabited (refer to Figure 6).

This rapid population growth presents significant economic and social challenges, including issues related to food security, health, education, employment, and overall quality of life. National policies must keep pace with both demographic growth and the rising demand driven by higher living standards, which place increasing pressure on Egypt's natural resources. Addressing the needs of a larger population will require more sustainable management and use of these resources.

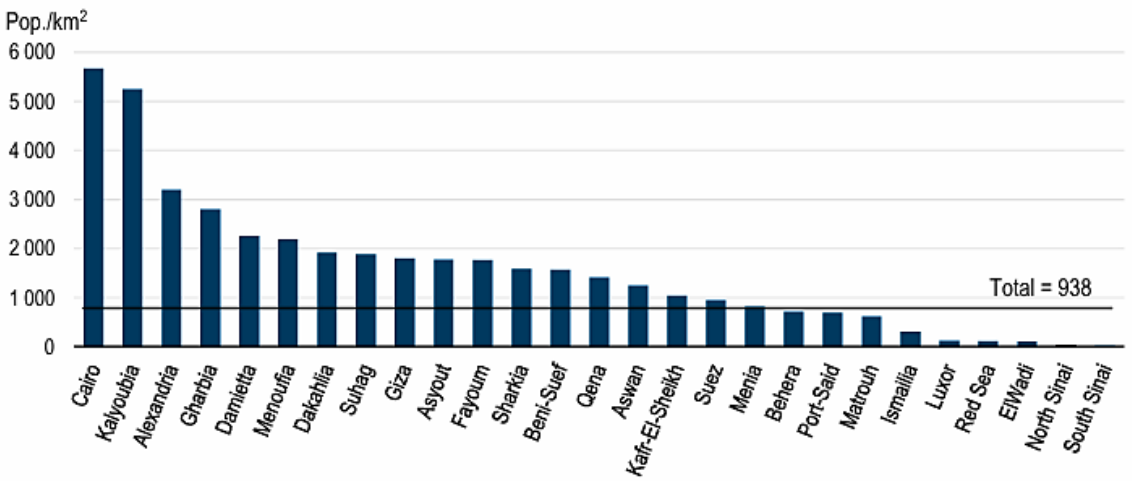


Figure 5: Egypt's fast-growing population is concentrated along the Nile River and its Delta (CAPMAS, 2024)

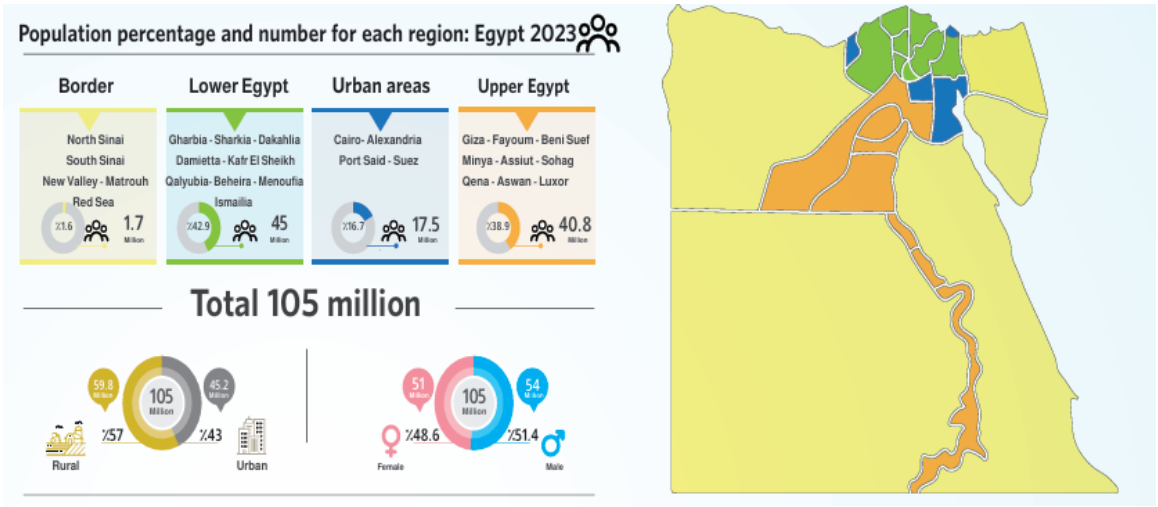


Figure 6: Population Density by Region (Source: National Population and Development Strategy 2023-2030)

1.3.2 Economic Profile

Egypt is a developing country with a fast-growing population. Egypt is currently facing significant economic challenges despite ambitious macroeconomic and structural reforms since 2016 to stabilize the economy. The adverse repercussions of the COVID-19 pandemic, global economic shocks resulting in abrupt increases in food and fuel prices, and geopolitical tensions have undermined recent economic progress.

Between 2015 and 2024, Egypt's economy underwent transformative changes, driven by macroeconomic reforms and external pressures. One of the most impactful developments was the devaluation of the Egyptian Pound (EGP) in November 2016, when the currency was floated as part of a $12 billion Extended Fund Facility (EFF) agreement with the International Monetary Fund (IMF). This decision led to a near 50% overnight reduction in the EGP's value. The intention of the currency flotation is to stabilize the economy, addressing foreign currency shortages, and attracting foreign investment. While this reform improved Egypt’s external competitiveness, increased remittances, and bolstered foreign reserves, it triggered short-term shocks including a historic inflation spike of 29.5% in 2017 (IMF, 2017).

Beyond 2017, the EGP underwent multiple episodes of devaluation driven by internal economic challenges and external global pressures. In subsequent years, Egypt pursued additional IMF support including a Rapid Financing Instrument (RFI) in 2020 to mitigate the impacts of the COVID-19 pandemic and a $3 billion EFF loan in 2022 to address vulnerabilities exacerbated by the Russia-Ukraine conflict (IMF, 2022). Despite these efforts, the EGP faced further devaluation in 2022 and 2023. By the end of 2022, the currency further depreciated to approximately EGP 24 per USD, driven by sustained economic pressures, declining foreign reserves, and challenges stemming from global and domestic financial conditions. This led to renewed inflationary pressures and increasing public debt. By 2024, the EGP stabilized, albeit at a weaker level than in 2015, reflecting the need for ongoing structural reforms to enhance resilience and ensure sustainable growth (IMF, 2023).

These currency reforms occurred alongside broader macroeconomic trends. Egypt’s Gross Domestic Product (GDP) growth peaked at 6.6% in 2021/2022, recovering from COVID-19 pandemic, before moderating to 4.2% in 2023/2024. GDP per capita growth followed a similar trajectory, reflecting a slower pace of individual income improvements. Unemployment declined significantly from 12.9% in 2015 to 6.8% in 2024 attributed to targeted labor market initiatives and investments in infrastructure (IMF, 2024). Nominal GDP increased consistently, expanding Egypt’s economic base from EGP 2.2 trillion in 2015 to a projected EGP 13.9 trillion in 2024 (World Bank, 2024).

Growth is expected to start a gradual recovery from an estimated 2.5% in FY24 (July 2023-June 2024) to 3.5% and 4.2% in FY25 and FY26, respectively driven by favorable base effects, as well as investment, notably that financed by the UAE deal . The budget deficit is forecast to widen from 3.6% of GDP in FY24 to 7% of GDP in FY25, mainly due to the higher interest payments and the vanishing impact of the Ras Elhekma transaction, before starting to decline thereafter, supported by fiscal consolidation. External financing requirements remain substantial, with maturing external debt and repayment of arrears to international oil companies. Further, the widened current account deficit may put pressure on foreign currency resources, especially if the Middle East conflict continues to cast a shadow on the economy very (World Bank, 2024).

Table 1: Egypt's Macroeconomic Trends (Source: IMF, 2024)

Year	GDP Growth Rate (%)	GDP Per Capita Growth Rate (%)	Inflation Rate (%)	Unemployment Rate (%)	Gross Domestic Savings Rate (%)	Gross Domestic Investment Rate (%)
2015	3.8	0.9	13	13.2	10.6	14.5
2016	4.2	1.3	14.1	12.5	11.7	16.1
2017	4.2	1.3	14.1	12.5	12.2	16.7
2018	5.6	2.7	13.3	11.9	13.9	17.7
2019	5.6	2.7	13.3	11.9	14.3	18.2
2020	3.6	0.6	5.9	8	11.1	15.2
2021	5.6	2.6	5.7	7.8	12.3	16.3
2022	6.6	3.6	6.6	7.2	11.7	15.6
2023	4.6	1.6	14.6	7.6	10.8	14.4
2024 (projected)	2.7	-0.8	33.3	7.2	9.4	12.1

Egypt's macroeconomic trends from 2015 to the projected values for 2024 highlight several key challenges and shifts in its economic landscape. The GDP growth rate has shown a declining trajectory, dropping from a peak of 6.6% in 2022 to a projected 2.7% in 2024, reflecting slowing economic momentum. Correspondingly, GDP per capita growth has turned negative in 2024 (-0.8%), signaling a reduction in individual economic welfare. Inflation has surged dramatically, increasing by fivefold from 6.6% in 2022 to a staggering 33.3% in 2024, intensifying economic pressures on households and businesses. Unemployment rates have steadily decreased, reaching 7.2% in 2024, which may reflect improved labor market conditions despite other economic headwinds. However, gross domestic savings rates have declined post-COVID, falling to 9.4% in 2024, with no signs of recovery. Similarly, gross domestic investment rates have shrunk significantly, from 18.2% in 2019 to 12.1% in 2024. Together, these indicators paint a picture of economic stress, with inflation and investment challenges likely dampening prospects for sustainable growth and financial resilience.

Table 2: GDP growth rate for Q4 and FY 2023/2024 million EGP (at constant prices) and (%) (Source: IMF, 2024)

Economic Activities	Q4	Total Year	(%)
AGRICULTURE FORESTRY FISHING	427,633.15	1,906,346	3.78
MINING QUARRYING	299,706.82	1,020,734	-4.69
PETROLEUM	162,274.02	517,150	-1.75
GAS	70,407.07	298,081	-13.12
OTHER EXTRACTION	67,025.73	205,502	3.71
MANUFACTURING INDUSTRIES	449,778.56	1,931,558	-5.4
PETROLEUM REFINING	59,133.80	362,717	-6.07
OTHER MANUFACTURING	390,644.76	1,568,841	-5.22
ELECTRICITY	50,404.35	190,887	5.16
WATER SEWERAGE	15,298.06	59,640	3.49
CONSTRUCTION	360,410.44	1,324,225	5.66
TRANSPORTATION AND STORAGE	178,902.69	636,508	5.37
SUEZ CANAL	46,031.28	225,269	-30.05
TOURISM (Restaurants and Hotels)	225,000	900,000	24.0

1.3.3 Government Structure

Egypt, a democratic and modernized state divided into 27 governorates, operates under a constitutional semi-presidential system. The President, as head of state, is elected for a six-year term and holds significant executive powers, including the appointment of 5% of parliamentary members and the authority to dissolve parliament under Article 137. The parliamentary system consists of two legislative chambers: the House of Representatives and the Senate, with the House holding final authority in resolving legislative disputes.

1.4 Key Mitigation Sectors

1.4.1 Electricity Sector

As part of broader energy sector reforms, Egypt is gradually removing electricity subsidies. This process includes incremental increases in electricity tariffs, designed to reduce fiscal burdens and promote efficient energy use. While the government acknowledges the social challenges posed by these tariff increases, it considers them essential for achieving long-term energy sustainability, accompanied by robust social protection measures to mitigate their impact. The adopted policies focus on increasing clean energy sources, diversifying Egypt's energy mix, and ensuring that renewables play a central role in meeting the country's future energy needs. In 2023, Egypt's total energy demand was approximately 93.5 MTOE (Million Tons of Oil Equivalent), with the industrial sector accounting for 37% of consumption, primarily driven by heavy industries such as cement, steel, and petrochemicals. The transport sector represented 25% of demand, dominated by oil products like diesel and gasoline. Residential and commercial usage constituted 29%, mainly for electricity used in lighting, cooling, and appliances. Agriculture accounted for 5%, primarily for water pumping and irrigation, while public services made up the remaining 4%. *(Source: IEA Egypt Energy Profile, 2023; Egypt Energy Strategy Report 2022-2023).*

Renewable Energy Projects:

Egypt is heavily investing in solar and wind energy, supported by the Integrated Sustainable Energy Strategy (ISES) 2035 and the National Renewable Energy Action Plan (NREAP). The Benban Solar Park (1465 MW), located in Aswan, is one of the largest solar energy complexes globally and significantly contributes to Egypt's renewable energy capacity. The Gabal El-Zeit Wind Farm (580 MW) is another key project contributing to wind energy expansion, and Assiut hydropower plant (32 MW). These projects are part of Egypt's broader strategy to generate 42% of its electricity from clean energy sources by 2030. To achieve this, the government continues to focus on large-scale solar and wind energy projects, supported by favorable regulatory frameworks and public-private partnerships (PPP) (International Trade Administration, 2022).

Despite its vast potential for solar energy, Egypt faces several challenges in expanding large-scale solar projects, with administrative holdups, financing issues, land acquisition, and inadequate infrastructure being the primary barriers. The government has responded by streamlining the approval process for renewable energy projects and enhancing the investment climate through regulatory reforms and financial incentives like the Sovereign Wealth Fund for Renewable Energy.

Energy Efficiency Improvements:

Alongside renewable energy expansion, Egypt has focused on improving energy efficiency across power generation and distribution. Key initiatives include the upgrade of aging power plants and the construction of combined-cycle plants, in collaboration with major international companies such as Siemens. These plants improve operational efficiency and increase power generation capacity, contributing to more reliable electricity production.

Expansion of the Power Grid:

The expansion and modernization of Egypt's power grid is crucial for integrating renewable energy sources. The government is investing in the development of a smart grid that can accommodate the growing share of solar and wind energy. This initiative is part of the Electricity Sector Modernization Programme, designed to enhance grid stability, efficiency, and resilience, particularly as the generation of renewable energy scales up. Modernizing the grid also ensures that energy produced from renewable sources can be distributed efficiently across the country (IRENA, 2018). However, financial constraints are impeding the expansion of the power grid, thereby limiting the integration of renewable energy at the planned capacities.

Frequent Load Shedding:

Despite considerable advancements in renewable energy installed capacity, Egypt has experienced frequent load shedding, primarily attributed to natural gas shortages in FY 2022/2023, which supply a significant portion of the country's power plants. Starting in September 2024, the load-shedding program was suspended after the government began importing the necessary natural gas to fulfill electricity demand. These shortages affect the country's ability to meet peak demand, highlighting the urgent need to expand renewable energy infrastructure. Current initiatives aim to decrease reliance on natural gas and enhance the grid's capability to handle peak loads more efficiently.

1.4.2 Oil & Gas Sector

Similar to electricity sector, part of the energy reforms involved gradual removal of subsidies on petroleum products. By phasing out these subsidies, the government aims to reduce fuel consumption, promote energy efficiency, and reallocate resources toward cleaner energy sources. While this reform has faced social challenges, the government has implemented social protection measures, such as expanding the Takaful and Karama programmes, to support vulnerable populations and mitigate any potential social impacts.

The Egyptian oil and gas sector adopted its first Energy Efficiency Strategy 2022-2035. Furthermore, the sector is advancing its decarbonization strategy, focusing on transitioning to low-carbon energy sources and reducing greenhouse gas emissions. Another cornerstone of Egypt's mitigation strategy is the Global Gas Recovery ‘Zero Flaring Project’. This initiative focuses on capturing associated gases from oil production sites for use in electricity generation and industrial applications. In the Western Desert, advanced gas recovery projects have reduced flaring rates by 40%, converting what was once wasted gas into a valuable energy source (World Bank, 2020).

1.4.3 Transport Sector

Major initiatives include expanding public transport networks such as the Cairo metro and the Light Rail Transit (LRT) system, as well as implementing monorail project to connect urban and peri-urban areas. Additionally, efforts are directed toward modernizing and electrifying railway systems, reducing dependence on diesel.

Low-emission vehicle transition is another cornerstone, with plans to introduce electric buses through the BRT project and expansion of electric vehicles. The National Authority for Tunnels (NAT) has been instrumental in driving metro and monorail expansions, which significantly contribute to sustainable urban mobility.

Egypt's transport sector faces challenges in implementing climate change mitigation measures due to financial constraints, public resistance to pay higher tariffs, and high investment costs for electric vehicles and its related infrastructure. Egypt’s Ministry of Planning, and Economic Development, and International Cooperation outlined ambitious plans for the transport sector in 2022/2023 (Ministry of Planning and Economic Development, 2023). The sector is seen as a crucial driver of economic and social development, with a focus on sustainability and efficiency. Key objectives include increased investment, enhanced production, the development of an integrated multimodal transport system, and institutional and human capacity building. By investing in infrastructure, technology, and human capital, Egypt aims to improve the quality of transport services, reduce travel times, and enhance the overall efficiency of the transportation system, contributing to the country's economic growth and social development.

1.4.4 Industry Sector

The sector's mitigation actions primarily focus on reducing greenhouse gas emissions by enhancing energy efficiency, adopting low-carbon technologies, and transitioning towards renewable and alternative fuels. Key sectors such as cement, steel, iron, and fertilizers are targeted for emission reductions through the implementation of cleaner production methods and technological upgrades. A potential solution in this transition is the development of green hydrogen, which is considered a promising aspect in the decarbonization process of energy-intensive industries in Egypt. The Egyptian government is working to promote green hydrogen production as part of its broader energy strategy (Egypt Oil & Gas, 2023). The National Strategy for Low-Carbon Hydrogen was issued in 2024. The strategy aims to reduce emissions in sectors such as industry by substituting conventional fuels with cleaner hydrogen alternatives and position Egypt as a global leader in the low-carbon hydrogen economy.

Despite these ambitious plans, Egypt faces significant challenges, including rising prices for electricity and petroleum products. These price increases, driven by ongoing subsidy reforms, aim to reduce fiscal burdens and promote energy efficiency. However, they may also undermine the competitiveness of energy-intensive industries. The gradual removal of subsidies, while essential for Egypt's long-term sustainability, could negatively affect industrial productivity, especially in sectors already burdened by high energy costs.

Additionally, natural gas shortages are disrupting industries that rely on it as both a fuel and feedstock. For instance, in June 2024, four major fertilizer producers in Egypt suspended operations due to a severe gas supply shortage, exacerbated by ongoing regional tensions and an unprecedented summer heatwave that significantly increased the demand for gas to power electricity grids.

Additionally, external pressures, such as the European Union's Carbon Border Adjustment Mechanism (CBAM), are further challenging Egypt's industrial competitiveness. The CBAM, which imposes carbon tariffs on certain exported goods, threatens Egypt's key export sectors, including cement, fertilizers, aluminum, and steel, all of which are high greenhouse gas (GHG) emitters.

1.4.5 Buildings and Urban Cities

Egypt's urbanization strategy includes sustainable development practices, improving public transport, and integrating smart city initiatives. New cities, like the New Administrative Capital, are designed with energy-efficient infrastructure and green building standards, contributing to economic growth and social development. Moreover, in 2023, the government approved a National Urban Policy (NUP) to develop people-centered smart cities. Facilitated by UN-Habitat, Egypt's NUP proposes a new urban system based on six clusters of cities, acknowledging different paces of urbanization (UN-Habitat, 2023). Also, the Egyptian government in cooperation with the World Bank will launch the *Atlas of Sustainable Egyptian Cities*, showcasing Egypt's commitment to sustainable urban development and climate resilience (World Urban Forum, 2024).

However, several challenges must be overcome to meet the NDC targets. One significant hurdle is the increase in electricity tariffs, which has raised operational costs for both the residential and commercial sectors. The gradual removal of subsidies has particularly impacted energy-intensive industries, such as construction, and contributed to a higher cost of living for urban populations, making the transition to energy-efficient buildings more challenging. Additionally, while the rapid expansion of new cities is crucial to accommodate Egypt's growing population, it presents logistical and financial obstacles in ensuring these cities meet green building standards and sustainability goals. Achieving these targets will also require addressing resistance from stakeholders who are wary of the upfront costs associated with green technologies and retrofitting existing infrastructure.

1.4.6 Tourism Sector

Greening the tourism industry requires incorporating eco-friendly practices across various facets of the sector. Notable initiatives include reducing the carbon footprint of hotels, resorts, and attractions through energy-efficient technologies and renewable energy adoption, such as PV panels and solar water heaters. Moreover, tourism hubs like Sharm El-Sheikh have embraced sustainability by implementing green building codes, using waste management systems that reduce environmental impact, and supporting low-carbon transport options for tourists, aligning with Egypt's broader climate targets.

One such initiative is the *Mainstreaming Biodiversity in Egypt's Tourism (MBDT)* project, funded by the Global Environment Facility (GEF) and implemented by the UNDP and Egypt's Ministry of Environment. This project supports eco-certified tourism businesses, helping them adopt sustainable practices and minimize the negative impacts of tourism development. Among the project's achievements is the launch of *ECO EGYPT*, Egypt's first-ever Green List (GL), which recognizes tourism businesses such as hotels, ecolodges, and diving centers for their commitment to sustainability (UNDP, 2024).

Additionally, *ECO EGYPT* offers tools like the Egyptian Sustainable Tourism Portal (ESTP), which provides hospitality professionals with guidelines for implementing sustainable, cost-effective measures. The project also collaborates with local authorities to establish ecolodge guidelines, helping promote nature-based, biodiversity-friendly tourism. Egypt's tourism sector, particularly areas like Sharm El-Sheikh, is undergoing a green transformation, positioning itself as a global leader in sustainable coastal tourism, which achieved a substantial contribution to climate change action and biodiversity conservation during COP27 (ECO Egypt, 2023).

The tourism sector in Egypt faces several challenges, despite ongoing efforts to promote sustainability. Geopolitical tensions and economic instability can significantly impact tourism flows, as these factors reduce international visitors and tourist spending, causing financial strain on the sector. Additionally, rising electricity tariffs and petroleum price increases further burden tourism businesses, leading to higher operational costs that could deter both operators and visitors. While green initiatives, such as the ECO EGYPT campaign and Sharm El Sheikh's green transformation, offer promising solutions, the widespread adoption of sustainable tourism practices is still limited. The lack of resources among many tourism operators to invest in eco-friendly infrastructure, coupled with the need for more robust training and regulatory enforcement, makes the transition challenging. Moreover, the growth of new tourism destinations, including in the New Administrative Capital and coastal resorts, risks exacerbating environmental degradation without clear green building standards or regulatory frameworks. These challenges underline the importance of continued policy alignment, international collaboration, and capacity-building to promote a more resilient, sustainable tourism industry in Egypt.

1.4.7 Waste Sector

Egypt generates 26 million tons of municipal waste annually, with 90% of it being collected. Out of the collected waste, 8.5 million tons undergo treatment, while 15.5 million tons are sent to landfills. The treated waste is utilized to produce 4.3 million tons of organic fertilizer and 1.7 million tons of refuse-derived fuel.

The sector aims to reduce GHG emissions through improved waste management practices, including waste minimization, recycling, and composting. A key milestone is the issuance of Egypt's new Waste Management Regulation Law 202/2020, which seeks to address challenges related to waste collection, disposal, and recycling. This law encourages the private sector's involvement in waste management and emphasizes the importance of adopting sustainable practices across urban and rural areas. Under the law, the Waste

Management Regulatory Authority (WMRA) is the key national entity for waste management in coordination with EEAA and other line ministries. WMRA has been actively developing strategies to enhance waste recycling and promote circular economy principles to reduce the volume of waste sent to landfills, thereby mitigating methane emissions (EEAA, 2020).

In addition to the provisions of Egypt's Waste Law 202/2020 and strategies from the EEAA, there are several key actions being taken to address waste management challenges and mitigate emissions. One important initiative is the expansion of waste-to-energy projects, which convert non-recyclable waste into electricity, helping to reduce both waste volumes in landfills and the reliance on fossil fuels. These projects are aligned with the country's goal to reduce emissions and provide a renewable energy source. Furthermore, Egypt is working to improve waste segregation at the household level, expand recycling programmes, and promote Extended Producer Responsibility (ERP) targeting both urban centers and rural areas (GIZ, 2024).

WMRA has finalized the regulations and conditions required for licensing collection and recycling facilities in accordance with the law. Additionally, WMRA is in the process of reviewing market practices and refining governance frameworks for waste handling and the management of materials destined for final disposal after treatment. Additionally, Egypt's plans to manage hazardous waste and reduce the environmental impacts of e-waste, which has been a growing concern with increasing electronic consumption. The Government has been collaborating with international partners and the private sector to implement sustainable solutions for hazardous waste disposal,Waste water Treatment including improving waste collection, recycling, and treatment technologies. While progress is being made, Egypt still faces considerable challenges in enforcing these regulations and in securing the necessary funding for large-scale projects to meet its NDC goals.

1.5 Effect of National Circumstances on Greenhouse Gas Emissions

Egypt's national circumstances have a profound impact on its greenhouse gas emissions. The interplay of geographical, economic, and social factors is crucial in determining the trajectory of emissions in the country. Nestled in an overwhelmingly arid region, Egypt grapples with significant challenges related to water scarcity, a situation worsened by climate variability coupled with a rapidly growing population that has surpassed 105 million. This demographic shift drives increased demands for energy and resources, primarily met through the combustion of fossil fuels. Such reliance not only escalates greenhouse gas emissions but also highlights the urgent need for a transition toward sustainable energy practices that can effectively mitigate environmental impacts and enhance resilience.

The Egyptian economy is intricately linked to several industries that have historically contributed to high levels of GHG emissions, especially in the oil and gas extraction and processing. While these industries are essential for national economic stability and growth, they present substantial challenges in the pursuit of a lower carbon footprint. Analysis of Egypt's GHG inventory reveals a complex narrative regarding emissions trends from 1990 to 2022, indicating a persistent rise in GHG emissions driven by industrial activity, urbanization, and the growing demand for energy.

Egypt has achieved significant progress in reduction of GHG emissions through various mitigation efforts. In particular through the establishment of ambitious renewable energy targets, efficiency improvement programmes, amd mass transit projects. This has contributed to a deceleration in the growth rate of GHG emissions in recent years. Investments in solar and wind projects not only contribute to lower emissions but also enhance national energy security and economic resilience. Furthermore, the gradual removal of energy subsidies has led to behavioural changes in energy consumption and increased feasibility of energy efficient technologies. This transition is expected to significantly reduce emissions associated with the combustion of the traditional fossil fuels.

On the other hand, the domestic economic challenges, exacerbated by the surrounding geopolitical conflicts, pose significant hurdles to Egypt's transition to a low-carbon pathway. These challenges include rising inflation, increasing public debt, and strained foreign currency reserves, which limit the government's capacity to invest in clean energy infrastructure and green projects. Additionally, geopolitical tensions in the region have disrupted trade routes, increased energy costs, and diverted attention and resources to addressing immediate economic and security concerns, further slowing progress on long-term climate goals. Adequate international assistance in the form of funding, capacity building, and technology transfer is essential to offset the financial and technical barriers that hinder the country's climate action. Without such support, achieving a low-carbon future in the context of these compounded challenges will remain a significant struggle, potentially impacting Egypt's contribution to global climate goals.

1.6 Key Adaptation Sectors

1.6.1 Water Resources

The water sector in Egypt faces significant challenges that are exacerbated by climate change and population growth, in addition to economic development which further intensifies demand for water resources. With over 98% of the country's freshwater supply sourced from the Nile River, the increasing demand for water due to agricultural, industrial, and domestic needs places immense pressure on this vital resource. To combat water scarcity, the Egyptian government is implementing a range of adaptation strategies that aimed at enhancing the efficiency of water management. These strategies include modernizing irrigation systems to reduce water wastage, promoting the use of drought-resistant crops, and adopting innovative technologies such as precision agriculture. Additionally, there is a strong focus on improving the overall water infrastructure, with investments directed towards the rehabilitation of existing reservoirs, canals, and treatment plants. Egypt is also exploring alternatives to freshwater sources, such as desalination and

wastewater recycling, to diversify its water supply and ensure sustainability in the face of increasing demand and climate variability. Furthermore, integrated water resource management practices are being developed to coordinate efforts among various stakeholders and ensure equitable water distribution across different sectors. These initiatives aim to not only address current water scarcity issues but also to build resilience against future climate impacts (Al-Mailam et al., 2023).

Egypt's coastal population, accounting for 40-45% of the nation's total, faces significant risks from climate change. The Nile Delta, home to over 40 million people, is especially susceptible to sea-level rise and storm surges, potentially displacing 6-8 million individuals by 2050. Rising sea levels also threaten freshwater sources through saltwater intrusion, negatively impacting agriculture and water supplies. These challenges heighten the risk of displacement, potentially triggering migration and increasing pressure on inland regions. The Egyptian government is implementing adaptation measures, such as constructing sea defenses, initiating reclamation projects, and improving water management. However, without effective mitigation of sea-level rise, displaced populations could migrate to urban areas, intensifying strain on housing, infrastructure, and essential resources.

To complement these efforts, several significant and successful water projects have been launched across the country, illustrating Egypt's commitment to enhancing water security and sustainability. One of the most notable projects is the New Delta Irrigation Water Treatment Plant, recognized as the largest of its kind in the world, with a capacity of processing 7.5 million cubic meters of agricultural drainage water daily. This ambitious initiative aims to reclaim approximately two million acres of land in the New Delta region, significantly boosting agricultural productivity while sustainably managing water resources.

Another critical project is El Hammam Wastewater Treatment Plant, designed to treat 7.5 million cubic meters of wastewater per day for agricultural use. This facility has not only reduced pollution levels in local water bodies, such as Lake Mariout but also exemplifies Egypt's innovative approach to utilizing treated wastewater, thereby alleviating pressure on freshwater sources.

Additionally, the country is making strides in expanding its desalination infrastructure, with plants like the Ain Sokhna facility, which has a capacity of purifying 136,000 cubic meters of seawater daily (Arab Republic of Egypt Presidency, 2019). The ongoing development of new desalination projects reflects Egypt's determination to diversify its water supply in response to the growing challenges of climate variability and water scarcity. Moreover, the implementation of Integrated Water Resources Management (IWRM) approaches underscores the need for a coordinated strategy involving various stakeholders to optimize water resource use across agricultural, industrial, and domestic sectors.

1.6.2 Agriculture and Livestock

Egypt's agriculture plays a vital role in regional food security and the national economy. With 55% of the labor force engaged in agricultural activities, the sector employs 21% of the workforce and accounted for 11.3% of Egypt's GDP in 2021. It provides income for citizens and revenue for the state. Domestically, agriculture meets 30% of the country's dietary needs, while also exporting food both regionally and internationally. However, Egypt cannot achieve food security on its own, particularly in terms of strategic agricultural commodities like cereal grains. Recent events, such as the coronavirus pandemic, have worsened food insecurity, leaving over a quarter of the population facing mild to acute levels of food insecurity.

Egypt's per capita caloric supply is high, but a third of this intake, along with over 38% of daily protein consumption, comes from wheat products alone. Despite producing 9 million metric tons of wheat annually, Egypt imports an additional 12 to 13 million metric tons to meet demand, creating a significant wheat import gap. This results in a $5.2 billion expenditure on wheat imports. Even so, Egypt's per capita wheat consumption is among the highest in the world, more than double the country's combined daily consumption of meat, seafood, eggs, milk, butter, and rice. The adverse impacts of climate change on wheat yields are a major concern, as they could increase Egypt's dependence on cereal imports and threaten both nutrition and domestic food security. Projections show that wheat and maize yields could decline by 10 to 12% and 13 to 15%, respectively, by 2030. Additionally, agriculture accounts for about 80% of Egypt's freshwater consumption.

Agriculture in Egypt is predominantly concentrated in the Nile Delta and Nile Valley, which together account for about 80% of the country's agricultural land (FAO, 2023). However, these areas face significant challenges from water scarcity, saltwater intrusion, and land degradation. The Nile Delta, home to around 60% of Egypt's agricultural production, is particularly vulnerable to sea-level rise, with projections suggesting that up to 200,000 hectares of farmland could be lost by 2050 due to saltwater intrusion (UNEP, 2022). Egypt's water scarcity, with an availability of less than 600 cubic meters per capita per year, further exacerbates these challenges, particularly given the reliance on the Nile for irrigation (FAO, 2023). Prolonged droughts and irregular rainfall patterns due to climate change threaten the sustainability of agricultural productivity and food security.

In response to these challenges, Egypt has initiated several projects aimed at expanding agricultural land and rehabilitating degraded areas. These include the New Valley Project and the Toshka Project, which focus on reclaiming desert land for agriculture, and efforts to use treated wastewater for irrigation to reduce pressure on freshwater resources (FAO, 2023). Additionally, soil improvement initiatives and the use of salt-tolerant crops in coastal regions impacted by sea-level rise are part of the government's strategy to maintain agricultural productivity (UNEP, 2022). Despite these efforts, the country's agricultural sector remains under significant stress due to environmental factors and water-related challenges, underscoring the need for sustainable land and water management to ensure long-term food security.

1.7 Climate Change Vulnerabilities and Adaptive Capacity

Egypt is a developing county characterized by its arid and semi-arid climate, experiences hot, dry summers and mild winters. Most rainfall is concentrated along the Mediterranean coast, leaving other regions with little precipitation. Over the past 25 years, Egypt has witnessed rising temperatures and frequent extreme weather events, causing economic losses. In 2022, the highest temperature recorded was 42.6°C in Aswan.

Egypt depends on the Nile River, which provides 55.5 billion cubic meters (BCM) of water annually, based on international treaties. However, Egypt's water needs exceed 114 BCM. The water deficit is managed through various methods: agricultural reuse, treated wastewater, desalination, and the extraction of non-renewable groundwater. The Nile Delta is particularly vulnerable to climate change; rising sea levels and salinization pose serious threats to agriculture and water security.

By 2024, Egypt's population reached over 105 million, with 95% concentrated in the Nile Valley and Delta. Rapid population growth and urbanization strain natural resources and infrastructure, exacerbating climate challenges. Cairo alone houses over 10 million people, putting additional pressures on housing, employment, and public services.

Climate change poses significant risks to Egypt's infrastructure, particularly in the Nile Delta, where sea-level rise and salinity intrusion threaten coastal areas. Extreme weather events like heatwaves and droughts also strains inland regions. Despite investments in renewable energy and transportation, ongoing efforts are needed to ensure Egypt's infrastructure is resilient to future climate impacts, as outlined in Egypt Vision 2030 and the National Climate Change Strategy 2050.

1.7.1 Adaptive Capacity

Adaptive capacity represents a country's ability to adjust to environmental changes and prepare for the effects of climate change. There are different factors that can affect it such as risks communication, supporting institutions, and overall resource management. Rapid population growth increases pressure on natural resources, further complicating adaptation efforts.

In Egypt, adaptive capacity varies significantly across regions. While some areas have developed strong adaptive measures while others face limited capacity to respond to climate events. National policies, such as Egypt Vision 2030 and the National Climate Change Strategy 2050, emphasize adaptation and resilience, integrating them across sectors. However, continued efforts are needed to address regional capacity gaps and strengthen national resilience strategies.

1.7.2 Informational Capacity

Informational capacity is critical to Egypt's adaptive capacity, as it refers to the availability, quality, and utilization of climate-related data and information, as well as assuring the availability and use of climate-related data for informed decision making. Key systems that improve climate data availability include:

- **Meteorological and Hydrological Monitoring System:** Managed by the Egyptian Meteorological Authority (EMA) and the Ministry of Water Resources and Irrigation (MWRI), these systems monitor weather, river flows, and sea-level changes.
- **Statistical Data Collection:** The Central Agency for Public Mobilization and Statistics (CAPMAS), which collects and analyze the climate data to support the planning initiatives in the various sectors.
- **Information Dissemination:** The Egyptian Environmental Affairs Agency (EEAA) shares climate and environmental reports and updates to the policymakers and stakeholders so that they are guided on the decisions they make.
- **Electronic Platform for Environmental and Climate Investment:** Launched in 2023, through the collaboration with the United Nations Industrial Development Organization (UNIDO) and the Green Growth Project. This platform gives information on green investments, market data, finance facilities, and feasibility studies.
- **Public Awareness and Communication:** Educational campaigns and media outreach improve public knowledge of climate risks and adaptation strategies.
- **International Collaboration**: Egypt's participation in global climate networks and conference, like COP 27, facilitate knowledge exchange and best practices in climate data management.

1.7.3 Human Capacity

Human capacity, in the form of trained and skilled personnel is needed for the implementation of adaptation actions in Egypt. Key efforts include:

- **Education and Training:** Universities and research centers offer courses and training on climate science and adaptation strategies to equip future professionals.
- **Community Engagement:** Awareness campaigns and capacity-building workshops empower local communities to take informed action on climate adaptation.
- **Professional Expertise:** Collaboration with climate experts, both local and international, enhances Egypt's ability to address climate challenges effectively.

1.7.4 Institutional Capacity

Institutional capacity is the ability of organizations and institutions to plan, implement, and manage climate adaptation strategies. Egypt's institutional capacity for climate adaptation has been strengthened through coordinated efforts across key entities:

- **Ministry of Environment (MOE):** The MOE serves as the lead institution for environmental and climate policy, overseeing national adaptation plans and ensuring alignment with international commitments under the United Nations Framework Convention on Climate Change (UNFCCC).
- **Egyptian Environmental Affairs Agency (EEAA):** It is the executive arm of the MOE, implements environmental policies and adaptation measures, focusing on biodiversity, pollution control, and sustainable land management.
- **Inter-Ministerial Coordination:** Key ministries collaborate to implement sector-specific strategies. The National Committee for Climate Change (NCCC) monitors adaptation progress.

1.8 Institutional Arrangement

1.8.1 National Climate Governance

Egypt's institutional framework integrates climate actions into national development through cross-sectoral coordination. The National Climate Change Council (NCCC), its organizational structure, and the roles of the Ministry of Environment (MoE) remain central to advancing national climate priorities and coordinating efforts across sectors.

National Council for Climate Change

The National Climate Change Council (NCCC) is an inter-ministerial committee and the key decision body responsible for coordinating climate policy development and implementation across ministries and agencies. The NCCC was established by Prime Minister Decree No. 1912 in 2015 and amended by Decree No. 1129 in 2019, serves as the highest climate governance body. The Prime Minister chairs the Council, which consists of representatives from sector ministries and engages stakeholders from national experts (scientists, practitioners, academic researchers), civil society (non-governmental organizations, union representatives), the private sector, and international donors.

The NCCC plays a central role in overseeing climate change activities, integrating them into national development planning, and formulating policies that align with Egypt's Vision 2030. The Council ensures that national climate change policies, strategies, and plans are linked to Egypt’s sustainable development strategy. It is tasked with drafting, updating, and developing the state's general policies related to climate change and monitoring budget allocations for ministries involved in climate action.

The NCCC is also responsible for raising awareness among officials and decision-makers about the implications of climate change and its relevance to their areas of responsibility. These efforts contribute to building both institutional and individual capacities to address climate challenges effectively. Additionally, the Council facilitates interministerial coordination, promoting knowledge sharing, data collection, policy alignment, project implementation, and financing for climate-related initiatives.

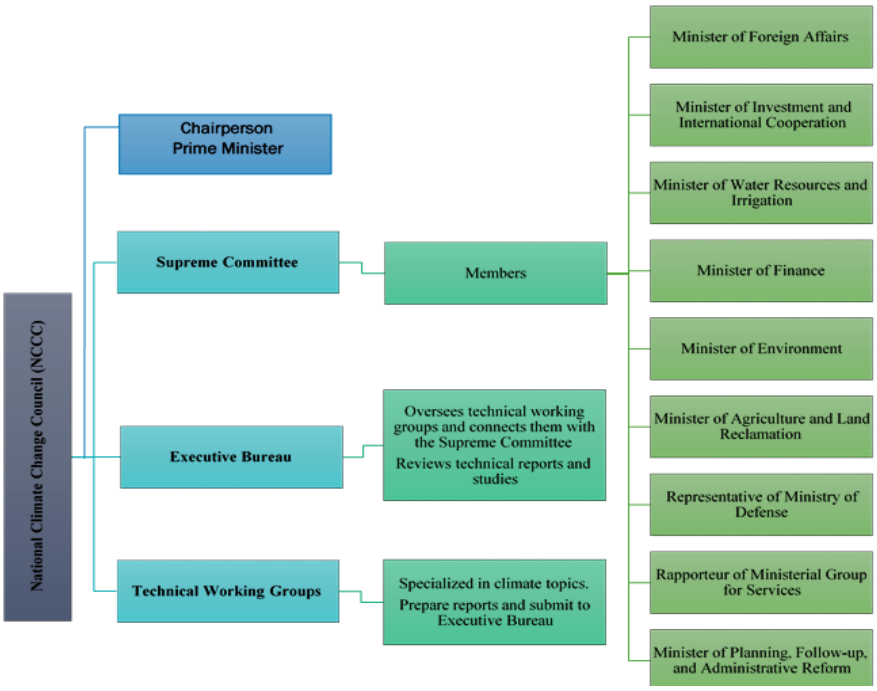


Figure 7: National Climate Change Council (NCCC) Organizational Structure

The NCCC's organizational structure includes:

- **Supreme Committee**: This committee is formed with the membership of ministers from key sectors ensure cross-ministerial collaboration.
- **Executive Bureau:** Oversees technical working groups and ensures coordination with national priorities.
- **Technical Working Groups:** Conduct climate-related studies and report to the Executive Bureau.

Ministry of Environment and the Egyptian Environmental Affairs Agency (EEAA)

The Ministry of Environment, through its executive arm, the Egyptian Environmental Affairs Agency (EEAA), plays a key role in environmental protection and climate reporting. The EEAA coordinates governmental activities related to environmental management and ensures Egypt meets its national and international climate obligations, particularly under frameworks such as the Paris Agreement. The Climate Change Central Department (CCCD) within the EEAA is pivotal in driving climate-related reporting and managing data collection.

The key roles of the Climate Change Central Department include:

- **Climate Reporting:**
  - Serves as Egypt's Action for Climate Empowerment (ACE) focal point, responsible for leading the country's climate-related reporting efforts.
  - Prepares and submits essential national reports such as National Communications and Biennial Update/Transparency Reports (BUR/BTRs), which highlight Egypt's progress in reducing greenhouse gas emissions, climate adaptation strategies, and technology transfer initiatives.

- **Data Collection:**
  - Oversees the collection of comprehensive climate-related data from various stakeholders, including government ministries, private sector entities, and international organizations.
  - Ensures all environmental and climate impacts are represented in both national and international reports.

- **Capacity Building:**
  - Collaborates with international bodies such as the United Nations and regional organizations to monitor and evaluate the impact of capacity-building programs.
  - Documents and tracks initiatives such as training workshops, technical assistance, and knowledge-sharing platforms aimed at building climate resilience.

- **Technology Transfer:**
  - Coordinates with relevant partners to ensure accurate data collection and reporting on incoming technology transfers.
  - Highlights the contributions of these technologies to reducing emissions and improving climate resilience.

- **Enhancing Monitoring, Reporting, and Verification (MRV) System:**
  - Supports the ongoing development and enhancement of Egypt's national MRV system by aligning with the proposed MRV structure, which includes pathways for tracking GHG emissions, mitigation actions, adaptation efforts, and support received.
  - Works to ensure that the MRV system evolves into a comprehensive framework to improve climate reporting, transparency, and accountability across sectors.

- **Finance Tracking:**
  - Collaborates with the Ministry of International Cooperation, Ministry of Finance, international donors, and multilateral institutions to report on financial support received and assess its impact on achieving Egypt's climate goals.
  - Ensures climate finance tracking is integrated into national reporting systems, highlighting gaps, needs, and opportunities for enhanced climate finance mobilization, particularly for vulnerable sectors and communities.

- **Collaboration with the National Council for Climate Change (NCCC):**
  - Works closely with the NCCC to ensure effective coordination among all relevant stakeholders, including government ministries, the private sector, civil society, and international partners.
  - Assists in the alignment of national climate policies with international commitments and facilitates cross-sectoral engagement to support climate action.

Ministry of International Cooperation (MoIC)

The Ministry of International Cooperation plays a pivotal role in monitoring and managing funds received from international climate finance institutions, such as the Green Climate Fund and the Global Environment Facility. By collaborating closely with the Ministry of Environment, the ministry ensures the effective allocation and transparent reporting of financial resources. This partnership supports accountability and aligns funding with Egypt's climate priorities, facilitating progress toward national and international climate commitments.

1.8.2 International Climate Change Commitments

Egypt has been proactive in addressing climate change through its commitments under international frameworks. In 1994, Egypt ratified the United Nations Framework Convention on Climate Change (UNFCCC), becoming one of the first nations to respond to the threats of climate change under the equity principle of common but differentiated responsibilities, aligned with its national capabilities.

In November 2015, Egypt submitted its Intended Nationally Determined Contribution (INDC), outlining its climate action goals to align with the global targets of the Paris Agreement. After signing the Paris Agreement on April 22, 2016, and ratifying it on June 29, 2017, Egypt's INDC was adopted as its first Nationally Determined Contribution (NDC). Since then, Egypt has submitted a first (2022) and second (2023) updates to its first NDC, covering the period between 2015 till 2030. These updates emphasize the country’s mitigation and adaptation plans within the context of its national priorities and development challenges.

Egypt has also submitted three national communications to the UNFCCC, with the initial communication in 1999, followed by the second in 2010 and the third in 2016. These reports have detailed Egypt's greenhouse gas inventories, adaptation strategies, climate policies, and vulnerabilities across various sectors. The fourth national communication is currently underway and is expected to be submitted in 2025, building on the insights from previous reports and reflecting Egypt's evolving climate action framework. Additionally, Egypt submitted its first Biennial Update Report (BUR) in 2019, summarizing recent developments in its climate policies, emissions, and mitigation actions. The following figure presents a timeline of Egypt's submitted reports.

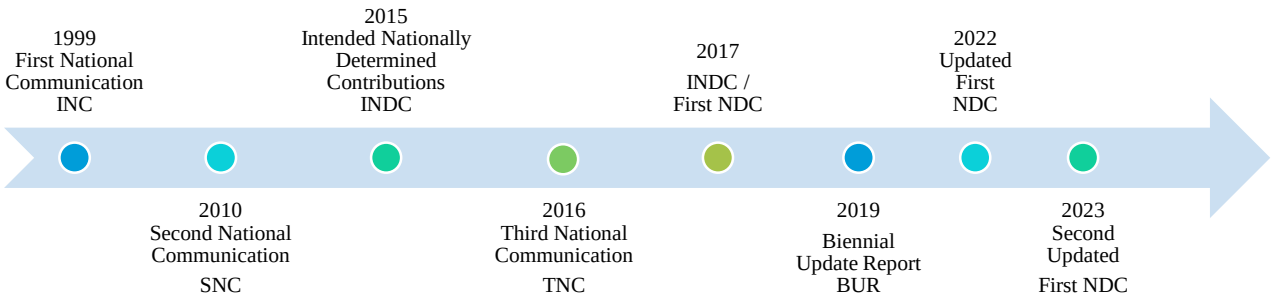


Figure 8: Timeline of Egypt's Document Submission to UNFCCC

Egypt's climate action efforts are based on a comprehensive and structured process designed to identify, track, and report support. This includes systematic data collection on financial resources, technology transfers, and capacity-building initiatives. Transparency and accountability are prioritized, with data aligned to meet the reporting requirements of the Paris Agreement. At the same time, adaptation and mitigation strategies are emphasized, focusing on reducing greenhouse gas emissions and addressing vulnerabilities in key sectors.

Through its national communications, BURs, and updated NDCs, Egypt has consistently demonstrated its commitment to tackling climate change while balancing its development priorities. This proactive approach highlights Egypt's leadership in climate diplomacy and its efforts to enhance its capacity for mitigation and adaptation, ensuring alignment with international obligations and contributing to global climate action.

1.8.3 National Monitoring, Reporting, and Verification

Egypt's institutional arrangements include the establishment of a Monitoring, Reporting, and Verification (MRV) system as a critical component for tracking progress in implementing climate actions. As a nation highly vulnerable to climate change impacts, Egypt recognizes the critical role of robust MRV systems in ensuring transparency, accountability, and effective implementation of climate policies. An MRV system enables the country to accurately measure greenhouse gas (GHG) emissions, track mitigation and adaptation actions, and monitor the financial and technical support received.

The national MRV system, formalized under Minister of Environment Decree No. 415/2023, aligns with international requirements under the UNFCCC and the Paris Agreement's Enhanced Transparency Framework (ETF) (EEAA, 2019). The launch of the domestic MRV system remains contingent on funding. In the interim, Egypt is building on partial MRV activities that have already been implemented, providing a solid foundation for the evolution into a fully comprehensive national MRV system.

The national Climate MRV system was proposed based on extensive consultations with representatives from all relevant national entities, ensuring a coordinated and inclusive approach. The structure envisions the National Council for Climate Change (NCCC) as the supervisory body, responsible for overseeing and guiding the entire MRV process. The Climate Change Central Department (CCCD), operating within the Ministry of Environment, would serve as the coordinating entity, collaborating with various ministries, governmental agencies, and stakeholders to streamline data collection and reporting.

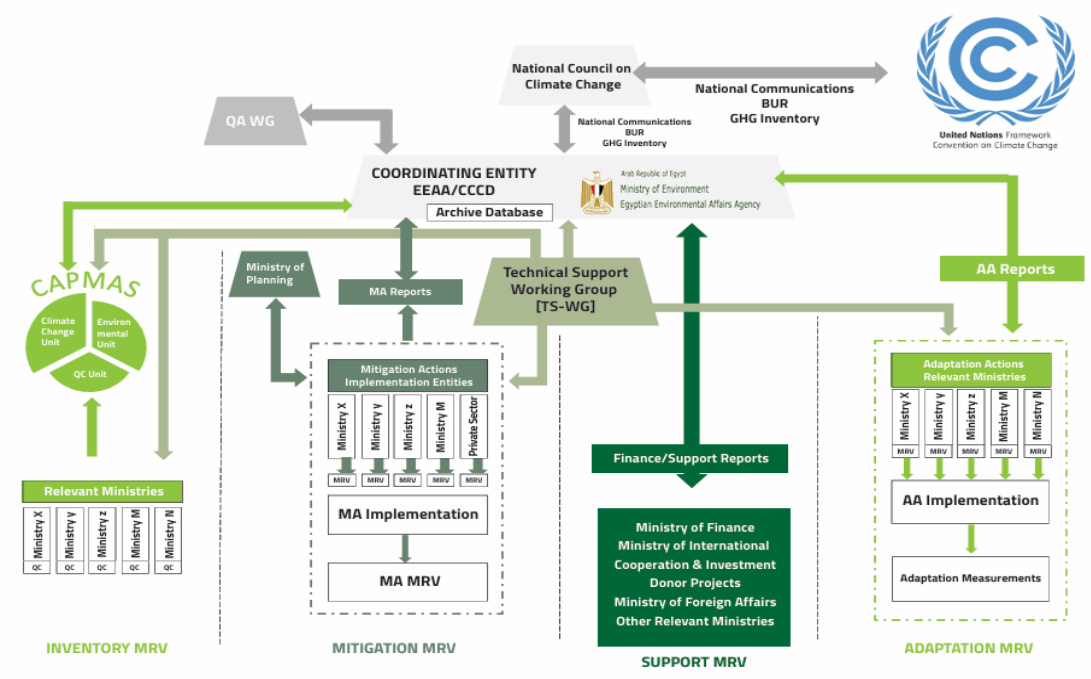


Figure 9: National MRV structure (BUR1, 2019)

The CCCD, represented by the NCCC, has two arms: the quality assurance working group (QA-WG) and the technical support working group (TS-WG). CAPMAS would act as the central data coordinating entity. Egypt's MRV system is designed to function across four key pathways, or tracks: i) GHG Inventory MRV, which will systematically track and quantify the country's emissions and removals; ii) Mitigation Policies and Actions MRV, which will assess the effectiveness of climate actions aimed at reducing emissions; iii) Support Received MRV, which will monitor and verify the financial, technical, and capacity-building support received from international sources; iv) Adaptation Policies and Actions MRV, which will evaluate the effectiveness of national efforts to adapt to climate change impacts and build resilience. Another key feature of the MRV system is the establishment of a centralized

database that collects, analyzes, and reports climate data. This enables Egypt to assess the effectiveness of its climate policies and actions in a transparent manner.

To date, only the Oil and Gas sector has established a MRV system to track NDC commitments, while the Ministry of Petroleum and Mineral Resources (MoPMR) has developed a preliminary electronic platform that connects the ministry with its affiliated companies. This platform is designed to collect initial data on energy consumption and mitigation projects. The Energy Efficiency and Climate Department (EECD) at the MoPMR conducts internal checks on the reported data to ensure its accuracy, identify any discrepancies, and verify that all values are realistic and project-specific. This verification process includes technical assessments, such as mass and energy balance validation.

The electricity sector is also actively working on enhancing its MRV system to monitor the progress of Egypt's NDCs. Additionally, several ongoing donor-funded programmes are supporting the establishment of these systems, including national electronic data collection and reporting mechanisms.

Key Challenges in Identifying, Tracking, and Reporting

Egypt faces several technical challenges in its efforts to collect and report climate data as part of its international obligations. These challenges arise from limitations in data infrastructure, human capacity, and financial resources, as well as difficulties in coordination across sectors and stakeholders. In addition, gaps in monitoring systems, technological capacity, and public engagement further complicate the collection and verification of accurate data. The following table outlines the key challenges that impact Egypt's ability to ensure comprehensive and reliable climate reporting, which is critical for advancing its climate action goals and meeting international transparency requirements.

Table 3: Key challenges in identifying, tracking, and reporting

Challenge	Description
Insufficient Data Infrastructure	Lack of integrated digital systems for data management and real-time data collection, leading to delays and inaccurate information gathering.
Limited Human Resources and Capacity	A shortage of skilled personnel to manage data collection, reporting, and analysis, especially in specialized areas.
Challenges in Coordinating Across Multiple Stakeholders	Inefficiencies in coordinating between government ministries, private sector, and international partners leading to data gaps.
Data Gaps in Key Sectors	Key sectors such as agriculture and coastal zones lack comprehensive data due to technical and resource constraints.
Inadequate Monitoring and Verification Systems	Underdeveloped systems for monitoring and verifying data quality, leading to inconsistent data reliability. MRV institutional barriers, such as the absence of an inventory for achieved development projects and programs is a main barrier to scaling up implementation of mitigation and adaptation measures across Egypt. The MRV system should be put in place to track the progress of achievements and associated development impact of each project.
Financial Constraints	Limited financial resources hinder the expansion of data collection systems and investment in technology. Substantial resources are required to implement capacity building programs and establish robust information systems to address the challenges of climate change. This

	requires financial support from international organizations. Competent personnel capable of preparing bankable funding proposals acceptable to donors and aligned with their development objectives are needed. Although the NCCC has formally adopted the domestic MRV framework, full institutionalization is still pending, as the launch of the national MRV system requires additional funding and resources.
Lack of Harmonized Data Collection Protocols	Different protocols and indicators are used across sectors, creating difficulties in data harmonization and integration.
Underdeveloped Data Integration Across Sectors	Fragmented information across sectors hinders a holistic view of climate impacts and actions.
Delays in Data Availability	Significant delays in collecting and processing data due to resource and bureaucratic constraints, impacting report timelines.
Challenges in Financial Data Tracking	Challenges in accurately capturing financial flows from private sector and international funding and distinguishing between adaptation and mitigation funds.
Insufficient Collaboration with the Private Sector	Limited collaboration with the private sector results in underreporting of climate activities, particularly emissions and technology use.

1.8.4 Legal Framework and Regulations

Egypt has adopted legislation to conserve the environment, promote climate adaptation, and support sustainable development. These include:

- **Environmental Protection Law No. 4/1994 (amended by Laws No. 9/2009 and No. 105/2015):** This foundational law integrates environmental considerations into national policies, including Environmental Impact Assessments (EIAs) and pollution control. It mandates resource and biodiversity protection, supported by regulations such as Prime Ministerial Decree No. 338 of 1995 and subsequent amendments.
- **Prime Ministerial Decree No. 1912/2015**: Established the National Council for Climate Change to coordinate policies across ministries.
- **Presidential Decree No. 566/2016**: Obligates ministries to comply with the Paris Agreement, emphasizing national adaptation and mitigation strategies.
- **Waste Management Law No. 202/2020**: Provides a framework for waste management and promotes recycling and waste-to-energy technologies.
- **PM Decree No. 1129/2019:** Climate change units establishment in relevant ministries/authorities. Climate change units formed in Ministry of Electricity & Renewable Energy (MoERE), Ministry of Petroleum and Mineral Resources (MoPMR), Ministry of Transport (MoT), Ministry of Agriculture & Land Reclamation (MALR), Ministry of Water Resources & Irrigation (MWRI).
- **Ministerial Decrees No. 415 and No. 34/2023**: Established the MRV working group and the Environmental and Climate Investment Unit, supporting national transparency efforts and investment in environmental projects. Members of the working group members: EEAA and CCCD, CAPMAS, MoERE, MoPMR, MoT, MWRI, and MoIC.

Table 4: Summary of key laws and regulations across the various sectors

Sector	Law/Regulation	Description and Adaptation Relevance
Water	Water Resources Law No. 147 of 2021	Governs the management of Egypt's water resources, addressing the allocation, protection, and sustainable use of water. Given Egypt's dependence on the Nile River, this law is crucial for adaptation strategies related to water security and drought management.
	Law No. 93 of 1962 (Wastewater Discharge) and its Executive Regulations No. 44 of 2000	Regulates wastewater treatment and discharge, crucial for water quality protection and preventing resource depletion.
	Law No. 48 of 1982 (Protection of the Nile River and Waterways)	Provides rules for protecting the Nile River and coastal environment from pollution.
Energy	Law on Renewable Energy No. 203 of 2014	Promotes renewable energy development, aiding in energy resilience and adaptation to supply disruptions.
	Electricity Law No. 87 of 2015 (Amended by Law No. 192 of 2020 and Law No. 70 of 2021)	Governs electricity production and distribution, ensuring energy systems are resilient to climate-related challenges.
Industry	Ministerial Decree 49/2021 (Alternative Fuels in Cement)	Supports partial replacement of fuels in the cement sector, contributing to sustainability and emission reductions.
Transport	Presidential Decree No. 549/2020 amending No.419 of 2018	Customs tariffs on EV set-up equipment, charging stations & parts for EV conversion
	Presidential Decree No. 419 of 2018	Exemption on import tariffs & permit to import used EVs (max 3 years old)
	Ministerial Decree of MoERE No. 14/2022	EVs charging tariffs
	Ministerial Decree of Ministry of Interior (No. 1945/2022)	Gas & diesel cars conversions to EVs
	Ministerial Decree of Ministry of Trade and Industry	EV imports' customs clearance conditions
	Ministerial Decree of Ministry of Finance	Customs tax discount on electric/dual motor (electric and gasoline) cars
	Law No. 162/2022	Establish Supreme Council for Automotive Industry (AI) and Environmentally Friendly AI Fund
	Circular No. 5/2022	Charging of EVs in Egypt
Agriculture	Agriculture Law No. 53 of 1966 (Amended by Law No. 116 of 1983)	Manages irrigation, crop rotation, and pest control, with amendments addressing climate-related risks like water scarcity and soil degradation.
Infrastructure	Building Code Law No. 119 of 2008	Sets climate-resilient building standards, including provisions for extreme weather resistance and adaptation guidelines.
Fisheries	Law No. 146 of 2021 (Protection and Development of Lakes and Fish Resources)	Protects and develops lakes, waterways, and fish resources, contributing to the conservation of aquatic ecosystems.
Biodiversity	Law No. 102 of 1983 (Nature Reserves)	Establishes protected areas, crucial for biodiversity conservation and climate resilience.

The table below summarizes key international agreements signed by Egypt, demonstrating its commitment to global environmental and climate initiatives.

Table 5*: *Key International environmental agreements that Egypt signed

International Agreement	Description	Focus Areas	Signature Date	Ratification Date	Entry into Force Date
United Nations Framework Convention on Climate Change (UNFCCC)	Global treaty addressing climate change, focusing on mitigation, adaptation, and transparency.	Climate change, adaptation, resilience, transparency.	09/06/1992	05/12/1994	-
Kyoto Protocol	Protocol to the UNFCCC setting legally binding targets for reducing greenhouse gas emissions for developed countries.	Greenhouse gas emissions reduction, climate change mitigation.	15/03/1999	12/01/2005	12/04/2005
Paris Agreement	Global climate agreement aiming to limit global warming and enhance climate resilience through nationally determined contributions.	Climate change mitigation, adaptation, finance, transparency.	22/04/2016	29/06/2017	-
Convention on Biological Diversity (CBD)	International agreement promoting the conservation of biodiversity and the sustainable use of biological resources.	Biodiversity conservation, sustainable use, ecosystem services.	09/06/1992	02/06/1994	08/09/1994
United Nations Convention to Combat Desertification (UNCCD)	Global initiative to combat desertification and promote sustainable land management.	Land degradation, desertification, resilience, ecosystem restoration.	14/10/1994	07/07/1995	26/12/1996
Montreal Protocol on Substances that Deplete the Ozone Layer	Treaty designed to protect the ozone layer by phasing out the production of substances responsible for ozone depletion.	Ozone layer protection, reduction of ozone-depleting substances, atmospheric preservation.	16/09/1987	02/08/1988	11/02/1993
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	Treaty focusing on the control and reduction of hazardous waste movement and disposal.	Hazardous waste management, environmental health, pollution control.	22/03/1989	08/01/1993	08/07/1993

1.8.5 Key Sectoral Policies, Action Plans, and Strategies

The table below summarizes Egypt's key national policies, action plans, and strategies by sector.

Table 6: Summary of key national policies, action plans, and strategies by sector

Strategy/ Plan	Year	Description	Objective
Climate Change			
Egypt's National Climate Change Strategy 2050	2022	The National Climate Change Strategy 2050 (NCCS) was adopted in May 2022 under Prime Ministerial Decree No. 1860/2022. The NCCS sets targets for both mitigation and adaptation, and its policy framework aligns with Egypt's Updated Vision 2023.	Aims to enhance the country's resilience, adaptability, and capacity to mitigate greenhouse gas emissions, aligning with international climate commitments and sustainable development goals.
Water Resources			
Egypt's Strategy for Development and Management of Water Resources 2050	2016	The strategy focuses on sustainable water management through integrated approaches. It includes rehabilitating water infrastructure, improving sewage networks, developing groundwater resources, raising awareness, and employing advanced water technologies. The four main axes aim to develop resources, rationalize usage, improve water quality, and create an enabling environment for integrated water management.	Achieve water security through sustainable management of water resources.
National Water Resources Plan (NWRP) 2017-2037	2005	The plan emphasizes sustainable water use considering socio-economic and environmental factors. It includes strategies to reduce water demand, optimize supply, and control pollution, while also developing new water sources like deep groundwater and desalination.	Increase water use efficiency. Protect water quality. Control pollution and augment water supply.
Agriculture			
Sustainable Agricultural Development Strategy 2030 (SADS) (Arab Republic of Egypt (ARE, 2009)	2009	Focuses on modernizing Egyptian agriculture to enhance resilience against climate change. Key initiatives include increasing land productivity, utilizing high-yield crops, enhancing irrigation efficiency to 80%, and boosting livestock production.	Achieve food security Enhance agricultural productivity Improve rural livelihoods Enhance the sustainable use of natural resources.
Energy			
Integrated Sustainable Energy Strategy (ISES) 2035	2016	Targets a 42% renewable energy share by 2035, promotes energy efficiency measures, and supports private sector investments. Includes four main pillars: securing energy supply, ensuring industry sustainability, developing institutional governance, and enhancing energy market competitiveness.	Increase renewable energy share Improve energy efficiency Enhance sector sustainability
National Energy Efficiency Action Plan (NEEAP) 2012-2015	2012	Focuses on energy efficiency improvements in the electricity sector by 5% through measures such as energy audits and efficiency upgrades. Adaptation involves setting up systems for energy management and monitoring to ensure effective implementation.	Achieve a cumulative energy efficiency improvement of 5%.
National Energy Efficiency Action Plan (NEEAP) II 2018/2019 – 2021/2022	2018	Enhances the previous plan, NEEAP includes policies merging energy efficiency with environmental strategies, promoting energy managers and auditors, energy efficiency tracking systems, improving energy efficiency tools, verification mechanisms, accreditation processes and compliance with Electricity Law No. 87 of 2015, focusing on adaptation to rising energy demands.	Align with Integrated Sustainable Energy Strategy (ISES) to 2035. Improve energy efficiency without affecting growth, production, or consumer well-being in key sectors.
Low Carbon Hydrogen Strategy	2024	Egypt's National Low-Carbon Hydrogen Strategy, launched in August 2024, aims to position the country as a leading player in the global hydrogen economy, targeting up to 8% of the tradable hydrogen market by 2040.	The strategy envisions producing approximately 1.4 million tonnes of low-carbon hydrogen annually by 2030, with plans to scale up to meet

Strategy/ Plan	Year	Description	Objective
			global demand centers such as the European Union.
Biodiversity			
National Biodiversity Strategy and Action Plan (NBSAP) 2015–2030 (EEAA, 2016)	2016	Focuses on the importance of conserving and sustainable use of biodiversity, it addresses numerous challenges, such as habitat degradation, climate change and overexploitation. It integrated biodiversity conservation into various sectors including agriculture and tourism; however, it also encompasses preparatory actions aimed at combating desertification.	Set the basis of the rational use and sustainable development of the national natural resources to meet present and futures' generation needs.

1.9 Use of Flexibility Provisions

In this BTR, Egypt utilizes the flexibility provisions provided under the Modalities, Procedures, and Guidelines (MPGs). Flexibility has been applied in specific areas, as outlined in the table below. The use of these flexibility provisions was to accommodate limitations in data availability, time constraints, or methodological challenges.

There was use of flexibility provisions in the NDC Progress Tracking (Chapter 3) and Emissions Projections. However, very few flexibility options were utilized in the greenhouse gas (GHG) inventory (Chapter 2) as detailed below. For most of the sectors, the inventory adhered strictly to the full requirements of the MPG. This included comprehensive reporting of all categories, gases, and time periods, ensuring the inventory's completeness and integrity. No omissions or simplifications were made, reflecting a commitment to maintaining the highest standards of transparency, consistency, and accuracy in the reporting process. All data and methodologies were aligned with established guidelines to provide a detailed and reliable account of emissions.

Table 7: Use of flexibility provisions in Egypt's BTR

Flexibility Provision	MPG Paragraph	Flexibility used?	Application
GHG Inventory			
Key Category Analysis	25	No	Did not utilize the flexibility provision that allows for the identification of fewer key categories or the use of less complex methodologies for non-key categories. Instead, the inventory maintained a rigorous approach, considering and reporting all categories comprehensively in line with the full IPCC guidelines. This ensured a robust and detailed estimation of greenhouse gas (GHG) emissions and removals, irrespective of whether a category was classified as key or non-key. The adherence to the full guidelines underscores a commitment to the completeness, accuracy, and transparency of the inventory process.
Uncertainty Assessment	29	No	The option to omit reporting quantitative uncertainty information was not utilized. Despite the challenges related to data availability, every effort was made to collect the most accurate data possible, and uncertainty was assessed and reported wherever feasible, in line with the full requirements of the MPG.
Completeness	32	No	The flexibility to omit estimation of more insignificant categories was not applied. All relevant categories, regardless of their perceived insignificance, were included in the inventory, ensuring a complete and thorough representation of GHG emissions and removals for all sectors.
Quality Assurance/Quality Control (QA/QC)	34 and 35	Yes	Flexibility was applied regarding the development of a QA/QC plan. A formal QA/QC plan has not been reported. However, quality control procedures were adopted by the inventory team and a third-party QA implemented to ensure the accuracy and consistency of the data throughout the reporting process, as required by the MPG.
Gases	48	No	The option to report fewer GHGs was not used. All relevant gases were reported as per the IPCC guidelines, providing a comprehensive overview of emissions and removals for each gas in the agricultural sector, regardless of data limitations.
Time Series	57 and 58	No	The flexibility provision to report a shorter time series and an earlier "latest reporting year" was not applied. A full time series was reported, with data provided for the entire period required by the MPG, ensuring consistency and transparency in the inventory's temporal coverage.
Mitigation Policies and Measures, Actions and Plans			
Estimates of GHG emissions reductions	85	Yes	The flexibility provision to omit reporting the estimates of expected and achieved GHG emissions reductions was applied. Due to data availability limitations, it is challenging to collect granular data for PaMs. In future BTRs, Egypt will aim to address some of these challenges following improvements to the national MRV system. However, certain limitations will remain, preventing the full reporting of GHG emissions reductions.
Emissions Projection			
Projections of GHG emissions and removals	92, 95, and 102	Yes	The flexibility provision to report projections was applied. No projections were made due to time constraints (not technical capacities). Projections should have made from the most recent year in the Party's national inventory report and extended at least 15 years beyond the next year ending in zero or five. Egypt will report projections in future BTRs.

Chapter 2: National Inventory Report of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases

2.1 National Circumstances and Institutional Arrangements

As outlined by the MPGs paragraphs 18 and 19, each Party should implement and maintain national inventory arrangements, including institutional, legal and procedural arrangements for the continued estimation, compilation and timely reporting of national inventory reports; and report on functions related to inventory planning, preparation and management. These functions include: a) national entity or national focal point with overall responsibility for the national inventory, b) inventory preparation process, c) archiving of all information for the reported time series, and d) processes for the official consideration and approval of the inventory.

These requirements are comprehensively addressed in Chapter 1 of this report, under subsection *1.8 Institutional Arrangements*. While the remaining information is covered under subsection 2.3 of this Chapter.

2.2 Background Information on the GHG Inventory

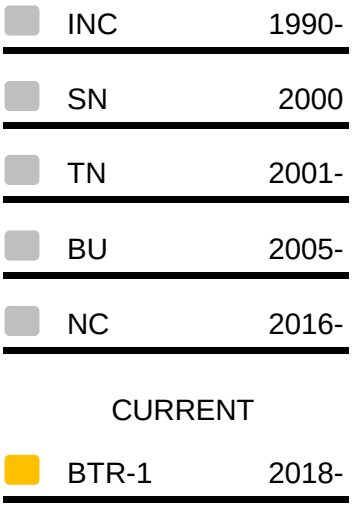
In this Chapter, Egypt presents its GHG inventory for the period 1990–2022. The inventory has been developed using the methodologies outlined in the *2006 IPCC Guidelines for National GHG Inventories and incorporates updates from the 2019 Refinement to the 2006 IPCC Guidelines*. This comprehensive inventory spans 33 years, beginning with the base year of 1990 and concluding with the inventory year of 2022. It covers the four key sectors specified in the 2006 IPCC Guidelines: energy, industrial processes and product use (IPPU), agriculture, forestry, and other land use (AFOLU), and waste.

National GHG inventories serve as a detailed account of annual GHG emissions by sources and removals by sinks within a country's jurisdiction over a specified period. The time series refers to the consistent annual accounting of emissions and removals from the base year (1990) to the inventory year (2022). Each submission builds upon the base year of 1990 and provides updated inventories for the subsequent reporting period.

Egypt has previously reported the following GHG inventory time series:

- **Initial National Communication (INC):** Submitted in 1999, covering the period 1990–1999. This report established the baseline for Egypt’s greenhouse gas (GHG) emissions and highlighted initial measures to address climate change.
- **Second National Communication (SNC):** Submitted in 2010, covering the year 2000. It updated the GHG inventory and introduced vulnerability assessments and adaptation strategies.

- **Third National Communication (TNC):** Submitted in 2016, covering 2000–2005. It provided updated GHG data, mitigation actions, and detailed sectoral vulnerability analyses.
- **First Biennial Update Report (BUR1)** Submitted in 2019, including GHG data from 1990 to 2015. It focused on mitigation actions and measurable, reportable, and verifiable (MRV) frameworks.
- **Fourth National Communication (NC4)** Submitted for the period 2016–2017, maintaining the time series from 1990 and further updating the emissions included in Egypt's BUR1.



This BTR marks a step forward by consolidating and extending the national GHG inventory to 2022. Like previous reports, this inventory builds upon the base year of 1990, ensuring consistency across all submissions. It provides a more complete picture of Egypt's contributions to global greenhouse gas emissions and removals over the past three decades.

This report was prepared following the guidelines set forth in the Modalities, Procedures, and Guidelines (MPGs) for the transparency framework established under the Paris Agreement (Decision 18/CMA.1). Egypt's methodologies adhere to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories developed by the Intergovernmental Panel on Climate Change (IPCC). To further ensure accuracy, transparency, and completeness, the inventory also incorporates elements from the 2013 Supplement to the 2006 IPCC Guidelines: Wetlands, the 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol, and the 2019 Refinement to the 2006 IPCC Guidelines.

Egypt's national inventory reporting reflects its commitment to the MPGs, ensuring alignment with international standards and supporting the country's efforts to provide a transparent and robust account of its GHG emissions and removals over the reporting period. Egypt's national GHG inventory is composed of GHG emissions and removals (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6,). These emissions are estimated in four sectors (Energy, IPPU, AFOLU and Waste). The inventory covered all relevant GHGs except for NF3, which has not been included as it is not occurring (i.e. there are no activities or industries in Egypt that emit this specific type of gas).

2.3 Overview of the GHG Inventory Process

2.3.1 Reporting Framework

Egypt has been actively participating in climate change initiatives under the UNFCCC since the 1990s, demonstrating a commitment to global environmental challenges. Egypt has submitted three NCs to the UNFCCC, providing an overview of its greenhouse gas emissions inventory, mitigation measures, and adaptation efforts. In 2019, Egypt submitted its BUR1, a requirement under the UNFCCC for non-Annex I countries. The country's Intended Nationally Determined Contribution (INDC) was submitted in 2015 (Egypt's First NDC), and updated NDCs were submitted in 2022 and 2023. Egypt is finalizing its NC4 by the end of 2024, which will include a standalone National Inventory Report (NIR). The country also developed its inaugural Biennial Transparency Report (BTR-1) under the Paris Agreement's Enhanced Transparency Framework.

2.3.2 Institutional Arrangements for Inventory Preparation

Egypt has been working in the previous years on developing and enhancing its national MRV system. An MRV working group comprising representatives from various ministries has been established in 2023. Its responsibilities include but are not limited to supporting the data collection, conducting quality assurance and quality control measures for the documents submitted under the UNFCCC and the Paris Agreement, and supporting the digitalization of the system. In the previous period, Egypt has focused on establishing MRV system for 3 key sectors; namely, electricity, oil and gas, and transport where data collection templates for the GHG inventory have been developed, and the institutional arrangements discussed. Moreover, a digital system has been developed under CAPMAS to develop the energy balance data, and two reports have been published accordingly. Egypt is currently working on integrating such system to its digital MRV system which is under establishment.

In addition, Egypt is taking significant strides to enhance its national GHG inventory system by developing a centralized platform for data collection and reporting. This initiative, spearheaded by the Ministry of Environment (MoE), aims to streamline the processes involved in preparing future BTRs, starting with BTR2. The platform is designed to serve as a centralized tool that ensures comprehensive and consistent data collection across all relevant sectors while avoiding double counting or omissions.

The current BTR in Egypt used a sector-based approach for data collection, with each sector contributing emissions and removals data using standardized forms. The new platform is being developed to institutionalize this process, enabling efficient data recording, processing, and emission estimation. This will enhance Egypt's adherence to transparency, accuracy, completeness, consistency, and comparability (TACCC) principles. The platform will strengthen the national inventory system, ensuring Egypt's GHG inventories meet international standards and are delivered on time. The institutional framework for preparing Egypt's Greenhouse Gas Inventory (GHGI) under the NIR ensures comprehensive collaboration, efficient data collection, and accurate reporting across key sectors.

Developing the GHG inventory for the first BTR was conducted under the supervision of the EEAA CEO, the CCCD Director, and the Climate Change National Focal Point. The GHG inventory team comprised of GHGI Team Leader who supervised the entire inventory process, ensuring consistency and quality across the sectors, which include Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry, and Other Land Use (AFOLU), and Waste. The Team Leader oversees sectoral experts, each of whom is responsible for conducting emissions and removals calculations specific to their sector. Sectoral experts also validate the data, document methodologies, and adhere to the IPCC guidelines for inventory preparation. An additional technical assistance and coordination team assisted the key experts throughout the project.

2.3.3 Data Collection Processes

The data collection process for the GHGI involves meticulous planning and coordination between the experts, team leader and designated ministry focal points. Sectoral experts begin by preparing data collection sheets tailored to the specific requirements of their sectors, ensuring alignment with IPCC methodologies. These templates, created in both English and Arabic, are designed to streamline communication with stakeholders and capture the necessary activity data, emission factors, and other parameters for accurate calculations.

Each ministry appoints a focal point to manage data collection efforts within their respective sectors. These focal points liaise with stakeholders such as government departments, industrial facilities, and agricultural bodies to gather the required information. Once the data is collected, it is submitted to the sectoral experts for review. The experts validate the data, addressing any discrepancies or gaps through follow-ups with the focal points, before incorporating it into the inventory.

2.3.4 Definitions and Scope for Egypt's National GHG Inventory

The scope of Egypt's national GHG inventory is defined by three primary components:

1. **GHG Coverage:** The inventory accounts for the six relevant greenhouse gases emitted or removed within Egypt's national boundaries:
    - Carbon dioxide (CO_2)
    - Methane (CH_4)
    - Nitrous oxide (N_2O)
    - Hydrofluorocarbons (HFCs)
    - Perfluorocarbons (PFCs)
    - Sulphur hexafluoride (SF_6)

2. **Sectoral Coverage:** The inventory encompasses emissions and removals across four key sectors as outlined in the 2006 IPCC Guidelines:
    - **Energy:** Includes emissions from fuel combustion and fugitive emissions from fuels.
    - **Industrial Processes and Product Use (IPPU):** Covers emissions from chemical reactions during production and the use of products containing greenhouse gases.
    - **Agriculture, Forestry, and Other Land Use (AFOLU):** Accounts for emissions from livestock, agricultural soils, and changes in forest carbon stocks.
    - **Waste:** Encompasses emissions from solid waste disposal, wastewater treatment, and other waste-related activities.

Each sector is further subdivided into categories, subcategories, and specific emission sources, ensuring detailed reporting.

3. **Geographical Scope:** The inventory covers all emissions and removals occurring within Egypt's national territory, as defined under international boundaries.

Considering the coverage of the six GHGs and the four sectors, the following table presents the specific GHGs covered under each of the sectors within Egypt's national GHG inventory.

Table 8: GHG Coverage by Gas and Sector

Sector/ Category	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3
1. Energy	✓	✓	✓	N.O.	N.O.	N.O.	N.O.
2. IPPU	✓	✓	✓	✓	✓	✓	N.O.
3. AFOLU	✓	✓	✓	N.O.	N.O.	N.O.	N.O.
4. Waste	✓	✓	✓	N.O.	N.O.	N.O.	N.O.

2.3.5 Description of Methodologies

The national GHG inventory of Egypt adheres to the methodologies recommended in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and the updates provided by the 2019 Refinement. These guidelines define a tiered approach to calculating emissions and removals, with the tiers representing varying levels of complexity and accuracy:

- **Tier 1:** Utilizes a default methodology, relying on global averages for emission factors (EF) and basic activity data (AD).
- **Tier 2:** Involves country-specific data for EFs or AD, providing higher accuracy.

- **Tier 3:** Employs advanced modeling or detailed measurements specific to the sector or activity.

- **Activity Data (AD):** Represents the annual level of a specific activity, such as fuel consumption or livestock population.
- **Emission Factor (EF):** Denotes the rate of emissions per unit of activity, such as CO_2 released per liter of fuel burned.

The inventory estimates emissions and removals by multiplying the AD by the EF for each source or sink. For example:

Emissions = Activity Data × Emission Factor

For most emissions and removals categories, the Tier 1 approach serves as the foundation for Egypt's inventory due to resource and data limitations. This approach applies default emission factors provided by the IPCC, which estimates the quantity of greenhouse gases emitted per unit of activity.

Egypt's national GHG inventory for the reporting period includes some activities using Tier 2 approach, ensuring a comprehensive overview of emissions while identifying areas for improvement in future reporting cycles as the country moves toward adopting higher-tier approaches. This methodology aligns with Egypt's commitments under the Paris Agreement and provides a robust foundation for transparency and improvement.

2.3.6 Data and Emission Factors Sources

To the extent possible, official country-specific activity data was used for inventory development, first from official published statistics and secondly from published peer-reviewed or other official publications. The following table presents the entities/sources that have provided national data for the development of the GHGI; categorized by sector. When such data was not available, default values were sourced primarily from the 2019 IPCC Refinement and secondly from the 2006 IPCC Guidelines.

Country-specific emission factors were used, when available, to develop Egypt's national GHG inventory. Otherwise, default values were adopted primarily from the 2019 IPCC Refinement and secondly from the 2006 IPCC Guidelines.

Table 9: Data Sources by Sector

Sector	Data Sources
Energy	• Ministry of Electricity and Renewable Energy (MoERE) and affiliated entities • Egyptian Electricity Holding Company (EEHC) • Egyptian Electricity Transmission Company (EETC) • New and Renewable Energy Authority (NREA) • Ministry of Petroleum (MoP) and affiliated entities • Egyptian General Petroleum Corporation (EGPC) • Egyptian Natural Gas Holding Company (EGAS) • International Energy Agency (IEA) • Ministry of Transport (MoT) and affiliated entities • General Authority for Roads and Bridges and Land Transport (GARBLT) • Maritime Transport Sector (MTS) • Egyptian National Railways (ENR) • River Transport Authority (RTA) • Traffic Sector under Ministry of Interior (MoI) • Ministry of Civil Aviation (MCA) • Industrial Development Authority (IDA) under the Ministry of Trade and Industry (MoTI) • Central Agency for Public Mobilization and Statistics (CAPMAS)
IPPU	• Central Agency for Public Mobilization and Statistics (CAPMAS) – Collects data through questionnaires from industries. • Industrial Development Authority (IDA) – Provides information on production capacity and raw materials. • Federation of Egyptian Industries – Offers insights through its various industrial chambers. • National Ozone Unit (NOU) – Supplies data on ODS substitutes. • US Geological Survey (USGS) Mineral Yearbook – Provides comprehensive information on mineral production and trends. • Donor-funded projects (e.g., UNIDO, World Bank) – Collect data on specific industries. • International publications – Such as the "Steel Statistical Yearbook" and reports from the Egyptian Petrochemical Company (ECHEM).
AFOLU	• Ministry of Agriculture and Land Reclamation (MALR) • Agricultural Research Centre (ARC) • The Agricultural Economic Affairs Sector (EAS) • Central Agency for Public Mobilization and Statistic (CAPMAS), central source of GHG data • The Central Administration for Agricultural Economics (CAAE) • The Central Administration for Agricultural Planning (CAAP) • Food and Agriculture Organization (FAO) • World bank database • International Fertilizer Association (IFASTAT) • National Authority for Remote Sensing & Space Sciences
Waste	• Egyptian Environmental Affairs Agency (EEAA) • National Solid Waste Management Program (NSWMP) • Central Agency for Public Mobilization and Statistics (CAPMAS) • Industrial Development Authority (IDA) • Ministry of Health • Ministry of Petroleum • Ministry of Industry • Waste Management Regulatory Authority (WMRA) • United Nations Food and Agriculture Organization (FAO)

2.3.7 Quality Control and Quality Assurance

Quality Assurance (QA) and Quality Control (QC) measures are integral to ensuring the accuracy, reliability, and compliance of data throughout the greenhouse gas inventory preparation process. These measures are meticulously applied at each stage of data collection and processing, adhering to the TACCC principles.

Data collection involves collaboration with various ministries, affiliated entities, and CAPMAS. Once collected, activity data undergoes rigorous validation by comparison with relevant publications and other sources. In the subsequent stages, the data is entered into the IPCC Software, where activity data tables are generated and reviewed for consistency against the original datasets.

The following QC activities are conducted to ensure the robustness of the estimates:

- **Guidelines Compliance**: The specific requirements of reporting guidelines are checked to ensure adherence to the international standards.
- **IPCC Compatibility:** Data requirements are reviewed in line with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (GHGI) and its software specifications.
- **Primary Data Collection:** Tailored questionnaires are used to gather data directly from primary sources, supplemented by information from national and sectoral reports.
- **Data Tabulation and Comparison:** Collected data is systematically tabulated by year, unit, and source. This is followed by comparing and adapting the data to match the needs of the inventory process.
- **Cross-Verification:** Key activity data and parameters are cross-checked across multiple sources, and sources with significant variations are carefully excluded from use.
- **Emission Factor Validation:** The correctness of emission factors employed in calculations is verified to maintain calculation integrity.
- **Trend Analysis:** Current data trends are analyzed against previous greenhouse gas inventories to identify anomalies and assess consistency with sectoral developments.
- **Parameter Confirmation:** Parameters and assumptions from earlier inventories are reviewed and updated to maintain time-series consistency.
- **Unit and Database Checks:** Proper usage of units is confirmed, and completeness checks are undertaken for all entries in the database.
- **Documentation and Transparency:** A comprehensive record of all QC activities is maintained, ensuring transparency and traceability.
- **Error Prevention and Data Accuracy:** All data inputs and references are carefully checked for transcription errors. Units of parameters and emissions are verified to ensure they are correctly recorded, and appropriate conversion factors are applied as needed.

- **Time-Series Consistency:** Emission trends across time series are analyzed for consistency. Any deviations from the trends observed in previous greenhouse gas inventories are identified, and explanations are provided to justify these differences.
- **Consistency in Methods and Data Selection:** The activity data, emission factors, and methodologies chosen are reviewed for correctness and uniformity across the entire time series. Any inconsistencies are addressed to maintain methodological alignment.
- **Data Quality Assurance and Recalibration**: The quality of existing data is rigorously assured, with recalculations performed when necessary. This includes the review, modification, and potential re-entry of data for specific years or subsectors.
- **Verification of Methodological Descriptions:** Methods applied in the calculations are thoroughly reviewed to confirm their accuracy and proper application. Descriptions of these methods are checked for consistency with IPCC guidelines.
- **Key Category Analysis:** The persistence of key categories over the time series is assessed to ensure their accurate representation and analysis.
- **IPCC Software Validation:** Year-by-year checks are conducted to identify and correct bugs or data misplacement issues within the IPCC software.
- **Uncertainty Analysis:** The expertise of individuals providing judgments on uncertainty estimates is verified. Proper documentation of qualifications and judgments is archived to ensure transparency. Uncertainties entered into the IPCC 2006 software are reviewed and updated to reflect the most accurate estimates.

Additionally, QA procedures were carried out to thoroughly review and validate the overall quality of the inventory. These procedures were designed to ensure that the processes followed align with established guidelines, as well as to identify any areas where improvements could be made. As shown in the following table, the validation process was implemented at different levels. These levels include a peer review conducted by third-party experts and a quality assessment performed at the national level. This multi-level approach ensures that the inventory meets both global standards and national requirements, thereby enhancing its credibility and transparency.

Table 10: Level of Quality Assurance Process

Level	Description
Third-party Review Level	In Egypt's inventory preparation process, third-party expert reviews were conducted through a dedicated team of national consultants. An expert peer reviewer was assigned to perform detailed checks, recommend improvements, and ensure the quality and integrity of the inventory. These expert reviewers focused on the five key quality principles throughout the data compilation and reporting processes. They assessed, among other factors, whether each chapter and section of the inventory provided clear activity data and emission factors with well-documented sources, explained the methodologies applied, and summarized the data sets comprehensively. Additionally, the reviewers examined whether consistent methods and data sources were applied throughout the entire time series. They also ensured that the same IPCC guidelines were followed for methodologies and reporting templates across the entire inventory and for all relevant gases. Furthermore, the review process included checking if estimates were made for all greenhouse gases and source categories present within Egypt's national territory. Finally, the expert reviewers assessed the inclusion of uncertainty analysis and proposed any necessary improvement plans to enhance the robustness and accuracy of the inventory.
Quality assessment at national level	Validation was carried out at the national level through a series of structured meetings and exchanges that occurred throughout the inventory preparation process. These sessions provided a platform for in-depth discussions and collaborative assessments, which played a crucial role in ensuring that the inventory's methodologies, accuracy, and overall quality were rigorously examined. This collaborative approach helped identify potential areas for improvement and facilitated the refinement of the inventory before finalizing the report.

2.3.8 Key Categories

A key category in Egypt's national GHG inventory is a source or sink category prioritized for its significant impact on total emissions and removals, either through absolute levels, trends, or uncertainties. Identifying these categories enables a systematic approach to refining methodologies, improving estimate accuracy, and prioritizing resources for inventory preparation.

The key category analysis follows the 2006 IPCC Approach 1, focusing on level and trend assessments. This methodology identifies impactful categories by applying cumulative emissions thresholds. Both analyses include and exclude emissions and removals from sectors such as Forestry and Other Land Use to ensure comprehensive coverage. The assessments align with international standards to maintain transparency and consistency in Egypt's inventory reporting.

Level assessments measure each category's contribution to total emissions, while trend assessments identify categories with trends that deviate significantly from overall inventory trends, even if their absolute emissions are relatively small. These analyses help target areas requiring detailed attention and support the transition to Tier 2 methodologies for more

accurate estimations in future submissions. Both assessments were completed using emission estimates from the current GHG inventory and are fully compliant with IPCC 2006 guidelines.

In the level assessment, key categories are defined as those that, when aggregated in descending order of magnitude, collectively account for 95% of the total contribution from all sources and sink categories to the national inventory level. This approach ensures that the most significant sources and sinks are identified and prioritized, providing a clear focus for inventory efforts. The following tables present the result of the key category analysis conducted.

Table 11: Level Assessment of Key Categories (2022)

Category Code	IPCC Category	GHG	Ex.t[2] Gg CO_2e	|Ex.t|[3] Gg CO_2e	Lx,t[4]
1.A.1	Energy Industries - Gaseous Fuels	CO_2	87,952.75	87,952.75	0.2277
1.A.3.b	Road Transportation - Liquid Fuels	CO_2	61,272.80	61,272.80	0.1587
1.A.2	Manufacturing Industries - Gaseous Fuels	CO_2	39,049.95	39,049.95	0.1011
2.A.1	Cement production	CO_2	25,276.12	25,276.12	0.0654
1.A.1	Energy Industries - Liquid Fuels	CO_2	18,663.81	18,663.81	0.0483
4.D	Wastewater Treatment and Discharge	CH_4	17,571.25	17,571.25	0.0455
4.A	Solid Waste Disposal	CH_4	16,852.03	16,852.03	0.0436
3.C.4	Direct N2O Emissions from managed soils	N_2O	12,819.17	12,819.17	0.0332
1.A.2	Manufacturing Industries - Solid Fuels	CO_2	10,762.38	10,762.38	0.0279
3.A.1	Enteric Fermentation	CH_4	10,290.67	10,290.67	0.0266
1.A.4	Other Sectors - Liquid Fuels	CO_2	10,218.96	10,218.96	0.0265
1.A.4	Other Sectors - Gaseous Fuels	CO_2	7,204.41	7,204.41	0.0187
1.B.2.b	Natural Gas	CO_2	7,033.89	7,033.89	0.0182
3.A.2	Manure Management	N_2O	6,937.06	6,937.06	0.0180
1.A.2	Manufacturing Industries - Liquid Fuels	CO_2	5,968.75	5,968.75	0.0155
2.F.1	Refrigeration and Air Conditioning	HFCs, PFCs	5,834.06	5,834.06	0.0151
2.B.1	Ammonia Production	CO_2	5,340.58	5,340.58	0.0138
2.C.1	Iron and Steel Production	CO_2	4,984.00	4,984.00	0.0129
3.C.7	Rice cultivation	CH_4	4,506.56	4,506.56	0.0117
2.C.3	Aluminum production	PFCs	4,213.44	4,213.44	0.0109
3.C.6	Indirect N2O Emissions from manure management	N_2O	2,899.73	2,899.73	0.0075
1.A.3.b	Road Transportation - Gaseous Fuels	CO_2	2,465.82	2,465.82	0.0064
Total			**368,118**	**368,118**	**0.9531**

[2] **Ex, t** refers to the **emissions (or removals)** from a specific category **x** in a given year **t**.
[3] **|Ex,t |** refers to the **absolute value** of emissions (or removals) for a specific category x in a given year t.
[4] **Lx,t** : The relative contribution of category x in year t

Table 12: Trend Assessment of Key Categories (2022)

Category Code	IPCC Category	GHG	1990 Ex.t Gg CO_2e	2022 Ex.t Gg CO_2e	Trend Assessment Txt	Contribution to trend %
1.A.1	Energy Industries - Gaseous Fuels	CO_2	9,329.54	87,952.75	0.4365	0.1845
1.A.2	Manufacturing Industries - Liquid Fuels	CO_2	20,311.94	5,968.75	0.3378	0.1428
1.A.2	Manufacturing Industries - Gaseous Fuels	CO_2	3,100.48	39,049.95	0.2132	0.0902
3.C.4	Direct N2O Emissions from managed soils	N_2O	13,700.60	12,819.17	0.1668	0.0705
1.A.1	Energy Industries - Liquid Fuels	CO_2	15,113.62	18,663.81	0.1526	0.0645
1.A.3.b	Road Transportation - Liquid Fuels	CO_2	15,098.97	61,272.80	0.1435	0.0607
1.A.4	Other Sectors - Liquid Fuels	CO_2	9,325.74	10,218.96	0.1032	0.0436
3.A.1	Enteric Fermentation	CH_4	8,812.04	10,290.67	0.0931	0.0394
2.A.1	Cement production	CO_2	4,433.20	25,276.12	0.0927	0.0392
4.A	Solid Waste Disposal	CH_4	9,858.12	16,852.03	0.0671	0.0283
1.A.4	Other Sectors - Gaseous Fuels	CO_2	151.47	7,204.41	0.0472	0.0200
2.F.1	Refrigeration and Air Conditioning	HFCs, PFCs	0.00	5,834.06	0.0405	0.0171
1.B.2.b	Natural Gas	CO_2	533.59	7,033.89	0.0389	0.0164
1.B.2.a	Oil	CO_2	2,530.82	1,575.87	0.0363	0.0154
2.B.1	Ammonia Production	CO_2	(202.77)	5,340.58	0.0361	0.0153
3.A.2	Manure Management	N_2O	677.76	6,937.06	0.0355	0.0150
3.C.7	Rice cultivation	CH_4	3,469.28	4,506.56	0.0335	0.0142
3.C.3	Urea application	CO_2	2,317.34	1,475.18	0.0330	0.0140
2.C.1	Iron and Steel Production	CO_2	3,579.66	4,984.00	0.0322	0.0136
1.A.2	Manufacturing Industries - Solid Fuels	CO_2	2,763.25	10,762.38	0.0231	0.0098
2.C.3	Aluminum production	PFCs	2,674.03	4,213.44	0.0207	0.0087
1.B.2.a	Oil	CH_4	1,289.34	802.84	0.0185	0.0078
1.A.1	Energy Industries - Biomass - solid	CH_4	980.97	0.00	0.0183	0.0077
1.A.3.b	Road Transportation - Gaseous Fuels	CO_2	0.00	2,465.82	0.0171	0.0072
3.C.6	Indirect N_2O Emissions from manure management	N_2O	183.97	2,899.73	0.0167	0.0071
Total			**130032.9**	**354400.8**	**2.25**	**0.9530**

2.3.9 General Uncertainty Assessment

Uncertainty represents the degree of incomplete knowledge that can affect the accuracy of data or results, stemming from limited information or disagreements about the extent of knowledge. It is inversely tied to accuracy and plays a critical role in refining Egypt's national GHG inventory.

Importance of Uncertainty Assessment

Uncertainty assessments are vital for:

- Identifying major sources of uncertainty to focus on improving data collection efforts.
- Guiding the selection of appropriate methodologies for more reliable estimations.

Sources of Uncertainty

Despite efforts to achieve the highest accuracy using available country-specific data, some uncertainties persist in Egypt's GHG inventory due to:

- **Data Limitations:** Lack of complete, high-quality, and recent country-specific data often necessitates the use of assumptions, default data, or splicing techniques.
- **Measurement Errors:** Random errors arising from studies, statistics, and measurement inaccuracies.
- **Model Simplifications:** Approximation methods that simplify real-world systems introduce variability.

Uncertainty analysis was performed using the IPCC software. Uncertainty analysis yielded 6.335 uncertainty in total inventory and 26.180 trend uncertainty over the period between 1990 and 2022. The uncertainty values for emission factors and activity data were based on default values in the IPCC guidelines and expert judgment.

Table 13: Uncertainty assessment (2018 – 2022)

Uncertainty Summary	2018	2019	2020	2021	2022
Uncertainty in Total Inventory	6.804	6.846	6.688	7.341	6.704
Trend Uncertainty	25.509	23.950	23.390	26.556	26.832

2.3.10 Assessment of Completeness

To ensure completeness, the national GHG inventory of Egypt uses notation keys where numerical data are not available. These notation keys include the following and are reported in the CRTs:

- "N.O." (not occurring): Used for categories or processes, including recovery, under a particular source or sink category that do not occur within a Party.
- "N.E." (not estimated): Used for activity data and/or emissions by sources and removals by sinks of GHGs that have not been estimated but for which a corresponding activity may occur within a Party.
- "N.A." (not applicable): Used for activities under a given source/sink category that do occur within the Party but do not result in emissions or removals of a specific gas.
- "I.E." (included elsewhere): Used for emissions by sources and removals by sinks of GHGs estimated but included elsewhere in the inventory instead of under the expected source/sink category.
- "C." (confidential): Used for emissions by sources and removals by sinks of GHGs where the reporting would involve the disclosure of confidential information.

2.3.11 Description of Metrics

Greenhouse gases (GHGs) exhibit differences in their ability to trap heat, referred to as radiative efficiency, as well as the duration they remain active in the atmosphere, known as their atmospheric lifetime. To quantify and compare their climate impacts, the Global Warming Potential (GWP) metric was introduced. GWP measures the cumulative radiative forcing of 1 metric ton of a greenhouse gas over a specified time frame—typically 100 years—relative to 1 ton of carbon dioxide (CO_2). This enables the comparison of the warming effects of different gases on a common scale.

The GWP value represents the ratio of the integrated radiative forcing caused by the release of 1 kilogram of a particular gas to that caused by 1 kilogram of CO_2. Consequently, GWP-weighted emissions are expressed in terms of carbon dioxide equivalent (CO_2e). A gas with a higher GWP has a more significant warming effect compared to CO_2 over the same time period.

In Egypt's National Greenhouse Gas Inventory (GHGI), the GWP values adopted are based on the IPCC Fifth Assessment Report (AR5) for a 100-year time horizon. This approach ensures consistency with international standards and facilitates accurate assessment of the nation's contributions to global warming.

GHG	AR5-GWP
CO_2	1
CH_4	28
N_2O	265
SF_6	23,500
HFCs	various
PFCs	various
NF_3	NO

2.4 National Total GHG Emissions (1990–2022)

The chart illustrates Egypt's total greenhouse gas (GHG) emissions over a 33-year period, measured in gigagrams of CO_2 equivalent (Gg CO_2e). From 1990 to 2022, there is an almost steady upward trajectory in emissions, reflecting growth in economic activities, industrialization, and population increase.

	Egypt 2022
386,208	$GgCO_2e$
386,208,181	$mtCO_2e$
3.48	$mtCO_2e$/capita
184.4	$GgCO_2e$/GDP (B.EGP)

The total GHG emissions rose from approximately 143,708.89 $GgCO_2e$ in 1990 to 386,208.18 $GgCO_2e$ in 2022, marking an increase of 169% over the period and a difference of 242,710 Gg CO2e. Between 2015 and 2022, emissions grew from 324,505.65 Gg CO_2e to 386,208.18 $GgCO_2e$, an increase of 19%. A notable drop in emissions occurred during the COVID-19 pandemic, decreasing from 344,599 $GgCO_2e$ in 2019 to 337,634 Gg CO_2e in 2020, reflecting a 2% reduction, likely due to reduced economic activity and energy demand.

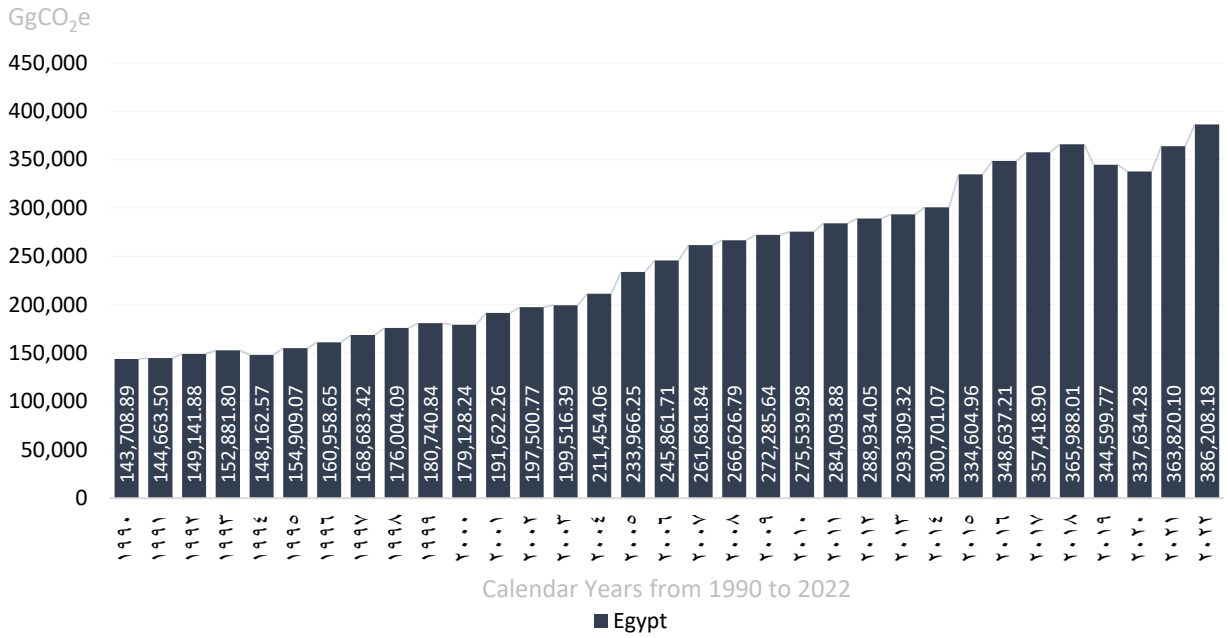


Figure 10: National total Greenhouse Gas emission 1990-2022 (GgCO2e)

2.4.1 GHG Emissions by Gas (1990–2022)

The distribution of emissions among gases (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in 2022 highlights the dominance of CO_2, which accounts for the largest share of emissions (75.89%) due to its association with energy production and industrial processes. Methane (CH_4) is the second-largest contributor (13.72%), predominantly from the AFOLU sector (e.g., enteric fermentation and rice cultivation). Nitrous oxide (N_2O) emissions (7.35%), largely linked to agricultural soil management and fertilizers, exhibit consistent growth. Hydrofluorocarbons (HFCs) and other fluorinated gases emerge in later years due to industrial applications and refrigeration technologies, reflecting technological evolution and industrialization.

Similar to the total emissions trend, individual gases also exhibit a decline during the pandemic period (2019–2020), aligning with reduced industrial and agricultural activities.

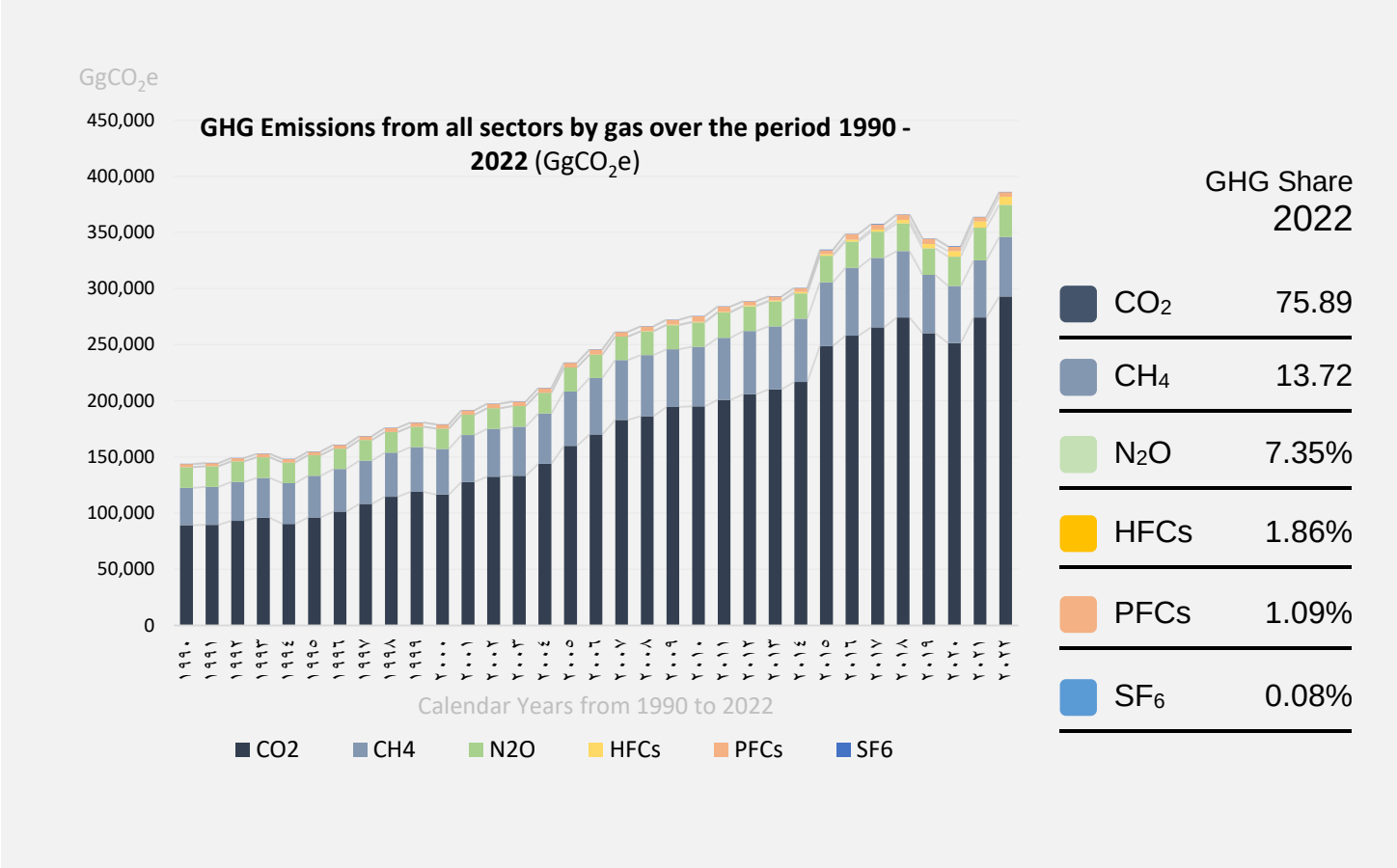


Figure 11: GHG emissions from all sectors by gas over the period 1990-2022 (GgCO2e)

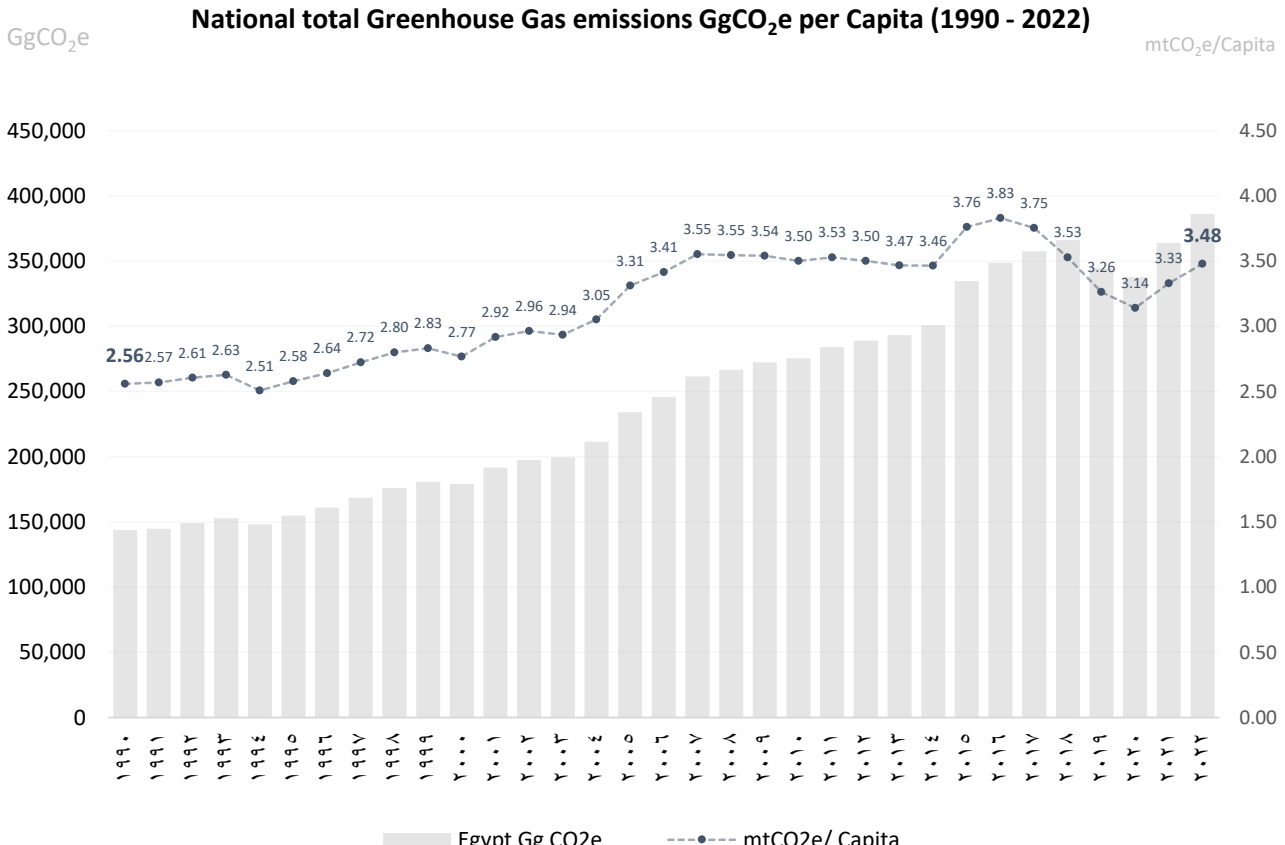
Table 14: GHG Emissions from all Sectors by Gas over the Period 1990-2022 (GgCO2e)

Emissions by Gas ($GgCO_2e$)	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
CO_2	89,346	116,593	159,910	248,947	258,193	265,621	274,384	260,395	251,439	274,173	293,107
CH_4	33,312	40,505	48,554	56,745	60,361	61,568	59,004	51,817	50,781	50,847	52,998
N_2O	18,305	18,137	21,179	23,548	23,316	23,481	24,577	23,545	26,149	29,129	28,404
HFCs	-	-	3	1,462	1,750	1,973	3,217	4,037	5,061	5,468	7,194
PFCs	2,674	3,762	4,137	3,612	4,725	4,484	4,514	4,514	3,912	3,912	4,213
SF_6	72	132	183	291	291	291	291	291	291	291	291
Total ($Gg\ CO_2e$)	**143,709**	**179,128**	**233,966**	**334,605**	**348,637**	**357,419**	**365,988**	**344,599**	**337,634**	**363,820**	**386,208**

2.4.2 GHG Emissions per Capita and per unit of GDP (1990–2022)

Emissions per Capita

The following chart depicts the evolution of Egypt's greenhouse gas (GHG) emissions per capita over 33 years. The general trend indicates that per capita emissions have shown a steady but moderate increase, reflecting a balance between population growth and emission levels. Total emissions per capita have increased from 2.56 $mtCO_2e$/capita in 1990 to 3.48 $mtCO_2e$/capita in 2022 reflecting a 36% increase, influenced by both rising national GHG emissions and population growth. The gradual rise suggests improved living standards and industrial expansion contributing to higher per capita emissions. The per capita emissions saw a dip during the COVID-19 pandemic, paralleling reductions in total national emissions due to slowed economic and industrial activities.



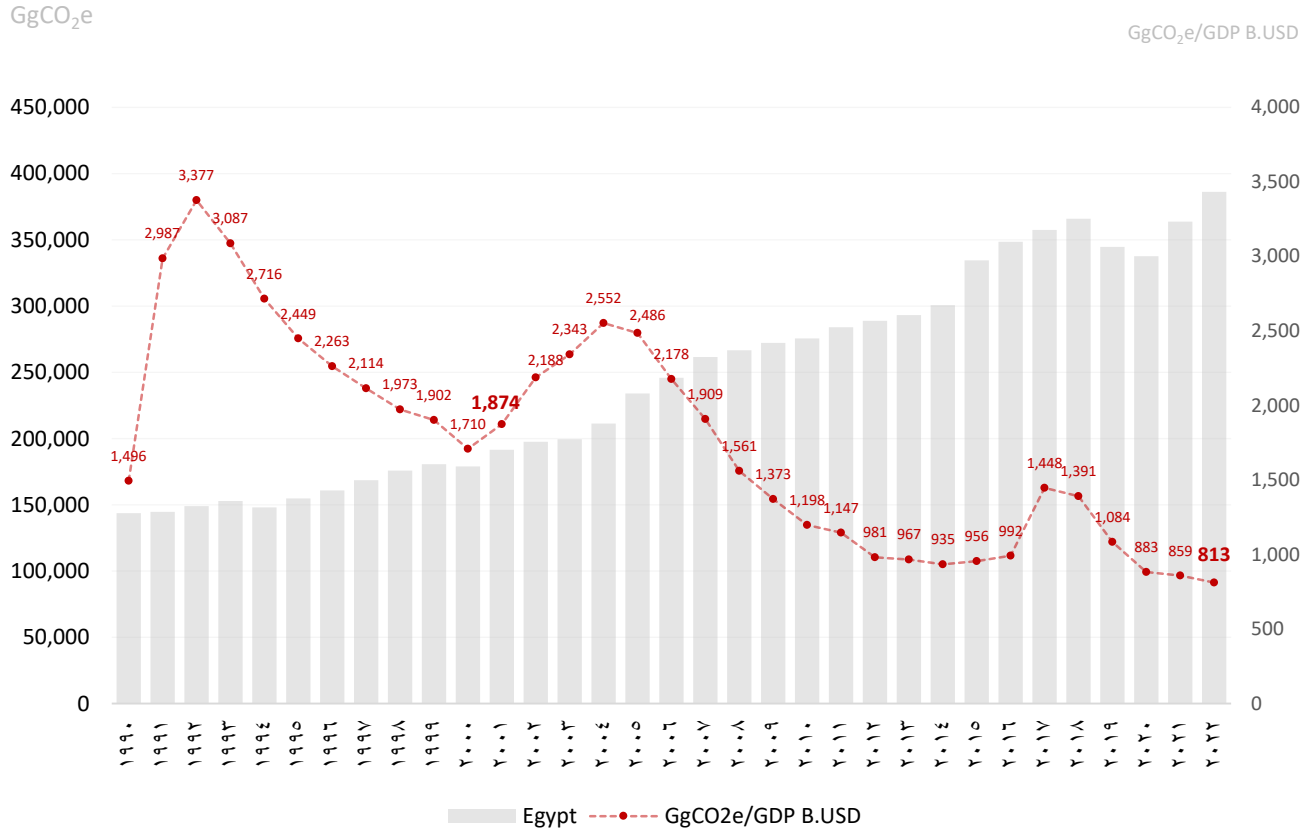
Unit	1990	2005	2015	2016	2017	2018	2019	2020	2021	2022
Gg CO_2e	143,709	233,966	334,605	348,637	357,419	365,988	344,599	337,634	363,820	386,208
Population (thousands)	56,130	70,653	88,958	91,023	95,203	103,700	105,600	107,500	109,300	110,990
$mtCO_2e$/ Cap	2.560	3.311	3.761	3.830	3.754	3.529	3.263	3.141	3.329	3.480

Figure 12: National Greenhouse Gases by Emissions GgCO2e per Capita (1990 - 2022)

Emissions per Unit of Gross Domestic Product (GDP)

The below chart provides insights into the efficiency of Egypt's economic growth concerning its GHG emissions. The metric of emissions per unit of GDP highlights the environmental intensity of economic activities. A declining trend in GHG emissions per unit of GDP is evident, reflecting improved economic efficiency.

This suggests that the country is generating more economic output while simultaneously reducing its environmental impact. Such a trend is crucial for sustainable development, as it reflects a commitment to balancing economic growth with environmental stewardship.



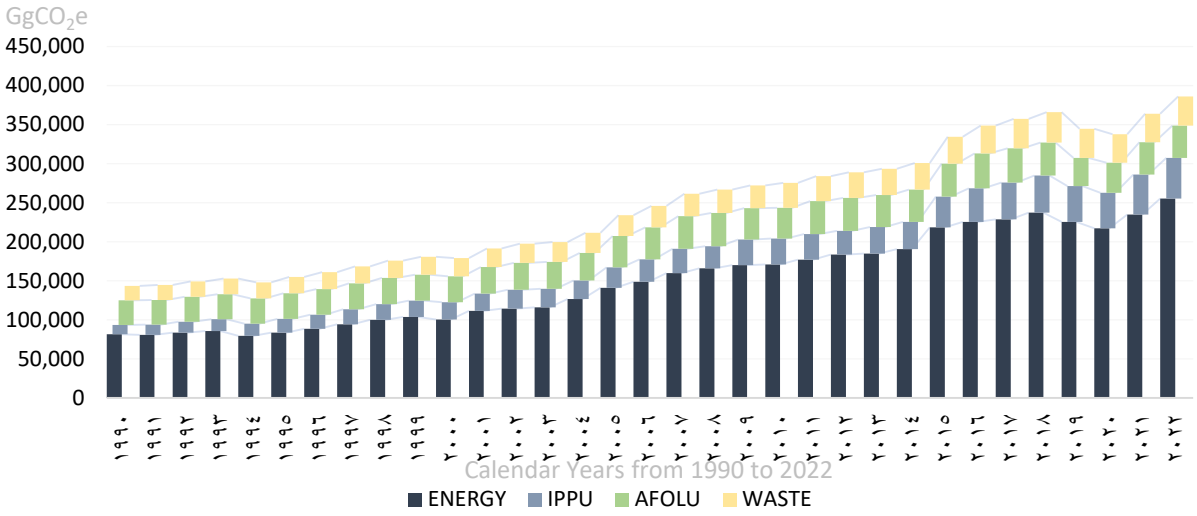
Unit	1990	2005	2015	2016	2017	2018	2019	2020	2021	2022
Gg CO_2e	143,709	233,966	334,605	348,637	357,419	365,988	344,599	337,634	363,820	386,208
GDP (B.USD)	96.09	94.13	350.12	351.44	246.83	263.16	317.89	382.53	423.30	475.23
Gg CO_2e/ B.USD	1,495.61	2,485.64	955.69	992.02	1,448.06	1,390.76	1,084.01	882.65	859.49	812.67

Figure 13: National total Greenhouse Gas emissions in GgCO2e per unit of GDP (1990 - 2022)

2.4.3 Emissions and Removal Tends by Sector

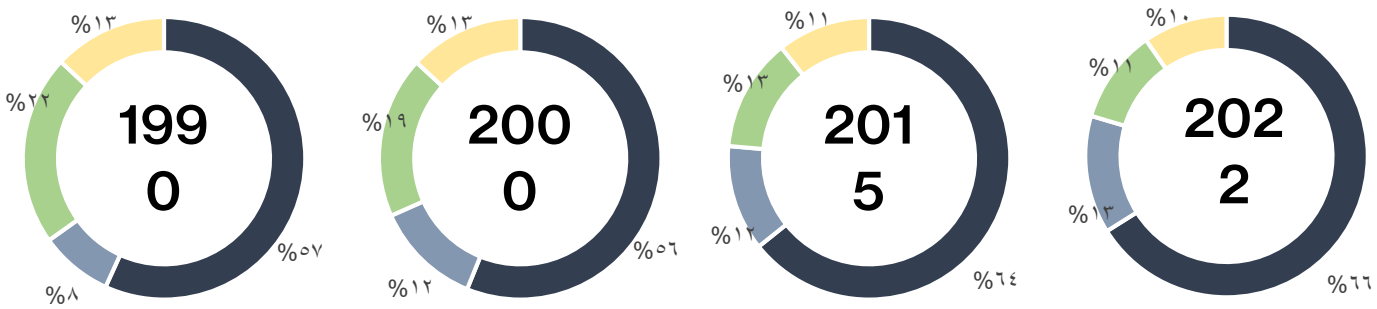
The sectoral contributions to total GHG emissions have evolved over the reporting period. The energy sector's share increased from 57% in 1990 to 66% in 2022, while the IPPU sector rose from 8% to 13%. The waste sector maintained a relatively stable share of 13% to 10%, and the AFOLU sector decreased from 22% to 11%.

In 2022, the breakdown of GHG emissions showed the energy sector as the largest contributor at 66%, followed by IPPU at 13%, AFOLU at 11%, and the waste sector at 10%. This distribution emphasizes the dominance of the energy sector, with significant contributions from industrial and agricultural and waste activities.



Sector	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
Energy	81,610	100,561	141,077	218,635	225,345	228,769	237,192	225,340	217,178	234,901	255,193
IPPU	12,007	21,859	26,030	39,364	43,074	47,083	47,478	46,065	45,543	51,051	52,200
AFOLU	31,386	33,217	40,439	42,057	44,718	43,560	42,369	35,867	38,342	41,684	41,561
Waste	18,706	23,491	26,421	34,549	35,500	37,894	37,894	37,328	36,571	36,184	37,255
Total (Gg CO_2e)	**143,709**	**179,128**	**233,966**	**334,605**	**348,637**	**357,419**	**365,988**	**344,599**	**337,634**	**363,820**	**386,208**

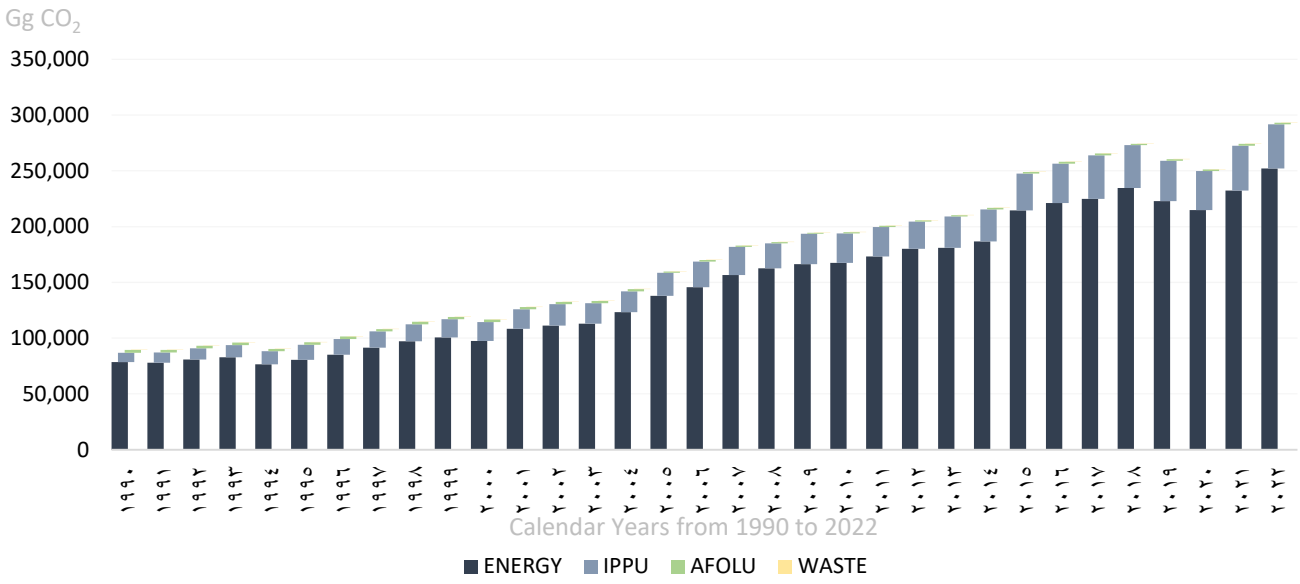
Figure 14: National total Greenhouse Gas emissions per sector 1990 - 2022



2.4.4 Emissions and Removal Tends by Gases

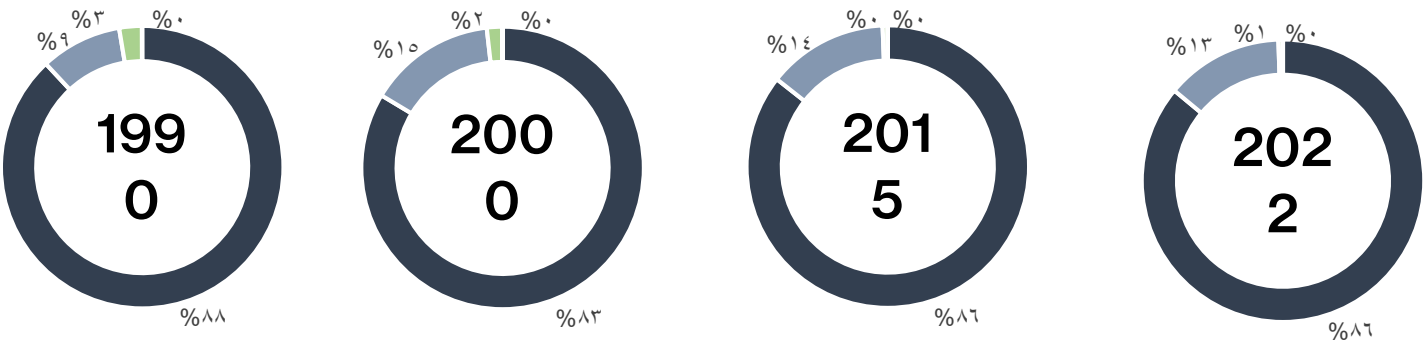
Trends in CO_2 emissions ($GgCO_2$)

CO_2 emissions in 2022 were 293,107 $GgCO_2e$, accounting for 73% of total GHG emissions. They increased from 62% in 1990. The breakdown of CO_2 emissions in 2022 shows that the energy sector accounts for 86% of the net CO_2 emissions and is followed by industrial processes and product use 13% and the AFOLU sector 1% and finally with almost 0% in the waste sector.



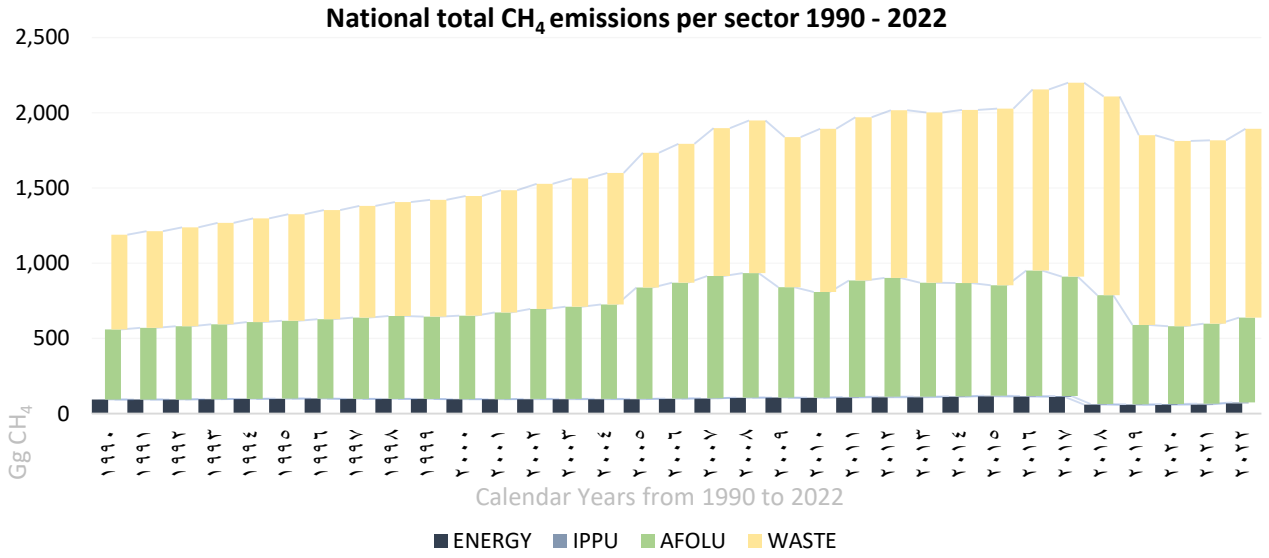
Gg CO2	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
Energy	78,675	97,463	137,896	214,585	221,257	224,759	234,637	222,904	214,742	232,309	252,169
IPPU	8,329	17,033	20,727	32,956	35,301	39,234	38,353	36,128	35,185	40,291	39,408
AFOLU	2,317	2,068	1,255	1,356	1,583	1,573	1,346	1,314	1,454	1,513	1,473
Waste	24.9	28.9	31.6	49.8	52.3	54.1	47.9	49.9	57.3	60.1	56.7
Total (CO_2)	**89,346**	**116,593**	**159,910**	**248,947**	**258,193**	**265,621**	**274,384**	**260,395**	**251,439**	**274,173**	**293,107**

Figure 15: National total Gg CO2 emissions per sector 1990 - 2022



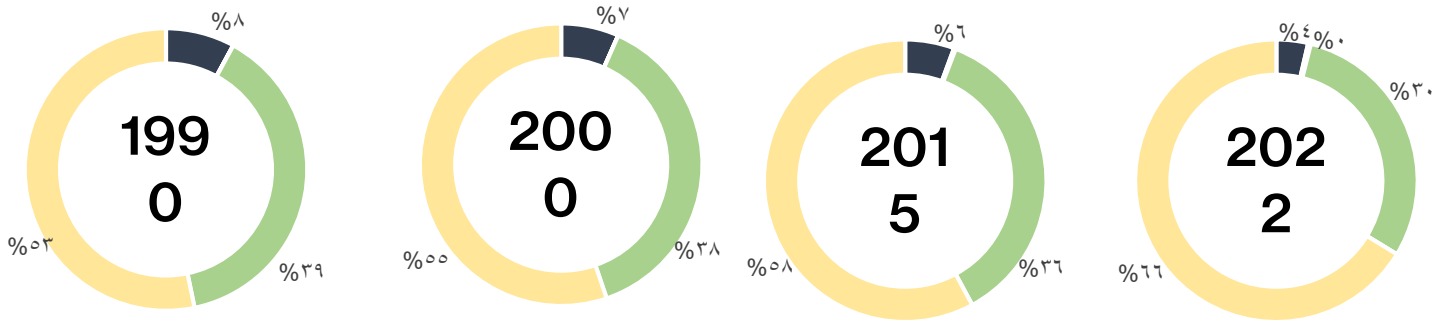
Trends in CH4 emissions ($GgCH_4$)

CH_4 emissions in 2022 were 1,892.80 Gg CH_4, accounting for 13.72% of total GHG emissions. They increased by 30.3% compared to 1990 and decreased by 59.10% compared to 2015. The breakdown of CH_4 emissions in 2022 shows that the waste sector accounts for 66% of the CH_4 emissions and is followed by the AFOLU sector 30% and the energy sector 4% and finally the IPPU sector with around 0.3%.



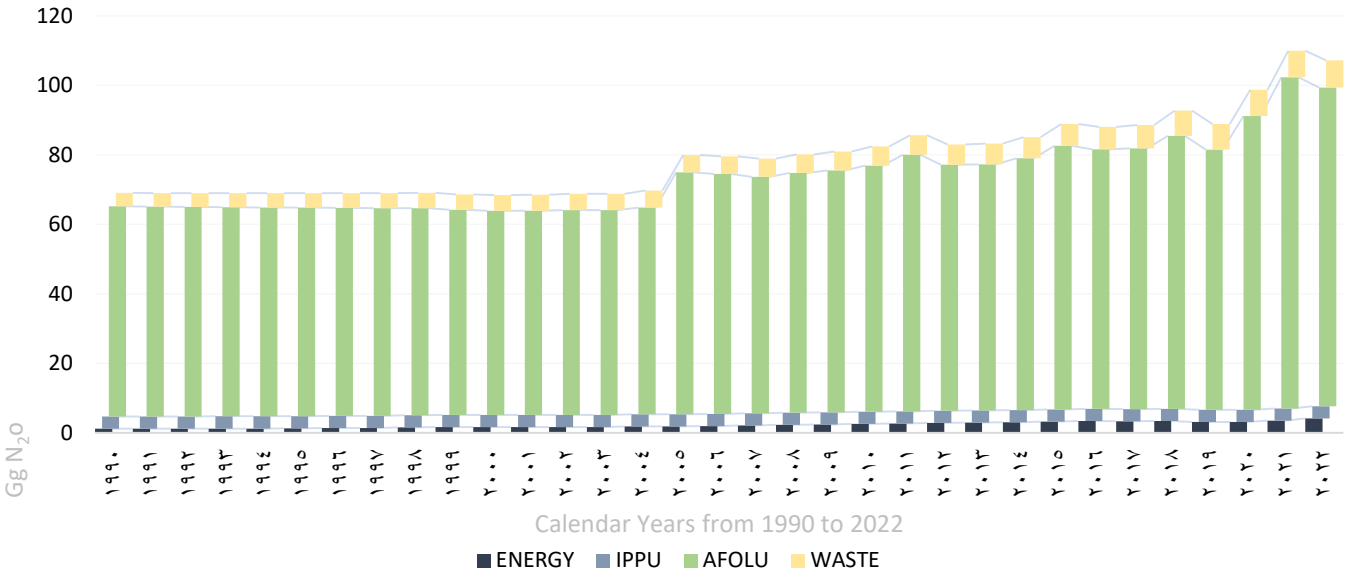
Gg CH4	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
Energy	93.57	95.12	95.99	114.19	113.27	111.71	58.69	56.80	57.18	59.41	68.51
IPPU	0.17	0.18	1.86	4.13	2.83	6.16	6.23	5.98	5.92	5.74	5.92
AFOLU	465.77	556.31	740.74	834.46	579.21	793.80	721.78	526.50	517.77	533.19	563.87
Waste	630.21	795.00	895.49	1,172.82	1,205.20	1,287.20	1,320.60	1,261.33	1,232.75	1,217.61	1,254.50
Total (CH_4)	**1,189.71**	**1,446.60**	**1,734.08**	**2,026.60**	**2,155.75**	**2,198.86**	**2,107.30**	**1,850.60**	**1,813.61**	**1,815.95**	**1,892.80**

Figure 16: National Total CH_4 Emissions per Sector 1990 – 2022



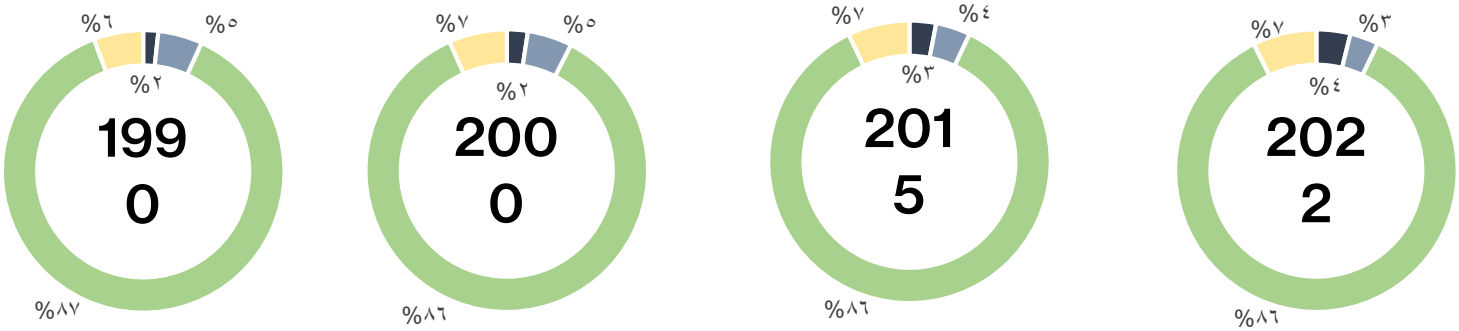
Trends in N_2O emissions (GgN_2O)

N_2O emissions in 2022 were 170.18 Gg N_2O, accounting for 7.35% of total GHG emissions. They increased by 55.51% compared to 1990 and increased by 21.34% compared to 2015. The breakdown of N_2O emissions in 2022 shows that the AFOLU sector accounts for 86% and is followed by the waste sector 7% and energy sector 4% and finally the IPPU sector 3%.



Gg N2O	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
Energy	1.19	1.64	1.86	3.22	3.45	3.33	3.44	3.19	3.15	3.50	4.17
IPPU	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
AFOLU	60.32	58.59	69.60	75.88	74.61	74.99	78.54	74.76	84.49	95.25	91.70
Waste	3.91	4.54	4.96	6.26	6.42	6.78	7.26	7.40	7.54	7.66	7.82
Total (N_2O)	**68.92**	**68.26**	**79.92**	**88.86**	**87.99**	**88.61**	**92.74**	**88.85**	**98.68**	**109.92**	**107.18**

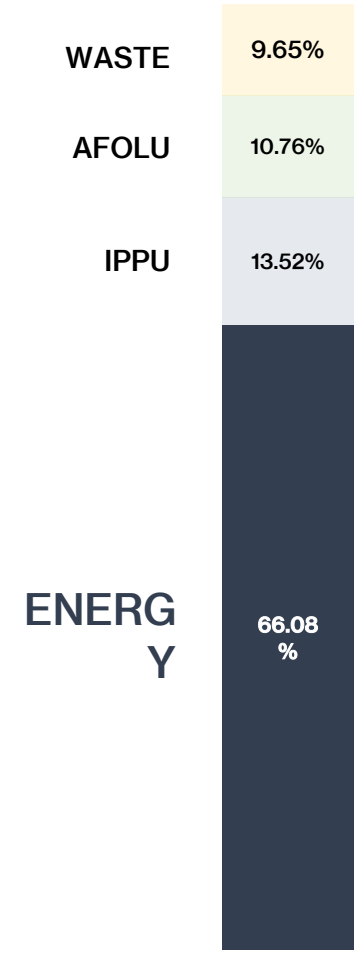
Figure 17: National total N2O emissions per sector 1990 - 2022



2.5 Energy

2.5.1 Overview of the Sector

Emissions from the Energy sector represented around 66.08% of the total national inventory in 2022. The Energy sector covers all GHG emissions arising from combustion of fuels or as fugitive releases from those fuels. Emissions from the non-energy uses of fuels are generally not included under the Energy sector but reported under the Industrial Processes and Product Use (IPPU) sector.



- **1.A Fuel combustion**
  This category includes emissions released when fossil fuels are combusted. It is divided into the following main sources:
  - 1.A.1 - Energy Industries
  - 1.A.2 - Manufacturing Industries and Construction
  - 1.A.3 - Transport
  - 1.A.4 - Other Sectors
  - 1.A.5 - Non-specified

- **1.B Fugitive Emissions**
  The Fugitive Emissions category encompasses all intentional and unintentional emissions from the extraction, processing, storage and transport of fuel to the point of final use.
  - 1.B.1 - Solid Fuels
  - 1.B.2 - Oil and Natural Gas
  - 1.B.3 - Other emissions from Energy Production

- **1.C Carbon dioxide Transport and Storage (not occurring)**

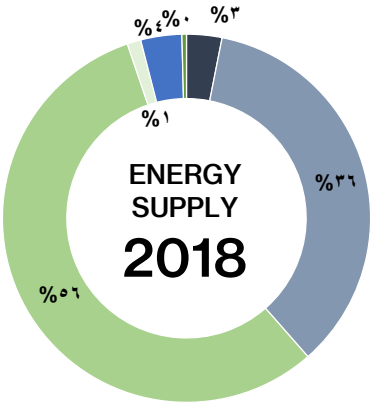
Emissions from Fuel Combustion accounts for nearly 96% of the Energy sector's emissions in 2022. The main activities covered for the estimation and development of the GHGI for the Energy sector comprised the following relevant source categories[5] (based on the IPCC GHGI Guidelines and sectors classifications):

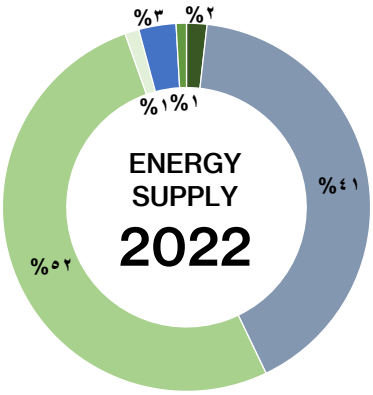
[5] All charts are constructed using only the relevant source categories (i.e. the source categories for which emissions were occurring)

Relevant source categories:

1.A.1.a.i	Electricity Generation	[Energy industries]
1.A.1.b	Petroleum Refining	[Energy industries]
1.A.1.c.i	Manufacture of Solid Fuels	[Energy industries]
1.A.1.c.ii	Other Energy Industries	[Energy industries]
1.A.2.m	Non-specified Industry	[Manufacturing Industries and Construction]
1.A.3.b	Road Transportation	[Transport]
1.A.4.a	Commercial/Institutional	[Other Sectors]
1.A.4.b	Residential	[Other Sectors]
1.A.4.c	Agriculture/Forestry/Fishing/Fish Farms	[Other Sectors]
1.B.2.a.i	Oil Venting	[Fugitive emissions from fuels]
1.B.2.a.ii	Oil Flaring	[Fugitive emissions from fuels]
1.B.2.b.i	NG Venting	[Fugitive emissions from fuels]
1.B.2.b.ii	NG Flaring	[Fugitive emissions from fuels]

Egypt's total energy supply was about 101.5 MtOe in 2022 and 92.1 MtOe in 2018, with an annual average growth rate of about 2% during that period. The below chart shows the evolution of primary energy supply by fuel type from 2018 up to 2022. It is clear that NG has the highest fuel supply share in Egypt's primary energy over the years. NG and oil's shares of total Egypt' energy supply during the year 2022 accounted for about 92.8% collectively and 51.7% and 41.4% separately while coal accounted for 1.8 %.





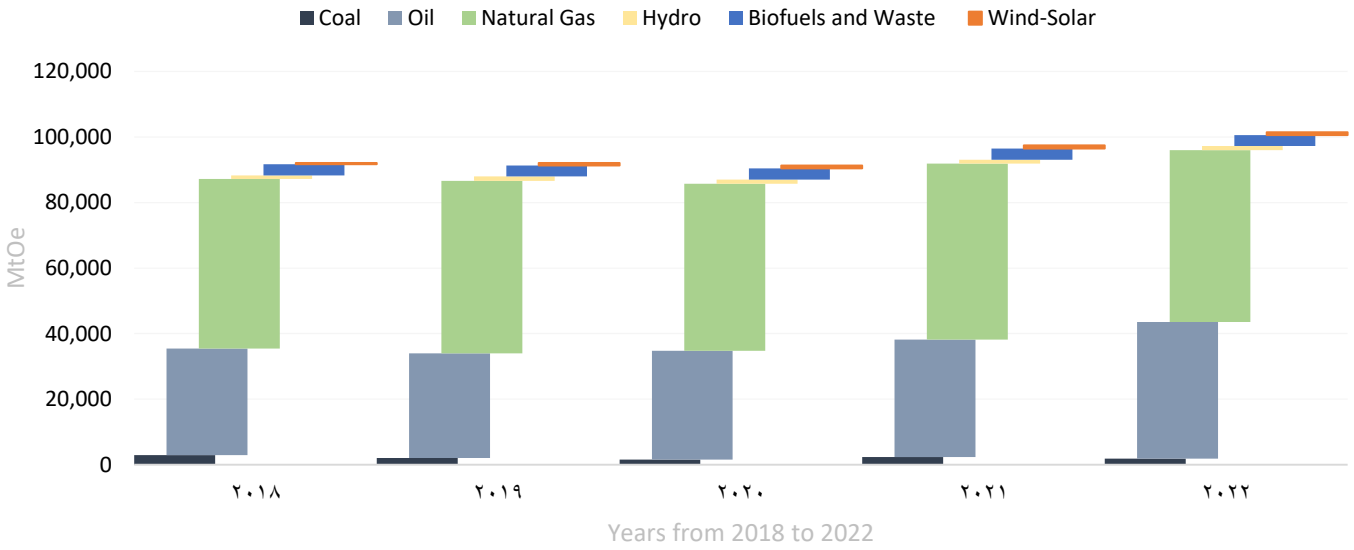
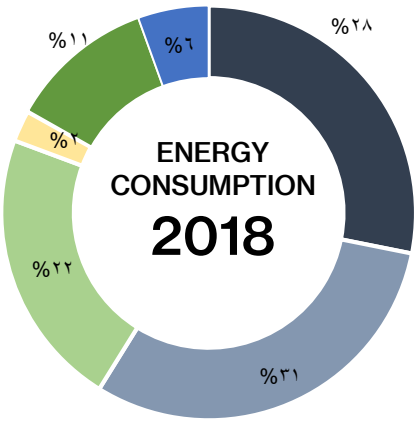
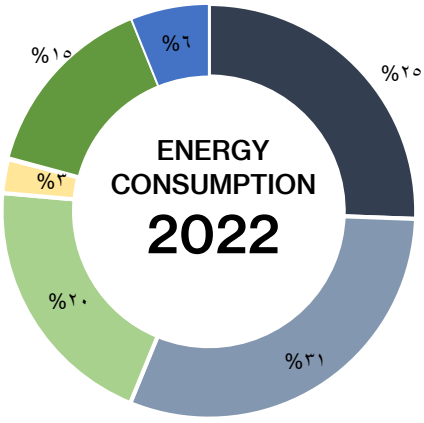


Figure 18: Evolution of Egypt's Primary Energy Supply (MtOe) 2018 - 2022

Total final energy consumption of primary resources has witnessed a slight increase over the last five years from about 61.1 MtOe in the year 2018 to about 61.7 MtOe in 2022 with an average annual growth rate of only 0.2% during that period. This is compared with a growth rate of 2.9% between 2015 and 2017. The below chart shows the evolution of final energy consumption from 2018 to 2022 by sector. Both the industrial and residential sectors achieved negative growth rates of 1.7% (from about 17.2 to about 15.8 MTOE) and 1.3% (from about 13.3 to about 12.5 MTOE) respectively. On the other hand, and although other sectors, mainly agriculture and commercial & public services achieved positive growth rates, the growth was very small or moderate (1.9% and 2.3% respectively).





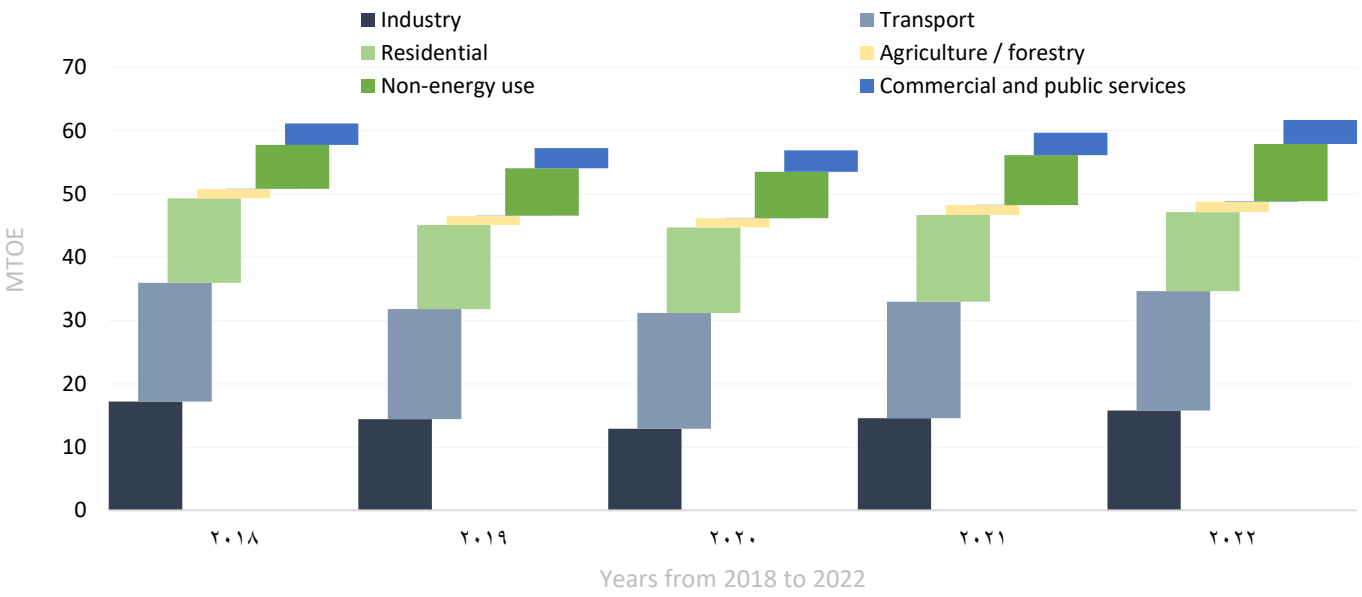
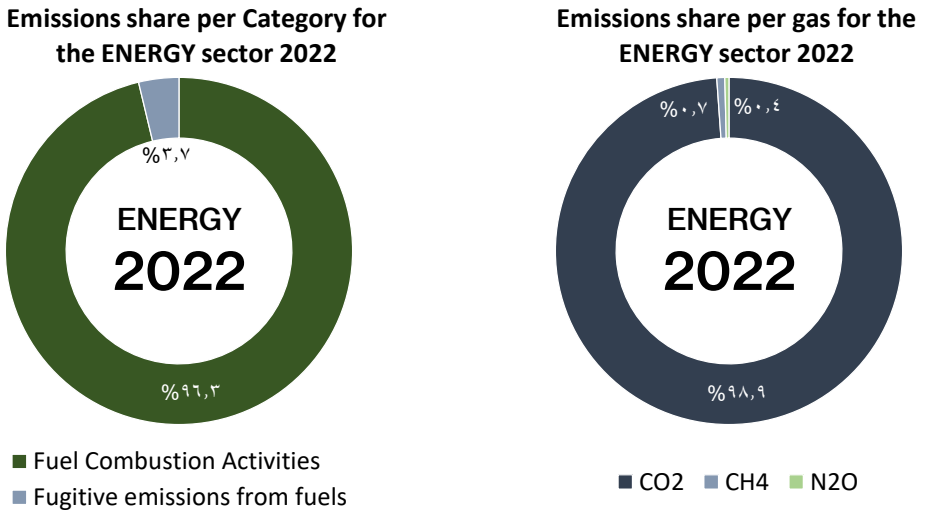


Figure 19: Evolution of Egypt's Final Energy Supply (MtOe) 2018 - 2022

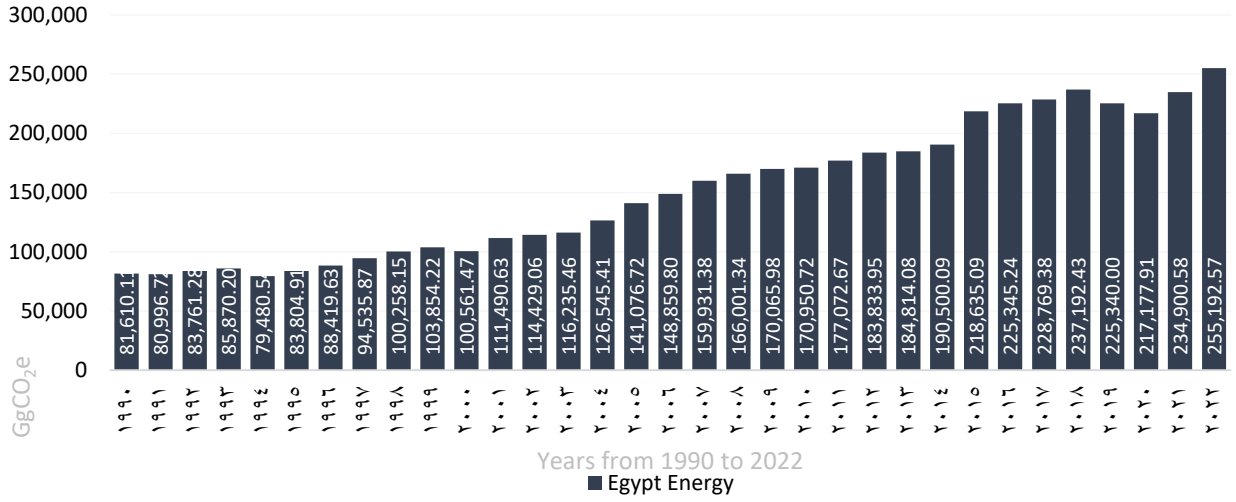
2.5.2 Energy Sector Emissions Trend

Sector Overall Emissions

In 2022, the Energy sector's emissions were **255,193 GgCO₂e,** with CO_2 as the major contributor with a share of 98.9% compared to 0.7% for CH_4 and 0.4% for N_2O. The breakdown of 2022 showed that fuel combustion accounted for 96.3% compared to 3.75% for oil and natural gas venting and flaring activities.



GHG trends over the period from 1990 up to 2022 have been generated using the IPCC software. The figure below presents the evolution of GHG emissions of the energy sector (Gg CO_2eq). This encompasses the current GHG inventory (2018-2022); NC4 (2016 and 2017); and BUR1(1990-2015).

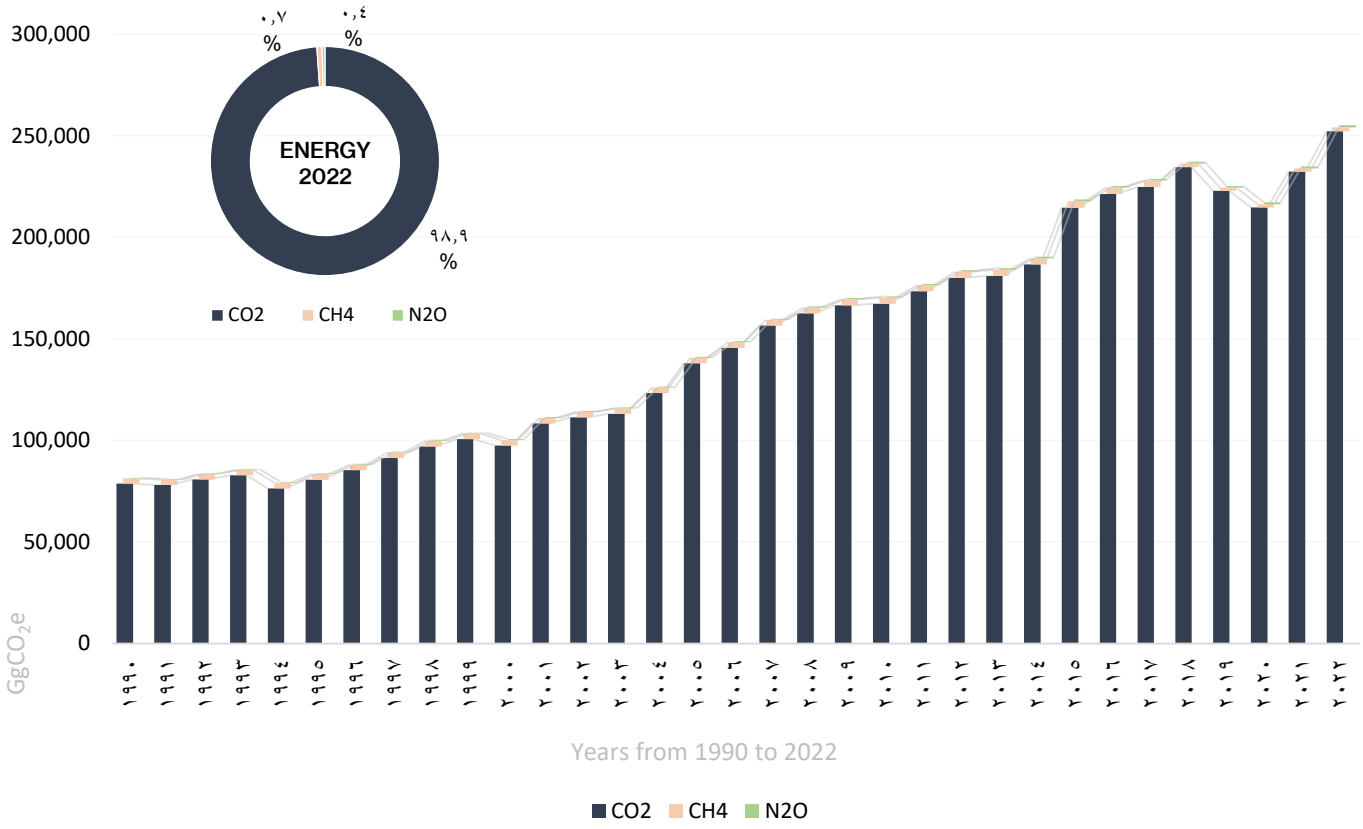


Sector	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
Energy	81,610	100,561	141,077	218,635	225,345	228,769	237,192	225,340	217,178	234,901	255,193

Figure 20: Energy Sector Greenhouse Gas Emissions 1990 - 2022

Sector Emissions by Gas

As shown in the figure below, the Energy sector's emissions increased from 81,610 Gg CO_2e (in 1990) to 255,193 Gg CO_2e (in 2022) representing a 212% increase from 1990 levels. The average annual growth rate has been 4.3% over the period from 2005 to 2017, which decreased to 1% between 2018 and 2022. There is a decline in the total emissions from 237,192 GgCO_2e in 2018 to 225,340 and 217,178 GgCO_2e in 2019 and 2020, respectively. The decline could be attributed to several factors on top of which has been the spread of Corona disease during those years (2019 and 2020). This has negatively affected the economic growth in Egypt and consequently led to a decline in the energy consumption combined with an associated decrease in GHG emissions.



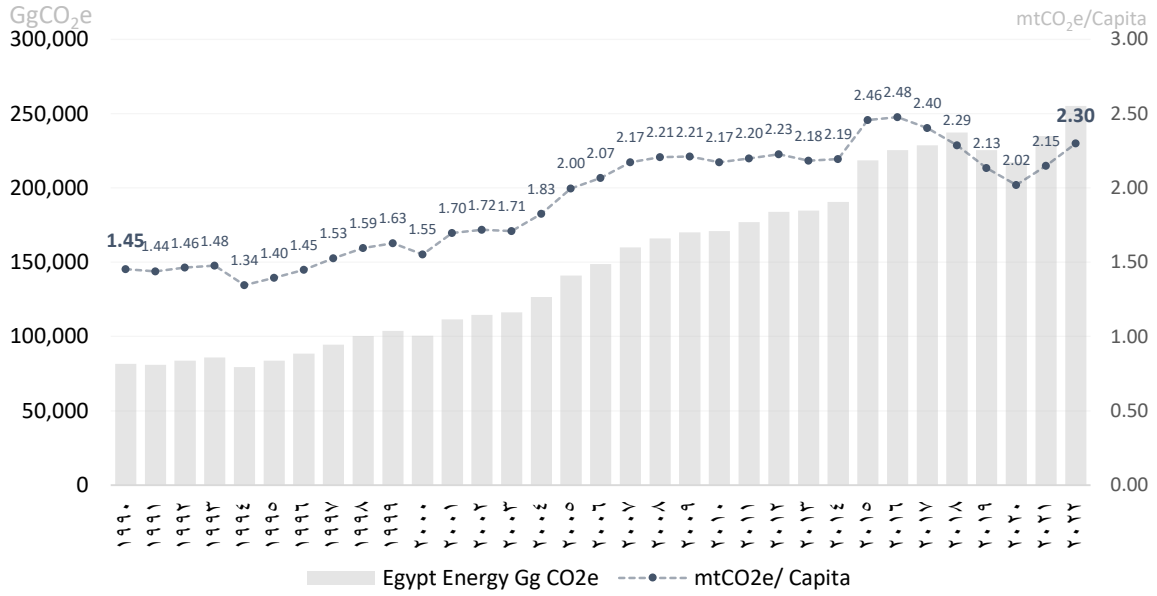
Energy Emissions by Gas ($GgCO_2e$)	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
CO_2	78,675	97,463	137,896	214,585	221,257	224,759	234,637	222,904	214,742	232,309	252,169
CH_4	2619.96	2663.36	2687.72	3,197.28	3,171.60	3,127.94	1643.32	1590.4	1601.04	1663.48	1918.28
N_2O	315.03	434.83	492.92	852.98	916.58	882.13	911.64	845.91	834.57	927.71	1104.83
Total (Gg CO_2e)	**81,610**	**100,561**	**141,077**	**218,635**	**225,345**	**228,769**	**237,192**	**225,340**	**217,178**	**234,901**	**255,193**

Figure 21: GHG Emissions from Energy Sector by gas over the period 1990 - 2022 (GgCO2e)

Sector Emissions per Capita

The figure below depicts the evolution of Egypt's Energy sector's emissions per capita between 1990 and 2022. The general trend indicates that per capita emissions have shown a steady but moderate increase, reflecting a balance between population growth and emission levels.

Energy emissions per capita have increased from 1.45 $mtCO_2e$/capita in 1990 to 2.30 $mtCO_2e$/capita in 2022 reflecting a 59% increase, influenced by economic development. From around 2005 to 2022, the energy emissions per capita remained somehow constant with a median of 2.28 and an average of 2.23. Considering the rise in the living standards and industrial expansion, this could be attributed to the implementation of aggressive programs for energy commodities price increase and subsidy phaseout, accompanied by the implementation of energy efficiency mitigation measures nationwide, energy conservation measures from the consumers side as well as the increase in the renewable energy generation. Per capita emissions saw a dip during COVID-19 pandemic, paralleling reductions in total national emissions due to slowed economic and industrial activities.



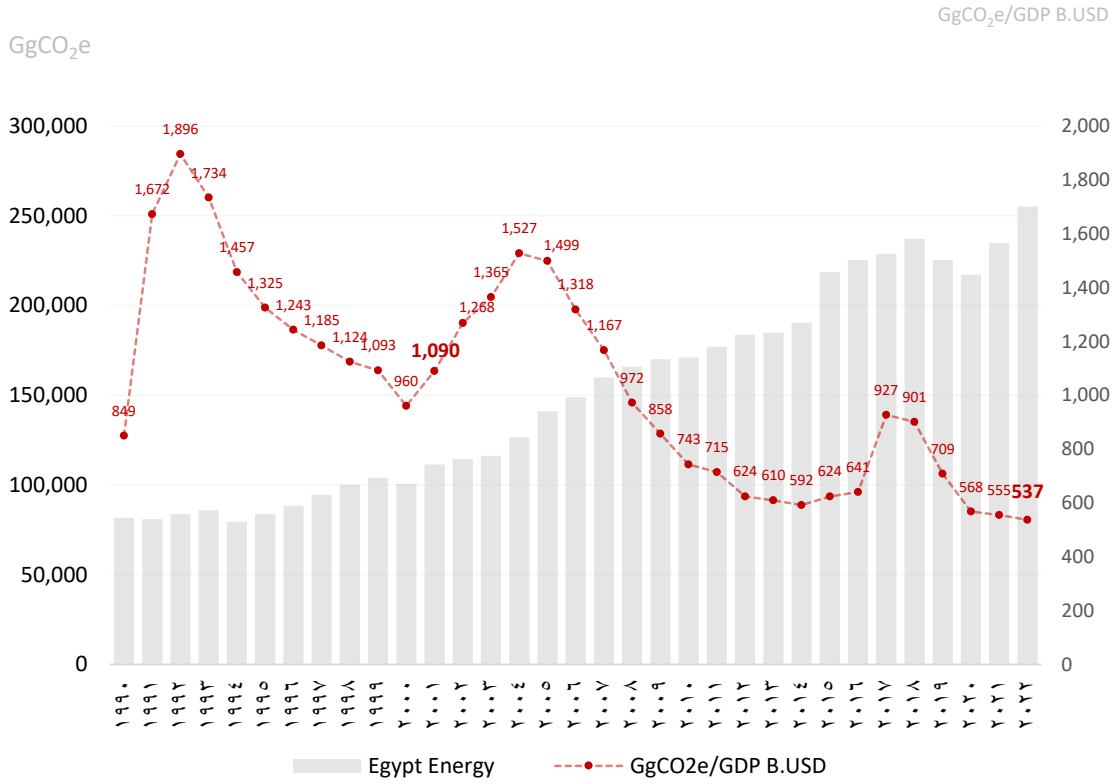
Unit	1990	2005	2015	2016	2017	2018	2019	2020	2021	2022
Gg CO_2e (Energy)	81,610.11	141,076.7	218,635.1	225,345.2	228,769.4	237,192.4	225,340	217,177.9	234,900.6	255,192.6
Population (thousands)	56,130	70,653	88,958	91,023	95,203	103,700	105,600	107,500	109,300	110,990
mtCO_2e/ Cap	1.45	2.00	2.46	2.48	2.40	2.29	2.13	2.02	2.15	2.30

Figure 22: Energy Sector National total Greenhouse Gas emissions GgCO2e per Capita (1990 - 2022)

Sector Emissions per Unit of Gross Domestic Product (GDP)

The figure below provides insights into the efficiency of Egypt's economic growth concerning its GHG emissions from the energy sector. The metric of emissions per unit of GDP highlights the environmental intensity of economic activities. A declining trend in GHG emissions per unit of GDP is evident, reflecting improved economic efficiency.

As Egypt's economy expanded, emissions grew at a slower pace relative to GDP growth, showcasing strides in decoupling economic performance from environmental impact. A slight increase in emissions per unit of GDP occurred during the pandemic, likely due to economic slowdowns, where GDP contracted more significantly than emissions declined.



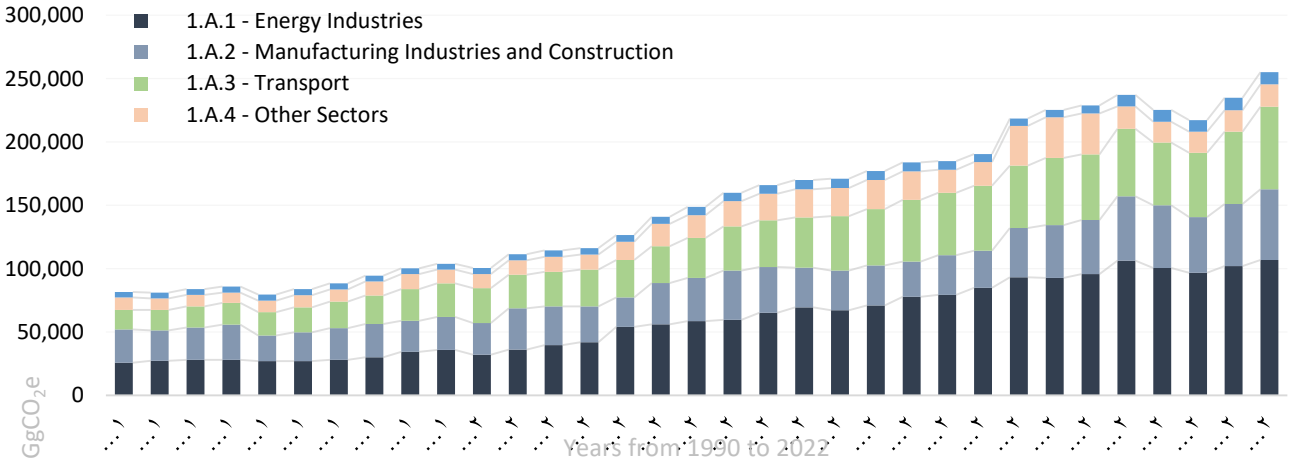
Unit	2001	2005	2015	2016	2017	2018	2019	2020	2021	2022
Gg CO_2e	111,491	141,077	218,635	225,345	228,769	237,192	225,340	217,177	234,900	255,192
GDP (B.USD)	96.09	94.13	350.12	351.44	246.83	263.16	317.89	382.53	423.30	475.23
Gg CO_2e/ B.USD	1,090.13	1,498.79	624.46	641.20	926.84	901.34	708.85	567.75	554.93	536.99

Figure 23: GHG Emission from Energy Sector per unit of GDP over the period 1990-2022 (GgCO2e)

Sector Emissions per Category

Between 1990 and 2022, GHG emissions from the energy sector experienced significant growth across all categories. The **Energy Industries** category remained the largest contributor, with emissions rising by approximately 312%, from 25,897 Gg CO_2e in 1990 to 106,763 Gg CO_2e in 2022, making it a key driver of the overall trend. Similarly, the **Transport** category saw a substantial increase of 322%, with emissions growing from 15,399 Gg CO_2e in 1990 to 65,068 Gg CO_2e in 2022. Other categories also exhibited notable trends:

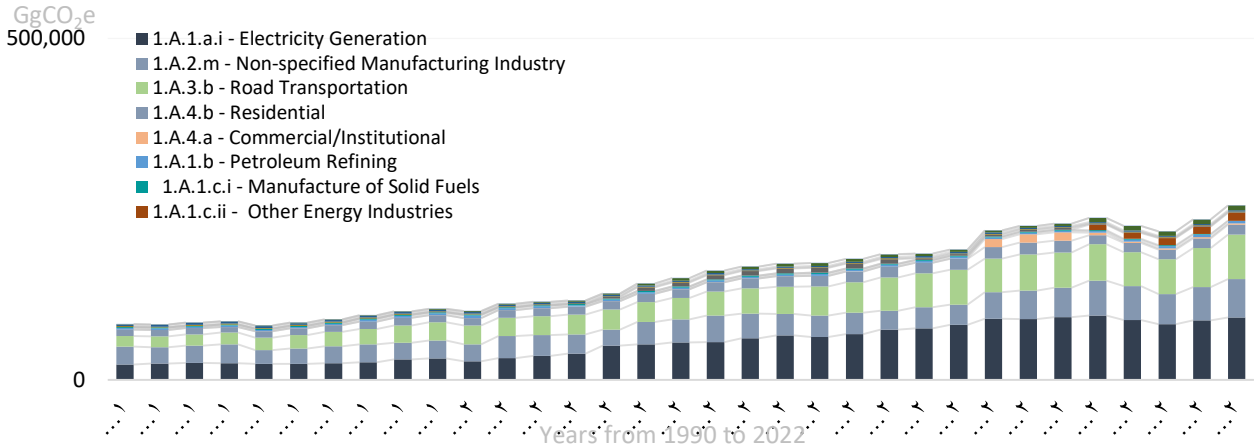
- The **Manufacturing** category recorded an 113% increase, with emissions rising from 26,246 Gg CO_2e in 1990 to 55,955 Gg CO_2e in 2022.
- Emissions from the **Oil and Gas** category grew by approximately 119%, increasing from 4,364 Gg CO_2e in 1990 to 9,562 Gg CO_2e in 2022.
- The **Other Sectors** category (which includes commercial, residential and agriculture) showed an 84% increase, with emissions rising from 9,703 Gg CO_2e in 1990 to 17,845 Gg CO_2e in 2022.



Energy Emissions by Gas ($GgCO_2e$)	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
Energy Industries	25,897	32,172	56,039	93,274	92,677	95,631	106,235	100,562	96,652	102,055	106,763
Manufacturing Ind.	26,246	24,914	32,742	38,775	41,811	42,782	50,895	49,532	43,983	48,946	55,955
Transport	15,399	27,536	29,035	49,394	53,017	51,819	53,416	49,586	50,977	57,069	65,068
Other Sectors	9,703	11,222	17,572	31,156	32,113	32,353	17,667	16,246	16,614	17,113	17,845
Oil and NG	4,364	4,718	5,688	6,037	5,727	6,184	8,980	9,414	8,952	9,719	9,562
Total ($Gg\ CO_2e$)	**81,610**	**100,561**	**141,077**	**218,635**	**225,345**	**228,769**	**237,192**	**225,340**	**217,178**	**234,901**	**255,193**

Figure 24: GHG Emissions from Energy Sector by main category over the period 1990 - 2022 (GgCO2e)

The electricity sector is considered as the main contributor of GHG emissions from the Energy sector in Egypt, which accounted for 35.8% of the total emissions in 2022, followed by the Transport sector (25.5%), then Industry (21.9%), 6.1% for Petroleum Refining (including the energy own use of other oil companies), Residential & Commercial (6.6%), Agriculture (0.4%), and Oil and Natural Gas Venting and Flaring accounting the remainder 3.7%. The corresponding emissions for 2018 were as follows: 39.7% for Electricity, 22.5% for Transport, 21.5% for Industry, 5% for the Petroleum Refining and 7% for the Residential & Commercial sector, 0.5% for Agriculture, and 3.8% for Oil and Natural Gas Venting and Flaring.



Energy Emissions by Gas ($GgCO_2e$)	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
Electricity Generation	22,326	27,075	51,989	89,511	88,885	91,863	94,205	87,630	81,624	86,838	91,403
Manufacturing Ind.	26,246	24,914	32,742	38,775	41,811	42,782	50,895	49,532	43,983	48,946	55,955
Road Transportation	15,399	27,536	29,035	49,394	53,017	51,819	53,416	49,586	50,977	57,069	65,068
Residential	9,685	10,941	12,215	16,465	17,059	17,233	13,280	13,717	14,191	14,269	14,621
Commercial	18	59	63	12,019	12,315	12,386	3,552	1,650	1,581	1,882	2,196
Petroleum Refining	2,174	3,392	2,277	2,293	2,297	2,268	2,627	3,111	3,589	3,458	3,644
Manuf. of Solid Fuels	1,397	1,705	1,773	1,470	1,495	1,500	1,105	1,108	1,111	1,111	0
Other Energy Industries	0	0	0	0	0	0	8,298	8,714	10,329	10,648	11,715
Agriculture	0	222	5,294	2,672	2,739	2,735	835	879	841	962	1,029
Oil venting	1,252	1,087	938	1,014	965	921	915	882	895	886	785
Oil Flaring	2,578	2,238	1,931	2,087	1,987	1,897	1,871	1,803	1,829	1,812	1,606
NG Venting	524	1,364	2,761	2,875	2,717	3,295	6,112	6,641	6,147	6,929	7,078
NG Flaring	10	29	59	61	58	70	81	88	81	91	93
Total ($Gg\ CO_2e$)	**81,610**	**100,561**	**141,077**	**218,635**	**225,345**	**228,769**	**237,192**	**225,340**	**217,178**	**234,901**	**255,193**

Figure 25: GHG Emissions from Energy Sector by source category over the period 1990 - 2022 (GgCO2e)

2.5.3 Methodology (Methods, Activity Data, Emission Factors)

The IPCC 2006 Guidelines were adopted for estimating and reporting GHG emissions for the Energy sector. The Energy sector assessment applied Tier 1 methods from the IPCC 2006 Guidelines, while country-specific emission factors (Tier 2) were used for some categories as detailed below.

Methods:

- **Category Identification**: A review of the IPCC 2006 guidelines was conducted for all subcategories of the Energy sector and the GHG inventory of all previous years.
- The data needs were identified along with their sources for the estimation process.
- **Data Collection and Stakeholder Engagement:** Data collection questionnaires were prepared for all relevant sub-sectors and disseminated to all relevant stakeholders/entities. Activity data for the Energy sector was collected from national sources (mainly MoPMR and CAPMAS) and international sources, specifically IEA.
- **Calculation and Data Compilation**. Default IPCC emission factors and Good Practice Guidance were used in the inventory estimations. Country-specific factors were used when available. The calculations were conducted on the latest version of the IPCC software (Version 2.93). CO_2, CH_4, and N_2O have been considered. Emissions resulting from the use of coal as a fuel in the cement industry since 2014 were included.

Activity Data:

- Domestic civil aviation and water-borne navigation were not considered in the GHG inventory emissions estimates due to data unavailability. On the other hand, emissions from both the international aviation and international water-borne navigation (international bunkers) were estimated and reported separately and as a memo item.
- Aggregated fuel consumption data was mostly utilized for all sectors due to the unavailability of detailed or disaggregated data. Whenever available, disaggregated data were used (i.e. Industrial Sector in 2022).
- CO_2 Transport and Storage activities haven't been considered as they aren't applicable and didn't exist in Egypt during the reported period.

Emission Factors:

Egypt developed country-specific fuel emission factors and net heating values for some fuels. The table below shows both the default and country-specific emission factors and net heating values for the various fuels and their sources.

Table 15:Default and Country-specific Emission Factors and Net Heating Values for Fuels and their Sources

Fuel Type	NHV (TJ/Gg)	EF (tCO_2/TJ)
Gas/Diesel Oil*	43.20	73.390
Residual Fuel Oil*	41.23	75.860
Special LFO**	315.03	434.83
Special LFO**	45.65	IPCC Default Values
Kerosene**	46.27	IPCC Default Values
Jet Gasoline**	46.28	IPCC Default Values
Gasoline**	46.99	IPCC Default Values
Liquefied Petroleum Gases**	49.14	IPCC Default Values
Natural Gas*	48.9	55.697
Bituminous coal*	26.99	96.170
Petroleum coke*	34.11	94.270
Other Fuels	IPCC Default Values	

*Development of National Country Specific Emission Factors for Energy Sector, Egypt, Integral 2018

** Ministry of Petroleum & Mineral Resources (MoPMR), Egypt

Category	Data sources	Tier used	EF
1.A - Fuel Combustion Activities			
1.A.1 – Energy Industries	MOPMR & IEA	T1/T2	D/CS
1.A.2 – Manufacturing Industries and Construction	MOPMR & IEA	T1/T2	D/CS
1.A.3 - Transport	MOPMR & IEA	T1/T2	D/CS
1.A.4 - Other Sectors	MOPMR & IEA	T1/T2	D/CS
1.A.5 – non-specified	MOPMR & IEA	T1/T2	D/CS
1.B – Fugitive Emissions from Fuels			
1.B.1 – Solid Fuels	MOPMR , CAPMAS & IEA	T1/T2	D/CS
1.B.2 – Oil and Natural Gas	MOPMR & IEA	T1/T2	D/CS
1.B.3 – Other Emissions from energy production	**MOPMR & IEA**	**T1/T2**	**D/CS**

T1: IPCC Tier 1, T2: IPCC Tier 2, T3: IPCC Tier 3, D: IPCC Default, CS: Country-Specific

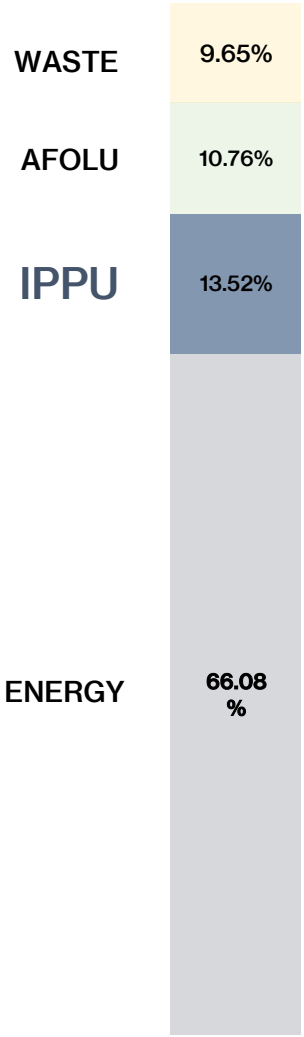
2.5.4 Recalculations

The inventory for the years 1990 to 2015 have been already recalculated during the preparation of Egypt's NC4, which highly improved the accuracy compared to previous emissions inventories. The current inventory adopted the same methodology including the same EFs and Tiers previously used for the NC4. The only recalculation to be reported for the Energy sector inventory is the use of AR5 global warming potentials (GWP) replacing the previously used (BUR1 and NC4) AR2 GWPs.

2.6 Industrial Processes and Product Use (IPPU)

2.6.1 Overview of the Sector

The main sources of GHG emissions in Egypt's Industrial Processes and Product Use (IPPU) sector include the mineral, chemical, and metal industries. The Mineral Industry, particularly the cement sector, contributes significantly to emissions through the calcination process, where limestone is heated to produce clinker, releasing carbon dioxide (CO_2) as a byproduct. The Chemical Industry also plays a major role, with emissions primarily from the production of fertilizers and petrochemicals. These processes often involve the release of nitrous oxide (N_2O) and other GHGs during chemical reactions and the use of raw materials.



Additionally, the Metal Industry, despite facing challenges, remains a notable source of emissions, especially from the iron, steel, and aluminum sectors. The production of these metals involves high-temperature processes that release CO_2 and perfluorocarbons (PFCs). Emissions from Ozone Depleting Substances (ODS) Substitutes have also increased significantly due to the phasing out of ODS, leading to a rise in the use of hydrofluorocarbons (HFCs) as replacements. These sources collectively reflect the trends in Egypt's industrial sector and its impact on GHG emissions, highlighting the need for targeted mitigation strategies to address emissions from these key sectors.

The IPPU sector produced **52,200.35 $GgCO_2e$** which accounts for 13.5% of the total national inventory in 2022. The main emissions contributors to the IPPU sector are the Mineral Industry at 51% followed by the Metal Industry at 19% and the Chemical Industry and Product Uses as Substitutes for Ozone Depleting Substances at 15% and 14%, respectively.

- **2.A Mineral Industry:**
  The Mineral Industry encompasses activities such as cement production, lime production, glass manufacturing, and other uses of carbonates. Cement production is the primary source of emissions within this sector, as it involves the chemical transformation of limestone into clinker, which generates substantial CO_2 emissions. Lime production, though smaller in comparison, also contributes to emissions through a similar chemical process. Glass production emits CO_2 primarily due to the high temperatures required to melt raw materials. Other process uses of carbonates, such as in ceramics, generate additional emissions, though to a lesser extent.

- **2.B <u>Chemical Industry</u>:**
  The Chemical Industry includes activities such as ammonia production, petrochemical manufacturing (e.g., methanol and ethylene), and other chemical processes. Ammonia production is the largest contributor to emissions in this sector, where CO_2 released as a byproduct of the chemical reaction. Petrochemical production, particularly for chemicals like methanol and ethylene, also generates significant emissions, as these processes require high temperatures and result in carbon releases. Smaller contributions come from nitric acid production and other chemical processes, although they represent a smaller share of the sector's emissions.

- **2.C <u>Metal Industry</u>:**
  The Metal Industry includes the production of iron and steel, ferroalloys, lead, and zinc. Iron and steel production is the largest source of emissions within this sector. The production of these metals involves high-temperature processes that release CO_2 as part of the chemical reactions involved in metal extraction and refining. Ferroalloys, lead, and zinc production contribute to emissions as well, but to a smaller extent compared to iron and steel.

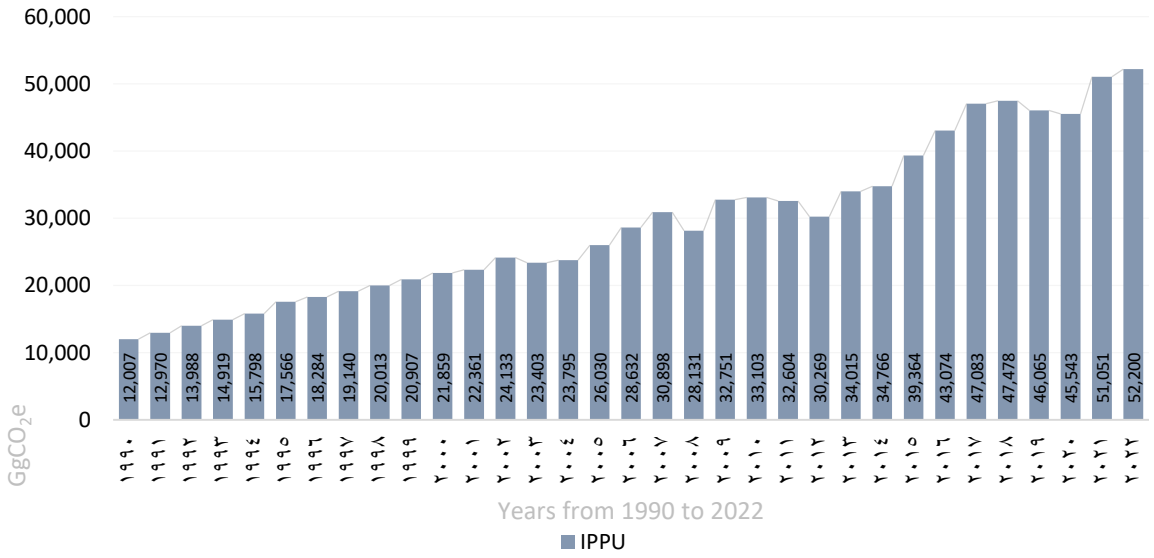
- **2.D <u>Non-Energy Products from Fuels and Solvent Use</u>:**
  This sector includes emissions from the use of lubricants, paraffin wax, and other products derived from fuels and solvents. Lubricants are the largest source of emissions, as they break down during their use in vehicles and machinery, releasing CO_2. Paraffin wax, which is used in products such as candles, cosmetics, and coatings, also generates emissions, though to a lesser extent.

- **2.F <u>Product Uses as Substitutes for Ozone-Depleting Substances</u>:**
  This sector involves emissions from the use of substitutes for ozone-depleting substances, such as in refrigeration and air conditioning, foam-blowing agents, and fire protection. The largest source of emissions comes from refrigeration and air conditioning, where the use of hydrofluorocarbons (HFCs) as refrigerants results in the release of potent greenhouse gases. Foam-blowing agents and fire protection systems also use HFCs, contributing to smaller amounts of emissions.

2.6.2 IPPU Sector Emissions Trends

Sector Overall Emissions

The data reveals a steady increase in emissions from the IPPU sector between 1990 and 2022. Starting at 12,007 Gg CO_2e in 1990, emissions rose consistently through the 1990s and early 2000s, reaching a peak of 30,898 $GgCO_2e$ in 2007, representing a 157% increase from 1990 levels with an average annual growth rate of 6%. After a dip in 2008, down to 28,131 $GgCO_2e$, emissions fluctuated then maintained a upward trajectory reaching 52,200 $GgCO_2e$ in 2022, with an average annual growth rate of 4.5% between 2008 and 2022. Overall, emissions grew by 335% over the 33-year period.



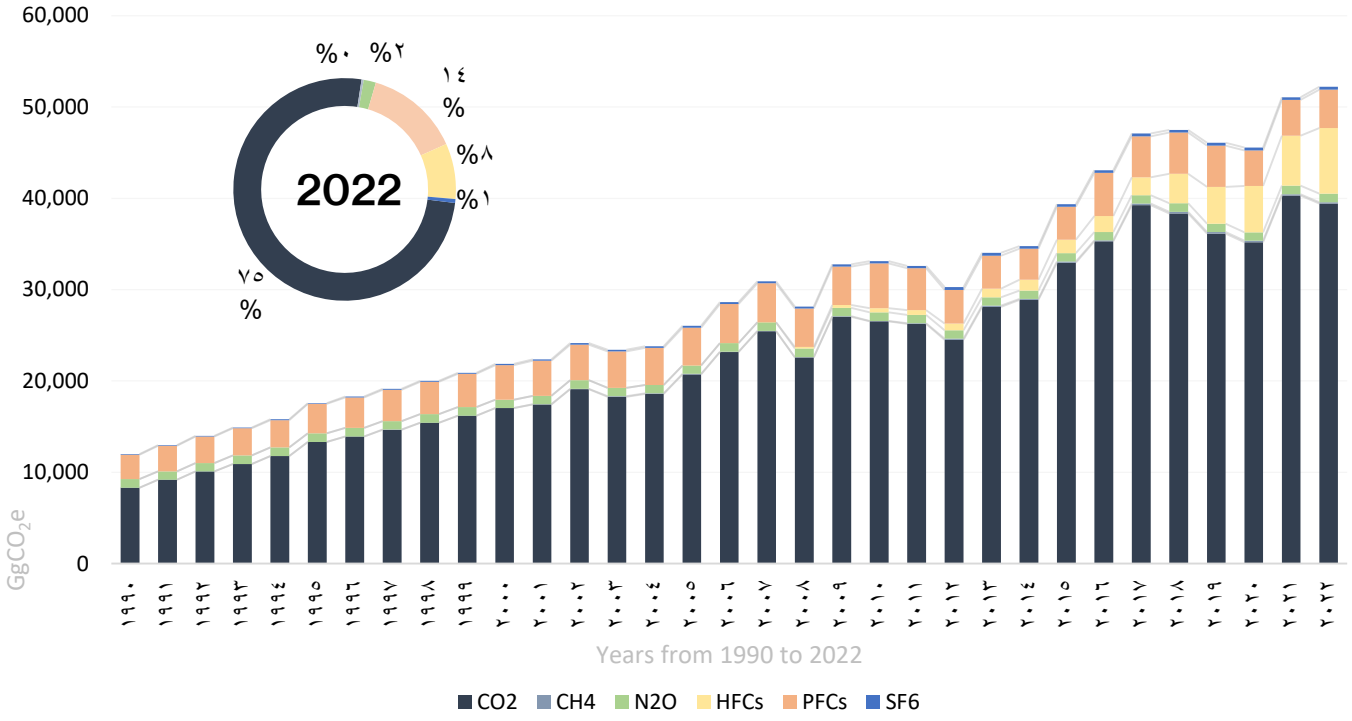
Sector	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
IPPU	12,007	21,859	26,030	39,364	43,074	47,083	47,478	46,065	45,543	51,051	52,200

Figure 26: GHG Emissions from IPPU Sector over the period 1990 - 2022 (GgCO2e)

Sector Emissions per Gas

The trend of greenhouse gas emissions from 1990 to 2022 reveals an increase across all major gases, with CO_2 emissions remaining the dominant contributor to total emissions, rising by nearly 374%, from 8,328.56 Gg CO_2e in 1990 to 39,407.98 Gg CO_2e in 2022. This increase reflects the expansion of industrial activities, particularly in the mineral and chemical industries. The average annual growth rate between 1990 and 2022 was around 5%, and the highest rate occurred between 2014 and 2017 reaching 10.5%. HFCs showed exponential growth, emerging as a key contributor to the overall emissions profile. Starting from negligible levels in 1990, HFC emissions surged to 7,194.36 Gg CO_2e by 2022, driven by their growing use as replacements for ozone-depleting substances. Other gases

exhibited varying trends. Methane (CH_4) and nitrous oxide (N_2O) emissions remained relatively stable, reflecting minimal changes in processes that produce these gases. PFCs and SF_6, primarily emitted in specific industrial applications, showed steady growth, with PFC emissions increasing from 2,674.03 Gg CO_2e in 1990 to 4,213.44 Gg CO_2e in 2022. These trends highlight the rising influence of synthetic gases, particularly HFCs, on the overall emissions profile and emphasize the need for targeted strategies to mitigate their growth.



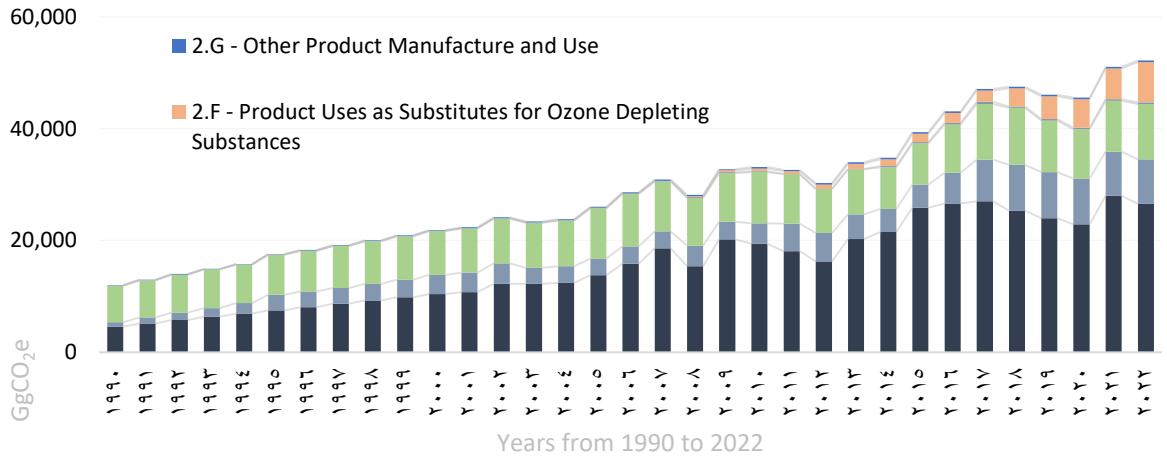
Emissions by Gas ($GgCO_2e$)	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
CO_2	8,328.6	17,033.0	20,726.6	32,956.4	35,300.8	39,234.4	38,353.3	36,127.7	35,185.1	40,290.9	39,408.0
CH_4	4.7	4.9	52.1	115.8	79.1	172.5	174.3	167.4	165.6	160.8	165.7
N_2O	927.5	927.5	927.5	927.5	927.5	927.5	927.5	927.5	927.5	927.5	927.5
HFCs	0.0	0.0	2.9	1,461.8	1,750.5	1,973.2	3,216.9	4,037.1	5,061.4	5,467.9	7,194.4
PFCs	2,674.0	3,762.0	4,137.3	3,611.5	4,725.1	4,484.3	4,514.4	4,514.4	3,912.5	3,912.5	4,213.4
SF_6	71.8	131.7	183.2	291.4	291.4	291.4	291.4	291.4	291.4	291.4	291.4
Total (Gg CO_2e)	**12,006.5**	**21,859.1**	**26,029.7**	**39,364.3**	**43,074.3**	**47,083.2**	**47,477.8**	**46,065.4**	**45,543.4**	**51,050.9**	**52,200.4**

Figure 27: GHG Emissions from IPPU Sector by gas over the period 1990 - 2022 (GgCO2e)

Sector Emissions per Category

Between 1990 and 2022, GHG emissions from the IPPU sector exhibited an increase across all categories. The **Mineral Industry (2.A)** remained the dominant contributor, where its emissions increased by approximately 480%, from 4,573.37 Gg CO_2e in 1990 to 26,558.10 Gg CO_2e in 2022, making it a key driver of the overall trend. Similarly, the **Chemical Industry (2.B)** demonstrated a nearly tenfold increase in emissions, growing from 790.09 Gg CO_2e in 1990 to 7,960.06 Gg CO_2e in 2022. Other sectors also showed notable trends:

- Emissions from the **Metal Industry (2.C)** increased by about 51%, rising from 6,542.69 Gg CO_2e in 1990 to 9,879.33 Gg CO_2e in 2022.
- Emissions from **Non-Energy Products (2.D)** grew nearly 11 times, from 28.62 Gg CO_2e in 1990 to 317.15 Gg CO_2e in 2022.
- The **ODS Substitutes (2.F)** sector, which had no reported emissions in 1990, reached 7,194.36 Gg CO_2e by 2022, reflecting an emerging contribution.
- The **Other Product Manufacture and Use (2.G)** sector experienced growth, with emissions increasing by around 305%, from 71.79 Gg CO_2e in 1990 to 291.35 Gg CO_2e in 2022.



Emissions per Cat. ($GgCO_2e$)	1990	2000	2005	2015	2022
2.A - Mineral Industry	4,573	10,422	13,762	25,863	26,558
2.B - Chemical Industry	790	3,385	2,994	4,112	7,960
2.C - Metal Industry	6,543	7,844	8,995	7,367	9,879
2.D - Non-Energy Products from Fuels and Solvent Use	29	76	93	269	317
2.F - Product Uses as Substitutes for Ozone Depleting Substances	-	-	3	1,462	7,194
2.G - Other Product Manufacture and Use	72	132	183	291	291
Total ($GgCO_2e$)	**12,007**	**21,859**	**26,030**	**39,364**	**52,200**

Figure 28: GHG Emissions from IPPU Sector by category over the period 1990 - 2022 (GgCO2e)

From 1990 to 2022, emissions from the **Mineral Industry (2.A)** grew by approximately 480%, with cement production continuing to be the dominant contributor. This increase reflects a rise in production volumes, as well as the difficulty in decarbonizing process-intensive activities like cement manufacturing. Lime and glass production emissions have increased more moderately, but cement remains the largest source, driven by the chemical processes involved, which remain challenging to reduce in terms of carbon emissions.

Emissions from the **Chemical Industry (2.B)** grew by about 907.5% between 1990 and 2022. Ammonia production, which accounts for the bulk of emissions in the sector, saw significant growth in response to global fertilizer demand. Meanwhile, petrochemical production also grew, driven by increasing demand for plastics and chemicals. Despite improvements in process efficiency, the chemical industry's emissions remain high due to the intrinsic CO_2 release in ammonia synthesis and petrochemical refining processes.

Emissions from the **Metal Industry (2.C)** grew by approximately 51% from 1990 to 2022, with iron and steel production remaining the largest emitting sector. This increase is mainly driven by the rising production levels within the sector. While ferroalloy, lead, and zinc emissions have grown more modestly, iron and steel production continue to be the dominant contributor. The emissions from this sector stem primarily from the chemical reactions involved in metal extraction, making it challenging to significantly reduce emissions without advancements in decarbonization technologies.

From 1990 to 2022, emissions from **Non-Energy Products from Fuels and Solvent Use (2.D)** grew by about 993%. The increase was driven largely by the higher consumption of lubricants, which are essential in transportation and industrial machinery. The demand for paraffin wax also grew, as it is used in a variety of consumer products. While this sector's emissions make up a small portion of total industrial emissions, the growth indicates rising consumption of products that generate CO_2 emissions during use and degradation.

Ozone Depleting Substances (2.F) had no emissions in 1990 but saw exponential growth since its introduction in the early 2000s. The growth is primarily attributed to the increasing demand for refrigeration and air conditioning systems worldwide, as well as the use of HFCs, which are potent greenhouse gases. Foam-blowing agents and fire protection applications also contributed to this rise, though to a lesser extent. This significant growth in emissions reflects both the global increase in refrigeration and air conditioning use and the continued reliance on HFCs, despite ongoing efforts to phase out high-GWP substances.

Overall, the data highlights that while the Mineral Industry continues to be the largest contributor, sectors such as Chemical Industry and ODS Substitutes have shown significant proportional growth. These trends emphasize the need for targeted mitigation efforts, particularly focusing on sectors with the most substantial and emerging contributions.

2.6.3 Methodology (Methods, Activity Data, and Emission Factors)

The methodology adopted in compiling the national GHGI, is in accordance with the 2006 IPCC Guidelines. These guidelines, established by the Intergovernmental Panel on Climate Change (IPCC), provide a standardized approach for estimating and reporting GHGs. They focus on ensuring transparency, consistency, and comparability in national inventories of emissions and removals, particularly in sectors like the IPPU

The IPPU sector assessment applied Tier 1 methods from the IPCC 2006 Guidelines, which are designed for countries with limited data availability. Tier 1 provides simplified, default methodologies based on global or regional averages, making it easier to estimate GHGs from industrial processes and product use. This approach utilizes default emission factors provided by the IPCC, ensuring a consistent and transparent framework for countries to report their emissions while adhering to international standards.

Table 16: Methodology (Methods, Activity Data, and Emission Factors)

Category	Data sources	Tier used	EF
2.A - Mineral Industry			
2.A.1 - Cement production	US Geological Survey	T1	D
2.A.2 - Lime production	US Geological Survey	T1	D
2.A.3 - Glass Production	Estimated (extrapolation)	T1	D
2.A.4 - Other Process Uses of Carbonates			
2.A.4.a – Ceramics	Estimated (extrapolation)	T1	D
2.B - Chemical Industry			
2.B.1 - Ammonia Production	US Geological Survey	T1	D
2.B.2 - Nitric Acid Production	Estimated (extrapolation)	T1	D
2.B.8 - Petrochemical and Carbon Black Production			
2.B.8.a - Methanol	MoPMR	T1	D
2.B.8.b - Ethylene	MoPMR	T1	D
2.B.8.c - Ethylene Dichloride and Vinyl Chloride Monomer	MoPMR	T1	D
2.B.8.f - Carbon Black	Estimated (extrapolation)	T1	D
2.C - Metal Industry			
2.C.1 - Iron and Steel Production	World Steel	T1	D
2.C.2 - Ferroalloys Production	US Geological Survey	T1	D
2.C.3 - Aluminum production	US Geological Survey	T1	D
2.C.5 - Lead Production	Estimated (extrapolation)	T1	D
2.C.6 - Zinc Production	Estimated (extrapolation)	T1	D
2.D - Non-Energy Products from Fuels and Solvent Use			
2.D.1 - Lubricant Use	Estimated (extrapolation)	T1	D
2.D.2 - Paraffin Wax Use	Estimated (extrapolation)	T1	D
2.F - Product Uses as Substitutes for Ozone Depleting Substances			

Category	Data sources	Tier used	EF
2.F.1 - Refrigeration and Air Conditioning	Ozone Unit - MoE	T1	D
2.F.1.a - Refrigeration and Stationary Air Conditioning	Ozone Unit - MoE	T1	D
2.F.2 - Foam Blowing Agents	Ozone Unit - MoE	T1	D
2.F.3 - Fire Protection	Ozone Unit - MoE	T1	D
2.F.6 - Other Applications (please specify)	Ozone Unit - MoE	T1	D
2.F.1 - Refrigeration and Air Conditioning	Ozone Unit - MoE	T1	D
2.G - Other Product Manufacture and Use			
2.G.1 - Electrical Equipment			
2.G.1.b - Use of Electrical Equipment	**Estimated (extrapolation)**	T1	D

The following steps were taken in preparing the IPPU inventory:

1. **Category identification**. A review of the IPCC 2006 guidelines was conducted for all subcategories of the IPPU sector and the GHG inventory of all previous years.
2. **The data needs were identified along with their sources for the estimation process.**
3. **Data collection and stakeholder engagement.** Data collection questionnaires were prepared for all relevant sub sectors and disseminated to all relevant stakeholders/entities. In cases where data was not available, an extrapolation was conducted using previously available data.
4. **Calculation and data compilation**. Default IPCC emission factors and Good Practice Guidance were used in the inventory estimations. Country or region-specific factors were used when available. The calculations were conducted on the latest version 2.93 of the IPCC Inventory Software.

The activity data requested varied depending on availability and equation parameters in the IPCC guidelines. The requested data included the following:

- The total annual production data.
- The total annual production capacity.
- The total annual consumption.
- The total annual Imports/Exports.
- The type of process, technology, and raw materials that are utilized in production or use.

Several entities were identified and contacted through the MOE:

1. Central Agency for Public Mobilization and Statistics (CAPMAS) – Collects data through questionnaires from industries.
2. Industrial Development Authority (IDA) – Provides information on production capacity and raw materials.
3. Federation of Egyptian Industries – Offers insights through its various industrial chambers.
4. National Ozone Unit (NOU) – Supplies data on ODS substitutes.
5. US Geological Survey (USGS) Mineral Yearbook – Provides comprehensive information on mineral production and trends.
6. Donor-funded projects (e.g., UNIDO, World Bank) – Collect data on specific industries.
7. International publications – Such as the “Steel Statistical Yearbook” and reports from the Egyptian Petrochemical Company (ECHEM) were also used.

2.6.4 Recalculations

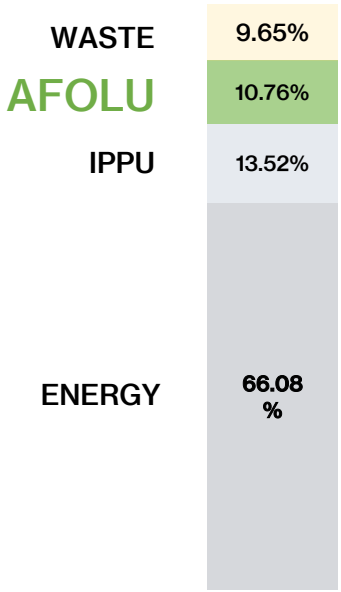
Recalculation has been performed for the IPPU sector inventory due to the use of AR5 GWP replacing the previously used (BUR1 and NC4) AR2 GWPs. Recalculations were also performed for the ammonia production sub-sector for the years 2016 and 2017, as the previously reported activity data for these years were found to be inconsistent with the overall trend across the time series. A more reliable source of activity data was used to replace the earlier figures, ensuring alignment with actual production levels during those years. This recalculation improved the accuracy of the emissions estimates for ammonia production while maintaining consistency with the principles outlined in the IPCC 2006 Guidelines.

GgCO2	2016	Recalculated	%Change	2017	Recalculated	%Change
2.B.1 Ammonia production	**1,882**	**3,633**	**+93%**	**758**	**4,733**	**+524%**

2.7 Agriculture, Forestry, and Other Land Use (AFOLU)

2.7.1 Overview of the Sector

The agricultural sector is a cornerstone of Egypt's economy, employing approximately 18.9% of the total labor force in 2022. During the 2021/2022 fiscal year, agriculture contributed 11.5% to the gross domestic product (GDP) with a growth rate of 4.0%.



Egypt's arable land is predominantly concentrated in the Nile Valley and Delta, with additional reclaimed desert areas. The total cultivated land spans 9.6 million acres (1 acre = 0.42 hectares), which constitutes only 4% of the country's total land area. Annually, the cropped area is about 16.4 million acres, reflecting a cropping intensity of approximately 2:1. The country's arid climate results in sparse rainfall, ranging from 60–190 mm annually along the Mediterranean coast, 25–60 mm in the Nile Delta, and less than 25 mm in Upper Egypt.

Over 3.5 million acres of desert have been reclaimed for agriculture, distributed among various reclamation projects.

The Agriculture, Forestry, and Other Land Use (AFOLU) sector accounted for **41,561 Gg CO_2e** of Egypt's national GHG emissions in 2022 with a share of 10.76% of the total inventory. Emissions primarily stemmed from enteric fermentation, manure management, field residue burning, agricultural soils, and rice cultivation. The largest contributors to the total GHG emissions are Aggregate Sources and Non-CO_2 Emissions Sources on Land (56%) followed by Livestock (44%).

The key greenhouse gases of concern are CO_2, N_2O, and CH_4. CO_2 fluxes between the atmosphere and ecosystems are primarily controlled by uptake through plant photosynthesis and release via respiration, decomposition, and combustion of organic matter. N_2O is primarily emitted from ecosystems as a by-product of nitrification and denitrification, while CH_4 is emitted through methanogenesis under anaerobic conditions in soils and manure storage, through enteric fermentation, and during incomplete combustion while burning organic matter. Other gases of interest (from combustion and soils) are NOx, NH_3, NMVOC, and CO because they are precursors for the formation of greenhouse gases in the atmosphere. The formation of greenhouse gases from precursor gases is considered an indirect emission. Indirect emissions are also associated with leaching or runoff of nitrogen compounds, particularly NO_3 losses from soils, some of which can be subsequently converted to N_2O through denitrification.

The direct emissions of N_2O from agricultural soils include the total amount of nitrogen in soils through cropping practices. These practices include the application of synthetic fertilizer, nitrogen from animal waste, production of nitrogen-fixing crops, nitrogen from crop residue mineralization, and soil nitrogen mineralization due to the cultivation of histosols. With the preparation of the First Biennial Update Report (BUR) and Fourth National Communication, Egypt adopted the *2006 IPCC Guidelines*, which refined the categorization of GHG emissions. The term "managed soils" is used in these guidelines to capture national anthropogenic emissions of **N_2O** (both direct and indirect) from managed soils and **CO_2 emissions** from the use of urea-based fertilizers. Consequently, the term "agricultural soil" has been retained in trend analyses to align with prior reporting conventions.

2.7.2 AFOLU Sector Emissions Trends

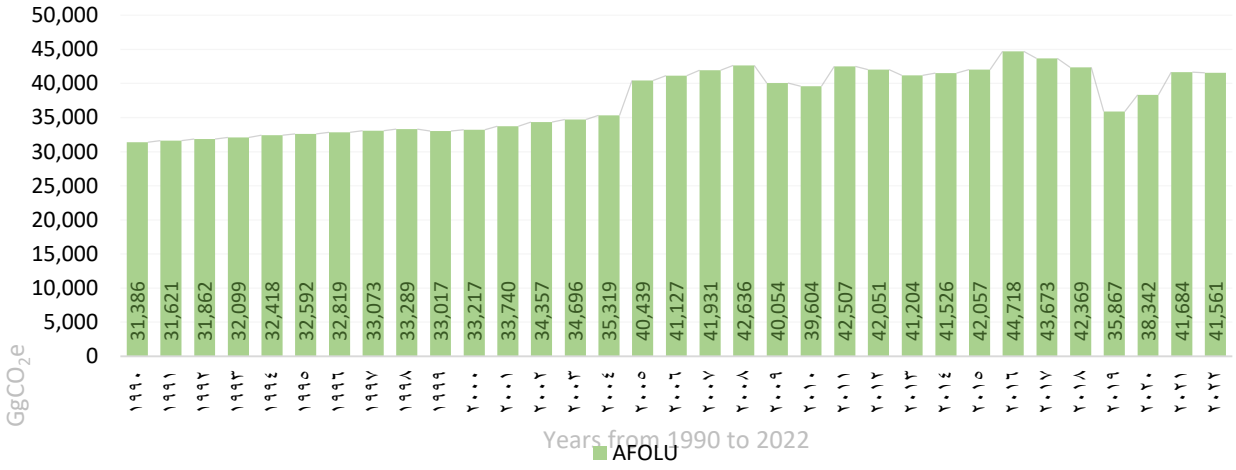
Sector Overall Emissions

Total emissions from the AFOLU sector decreased over the period, from 43,882 Gg CO_2e in 2018 to 41,561 Gg CO_2e in 2022. A notable decrease occurred in 2019, with emissions falling to 35,867 Gg CO_2e, primarily due to a reduction in the use of synthetic fertilizers and urea. The overall fluctuations in emissions reflect variations in the amounts of fertilizers used and changes in livestock numbers. Emissions from the AFOLU sector in 2022 were 5.3% lower than in 2018 for this reason.

The below graph highlights the growth in GHG emissions from the AFOLU sector between 1990 and 2022. Key observations include:

- A **steady increase** in total emissions from the AFOLU sector, with variability due to agricultural inputs, particularly fertilizer prices and quantities.
- A **decline in emissions during 2019–2020,** attributable to reduced activity during the COVID-19 pandemic, followed by a rebound in 2021 and 2022.

This variability underscores the influence of economic and external factors (like the pandemic) on agricultural emissions, emphasizing the need for robust data monitoring and adaptive mitigation strategies in the sector.



Sector	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
AFOLU	31,386.4	33,216.5	40,439.1	42,056.6	44,717.8	43,672.8	42,368.9	35,866.7	38,341.8	41,684.5	41,560.7

Figure 29: GHG Emissions from AFOLU Sector over the period 1990 - 2022 (GgCO2e)

Sector Emissions per Gas

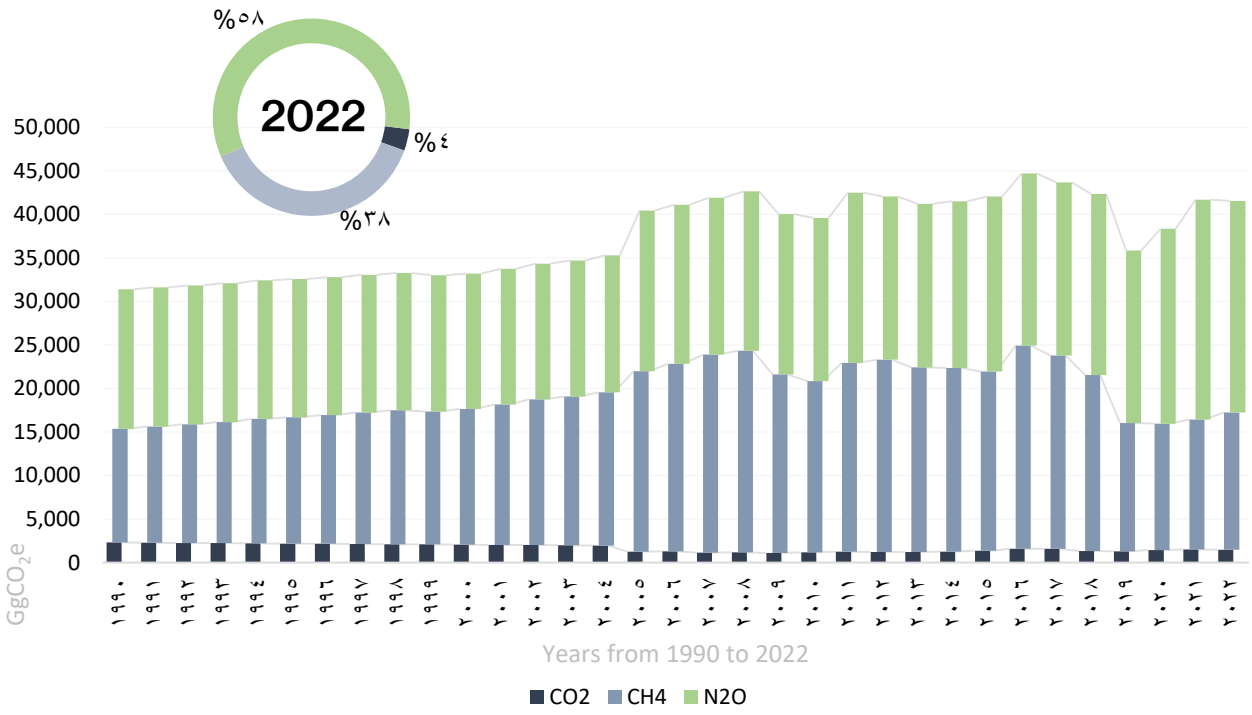
The trend of GHG emissions from 1990 to 2022 reveals increases across all major gases, with N_2O emissions remaining the dominant contributor to total emissions. N_2O emissions rose by nearly 51.6%, from 16,027.6 Gg CO_2e in 1990 to 24,299.8 Gg CO_2e in 2022.

Other gases exhibited varying trends. Methane emissions remained relatively stable throughout the years with an increase of 21% from 1990 to 2022, reflecting minimal changes in activities that produce these gases. While CO_2 emissions decreased by 36.5% for the same period.

In 2022, the AFOLU sector's GHG emissions were distributed across three primary gases:

- N_2O: Representing the largest share at 58%, N_2O emissions were primarily attributed to agricultural soils and manure management practices.
- CH_4: Contributing 38%, CH_4 emissions originated mainly from enteric fermentation in livestock and rice cultivation.
- CO_2: Accounting for the smallest share of 4%, CO_2 emissions were largely associated with biomass burning and liming activities.

This breakdown highlights the dominant role of nitrous oxide and methane in the AFOLU sector's emissions profile, underscoring the need for targeted mitigation strategies in soil and livestock management.



Emissions by Gas ($GgCO_2e$)	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
CO_2	2,317.3	2,068.0	1,255.3	1,356.3	1,582.6	1,573.1	1,345.8	1,313.7	1,454.1	1,512.7	1,472.5
CH_4	13,041.6	15,576.6	20,740.7	20,592.7	23,364.8	22,226.3	20,209.8	14,741.9	14,497.4	14,929.2	15,788.4
N_2O	16,027.6	15,571.9	18,443.0	20,107.6	19,770.4	19,873.3	20,813	19,811.1	22,390.2	25,242.5	24,299.8
Total (Gg CO_2e)	**31,386.4**	**33,216.5**	**40,439.1**	**42,056.6**	**44,717.8**	**43,672.8**	**42,368.9**	**35,866.7**	**38,341.8**	**41,684.5**	**41,560.7**

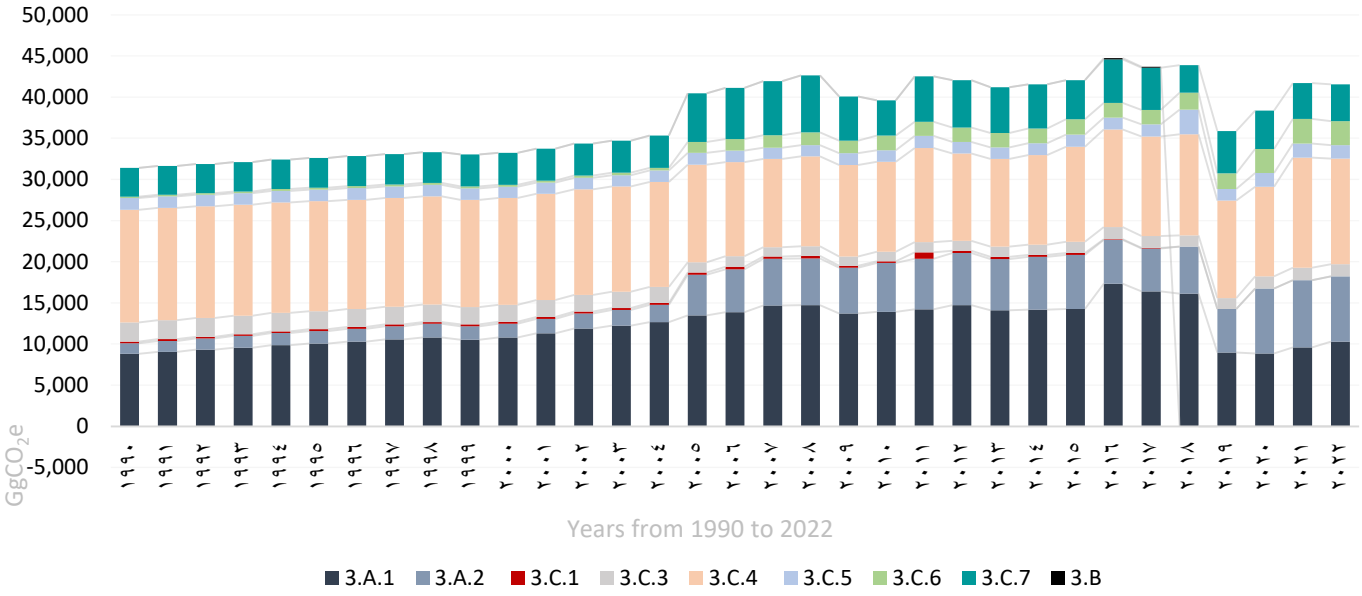
Figure 30: GHG Emissions from AFOLU Sector by gas over the period 1990 - 2022 (GgCO2e)

Sector Emissions per Category

Tracking GHG emissions across different categories within the AFOLU sector from 2018 to 2022 highlights significant shifts:

- **Enteric Fermentation:** The proportion of emissions attributed to enteric fermentation decreased markedly, from 37% in 2018 to 25% in 2022, reflecting a decline in livestock numbers. This reduction is primarily linked to higher feed prices, which led to a decrease in the total number of farm animals.

- **Manure Management:** Emissions from manure management increased from 13% in 2018 to 19% in 2022, driven primarily by a 51.13% rise in poultry numbers during this period, which significantly contributed to the increase in emissions from manure. Unlike cattle, poultry do not produce emissions from enteric fermentation; however, their growing numbers created an opposite trend in manure management emissions.
- **Rice Cultivation:** Emissions from rice cultivation grew from 8% in 2018 to 11%, in 2022 reflecting changes in the scale of rice cultivation, including expansions in some years.
- **Agricultural Soils:** Emissions from agricultural soils rose slightly, accounting for 43% in 2018 and 45% in 2022, underscoring the dominant role of soil-related practices such as fertilizer application in the AFOLU sector's emissions profile.



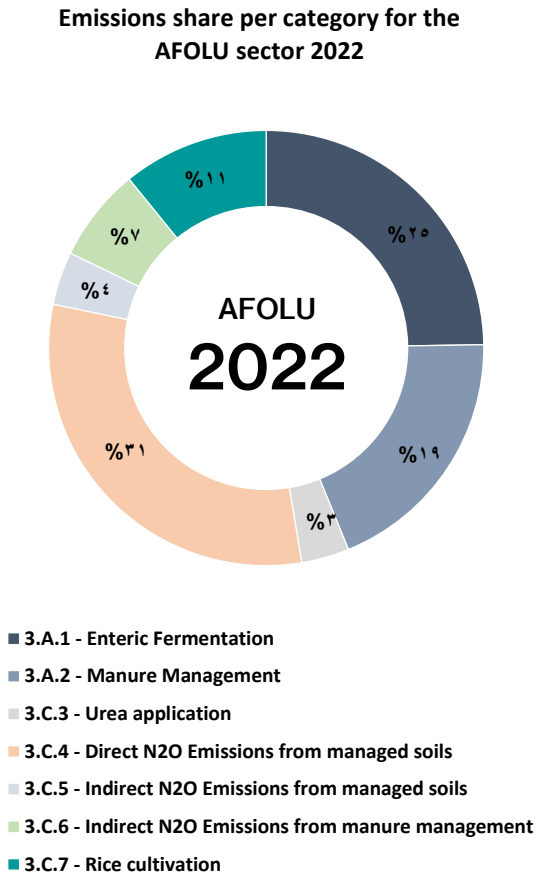
Emissions per Cat. ($GgCO_2e$)	1990	2000	2005	2015	2022
3.A.1 - Enteric Fermentation	8,812.04	10,791.51	13,465.51	14,257.12	10,290.67
3.A.2 - Manure Management	1,268.95	1,670.92	4,965.04	6,571.55	7,928.19
3.C.1 – Burning	210.53	237.67	255.92	226.21	0.00
3.C.3 - Urea application	2,317.34	2,068.01	1,255.34	1,356.27	1,475.18
3.C.4 - Direct N_2O Emissions from managed soils	13,700.60	12,958.57	11,845.77	11,536.27	12,819.17
3.C.5 - Indirect N_2O Emissions from managed soils	1,423.73	1,375.89	1,449.47	1,494.06	1,643.82
3.C.6 - Indirect N_2O Emissions from manure management	183.97	236.67	1,301.58	1,846.34	2,899.73
3.C.7 - Rice cultivation	3,469.28	3,877.31	5,900.44	4,768.82	4,506.56
3.B – Land	0.00	0.00	0.00	0.00	-2.65
Total (Gg CO_2e)	**31,386.4**	**33,216.5**	**40,439.1**	**42,056.6**	**41,560.7**

Figure 31: GHG Emissions from AFOLU Sector by category over the period 1990 - 2022 (GgCO2e)

LIVESTOCK

3.A.1 - Enteric Fermentation

GHG emissions from enteric fermentation have shown a steady increase over the period from 1990 to 2022. The emissions grew by approximately 17%, rising from 8,812 Gg CO_2e in 1990 to 10,291 Gg CO_2e in 2022. This category is a significant source of CH_4 emissions within the AFOLU sector. Despite minor year-to-year fluctuations, the overall trend has remained relatively constant. Notably, emissions saw a slight decrease in 2019 and 2020, corresponding to a temporary reduction in livestock activities likely due to economic and environmental factors. The long-term growth in emissions is directly linked to the expansion of Egypt's livestock population over this period.



3.A.2 - Manure Management

Emissions from manure management, particularly indirect N_2O emissions, constitute a relatively small fraction of Egypt's total GHG inventory. From 1990 to 2022, the emissions from manure management increased from 1,269 to 7,928 Gg CO_2e, reflecting a consistent upward trend. The most significant surge occurred in 2021, followed by moderate growth in 2022. This steady increase aligns with the expansion of livestock operations and the greater volume of manure being managed over time.

3.C.7 - Rice Cultivation

Rice cultivation remains to be one of the largest sources of CH_4 emissions within the AFOLU sector. Emissions increased by 30% from 3,469 Gg CO_2e in 1990 to 4,507 Gg CO_2e in 2022. A notable fluctuation occurred in 2018, when emissions decreased significantly due to a reduction in the area cultivated with rice, shrinking to 244 hectares compared to 543 hectares in 2019. In contrast, emissions peaked at 5,119 Gg CO_2e in 2019. This variability highlights the sensitivity of emissions to changes in rice cultivation practices and the area under cultivation.

Aggregate Sources and Non-CO_2 Emission Sources on Land

GHG emissions from aggregate sources and non-CO_2 emissions on land followed a steady upward trend from 1990 to 2003, with minor fluctuations thereafter. Emissions reached their peak in 2021, estimated at 19,620 Gg CO_2e. While emissions have remained higher than pre-2000 levels, they began to exhibit a declining trend in 2022. This category represents a significant source of N_2O emissions within the AFOLU sector.

Biomass Burning

From 1990 to 2022, emissions from biomass burning experienced significant changes due to data availability issues. Expert judgment has informed estimates for the period from 2018 to 2022, during which no emissions from biomass burning were recorded. This absence is attributed to the Egyptian government's measures to eliminate agricultural waste burning, instead promoting alternative uses for waste to preserve the environment. As a result, GHG emissions from biomass burning contributed zero emissions to the total AFOLU inventory during this period.

2.7.3 Methodology (Methods, Activity Data, and Emission Factors)

In Egypt's prior submissions to the UNFCCC (the first, second, and third National Communications), GHG emissions from the AFOLU sector were calculated using the default methodology outlined in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* and the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. These guidelines recognize that various agricultural activities introduce nitrogen into soils, enhancing conditions for nitrification and denitrification, thereby increasing N_2O emissions. The methodology categorizes N_2O emissions into three sources:

1. **Direct N_2O emissions from agricultural soils**, which include nitrogen inputs from fertilizers, animal waste, crop residues, and nitrogen-fixing crops.
2. **Direct soil emissions of N_2O from livestock production.**
3. **Indirect N_2O emissions** resulting from nitrogen leaching, runoff, and volatilization triggered by agricultural activities.

With the preparation of the First Biennial Update Report (BUR) and Fourth National Communication, Egypt adopted the *2006 IPCC Guidelines*, which refine the categorization of GHG emissions. The term "managed soils" is used in these guidelines to capture national anthropogenic emissions of **N_2O** (both direct and indirect) from managed soils and **CO_2 emissions** from the use of urea-based fertilizers. Consequently, the term "agricultural soil" has been retained in trend analyses to align with prior reporting conventions.

Notably, emissions related to **land-use change were not estimated** in the trend analysis in earlier reports due to a lack of consistent calculations, except for the years 2016 - 2022, when such emissions were quantified. This highlights a gap in integrating land-use change emissions in Egypt's broader GHG inventory trend analysis.

The primary sources of activity data for the AFOLU sector include CAPMAS, the Economic Affairs Sector of the Ministry of Agriculture, the International Fertilizer Association (IFASTAT), and the Food and Agriculture Organization (FAO). Integration of recycling policies and the nationwide ban on agricultural waste burning have driven significant progress. Farmers now use agricultural residues for composting, bioenergy, and other sustainable purposes, leading to a **0% biomass burning rate** on agricultural lands. This outcome underscores the success of Egypt's environmental strategies, which align economic incentives with sustainability goals to reduce emissions and conserve resources.

Fertilizer usage trends were carefully analyzed due to data inconsistencies. Recalibration for the period 2005–2018, relying on IFASTAT data, addressed these irregularities, particularly for urea and nitrogen-based fertilizers. Similarly, for 2018–2022, emission calculations were based on IFASTAT data to maintain consistency. This recalibration provided a more accurate basis for analyzing emissions trends.

For emissions estimation, Tier 1 methods from the IPCC guidelines were primarily used. However, Tier 2 methodologies were introduced for livestock emissions, such as **enteric fermentation** and **manure management** for cattle and buffalo. The use of Tier 2 remains limited due to insufficient activity data but represents a step toward improved inventory quality. Future expansions of Tier 2 applications are anticipated as data availability improves.

Egypt lacks ecosystems classified as natural savannahs; therefore, emissions from this subcategory were not included in the inventory. For the Land Use, Land-Use Change, and Forestry (LULUCF) sector, MPG mandates separate reporting of emissions and removals. However, limited data availability restricted full separation. Data on land reclamation and croplands converted to settlements were used to estimate net changes in croplands, with flexibility provisions in the MPG allowing adjustments based on available data.

Table 17: Methodology (Methods, Activity Data, and Emission Factors)

Category	Data sources	Tier used	EF
3.A - Livestock			
3.A.1.a - Cattle			D
3.A.1.a.i - Dairy Cows	CAPMAS/EAS	T2 (Simplified)	D
3.A.1.a.ii - Other Cattle	CAPMAS/EAS	T2 (Simplified)	D
3.A.1.b - Buffalo			D
3.A.b.a.i - Dairy Buffalo	CAPMAS/EAS	T2 (Simplified)	D
3.A.b.a.ii - Other Buffalo	CAPMAS/EAS	T2 (Simplified)	D
3.A.1.c - Sheep	CAPMAS	T1	D
3.A.1.d - Goats	CAPMAS	T1	D
3.A.1.e - Camels	FAOstat	T1	D
3.A.1.f - Horses	FAOstat	T1	D

Category	Data sources	Tier used	EF
3.A.1.g - Mules and Asses	CAPMAS	T1	D
3.A.1.h - Swine	FAOstat Estimated value	T1	D
3.A.1.j Poultry	CAPMAS	T1	D
3.A.1.j - Other (rabbits)	CAPMAS	T1	D
3.B - Land			
3.B.1 - Forest land	-	-	-
3.B.2 - Cropland	CAPMAS/EAS	T1 (Approach 1)	D
3.B.3 - Grassland	-	-	-
3.B.4 - Wetlands	-	-	-
3.B.5 - Settlements	CAPMAS/EAS	T1 (Approach 1)	D
3.B.6 - Other Land	-	-	-
3.C - Aggregate sources and non-CO_2 emissions sources on land		**T1**	**D**
3.C.1 - Emissions from biomass burning	-	-	-
3.C.2 - Liming	-	-	-
3.C.3 - Urea application	IAFSTAT	-	-
3.C.4 - Direct N2O Emissions from managed soils	IAFSTAT	T1	D
3.C.5 - Indirect N2O Emissions from managed soils	IAFSTAT	T1	D
3.C.6 - Indirect N2O Emissions from manure management	CAPMAS/EAS	T1	D
3.C.7 - Rice cultivation	**CAPMAS/EAS**	**-**	**-**

2.7.4 Recalculations

Recalculation has been performed for the AFOLU sector inventory due to the use of AR5 GWP replacing the previously used (BUR1 and NC4) AR2 GWPs.

To enhance the accuracy of the GHG inventory for the AFOLU sector, recalculations were also conducted to address potential underestimation or overestimation of emissions, particularly in key categories. These recalculations were based on newly acquired datasets that were deemed more reliable and accurate, the inclusion of newly added categories, and quality assurance/quality control (QA/QC) measures such as cross-verifying activity data from multiple sources.

Updates to Urea Application and Nitrogen Fertilizers

Recalculations for urea application and nitrogen fertilizers were applied for the entire period from 2005 to 2017. The data source for this period was revised to align with the International Fertilizer Association (IFA), the same source used for the years 2018–2022. This update ensured consistency and allowed for meaningful comparisons across the time series. The emission factors for nitrogen fertilizers, including urea, were also revised in accordance with the 2019 IPCC guidelines.

Previously, the 2006 IPCC guidelines provided an emission factor range for nitrogen fertilizers of 0.001 to 0.03 kg N2O–N (kg N)$^{-1}$, with the upper limit reduced to 0.018 kg N2O–N (kg N)$^{-1}$ in the 2019 guidelines. The default value in the IPCC software was set at 0.01, but recalculations were based on the updated upper limit of 0.018, ensuring compliance with the latest recommendations.

Table 18: Updates to Urea Application and Nitrogen Fertilizers

Year	IAF STAT (New data reported)			Other sources (Old data reported)		
	Urea	Total N Synthetic Fertilizer for Rice	Total N without rice Synthetic Fertilizer	Urea	Total N Synthetic Fertilizer for Rice	Total N without rice Synthetic Fertilizer
2005	1,711,828.0	103,841.1	1,205,158.9	2,564,991	-	1,576,844.9
2006	1,755,914.0	109,948.5	1,129,051.5	2,606,539	-	1,564,149
2007	1,558,494.6	115,463.4	1,004,536.6	2,548,543	-	1,557,534
2008	1,602,150.5	122,163.8	1,016,936.2	2,467,518	-	1,534,904
2009	1,505,376.3	94,515.2	1,098,684.8	2,467,920	-	1,534,954
2010	1,618,279.6	75,468.0	1,083,232.0	2,416,873	-	1,531,867
2011	1,698,924.7	97,270.7	1,109,729.3	2,230,065	-	1,464,361
2012	1,661,720.4	101,618.2	985,181.8	3,147,081	-	1,860,383
2013	1,673,118.3	97,976.2	1,006,123.8	3,137,519	-	1,874,318
2014	1,720,430.1	94,140.2	1,030,459.8	1,842,233	-	1,257,076
2015	1,849,462.4	83,925.8	1,136,674.2	1,850,795	-	1,253,066
2016	1,991,397.8	93,388.1	1,188,412.0	3,208,722.5	93,389.9	2,139,361
2017	1,978,494.6	90,268.0	1,225,332.0	3,317,815.9	90,269.8	2,970,177

Recalculations for Livestock and Soil Emissions

In addition to fertilizers, recalculations were made for emissions from livestock production, direct and indirect emissions from agricultural soils, and indirect emissions from fertilizer management. These adjustments, spanning the period from 2005 to 2022, reflect updates in the emission factors provided by the 2019 IPCC guidelines. By incorporating new data and methodological updates, the recalculations provide a more accurate representation of emissions and trends over time.

These comprehensive recalculations underline the commitment to improving the quality and accuracy of the GHG inventory, ensuring alignment with the most current IPCC guidelines and the evolving understanding of emissions dynamics in the AFOLU sector

Data source	**EAS** (New data reported)		**CAPMAS** (Old data reported)	
	2016	**2017**	**2016**	**2017**
3.A.1.a.i - Dairy Cows	171,570	188,900	5,012,217	4,387,289
3.A.1.a.ii - Other Cattle	4,840,647	4,198,389	-	-
Total Cattle	5,012,217	4,387,289	5,012,217	4,387,289

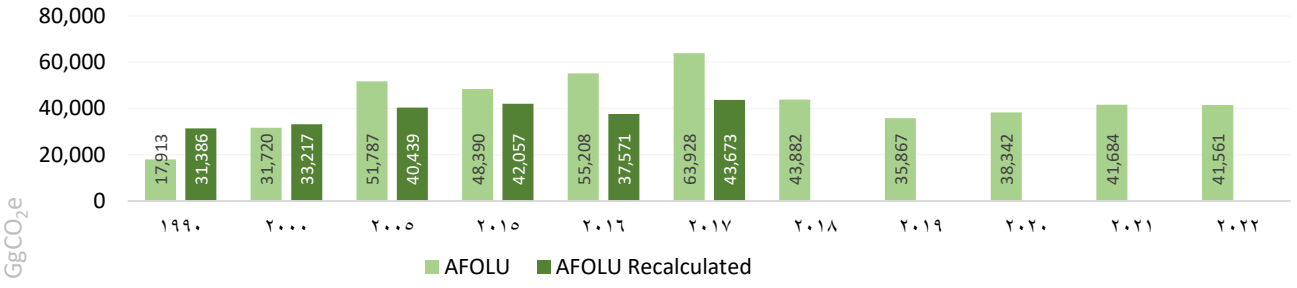
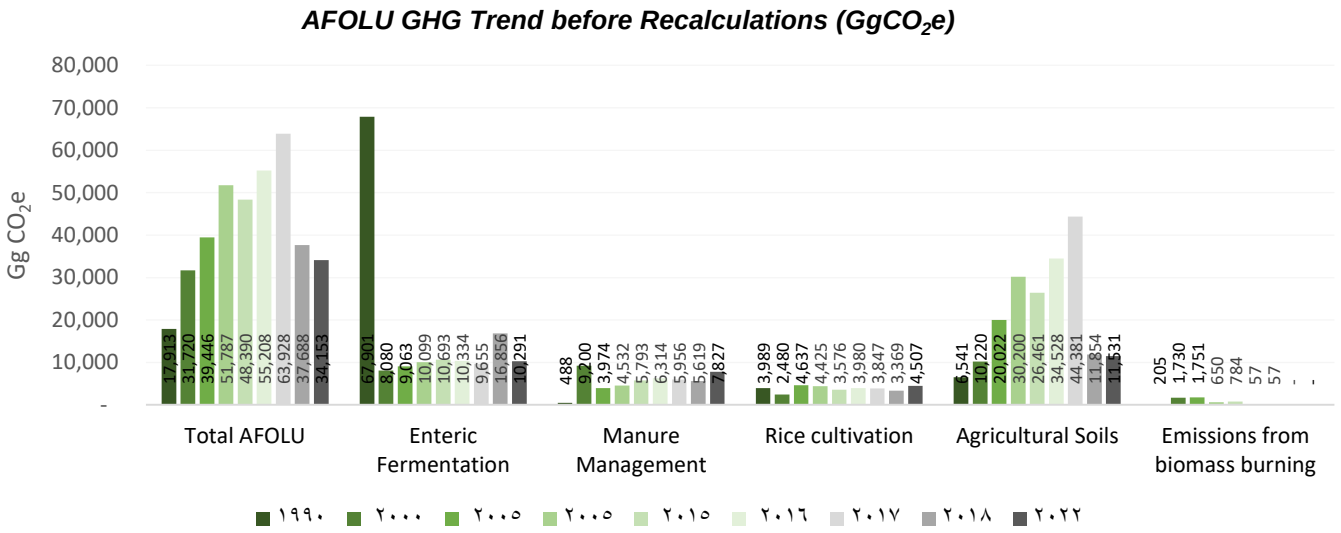
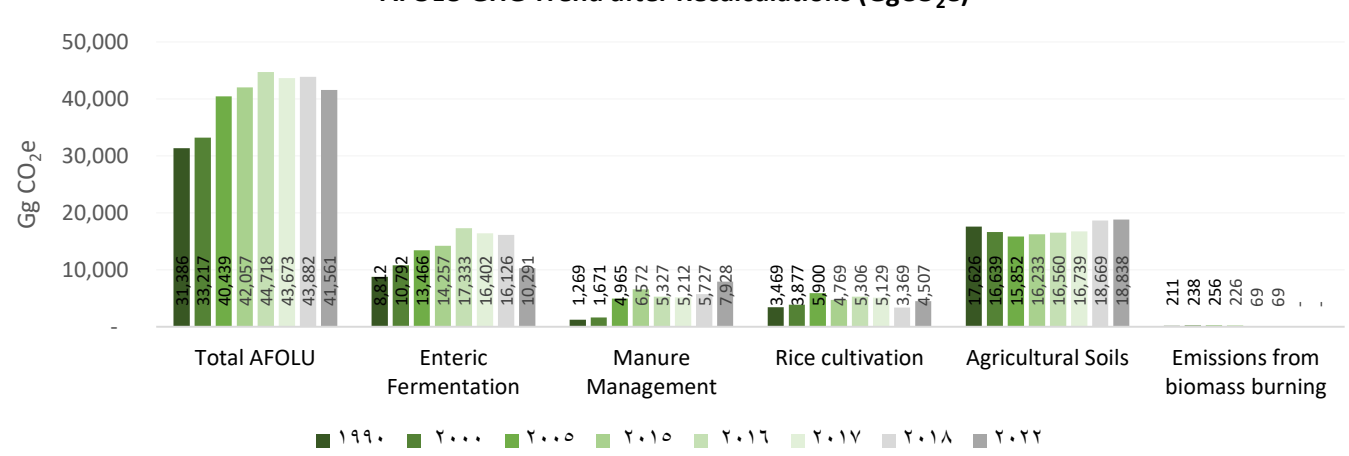


Figure 32: GHG Emissions from AFOLU sector over the period 1990 - 2022 (GgCO2e)



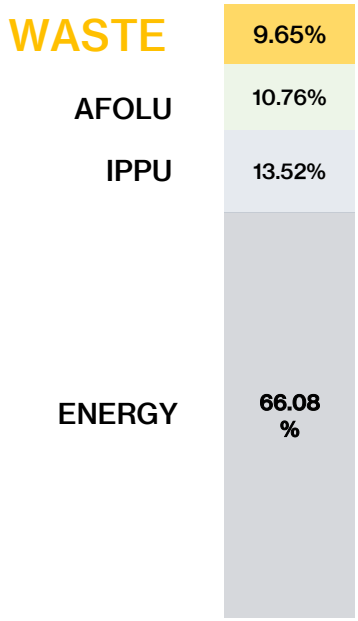


Sector/ Category	1990	2000	2005	2015	2016	2017	2022
Total AFOLU	17,913	31,720	51,787	48,390	55,208	63,928	41,561
Total Recalculated Emissions	31,386	33,217	40,439	42,057	44,718	43,673	
3.A.1 Enteric Fermentation	67,901	8,080	10,099	10,693	10,334	9,655	10,291
Recalculated Emissions	8,812	10,792	13,466	14,257	17,333	16,402	
3.A.2 Manure Management	488	9,200	4,532	5,793	6,314	5,956	7,928
Recalculated Emissions	1,269	1,671	4,965	6,572	5,327	5,212	
3.C.7 Rice cultivation	3,989	2,480	4,425	3,576	3,980	3,847	4,507
Recalculated Emissions	3,469	3,877	5,900	4,769	5,306	5,129	
Agricultural Soil	6,541	10,220	30,200	26,461	34,528	44,381	18,838
Recalculated Emissions	17,626	16,639	15,852	16,233	16,560	16,739	
Emissions from biomass burning	211	238	256	226	69	69	No burning

2.8 Waste

2.8.1 Overview of the Sector

This section details the preparation process and overviews main features of the GHGI of the WASTE sector categories as defined by the IPCC 2006 guidelines (detailed below). Waste sector GHGI presented in this section estimates CO_2, CH_4 and N_2O emissions from solid waste and wastewater activities on the national level guided by categories structure and coding in the Waste Volume of the IPCC 2006 Guidelines.



National activity considered to be resulting in GHG emissions as per IPCC Waste sector categories outlined above could be summarized as follows:

4A Solid waste disposal (SWD): For preparing the GHG inventory of this BTR1, the same distribution used in the last published GHG inventory (Egypt BUR1) was maintained: 80% of generated municipal solid waste and non-hazardous industrial waste ends up in disposal sites, 5-6% is composted, and 8% open burnt.

Sludge is assumed to be fully disposed in disposal sites. There are amounts of sludge which are either digested anaerobically with energy recovery from methane in at least one wastewater treatment plant. There are also amounts of sludge which are dried and mixed with fertilizer for land application. However, the amounts digested were not available (and would, in any case, be reported under the energy sector) and, similarly, data on amounts dried and applied on land were also not available.

Of the amounts disposed, there is 8% in Managed (anaerobic) Waste Disposal Sites, 34% in Unmanaged (mostly deep) Waste Disposal Sites, and 58% in Uncategorized Waste Disposal Sites. This distribution was determined through expert consultations in 2016 and should be revisited as the Waste sector MRV system develops.

4B Biological treatment of Waste: Methane and nitrous oxide emissions from biological treatment of solid waste are assumed to result solely from composting of organic fractions of municipal and non-hazardous industrial solid waste. The total amount composted is around 7% of total municipal solid waste generated. This percentage has likely increased with the expansion of composting facilities and could be revisited in future inventories. Biogas facilities seem to be focused on small-scale rural systems predominantly digesting manure.

4C1 Waste incineration: Waste incineration without energy recovery is assumed to result predominantly from incinerators dedicated to clinical and healthcare waste. This results in carbon dioxide and nitrous oxide as incineration takes place in controlled systems. Incineration of liquid fuels and organic chemicals predominantly takes place in cement kilns and, if data is available, would be reported under the energy sector.

4C2 Open Burning of Waste: Open burning of small amounts of municipal solid waste takes place in rural and semi-rural areas. In some urban areas, waste accumulations may be burnt to reduce volume and make inert. In some cases, spontaneous combustion occurs in deep accumulations which generate methane (usually inside disposal sites). Emissions include carbon dioxide, methane, and nitrous oxide from uncontrolled burning of fractions of municipal solid waste.

4D1 Domestic Wastewater Treatment & Discharge: For the purposes of estimating emissions from the municipal wastewater sector, population income groups are assumed to be 57% rural, 34% urban low-income and 9% urban high-income. In urban groups, 90% are assumed to be connected to a centralized aerobic treatment plant and 10% use septic systems. For rural groups, 24% are connected to centralized aerobic treatment plants, 46% use latrines, 29.5% use septic systems and the remaining 0.5% discharge to water bodies. Emissions include methane from conversion of biological oxygen demand (BOD) and nitrous oxide from nitrogen in domestic wastewater according to treatment method and final discharge.

4D2 Industrial Wastewater Treatment & Discharge: Generally, the law regulates wastewater quality discharged into public sewers from industrial facilities. Most industrial facilities include some level of wastewater treatment prior to discharge to the public sewer system. While Chemical Oxygen Demand (COD) is one of the wastewater quality parameters regulated by law, data on volumes of wastewater generated, type of treatment used, and level of COD in treated wastewater discharged to the sewer system is not available. Default values for wastewater generation volumes and COD concentrations according to industry are used to estimate methane emissions from industrial wastewater treatment and discharge. The activity data used for the estimation is annual production in the relevant industries. This is an important area of improvement for future inventories as country/industry-specific wastewater generation and COD are likely to significantly impact the estimated emissions. Emissions include methane from conversion of chemical oxygen demand (COD) in industrial wastewater according to treatment method and final discharge

In the most recent published GHG inventory prepared for the Waste sector in Egypt (Egypt's first BUR: inventory years 2006-2015), solid waste disposal (4A) and wastewater treatment & discharge (4D) accounted for 97% of waste sector emissions in CO2eq. Solid waste disposal was the highest contributor, typically exceeding 55% of waste sector emissions. Domestic wastewater treatment & discharge (4D1) contributed around 17% while industrial wastewater treatment and discharge (4D2) contributed around 23% for a combined share of over 40% of waste sector GHG emissions. Biological treatment of waste (4B)-

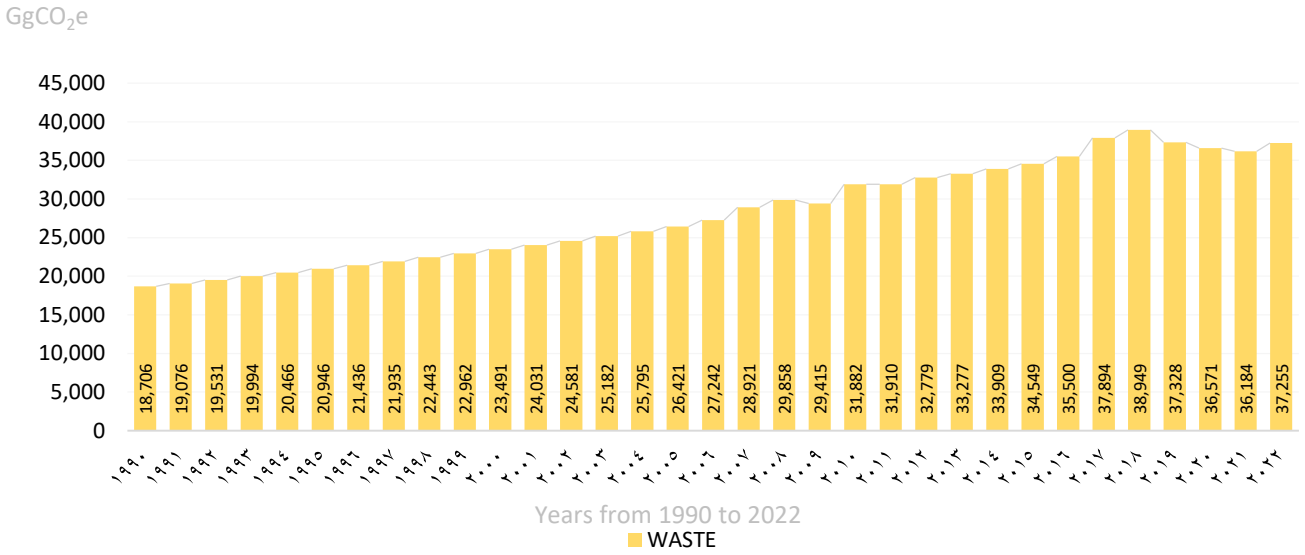
composting- emits around 1% while incineration of healthcare/clinical waste in addition to open burning of (municipal) waste (4C) contributes with 2% of emissions in the sector.

Between 2018 and 2022, the waste sector inventory trends showed a 16% increase in industrial wastewater emissions, compared to a 4% rise in domestic wastewater emissions over the same period. The estimation for industrial wastewater relies on default parameters combined with industrial production data. While the increase may reflect actual growth in local industrial production, incorporating country- or industry-specific parameters and prioritizing high-impact industries would enhance future reporting and mitigation efforts.

2.8.2 Waste Sector Emissions Trends

Sector Overall Emissions

The trend below reveals a steady increase in greenhouse gas emissions from the waste sector between 1990 and 2022. Starting at 18,706 Gg CO_2e in 1990, emissions rose consistently through the 1990s and early 2000s, reaching 37,255 Gg CO_2e in 2022, representing a 99% increase from 1990 levels.



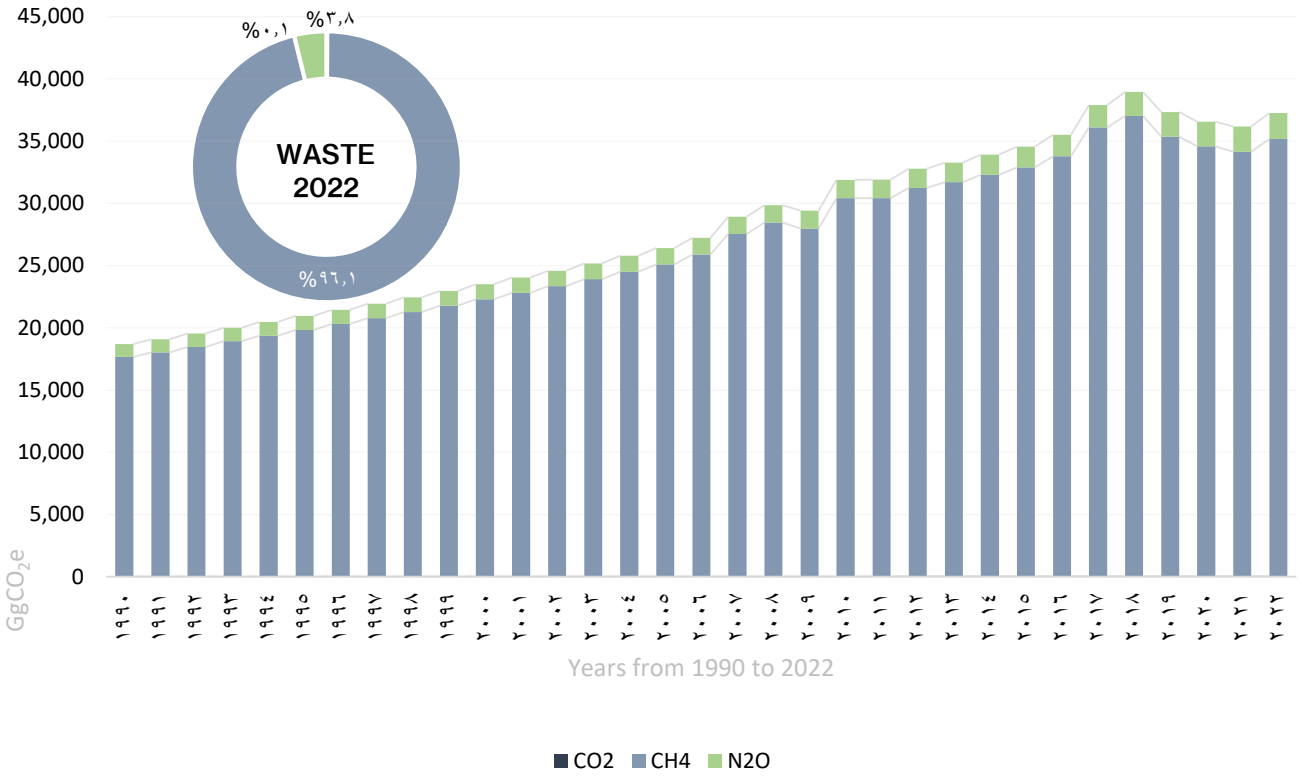
Sector	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
Waste	18,706	23,491	26,421	34,549	35,500	37,894	37,894	37,328	36,571	36,184	37,255

Figure 33: GHG Emissions from Waste Sector over the period 1990 - 2022 (GgCO$_2$e)

Sector Emissions per Gas

The ratio of the three primary greenhouse gases—CO_2, CH_4, and N_2O—remained relatively consistent over the years. On average, CH_4 accounted for **94.8%**, N_2O for **5.07%**, and CO_2 for **0.13%** of the total emissions in the waste sector. Methane (CH_4) continued to dominate, representing **94%** of total emissions, with a contribution of **35,126.042 Gg CO_2e** in 2022. This was followed by nitrous oxide (N_2O) at **5.5%** (2,071 Gg CO_2e), while carbon dioxide

(CO_2) made up only **0.2%** of the sector's emissions in the same year. These proportions highlight the significant role of methane in the sector's emissions profile



Emissions by Gas ($GgCO_2e$)	1990	2000	2005	2015	2016	2017	2018	2019	2020	2021	2022
CO_2	24.9	28.9	31.6	49.8	52.3	54.1	47.9	49.9	57.3	60.1	56.7
CH_4	17,645.8	22,260.0	25,073.8	32,839.1	33,745.5	36,041.5	36,976.9	35,317.3	34,517.0	34,093.1	35,126.0
N_2O	1,035.1	1,202.3	1,315.4	1,660.0	1,702.0	1,797.9	1,924.1	1,960.5	1,996.9	2,030.9	2,071.9
Total (Gg CO_2e)	**18,706**	**23,491**	**26,421**	**34,549**	**35,500**	**37,894**	**37,894**	**37,328**	**36,571**	**36,184**	**37,255**

Figure 34: GHG Emissions from Waste Sector by gas over the period 1990 - 2022 (GgCO2e)

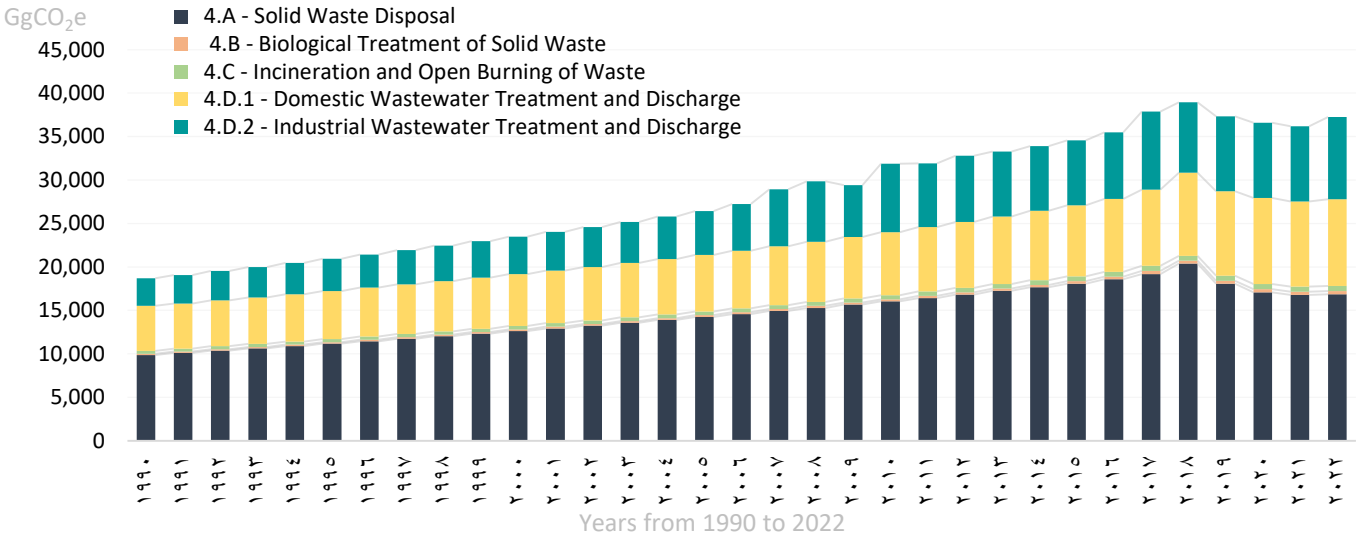
Sector Emissions per Category

Between 1990 and 2022, GHG emissions from the Waste sector categories experienced a growth across all subcategories. **Solid Waste Disposal (4.A)** remained the largest contributor, with emissions increasing by approximately **71%**, from **9,858.12 $GgCO_2e$ in 1990** to **16,852.03 $GgCO_2e$ in 2022**, making it a key driver of the sector's overall trend. Similarly, **Domestic Wastewater Treatment and Discharge (4.D.1)** saw a **93% increase** in emissions, from

5,169.19 $GgCO_2e$ in 1990 to **9,953.73 $GgCO_2e$ in 2022**. Other categories also exhibited notable growth:

- Industrial Wastewater Treatment and Discharge (4.D.2) recorded the most significant increase, with emissions rising by 197%, from 3,188.42 Gg CO_2e in 1990 to 9,473.22 Gg CO_2e in 2022.
- Emissions from Incineration and Open Burning of Waste (4.C) grew by 76%, increasing from 341.89 Gg CO_2e in 1990 to 600.92 Gg CO_2e in 2022.
- The Biological Treatment of Solid Waste (4.B), which represents the smallest share of emissions, saw an increase from 148.15 Gg CO_2e in 1990 to 374.70 Gg CO_2e in 2022.

Between 2018 and 2022, emissions from solid waste disposal dropped from 52 to 45% of overall waste sector emissions between 2018 and 2022. This was countered by an increase in the contribution of industrial wastewater emissions from 20 to 25% of overall waste sector emissions, which led to an overall decrease in 2022 emissions by only about 4% as compared with 2018. The total sector emissions from domestic wastewater, composting, and incineration of clinical waste exhibited stable trends with minor decreases over the same period.



Emissions per Cat. ($GgCO_2e$)	1990	2000	2005	2015	2018	2022
4.A – Solid waste disposal	9,858.12	12,619.23	14,231.18	18,064.81	20,395.96	16,852.03
4.B - Biological Treatment of Solid Waste	148.15	190.83	216.59	281.51	319.04	374.70
4.C - Incineration and Open Burning of Waste	341.89	394.55	430.63	552.43	568.74	600.92
4.D.1 - Domestic Wastewater Treatment and Discharge	5,169.19	5,962.76	6,506.66	8,192.43	9,550.07	9,953.73
4.D.2 - Industrial Wastewater Treatment and Discharge	3,188.42	4,323.73	5,035.72	7,457.74	8,115.15	9,473.22
Total ($GgCO_2e$)	**18,705.78**	**23,491.11**	**26,420.77**	**34,548.91**	**38,948.96**	**37,254.60**

Figure 35: GHG Emissions from Waste Sector by source category over the period 1990 - 2022 (Gg CO2e)

2.8.3 Methodology (Methods, Activity Data, and Emission Factors)

With the exception of solid waste disposal, tier 1 methodologies were used for calculation of GHG emissions from waste sector categories. Tier 2 was used for solid waste disposal as good quality country-specific activity data on current and historical waste disposal was available. The table below presents the details of the methodologies used for each source category.

Table 19: Methodological tiers for waste sector categories

Category	Tier Method Description	Tier used
Solid Waste Disposal Sites	**Tier 1:** The estimations of the Tier 1 methods are based on the IPCC FOD method using mainly default activity data and default parameters. **Tier 2:** Tier 2 methods use the IPCC FOD method and some default parameters but require good quality country-specific activity data on current and historical waste disposal at SWDS.	Tier 2 Reasonably good country-specific current and historical data is available
Biological Treatment of Solid Waste	**Tier 1:** Tier 1 uses the IPCC default emission factors. **Tier 2:** Country-specific emission factors based on representative measurements are used for Tier 2. **Tier 3:** Tier 3 methods would be based on facility or site-specific measurements (on-line or periodic).	Tier 1 Sufficiently reliable and available country-specific emission factors are not available
Incineration and Open Burning of Waste	The **Tier 1** method is a simple method used when CO2 emissions from incineration/open burning are not a key category. Data on the amount of waste incinerated/open-burned are necessary. The **Tier 2** method is based on country-specific data regarding waste generation, composition and management practices.	Tier 1 National data on waste generated and waste fractions are available.
Wastewater Treatment and Discharge	The **Tier 1** method applies default values for the emission factor and activity parameters. This method is considered good practice for countries with limited data. The **Tier 2** method follows the same method as Tier 1 but allows for incorporation of a country specific emission factor and country specific activity data. For a country with good data and advanced methodologies, a country specific method could be applied as a **Tier 3** method.	Tier 1 Country specific emission factors are not available.

Due to the cross-cutting nature of the sub-sectors considered as per the 2006 IPCC GHGI guidelines, a number of entities were engaged using tailored questionnaires for data collection and parameter/assumption consultation:

- Central Agency for Public Mobilization and Statistics
- Egyptian Environmental Affairs Agency
- Waste Management Regulatory Authority
- Select solid waste management facilities
- Holding company for Water and Wastewater
- Ministry of Electricity and Renewable Energy
- Ministry of Health and Population
- Ministry of Petroleum and Mineral Resources

Parameters and assumptions used for preparation of the waste sector GHGI year 2015 in Egypt's first BUR and the fourth national communication were reused for the GHGI in this BTR1. Default emission factors as provided by the 2006 IPCC GHGI guidelines/software were used.

Activity Data

Sources of activity data used for the preparation of the GHGI inventory sector include:

- Waste management regulatory Authority
- CAPMAS (National Statistics Authority)
- Egyptian Environmental Affairs Agency

Emission Factors

Applicable default emission factors were used in all waste sector categories as defined by the 2006 IPCC GHGI guidelines and built into the 2006 IPCC software.

2.8.4 Recalculations

The only recalculation to be reported for the Waste sector inventory is the use of AR5 global warming potentials (GWP) replacing the previously used (BUR1 and NC4) AR2 GWPs. As methane (GWP 21 in AR2 compared to GWP 28 in AR5) constitutes more than 90% of waste sector emissions, the recalculation using AR5 GWPs lead to a significant increase in estimated waste sector emissions throughout the time series. This, for instance in 2017, increased estimated emissions from 29,288 $GgCO_2e$ to around 37,894 $GgCO_2e$.

2.9 Improvements in reporting over time

Through the process of data collection and GHG emission calculations for the national GHGI, several challenges were identified that could be addressed to improve the overall quality of the GHG inventory. Based on the stakeholder engagement with various entities involved throughout the preparation of the GHGI, the following challenges are identified as follows:

- No systematic procedure, nor standard formats for getting data and information from the governmental authorities;
- Absence of GHGI data and MRV capacity in key entities
- Lack of awareness regarding the importance of data and information;
- Compatibility issues with regards to the units and Fiscal years vs Calander years, between data available/published and data required;
- Unavailability of data for some source categories
- Reliance on default emission factors for all categories

Recommended improvement actions

The Central Agency for Public Mobilization and Statistics (CAPMAS) shall remain the primary entity for collecting nationally aggregated data for estimating GHG emissions from all sectors. Data shall be collected using questionnaires that are disseminated directly to all sector classification, both in the public and private sector. In order to improve the quality of the current inventory process, the following areas for improvements are proposed:

Data collection strategy

- A strategy needs to be developed based on the following:
    - Identification and prioritization of the all the challenges faced during the compilation of the current inventory as well as precious ones.
    - Identification of priority areas for collection/measurement of key activity data/parameters.
    - Defining the data gaps and consequently the type and sources of additional data and categories needed for utilizing Tiers 2 and 3 of the 2006 IPCC Guidelines in the future if feasible.
    - Identification of the possible roles and responsibilities of the different entities
    - Stakeholder engagement activities.
    - Budgeting and allocation of human and financial resources.

Data collection system

Another important improvement identified is the development of standard operating procedures for data collection.in addition to a centralized data management system/platform with coordination structurebetween relevant stakeholders. Enhancing the role of CAPMAS and strengthening them as the primary entity for collecting aggregated national data across all sectors would provide a unified process for estimating GHG emissions. This centralized approach would improve consistency, transparency, and efficiency in the data collection process, ensuring a more comprehensive and coordinated GHG inventory system in the future. Proposed actions would encompass the following:

- Preparing user-friendly data collection forms using national and sectoral terminology and definitions.
- Automating the data collection process and/or integrating the required data into the existing CAPMAS data collection systems (i.e. forms and surveys).
- Establishing the necessary databases and systems within EEAA's CCCD for GHGI development, analysis, reporting, verification and updating in cooperation and collaboration with the concerned ministries and authorities.
- Establishing the appropriate legal framework and issuing the necessary legislation to oblige the various concerned entities and organizations to collect GHGI data for the energy sector.

Training and capacity building

- Consolidate and enhance where possible, the existing capacity building and training program for strengthening the existing institutional set up for the development of GHGI, targeting responsible staff within the concerned entities on effective approaches and methodologies for the data collection and preparation of GHGI.
- Strengthening the existing institutional set up for the development of GHGI, including capacity building.

Emission factors

- Conducting more detailed studies for estimating country-specific emission factors for the various sectors, as well as heating values for some fuels. This should involve the governmental, academic institutes and scientific research centers in the measurement and documentation processes.
- To complement the above action, means of encouragement and incentives should be provided to governmental, academic institutes and scientific research centers.

Chapter 3: Information Necessary to track Progress Made in the Implementation and Fulfillment of Nationally Determined Contributions under Article 4 of the Paris Agreement

3.1 National Circumstances and Institutional Arrangements

As outlined by the MPGs paragraphs 59-62, each Party shall describe its national circumstances relevant to progress made in implementing and achieving its NDC under Article 4 of the Paris Agreement, including: government structure, population profile, geographical profile, economic profile, climate profile, sector-specific details, the impact of national circumstances on GHG emissions over time, and institutional arrangements for monitoring progress in implementing and achieving the NDC under Article 4.

These requirements are comprehensively addressed in Chapter 1 of this report, under subsections: *1.1 Geophysical Characteristics, 1.2 Climate Profile, 1.3 Socioeconomic Profile, 1.4 Key Mitigation Sectors, 1.5 Effect of National Circumstances on GHG Emissions, and 1.8 Institutional Arrangements.*

3.2 Description of a Party's Nationally Determined Contribution under Article 4 of the Paris Agreement (including updates)

Egypt's GHG emission reduction target is a reduction of 37% in Electricity Sector, 65% in Oil & Gas Sector (associated gases), and 7 % in Transport Sector relative to the BAU emission projections by 2030. The starting year of the NDC is 2015 (reference year) till the end of year 2030. These targets were submitted to the UNFCCC on 24th June 2023, as the second update of Egypt's Nationally Determined Contribution (NDC).

Information on the description of Egypt's NDC is shown in the table below which constitutes the **CTF Appendix** *Description of a Party's nationally determined contribution under Article 4 of the Paris Agreement, including updates*, in accordance with Decision 5/CMA.3.

Table 20: Description of Egypt's NDCs (CTF Appendix)

<table>
<tr><th>Reporting requirement</th><th>Description</th></tr>
<tr><td>Target(s) and description, including target type(s), as applicable</td><td>Egypt's NDC has mitigation emission reduction target for the below three sectors relative to the deviation from BAU emission projections by 2030. The sectoral emission reduction targets as a result of implementing mitigation measures are as follows:
<table>
<tr><th rowspan="2">Sector</th><th colspan="2">Mitigation emission reductions in 2030 compared to BAU Scenario</th></tr>
<tr><th>GgCO2e</th><th>%</th></tr>
<tr><td>Electricity</td><td>80,520</td><td>37%</td></tr>
<tr><td>Oil & Gas (APG)</td><td>1,682</td><td>65%</td></tr>
<tr><td>Transport</td><td>8,960</td><td>7%</td></tr>
</table></td></tr>
<tr><td>Target year(s) or period(s), and whether they are single-year or multi-year target(s), as applicable</td><td>Egypt's NDC is a single-year target, with target year of 2030.</td></tr>
</table>

Reference point(s), level(s), baseline(s), base year(s) or starting point(s), and their respective value(s), as applicable	The reference year for Egypt's GHG emissions is 2015, which is the starting point of the projections. The reference baseline is the BAU between 2015 until 2030. The Business-as-Usual (BAU) projection end year is 2030.
Time frame(s) and/or periods for implementation, as applicable	The time frame for implementation is between 2015 – 2030. Starts on 16th November 2015 and ends on 31st December 2030.
Scope and coverage, including, as relevant, sectors, categories, activities, sources and sinks, pools and gases, as applicable	Egypt's NDC is a sectoral emission reduction target compared to the BAU projection of each of the three sectors by 2030. Key sectors covered under the quantitative targets are (1) Electricity (Power Generation, Transmission, and Distribution), (2) Oil & Gas, and (3) Transport. While policies and measures are reported for the following sectors: Industry, Buildings and Urban Cities, Tourism, and Waste. The Agriculture and Land Use sectors have not been included under the mitigation actions. The greenhouse gases covered are CO_2, CH_4, N_2O emissions converted to CO_2 equivalents multiplied by their respective global warming potential (GWP).
Intention to use cooperative approaches that involve the use of ITMOs under Article 6 towards NDCs under Article 4 of the Paris Agreement, as applicable	Egypt expresses interest for voluntary cooperation in emerging international carbon markets governed by Article 6 of the Paris Agreement.
Any updates or clarifications of previously reported information, as applicable	Not applicable.

3.3 Information Necessary to Track Progress made in Implementing and Achieving Nationally Determined Contributions Under Article 4 of the Paris Agreement

Egypt has made notable advancements towards its Nationally Determined Contributions (NDC) across multiple sectors. In the **electricity sector**, renewable energy integration and rolling out of energy efficiency across the value chain are progressing. The **oil and gas sector** has implemented associated gas recovery projects, contributing to emissions reductions and energy efficiency improvements. Similarly, the **transport sector** is expanding sustainable public transport systems, including electric railways and bus systems using lower-carbon fuels.

3.3.1 Selected Indicators

Table below presents the selected indicators for the Electricity, Oil and Gas (Associated Gases subsector), and Transport sectors with quantitative targets in Egypt's NDC.

Table 21: Selected Indicators

NDC Commitment	Indicators
Achieving 37% reduction in GHG emissions from the electricity sector (generation, transmission, and distribution) by 2030.	Indicator 1: Mitigation GHG Emission Levels for Electricity Generation, Transmission, and Distribution
Recover and utilize associated gases from crude oil fields through 17 implemented projects and 36 additional planned projects by 2030 with 65% reduction of GHG emissions by 2030.	Indicator 2: Mitigation GHG Emission Levels for Oil and Gas (Associated Gases Subsector)
Achieving 7% reduction in GHG emissions from the transport sector by 2030.	Indicator 3: Mitigation GHG Emission Levels for Transport Sector

3.3.2 Description of Progress by Sector

3.3.2.1 Electricity Sector

According to the Egypt's Second Updated NDC, the GHG reduction in the Electricity Sector is as shown in Table below.

Table 22: GHG Emission Reductions in the Electricity Sector

Baseline GHG Emissions in 2015 =	**87,694 $GgCO_{2e}$**
BAU GHG Emissions by 2030 =	**214,740 $GgCO_{2e}$**
Mitigation Target by 2030 =	**80,520 $GgCO_{2e}$**
GHG reduction % compared to BAU in 2030 =	**37%**

NDC Commitment: Achieve 37% GHG emissions reduction compared to the BAU from the electricity sector (generation, transmission, and distribution) by 2030.

- **Description:** This quantitative target in the NDC aims to lower significantly the overall GHG emissions generated from the electricity sector. This includes emissions across the electricity value chain, starting from electricity generation, which currently relies largely on fossil fuels, then transmission network that transfer the high-voltage electricity over long distances, and finally distribution of electricity through local networks, and its consumption by end users.

  Indicator 1: Mitigation GHG Emission Levels for Electricity Sector. The GHG Emission Reductions are expressed as a result of implementing mitigation measures in the Electricity Generation, Transmission, and Distribution sector reflected under the Mitigation GHG Emissions levels in the reporting period between 2015 till end of 2022. It is compared to the BAU emission levels of the Electricity Generation, Transmission, and Distribution sector.

- **Type of Indicator:** quantitative including GHG calculations.

- **Progress Summary (2015 - 2022):**

Egypt has achieved remarkable success in transitioning to low carbon pathway in the electricity sector (generation, transmission, and distribution) with a substantial GHG emission reduction of **47,810 GgCO2e in 2022**, with a **decrease of 34.34% in emissions** compared to BAU levels for that same year. Egypt's electricity sector is advancing steadily towards the **2030 target of 37%** overall GHG emission reduction.

Table 23: GHG Emissions Reduction Compared to BAU in Electricity Sector (CTF Table 4)

Year	2015	2016	2017	2018	2019	2020	2021	2022	Target by 2030
BAU GHG Emissions Levels for Electricity Sector ($GgCO_2e$)	87,694	97,291.62	97,317.41	99,342.26	103,479.11	113,414.67	125,853.49	139,213.87	**214,740**
Indicator 1: Mitigation GHG Emission Levels for Electricity Sector ($GgCO_2e$)[6]	89,510.52	88,885.34	91,863.12	94,204.76	87,629.62	81,623.72	86,837.94	91,403.40	**134,220**
GHG Emission Reduction % compared to BAU for Electricity Sector	-2.07%	8.64%	5.60%	5.17%	15.32%	28.03%	31.%	34.34%	**37%**

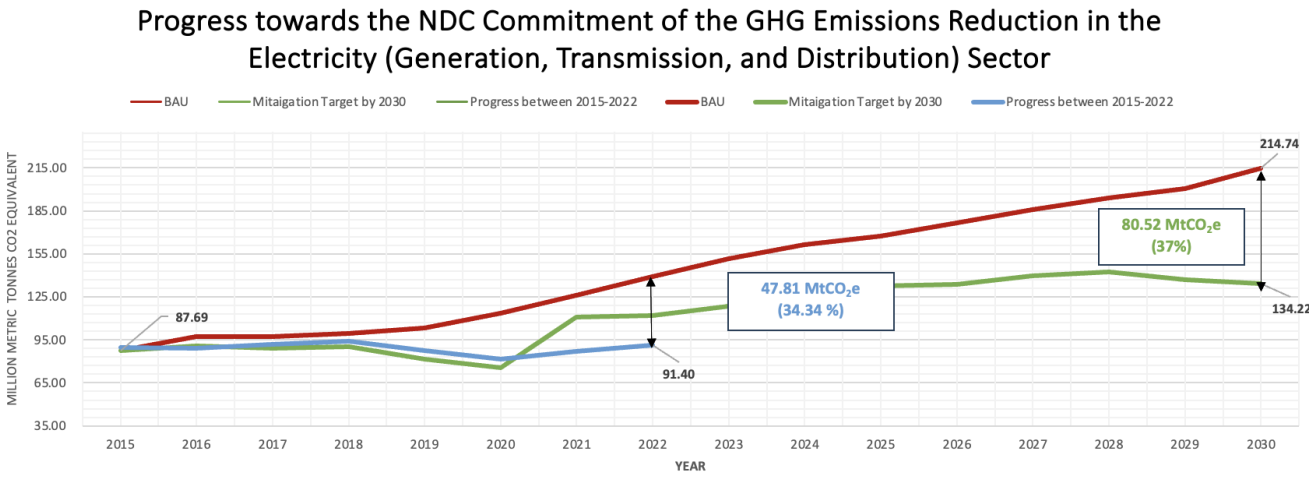


Figure 36: Progress towards the NDC Commitment of GHG Emissions Reduction in the Electricity Sector (including Generation, Transmission, and Distribution)

This outstanding achievement is primarily due to the adoption of energy-efficient technologies on both supply and demand sides, extensive fossil fuel subsidy removal program, expansion in natural gas as a fuel for power generation (i.e. decreasing share of LFO and HFO), conversion of simple cycle gas turbines to combined cycle power plants, scale-up of energy efficient lighting, abandoning plans to include coal in power generation mix, and increase of renewable energy generation within its power generation mix. It comes as a result of several comprehensive reforms in the energy sector aimed at promoting sustainability and enhancing efficiency. This has been supported by

[6] Indicator is based on Egypt's national inventory for electricity generation subcategory for reported years 2015 – 2022, including any recalculations.

adopting legislations and strategies, such as Electricity Law 87/2015 and the launch of national strategies, primarily Egypt's Integrated Sustainable Energy Strategy (ISES) 2035 and Second National Energy Efficiency Action Plan (NEEAP II, 2018/2019 – 2021/2022).

As a result, these measures have significantly reduced fuel consumption for electricity generation and overall electricity consumption. This progress has been achieved despite a growing population and the expansion of development projects, underscoring Egypt's dedication to advancing a more sustainable energy future.

3.3.2.2 Oil and Gas Sector

According to the Egypt's Second Updated NDC, the GHG reduction in the Oil and Gas (Associated Gases Subsector) is as shown in Table below.

Table 24: GHG Emission Reductions in the Oil and Gas (Associated Gases Subsector)

Baseline GHG Emissions in 2015 =	**2,137 Gg CO_2e**
BAU GHG Emissions by 2030 =	**2,575 Gg CO_2e**
Mitigation Target by 2030 =	**1,682 Gg CO_2e**
GHG reduction % compared to BAU in 2030 =	**65%**

NDC Commitment: Recovery and utilization of associated gases generated from the crude oil fields with 65 % GHG emission reduction by 2030.

- **Description:** This quantitative target in the NDC focuses on the recovery and utilization of associated gases produced from crude oil fields. The programme is part of an ongoing initiative that has already implemented 17 projects, with an additional 36 projects planned through 2030. The goal is to redirect associated gases which would typically be flared and wasted, to inject into natural gas pipeline; on-site electricity generation; or alternatively to gas processing facilities for the production of LPG (liquefied petroleum gas), natural gas, and condensates. This approach aims to significantly reduce GHG emissions from the associated gases subsector.

- **Indicator 2: Mitigation GHG Emission Levels for Oil & Gas Sector (Associated Gases subsector).** The GHG Emission Reductions are as a result of implementing mitigation measures in the Oil & Gas Sector (under associated gases subsector) reflected under the Mitigation GHG Emissions levels in the reporting period between 2015 till end of 2022. It is compared to the BAU emission levels of the Oil & Gas Sector.

- **Type of Indicator:** quantitative including GHG calculations.
- **Progress Summary (2015 - 2022):**

Egypt has made significant progress in the recovery and utilization of associated gases produced from crude oil fields. Efforts in the oil and gas sector have resulted in a cumulative GHG emission reduction of **1,351 Gg CO2e in 2022**, with a **decrease of 57% in emissions** compared to BAU levels for that same year. The associated gases subsector of Egypt's Oil & Gas industry is on track to achieve the **2030 target of a 65%** overall GHG emission reduction, with significant progress already made.

Table 25: GHG Emissions Reduction Compared to BAU in Oil & Gas Sector (CTF Table 4)

Year	2015	2016	2017	2018	2019	2020	2021	2022	Target by 2030
BAU GHG Emissions Levels for Oil & Gas Sector ($GgCO_2e$)	2,137	2,371	2,371	2,371	2,370	2,370	2,370	2,391	**2,575**
Indicator 2: Mitigation GHG Emission Levels for Oil & Gas Sector ($GgCO_2e$)[7]	2,137	2,371	2,371	2,220	1,827	1,630	1,103	1,040	**890**
GHG Emission Reduction % compared to BAU for Oil & Gas Sector	0%	0%	0%	6%	23%	31%	53%	57%	**65%**

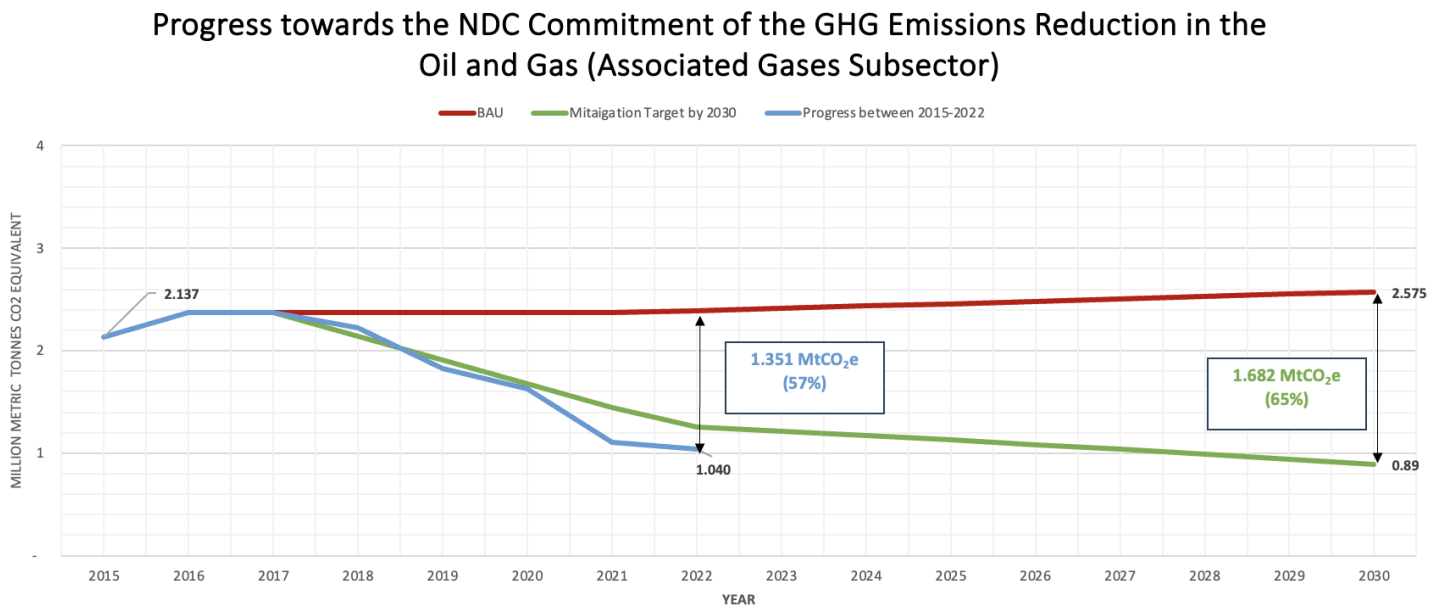


Figure 37: Progress towards the NDC Commitment of GHG Emissions Reduction in the Oil & Gas Sector (Associated Gases Subsector)

3.3.2.3 Transport Sector

[7] This indicator has been calculated in accordance with UNFCCC CDM methodology ***AM0009: Recovery and utilization of gas from oil fields that would otherwise be flared or vented --- Version 7.0***. The emissions from consumption of fossil fuels/electricity for the recovery, pre-treatment, transportation were not calculated. Furthermore, in order to adopt a conservative approach, the emissions reductions resulting from fuel savings to displace diesel by associated gases for on-site electricity generation were also excluded from the calculations.

According to the Egypt's Second Updated NDC, the GHG reduction in the transport sector is as shown in table below.

Table 26: GHG Emission Reductions in the Transport Sector

Baseline GHG Emissions in 2015 =	**48,235 Gg CO_{2e}**
BAU GHG Emissions by 2030 =	**124,360 Gg CO_{2e}**
Mitigation Target by 2030 =	**8,960 Gg CO_{2e}**
GHG reduction % compared to BAU in 2030 =	**7%**

NDC Commitment: Achieving 7% reduction in GHG emissions from the transport sector by 2030.

- **Description:** This quantitative target in the NDC aims to lower the overall GHG emissions generated from the transport sector. Since road transport is by far the largest GHGs contributor in the transport sector in Egypt, it is planned to drive low carbon modal shift from private passenger and freight vehicles into mass transit mainly through the execution of metro lines, monorail lines, light rail transit (LRT), upgrading existing tramlines, Bus Rapid Transit (BRT) lines as well as the expansion and upgrading Egypt's road and using low carbon fuel in domestic aviation. Fossil fuel subsidy removal plays a significant role in reducing consumption and in turn emissions from the sector.

- **Indicator 3: Mitigation GHG Emission Levels for Transport Sector.** The GHG Emission Reductions are as a result of implementing mitigation measures in the Transport sector reflected under the Mitigation GHG Emissions levels in the reporting period between 2015 till end of 2022. It is compared to the BAU emission levels of the Transport sector.

- **Type of Indicator:** quantitative including GHG calculations.

- **Progress Summary (2015 -2022):**

Egypt has achieved outstanding success to adopt more sustainable low carbon modes of transport with a substantial **13,200 GgCO2e in 2022** with a **decrease of 16.86% of emissions** compared to BAU levels for that same year. This has surpassed the **2030 target of 7%** overall GHG emission reduction. This positive trend was since 2015 and continued till 2022 due to multiple policy interventions, such as energy subsidy reform program, and other influencing factors that led to behavioral changes in road transport.

Table 27: GHG Emissions Reduction Compared to BAU in Transport Sector (CTF Table 4)

Year	2015	2016	2017	2018	2019	2020	2021	2022	Target by 2030
BAU GHG Emissions Levels for Transport Sector ($GgCO_2e$)	48,235.00	54,000.33	56,338.77	62,091.10	65,790.97	69,709.51	73,862.69	78,264.22	**124,360**
Indicator 3: Mitigation GHG Emission Levels for Transport Sector ($GgCO_2e$)[8]	49,393.50	53,016.87	51,819.50	53,416.43	49,585.71	50,977.34	57,068.63	65,068.11	**115,400**
GHG Emission Reduction % compared to BAU for Transport Sector	-2.40%	1.82%	8.02%	13.97%	24.63%	26.87%	22.74%	16.86%	**7%**

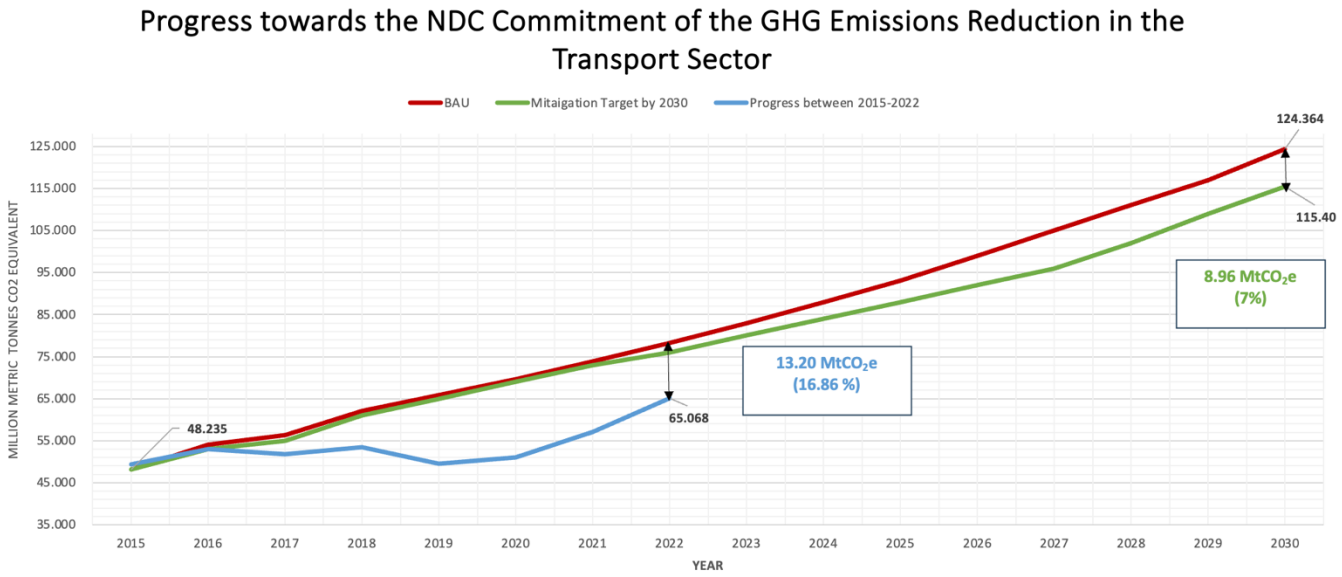


Figure 38: Progress towards the NDC Commitment of GHG Emissions Reduction in the Transport Sector

Since 2016, the government has implemented fuel price increases by phasing out energy subsidies. Additionally, regulations have been introduced to phase out older vehicles by imposing age restrictions on transport and passenger cars. A major step in improving public transit in Cairo was the opening of the third metro line. According to a 2019 World Bank study, long-term fluctuations in real GDP have influenced traffic patterns through reduced fuel consumption, new car purchases, maintenance intensity, and the retirement of older,

[8] Indicator is based on Egypt's national inventory for road transport subcategory for reported years 2015 – 2022, including any recalculations.

fuel-inefficient vehicles. The new metro line led to a reduction of 40 cars per tile, while fuel subsidy cuts removed 44 cars per tile. These policy measures have effectively offset the traffic congestion and air pollution removing 3 cars for every 2 cars added due to a growing economy.

Since there is no quantitative targets for the remaining mitigation sectors, the relevant policies and measures implemented are reported under section 3.5 and CTF Table 5.

3.4 Methodologies and accounting approaches for tracking progress toward implementing and achieving the NDC

Egypt's NDC has been accounted for based on net GHG emissions and removals in 2030 and the accounting approaches are aligned to the GHG National Inventory. Egypt's national greenhouse gas (GHG) inventory follows the methodologies set out in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, incorporating updates from the *2019 Refinement* to enhance precision and reliability. These guidelines use a tiered approach to estimate emissions and removals, with each tier reflecting a different level of complexity and data specificity. While Tier 1 is the foundation of Egypt's inventory, the country is beginning to adopt Tier 2 approaches where feasible, aiming for greater accuracy and alignment with international standards under the Paris Agreement. Egypt's national GHG inventory uses the GWP values from the *IPCC Fifth Assessment Report (AR5)*, which ensures consistency with international reporting standards.

Furthermore, Egypt has not participated yet in cooperative approaches that involve the use of ITMOs. Egypt plans to report in the future accounting methodologies accordingly when this occurs in the future. As such, Egypt's NDC accounting is consistent with Article 4, paragraphs 13 and 14. Egypt also takes into account, where appropriate, existing methods and guidance under the Convention. Details of the methodologies and accounting approaches to be used to track progress in implementing and achieving the NDC are provided in the table below.

Table 28: Methodology and Accounting Approaches in NDC Progress Tracking (CTF Table 3)

Reporting requirement	Description or reference to the relevant section of the BTR
For the first NDC under Article 4:[a]	
Accounting approach, including how it is consistent with Article 4, paragraphs 13–14, of the Paris Agreement (para. 71 of the MPGs)	For its first NDC, Egypt accounted for its anthropogenic GHG emissions and removals using the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, incorporating updates from the 2019 Refinement to enhance precision and reliability. While Tier 1 is the foundation of Egypt's inventory, the country is beginning to adopt Tier 2 approaches where feasible, aiming for greater accuracy and alignment with international standards under the Paris Agreement. Egypt's national GHG inventory uses the GWP values from the IPCC Fifth Assessment Report (AR5), which ensures consistency with international reporting standards. Egypt's NDC accounting is consistent with Article 4, paragraphs 13 and 14. Egypt also takes into account, where appropriate, existing methods and guidance under the Convention.
For the second and subsequent NDC under Article 4, and optionally for the first NDC under Article 4:[b]	
Information on how the accounting approach used is consistent with paragraphs 13–17 and annex II of decision 4/CMA.1 (para. 72 of the MPGs)	To be reported for second and subsequent NDC under Article 4.
Explain how the accounting for anthropogenic emissions and removals is in accordance with methodologies and common metrics assessed by the IPCC and in accordance with decision 18/CMA.1 (para. 1(a) of annex II to decision 4/CMA.1)	To be reported for second and subsequent NDC under Article 4.
Explain how consistency has been maintained between any GHG data and estimation methodologies used for accounting and the Party's GHG inventory, pursuant to Article 13, paragraph 7(a), of the Paris Agreement, if applicable (para. 2(b) of annex II to decision 4/CMA.1)	To be reported for second and subsequent NDC under Article 4.
Explain how overestimation or underestimation has been avoided for any projected emissions and removals used for accounting (para. 2(c) of annex II to decision 4/CMA.1)	To be reported for second and subsequent NDC under Article 4.
For each NDC under Article 4:[b]	
Accounting for anthropogenic emissions and removals in accordance with methodologies and common metrics assessed by the IPCC and adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement:	
Each methodology and/or accounting approach used to assess the implementation and achievement of the target(s), as applicable (para. 74(a) of the MPGs)	Egypt assessed the implementation and achievement of its NDC targets by accounting for its anthropogenic GHG emissions and removals using the 2006 IPCC Guidelines. For the Oil & Gas (associated gases subsector) the mitigation emission reduction were calculated in accordance to UNFCCC CDM methodology AM0009.
Each methodology and/or accounting approach used for the construction of any baseline, to the extent possible (para. 74(b) of the MPGs)	Data used in quantifying the baseline GHG emissions of the reference year 2015 is based on Egypt's GHG Inventory submitted to the UNFCCC in 2019 under the First BUR. The modelling of the 2030 projections (BAU and target reductions) was based on analysis for Egypt's Low Emission Development Strategy (LEDS) utilizing the LEAP software.
If the methodology or accounting approach used for the indicator(s) in table 1 differ from those used to assess the implementation and achievement the target, describe each methodology or accounting approach used to generate the information generated for each indicator in table 4 (para. 74(c) of the MPGs)	Not applicable. The accounting approach for the indicator does not differ from the accounting approach used to assess the implementation and achievement of Egypt's NDC target.
Any conditions and assumptions relevant to the achievement of the NDC under Article 4, as applicable and available (para. 75(i) of the MPGs)	The achievement of Egypt's NDC is conditional on the provision of adequate, appropriate international finance through highly concessional finance and grants as appropriate. The Egyptian national efforts alone will not be sufficient to fulfill the country's aspirations described in this updated NDC to contribute to the international climate change GHGs reduction targets. Therefore, Article 9 of the Paris Agreement, which states that developed parties shall provide support to developing countries, should be enacted.
Key parameters, assumptions, definitions, data sources and models used, as applicable and available (para. 75(a) of the MPGs)	As Egypt's NDC is based on net GHG emissions and removals in 2030, the accounting approach is aligned with the methodologies in Egypt's GHG National Inventory. Any key parameters, assumptions, definitions,

Reporting requirement	Description or reference to the relevant section of the BTR
	data sources and models used within our GHG National Inventory would also be used to account for Egypt's NDC targets.
IPCC Guidelines used, as applicable and available (para. 75(b) of the MPGs)	Egypt accounted for its anthropogenic GHG emissions and removals using the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, incorporating updates from the 2019 Refinement.
Report the metrics used, as applicable and available (para. 75(c) of the MPGs)	Egypt's emissions for CO_2, CH_4, and N_2O emissions will be derived using the 2006 IPCC Guidelines, via the Sectoral approach, and reported as well as CO_2 equivalents multiplied by their respective global warming potential (GWP). The Tier 1 methodology will be used for most emissions estimates. Tier 2 methodology will be used, where relevant and depending on availability of data. The aggregation of GHG emissions and removals will be reported using the 100-year time- horizon GWP values from the IPCC Fifth Assessment Report.
For Parties whose NDC cannot be accounted for using methodologies covered by IPCC guidelines, provide information on their own methodology used, including for NDCs, pursuant to Article 4, paragraph 6, of the Paris Agreement, if applicable (para. 1(b) of annex II to decision 4/CMA.1)	Not applicable. Egypt's NDC will be accounted for using IPCC guidelines.
Provide information on methodologies used to track progress arising from the implementation of policies and measures, as appropriate (para. 1(d) of annex II to decision 4/CMA.1)	Not applicable. Egypt did not select to use accounting approaches in annex II to decision 4/CMA.1.
Where applicable to its NDC, any sector-, category or activity-specific assumptions, methodologies and approaches consistent with IPCC guidance, taking into account any relevant decision under the Convention, as applicable (para. 75(d) of the MPGs):	
For Parties that address emissions and subsequent removals from natural disturbances on managed lands, provide detailed information on the approach used and how it is consistent with relevant IPCC guidance, as appropriate, or indicate the relevant section of the national GHG inventory report containing that information (para. 1(e) of annex II to decision 4/CMA.1, para. 75(d)(i) of the MPGs)	Not applicable. Egypt's NDC did not include GHG emissions and removals from natural disturbances.
For Parties that account for emissions and removals from harvested wood products, provide detailed information on which IPCC approach has been used to estimate emissions and removals (para. 1(f) of annex II to decision 4/CMA.1, para. 75(d)(ii) of the MPGs)	Not applicable. Egypt at present has no GHG emissions and removals from harvested wood products.
For Parties that address the effects of age-class structure in forests, provide detailed information on the approach used and how this is consistent with relevant IPCC guidance, as appropriate (para. 1(g) of annex II to decision 4/CMA.1, para. 75(d)(iii) of the MPGs)	Not applicable.
How the Party has drawn on existing methods and guidance established under the Convention and its related legal instruments, as appropriate, if applicable (para. 1(c) of annex II to decision 4/CMA.1)	Not applicable.
Any methodologies used to account for mitigation benefits of adaptation actions and/or economic diversification plans (para. 75(e) of the MPGs)	Not applicable. Egypt's NDC did not account for mitigation benefits of adaptation actions and/or economic diversification plans.
Describe how double counting of net GHG emission reductions has been avoided, including in accordance with guidance developed related to Article 6 if relevant (para. 76(d) of the MPGs)	Egypt has not participated yet in cooperative approaches that involve the use of internationally transferred mitigation outcomes (ITMOs) under Article 6. When this occurs, it will be reported accordingly.
Any other methodologies related to the NDC under Article 4 (para. 75(h) of the MPGs)	Not applicable.
Ensuring methodological consistency, including on:	

Reporting requirement	Description or reference to the relevant section of the BTR
Explain how consistency has been maintained in scope and coverage, definitions, data sources, metrics, assumptions and methodological approaches including on baselines, between the communication and implementation of NDCs (para. 2(a) of annex II to decision 4/CMA.1)	Not applicable. Egypt did not select to use accounting approaches in annex II to decision 4/CMA.1.
Explain how consistency has been maintained between any GHG data and estimation methodologies used for accounting and the Party's GHG inventory, pursuant to Article 13, paragraph 7(a), of the Paris Agreement, if applicable (para. 2(b) of annex II to decision 4/CMA.1) and explain methodological inconsistencies with the Party's most recent national inventory report, if applicable (para. 76(c) of the MPGs)	As Egypt's NDC is based on net GHG emissions and removals in 2030, the methodologies used for accounting will be equivalent to, and therefore consistent with, the methodologies in Egypt's GHG National Inventory.
For Parties that apply technical changes to update reference points, reference levels or projections, the changes should reflect either of the following (para. 2(d) of annex II to decision 4/CMA.1):	
Explain how any methodological changes and technical updates made during the implementation of their NDC were transparently reported (para. 2(e) of annex II to decision 4/CMA.1)	Not applicable. Egypt did not select to use accounting approaches in annex II to decision 4/CMA.1.
Striving to include all categories of anthropogenic emissions or removals in the NDC and, once a source, sink or activity is included, continuing to include it (para. 12 (c) of decision 4/CMA.1 and para. 3 of annex II to decision 4/CMA.1):	
Explain how all categories of anthropogenic emissions and removals corresponding to their NDC were accounted for (para. 3(a) of annex II to decision 4/CMA.1)	Not applicable. Egypt did not select to use accounting approaches in annex II to decision 4/CMA.1.
Explain how Party is striving to include all categories of anthropogenic emissions and removals in its NDC, and, once a source, sink or activity is included, continue to include it (para. 3(b) of annex II to decision 4/CMA.1)	
Provide an explanation of why any categories of anthropogenic emissions or removals are excluded (para. 12 (c) of decision 4/CMA.1 and para. 4 of annex II to decision 4/CMA.1)	
Each Party that participates in cooperative approaches that involve the use of ITMOs towards an NDC under Article 4, or authorizes the use of mitigation outcomes for international mitigation purposes other than achievement of its NDC	
Provide information on any methodologies associated with any cooperative approaches that involve the use of ITMOs towards an NDC under Article 4 (para. 75(f) of the MPGs)	Egypt has not participated yet in cooperative approaches that involve the use of internationally transferred mitigation outcomes (ITMOs) under Article 6. When this occurs, it will be reported accordingly.

3.5 Mitigation Policies, and Measures, Actions, and Plans, with Co-benefits resulting from Adaptation Actions and Economic Diversification Plans

Egypt's NDC is aligned with Egypt's developmental and climate change policies, including Sustainable Development Strategy: Egypt's Vision 2030, the emerging Long Term Low Emission Development Strategy 2050 (LT-LEDS), the National Climate Change Strategy 2050 (NCCS), National Strategy for Disaster Risk Reduction 20301, and the National Strategy for Adaptation to Climate Change. In addition to sectoral strategies, such as: Integrated Sustainable Energy Strategy 2035, National Energy Efficiency Action Plan II (2018 – 2022), National Water Resources Plan (2017- 2037), Integrated Solid Waste Management Strategy, and Sustainable Agricultural Development Strategy towards 2030 (SADS 2030).

The mitigation policies and measures encompass activities within the following key sectors: electricity, oil & gas, transport, industry, buildings and urban cities, tourism, and waste. The following section provides a summary of the mitigation policies and measures that have been implemented, adopted, or planned for implementation including with co-benefits (including any relevant adaptation actions) and economic diversification plans.

The progress in several of these policies and measures indicated in the NDC will be elaborated on in the subsequent sections and CTF Table 5 in the Annex.

3.5.1 Electricity Sector

This section describes the policies and measures in the electricity sector indicated in the NDC with the progress made from 2015 till 2022.

Table 29: Mitigation Policies and Measures in Electricity Sector

Policies and Measures	Status
A] Electricity Sector	
PAM A.1: Gradual removal of electricity subsidies under national economic reform program	Adopted
PAM A.2: Installing additional renewable energy (RE) capacities to increase electricity generation contribution to be 42% of generation mix by 2030	Adopted
PAM A.3: Improve energy efficiency in electricity generation by maintaining, upgrading, and replacing obsolete power plants.	Adopted
PAM A.4: Activation of the role of electricity distribution companies in achieving energy efficiency improvements and promotion of large-scale and small-scale decentralized renewable energy systems for subscribers by implementing Egypt's Sustainable Energy Action Plans required by the Electricity Law 87/2015.	Adopted
PAM A.5: Improve and upgrade the transmission and distribution networks including extra high voltage substations, control centers, and smart grids.	Adopted

PAM A.1: Gradual removal of electricity subsidies under national economic reform program

- **Description:** The Government of Egypt launched a comprehensive energy policy reform programme that included energy subsidy phase-out and comprehensive reforms for electricity and oil & gas sectors. Prior to this programme, energy subsidies constituted 22% of total government expenditure and 6% of the country's GDP in 2012/13.[9]Between 2014 and FY2017/18, energy subsidies dropped by nearly half to 3.4 percent of Egypt's total GDP and comprised of only 0.3 percent of total GDP in FY2019/2020.[10]

- **Progress Summary (2015 – 2022):** This policy and measure (PAM) was initially a five-year plan to phase out internal subsidies in the electricity sector that was officially endorsed as per the Prime Minister's Decree No. 1257. The aim was to reflect actual production costs in electricity tariffs while safeguarding vulnerable segments of the population through targeted support. Steps were taken to implement a comprehensive five-year subsidy reform initiative, which includes annual tariff increases for most user segments on 1 July each year, that was extended due to multiple economic crises to be completed by FY2024/2025.

  By 2021/2022, significant strides had been made in reducing subsidies, with most consumer categories approaching cost-reflective electricity pricing. The government maintained its focus on improving energy efficiency and diversifying the energy mix, including solar and wind projects.

PAM A.2: Installing additional renewable energy (RE) capacities to increase electricity generation contribution to be 42% of generation mix by 2030.

- **Description:** This PAM aims to increase the share of renewable energy sources in the generation mix to 42% by 2030. Achieving this involves accelerating the expansion of on-grid renewable energy to reduce electricity generation from fossil fuel power plants, including replacing inefficient thermal power plants with renewable energy capacities.This PAM is aligned with the renewable energy sources identified in Egypt's Integrated Sustainable Energy Strategy (ISES 2035), which includes wind, solar, hydropower, and biomass. Nevertheless, Egypt is exploring additional clean energy options beyond these sources as part of its commitment to diversifying its energy portfolio and to ensure the achievement of its emission reduction target in the electricity sector.

[9] Financial Statements of the State's General Budget for FY 2017/18, Ministry of Finance, Egypt and Breisinger et al. (2019). Energy subsidy reform for growth and equity in Egypt: The approach matters. Energy Policy 129, pp 661-671.
[1] Developing Human Capital in Egypt through Energy Subsidy Reforms: A Case Study. World Bank and Baseera, April 2021.

- **Progress Summary (2015 – 2022):** Investments in renewable energy in Egypt have been encouraged by the government through multiple policy measures regulated under Renewable Energy Law and other supporting legislations. As a result, according to the annual report of Egyptian Electricity Holding Company for FY 2022/2023, the total installed capacity of wind and solar power plants reached 3,308 MW in FY 2022/2023, marking a remarkable 273% increase from FY 2015/2016, when it was just 887 MW. The total renewable energy capacity, including hydropower, reached 6,140 MW in the same period. Key renewable energy accomplishments include the launch of the Benban Solar Park (totaling 1,465 MW), Assiut Hydropower Plant (32 MW), Kom Ombo Solar PV Plant (26 MW), and Gabal El-Zeit Wind Power Plant (580 MW).

Table 30: Renewable Energy Share in Electricity Generation (Source: EEHC Annual Reports FY 2015/2016 – 2022/2023)[1]

Calendar Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Fiscal Year	***2015/2016***	***2016/2017***	***2017/2018***	***2018/2019***	***2019/2020***	***2020/2021***	***2021/2022***	***2022/2023***
Installed hydropower capacities (MW)	2,800	2,800	2,832	2,832	2,832	2,832	2,832	2,832
Installed wind and solar capacities (MW)	887	887	1,157	2,247	3,016	3,016	3,264	3,308
Total	**3,687**	**3,687**	**3,989**	**5,079**	**5,848**	**5,848**	**6,096**	**6,140**
Electricity Generated from RE Installed (GWh)	15,602.79	15,603.1	15,770.35	17,664	23,701	24,971	25,183	26,100
Total Electricity Generation (GWh)	186,320	189,550	196,760	199,843	197,357	204,794	214,220	216,252
RE Share in Electricity Generation (%)	**8.37%**	**8.23%**	**8.02%**	**8.84%**	**12.01%**	**12.19%**	**11.76%**	**12.07%**

Renewable energy accounted for 12.07% of Egypt's electricity generation in 2022, indicating slow progress toward the target of 42% by 2030. While this represents a notable increase in RE capacity and demonstrates Egypt's commitment to strengthening its renewable energy sector and meeting its NDC targets, the path forward is not without challenges. Key obstacles include financial and technological barriers, particularly the devaluation of the Egyptian Pound and availability of foreign currency, which directly impacts the initial capital costs of imported renewable energy equipment. Moreover, integrating renewable energy sources like solar and wind into the existing grid infrastructure presents challenges. Ensuring grid stability and reliability while accommodating the variability of renewable energy generation is technically demanding. Additionally, developing the required

[1] The original data from EEHC has been reported as fiscal years. It has been assumed that calendar years are equivalent to fiscal years (such as: calendar year 2015 is sourced from FY 2015/2016). Source: http://www.moee.gov.eg/english_new/report.aspx

infrastructure, such as transmission lines and storage facilities, is crucial to support renewable energy generation. However, the unavailability of sufficient finance to expand the grid to be able to accommodate the required renewable energy capacity is hindering the progress of implementation.

PAM A.3: Improve energy efficiency in electricity generation by maintaining, upgrading, and replacing obsolete power plants. This includes conversion of simple cycle gas turbines to combined cycle power plants, installation of supercritical steam units, and other measures.

- **Description:** This PAM focuses on enhancing the efficiency of electricity generation processes through regular maintenance and upgrade of current power generation facilities. Additionally, it emphasizes the need to phase out outdated and inefficient facilities to transition toward more efficient generation technologies. Such replacement with newer and cleaner technologies leads to higher energy production with reduced environmental impact and lower GHG emissions and other pollutants, ensuring that electricity is generated with minimal waste and maximum efficiency, contributing to a more sustainable energy future.

  Progress Summary (2015 – 2022): In recent years, Egypt has made a notable progress in enhancing energy efficiency within the electricity sector, a critical step towards sustainable development. The Specific Fuel Consumption Rate (SFC) refers to the amount of fossil fuel consumed by on-grid power plants for each unit of electricity generated, expressed in grams per kilowatt-hour (gm/kWh). A lower SFC Rate signifies more efficient use of fossil fuels, leading to lower greenhouse gas emissions, which is essential for mitigating climate change.

  Data from 2015 to 2022 illustrates a consistent decrease in fossil fuel consumption at power generation, highlighting the country's commitment to optimizing energy use and reducing environmental impact. In 2015/2016, energy consumption was recorded at 214.1 gm/kWh, indicating that there is room for improvement. This figure decreased to 210.2 gm/kWh in 2016/2017, signaling the start of a positive trend that continued and ultimately reached an impressive 175.26 gm/kWh in 2022/2023. This reduction represents a 17.64% decrease compared to the 2015/2016 levels.

From 2014 to 2020, 28,229 MW of new power generation capacities were added, among which 51 % (14,400 MW) came from three Mega power projects where highly efficient combined cycle power plants were introduced. In addition, simple cycle power plants were converted into combined power plants which have a capacity of 1,850 MW (Ministry of Electricity and Renewable Energy (MoERE), 2022).

This data highlights Egypt's strong dedication to optimizing energy usage, resulting in a more sustainable and efficient electricity sector that not only meets growing demand but also contributes meaningfully to broader environmental goals.

Table 31: Specific Fuel Consumption Rate of Electricity Power Plants (gm/kWh)

Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022
Fiscal Year	*2015/2016*	*2016/2017*	*2017/2018*	*2018/2019*	*2019/2020*	*2020/2021*	*2021/2022*	*2022/2023*
Specific Fuel Consumption Rate of Electricity Power Plants (gm/kWh)[1]	212.8	210.2	206.3	189.6	183.2	178.3	179.3	175.26

PAM A.4: Activation of the role of electricity distribution companies in achieving energy efficiency improvements and promotion of large-scale and small-scale decentralized renewable energy systems for subscribers by implementing Egypt's Sustainable Energy Action Plans required by the Electricity Law 87/2015.

- **Description:** Electricity distribution companies play a crucial role in enhancing energy efficiency and promoting both large and small-scale decentralized renewable energy systems for their subscribers. This involvement is facilitated through the implementation of Sustainable Energy Action Plans mandated by Electricity Law 87/2015. These plans are designed to guide distribution companies in identifying and implementing strategies that include awareness raising, energy efficiency improvements, and promotion of renewable energy with end-users.

[1] Source: EEHC Annual Reports, http://www.moee.gov.eg/english_new/report.aspx

- **Progress Summary (2015 – 2022):** National statistics indicate a significant rise in the number of clean energy generation licenses issued (i.e. renewable electricity generation and cogeneration/tri-generation), with 2018 marking a notable peak of 37 licenses granted, contributing to a total of 64 licenses overall. This trend reflects a growing adoption of clean energy initiatives and strong regulatory support for licensing in the sector over the past eight years. The overall increase signifies a substantial transformation in the licensing landscape, highlighting increased activity and investment in the clean energy market.

Table 32: Number of generation licenses issued from EgyptERA for clean electricity (Source: MoERE, 2024)[1]

Year	2015	2016	2017	2018	2019	2020	2021	2022
Number of generation licenses issued from EgyptERA for clean electricity	3	1	0	37	4	3	4	12

For the electricity savings, Egypt has launched a variety of energy efficiency initiatives mentioned in Egypt's National Energy Efficiency Action Plan (NEEAP II) that spanned over the period from 2018/2019 to 2021/2022. As highlighted in Egypt's First Energy Efficiency Report published in 2022, an assessment of the measures implemented during the NEEAP II period revealed significant progress in reducing GHG emissions which demonstrated both short-term economic feasibility and long-term sustainability. The evaluation quantified electricity saving and GHG emission reduction as listed in Table below. Collectively, these measures achieved an impressive total of 63,162,380 MWh electricity savings and 29,688,959 tCO_2 emission reduction during the period between 2018/2019 – 2021/2022.

[1] Data provided by Ministry of Electricity and Renewable Energy (MoERE) in November 2024.

Table 33: Electricity savings achieved by sectors on the demand side (Source: Egypt's First Energy Efficiency Report, 2022)

#	Measure	Description	Indicators	2018	2019	2020	2021	Total (4 years)
				2018/2019	*2019/2020*	*2020/2021*	*2021/2022*	
1	Activation of the role of Electricity Distribution Companies (EDCs)	• 3 EDCs installed Off-grid PVs (replacing diesel generators), isolated PY plants (replacing grid power), and PYs on EDCs' buildings. • EDCs installed 156,350 sets of low loss transformers.	Electricity savings (MWh/year)	789,899	789,899	789,899	789,899	**3,159,596**
			GHG emission reductions (tCO2/year)	410,811	410,811	410,811	410,811	**1,643,245**
2	Introduction of LEDs in residential and building sectors	• EDCs distributed 156 million LED lamps [14] in residential and other buildings.	Electricity savings (MWh/year)	13,831,550	13,831,550	13,831,550	13,831,550	**55,326,201**
			GHG emission reductions (tCO2/year)	6,340,599	6,340,599	6,340,599	6,340,599	**25,362,397**
3	Improving energy efficiency of public street lighting	• EEHC, together with municipalities, replaced over 4 million street luminaires with efficient ones. • NUCA introduced street lighting PV system.	Electricity savings (MWh/year)	234	573	1,841,582	2,608,339	**4,450,728**
			GHG emission reductions (tCO2/year)	134	329	1,056,658	1,496,606	**2,553,727**
4	PV Installation under FIT and net metering systems	• 26,240 MWh/year PV system was introduced under FIT scheme. • 30,224 MWh/year PV system was introduced under net metering system.	Electricity savings (MWh/year)	56,464	56,464	56,464	56,464	**225,855**
			GHG emission reductions (tCO2/year)	32,398	32,398	32,398	32,398	**129,590**

[1] Source: JCEE Project "Development of Four (4) Energy Efficiency Action Plans & Quantification of GHG Mitigation Potential of Nine (9) EE Measures Under the NEEAP II", February 2023. Re-calculation for LED lamps electricity savings estimates in Egypt's 1st Energy Efficiency Report.

PAM A.5: Improve and upgrade the transmission and distribution networks including extra high voltage substations, control centers, and smart grids.

- **Description:** This PAM aims to enhance the infrastructure and technology necessary for efficiently delivering electricity from generation sources to end users by updating both transmission and distribution (T&D) systems and improve their reliability, efficiency, and capacity to accommodate growing demand. Upgrading transmission networks also involves enhancing extra high-voltage substations, which are critical for managing large volumes of electricity over long distances while minimizing losses. Additionally, the policy highlights the importance of modern control centers, which serve as the central hub for electricity management. It also incorporates smart grid technologies, which would enhance the grid's ability to operate more adaptively and efficiently, improve demand response capabilities, and facilitates the integration of renewable energy sources, such as solar and wind energy. This modernized framework not only increases operational efficiency but also improves overall stability and resilience of the national electricity grid allowing for better integration of renewable energy sources.

- **Progress Summary (2015 – 2022):** Egypt's national electricity grid has experienced substantial improvements, particularly characterized by a notable reduction in transmission and distribution (T&D) losses.[15] In 2016, T&D losses were recorded at 17.6%, highlighting some initial operational challenges and signaling some underlying inefficiencies. This trend continued, peaking at 22.6% in 2020, reflecting serious obstacles in the grid's transmission and distribution processes. However, a positive shift occurred in the following years. In 2021, T&D losses fell to 21.2%, and improvement continued in 2022, with losses recorded at 19.4%. This significant reduction demonstrates Egypt's effective measures to enhance grid efficiency and the country's commitment to sustainable energy practices.

[1] This relates to the losses that occur in transmission of electricity between the sources of supply and points of distribution, including non-technical losses such as theft or metering inaccuracies. Implementing electricity savings on the transmission and distribution networks reduces these T&D losses and GHG emissions.

Table 34: Percentage of Transmission & Distribution Losses

Year	2015	2016	2017	2018	2019	2020	2021	2022
Percentage of T&D Losses (%)	-	17.6	17.7	21.7	22.5	22.6	21.2	19.4

The co-benefits and economic diversification from the mitigation policies and measures in the Electricity Sector are summarized in Table below.

Table 35: Co-benefits and Economic Diversification in Electricity Sector

A] Electricity Sector
Economic Diversification: Egypt is a major gas producer in the MENA region and is reliant on hydrocarbon electricity generation. In Egypt's Integrated Energy Strategy (ISES) 2035, it is planned to diversify energy sources through the expansion in renewable energy, energy efficiency, and other clean sources. This would optimize electricity, reduce electricity production costs and boost the national economy.
Co-Benefits: • Reduced local air pollution from fossil fuel combustion. • Conservation of natural resources. • Lower carbon emissions from cleaner energy sources help mitigate the effects of climate change on ecosystems and biodiversity. • Local job creation. • Lower burden on national economy and foreign currency reserves to import fuel.

3.5.2 Oil and Gas Sector

This section describes the policies and measures in the oil and gas sector indicated in the NDC with the progress made from 2015 till 2022.

Table 36: Mitigation Policies and Measures in Oil and Gas Sector

Policies and Measures	Status
B] Oil and Gas Sector	
PAM B.1: Gradual removal of petroleum products subsidies under national economic reform program.	Adopted
PAM B.2: Recover and utilize associated gases from crude oil fields through 17 implemented projects and 36 additional planned projects by 2030.	Adopted
PAM B.3: Expand natural gas pipelines to serve 180 additional villages, reaching 476,000 residents by 2030.	Adopted
PAM B.4: Implement energy efficiency measures to reduce 5% of the sector's energy consumption, with audits in two refineries, one petrochemical plant, and two upstream oil and gas facilities.	Adopted
PAM B.5: Produce 205,000 cubic meters of medium-density wood panels (MDF) annually from 250,000 tons of rice straw in Idku city.	Adopted

PAM B.1: Gradual removal of petroleum products subsidies under national economic reform program.

- **Description:** The subsidies of petroleum products constitute an essential part of total subsidies in Egypt's state budget. Petroleum products are primarily gasoline, diesel, and LPG, which have traditionally been the most heavily subsidized fuels in Egypt. The Government of Egypt implemented a phased program to remove subsidies on petroleum products as part of broader economic reform agenda, which included measures to reduce the fiscal deficit, improve resource allocation, and enhance the efficiency of energy consumption.

- **Progress Summary (2015 – 2022):** The share of total subsidies of petroleum products has been declining with reference to 80% in 2014. The government began reducing subsidies on petroleum products, resulting in periodic increases in fuel prices. The Egyptian pound was floated in November 2016, leading to a sharp depreciation of the currency and increased costs of energy imports which accelerated the need to reduce subsidies. Fuel prices were adjusted multiple times, aligning more closely with international market rates.The government introduced social protection measures, such as cash transfer programs, to mitigate the impact of higher fuel costs on low-income households. By 2019, subsidies for several petroleum products were significantly reduced, with some items sold at or near cost-recovery prices.

  The fuel pricing indexation mechanism was first implemented in June 2018 within the framework of the $12 billion IMF loan agreement. This quarterly automatic fuel pricing mechanism was introduced to link domestic fuel prices to global oil prices, exchange rates, and other cost factors. This mechanism ensured transparency and avoided abrupt price shocks, as adjustments were capped at 10% per quarter.

  Subsidies for petroleum products decreased by 46.8% in FY 2020/21 and by 34.7% in FY 2021/22 (MoP, 2023). This decline was partly attributed to the stability of exchange rates, which averaged EGP 15.78 and EGP 16.51 per US dollar during FYs 2020/21 and 2021/22, respectively. The COVID-19 pandemic briefly delayed some reforms as global oil prices dropped and economic recovery became a priority. Moreover, in FY 2022/23, subsidies for petroleum products increased significantly due to a sharp rise in global petroleum prices and currency fluctuations, highlighting the challenges of external market dependencies.

PAM B.2 Recovery and utilization of associated gases generated from the crude oil fields with 65 % GHG emission reduction by 2030.

- **Description:** This policy in the NDC focuses on the recovery and utilization of associated gases produced from crude oil fields. The programme is part of an ongoing initiative that has already implemented 17 projects, with an additional 36 projects planned through 2030. The goal is to redirect associated gases which would typically be flared and wasted, to inject into natural gas pipeline; on-site electricity generation; or alternatively to gas processing facilities for the production of LPG (liquefied petroleum gas), natural gas, and condensates. This approach aims to significantly reduce GHG emissions from the associated gases subsector.

- **Progress Summary (2015 – 2022):** Between 2018 and 2022, Egypt made significant progress in implementing gas recovery and utilization projects. Over this period, a total of 23 projects were completed, showcasing a steady and consistent effort to utilize associated petroleum gases (APG) for sustainable energy. From 2018 to 2020, four projects were completed each year, adding up to 12 projects by the end of 2020. This momentum continued with the completion of eight additional projects in 2021 and three more in 2022. These efforts underscore Egypt's commitment to reducing greenhouse gas emissions and enhancing energy sustainability.

Table 37: Number of gas recovery and utilization projects completed (Source: MoPMR, 2024[1])

Year	2015	2016	2017	2018	2019	2020	2021	2022
Number of gas recovery and utilization projects	0	0	0	4	4	4	8	3

By the end of 2022, Egypt had successfully implemented 23 projects aimed at recovering and utilizing 56.35 million standard cubic feet per day (MMSCFD) of associated petroleum gases (APG) that were previously flared at production sites. Over the five-year period from 2018 to 2022, a cumulative total of 20,569 million standard cubic feet (SCF) of associated gases were recovered in 2022. These recovered gases were repurposed for various applications, including sale as fuel, on-site electricity generation, and as a substitute for diesel in operational processes.

[1] Data provided by Ministry of Petroleum and Mineral Resources (MoPMR) in November 2024.

Table 38: Annual Volume of Associated Gases Recovered (Source: MoPMR, 2024)

Year	2015	2016	2017	2018	2019	2020	2021	2022
Annual volume of associated gases recovered (million SCF/year)	0	0	0	2,409	6,023	3,030	7,902	1,205
Cumulative volume of associated gases recovered (million SCF/year)	0	0	0	2,409	8,432	11,462	19,364	20,569
Average Net Heating Value (BTU/SCF)	-	-	-	1,085	1,125	1,121	1,154	1,200

The key challenge is provision of funding for advanced measurement equipment, particularly for monitoring of flared gas, methane fugitives, fuel consumption and associated emissions. Access to advanced monitoring and verification technologies, such as real-time emissions monitoring tools, to improve data accuracy and coverage. Furthermore, there is lack of expertise in advanced measurement and monitoring techniques,

PAM B.3: Expand natural gas pipelines to serve 180 additional villages, reaching 476,000 residents by 2030.

- **Description:** This PAM considers *The Decent Life Initiative (Hayah Karima)*, launched in January 2021, that aims to enhance living standards in Egypt by expanding access to clean fuel for households, particularly in rural areas. As part of this initiative, natural gas pipelines have already been connected to 86 villages, improving the quality of life and energy access for many residents. The plan includes extending this network to an additional 180 villages, which will benefit approximately 476,000 residential units. This will help achieve the quantitative target indicated in the NDC with 65% reduction in GHG emissions by 2030 as part of the associated gases recovered will be injected in the natural gas pipelines. These villages and residential units traditionally rely on less sustainable fuel sources, such as kerosene, LPG cylinders or biomass, for cooking, heating, and other energy needs.

- **Progress Summary (2015 – 2022):**

  Under the *Hayah Karima programme*, during years 2021 and 2022, 248 villages were successfully connected to the natural gas pipeline network. This progress demonstrates accelerated efforts compared to the planned extension of 180 additional villages by 2030.

  Under the *Hayah Karima initiative*, 104,000 residential units have gained access to natural gas, significantly improving living standards, reducing dependence on traditional fuels, and promoting energy sustainability in rural areas.

PAM B.4: Implement energy efficiency measures to reduce 5% of the sector's energy consumption, with audits in two refineries, one petrochemical plant, and two upstream oil and gas facilities.

- **Description:** This PAM aims to enhance energy efficiency within Egypt's petroleum sector through cost-effective, low-investment measures, targeting a 5% reduction in the sector's overall energy consumption. The initiative includes conducting energy efficiency audits to identify energy savings opportunities at key facilities, specifically two refineries, one petrochemical plant, and two upstream oil and gas facilities. Additionally, a Voluntary Annual Target has been set for all petroleum operations to conserve energy, encouraging ongoing, sector-wide commitment to energy efficiency. By focusing on achievable, low-cost improvements, this target supports the sector in reducing operational costs and greenhouse gas emissions, aligning with Egypt's broader climate goals and commitments under its NDCs. This will assist in achieving the quantitative target in the NDC with 65% reduction in GHG emissions by 2030 as energy efficiency will result in reduced energy consumption and therefore the associated gas captured can be used to replace other consumption which would increase emission reductions.

- **Progress Summary (2015 – 2022):**

  The implementation of 266 no and low-cost energy efficiency measures marks a significant milestone in advancing energy efficiency within the sector. These initiatives achieved a 5.64% reduction in energy consumption, exceeding the NDC target of a 5% reduction through low-investment energy-saving measures in petroleum companies.

  Significant progress has been achieved in conducting energy efficiency audits within the oil and gas sector to identify opportunities for reducing energy consumption and emissions. By the end of 2022, six energy efficiency audits were completed, including one audit in 2021 and five in 2022. These audits serve as a foundational step toward improving energy performance, optimizing resource utilization, and supporting Egypt's sustainability and emissions reduction goals.

  The key challenges encountered are absence of automated QA/QC processes in data systems, which increases the risk of transcription errors and unit inconsistencies, impacting data integrity; difficulty in integrating data across various platforms and departments; and gaps in training on energy savings verification and emissions reduction calculations. Financial support is required to establish an electronic energy management system for energy-intensive consumption companies; launch of Center of Excellence for Energy Transition to promote best practices for emissions reduction technologies and energy efficiency measures; and economic incentives or funding mechanisms to support the implementation of energy efficiency projects identified through technical energy audits.

PAM B.5: Produce 205,000 cubic meters of medium-density wood panels (MDF) annually from 250,000 tons of rice straw in Idku city.

- **Description:** This PAM in the NDC aims to harness natural resources more efficiently by repurposing agricultural waste, specifically rice straw, into sustainable building materials. The plan proposes the production of Medium-Density Fiberboard (MDF) in Idku City, with an annual capacity of 205,000 cubic meters from approximately 250,000 tons of rice straw.

- **Progress Summary (2015 – 2022):** The Wood Tech Company, affiliated with the Ministry of Petroleum and Mineral Resources, has achieved a major milestone by successfully advancing its innovative project to the trial production phase. This development highlights significant progress toward achieving full operational capacity and marks a key step in the project's implementation journey. Commercial operations are scheduled to begin in December 2024, signaling the transition from trial production to full-scale industrial activity. The project aims to support sustainable resource utilization and foster industrial growth, aligning with Egypt's national economic and environmental objectives.

Other PAMS:

- Manufacture 75,000 tons of biodegradable plastic bags annually.
- Convert plastic waste into oil to produce 30,000 tons of polyethylene.
- Extract 350,000 tons of algae oil annually for biofuels and produce 100,000 tons of bioethanol annually.

These prior policies were deemed unfeasible due to technical challenges and require support to overcome these obstacles

The co-benefits and economic diversification from the mitigation policies and measures in the Oil & Gas Sector are summarized in Table below.

Table 39: Co-benefits and Economic Diversification in Oil & Gas Sector

B] Oil and Gas Sector
Economic Diversification: the oil and gas sector has been a significant contributor to Egypt's economy, accounting for around 10% of the country's Gross Domestic Product (GDP) and 40% of its exports. The sector has been a major source of government revenue, with oil and gas exports generating significant foreign exchange earnings. However, the government recognizes that the country's dependence on the oil and gas sector poses significant risks to its economic stability and sustainability. With the ongoing natural gas shortages, it is useful to explore alternative energy sources.
Co-benefits: • Recovery of associated gas recovery generates a new energy source alternative to natural gas. • Improve local air quality. • Lower burden on national economy and foreign currency reserves to import fuel. • Enhancing quality of life and supporting community development by expanding natural gas pipelines improves energy access in rural villages. • Diverting energy saved to other purposes useful to the economy. • Reduce local air pollution from fossil fuel combustion. • Enhanced energy efficiency lowers operational costs in the oil and gas sector. • Utilization of agricultural waste (rice straw) that are currently open burned and cause local air pollution. • Local job creation.

3.5.3 Transport Sector

This section describes the policies and measures in the transport sector indicated in the NDC with the progress made from 2015 till 2022.

Table 40: Mitigation Policies and Measures in Transport Sector

Policies and Measures	Status
C] Transport	
PAM C.1: The expansion in Cairo metro network.	Adopted
PAM C.2: The development of Alexandria Metro (Abu Qir – Alexandria railway line) and rehabilitation of the Raml tram line.	Adopted
PAM C.3: The operation of New Capital monorail at the length of 56.5 km (22 stations) and 6th October monorail at the length of 42 km (12 stations).	Adopted
PAM C.4: The operation of the Light Rail Transit (LRT) electric train and the operation of the rapid electric train.	Adopted
PAM C.5: The transformation of public buses to operate on lower carbon intensive fuels, efficient routes through the adoption of Bus Rapid Transit (BRT) systems. Moreover, the encouragement of use of bicycles and construction of designated lanes and other infrastructure.	Adopted
PAM C.6: Implement the National Road Project that aims to develop new roads and improve interconnections between cities and decrease commuting time and fuel consumption for road vehicles.	Adopted
PAM C.7: Greening of the civil aviation sector.	Adopted

PAM C.1: The expansion in Cairo metro network.

- **Description:** The National Authority for Tunnels (NAT) are committed to executing the expansion of Cairo metro network through the construction and operation of stage 3 of Line 3 (17.7 km); Line 4 (42 km) that extends from 6th October City, Giza, Abbassia, Nasr City, and El Rehab city; and Line 6 (35 km) that connects Maadi, Old City Centre, Shubra El Kheima. The GHG emission reductions from Cairo metro network includes the rehabilitation of existing lines 1 and 2.

- **Progress Summary (2015 – 2022):**
  Cairo Metro opened in 1987 as Line 1 from Helwan to Ramses Square with a length of 29 km. As of 2013, the metro carried nearly 4 million passengers per day and as of May 2024, the Cairo Metro has 84 stations of which 5 are transfer stations, with a total length of 106.8 km. The system currently consists of three operational lines numbered 1 to 3.

  Cairo Metro Line 3 is the newest, opening the first section in 2012. It presently operates from Rod El-Farag Corridor and Cairo University to Adly Mansour, where it connects to the Cairo Light Rail Transit. Eventually, it will be extended to Cairo International Airport. The total length of the line will be approximately 50 km, most of which are in the bored tunnel, and is implemented in four phases as shown in the table below.

  The expansion in Cairo metro network through the construction and operation of Stage 3 of Line 3 which extends over a length of 17.7 km is estimated to contribute to reduce traffic-related GHG emissions by almost 120,000 tCO_2e annually due to mainly the expected shift to public transport (mainly the new metro) from private cars, and to the reduction of conventional bus line services, and diesel buses.[17]

  Cairo Metro Line 4 (42 km) extends from Nasr City, Abbassia and Giza. The first phase, which covers a length of 19 km, 17 stations and extends from Hadaek El Ashgar to El Fustat is under construction. It is estimated that the operation of the first phase of line 4 in 2028 will reduce GHG emissions by approximately 75,886 tCO_2e annually by 2030.[18]

[1] Source: https://inclusiveinfra.gihub.org/case-studies/cairo-metro-egypt/
[1] Source: https://www2.jica.go.jp/en/evaluation/pdf/2022_EG-P43_1_s.pdf

Table 41: The Phases of Cairo Metro Line

Metro Line 3 Phases	Start of Operation	Length in km	Expected number of passengers served passenger/day
Phase 1 from Attaba station to Abbassia	February 2012	4.4km	55,000
Phase 2 to Attaba -Al Ahram Station	May 2014	7.7 km	75,000
Phase 4A from Haroun to El Shams Club	June 2019	3.7 km	125,000
Phase 4B from El Shams Club to Adly Mansour	August 2020	7.8 km	200,000
Phase 3A from Attaba station to Kit Kat station	October 2022	4.0 km	255,000
Phase 3B from Kit Kat station to Rod El-Farag Corridor station	January 2024	6.6 km	350,000
Phase 3C from Kit Kat to Cairo University	May 2024	7.1 km	350,000

PAM C.2: The development of Alexandria Metro (Abu Qir – Alexandria railway line) and rehabilitation of the Raml tram line."

- **Description:** In the city of Alexandria, it is planned to develop the Alexandria Metro (Abu Qir – Alexandria railway line) and rehabilitation of the existing Raml tram line.

- **Progress Summary (2015 – 2022):** The Raml Tram is being rehabilitated over its length of 13.2 km and 24 stations from Victoria to Raml station. As for the Abu Qir metro it extends to 21.7 km, 20 stations from Abu Qir to Misr Railway station. The Raml Tram is to be contracted 2025 and the Abu Qir metro rehabilitation started early 2024. The two projects would transport 61,000 passengers/hour/direction and 13,800 passengers/hour/direction respectively.

PAM C.3: The operation of New Capital monorail at the length of 56.5 km (22 stations) and 6th October monorail at the length of 42 km (12 stations).

- **Description:** The Cairo Monorail is a two-line monorail rapid transit system currently under construction in the Cairo region and is projected to become the longest driverless monorail system in the world when completed. The two lines will create the first public transport from the New Administrative Capital and 6th of October City to the Cairo metropolitan area.

- **Progress Summary (2015 – 2022):** The New Capital monorail at the length of 56.5 km (22 stations) and the 6th of October monorail at the length of 42 km (12 stations) are currently under construction. The New Capital Monorail should start operation on April 2025 and the 6th of October monorail by Jan 2026. The expected number of passengers to be served by the New Capital Monorail is 500,000 passengers per day and the 6th of October monorail also about 500,000 passengers per day.

PAM C.4: The operation of the Light Rail Transit (LRT) electric train and the operation of the rapid electric train.

- **Description:** The operation of the Light Rail Transit (LRT) electric train (Al Salam – 10th of Ramadan – New Capital) at the length of 103 km (19 stations). In addition, operation of the high speed electric train green line (Ain Sokhna – New Capital – Borg El Arab – Alamein – Matrouh) at the length of 660 km (22 stations). Others include the high speed electric train blue line (6th October – Luxor – Aswan) at the length of 1060 km (28 stations), the high speed electric train red line (Luxor – Qena – Safaga – Hurghada),264 km and the LRT electric train (West Port Said - Abu Qir).

- **Progress Summary (2015 – 2022):**
  The LRT system links Cairo with 10th of Ramadan City and with the New Administrative Capital. The main branch of the system serves the city of Cairo in Adly Mansour station, providing an interchange with Line 3 of the Cairo Metro. The line extends east serving the New Urban Communities of El Obour, Future City, El Shorouk, New Heliopolis and Badr City. At Badr Station, the tracks separate, with one branch turning north towards 10th of Ramadan City and another turning south towards the New Administrative Capital. The northern branch currently terminates in the Knowledge City Station, in the outskirts of 10th of Ramadan. The line will reach the center of the city via an extension of 16.5 km with three more stations.

  The New Administrative Capital branch turns south, serving the Capital International Airport before terminating at Arts and Culture City. This station will provide an interchange with the Cairo-New Administrative Capital Monorail line in the future. The branch will serve the Nativity Cathedral and the Octagon military complex with an extension over 20.4 km and four stations over all before terminating at the future New Administrative Capital high-speed rail station. And there is another extension of 5.5 km (3.4 mi) and one station until the industrial zone under study.

  As for the High-Speed Rail Network, it is comprise of 3 lines for passengers and freight with a total of about 2000 kms. Line 1 (Green Line) extends from Sokhna (Red Sea) via the New Capital, 6th October, reaching Alexandria and AlAlamein (Mediterranean Sea) over a total length of 660 km and 22 stations. Line 2 (Blue Line) extends form 6th October city to go all the way south to reach Aswan and Abu Simbel extending over a length of 1060 km and 28 stations. Line 3 (Red Line) plans to link Qena to Safaga and Hurghada (Red Sea) with a length of 264 km and 3 stations. These plan to serve 2.5 million passengers per day and 20,000 tons of freight per day.

PAM C.5: The transformation of public buses to operate on lower carbon intensive fuels (i.e. natural gas), efficient routes through the adoption of Bus Rapid Transit (BRT) systems. Moreover, the encouragement of use of bicycles and construction of designated lanes and other infrastructure.

- **Description:** The transformation of public buses to operate on lower carbon intensive fuels), efficient routes through the adoption of Bus Rapid Transit (BRT) systems. Moreover, the encouragement of the use of bicycles and construction of designated lanes and other infrastructure.

- **Progress Summary (2015 – 2022):**
  The Bus Rapid Transit (BRT) project is being implemented by the Ministry of Transport[1] , as an alternative to the fifth metro line that operates on the ring road. The BRT will also be an alternative to the microbus. A service road will be constructed to connect the microbus stops and the new bus stations. The project is being implemented in two phases, with 49 stations on the ring road. The project aims to operate 100 electric buses along the road, and they will be connected to other means of transportation, including service stop points under the ring road, in addition to other means of transportation such as the metro, trains, and SuperJet.

  The project consists of 49 stations on the ring road, including 36 stations as a first phase. The first phase included expanding the distance from the Mariouteya/Munib axis to the Alexandria Agricultural Road and the distance from the Mansourieh/Fayoum Road/Al Wahat Road intersection, with a total of 76 km. Construction of stations, infrastructure and systems is underway for the BRT project.

PAM C.6: Implement the National Road Project that aims to develop new roads and improve interconnections between cities and decrease commuting time and fuel consumption for road vehicles.

- **Description:** This PAM is related to implementation of the National Road Project that aims to develop new roads of 7,000 km length to sum up the total roads network to 30,000 km and upgrade 10,000 km of the current road infrastructure. Moreover, establish 34 new road axes on the Nile, construct 1,000 bridges and tunnels, construct paved roads within the governorates, and utilize modern asphalt recycling technologies to reduce environmental impacts. This would improve interconnections between cities and decrease commuting time and fuel consumption for road vehicles.

[1] https://www.sis.gov.eg/Story/191144/Bus-Rapid-Transit-(BRT)?lang=en-us#:~:text=The%20Bus%20Rapid%20Transit%20(BRT,and%20the%20new%20bus%20stations.

- **Progress Summary (2015 – 2022):** In August 2014, the "National Road Project" was launched with an aim to develop new roads of 7,000 km length to sum up the total roads network to 30,000 km and upgrade 10,000 km of the current road infrastructure. Moreover, establish 34 new road axes on the Nile, construct 1,000 bridges and tunnels, construct paved roads within the governorates, and utilize modern asphalt recycling technologies to reduce environmental impacts. This would improve interconnections between cities and decrease commuting time and fuel consumption for road vehicles.

PAM C.7: Greening of the civil aviation sector.

- **Description:** This PAM is related to greening of the civil aviation sector through introducing 2% biofuels to airplanes, convert passenger buses and other vehicles to operate on cleaner fuels, install PV in airports and improve energy efficiency of its facilities, and other resource efficiency measures.

- **Progress Summary (2015 – 2022):** The Ministry of Civil Aviation, The Governorate of South Sinai, Japan, and UNDP inaugurated solar panel station at the Sharm El Sheikh International Airport mid-2023 (UNDP, 2023). Moreover, the Egyptian Ministries of Environment, Civil Aviation, Trade and Industry signed a cooperation protocol to implement a solar power plant connected to the grid and chargers equipped with solar-powered display screens at the Cairo International Airport. The project was implemented in tandem with UNDP and the Global Environment Facility (GEF).

  The co-benefits and economic diversification from the mitigation policies and measures in the Transport Sector are summarized in Table below.

Table 42: Co-benefits and Economic Diversification in Transport Sector

C] Transport Sector
Economic Diversification: Egypt's transport sector is undergoing significant transformation as part of the country's broader economic diversification strategy. An important component is the 'electrification' of the sector with the ambition that the share of renewable energy in the nation electricity grid would increase. In parallel, promote modal shift from passenger cards and micro and minibuses to electric mono rails, trains, and buses.
Co-benefits: • Higher local air quality, improved public health, and lower healthcare costs by reducing respiratory and cardiovascular diseases associated with pollution. • Enhanced quality of life from less commuting time. • Reduce costs associated with traffic congestion and fuel consumption. • Investments in green infrastructure create new industries and generate employment opportunities. • Lower burden on national economy and foreign currency reserves to import fuel.

3.5.4 Industry Sector

This section describes the policies and measures in the industry sector indicated in the NDC with the progress made from 2015 till 2022. Egypt is decarbonizing the industrial sector by reducing the energy intensity, use of renewable and alternative fuels, and low carbon process improvements, through a number of policies and measures

Table 43: Mitigation Policies and Measures in Industry Sector

Policies and Measures	Status
D] Industry	
PAM D.1: Alternative fuels partial substitution, lowering the clinker content in cement up to 80% conditional on meeting relevant national standards, and energy efficiency improvements.	Adopted
PAM D.2: Energy savings in audited industries due to the application of solar water heating in industry or solar energy for power.	Adopted
PAM D.3: Energy savings in industry due to replacement of old inefficient motors with IE3 or higher motors.	Adopted
PAM D.4: The transition towards low carbon nitrogen fertilizer production, replace feedstock with green hydrogen to produce green ammonia.	Adopted
PAM D.5: Promote eco-industrial parks concept to scale up resource efficiency through intra- firm exchanges, improvement of economic, environmental, and social performances of businesses, and creation of green industries (such as recycling and renewable energy) towards an inclusive and sustainable industrial development.	Adopted

PAM D.1: Low Carbon Roadmap for the Egyptian Cement Industry.

- **Description:** Implement measures in the low carbon roadmap for the Egyptian cement industry including alternative fuels partial substitution, lowering the clinker content in cement up to 80% conditional on meeting relevant national standards, and energy efficiency improvements.

- **Progress Summary (2015 – 2022):** In March 2021, EEAA issued Ministerial Decree 49/2021 to require cement companies to replace a minimum of 10% of fossil fuels with Refuse Derived Fuel (RDF) and pay a carbon tax equivalent to 1% of the coal/pet-coke price (0.1% of this amount is directed to support RDF manufacturers). The cement sector has already started using alternative fuel at a share of 6.4% in 2015 to replace a percentage of the coal used as the main fuel for thermal energy. Furthermore, it is planned to decrease the average specific energy consumption from 3710 to 3540 MJ/ton cement.

PAM D.2: Enhance electrical and thermal energy efficiency in other resource-intensive sectors and with SMEs.

- **Description:** The energy-intensive industries represent 68.47% of the total energy consumption of the industrial sector, while SMEs account for 11% of the country's total electricity consumption. The decrease in the average specific thermal energy consumption by 10% for three energy intensive industries (iron and steel, fertilizers, and ceramic tiles industries). Furthermore, increase the

share of solar heating in the industrial processes of relevant sectors and promote roof-top PV systems. The industrial process heat represents 23% of the energy consumption in the textile industry, 33% of that in the food industry and 7% in the chemical sector in Egypt.

- **Progress Summary (2015 – 2022):** According to the UNIDO "Utilizing Solar Energy for Industrial Process Heat" (SHIP) project, the Identified potential "thermal" energy savings of 22.65 GWh annually. Moreover, roadmaps for implementation of solar thermal energy in 3 industrial sectors were developed as well as two standards for solar energy systems and a framework for the certification of personnel working in the installation and maintenance of the solar energy systems was developed. The project also the project has developed an extra roadmap covering the tools for strengthening the local manufacturing of solar water heaters (SWHs) and solar thermal technologies in the Egyptian market. The project has developed an extra roadmap covering the tools for strengthening the local manufacturing of SWHs and solar thermal technologies in the Egyptian market.

PAM D.3: A motor system optimization programme to replace inefficient motors.

- **Description:** A stand-alone motor system optimization programme has been initiated to replace old inefficient motors with IE3 or higher motors in industrial plants to achieve savings in electrical energy consumption.
- **Progress Summary (2015 – 2022):** A stand-alone motor system optimization programme has been initiated to replace old inefficient motors with IE3 or higher motors in industrial plants to achieve savings in electrical energy consumption. This had been reinforced with the issuance of Ministerial Decree #463/2020 in October 2020 by Ministry of Trade and Industry to mandate producers and importers of electric motors to comply with the Egyptian specification for minimum energy performance standard (MEPS). According to the UNIDO Industrial Motors Energy Efficiency Programme, the identified potential energy savings of 89.33 GWh annually. Guidelines on best practices developed in motors rewinding, highlighting drawbacks of bad rewinding practices, focusing on most commonly used 3-phase induction motors in industrial sector was developed.

PAM D.4: Application of sector-specific process improvements.

- **Description:** This NDC policy is related to the application of sector-specific process improvements, such as the transformation of the charcoal sector from traditional open pits into mechanized kilns and the replacement of feedstock with green hydrogen to produce green ammonia and transition towards low carbon nitrogen fertilizer production.
- **Progress Summary (2015 – 2022):** The transition towards low carbon nitrogen fertilizer production and the replacement of the feedstock with green hydrogen to produce green ammonia was initiated when Misr Fertilizers Production Company

"Mopco" signed an agreement in 2023 for a green ammonia production project in Damietta. The initial investment cost is approximately 890 million dollars, aiming to produce 150,000 tons of green ammonia annually. The operation is expected to begin in 2027. Also, the Sovereign Fund of Egypt (TSFE) and Suez Canal Economic Zone (SCZone) have signed on Sunday 30 June 2024, four agreements worth $33 billion in the field of green ammonia with European developers which are as follows:[20]

- German company DAI Infrastruktur GmbH (DAI) signed the first agreement worth $11 billion to develop a green ammonia project in East Port Said. The project aims to export roughly two million tons of green ammonia annually.
- The second agreement worth $4.25 billion was signed with India's OCIOR Energy. The deal involves building a green ammonia project at Sokhna Port, targeting the European market.
- The third agreement worth $3.46 billion was signed with TAQA Arabia and French company Voltalia. This alliance will develop a green ammonia project at Sokhna Port.
- As for the fourth agreement, it is worth $14 billion. Signed with BP, MASDAR, Hassan Allam Utilities, and Infinity Power Holding, the agreement aims to construct a green ammonia project at Sokhna Port.

PAM D.5: Promote eco-industrial parks concept.

- **Description:** Promote eco-industrial parks concept to scale up resource efficiency through intra- firm exchanges, improvement of economic, environmental, and social performances of businesses, and creation of green industries (such as recycling and renewable energy) towards an inclusive and sustainable industrial development.

- **Progress Summary (2015 – 2022):** The UNIDO Global Eco-Industrial Parks Programme is implemented in Egypt from 2022 for three years until 2024. Three industrial parks in Egypt were targeted for demonstration activities; Robbiki Leather Cluster, Orascom Industrial Parks – Sokhna Complex (formerly named Suez Industrial Development Company (SIDC)) and Polaris Parks. The objective is to demonstrate the viability and benefits of EIP approaches in scaling up resource productivity and improving economic, environmental and social performances of businesses and thereby contribute to inclusive and sustainable industrial development in Egypt. The specific expected outcome of the country level intervention in Egypt is the improved environmental, economic and social performance of industries in Egypt through the implementation of EIP approaches in selected pilot industrial parks and an increased role of EIPs in environmental, industrial and other relevant policies at the national level.

  The co-benefits and economic diversification from the mitigation policies and measures in the Industry Sector are summarized in Table below.

[2] https://sis.gov.eg/Story/193422/PM-witnesses-the-signing-of-4-green-ammonia-deals-worth-%2433b?lang=en-us

Table 44: Co-benefits and Economic Diversification in Industry Sector

D] Industry Sector
Economic Diversification: Egypt is actively diversifying its industrial sector to reduce reliance on traditional industries and foster sustainable economic growth. High-value sectors such as petrochemicals, automotive manufacturing, electronics, pharmaceuticals, and green & low carbon technologies. Egypt implemented policies and initiatives to promote industrial development, including the establishment of industrial parks and zones, SMEs development, and promotion of innovation and entrepreneurship.
Co-benefits: • Reducing local air pollution, conserving biodiversity, and improving environmental quality. • Improved public health and enhanced quality of life. • Investments in green technologies and generate employment opportunities. • Creating high-value export green products. • Reduce operational costs and increases productivity. • Reduce energy demand through water conservation, recycling, and rainwater harvesting. • Increasing the sustainability of natural resource. • Lower burden on national economy and foreign currency reserves to import fuel.

3.5.5 Buildings and Urban Cities Sector

This section describes the policies and measures in the buildings and urban cities sector indicated in the NDC with the progress made from 2015 till 2022. Egypt has promoted sustainability in existing and new buildings and urban developments to adopt low carbon standards and programmes.

Table 45: Mitigation Policies and Measures in Buildings and Urban Cities Sector

Policies and Measures	Status
E] Buildings and Urban Cities	
PAM E.1: Promoting the use of renewable energy and energy efficiency in existing and new establishments and rank sustainability interventions in accordance with national priorities. This includes installation of rooftop PV panels for electricity generation, 5,300 solar water heaters, and expanding the use of LED lighting in residential sector by 2030.	Adopted
PAM E.2: Expanding energy efficiency labels and specifications for appliances programme, elimination of non-energy efficient equipment, and raising awareness among consumers on purchasing alternative energy efficient home appliances.	Adopted
PAM E.3: Promote green buildings by activating the energy efficiency codes for new buildings, adopting procedures for the renovation of existing buildings to meet energy performance standards, adopting voluntary green buildings guidelines, and rollout incentives to encourage the use of the best available technologies for sustainable buildings. Energy Efficiency Building Codes for new residential buildings and for commercial and government buildings were first developed by the Housing and Building Research Center (HBRC) and then enacted by ministerial decrees issued in 2005, 2009 and 2010. It is planned to develop 16,960 residential units according to green building standards by 2030 and increase awareness and community participation on sustainable buildings.	Adopted
PAM E.4: Increase green spaces and sustainable parks in new cities that are irrigated with treated wastewater to act as carbon sinks to improve quality of life for citizens and reduce negative health impacts. Furthermore, increase the per capita share of public green areas in existing cities, such as Ahl Masr Walkway and Ain Hayah project.	Adopted
PAM E.5: Adopt the National Active Mobility Strategy to encourage citizens to use bicycles and walking in designated paths and shift gradually to electric vehicles using clean energy sources and the establishment of the necessary infrastructure inside cities.	Adopted
PAM E.6: Installing energy efficient and/or solar-operated street lighting and advertisements in internal roads and in highways between cities.	Adopted

PAM E.1: Promoting the use of renewable energy and energy efficiency in existing and new establishments and rank sustainability interventions in accordance with national priorities. This includes installation of rooftop PV panels for electricity generation, 5,300 solar water heaters, and expanding the use of LED lighting in residential sector by 2030.

- **Description:** This PAM aims to promote the adoption of renewable energy and energy-efficient solutions in both existing and new establishments, aligning with national priorities. Key initiatives include the installation of rooftop photovoltaic (PV) panels to generate electricity, the deployment of 5,300 solar water heaters, and the expansion of LED lighting usage in the residential sector.

- **Progress Summary (2015 – 2022):**

For the expansion of LED lightening in the residential sector, it has been partially reported under A.7 “Electricity savings achieved by sectors on the demand side”. The Electricity Distribution Companies (EDCs) distributed 156 million LED lamps in residential and other buildings. This has achieved a total of 55,326,201 MWh electricity savings and 25,362,397 tCO2 emission reduction during the period between 2018/2019 – 2021/2022.

For the renewable energy installed, this has been partially reported under **PAM A.7** “Electricity savings achieved by sectors on the demand side” under “PV Installation under FIT and net metering systems”. This PAM focuses on expanding the use of renewable energy in existing and new buildings, with significant legislative and project-driven progress. Decree No. 2532 of 2016 initially set a Feed-in Tariff (FiT) for renewable energy projects, allocating 300 MW for capacities under 500 kW and 2,000 MW for larger capacities. However, this decree expired on 28/10/2017, prompting an amendment to Circular No. 1 of 2017. This amendment introduced a net metering system to encourage electricity production using photovoltaic (PV) power plants for capacities up to 20 MW.

Rooftop solar PV installations showed limited progress, with three installations each in 2015 and 2016, decreasing to two in 2017, four in 2018, and one in 2019 and 2021, with no data for 2020 and no installations in 2022–2023. Annual installed capacities peaked at 105.35 kW in 2015 but remained below 1 kW annually in subsequent years. Electricity generation from renewables grew from 395 MWh in 2015 to a peak of 2,596.63 MWh in 2021, before declining to 1,300.53 MWh in 2022 and 1290.33 MWh in 2023. In terms of implementation, one of the major initiatives is the Rooftop Photovoltaic Installation Project in Egypt's New Administrative Capital (NAC). This project aims to integrate renewable energy into the city's urban infrastructure, with 18 MWp of rooftop solar panels being installed across 64 government buildings. Furthermore, the promotion of renewable energy extends to educational institutions, with 7,272 secondary schools set to adopt PV panels as part of the broader Energy Efficiency Improvement Project (EEIP).

In 2016, 48 solar water heater installations were completed, with an annual installed capacity of 1.5 million liters per year. By 2017, this increased significantly to 200 installations, achieving an annual installed capacity of 6 million liters per year.

PAM E.2: Expanding energy efficiency labels and specifications for appliances programme, elimination of non-energy efficient equipment, and raising awareness among consumers on purchasing alternative energy efficient home appliances.

- **Description:** This PAM aims to enhance the adoption of energy-efficient appliances by expanding energy efficiency labels and specifications across various appliances. Additionally, this initiative seeks to raise awareness among consumers about the importance of energy efficiency in their purchasing decisions.

- **Progress Summary (2015 – 2022):**

Key efforts include organizing 14 training courses focused on energy-efficient street lighting, attended by 327 engineers from government entities and electricity distribution companies. Additionally, capacity-building initiatives have trained engineers at energy efficiency testing laboratories on the proper methods for conducting tests for household appliances, involving key stakeholders like the Ministry of Electricity and Renewable Energy, the New and Renewable Energy Authority, and the Egyptian Organization for Standardization and Quality. Furthermore, a comprehensive seven-month training programme was successfully delivered to 1,166 shop managers, sales staff, and customer service representatives across various appliance stores.

Between 2015 and 2023, eliminating non-energy efficient equipment steadily increased energy savings. Removals grew from 3,360 units (0.4 MWh/year saved) in 2015 to 10,342 units (4,934.95 MWh/year saved) in 2023, with notable peaks in 2018 (6,668 units) and 2022 (8,095 units). Energy savings rose consistently, reaching 4,934.95 MWh/year saved by 2023.

PAM E.3: Promote green buildings by activating the energy efficiency codes for new buildings, adopting procedures for the renovation of existing buildings to meet energy performance standards, adopting voluntary green buildings guidelines, and rollout incentives to encourage the use of best available technologies for sustainable buildings.

- **Description:** This PAM aims to promote green buildings by activating energy efficiency codes for new constructions, implementing renovation procedures for existing buildings to meet energy performance standards, and adopting voluntary green building guidelines. This initiative also includes rolling out incentives to encourage the use of the best available technologies for sustainable buildings. By 2030, the goal is to develop 16,960 residential units in line with green building

standards while enhancing awareness and community engagement in sustainable building practices.

- **Progress Summary (2015 – 2022):**

  Energy Efficiency Building Codes for new residential buildings and for commercial and government buildings were first developed by the Housing and Building Research Center (HBRC) and then enacted by ministerial decrees issued in 2005, 2009 and 2010. It is planned to develop 16,960 residential units according to green building standards by 2030 and increase awareness and community participation on sustainable buildings.

  From 2015 to 2023, building renovations to meet energy standards progressed steadily, starting with one renovation in 2015 and peaking at two in 2016. Annual energy savings rose from 150 MWh in 2015 to 827 MWh in 2020, stabilizing around 822–826 MWh annually from 2021 to 2023. Renovations primarily involved installing solar power stations.

  One notable initiative under this PAM is "Housing for All," Egypt's first national programme dedicated to providing affordable housing for 1 million low-income households while integrating green building principles. This initiative is also the first of its kind in the region to focus on green social housing. By utilizing the Green Pyramid Rating System (GPRS), the programme aims to minimize the environmental footprint of construction and promote sustainability. As part of its pilot phase, 7,000 GPRS-certified units have already been constructed, and plans are underway to deliver an additional 25,000 units over the next three years.

  The development of residential units according to green building standards has shown notable advancement, with 16,710 units completed in 2022 and 7,896 units in 2023. These units are being developed to meet green building criteria. In addition, efforts to increase awareness about green building practices among stakeholders have primarily focused on workshops as a key measure. These workshops were held from 2015 till 2019, and 2022, with a total of one awareness movement conducted each year.

  The adoption of voluntary green building guidelines began with the introduction of green building guidelines in 2022, with 16,710 projects following these voluntary guidelines that year, and 7,896 projects in 2023.

PAM E.4: Increase green spaces and sustainable parks in new cities that are irrigated with wastewater treated to act as carbon sinks to improve quality of life for citizens and reduce negative health impacts. Furthermore, increase the per capita share of public green areas in existing cities, such as Ahl Masr Walkway and Ain Hayah project.

- **Description:** This PAM aims to expand green spaces and develop sustainable parks in newly established cities, utilizing treated wastewater for irrigation. This initiative focuses on creating carbon sinks, which play a crucial role in reducing greenhouse gas emissions and enhancing the overall quality of life for citizens by mitigating negative health impacts. Additionally, the target seeks to increase the per capita share of public green areas in existing urban areas, with notable projects such as the Ahl Masr Walkway and the Ain Hayah project serving as prime examples of this vision. These efforts aim to foster a healthier, more sustainable urban environment while promoting public well-being.

- **Progress Summary (2015 – 2022):**
  New green spaces, including parks and islands in the new cities, are being established and irrigated using treated wastewater reaching 11,500 faddens of green spaces irrigated with treated wastewater. Additionally, for all housing projects in new cities, 60% of the total project area is dedicated to green spaces.

  Mamsha Ahl Masr (The Walkway of Egypt's People) is a project aimed at creating accessible, two-level promenades along the Nile Corniche in Cairo and Giza. This project aims to promote active mobility through walking. Stretching 54 km, the walkways will offer recreational spaces and better public access to the Nile waterfront, helping to reduce exposure to air pollution. The first phase, from Imbaba Bridge to 15 May Bridge, is completed, featuring walkways, a floating restaurant, and other facilities. The second phase adds a 4.7 km walkway, and the third phase extends to two other sectors which are under progress.

PAM E.5: "Adopt the National Active Mobility Strategy to encourage citizens to use bicycles and walking in designated paths and shift gradually to electric vehicles using clean energy sources and the establishment of the necessary infrastructure inside cities."

- **Description:** Adopt and implement the National Active Mobility Strategy to promote sustainable urban transportation. The strategy aims to encourage citizens to prioritize walking and cycling by developing designated, safe, and accessible pathways. It also facilitates a gradual transition to electric vehicles powered by clean energy sources, reducing dependency on conventional fuels.

- **Progress Summary (2015 – 2022):** For active mobility**,** bicycle paths have been constructed over the years, with the following progress: 1.5 km in 2017, 2 km in

2018, 3 km in 2019, 1 km in 2020, 1.5 km in 2021, and 0.8 km in 2022. In addition, the first phase of Cairo Bike introduced 250 bicycles across 26 stations, with plans to expand to 500 bicycles and 45 stations in the second phase. Spanning over six square kilometers in downtown Cairo, El-Sayeda Zainab, Garden City, and Al Attaba, all stations are solar-powered and equipped with surveillance cameras. Bicycles can be rented via a mobile app or prepaid card.

For electric vehicles and charging stations, regulatory measures have been implemented to encourage the adoption and local production of electric vehicles (EVs). Ministerial Resolution 255/2018 exempted EVs from customs duties and allowed the import of used EVs up to three years old, marking an exception to the ban on importing used cars. Additionally, Presidential Decree 549/2020 expanded incentives by allowing companies involved in EV manufacturing and assembly to import vehicles, fostering the local assembly of EVs and enhancing opportunities for the industry's growth.

The Prime Minister directed coordination between ministries and authorities to establish a legal framework and plan for a company dedicated to creating, operating, and managing electric vehicle (EV) charging stations. The initiative focuses on Cairo, Giza, Alexandria, and Sharm El-Sheikh as part of the state's strategy to localize and expand the use of EVs. Measures include determining charging service prices in collaboration with the Ministry of Electricity and identifying suitable sites for the stations. Additionally, efforts were reviewed to restructure the Nasr Export and Import Company into the "Gosoor" project, aimed at supporting Egyptian manufacturers with promotion, mediation, and logistics services, and designing an electronic catalog for better marketing and market expansion.

PAM E.6: Installing energy efficient and/or solar-operated street lighting and advertisements on internal roads and in highways between cities.

- **Description:** The policy involves the installation of energy-efficient and/or solar-powered street lighting and advertisements along internal roads and highways between cities. This initiative aims to reduce energy consumption and reliance on traditional power sources by incorporating renewable energy solutions, such as solar panels, to power streetlights and advertising displays.

  For energy efficiency and solar operated street lightening and advertisments on roads, this has been partially reported under **PAM A.4** “Electricity savings achieved by sectors on the demand side” under “improving energy efficiency of public street lighting”. EEHC, together with municipalities, replaced over 4 million street luminaires with efficient ones.

  From 2015 to 2023, installations of energy-efficient and solar-operated advertisements along roads and highways steadily increased, from 3500 installations (0.756 MW) in 2015 to 25,000 installations (5.4 MW) in 2023.

Significant growth occurred in 2021 with 11,000 installations (2.376 MW) and 2022 with 15,000 installations (3.24 MW), reflecting a consistent rise in capacity.

Between 2015 and 2023, energy-efficient and solar-operated lighting installations grew significantly, boosting energy savings from 0.2% (2,250 installations, 0.22 MW capacity) in 2015 to 10.50% (81,891 installations, 14,367.18 MW capacity) in 2023. Electricity generation also rose sharply, from 989 MWh in 2017 to 21,845.79 MWh in 2023, reflecting consistent progress in sustainable lighting initiatives.

The co-benefits and economic diversification from the mitigation policies and measures in the Buildings and Urban Cities Sector are summarized in Table below.

Table 46: Co-benefits and Economic Diversification in Buildings and Urban Cities Sector

E] Budling and Urban Cities Sector
Economic Diversification: The Government has implemented policies and initiatives to promote sustainable urban development, including the Urban Development Strategy, Investment Law No. 72 of 2017, and the development of a new administrative capital, as well as initiatives to promote smart cities and green building practices.
Co-benefits: • Reducing local air pollution and improving environmental quality, water and resources conservation. • Higher local air quality, improved public health, and lower healthcare costs by reducing respiratory and cardiovascular diseases associated with pollution. • Use of solar energy and energy efficiency reduces dependence on imported fossil fuels. • Better quality of life, reduced exposure to extreme temperatures, and other climate change-related weather events. • Increase green areas lowers temperatures for residents. • Lower electricity and water bills. • Investments in green infrastructure create new industries and generate employment opportunities. • Lower burden on national economy and foreign currency reserves to import fuel.

3.5.6 Tourism Sector

This section describes the policies and measures in the tourism sector indicated in the NDC with the progress made from 2015 till 2022. Egypt strives towards low carbon touristic developments and greening of hotels and resorts.

Table 47: Mitigation Policies and Measures in Tourism Sector

Policies and Measures		**Status**
F] Tourism		
PAM F.1: Promoting the use of renewable energy, such as solar PV power plants, solar water heating for domestic uses and for swimming pools in touristic hotels and resorts, and solar water desalination.	Promote use of renewable energy in tourism sector	Adopted
PAM F.2: Implementing energy efficiency improvements through LED lighting replacements, improved building envelope, employing efficient heating, ventilation, and air conditioning (HVAC) systems, efficient water pumping, and influencing the behavior of the hotel guests towards energy efficiency.	Implement energy efficiency improvements in tourism sector	Adopted

PAM F.1: "Promoting the use of renewable energy, such as solar PV power plants, solar water heating for domestic uses and for swimming pools in touristic hotels and resorts, and solar water desalination."

- **Description:** This policy aims to boost the adoption of renewable energy within the tourism sector by promoting various solar-based technologies. This includes the deployment of solar PV power plants, solar water heating systems for both domestic use and swimming pools in hotels and resorts, as well as solar-powered water desalination systems. These initiatives are designed to support the shift toward sustainable energy sources, reduce reliance on conventional energy, and contribute to the overall reduction of greenhouse gas emissions.

- **Progress Summary (2015 – 2022):** This has been partially reported under **PAM A.4** "Electricity savings achieved by sectors on the demand side" under "PV Installation under FIT and net metering systems". Egypt's tourism sector has made significant progress in adopting renewable energy technologies to reduce reliance on fossil fuels. Through the UNDP Egypt PV Project (2018-2019), 768 kW of solar photovoltaic (PV) systems were installed at five locations, including three hotels in Cairo, one hotel in the Red Sea region, and a cultural site in Old Cairo. These installations generate 1,353 MWh annually, reducing emissions by an estimate 0.832 $ktCO_2e$ per year.

  As part of the preparations for COP27, the Egypt PV Project also installed seven solar PV plants at hotels and resorts in Sharm El Sheikh, providing a total capacity of 1,864 kW. Additionally, by collecting electricity consumption data from a sample of Green Star hotels, solar water heaters were introduced in 10 hotels, replacing electric and diesel-fired heating systems. In total, 750 units (250 liters each) were installed, saving approximately 4.5 million kWh annually. These initiatives, led by the Ministry of Tourism and Antiquities, underscore the sector's commitment to sustainable energy practices, reducing greenhouse gas emissions, and advancing sustainable development goals.

PAM F.2: Implementing energy efficiency improvements through LED lighting replacements, improved building envelope, employing efficient heating, ventilation, and air conditioning (HVAC) systems, efficient water pumping, and influencing the behavior of the hotel guests towards energy efficiency.

- **Description:** This policy focuses on enhancing energy efficiency within the tourism sector by implementing a range of improvements. Key measures include replacing traditional lighting with LED alternatives, upgrading building envelopes to enhance insulation, and using efficient HVAC systems. It also involves optimizing water pumping systems and encouraging hotel guests to adopt energy-saving practices. These actions aim to reduce overall energy consumption, lower greenhouse gas emissions, and promote sustainable practices in the hospitality industry.

- **Progress Summary (2015 – 2022):**

  This has been partially reported under **PAM A.4** "Electricity savings achieved by sectors on the demand side" under "introduction of LEDs in residential and building sectors".

  Egypt's tourism sector has undertaken significant energy efficiency improvements to reduce fuel and electricity consumption and lower GHG emissions. LED lighting upgrades were implemented in 13 Green Star Hotels, with the installation of 38,450 LED lamps ranging from 3 to 48 watts. This measure resulted in annual energy savings of approximately 200,000 kWh. Additionally, AC shading improvements were applied in 17 Green Star Hotels, targeting 2,742 air conditioning units—representing 60% of the total AC systems—achieving energy savings of 150,000 kWh annually.

  The sector also advanced energy efficiency through the Green Star Hotel (GSH) certification programme, where, as of March 2024, 182 hotels (out of 1,247) obtained certification. Notably, 40% of the GSH requirements relate to energy and water efficiency, significantly contributing to GHG emissions reductions. Moreover, the UNDP Green Sharm Project addressed multiple sustainability aspects, including energy efficiency, waste management, renewable energy, sustainable transportation, and biodiversity, demonstrating a holistic approach to environmental sustainability in the tourism industry. These initiatives, led by the Ministry of Tourism and Antiquities, highlight Egypt's commitment to sustainable tourism development.

The co-benefits and economic diversification from the mitigation policies and measures in the Tourism Sector are summarized in Table below.

Table 48: Co-benefits and Economic Diversification in Tourism Sector

F] Tourism Sector
Economic Diversification: Egypt's tourism sector is highly volatile to external shocks. It is critical to identify cost savings opportunities and also attract eco-conscious tourists. Sustainable and resilient tourism practices, including energy efficiency, waste reduction, and water conservation in tourism facilities.
Co-benefits: • Sustainable tourism attracts eco-conscious tourists, creating new job opportunities and supporting local businesses. • Use of renewable energy to develop unconventional water sources (i.e. solar desalination). • Reducing local air pollution and improving environmental quality, water and resources conservation. • Reduce operational costs. • Investments in green technologies and generate employment opportunities.

3.5.7 Waste Sector

This section describes the policies and measures in the waste sector indicated in the NDC with the progress made from 2015 till 2022. Egypt has been decarbonizing the waste sector through a number of policies and actions.

Table 49: Mitigation Policies and Measures in Waste Sector

Policies and Measures	Status
G] Waste Management	
PAM G.1: Enhancing the waste management infrastructure, improving collection efficiency and increasing recycling and energy recovery rates	Adopted
PAM G.2: Increase green spaces and sustainable parks in new cities that are irrigated with treated wastewater	Adopted
PAM G.3: Expand the coverage of municipal and industrial wastewater tertiary treatment infrastructure and rehabilitate existing facilities, utilize treated wastewater and grey water, and recover sewage sludge for recycling and energy use; and "increase green spaces and sustainable parks in new cities that are irrigated with treated wastewater.	Adopted

PAM G.1: Enhancing the waste management infrastructure, improving collection efficiency and increasing recycling and energy recovery rates.

- **Description:** Attracting investments in upgrading the solid waste management infrastructure in all governorates to improve collection efficiency from 55% to 95% by year 2025 and increase recycling and energy recovery rates. This entails establishment of fixed and mobile transfer stations, rehabilitation and new construction of mechanical and biological treatment (MBT) plants to utilize at least 60% of the collected waste, and closure of uncontrolled dumpsites to be replaced with sanitary landfills but not to exceed 20% of the collected waste by 2025.

- **Progress Summary (2015 – 2022):**

  Solid Waste Management Policy reforms took place with the issuance of Waste Management Regulation Law 202/2020 and its Executive Regulations, Prime Minister Decree 41/2019 on waste-to-energy feed in tariff (October 2019), and Ministerial Decree 49/2021 for mandatory partial replacement of alternative fuels in cement sector (March 2021).

  According to the Waste Management Regulatory Authority (WMRA), about six uncontrolled dumpsites have been closed and replaced with sanitary landfills. About 6 uncontrolled waste dumpsites have been closed by 2023 and 21 sanitary landfills were constructed and operating by 2023.

  Collection of municipal solid waste is the responsibility of the local governmental authorities in each governorate. WMRA has reported that the collection efficiency increased from 40% in 2022 to 60% in 2023 and the Ministry of local development reported an increase in the waste collection coverage to 24 million

tonnes of municipal solid waste annually out of the generated 26 million tonnes representing 90% collection efficiency.

The Ministry of Local Development reported that around 8.5 million tonnes per year of the generated waste are being directed to the mechanical and biological treatment (MDT) plants to be treated. Approximately 4.3 million tonnes per year are turned into compost and 1.7 million tonnes are transformed to refuse derived fuel (RDF) to be used as alternative fuel in cement factories. Therefore around 35% of the collected waste is being treated in the MBT plants. According to the Waste Management Regulatory Agency, 48 waste treatment mechanical and biological treatment (MBT) lines have become operational by 2023.

In addition, a number of international funded projects are working in the waste sector including:

- The National Solid Waste Management Programme initially launched in 2012 under the Ministry of Environment of the Government of Egypt (GoE) and is currently in its third phase which extends from 2022 to 2026. The project supports the Waste Management Regulatory Authority (WMRA) and has been establishing a sustainable and integrated solid waste management system and infrastructure in four governorates in Egypt (Kafr El Sheikh- Gharbeya- Assiut-Quena).
- In Greater Cairo, the Air Pollution Management and Climate Change Project operating since 2020 and is expected to end in 2026, focuses on reducing vehicle emissions, improving the management of solid waste, and strengthening the air and climate decision-making system. The component of solid waste management includes the establishment of integrated waste management facility in 10th Ramadan City and closure and rehabilitation of the Abu Zaabal dumpsite. The 10th Ramadan Complex will mitigate impacts resulting from waste disposal in both Cairo and Qalyoubia Governorates as the complex will include:[21]
    - Sanitary landfill in Qalyoubia Governorate for rejects of treated municipal solid waste (227.5 acres.)
    - Construction and demolition waste treatment facility (23 acres).
    - Sanitary landfill in Cairo Governorate for rejects of treated municipal solid waste (447 acres).
    - Medical waste treatment and disposal plant in Cairo and Qalyoubia governorates (16.51 acres).
    - Urban Communities Authority landfill for rejects of treated municipal solid waste and construction and demolition waste (100 acres).
    - Municipal solid waste treatment plant for Cairo Governorate (Organic fertilizer production and recycling plant) (212 acres).
    - Municipal solid waste treatment plant in Qalyoubia Governorate (organic fertilizer production and recycling plant) (106 acres).

[2] The World Bank (2020), Greater Cairo Air Pollution Management and Climate Change Project, https://www.eeaa.gov.eg/Uploads/Project/Files/2022110812125143.pdf

PAM G.2: Increase waste-to-energy contribution in solid waste management up to 20% of collected waste by 2026.

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- **Description:** Increase waste-to-energy contribution in solid waste management up to 20% of collected waste by 2026 through utilization of waste as alternative fuel in cement sector, waste to biofuels, and installation of 300 MW to generate electric power through incineration, pyrolysis, and other modern technologies.

- **Progress Summary (2015 – 2022):** Egypt has signed for the establishment of a Waste to Energy plant in 2023 of USD 120 million in investments to be built in the Abu Rawash industrial zone in Giza Governorate west of Greater Cairo. It will have the capacity to process 1,200 tonnes of municipal solid waste daily to produce 30 MW of power. The Ministry of Local Development reported that 1.7 million tonnes per year are transformed to refuse derived fuel (RDF) to be used as alternative fuel in cement factories.

PAM G.3: Expand the coverage of municipal and industrial wastewater tertiary treatment infrastructure and rehabilitate existing facilities, utilize treated wastewater and grey water, and recover sewage sludge for recycling and energy use.
and Increase green spaces and sustainable parks in new cities that are irrigated with treated wastewater.

- **Description:** Increase green spaces and sustainable parks in new cities that are irrigated with treated wastewater to act as carbon sinks to improve quality of life for citizens and reduce negative health impacts. The treated wastewater used in irrigating non-edible plants would conserve fresh water that would have been used for same purpose.

- **Progress Summary (2015 – 2022):** Egypt is expanding the coverage of municipal and industrial wastewater tertiary treatment infrastructure and rehabilitating existing facilities, utilizing treated wastewater, and grey water, and recovering sewage sludge for recycling and energy use. Recently Bahr Al-Baqar, one of the largest agricultural drainage and wastewater treatment plant of its kind worldwide, was inaugurated in Port Said with production capacity of 5.6 million cubic meters per day to recycle and reuse the drainage water that flows along the Bahr Al-Baqar drain to be used in reducing the gap for agricultural irrigation (September 2021).

  Wastewater Treatment Plant in Beni Suef New City, with a total capacity of 52,000 m^3/day, is designed to serve the city's growing population. It produces around 12,000 cubic meters of tertiary treated water daily, which is used for irrigating green spaces, benefiting 160,000 residents and 30,000 visitors from the local university and industrial workforce. Moreover, the Sewage Treatment Plant in New Minya City has inaugurated its first phase in 2023, operating with a daily capacity of

20,000 m³/day, out of a planned total capacity of 140,000 m³/day. The treated water is repurposed for irrigating green spaces across the city, contributing to sustainable water reuse and urban greening efforts.

The co-benefits and economic diversification from the mitigation policies and measures in the Waste Sector are summarized in Table below.

Table 50: Co-benefits and Economic Diversification in Waste Sector

G] Waste Sector
Economic Diversification: The Government is focusing on promoting recycling, waste-to-energy projects, and the development of a circular economy. With rapid urbanization and increased industrial activity, waste generation has risen significantly, prompting the need for innovative solutions that not only address environmental concerns but also create new economic opportunities.
Co-benefits: • Reduce landfill/dumpsites and minimize environmental pollution. • Improved public health from adequate solid waste management and sanitation. • Using treated wastewater for irrigation conserves potable water, making urban water use more sustainable. • Create green jobs in waste management, recycling, and energy recovery sectors. • Increase green products of high-added value to generate new revenue streams.

Chapter 4: Information Related to Climate Change Impacts and Adaptation under Article 7 of the Paris Agreement

4.1 National Circumstances, Institutional Arrangements and Legal Framework

As outlined by the MPGs paragraph 106, each Party should provide information on national circumstances relevant to adaptation actions of Parties, including biogeophysical characteristics, demographics, economy, infrastructure and information on adaptive capacity; Institutional arrangements and governance; and legal and policy frameworks and regulations.

These requirements are comprehensively addressed in Chapter 1 of this report, under subsections: *1.1 Geophysical Characteristics, 1.2 Climate Profile, 1.3 Socioeconomic Profile, 1.6 Key Adaptation Sectors, 1.7 Climate Change Vulnerabilities and Adaptive Capacity, and 1.8 Institutional Arrangements*. While the remaining information is covered under this Chapter.

4.2 Adaptation Priorities, Strategies, Policies, Plans, Goals and Actions to Integrate Adaptation into National Policies and Strategies

In alignment with Egypt's ongoing commitment to addressing climate change, the country has developed and implemented several strategic frameworks, policies, and plans aimed at enhancing adaptation efforts and integrating climate considerations into national development agendas. Central to these efforts is the **National Climate Change Strategy 2050 (NCCS)**, which aims to consolidate all aspects of climate change into a comprehensive framework that serves as a fundamental reference for integrating climate considerations into the country's overall planning across various sectors.

The NCCS encompasses five key goals:

1. **Achieving Sustainable Economic Growth**: Promoting low-emission development across sectors.
2. **Enhancing Adaptive Capacity:** Building resilience to climate change and mitigating associated negative impacts.
3. **Strengthening Governance:** Improving the governance of climate change actions.
4. **Enhancing Climate Financing**: Developing the infrastructure needed for climate finance.
5. **Promoting Research and Awareness**: Encouraging scientific research, technology transfer, and public awareness to combat climate change.

The NCCS aligns with Objective 3.1 of the updated Egypt Vision 2030, supporting the country's economic and development goals while following a low-emission approach. The strategy emphasizes improving the quality of life for Egyptian citizens, preserving natural resources, and reinforcing Egypt's leadership in international climate change efforts.
The NCCS 2050 is under active implementation, with priority given to enhancing infrastructure resilience and scaling up renewable energy projects, while promoting gender-responsive measures for vulnerable communities.

Recognizing water scarcity as a significant challenge, Egypt prioritizes the sustainable management of water resources through the **Climate Change Adaptation Strategy for the Ministry of Water Resources & Irrigation (2013)** and the **Strategy for Development and Management of Water Resources 2050**, which includes initiatives for improved irrigation techniques and water conservation. The **National Water Resources Plan (NWRP-2017-2037)** further supports these efforts by addressing water management challenges. Complementing these efforts is the 2030 Strategic Vision for Treated Wastewater Reuse in Egypt, which emphasizes the importance of recycling water to meet growing demands.

The **Sustainable Agricultural Development Strategy towards 2030 (SADS 2030)** focuses on enhancing food security and supporting farmers in adapting to climate variability through the promotion of climate-smart agricultural practices. The strategy builds on previous agricultural policies, such as the 1980s and 1990s Agricultural Development Strategies, which emphasized sector liberalization and economic reforms. The Agricultural Development Strategy towards 2017 aimed for self-sufficiency and increased agricultural production.

Coastal management is also a key area of focus, particularly in response to the risks posed by sea-level rise and coastal erosion. The **National Strategy for Integrated Coastal Zone Management (ICZM) aims** to address vulnerabilities in coastal areas by mitigating the impacts of sea-level rise and preserving marine biodiversity. This strategy is part of a broader **ICZM Plan** for the North Coast of Egypt aimed at linking land use development with effective coastal protection.

In addition to sector-specific strategies, Egypt has also integrated climate adaptation into broader social and economic policies. The **National Strategy for Gender Mainstreaming in Climate Change** ensures that gender perspectives are incorporated into adaptation planning, recognizing the critical role of women in climate resilience. Similarly, national social support programs such as Takaful, Karama, and Hayat Karima contribute to mitigating the socio-economic impacts of climate change, particularly for vulnerable populations other strategies include the **National Strategy for the Empowerment of Egyptian Women 2030, Egypt's National Population and Development Strategy 2023-2030, Egypt country strategic plan (2023–2028), and The National Human Rights Strategy 2021-2026.**

Through these comprehensive strategies and plans, Egypt continues to make significant progress in its adaptation efforts, addressing both immediate and long-term challenges posed by climate change. The integration of these initiatives into national policies and development plans ensures that Egypt remains on a path toward sustainable and resilient growth.

4.2.1 Key Sector Strategies, Plans and Policies

This section draws on the detailed overview of key sector strategies, plans, and policies provided in **Chapter 1, subsection 1.8.5**. These strategies reflect Egypt's commitment to sustainable development, resilience building, and low-emission growth, aligning with Vision 2030, NCCS 2050 and international frameworks like the Paris Agreement.

National Adaptation Plan (NAP) Project

As part of Egypt’s broader climate adaptation efforts, the National Adaptation Plan (NAP) focuses on addressing climate vulnerabilities across critical sectors such as agriculture, water resources, coastal zones, health, and urban infrastructure. Launched in March 2017 with a stocktaking workshop and the subsequent establishment of an Adaptation Task Force under the National Council for Climate Change in November 2017, the NAP integrates climate adaptation into Egypt’s sustainable development framework.

Key stakeholders in these efforts include the Ministry of Environment, Ministry of Water Resources and Irrigation, Ministry of Agriculture, along with international partners such as UNDP, Green Climate Fund (GCF), the World Bank, and GIZ. These organizations collaborate to enhance Egypt’s institutional capacity for climate adaptation and reduce vulnerabilities across sectors.

The objectives of the NAP are to ensure that climate adaptation becomes a central component of national development planning, aligning with Egypt's Vision 2030 and integrating adaptation strategies into various sectoral policies.

Egypt has implemented numerous sector-specific projects over the past decade to mitigate the impacts of climate change, including:

- **Sustainable Agriculture Investments and Livelihoods Project (SAIL) (2014–2023):** This project, supported by GEF, IFAD, and the Ministry of Agriculture, focused on enhancing agricultural resilience in vulnerable rural communities.

- **Urban Adaptation Initiatives:** These include the **Participatory Development Programme in Urban Areas (PDP) (2010–2018)**, implemented by GIZ in collaboration with the Ministry of Housing and Environment, which worked on improving urban resilience and infrastructure.

- **Coastal Protection Efforts:** Initiatives like **Adaptation to Climate Change in the Nile Delta through Integrated Coastal Zone Management (2009–2017)** and

Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions (2018–2024), both funded by the Green Climate Fund, aim to address the risks posed by sea-level rise and coastal erosion (UNDP, 2018).

4.2.2 Integration of Best Available Science, Gender Perspectives and Indigenous, Traditional and Local Knowledge into Adaptation

Egypt's adaptation strategies are informed by a holistic approach that integrates best available science, gender perspectives, and indigenous, traditional, and local knowledge. These elements ensure that adaptation efforts are effective, inclusive, and culturally sensitive.

Adaptation policies in Egypt rely heavily on scientific research, climate models, and environmental monitoring. The country integrates these tools into decision-making, particularly in key areas such as agriculture, water management, and biodiversity. For example, the National Strategy for Climate Change 2050 promotes the integration of scientific methods alongside traditional knowledge for sustainable resource management. The Bedouin communities in Wadi Allaqi, who use rotational grazing and water management practices, showcase the importance of local knowledge in addressing climate risks, as recognized by the designation of Wadi Allaqi as a UNESCO biosphere reserve.

Additionally, initiatives like the NWFE (National Platform for Green Projects) promote sustainable energy, water, and food security projects by linking scientific advancements with traditional and local knowledge. This platform focuses on both mitigation and adaptation, particularly addressing water and food shortages through science-backed, community-driven projects.

Egypt promotes women’s participation in decision-making and empowers them as agents of change, with strategies such as the National Strategy for Mainstreaming Gender in Climate Change (NSGMCC) and the National Strategy for the Empowerment of Egyptian Women 2030. These strategies focus on sectors like agriculture, water, and health, aiming to mitigate gender-based inequalities and enhance women’s access to resources, reproductive health services, and decision-making roles.

Additionally, Egypt’s National Climate Change Strategy (NCCS) 2050 integrates gender considerations, particularly in objective 2.G, which focuses on empowering women to adapt to climate change "Strengthening women’s response considerations to help them adapt to climate change." On the ground, initiatives include the involvement of mobile health teams, community-based organizations, and local entities in addressing women’s health and climate impacts at the community level. The Environmental and Climate Investment Electronic Platform further supports gender-responsive adaptation efforts by providing access to green finance and enabling community-led projects that account for gender differences.

Women's critical roles in agriculture, food security, and natural resource management are emphasized, but their underrepresentation in decision-making remains a challenge. Despite facing compounded vulnerabilities, women are key agents of change in building climate resilience. Egypt's participation in COP27 reflects its global commitment to embedding gender-sensitive perspectives into climate policies, promoting women's leadership, and ensuring their voices are included in environmental governance. Egypt's approach prioritizes the empowerment of vulnerable groups and aims for a more inclusive and equitable environmental transition.

Egypt values indigenous and local knowledge systems in its adaptation strategies, particularly in agriculture and water management. Bedouin practices in desert regions, such as Wadi Allaqi, emphasize sustainable grazing and water conservation, demonstrating how traditional knowledge enhances climate resilience. By integrating this knowledge into national policies and conservation efforts, such as the Wadi Allaqi Biosphere Reserve, Egypt preserves valuable cultural heritage while improving adaptation outcomes.

However, challenges remain, including the documentation and transmission of traditional knowledge and addressing gender gaps in decision-making. To strengthen the inclusion of indigenous knowledge and gender-sensitive approaches, legal frameworks must protect community rights and ensure the equitable participation of all stakeholders in adaptation strategies.

4.3 Impacts, Risk and Vulnerabilities of Climate Change

4.3.1 Historical Climate Data (1901–2022)

According to data from the World Bank's Climate Change Knowledge Portal (CCKP), Egypt's average annual temperature is 22.5°C, with monthly averages ranging between 13°C in January and 30°C in July. Annual precipitation is remarkably low totaling only 33.3 mm, with most rainfall occurring between December and February. Over the past thirty years, Egypt has experienced a significant warming trend, with average annual temperatures rising by 0.53°C per decade, particularly during the summer months, accompanied by a notable increase in daily minimum temperatures. This has resulted in fewer cold nights and more warm nights (World Bank, 2023).

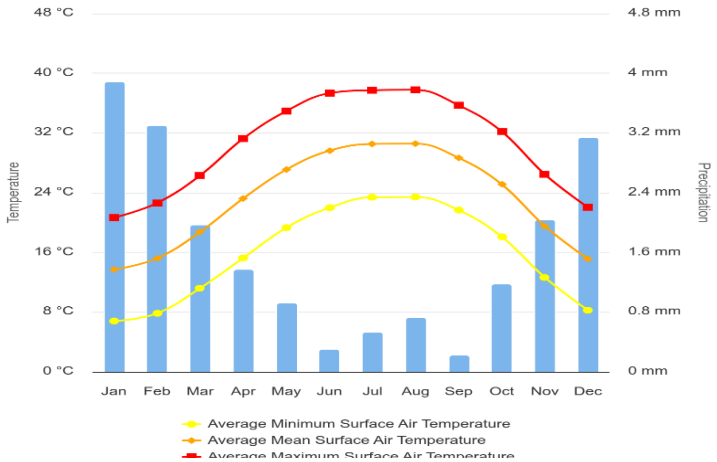


Figure 39: Monthly Climatology of Average Minimum Surface Air Temperature, Average Mean Surface Air Temperature, Average Maximum Surface Air Temperature & Precipitation in Egypt, 1991-2022 (Source: https://climateknowledgeportal.worldbank.org/country/egypt)

Historical data also show a consistent reduction in annual precipitation, with a 22% decline over the past three decades. This has exacerbated water scarcity, contributing to extended droughts and reduced water availability in many areas. Additionally, the frequency and severity of flash floods have increased, particularly in winter and early spring months.

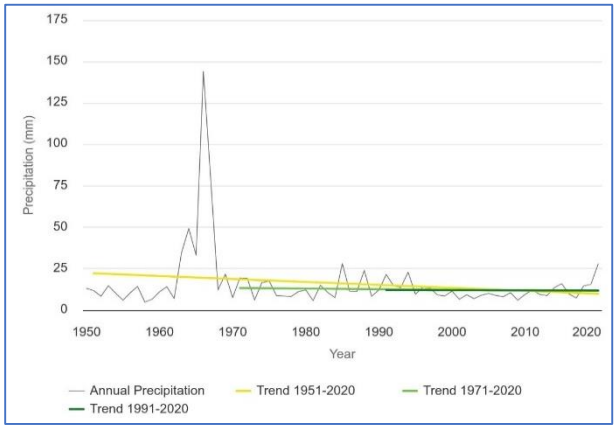


Figure 40: Precipitation Annual Trends with Significance of Trend per Decade 1951 – 2020 (World Bank, 2023)

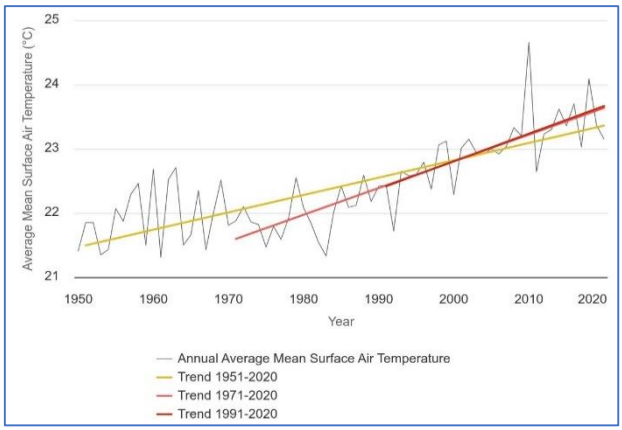


Figure 41: Average Mean Surface Air Temperature Annual Trends with Significance of Trend per Decade 1951 – 2020 (World Bank, 2023)

4.3.2 Projected Future Climate Trends

Climate projections based on the Coupled Model Intercomparison Project (CMIP) indicate that Egypt will experience substantial warming by the end of the century, depending on the emissions scenarios. Under a high-emission scenario (RCP8.5), temperatures are projected to rise by 2.1°C to 5.7°C by the 2080s, with the interior regions and summer months experiencing the most rapid increases. Heatwaves are expected to become more frequent, intense, and prolonged, while cold spells will diminish.

In terms of precipitation, Egypt is expected to see a continuation of reduced rainfall, with longer dry spells and an increase in the intensity of heavy rainfall events, though overall annual precipitation will remain low. The combination of rising temperatures and decreasing precipitation will intensify evaporation rates, worsen water scarcity and increase the likelihood of droughts.

The projected climate changes pose significant challenges for Egypt, particularly in the areas of water resource management, agriculture, and public health. Rising temperatures and reduced precipitation will heighten water scarcity, affecting both agricultural productivity and the availability of water for a growing population. Longer periods of extreme heat will also have adverse effects on human health, ecosystems, and livestock. To mitigate these impacts, robust adaptation and resource management strategies will be essential in safeguarding Egypt's future against climate vulnerabilities.

4.3.3 Egypt's Vulnerability to Climate Change

The Intergovernmental Panel on Climate Change (IPCC) defined vulnerability in its fourth assessment report released in 2007 as 'the degree, to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity' (IPCC, 2007).

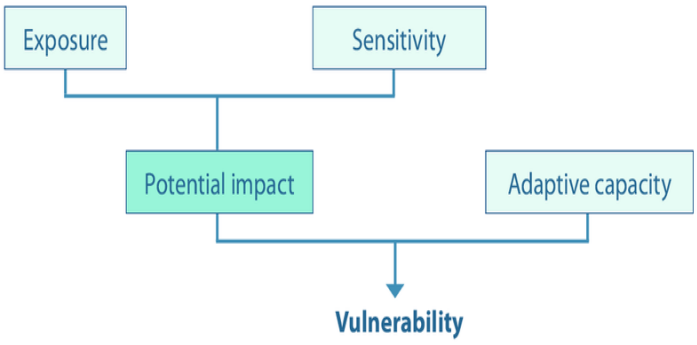


Figure 42: Vulnerability and its Components

Egypt is highly susceptible to the impacts of climate change. According to Intergovernmental Panel on Climate Change (IPCC), the Nile Delta has been identified as one of the world´s three “extreme” vulnerability hotspots, where future climate projections indicate severe impacts, including sea level rise, water scarcity and deficit, and more frequent and intense extreme weather events such as heat waves, flash floods, heavy rains, sand and dust storms. Egypt's vulnerability is driven by its dependence on the Nile River, which support key sectors such as, agriculture, industry, fisheries, and energy. This dependence heightens the risk, especially as rising temperatures, reduced rainfall, and increasing water deficits threaten water availability for various uses. The ND-GAIN Index ranked Egypt 107 out of 181 countries in 2019, indicating a high level of vulnerability to climate change due to political, geographic, and social factors. The index measures both vulnerability to climate change and the country’s readiness to improve resilience (World Bank, 2021).

Sectoral Vulnerabilities:

The impacts of climate change are already evident in sectors such as water resources, agriculture, health, coastal zones, and infrastructure.

1. Water Resources

Climate change significantly impacts Egypt's water resources, exacerbating existing vulnerabilities in this critical sector. Fluctuations in the flow of the Nile, combined with reduced rainfall in the Upper Nile Basin and the Mediterranean coastal zone, pose severe challenges to potable water availability, agricultural irrigation, and industrial processes. The economic implications are profound, as these challenges disrupt agricultural productivity and industrial operations. Additionally, prolonged and intensified droughts further exacerbate water scarcity , while extreme weather events such as flooding and storm surges increase water turbidity, reducing potable water supplies and heightening the risk of waterborne diseases, particularly among vulnerable populations.

2. Agriculture and Food Security

Rising temperatures and declining precipitation adversely affect crop yields, threatening food security and agricultural livelihoods. The resulting economic instability is particularly severe for rural communities, where agriculture accounts for a significant share of employment and income. Climate-related crop losses and reduced agricultural productivity increase food prices, disproportionately affecting low-income households.

3. Public Health

Climate change poses growing risks to public health, particularly through intensified heat waves, which exacerbate existing health conditions and disproportionately affect vulnerable populations, including the elderly, children, and outdoor workers. The economic burden of climate-related health issues includes increased healthcare costs and productivity losses due to heat-related illnesses. Extreme weather events also compromise public health infrastructure. Flooding damages water treatment facilities, reducing potable water supplies, especially in regions reliant on these sources for drinking water.

4. Coastal Zones

Egypt's Mediterranean coast is highly vulnerable to rising sea levels. Land subsidence along the northern coastline, including in the Nile Delta, is already underway, contributing to the increased risk of coastal inundation. Subsidence rates in the Delta vary from 1–8.4 millimeters per year, affecting major cities like Alexandria and Port Said. Between 1993 and 2010, sea levels in the Mediterranean rose by 2.6 cm per decade. By the end of the century, they may rise by 22 cm.

Projections indicate that by 2100, sea levels could rise by one to three meters, with significant displacement of populations, as shown in Figure 43. These changes have severe economic implications, including damage to coastal infrastructure, ports, and tourism facilities. Socially, sea level rise threatens to displace millions of people. By 2030, around 45 million Egyptians will be seriously threatened by sea level rise, and by 2060, the population living in Low Elevation Coastal Zones (LECZ) is expected to grow to 63.5 million, representing a 249% increase over 60 years (IPCC, 2022).

Recent storm surges and flooding events illustrate these risks;

- December 2010, January 2011, and October 2015: Storm surges reached 1.2 meters above sea level, causing coastal flooding in the Nile Delta and damage to coastal structures.
- Alexandria (2015): Heavy rainfall led to urban flooding, affecting water treatment facilities and reducing potable water supplies. Saltwater intrusion into coastal aquifers further compounded the water crisis.

The economic costs of repairing and rebuilding damaged infrastructure strain public finances. Socially, the displacement caused by flooding events and the disruption of basic services disproportionately affect low-income people.

Egypt's socio-economic vulnerability is heightened by the prevalence of informal settlements, which are more exposed to environmental hazards due to inadequate infrastructure and limited preparedness among residents. The most affected social groups include the elderly, children, women, and the poor, who often have limited adaptive capacity.

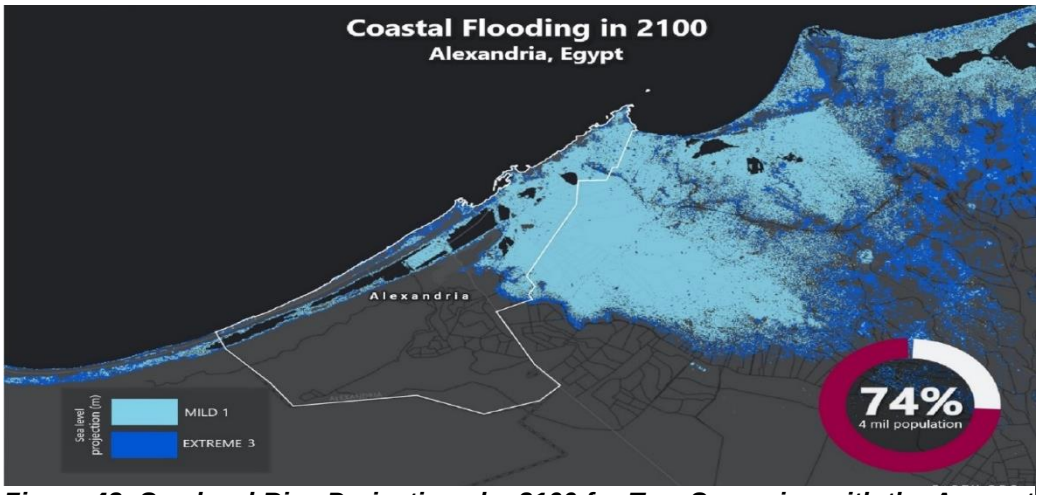


Figure 43: Sea-level Rise Projections by 2100 for Two Scenarios with the Amount of Rise in Meters (mild = 1m, extreme = 3m) (percentage and total population displacement indicated at the bottom right of the image). (Source: https://earth.org/data_visualization/sea-level-rise-by-the-end-of-the-century-alexandria/)

4.3.4 Exposure to Climate Hazards

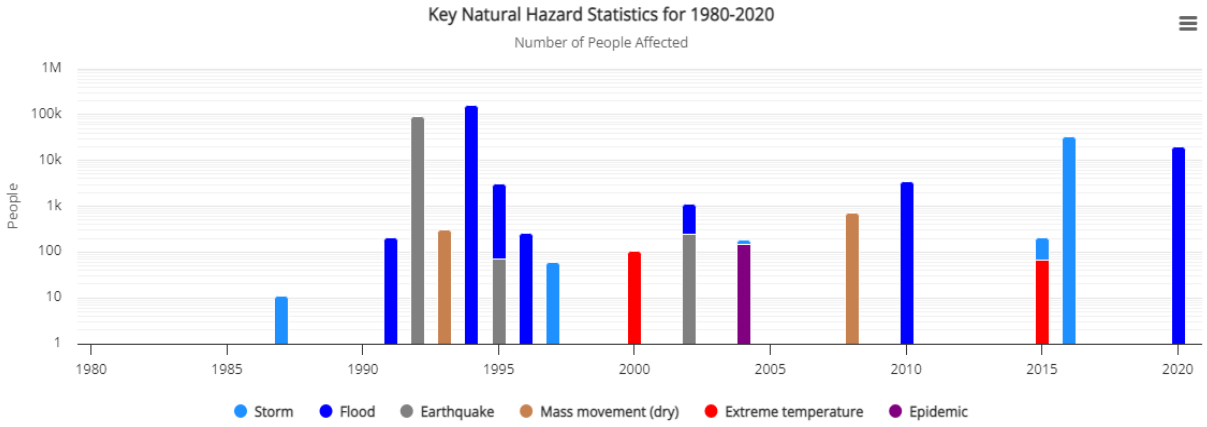
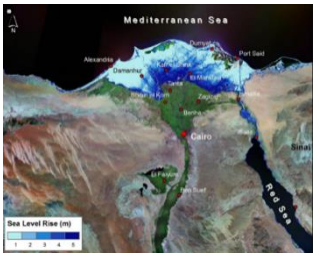
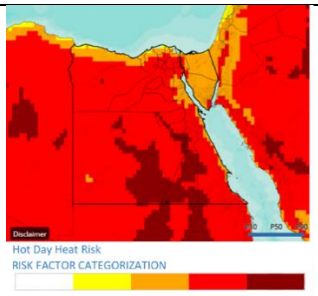
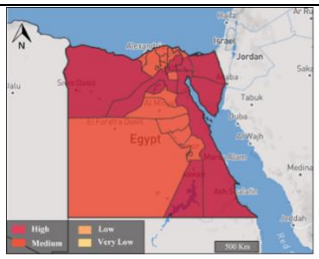
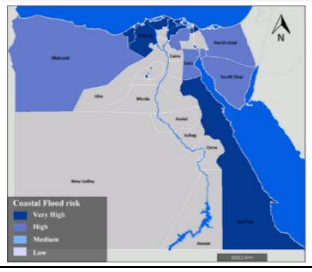


Figure 44: Key Natural Hazards Statistics from 1980 – 2020 (Source: https://climateknowledgeportal.worldbank.org/country/egypt/vulnerability#:~:text=Historical%20Hazards,in%20flash%20floods%20in%20Egypt)

Egypt's Nile Delta and Mediterranean coastline are highly vulnerable to natural hazards exacerbated by climate change, including shoreline erosion, sea-level rise, subsidence, and storm surges. The combination of these hazards, along with heavy rainfall, flash floods, and dust storms, poses significant risks to both humans' lives and property. The following chart provides an overview of the most frequent natural disasters in Egypt and illustrates the impacts of those disasters on human populations.

Table 51: Summary of Key Climate Risks in Egypt (World Bank, 2022)

Climate Hazard	Key Risks	Vulnerable Areas	Maps
Sea-Level Rise	-Coastal Erosion -Inundation -Salinization of ground water -Damage to Infrastructure -Impacts on Tourism	-Alexandria -Delta Region -Coastal Resorts	
Increase in Average Temperatures	-Sea Level Rise -Extreme Weather Events -Water Scarcity -Agricultural Productivity -Ecosystem Degradation	-Coastal Regions -Nile Delta -Oases -Urban Areas	
Extreme Heat Waves	-Public Health Risks -Loss Agricultural Productivity -Structural Damage -Energy Requirements	-Heat wave hazard levels in Egypt, ranging from high in the western and southern regions to medium and low in the eastern and northern areas.	
Flash Floods and Heavy Precipitation	-Flash Floods -Urban Flooding -Soil Erosion -Agricultural Damage	-Red Sea Coast -Western Desert -Sinai Peninsula -Urban Areas -Agricultural Regions	 

Over the last 20 years, natural hazards have killed nearly 1,500 people, causing $346.7 million in economic damages. Notable events include a deadly 2009 rockslide in Cairo and severe flooding in 2010 that displaced thousands of people and damaged over 4,000 houses. Climate change is expected to increase the potential impact of hazards. (GFDRR, 2019). Data from the Emergency Event Database: EM-Dat database, indicates Egypt has experienced various natural disasters, including floods, landslides, epidemics, and storms from 1900 to 2020 (GFDRR, 2019).

4.3.5 Sensitivity of Assets, Infrastructure, and the Wider Society

Egypt's assets, infrastructure, and society are highly vulnerable to climate change, with risks varying across regions and population groups. Climate hazards, including sea-level rise, extreme weather events, and heatwaves, significantly impact critical infrastructure systems. Heatwaves reduce energy generation efficiency, while flooding damages highways, power lines, and inadequate drainage systems, leading to operational disruptions, higher maintenance costs, and power outages.

Key sectors, including agriculture, fisheries, tourism, and health, face significant impacts. Rising temperatures and changes in rainfall patterns are putting agriculture at risk while fisheries are affected by changes in water conditions. Water scarcity endangers both consumption and industrial uses that are highly affected by fluctuation of the Nile River. Heat stress and waterborne diseases threaten public health; coastal tourism suffers from coastal erosion and degradation of coral reefs. Alongside the thread from heavy rains and rising seas to Egypt’s cultural heritage sites lead to damages and that increase preservation costs.

Socially, low-income communities, women, children, and the elderly are more exposed due to limited adaptive capacity and poor infrastructure. Poor urban planning and inadequate infrastructure in cities like Cairo and Alexandria increase sensitivity to heatwaves and flooding. Low-income communities lack the resources to recover from climate-related losses, while women in rural areas are more affected by water scarcity and food shortages due to their caregiving roles. The elderly, with limited mobility, face heightened risks during extreme weather events such as heatwaves.

4.4 Summary of Observed and Potential Impacts of Climate Change across Sectors

Key Sectors	Climate Stressors	Potential Impacts	Existing/Planned Adaptation Actions	Effectiveness of Adaptation	Risk Level	Institutional and Policy Context	Resilience Capacity	Data Sources
Agriculture	Temperature increase	Reduced crop yield	Drought-resistant crops	Moderate effectiveness in certain regions	Extreme	National Agricultural Strategy, NDCs	Medium	Ministry of Agriculture, Desert Research Center
	Drought	Increased irrigation needs	Improved irrigation systems	High in areas with new irrigation systems	High	Policies on water use efficiency	Medium	Scientific Studies, National Plans
Water	Reduced Nile flow	Water scarcity	Water conservation programs	Effective at community level	High	National Water Resources Plan	Medium	Ministry of Water Resources, Coastal Reports
	Higher evaporation rates	Increased water demand	Groundwater extraction	Moderate effectiveness due to depletion	High	UNFCCC NDC Reports	Low	Research Institutes and Water Management Policies
Sea and River Defense Infrastructure	Sea-level rise	Coastal erosion	Sea walls, levees	Effective for critical infrastructure protection	High	Coastal protection policy framework	High	Environmental Impact Assessments
	River flooding	Damage to riverbanks	Flood management plans	High effectiveness in urban zones	High	Integrated Flood Risk Management Plans	Medium	National Flood Management Programs
Ecosystems and Biodiversity	Habitat loss, temperature changes	Species decline	Protected areas, reforestation	Moderate, requires expansion	Extreme	National Biodiversity Strategy	Medium	- Ministry of Environment, global studies - Egyptian Biodiversity Strategy and Action Plan 2015-2030
Fisheries	Ocean warming, acidification	Fish stock decline	Sustainable fisheries programs, aquaculture	Moderate, needs scaling up	High	Fisheries management policies	Medium	National Institute of Oceanography and Fisheries
Health	Heat waves, vector-borne disease spread	Heat stress, increased disease rates	Public health campaigns, health system upgrades	Effective in urban zones	Extreme	Public Health Policies (Heat and Disease Management)	Low-Medium	- Ministry of Health, WHO guidelines. -UNICEF (2022). Children's Climate Risk Index: Egypt Report
Tourism	Extreme weather, sea-level rise	Tourism loss, infrastructure damage	Climate-resilient infrastructure, diversification	Moderate effectiveness	Low-Medium	National Tourism Strategy	low	Tourism ministry reports, local tourism data
Transport	Flooding, heat waves	Road damage, disrupted transport systems	Flood-resistant infrastructure, heat-resistant materials	Effective where infrastructure has been upgraded	Low	National Transport Policy	Medium	Ministry of Transport, Infrastructure Reports
Housing	Heat waves, flooding	Increased cooling demands, housing damage	Energy-efficient designs, improved drainage systems	Moderate, needs expansion to informal housing	Low-Medium	Housing and Urban Planning Policies	Low	- Local Housing Authorities, National Housing Strategy
Community and Regional Development	Drought, extreme weather	Economic decline, displacement risks	Drought mitigation programs, resilient planning	Effective in regions with active local governance	High	National Urban Development Strategy	Medium	Regional government reports, NGOs

4.5 Qualitative Methodology for Climate Change Impact Assessment

This climate change impact assessment employs a comprehensive, multi-step approach to evaluate the vulnerabilities and risks of climate stressors across key sectors. The methodology is designed to ensure a thorough analysis, drawing on both quantitative and qualitative data sources.

4.5.1 Identification of Climate Stressors and Sectorial Vulnerabilities

Key climate stressors (i.e. temperature increases, drought, sea-level rise, flooding) are systematically identified for each sector. The associated vulnerabilities, such as reduced agricultural yields, increased irrigation demands, or coastal erosion, are mapped using climate vulnerability indicators. This process incorporates data from local agencies, scientific studies, and sector-specific assessments.

4.5.2 Impact Analysis and Evaluation

Impacts are assessed through a structured analysis of severity, geographic extent, and duration. This includes both immediate and long-term consequences of climate stressors. High-risk regions (i.e. Upper Egypt and Nile Delta) were given a special attention, with particular focus on the magnitude of effects such as water scarcity, ecosystem degradation, or infrastructure damage. The significance of these impacts is evaluated based on the sensitivity and adaptive capacity of affected sectors. This includes assessing how well each sector can withstand or recover from climate-induced disruptions.

4.5.3 Assessment of Adaptation Measures

Existing and planned adaptation strategies (i.e. drought-resistant crops, improved irrigation systems, coastal defenses) were reviewed to determine their effectiveness. The assessment considers factors such as regional applicability, scalability, and long-term viability. Effectiveness is rated based on successful implementation in areas with high exposure to climate risks. The assessment also identifies gaps where adaptation measures need further enhancement or expansion, particularly in vulnerable regions or sectors lacking resilience.

4.5.4 Climate Vulnerability Mapping and Risk Assessment

Vulnerability mapping is conducted to visualize high-risk areas and sectors. Risk levels are assigned based on an integration of climate indicators, sectorial stressors, and institutional capacity. This allows for a clear understanding of where the greatest risks lie and where adaptation efforts should be prioritized. Resilience capacity is evaluated based on institutional frameworks, policy support, and community-level adaptation actions. This includes an analysis of how national strategies (i.e. National Water Resources Plan and National Biodiversity Strategy) contribute to enhancing sectorial resilience.

4.5.5 Synthesis of Data and Policy Context

The assessment draws on diverse data sources, including government reports, scientific studies, and community feedback, to provide a robust foundation for evaluating climate impacts. Additionally, the institutional and policy context is analyzed to ensure alignment with national climate goals and international commitments (i.e. NDCs and UNFCCC reports). This methodology provides a structured, data-driven approach to identifying climate vulnerabilities and evaluating the effectiveness of adaptation measures, ensuring that the assessment is both actionable and aligned with broader climate resilience objectives.

4.6 Monitoring and Evaluation of Adaptation Actions and Processes:

The operational framework of climate change adaptation involves a set of actions and activities that are consistent with the main objectives of any strategy and execution phases. It is expected that the implementing agencies would separately identify and describe their roles and responsibilities in full. They would also prepare an action plan, in order to achieve the strategic objectives within the limits of their competence. It is important that this be followed through monitoring and evaluation so as to improve the procedures of implementation, planning and resource allocation. Monitoring and Evaluation (M&E) is a crucial stage of the policy cycle regarding adaptation: it appears in the National Adaptation Polices (NAP) Guidelines associated with reviewing progress and effectiveness. As shown in Figure 45, the formulation of a NAP includes a structured framework of elements and steps, highlighting M&E as an integral component of the process. Refer to further elaboration on Egypt's National MRV system in Chapter 1, subsection *1.8 Institutional Arrangements*.

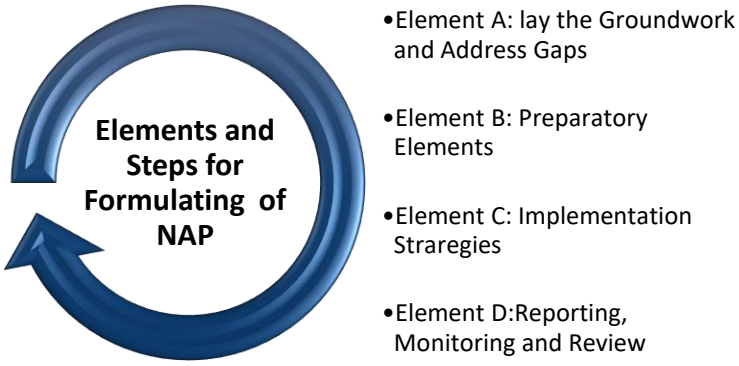


Figure 45: Element and Steps for Formulating NAP. (Source: UNFCCC Technical Guidelines for the National Adaptation Plan Process. (Source: https://unfccc.int/topics/adaptation-and-resilience/resources/publications/technical-guidelines-for-the-national-adaptation-plan-process).

4.7 Information Related to Averting, Minimizing, and Addressing Loss & Damage Associated with Climate Change Impacts

Egypt's efforts to avert, minimize, and address loss and damage associated with climate change are grounded in the need to respond to projected climate-related risks, vulnerabilities, and adaptive capacities across various sectors. Observed and potential impacts, including extreme weather events such as floods and heatwaves, along with slow onset events like desertification and sea- level rise, pose severe threats to critical areas, especially the Nile Delta. These challenges threaten key sectors like agriculture and water resources, which are vital to Egypt's economy and food security.

Table 52: Natural Disasters in Egypt, 1900 – 2020. (Source: https://thinkhazard.org)

Natural Hazard	Subtype	Events Count	Total Deaths	Total Affected	Total Damage ('000 USD)
Earthquake	Ground Movement	5	594	92,996	1,200,000
Epidemic	Bacterial Disease	1	10,276	0	0
	Viral Disease	2	15	143	0
Extreme Temperature	Cold Wave	1	3	105	0
	Heat Wave	3	164	66	0
Flood	Flash Flood	2	13	468	0
	Riverine Flood	6	638	167,960	140,000
Storm	Convective Storm	6	109	47,807	126,000
Mass Movement (dry)	Rockfall	1	98	697	0
	Subsidence	1	34	300	0

Scientific assessments reveal the vulnerabilities of Egypt's coastal regions, where rising sea levels and salinization directly threaten agricultural productivity. Between 1993 and 2010, the Mediterranean Sea rose by 2.6 centimeters per decade, a significant trend expected to worsen, with sea levels projected to increase by 22 centimeters by the end of the century. This escalation has left Egypt's coastline, particularly in areas like Rosetta, highly vulnerable to erosion, saltwater intrusion, and increased soil salinity. The salinity of Rosetta's coast rose sharply from 27 percent in 1964 to over 29 percent by 2015, contributing to the deterioration of cultivated land and the degradation of freshwater resources (Al-Mailam et al., 2023).

These coastal issues increase water scarcity and pose a direct threat to agricultural productivity in the Nile Delta, one of Egypt's most crucial agricultural regions. Increased soil salinity and declining freshwater availability have led to significant crop damage and reduced yields, affecting national food security.

In response to these impacts, Egypt has embarked on several adaptation initiatives. Agricultural production in vulnerable regions, such as the Nile Delta, is being enhanced through targeted interventions, with projected investments of $4 billion. Similarly, $2 billion has been allocated for the rehabilitation of agricultural areas in the Northern Delta affected by sea-level rise. Egypt is also focused on increasing resilience in climatically vulnerable areas by combating desertification and rehabilitating degraded pastures, with a budget of $3.5 billion dedicated to these activities. Improving water management is another priority, with projects such as the development of on-farm irrigation in the Nile Valley and Delta estimated at $4 billion. Additionally, supporting early warning systems, agricultural weather forecasting, and establishing agricultural insurance are expected to cost $1.5 billion.

Water resource management is also a significant area of focus, with cross-cutting projects such as water desalination using solar energy allocated $625 million. Natural protection efforts along the Rosetta shoreline using innovative techniques like the sand motor will cost $120 million, while the rehabilitation of irrigation canals to enhance agricultural resilience will require $4.5 billion. Coastal protection and development efforts in three Mediterranean cities, integrating climate adaptation into urban planning, are set to receive $2 billion, while scaling up solar-powered irrigation projects is expected to cost $50 million. Furthermore, infrastructure projects such as building a breakwater at the Port of Alexandria to mitigate the impacts of rising sea levels is expected to receive $41 million in funding. The total cost of implementing these adaptation measures is estimated at $50 billion, forming part of Egypt's broader climate strategy. However, the country's ability to implement these measures is conditional on receiving adequate international financial support. As outlined in Egypt's second updated NDC, the total financial requirement for both mitigation and adaptation efforts up to 2030 is estimated at $246 billion. Of this, $196 billion needed for mitigation, while $50 billion is required for adaptation.

Egypt has also taken significant steps to mitigate the adverse effects of climate change through various initiatives. The Integrated Coastal Zone Management (ICZM) Plan aims to develop climate-resilient strategies that link land use planning with coastal protection measures over the next 10-15 years. The government has also integrated Disaster Risk Reduction (DRR) strategies into national planning, focusing on developing hazard maps and early warning systems to reduce the vulnerability of communities and critical infrastructure, particularly against extreme weather events like floods.

Despite significant efforts by the Egyptian government to mobilize resources through domestic public and private channels, meeting these targets will not be possible without substantial international support. Egypt emphasizes the need for developed countries to fulfill their commitments under Article 9 of the Paris Agreement, which mandates financial support to developing countries. This support should be delivered through international and regional development partners, funds, and private investors using a variety of financial modalities, including blended finance, green bonds, and grants (EEAA, 2023).

Institutional arrangements within Egypt, such as the National Council for Climate Change, alongside key ministries, continue to drive national climate efforts. These institutions

collaborate with international partners to ensure that Egypt’s adaptation and mitigation plans are effectively implemented. Egypt remains committed to its sustainable development goals as part of its Vision 2030, which integrates climate action into the country's broader developmental objectives, ensuring that loss and damage from climate impacts are adequately addressed.

4.8 Cooperation, Good Practice, Experience, and Lessons Learned

Egypt has been actively engaged in a range of national, regional, and international initiatives that aimed at sharing information, promoting good practices, and exchanging experiences related to climate adaptation. These cooperative efforts have been central to strengthening Egypt's adaptive capacity and have enabled the integration of climate adaptation actions into national strategies and planning frameworks.

Through collaborations with international organizations like the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF), Egypt has shared and adopted policy innovations that have informed its national adaptation strategies. Notable examples include the National Adaptation Plan (NAP) and pilot projects focused on sustainable agricultural practices and water resource management, particularly in vulnerable regions such as the Nile Delta. These initiatives have provided valuable insights into embedding climate science into planning frameworks, thereby enhancing the resilience of local communities.

Egypt’s efforts in ICZM and disaster risk reduction have further highlighted the importance of incorporating adaptation actions at different governance levels. ICZM, in particular, has facilitated the exchange of knowledge on coastal protection, providing strategies that have been applied both locally and regionally to mitigate the effects of sea-level rise and coastal erosion.

Egypt’s cooperation extends across local, national, regional, and international levels, involving diverse actors such as local governments, farmers’ cooperatives, international donors, and regional organizations. These efforts focus on water conservation, renewable energy projects, and transboundary water management. International cooperation with institutions like the UNFCCC, Green Climate Fund (GCF), and European Bank for Reconstruction and Development (EBRD) has mobilized funding and technical support for large-scale climate projects, advancing Egypt’s climate resilience.

In terms of strengthening scientific research and institutional capacities, Egypt has made significant progress by improving its early warning systems, enhancing its capacity to conduct vulnerability assessments, and developing robust monitoring and evaluation frameworks. These advancements have been crucial for evidence-based decision-making and have helped ensure that adaptation measures are more effective and responsive to climate risks. The enhanced national early warning systems have significantly improved Egypt’s preparedness for extreme weather events, which has, in turn, increased the resilience of vulnerable areas.

Egypt has also played a leading role in sharing lessons learned with other developing nations, particularly within regional forums. Through its experiences in addressing challenges such as water scarcity, desertification, and agricultural resilience, Egypt has contributed to shaping regionally adapted solutions and identifying common priorities for climate adaptation.

Ultimately, Egypt's cooperative efforts underscore the vital role of partnerships in fostering innovation and building adaptive capacity. By leveraging regional and international cooperation, Egypt has not only strengthened its own resilience but has also contributed to the global exchange of good practices, science, and policy advancements in climate adaptation. These efforts demonstrate that effective cooperation is key to addressing the multifaceted challenges posed by climate change.

In addition, Egypt has significantly invested in strengthening its climate research and monitoring systems. Systematic observation of key climate variables, such as temperature, precipitation, and sea-level rise, has provided vital data for informing adaptation actions. The development of robust monitoring and evaluation frameworks has enabled Egypt to track its adaptation progress, optimize resource allocation, and incorporate lessons learned into future planning, ensuring that adaptation actions remain effective and durable.

4.9 Stakeholder Involvement, including Subnational, Community-level, and Private Sector Plans, Priorities, Actions, and Programs

Climate change adaptation in Egypt involves diverse stakeholders, including government bodies, subnational authorities, private sector actors, international organizations, non-governmental organizations (NGOs), and community-level organizations. The National Council for Climate Change (NCCC), established by Prime Minister Decree No. 1912/2015 (amended by Decree No. 1129/2019), leads climate governance, coordinating cross-sectoral efforts under the National Climate Change Strategy 2050. Key roles of the NCCC include policy coordination, multi-stakeholder collaboration, capacity building, monitoring and reporting mechanism, and implementation of NAP. Involvement spans national ministries, such as the Ministry of Water Resources, Agriculture, and Renewable Energy, and international organizations like UNDP. The National Climate Change Strategy 2050 also stated the importance of defining stakeholder's roles and responsibilities as outlined in the third goal of NCCS; *"Goal 3: Enhancing Climate Change Action Governance, Objective, (3.a): Defining the roles and responsibilities of the different stakeholders in order to achieve the strategic goals."* The table below outlines key stakeholders, their roles, interests, policies, and programs in the adaptation process.

Table 53: Summary of Key Stakeholders, Roles and Responsibilities, Actions in the Adaptation Process

Stakeholder	Roles & Interests	Key Policies & Strategies	Programs & Actions
Ministry of Environment (MoE)	Role: Develops national policies, strategies, and coordinates adaptation efforts. Interest: Economic resilience, biodiversity conservation.	Environmental Protection Law, National Climate Change Strategy (NCCS) 2050, Egypt's Vision 2030.	Climate risk management program, coastal protection program, climate-smart agriculture, raising awareness.
Egyptian Environmental Affairs Agency (EEAA)	Role: Implements NAP, coordinates adaptation activities, focuses on loss and damage. Interest: National adaptation capacity.	NCCS 2050, National Action Plan (NAP), Third National Communication (TNC), Forth National Communication (FNC).	The Integrated Coastal Zone Management (ICZM), capacity building, public awareness.
National Council for Climate Change (NCCC)	Role: Supervises climate activities, integrates climate in national development planning. Interest: Cross-ministerial collaboration.	NCCS 2050, Egypt's Nationally Determined Contributions (NDCs), Egypt's Vision 2030.	MRV system, stakeholder engagement.
National Ministries (Water, Agriculture, Energy, Petroleum)	Role: Manages water resources, food security, fisheries management, and transitions to renewable energy. Interest: Climate-resilient agriculture, energy transition.	Egypt's National Water Resources Plan (NWRP) 2037, The Sustainable Agriculture Development Strategy (SADS) 2030, Egypt's Integrated Sustainable Energy Strategy (ISES) 2035, The National Energy Efficiency Action Plan (NEEAP), Fisheries Development Plan.	Modern irrigation, water reuse, drought-resistant crops, renewable energy integration.
Local Level (Subnational Governments)	Role: Implements national policies, disaster risk reduction (DRR), community engagement. Interest: Reducing local vulnerability.	Local Climate Adaptation Plans, Egypt's National Strategy for Disaster Risk Reduction (DRR), water management policies.	Alexandria Coastal Zone Management (ICZM), Beheira water conservation efforts, climate-resilient housing in Cairo.
International Organizations (UNDP, UNFCCC, IFAD, World Bank, GIZ)	Role: Provides funding, technical expertise, and capacity building for climate resilience. Interest: Climate resilience, low-carbon transition.	The Paris Agreement, NDCs, Climate Change Action Plan (2021-2025).	NAP process, climate finance, climate-smart agriculture, water efficiency and irrigation programs.

Stakeholder	Roles & Interests	Key Policies & Strategies	Programs & Actions
Businesses and Private Sector	Role: Innovates technology, invests in green projects, and manages climate risks. Interest: Sustainability, market opportunities.	NCCS 2050, ISO environmental standards.	Renewable energy projects (Benban Solar Park- Wind Farms in Zafarana), energy efficiency, sustainable agriculture.
Research Institutions (Universities, Research Centers)	Role: Conducts climate research, supports policy, and develops adaptation technologies. Interest: Scientific advancement, national development goals.	NAP, NDCs, Science, Technology & Innovation Strategy 2030.	Climate-smart agriculture, renewable energy research, water management projects, education and training Programs.
NGOs (Youth Loves Egypt, Nature Conservation Egypt)	Role: Advocates for climate awareness, community engagement, and education. Interest: Environmental conservation, capacity building.	NCCS 2050. Sustainable Development Goals (SDGs)	Environmental campaigns, biodiversity protection, Climate Change and Health Initiatives.

Chapter 5: Financial, Technology Development and Transfer, and Capacity Building Needed and Received under Articles 9-11, and Article 13 of the Paris Agreement

5.1 National Circumstances

As outlined by the MPGs paragraphs 119 and 120, each Party should provide information on national circumstances and institutional arrangements relevant to reporting on the provision and mobilization of support; and information, if available, on national circumstances and institutional arrangements for the provision of technology development and transfer and capacity-building support.

These requirements are comprehensively addressed in Chapter 1 of this report, under subsection *1.8 Institutional Arrangements*. While the remaining information is covered under this Chapter.

5.2 Country Priorities, Strategies and Regulations

Egypt has demonstrated a strong commitment to climate action through various national initiatives, international engagement, and active participation in global climate negotiations, highlighted by its role in hosting Conference of the Parties (COP27) in Sharm El-Sheikh in 2022. This event served as a significant milestone for the country, allowing it to showcase its commitment to sustainable development and climate resilience while advancing climate diplomacy on a global scale. In conjunction with COP27, Egypt launched its National Climate Change Strategy (NCCS) 2050, outlining a long-term vision for climate resilience and low-emission development. COP27 marked important advancements in global climate action, particularly through the establishment of the "Loss and Damage" fund, which aims to provide essential financial aid to countries adversely affected by climate change, emphasizing the moral responsibility of the global community to compensate these nations.

In line with this commitment, COP27 focused on adaptation financing, with countries agreeing to double adaptation finance by 2025 to enhance the resilience of vulnerable nations. For the first time, food security was integrated into the conference agenda, emphasizing the significance of sustainable agriculture and climate resilience through initiatives like the "Food and Agriculture for Sustainable Transformation (FAST)" programme. Additionally, new Just Energy Transition Partnerships (JETP) for Indonesia and Vietnam demonstrated a commitment to supporting renewable energy transitions while ensuring fairness for affected workers and communities. Despite the ongoing challenge of meeting the $100 billion annual climate finance target, COP27 improved transparency and accountability in tracking financial contributions, reinforcing the necessity to increase both mitigation and adaptation financing. The conference also introduced the Global Shield initiative, spearheaded by the G7 and V20 countries, aimed at providing financial protection against climate-induced losses through insurance and disaster relief. It also highlighted the urgent need for greater financial support and climate justice for African countries and the Global South, addressing the disproportionate

impacts of climate change on these regions and stressing the importance of collective action in the global response to climate change.

Reinforced by COP27 achievements, Egypt's climate action priorities are primarily outlined in two key strategic policy documents: the National Climate Change Strategy 2050 and the second updated NDC. These documents reflect Egypt's comprehensive approach to tackling climate change while balancing economic growth and environmental sustainability.

5.2.1 Egypt's NCCS 2050 and Financial Support Required

Egypt's National Climate Change Strategy 2050 (NCCS) serves as a comprehensive roadmap to guide the country toward sustainable economic development while addressing the challenges posed by climate change. This strategy is designed to meet Egypt's commitments under the Paris Agreement and aligns with the Sustainable Development Strategy (SDS), also known as Egypt's Vision 2030. Below is a summary of the main components of NCCS and the financial needs for its implementation:

Table 54: Main Components of Egypt's National Climate Change Strategy (NCCS) 2050

Goal	Objectives
Goal 1: Achieving Sustainable Economic Growth and Low-Emission Development	- Transition to renewable and alternative energy sources (e.g., wind, solar, bioenergy) - Reducing greenhouse gas emissions from key sectors like energy and transportation - Enhancing energy efficiency across industries, buildings, and infrastructure - Promoting sustainable consumption and production, reducing waste and pollution in agriculture and waste management
Goal 2: Enhancing Adaptive Capacity and Resilience to Climate Change	- Protect citizens, especially vulnerable groups (women, children, elderly) from health risks due to climate change - Minimize damage to national assets, ecosystems, infrastructure, and heritage from climate impacts - Develop resilient infrastructure to handle extreme weather events like floods, heat waves, and sea level rise - Implement disaster risk reduction strategies, early warning systems, and community engagement
Goal 3: Enhancing Climate Change Governance	- Clearly define roles and responsibilities for different stakeholders, including government, private sector, and civil society - Improve Egypt's international ranking in climate action and attract investments and climate finance opportunities - Reform sectoral policies to align with climate mitigation and adaptation needs - Strengthen institutional, procedural, and legal arrangements such as Monitoring, Reporting, and Verification (MRV) systems
Goal 4: Enhancing Climate Financing Infrastructure	- Promote local green banking and develop green credit lines to support environmentally sustainable projects - Expand innovative financing mechanisms such as green bonds and results-based financing, with a focus on adaptation projects - Engage the private sector in climate finance and promote green job creation - Align with Multilateral Development Banks (MDB) guidelines to access more climate finance, building on successes from current programmes like the Benban Solar Plant

Goal 5: Enhancing Scientific Research, Technology Transfer, and Knowledge Management	- Strengthen scientific research and technological innovation for climate change mitigation and adaptation - Foster cooperation between universities, research centers, and government for technology transfer and disaster preparedness - Raise public awareness on climate change issues across all stakeholder groups, including decision-makers, citizens, and students - Develop educational materials and national campaigns on climate change to foster behavioral change and engagement

The overall estimated financing needed for implementing Egypt's climate change mitigation and adaptation programs within the strategy is USD 324 billion:

- **Mitigation Programmes**: The total cost is projected at USD 211 billion, with USD 57.6 billion in secured funding. This leaves a funding gap of USD 153.6 billion that needs to be filled to fully support mitigation efforts.
- **Adaptation Programmes**: The total cost is estimated at USD 113 billion, with USD 18.3 billion already secured. This results in a funding gap of USD 94.7 billion to ensure the successful implementation of adaptation initiatives.

5.2.2 Egypt's Second Updated NDC and Financial Support Required

Egypt's Second Updated NDC highlights several key aspects, including the focus sectors and targets, and the estimated financial requirements, for climate change mitigation and adaptation commitments. The table below provides a summary by sector.

Table 55: Financial Requirements for Climate Change Mitigation and Adaptation

Sector	Target
Mitigation: USD 196 billion	
Electricity	Egypt committed to reduce emissions by 37% (80 Mt CO2e) by 2030 compared to BAU, conditional on external support. Plans to install additional renewable energy capacities generating 42% of electricity by 2035.
Oil and Gas	Plans to reduce GHG emissions by 65% (1.7 Mt CO2e) by 2030 through the recovery and utilization of associated gases, improving energy efficiency, producing biofuels, and reducing flaring of associated gases.
Transport	Aims for a 7% reduction (9 Mt CO2e) in emissions by 2030 through expanding metro networks, high-speed rail, electric vehicles, and promoting the use of lower-carbon fuels like natural gas for buses.
Industry	Focusing on energy efficiency and low-carbon technologies, particularly in cement and petrochemical sectors, and encouraging the use of alternative fuels.
Buildings	Promoting energy-efficient appliances, solar panels, and green buildings.
Adaptation: USD 50 billion	
Water Resources	Projects include desalination using solar energy, rehabilitation of irrigation canals, and expanding wastewater reuse, improving agricultural resilience.
Agriculture	Introducing climate-resilient crops and irrigation practices, enhancing biodiversity, and improving livestock and fisheries management.
Coastal Zones	Coastal protection measures aim to address sea-level rise in the Nile Delta, including breakwaters, sand nourishment, and dune stabilization.
Tourism and Urban Development	Promoting renewable energy in hotels, greening urban spaces, and protecting vulnerable sites from climate impacts.

The successful implementation of Egypt's updated NDC through 2030 is contingent upon receiving substantial international financial support. The total estimated financial need for this period amounts to USD 246 billion, distributed as follows:

- **Mitigation:** USD 196 billion is required to fund mitigation measures aimed at reducing greenhouse gas emissions across key sectors such as electricity, oil and gas, transport, industry, and buildings.

- **Adaptation:** USD 50 billion is needed to enhance Egypt’s resilience to climate change, focusing on projects related to water resources, agriculture, coastal zones, and urban development.

Under Section 5.4, examples of required projects and activities will be provided in more detail. Achieving the targets set out in Egypt’s NDC is contingent on securing international support through concessional financing, grants, and innovative financial mechanisms such as green bonds. Without this external financial support, Egypt's ability to meet its climate goals will be significantly limited. Egypt’s achievement of its climate targets and goals also hinges on accelerating climate finance through international support and greater private sector engagement.

5.2.3 National Sustainable Finance Initiatives

The Egyptian Financial Regulatory Authority (FRA) has been proactively developing a legislative framework to support green and climate financing. Key initiatives in this framework include the introduction of a Green Bond framework in 2020, which established regulations for issuing green bonds that enable companies to fund environmentally beneficial projects such as renewable energy and sustainable infrastructure.

Moreover, in 2021, the FRA mandated that all companies listed on the Egyptian Stock Exchange and select non-bank financial institutions report on Environmental, Social, and Governance (ESG) standards and climate-related risks. Also in 2021, the Regional Center for Sustainable Finance (RCSF) was established to act as a hub for green finance in the Middle East and Africa, promoting sustainable investment and building capacity within non-banking financial institutions. To further bolster ESG initiatives, the FRA amended regulations in 2023 to allow more entities, including financing and consumer finance companies, to establish and manage ESG-focused investment funds, and expanded the definition of bonds to include green and sustainable bonds, thereby encouraging their issuance for environmentally friendly projects. Most recently, in August 2024, Egypt launched its first Voluntary Carbon Market in collaboration with the Ministry of Environment, enabling businesses to trade carbon credits and support emissions reductions, enhancing the country’s commitments to combating climate change.

The Central Bank of Egypt has also launched several important initiatives that aimed at promoting sustainable finance and integrating environmental, social, and governance (ESG) principles within the Egyptian banking sector. Among these measures are the "Guiding Principles for Sustainable Finance" established in 2021, which provide a framework for banks to incorporate ESG elements into their financial decisions, particularly in lending and investment. These principles also establish methods for identifying and managing climate-related risks, focusing on financing projects that are climate-friendly, thereby aligning with Egypt’s Vision 2030 and enhancing the integration of environmental and social factors in banking practices. Following this, the "Binding Sustainable Finance Regulations" implemented in 2022 require banks to establish sustainability units by April 2023, hire certified environmental consultants to assess climate and environmental risks starting in July 2023, and submit quarterly and annual

sustainability reports, all aimed at ensuring a thorough commitment to sustainable financial practices.

Furthermore, Egypt has issued several international sovereign green bonds as part of its broader strategy to finance environmentally sustainable projects. In September 2020, the country issued its first sovereign green bond of $750 million, marking a landmark achievement as Egypt became the first country in the Middle East and North Africa (MENA) region to achieve this milestone. The proceeds from this bond are allocated to financing clean transportation, renewable energy, water desalination, wastewater treatment, and other environmentally friendly infrastructure projects, garnering significant interest from global investors focused on green finance. Building on the success of this initial issuance, Egypt has since accessed other global green bond markets, including the issuance of Panda bonds (denominated in Chinese yuan) and Samurai bonds (denominated in Japanese yen), both aimed at funding eco-friendly initiatives. These efforts are part of Egypt's strategic push to attract foreign direct investment for its green economy.

The Egyptian government has further implemented various green incentives to promote sustainable development, with a particular focus on green hydrogen projects and renewable energy initiatives. The newly introduced Green Hydrogen Incentives Law (2024) offers significant benefits to projects related to green hydrogen production, including tax credits ranging from 33% to 55% on revenues, exemptions from value-added tax (VAT) on production equipment, and a waiver of registration fees for companies and land associated with green hydrogen initiatives. Additionally, projects that qualify can benefit from Egypt's Golden License, which streamlines administrative approvals into a single step. Complementing this, the Tax Incentives for Green Economy Programme (2023) provides tax advantages for businesses engaged in green hydrogen, renewable energy, and sustainability projects, including VAT exemptions on equipment and raw materials used in such initiatives. Additionally, Egypt is advocating for 50% of government investments to be directed towards environmentally sustainable projects, thereby reinforcing its commitment to a greener economy.

5.3 Underlying Assumptions, Definitions, and Methodologies

In accordance with the Modalities, Procedures, and Guidelines (MPG) assigned for the development of transparency for this specific chapter within the report under the Paris Agreement, the following underlying assumptions, definitions, and methodologies have been used to provide information on the support needed and received:

Table 56: Underlying assumptions used for information on needed and received support

Item	Description	Methodology/Assumptions
Conversion of Domestic Currency	Converting domestic currency into USD	Egypt uses the **average exchange rate** for the reporting year, based on the Central Bank of Egypt's official rates. **Assumption**: The exchange rate applied remains constant for the duration of the reporting period unless significant currency fluctuations warrant adjustments. The exchange rate used is the buy rate from the Central Bank of Egypt on the 11/12/2024 of 50.409 EGP for each dollar and for 53.06 for each Euro.
Estimation of Support Needed	Estimating financial, technical, and capacity-building support required for implementing Egypt's NDCs and climate strategies	Needs assessments are conducted using Egypt's Second **Updated Nationally Determined Contribution (NDC) and the National Climate Change Strategy 2050**, supported by sectoral studies to estimate mitigation and adaptation costs. The financial estimates are derived from the required upfront capital expenditures to implement mitigation and adaptation programmes, capacity building and technology transfer, and the human resources needed to implement the actions.
Determination of Reporting Year	Time frame for reporting financial support	The time frame from **January 1, 2022, to June 6th of 2024** is adopted for this report. Only project that have been approved and started in 2024 has been reported on .
Identification of Support Sources	Categorizing sources of support as bilateral, multilateral, or regional	Bilateral support is provided through structured agreements between two parties, typically involving a donor country and the recipient nation. This type of support is characterized by direct financial transfers or assistance aimed at specific projects or initiatives. In contrast, multilateral support is coordinated and managed by international organizations or financial institutions that gather contributions from multiple countries. These institutions then allocate resources to fund large-scale projects.
Determination of Support Status	Categorizing support as committed, received, or needed	Support is categorized as: - **Committed**: Formally pledged but not yet disbursed. - **Received**: Funds disbursed to Egypt. - **Needed**: Future financial requirements identified for planned or ongoing programs.
Status of Supported Activities	Reporting the status of supported activities (planned, ongoing, completed)	Activities are classified based on their implementation status: - **Planned**: In planning phase. - **Ongoing**: Implementation started. - **Completed**: Project objectives met. Monitoring and evaluation (M&E) reports are used for status tracking.
Identification of Channels	Identifying channels of support (bilateral, regional, multilateral)	Financial support is categorized based on the type of funding mechanism through which it is provided. Bilateral channels involve direct agreements between two parties, usually between a donor country and the recipient nation, while multilateral channels involve funding from international organizations or multilateral banks, financial institutions that pool resources from multiple countries or facilities to support large-scale projects.
Type of Support	Identifying the type of support (mitigation, adaptation, cross-cutting)	Projects are categorized as: - **Mitigation**: Focus on reducing GHG emissions. - **Adaptation**: Resilience-building projects. - **Cross-cutting**: Addressing both adaptation and mitigation.
Identification of Financial Instruments	Identifying the financial instruments used (grant, concessional loan, non-concessional loan, equity, guarantee)	Financial support is categorized by the type of instrument: - **Grants** - **Concessional loans** - **non-concessional loans** - **Equity** - **Guarantees**. Terms are specified in project agreements.
Sectors and Subsectors	Identifying sectors and subsectors receiving support	Support is reported according to sectors such as **Energy**, **Water resources**, **Agriculture**, **Waste management**, and subsectors where applicable.
Use, Impact, and Results	Reporting on the use, impact, and estimated results of support	Performance indicators, such as GHG reductions, resilience improvements, and job creation, are used to measure the impact of support. Data is sourced from national M&E systems.

Contribution to Technology and Capacity-building	Report on contributions to technology transfer and capacity-building	Contributions to **technology development** and **capacity-building** are collected through relevant stakeholders and reported KPI such as technologies deployed, and number of personnel trained when available.
Avoidance of Double Counting	Avoiding double counting when reporting financial support	To prevent double counting, financial flows are tracked separately for transparency-related capacity-building and other forms of climate support. The institutional framework collecting this data clearly distinguishes between funding allocated for transparency efforts and broader climate initiatives. Consequently, certain projects may appear multiple times, each time specifying the relevant activity and its associated financial amount.

5.4 Information on Financial Support Needed by Egypt under Article 9 of the Paris Agreement

5.4.1 Priority Sectors for Securing International Finance

Egypt seeks international financial support across multiple sectors to implement its climate mitigation and adaptation strategies in line with its second updated NDCs and national climate change strategy by 2050. Key sectors targeted for this support include energy sector, with a goal of expanding renewables installed capacities so that the electricity produced from renewables reaches up to 42% of total electricity generated by 2030.

In the oil and gas sector, the focus is on reducing GHG emissions via associated gas recovery, energy efficiency improvements, and biofuel production. The transport sector aims to enhance public transport systems, such as Cairo Metro and high-speed rail. In industry, efforts concentrate on increasing energy efficiency and adopting low-carbon technologies, particularly within the cement and petrochemical sectors. Water resource projects involve solar-powered desalination, rehabilitation of irrigation canals, and wastewater reuse. In agriculture, initiatives include introducing climate-resilient crops, enhancing irrigation practices, and preserving biodiversity. Additionally, protective measures in coastal zones address sea-level rise through the construction of breakwaters and dune stabilization. Finally, in tourism and urban development, priorities include greening urban areas, promoting renewable energy usage in hotels, and safeguarding cultural sites from climate impacts.

5.4.2 Barriers and Gaps to Attracting International Finance

While Egypt is committed to achieving its National Climate Change Strategy 2050 and updated NDC commitments, several barriers such as currency instability, shortage in foreign currency, high lending rates and inflation limit the country's and private sector ability to secure international finance across key sectors. Below is a further breakdown of perceived gaps:

Table 57: Barriers and Gaps Attracting International Finance

Barrier	Description
High Initial Capital Costs	Large-scale projects, particularly in **renewable energy** and **transport infrastructure**, require significant upfront investments, deterring investors who seek shorter payback periods.
Limited Green Finance Access	Egypt's green finance infrastructure is underdeveloped, limiting access to affordable funding for smaller projects in **agriculture** and **water management**. International loans add complexity.

Technological and Capacity Constraints	Key sectors like **industry**, **agriculture**, and **water resources** require costly, advanced technologies. Difficulty accessing these technologies deters financiers who prefer proven, scalable solutions.
Limited Private Sector Engagement	The private sector's participation in **climate finance** is limited due to insufficient financial incentives and perceived risks, particularly in sectors like **renewable energy** and **green urban development**.
Low Returns in Agriculture and Water Sectors	Projects in **agriculture** and **water resources** offer long-term environmental benefits but relatively low financial returns, discouraging investment without concessional finance or grants.
Inadequate Risk Mitigation Mechanisms	A lack of insurance mechanisms, especially in vulnerable sectors like **coastal zones** and **agriculture**, deters investment due to the high risk of climate-related impacts.

5.4.3 Contribution of Financial Support to Egypt's NDC and Long-Term Goals of the Paris Agreement

The financial support will help Egypt contribute to the achievement of its NDC as shown in page 199 of this report, and it will also contribute to the long-term goals of the Paris Agreement, specifically by:

- **Transitioning to a Low-Carbon Economy**: Investments in renewable energy, energy efficiency, and sustainable industries will drive Egypt's transition to a low-emission economy, contributing to global efforts to limit temperature rise to well below 2°C.
- **Building Climate Resilience**: Funding for adaptation projects in critical sectors like water and agriculture will enhance Egypt's resilience to climate change, particularly in regions like the Nile Delta, which are vulnerable to sea-level rise and desertification.
- **Leveraging International Cooperation**: By aligning its projects with international financial mechanisms (e.g., Green Climate Fund, Multilateral Development Banks), Egypt can secure more resources for scaling up its climate actions, thus contributing to the collective global effort under the Paris Agreement.

5.5 Breakdown of Required Financial Support

Table 58: Breakdown of Required Climate Financial Support by Mitigation Sector

Information Category	Details	
Title of Activity/Programme/Project	**Electricity Programme**	**Oil and Gas Programme**
Programme/Project Description	Renewable energy projects aimed at increasing energy generation from wind and solar resources, replacing inefficient thermal power plants, and integrating smart meters for energy management. Projects include: Wind power plants, Solar PV power plants, Solar CSP power plants, Replacement of inefficient thermal power plants with renewable energy, and smart meters.	Projects aimed at reducing emissions from petroleum-associated gas flaring, developing biodegradable plastics, producing bioethanol and biofuels, utilizing carbon capture and utilization (CCU) in melamine production, and producing wooden plates from rice straw. Projects include: Petroleum associated gases flaring reduction, Biodegradable plastic production, Bioethanol production, Melamine project in Damietta Port (CCU), Extracting algae oil for biofuels, Fuel oil from waste plastic, and wooden plates production (MDF) from rice straw.
Estimated Amount (Domestic Currency)	EGP 4,722,617,574,000	EGP 165,845,610,000
Estimated Amount (USD)	$40,526 million (Wind power plants), $23,754 million (Solar PV power plants), $18,109 million (Solar CSP power plants), $10,000 million (Thermal power replacement), $1,297 million (Smart meters) Total: $93,686 million USD	$150 million (Gas flaring reduction), $600 million (Biodegradable plastic production), $130 million (Bioethanol), $260 million (Melamine project), $600 million (Algae biofuels), $50 million (Fuel oil from plastic), $1,500 million (Wooden plates) Total: $3,290 million
Expected Timeframe	UA	UA
Expected Financial Instrument	UA	UA
Type of Support	Mitigation	Mitigation
Sector	Electricity	Oil and Gas
Subsector	Renewable energy deployment, energy efficiency improvement, grid modernization, and emission reductions from power generation	Emission reduction, renewable fuel production, waste-to-energy conversion, carbon capture and utilization, sustainable industrial practices
Contribution to Technology Development and Transfer	UA	UA
Contribution to Capacity-building	UA	UA
Anchored in National Strategy and NDC	Aligned with the national energy and climate change strategies and contributions included in Nationally Determined Contributions (NDC) for increasing renewable energy and reducing carbon emissions in the power sector.	Aligned with the national strategy for industrial sustainability and emissions reduction and Contributions included in Nationally Determined Contributions (NDC) for reducing industrial emissions and transitioning to renewable fuel production.
Expected Use	Generating renewable electricity, reducing GHG emissions, and improving energy efficiency of national electricity grid.	Reducing emissions from the oil and gas sector, producing biofuels, and utilizing waste materials for energy and production.
Expected Impact	Significant reduction in GHG emissions, increased share of renewable energy in the energy mix, and improved energy management.	Significant reduction in CO_2 and other greenhouse gas emissions, transition to biodegradable and renewable products, and reduced reliance on fossil fuels.
Estimated Results	Large-scale deployment of wind and solar energy, replacement of inefficient power plants, and integration of smart grid technologies.	Implementation of emission-reducing technologies, large-scale production of biofuels and biodegradable plastics, and development of sustainable industrial processes.

Information Category	Details	
Title of Activity/Programme/Project	**Transport Programme**	**Industry Programme**
Programme/Project Description	Large-scale transport infrastructure projects aimed at upgrading metro systems, developing electric high-speed rails and electric light rail networks, implementing a bus rapid transit system, and rehabilitating the Alexandria tram to reduce emissions and improve urban mobility. Projects include: Upgrading the Cairo metro network, Electric High-Speed Rails (HSR), Bus Rapid Transit (BRT) system - Ring Road, Electric light rail network, and Alexandria Raml tram rehabilitation project	Aims at improving energy efficiency and promoting sustainable industrial practices, focusing on reducing emissions and introducing green technologies. Projects include: Transform traditional charcoal open pits to mechanized kilns, green hydrogen for green ammonia, and Regulatory Efficient Motors.
Estimated Amount (Domestic Currency)	EGP 276,527,139,030	EGP 600,875,280,000
Estimated Amount (USD)	$2,160 million (Cairo metro Line 6), $3,000 million (Electric light rail Port Said - AbuQir), $83.67 million (BRT system), $242.0 million (Alexandria tram rehabilitation) **Total: $5,485.67 million**	$ 138 million (Charcoal kilns), $140 million (Green hydrogen for ammonia), $11,642 million (Efficient Motors) **Total: $11,920 million**
Expected Timeframe	UA	UA
Expected Financial Instrument	UA	UA
Type of Support	Mitigation	Mitigation
Sector	Transport	Industry
Subsector	Public transport modernization, electric transport systems, urban mobility improvement, and emission reduction from transport	Energy efficiency, Green Hydrogen, Industrial emissions reduction
Contribution to Technology Development and Transfer	YA	UA
Contribution to Capacity-building	UA	UA
Anchored in National Strategy and NDC	Aligned with the national strategy for sustainable urban transport and emission reductions and contributions included in Nationally Determined Contributions (NDC) for reducing transport-related emissions and improving sustainable urban transport systems.	Aligned with the national climate strategy and industrial sustainability roadmap contributions included in Nationally Determined Contributions for emission reductions and industrial sustainability.
Expected Use	Modernizing public transport infrastructure, reducing emissions, and promoting sustainable urban mobility.	Efficient industrial operations, emission reductions, and sustainable energy transitions.
Expected Impact	Significant reduction in CO_2 emissions, improved urban mobility, and transition to electric and sustainable transport systems.	Improved efficiency of industrial activities, deployment of low carbon technologies (green H_2)
Estimated Results	Large-scale deployment of electric transport systems, reduction of urban transport emissions, and improved connectivity in cities.	Estimated reduction in GHG emissions, increase in energy efficiency, promotion of sustainable industrial technologies.

Information Category	Details		
Title of Activity/Programme/Project	**Buildings and Urban Cities**	**Tourism Programme**	**Waste Sector**
Programme/Project Description	Projects aimed at improving energy efficiency in urban buildings by integrating energy-efficient cooling technologies to reduce energy consumption and emissions in the urban environment. Project includes energy efficient cooling in buildings	Projects aimed at improving energy efficiency and integrating renewable energy systems in the tourism sector, particularly in hotels and resorts, to reduce energy consumption and carbon emissions. Project includes energy efficiency and renewable energy in hotels and resorts	Projects aimed at upgrading municipal solid waste (MSW) management infrastructure, including mechanical biological treatment (MBT) plants and waste-to-energy facilities, to reduce landfill waste, generate alternative energy, and reduce greenhouse gas emissions. These include new investments and upgrading of MSW management infrastructure (i.e., MBT plants, waste-to-energy plants) and operation and maintenance
Estimated Amount (Domestic Currency)	EGP 12,602,250,000	EGP 17,391,105,000	EGP 282,340,809,000
Estimated Amount (USD)	$250 million	$345 million	$5,601 million
Expected Timeframe	UA	UA	UA
Expected Financial Instrument	UA	UA	UA
Type of Support	Mitigation	Mitigation	Mitigation
Sector	Buildings and Urban Cities	Tourism	Waste
Subsector	Energy efficiency in buildings, urban cooling systems, and sustainable building technologies	Energy efficiency in tourism facilities, renewable energy integration, sustainable tourism practices	Waste management infrastructure, waste-to-energy conversion, landfill waste reduction, and renewable energy generation from waste
Contribution to Technology Development and Transfer	UA	UA	UA
Contribution to Capacity-building	UA.	UA	UA.
Anchored in National Strategy and NDC	Aligned with national urban sustainability and energy efficiency strategies and contributions included in Nationally Determined Contributions (NDC) for energy efficiency and reducing emissions from urban buildings.	Aligned with national strategies for sustainable tourism and energy efficiency and contributions included in Nationally Determined Contributions (NDC) for reducing carbon emissions in the tourism sector and promoting energy efficiency.	Aligned with the national waste management strategy and renewable energy goals and contributions included in Nationally Determined Contributions (NDC) for waste management and emission reductions through waste-to-energy technologies.
Expected Use	Reducing energy consumption in buildings and improving urban cooling efficiency.	Reducing energy consumption and emissions in hotels and resorts by implementing renewable energy and energy-efficient systems.	Managing municipal solid waste more efficiently, reducing landfill waste, and generating renewable energy from waste materials.
Expected Impact	Significant reduction in energy consumption and CO_2 emissions from the building sector, improved urban climate resilience.	Significant reduction in energy consumption and carbon emissions in the tourism sector, enhanced sustainability in hotel and resort operations.	Significant reduction in landfill waste and greenhouse gas emissions, increased renewable energy generation, and improved waste management systems.
Estimated Results	Large-scale implementation of energy-efficient cooling systems in urban buildings, reduction of emissions from cooling.	Widespread adoption of renewable energy and energy-efficient practices in the tourism industry, contributing to emission reductions and sustainable tourism growth.	Large-scale implementation of waste-to-energy facilities, improved waste management infrastructure, and reduction of emissions from waste disposal.

Table 59: Breakdown of Required Climate Financial Support by Adaptation Sector

Information Category	Details		
Title of Activity/Programme/Project	**Agriculture Programme**	**Water Programme**	**Transport Adaptation Project: Breakwater in the port of Alexandria**
Programme/Project Description	Adaptation projects in systems and agriculture sector aimed at enhancing agricultural production, rehabilitating areas affected by sea-level rise, increasing resilience in vulnerable areas, developing irrigation systems, and establishing early warning and agricultural insurance systems. Projects include: ▪ Enhancing agricultural production for adaptation to climate ▪ change in the Valley and Nile Delta regions ▪ Rehabilitation of Agricultural Areas in Northern Delta Affected by ▪ the Repercussions of Sea-Level Rise ▪ Increasing the resilience of climatically vulnerable areas through ▪ combating desertification, water harvesting and rehabilitating ▪ degraded pastures in marginal areas ▪ Development of on-farm Irrigation in the old Valley and the Delta ▪ Supporting the establishment of early warning systems, ▪ improving agricultural weather forecasting services, modern ▪ agricultural extension, and establishing an agricultural insurance ▪ system against climate risks	Adaptation projects focused on water resources including solar-powered desalination, shore protection, rehabilitation of irrigation canals, coastal protection, scaling up solar pumping, and modernizing on-farm practices to enhance agricultural climate resilience. Projects include Water desalination, Natural shore protection, Rehabilitation of irrigation canals, Coastal protection, Solar pumping, Agricultural climate resilience. Projects include: ▪ Water desalination using solar energy ▪ Natural protection of Rosetta shoreline using the sand motor ▪ Rehabilitation of irrigation canals to enhance agricultural climate resilience ▪ Integration of coastal protection and development in 3 Egyptian cities in the Mediterranean ▪ Scaling up solar pumping for irrigation Improve agricultural climate resilience by modernizing on-farm practices	Adaptation project focused on building a breakwater in the port of Alexandria to protect against sea-level rise and extreme weather events, improving the port's resilience to climate change.
Estimated Amount (Domestic Currency)	EGP 756,135,000,000	EGP 569,369,655,000	EGP 2,066,785,400
Estimated Amount (USD)	Enhancing agricultural production: $4,000 million, Rehabilitation of agricultural areas: $2,000 million, Increasing resilience: $3,500 million, On-farm irrigation: $4,000 million, Early warning systems: $1,500 million Total: $15,000 million	Water desalination: $625 million, Natural shore protection: $120 million, Rehabilitation of irrigation canals: $4,500 million, Coastal protection: $2,000 million, Solar pumping: $50 million, Modernizing on-farm practices: $4,000 million Total: $11,295 million	$41 million
Expected Time Frame	UA	UA	UA
Expected Financial Instrument	UA	UA	UA
Type of Support	Adaptation	Adaptation	Adaptation
Sector	Agriculture	Water Resources	Transport
Subsector	Agricultural resilience, irrigation systems, climate adaptation in farming, early warning systems, insurance for climate risks	Water desalination, irrigation canal rehabilitation, coastal protection, solar-powered irrigation, climate-resilient farming practices	Coastal protection, port infrastructure adaptation to sea-level rise and extreme weather events

Contribution to Technology Development and Transfer	UA	UA	UA
Contribution to Capacity-building	UA	UA	UA
Anchored in National Strategy and NDC	Aligned with the national strategy for agriculture adaptation to climate change and contributions included in Nationally Determined Contributions (NDC) for agricultural resilience and climate adaptation.	Aligned with the national water resource management and climate change strategies and Contributions included in Nationally Determined Contributions (NDC) for climate-resilient water management.	Aligned with the national climate change strategy and contributions included in Nationally Determined Contributions (NDC) for enhancing resilience of coastal infrastructure.
Expected Use	Improving agricultural resilience, irrigation systems, and early warning mechanisms to adapt to climate change.	Improving water resource management, protecting shorelines, rehabilitating irrigation systems, and enhancing agricultural resilience through water-saving technologies.	Protecting port infrastructure from climate-induced risks such as sea-level rise and extreme weather events.
Expected Impact	Deployment of climate-smart technologies (irrigation systems) and early warning system, rehabilitation of agricultural areas	Reduced water scarcity, improved irrigation efficiency, and increased resilience to climate change impacts on water resources.	Increased resilience of the port of Alexandria to climate change, protection of coastal infrastructure, and reduced economic losses from extreme weather events.
Estimated Results	Enhanced resilience and adaptive capacity, and reduced vulnerability to climate change impacts	Enhanced water management, increased use of renewable energy for irrigation, and improved coastal protection.	Successful construction of the breakwater, improved climate resilience of the port, and reduced vulnerability to sea-level rise.

5.6 Information on Financial Support Received by Egypt under Article 9 of the Paris Agreement

Article 9 of the Paris Agreement commits developed countries to provide financial resources to assist developing countries in their efforts to mitigate and adapt to climate change. Egypt, as a developing country party to the agreement, has received financial support to bolster its transition towards a low-carbon, climate-resilient economy. This support has been channeled through various multilateral and bilateral financial mechanisms, including concessional loans, grants, and technical assistance.

Table 60: Breakdown of Received Financial Support

Information Category	Details	
Title of Activity/Programme/Project	**Green Economy Financing Facility Egypt II (GEFF Egypt II)**	**Egypt - Electricity and Green Growth Support Programme II (EGGSP II)**
Programme/Project Description	GEFF Egypt II is designed to help Egypt's transition to a green economy by providing a combination of concessional loans and grants to private sector MSMEs. The programme supports investments in energy efficiency, renewable energy, water efficiency, and resource-efficient technologies. GEFF II also provides grant incentives of up to 10-15% on successful project completion, as well as free technical assistance for project development. Its scope includes key sectors such as agriculture, construction, and manufacturing, and contributes to cross-cutting goals including climate change mitigation and sustainability.	The EGGSP II aims to promote a sustainable, competitive, and diversified electricity sector in Egypt to ensure security of supply and support climate change mitigation and green growth. The expected outcomes of the programme include: i) rationalization of electricity tariffs, ii) enhanced financial sustainability of the electricity sector, iii) improved corporate governance and competitiveness of key electricity institutions, iv) enhanced security of energy supply through renewable energy and energy efficiency, and v) stronger private sector engagement for better service delivery. The programme also supports low-carbon economic growth.
Channel	Multilateral (via EBRD, supported by EU, AFD, and GCF)	Bilateral (via AfDB)
Recipient Entity	Private sector MSMEs in Egypt across various sectors, including agriculture, construction, and manufacturing.	Government of Egypt (Ministry of Electricity and Renewable Energy)
Implementing Entity	European Bank for Reconstruction and Development (EBRD)	African Development Bank (AfDB) and Ministry of Electricity and Renewable Energy
Amount Received (Domestic Currency)	EGP 8,821,575,000	EGP 4,536,810,000
Amount Received (USD)	$175 million (GEFF II total funding)	USD 90 million
Time Frame	Start: 2022	Signature Date: 20 April 2022
Financial Instrument	Grant and Loan	Loan
Sector	Energy efficiency, renewable energy, resource and water efficiency, circular economy	Energy, specifically electricity and green energy growth
Subsector	Agriculture, construction, manufacturing, MSMEs	Electricity sector reforms, renewable energy, energy efficiency
Type of Support	Mitigation	Mitigation
Contribution to Technology Development and Transfer	UA	UA
Contribution to Capacity-building	UA	UA
Status of Activity	Ongoing	Ongoing
Use of Support	Financing green technologies and sustainable solutions for MSMEs to promote energy efficiency, renewable energy, and climate resilience across various sectors.	The financial support is used to improve the efficiency of Egypt's electricity infrastructure, facilitate reforms in the energy sector, and support green energy growth and climate adaptation initiatives.
Impact	GEFF II aims to significantly reduce Egypt's carbon footprint by enabling MSMEs to adopt sustainable technologies. It supports the country's green transition through investments in energy-efficient technologies, water-saving initiatives, and renewable energy. It also aims to foster inclusivity by supporting equal access to green finance for men and women.	The programme is expected to enhance the reliability of Egypt's electricity supply, promote the adoption of renewable energy, and support low-carbon economic growth.
Estimated Results	More than €150 million in green investments; Significant reductions in energy consumption and greenhouse gas emissions across sectors; Creation of job opportunities and enhanced competitiveness of MSMEs. GEFF II builds on the success of GEFF I, which funded over 100 projects and enabled energy-efficient upgrades for private sector firms.	Increased share of renewable energy in Egypt's energy mix, reduced greenhouse gas emissions, and improved energy security. The programme supports Egypt's transition to a sustainable, low-carbon economy, in line with the country's climate commitments under the Paris Agreement.

Information Category	Details		
Title of Activity/Programme/Project	**Helwan Wastewater Treatment Project (WWTP)**	**Sustainable Transformation for Agricultural Resilience in Upper Egypt (STAR)**	**Transport Program**
Programme/Project Description	The project focuses on expanding and upgrading the Helwan Wastewater Treatment Plant (WWTP) in Cairo, improving water quality, sanitation, and pollution reduction. It will serve 2.2 million inhabitants, provide treated wastewater for irrigation, and generate biogas, contributing to climate change mitigation and adaptation. The operation will contribute to: (i) environmental protection, depollution, and climate action; (ii) increasing access to sanitation and water services; (iii) improving public health; and (iv) promoting sustainable economic development.	The STAR project aims to improve the living standards of smallholder farmers, poor households, and vulnerable women and youth in Upper Egypt. It focuses on increasing income and resilience through better market linkages, climate-adapted agricultural practices, and the development of small rural businesses. The project also includes water infrastructure rehabilitation and strengthening rural institutions.	Cairo Monorail, which consists of two lines: the Administrative Capital Line and the 6th of October Line
Channel	Multilateral (via EIB, EU-Neighborhood Investment Platform, Agence Française de Développement (AFD))	Bilateral (via IFAD)	Green Bond
Recipient Entity	Construction Authority for Potable Water and Wastewater	Government of Egypt	Government of Egypt (ministry of transport through National Authority for Tunnels)
Implementing Entity	European Investment Bank (EIB) and partner organizations	International Fund for Agricultural Development (IFAD)	National Authority for Tunnels
Amount Received (Domestic Currency)	EGP 8,975,213,000	EGP 3,253,396,860	EGP 17,492,061,800
Amount Received (USD)	EUR 88 million loan from the EIB USD 57 million from AFD EUR 27 million grant from the EU Total USD: **$178,044,297**	IFAD Financing: USD 64.54 million	USD 347 million
Time Frame	Signature Date: 30 November 2022	Start Date: 2022	Signature Date: September 2020
Financial Instrument	Loan and Grant (mobilized through EU-NIP, EUR 27 million)	Grant and Loan	Green bond
Sector	Water, Sewerage	Agriculture, Water	Clean transportation
Subsector	Water treatment, waste management, sanitation	Agricultural resilience, rural business development, irrigation infrastructure	electric transport systems, urban mobility improvement, and emission reduction from transport
Type of Support	Crosscutting	Crosscutting	Mitigation
Contribution to Technology Development and Transfer	UA	UA.	Development and transfer of electric rail technologies through monorail
Contribution to Capacity-building	UA	UA	Boosting Egypt's Capabilities with New Monorail Technology
Status of Activity	Ongoing	Ongoing	Aligned with the national strategy for sustainable urban transport and emission reductions and contributions included in Nationally Determined Contributions (NDC) for reducing transport-related emissions and improving sustainable urban transport systems.
Use of Support	The project contributes to water management, reducing pollution, improving sanitation services, and enhancing the resilience of the Greater Cairo area by	Financial support is directed at improving the productivity and resilience of smallholder farmers, rehabilitating water infrastructure, and	Modernizing public transport infrastructure, reducing emissions, and promoting sustainable urban mobility.

	generating a non-conventional water source for irrigation. It also contributes to climate change mitigation by reducing greenhouse gas emissions through biogas energy generation.	enhancing market access and rural institutions in Upper Egypt.	
Impact	The project will enhance sanitation services for 2.2 million people, reduce pollution, support irrigation with treated wastewater, and contribute to climate change mitigation and adaptation efforts. It also aims to create over 2,000 jobs and improve livelihoods in the region.	The project aims to improve the livelihoods of 240,000 rural households, strengthen climate resilience, and foster sustainable agricultural practices in Upper Egypt, benefiting smallholder farmers, women, and youth.	Significant reduction in CO2 emissions, improved urban mobility, and transition to electric and sustainable transport systems.
Estimated Results	Significant improvements in water quality, sanitation services, and public health for Helwan, along with enhanced economic prospects for local communities. The project supports Egypt's Vision 2030 and climate resilience efforts.	Increased smallholder productivity, improved rural infrastructure, strengthened market linkages, and higher income resilience for 240,000 households, including 160,000 smallholder households and 80,000 households benefiting from rehabilitated water infrastructure.	Large-scale deployment of electric transport systems, reduction of urban transport emissions, and improved connectivity in cities.

Information Category	Details		
Title of Activity/Programme/Project	**Transforming Financial Systems for Climate (TFSC) – NBE Second Advance**	**USAID Climate Change Adaptation Initiative with Egypt**	**Green Sustainable Industries (GSI) – Egypt**
Programme/Project Description	As part of the TFSC programme, AFD and National Bank of Egypt (NBE) signed a credit facility agreement to support climate-compatible projects for SMEs in Egypt. On 19 December 2022, AFD disbursed a second advance of EUR 28.6 million under this EUR 100 million agreement. This credit line finances low-carbon and climate-resilient investments for SMEs, focusing on greenhouse gas mitigation and climate adaptation	This initiative, part of the USAID Climate Change Initiative, was approved by the Egyptian Parliament in July 2023. It includes a USD 15 million grant signed in September 2022. The project focuses on enhancing Egypt's ability to adapt and mitigate the economic, environmental, and social impacts of climate change. The initiative supports the preservation of ecosystems, reducing emissions, and improving climate resilience across critical sectors like the Red Sea and biodiversity.	The GSI project, part of a €271 million agreement between Egypt and the EU, supported by the EIB and NBE, focuses on financing public and private industrial projects for pollution abatement, decarbonization, and resource efficiency. The project aims to assist Egypt's industrial transition to a green economy through climate action, environmental sustainability, and compliance with environmental regulations
Channel	Bilateral (via AFD, NBE)	Bilateral (via USAID and Government of Egypt)	Bilateral (via EIB)
Recipient Entity	National Bank of Egypt (NBE)	Government of Egypt	Egyptian Environmental Affairs Agency (EEAA), National Bank of Egypt (NBE)
Implementing Entity	National Bank of Egypt (NBE), Agence Française de Développement (AFD)	USAID	EIB, EEAA, NBE
Amount Received (Domestic Currency)	EGP 1,517,516,000	EGP 756,135,000	EGP 8,277,360,000
Amount Received (USD)	EUR 28.6 million (Second advance under EUR 100 million credit line) or $30,103,472 USD	USD 15 million	€156 million (EIB financing) or $164,200,754 USD
Time Frame	Start Date: 19 December 2022	Start Date: September 2022	Start Date: 2023
Financial Instrument	Loan	Grant	Loan
Sector	Finance, Climate Change	Climate Change, Environment, Biodiversity	Industry, Climate Change, Environmental Sustainability
Subsector	Climate finance, SME investments, low-carbon projects	Climate adaptation, biodiversity preservation, emissions reduction	Pollution abatement, decarbonization, energy/resource efficiency
Type of Support	Crosscutting	Crosscutting	Crosscutting
Contribution to Technology Development and Transfer	UA	UA	UA
Contribution to Capacity-building	UA	UA	UA
Status of Activity	Ongoing	Ongoing	Ongoing
Use of Support	The loan supports the low-carbon and climate-resilient transition of Egyptian SMEs by financing investments that contribute to both greenhouse gas mitigation and climate adaptation.	The grant is used to support adaptation strategies in Egypt, including the preservation of ecosystems, addressing biodiversity loss, and enhancing climate resilience.	The project funds climate-friendly industrial projects focusing on pollution reduction, energy efficiency, and resource management, aiding Egypt's transition to a green economy and compliance with national environmental regulations.
Impact	The project promotes the financing of 100% climate-compatible investments in Egypt's SME sector, supporting the low-carbon transition and improving climate resilience in the financial system.	The initiative aims to reduce emissions, preserve ecosystems, and strengthen Egypt's capacity to adapt to climate change by improving climate-related systems and infrastructure, with a particular focus on biodiversity and the Red Sea ecosystem.	The initiative is expected to reduce greenhouse gas emissions, improve industrial sustainability, and mitigate environmental health risks, supporting Egypt's Green Vision 2030 and National Climate Change Strategy 2050.
Estimated Results	Increased financing for climate-compatible projects, enhanced NBE capacity for climate finance, and improved access to funding for low-carbon SMEs in Egypt.	Enhanced climate resilience, improved biodiversity protection, reduced emissions, and stronger infrastructure for addressing climate risks in Egypt.	Reduction in pollution load, enhanced energy and resource efficiency, and compliance with environmental regulations in Egypt's industrial sectors.

Information Category	Details		
Title of Activity/Programme/Project	**Egypt Green Economy Financing Facility (GEFF)**	**Alcazar Energy Partners II – Egypt**	**Egyptian Pollution Abatement Programme (EPAP) III**
Programme/Project Description	The GEFF supports green economy projects in Egypt, focusing on financing small and medium enterprises (SMEs) involved in energy efficiency, renewable energy, and climate change mitigation. Through a partnership between the EIB and Bank of Alexandria (AlexBank), the programme funds private sector projects that aim to reduce carbon emissions and promote sustainable energy practices across Egypt.	The Alcazar Energy Partners II project focuses on supporting renewable energy projects in Egypt and other regions in the Middle East, North Africa, Eastern Europe, and Central Asia. It addresses the gap in greenfield infrastructure by developing a portfolio of renewable energy assets, including solar, wind, and hydropower projects to support Egypt's green energy transition.	EPAP III is focused on financing pollution abatement in Egypt's industrial sector. The programme provides credit lines to industries for environmental investments aimed at reducing pollution emissions and promoting sustainable practices. In 2022, the programme received an additional €3.975 million in investment grants from the Neighborhood Investment Platform (NIP) to further enhance the scope of pollution reduction efforts.
Channel	Bilateral (via EIB)	Bilateral (via EIB)	Bilateral (via EIB)
Recipient Entity	Bank of Alexandria (AlexBank)	Alcazar Energy Management Services Ltd, Egypt	Egyptian Environmental Affairs Agency (EEAA)
Implementing Entity	EBRD, AlexBank	EIB, Alcazar Energy Management Services Ltd	EPAP Project Unit
Amount Received (Domestic Currency)	EGP 756,135,000	EGP 3,780,675,000	EGP 210,913,500
Amount Received (USD)	$15 million (EIB funding)	USD 75 million (EIB funding)	€3.975 million (Investment Grants from NIP) or $4,183,962 USD
Time Frame	Start Date: 2022	Start Date: 2022	Start Date: 2022
Financial Instrument	Loan	Loan	Grant (NIP Investment Grants)
Sector	Renewable energy, climate change mitigation, SME financing	Renewable Energy, Climate Change	Environmental Sustainability, Pollution Abatement
Subsector	Finance, Climate Change, Energy Efficiency	Wind energy, solar energy, hydropower	Industrial emissions reduction, sustainable industrial practices
Type of Support	Mitigation	Mitigation	Mitigation
Contribution to Technology Development and Transfer	UA	UA	UA
Contribution to Capacity-building	UA	UA	UA
Status of Activity	Ongoing	Ongoing	Ongoing
Use of Support	The financing supports SMEs in Egypt by promoting energy efficiency and renewable energy investments, contributing to carbon emission reductions and helping Egypt transition to a low-carbon economy.	The project finances renewable energy projects in Egypt and other regions, addressing the gap in greenfield infrastructure and promoting the transition to low-carbon energy generation.	The support is used to finance pollution reduction investments in Egypt's industrial sector, promoting compliance with environmental standards and reducing harmful emissions.
Impact	The project is expected to promote sustainable energy use and reduce carbon emissions, helping SMEs improve their environmental footprint while advancing Egypt's green energy goals.	The project will promote the development of renewable energy capacity in Egypt and reduce reliance on fossil fuels, supporting Egypt's climate goals and those of the broader region.	The programme reduces pollution emissions from industrial facilities, improves air and water quality, and contributes to Egypt's environmental sustainability goals.
Estimated Results	Increased deployment of energy efficient and renewable energy technologies	Increased deployment of renewable energy technologies (wind, solar, and hydropower) in Egypt and target regions, leading to carbon emission reductions and improvements in energy access.	Reduced industrial pollution, enhanced environmental management practices, and compliance with pollution abatement standards across Egypt's industrial sectors.

Information Category	Details	
Title of Activity/Programme/Project	**CIB Senior Loan for Climate Finance Expansion**	**Egypt Sustainable Transport and Digital Infrastructure Guarantee**
Programme/Project Description	The project involves a senior loan of up to $100 million from IFC to CIB with a tenor of 5 to 7 years to support CIB's growing climate finance business. The loan will help CIB expand its lending to climate-friendly projects and SMEs, with a focus on decarbonization and sustainable growth. The project also includes advisory services to strengthen CIB's climate risk management capabilities.	This project, supported by the Asian Infrastructure Investment Bank (AIIB), involves providing a $150 million guarantee to Egypt for sustainable transport and digital infrastructure development. The guarantee will back investments in green, climate-resilient transportation systems and enhance digital infrastructure, contributing to economic growth and environmental sustainability. It supports the green economy transition in Egypt by improving public transport and digital connectivity.
Channel	Bilateral via IFC	Bilateral (via AIIB)
Recipient Entity	Commercial International Bank (CIB)	Government of Egypt
Implementing Entity	International Finance Corporation (IFC), CIB	Egyptian Government
Amount Received (Domestic Currency)	EGP 5,040,900,000	EGP 7,561,350,000
Amount Received (USD)	$100 million	$150 million (AIIB Guarantee)
Time Frame	Start Date: 2023	Start Date: 2023
Financial Instrument	Senior Loan	Guarantee
Sector	Finance, Climate Change	Green transport, climate-resilient infrastructure, digital economy
Subsector	SME finance, climate risk management, sustainable finance	Transport, Digital Infrastructure, Climate Change
Type of Support	Mitigation	Crosscutting
Contribution to Technology Development and Transfer	UA	UA
Contribution to Capacity-building	UA	UA
Status of Activity	Ongoing	Ongoing
Use of Support	The loan supports CIB's expansion of its climate finance portfolio and facilitates investments in SMEs and sustainable projects aligned with green economy goals.	The guarantee backs investments in sustainable transport and digital infrastructure, contributing to Egypt's green economy and improving public transport systems and digital connectivity.
Impact	The project is expected to increase CIB's ability to finance climate-friendly projects, improve SME access to finance, and enhance climate risk management practices in Egypt.	The project will enhance sustainable transport and digital infrastructure, supporting Egypt's economic growth and transition to a green economy.
Estimated Results	Increased financing for SMEs and sustainable projects, enhanced climate risk management capabilities, and improved alignment with Egypt's climate finance objectives.	Deployment / development of sustainable transport and digital infrastructure

Information Category	Details	
Title of Activity/Programme/Project	**Eighth Operational Phase of the GEF Small Grants Programme (SGP OP8) – Part 1**	**Introducing Systemic Climate Resilience Methodologies in Infrastructure Investment Planning**
Programme/Project Description	The SGP OP8 focuses on empowering local civil society organizations (CSOs) and community-based organizations (CBOs) in 99 countries, including Egypt, by providing access to knowledge, technical assistance, and grant funding for community-driven initiatives. The programme targets socioeconomic development, biodiversity conservation, and climate change adaptation, with a strong emphasis on women, youth, and Indigenous Peoples.	This project focuses on adopting long-term climate-resilient policies in infrastructure investment plans by developing systemic climate resilience methodologies and using the Systemic Risk Assessment and Investment Prioritization Tool (SRAT). It aims to integrate these methodologies within national and municipal planning institutes. The project also provides governments with evidence and experience to demonstrate these resilience methodologies and metrics in their infrastructure investment plans, enhancing capacity for future climate challenges.
Channel	Bilateral via GEF	Bilateral (via GEF)
Recipient Entity	Local CSOs, CBOs	UNIDO
Implementing Entity	United Nations Development Programme (UNDP)	United Nations Industrial Development Organization (UNIDO)
Amount Received (Domestic Currency)	EGP 360,940,470.63	EGP 57,325,820.53
Amount Received (USD)	$126,186,603 (GEF Project Grant)	$1,137,214 (GEF Project Grant)
Time Frame	Start Date: 2024	Start Date: 2023
Financial Instrument	Grant	Grant
Sector	Crosscutting	Crosscutting
Subsector	Biodiversity, Climate Change, Land Degradation	Climate Change, Infrastructure
Type of Support	Ecosystem restoration, landscape management, sustainable livelihoods	Climate resilience, infrastructure investment
Contribution to Technology Development and Transfer	… UA	UA
Contribution to Capacity-building	UA	UA
Status of Activity	Ongoing	Ongoing
Use of Support	Enhances the capacity of local communities to implement sustainable practices and engage in the green economy.	Enhances capacity for infrastructure planners and governments to integrate resilience metrics into planning processes, reducing vulnerability to climate impacts.
Impact	The project provides technical and grant assistance to local CSOs and CBOs for biodiversity conservation, ecosystem restoration, and socioeconomic development.	The project develops resilience methodologies for global infrastructure investments, aiming to improve their ability to withstand climate impacts.
Estimated Results	Expected results include the restoration of 225,000 hectares of land, the improvement of 3.8 million hectares of landscapes, and better management of marine protected areas.	The project will enhance the resilience of global infrastructure projects, preventing human and financial disasters caused by climate change.

5.7 Information on Technology Development and Transfer Support Needed by Egypt under Article 10 of the Paris Agreement

Egypt emphasizes that its ability to implement ambitious climate action is highly constrained by the availability of appropriate technologies. The country calls for climate know-how to be freely available as a global public good to collectively fast-track the transition towards the target of the Paris Agreement. To achieve its climate goals, Egypt requires substantial support in technology development and transfer, including financial assistance, capacity building, and enhanced access to cutting-edge climate technologies. International cooperation and support will be crucial in addressing these technology needs and enabling Egypt to transition towards a low-carbon, climate-resilient future.

5.7.1 Overview of Egypt's Technology Development and Transfer Plans

Egypt recognizes the critical role of technology in addressing climate change challenges and achieving its climate goals. The country's plans related to technology development and transfer include deploying climate-friendly technologies such as renewable energy sources (solar, wind, and biomass), energy storage solutions, smart grid systems, and water desalination and conservation technologies. Furthermore, Egypt aims to integrate climate-resilient agricultural technologies, low-carbon transportation systems, and waste management and recycling technologies. To support this technological adoption, the government is focused on building administrative capacities and legal frameworks by developing policies to support technology adoption and innovation, enhancing institutional capabilities for technology assessment and implementation, and strengthening intellectual property rights while ensuring technology accessibility. Additionally, fostering partnerships and investments is a priority, which involves creating collaborative models between government entities, the private sector, development organizations, financial institutions, NGOs, and research institutions, encouraging foreign direct investment in climate technologies, and promoting technology transfer through international cooperation. Lastly, to enhance youth participation and entrepreneurship, Egypt plans to provide skills training in climate technologies, support research and innovation initiatives, and facilitate access to business incubators and accelerators for green startups.

5.7.2 Primary Needs and Priorities for Technology Development and Transfer

Key sectors and their advanced technologies include:

The Energy Sector emphasizes renewable energy technologies like high-efficiency solar panels and offshore wind, energy storage solutions, smart grids for renewable integration, and energy-efficient technologies for buildings and industries. The Water Sector focuses on solar-powered desalination, water conservation, wastewater treatment, and resource monitoring technologies.

The Agriculture Sector prioritizes drought-resistant crops, precision agriculture, advanced irrigation systems, and climate-smart livestock management. The Transportation Sector

promotes electric vehicles, efficient public transport, intelligent traffic systems, and low-carbon maritime and aviation technologies.

The Waste Management Sector advances waste-to-energy solutions, recycling technologies, and biodegradable plastics. Finally, the Climate Monitoring and Early Warning Systems Sector focuses on weather forecasting, satellite-based environmental monitoring, and early warning systems for natural disasters.

5.7.3 Needs for Enhancing Endogenous Capacities

Table 61: Needs for Enhancing Endogenous Capacities

Category	Details
4.1 Human Resource Development	- Training programmes for technicians, engineers, and managers in climate technologies - Curriculum development in universities to include climate technology courses - Capacity building for policymakers on technology assessment and implementation
4.2 Institutional Strengthening	- Enhancing research and development capabilities in universities and research institutions - Strengthening technology transfer offices in academic and research institutions - Improving coordination among government agencies for technology-related policies
4.3 Data Management and Analysis	- Developing capabilities for big data analytics related to climate and energy - Improving climate modeling and scenario analysis capabilities - Enhancing GHG inventory and MRV (Monitoring, Reporting, and Verification) systems
4.4 Policy and Regulatory Framework	- Developing supportive policies for technology innovation and adoption - Creating incentives for private sector investment in climate technologies - Enhancing intellectual property rights while ensuring technology accessibility

5.7.4 Needs for Enhancing Endogenous Technologies

- **Localization of Technologies**
  - Adapting international technologies to suit Egypt's specific climate, geographical, and socio-economic context.
  - Developing locally-appropriate and affordable versions of key climate technologies.
  - Enhancing local manufacturing capabilities for climate technologies.

- **Innovation and R&D**
  - Increasing funding for climate technology research in national institutions.
  - Establishing centers of excellence for key climate technologies.
  - Promoting collaboration between academia and industry for applied research.

- **Technology Transfer Mechanisms**
  - Developing effective mechanisms for technology transfer from international partners.
  - Enhancing absorptive capacity for new technologies.
  - Promoting joint ventures and licensing agreements with technology providers.

- **Entrepreneurship and Startups:**
  - Supporting incubators and accelerators focused on climate technologies.
  - Providing funding and mentorship for climate tech startups.
  - Facilitating linkages between startups and larger industries for technology commercialization.

Table 62: Needs for Enhancing Endogenous Technologies

Sector	Project	Technology Needed	Purpose
Renewable Energy	Decommissioning Inefficient Thermal Power Plants	Solar and wind power generation, grid integration, energy storage	Replace 5 GW of thermal power with 10 GW of renewables
	Solar Energy for Water Desalination	Solar-powered desalination technologies	Address water scarcity in coastal areas
	Solar Irrigation Pumps	Solar-powered water pumps	Improve water efficiency in agriculture
Energy Efficiency	Grid Modernization and Energy Storage	Advanced energy storage, smart grid technologies	Stabilize energy grid with renewable influx
	Energy-Efficient Industrial Technologies	Advanced industrial manufacturing systems	Enhance energy efficiency in industries
Agriculture and Water	Modernizing Irrigation Systems	Drip irrigation, climate-resilient irrigation systems	Conserve water and boost agricultural productivity
	Smart Agricultural Practices	Precision farming technologies	Increase resilience and productivity in farming
Transport	Electrification of Railways and Metro Lines	Electric trains, metro electrification systems	Transition to green transport systems
Water Management	Desalination Plants	Solar-powered desalination technology	Mitigate water shortages in high-need areas
Adaptation	Early Warning Systems for Climate Adaptation	Climate risk management, early warning systems	Improve resilience to climate-related risks

5.7.5 Breakdown of information on technology development and transfer support needed

Table 63: Breakdown of Information on Technology Development and Transfer Support Needed

Category	Energy Programme	Water Programme	Agriculture Programme
Title (of activity, programme or project)	Energy Programme	Water Programme	Agriculture Programme
Programme/project description	UA	UA	UA
Type of support (mitigation, adaptation, or cross-cutting)	UA	UA	UA
Type of technology	- Advanced renewable energy technologies (e.g., high-efficiency solar panels, offshore wind)	- Advanced water desalination technologies (e.g., solar-powered desalination)	- Drought-resistant and salt-tolerant crop varieties
	- Energy storage solutions (batteries, thermal storage, pumped hydro)	- Water conservation and efficiency technologies	- Precision agriculture technologies for optimizing water and input use
	- Smart grid technologies for renewable integration	- Wastewater treatment and recycling systems	- Advanced irrigation systems (e.g., drip irrigation, smart irrigation)
	- Energy-efficient technologies for buildings and industries	- Technologies for monitoring and managing water resources	- Climate-smart livestock management technologies
Expected time frame	UA	UA	UA
Sector	Energy Sector	Water Sector	Agriculture Sector
Expected use, impact, and estimated results	UA	UA	UA

Category	Transportation Programme	Waste Management Programme	Climate Monitoring and Early Warning Systems Programme
Title (of activity, programme or project)	Transportation Programme	Waste Management Programme	Climate Monitoring and Early Warning Systems Programme
Programme/project description	UA	UA	UA
Type of support (mitigation, adaptation, or cross-cutting)	UA	UA	UA
Type of technology	- Electric vehicle technologies and charging infrastructure	- Advanced waste-to-energy technologies	- Advanced weather forecasting and climate modeling technologies
	- Technologies for improving public transportation efficiency	- Recycling and material recovery technologies	- Remote sensing and satellite technologies for environmental monitoring
	- Intelligent transportation systems for traffic management	- Biodegradable plastics and alternative packaging materials	- Early warning systems for extreme weather events and natural disasters
	- Low-carbon technologies for maritime and aviation sectors		
Expected time frame	UA	UA	UA
Sector	Transportation Sector	Waste Management	Climate Monitoring and Early Warning Systems
Expected use, impact, and estimated results	UA	UA	UA

5.8 Information on Technology Development and Transfer Support Received by Egypt under Article 10 of the Paris Agreement

Several large-scale renewable energy infrastructure projects in Egypt have facilitated technology transfer and contributed to the country's clean energy capacity. Projects like the Benban Solar Park have not only increased solar energy production but also introduced new technologies and best practices in solar energy deployment, benefiting local industries. Additionally, other renewable energy initiatives have supported the integration of advanced technologies in areas such as wind power and energy storage. These projects, developed with international collaboration, have enabled Egypt to access and implement cutting-edge renewable energy technologies, further strengthening the country's transition to a sustainable energy future. Additionally, with assistance from initiatives such as the Green Economy Financing Facility (GEFF), Egypt has integrated energy-efficient technologies into key industrial sectors like oil, gas, and textiles. This support has promoted sustainability by reducing emissions and improving energy use in industries crucial to the national economy.

The USAID Center of Excellence for Energy at Ain Shams University is a successful initiative that promotes innovation and capacity-building in Egypt’s energy sector. Through international partnerships, the center has facilitated technology transfer in renewable energy, energy management, and efficiency. It provides specialized training and fosters local expertise, bridging the gap between academic research and practical energy solutions. Additionally, the center has strengthened collaboration with the private sector, supporting the development and commercialization of sustainable energy technologies, positioning Egypt as a regional leader in clean energy.

Contributions of Support to Technology Development, Capacity Enhancement, and Know-How:

- **Technology Development and Transfer:** International partnerships have enabled Egypt to adopt advanced technologies in renewable energy and energy efficiency, enhancing local expertise in energy management and storage.
- **Enhancement of Endogenous Capacities:** Programmes like GEFF have provided crucial capacity-building, offering training to boost local technical expertise in renewable energy and industrial efficiency.
- **Improvement of Know-How:** Skill-building initiatives linked to technology transfer have empowered Egypt to operate large-scale renewable energy projects like Benban and adopt advanced industrial processes.

Table 64: Breakdown of Support Received to Technology Development and Capacity Building

Information Category	Details
Title of Activity/Programme/Project	**Improved Management of E-Waste and Healthcare Waste to Reduce Emissions of Unintentionally Produced POPs (UPOPs)/Greater Cairo Air Pollution Management and Climate Change Project – Expanded Scope**
Programme/Project Description	The project focuses on improving the management of electronic and healthcare waste in Egypt as part of efforts to reduce air pollution and enhance climate resilience. A $9.13 million grant was provided by the World Bank's Global Environment Facility (GEF) to support the development of waste treatment facilities, enhance public awareness, and promote sustainable waste management practice.
Type of technology	E-waste and healthcare waste treatment technologies, climate-friendly waste management practices
Channel	Bilateral (via GEF)
Recipient Entity	Egyptian Environmental Affairs Agency (EEAA)
Implementing Entity	World Bank, EEAA
Time Frame	Start Date: 2023
Financial Instrument	Grant
Sector	Air Pollution, Climate Change, Waste Management
Subsector	Electronic waste, healthcare waste, pollution control
Type of Support	Crosscutting
Status of Activity	Ongoing
Use of Support	Crosscutting
Impact	The project aims to reduce air pollution from electronic and healthcare waste, promote sustainable waste management practices, and strengthen Egypt's capacity for handling hazardous waste materials, contributing to overall climate resilience.
Estimated Results	Enhanced waste management systems, reduced air pollution from e-waste and healthcare waste, and improved public health and climate resilience in Greater Cairo.

Information Category	Details	
Title of Activity/Programme/Project	**Promoting climate smart agriculture and agricultural biodiversity for enhancing the adaptive capacity of vulnerable rural communities in old and new lands of Upper and Lower Egypt**	**Greening Hurghada – Climate Resilience and Biodiversity Conservation**
Programme/Project Description	This project, funded through an $8 million grant from the Canadian government, focuses on promoting climate-smart agricultural practices and enhancing agrobiodiversity in rural communities in Aswan, Beheira, and Kafr El-Sheikh. The project aims to increase resilience to climate change, support food security, and promote sustainable agricultural practices, with a focus on empowering women and improving soil and plant health.	The Greening Hurghada project aims to reduce GHG emissions and preserve biodiversity by integrating sustainable and climate smart technologies across the tourism, energy, and transport sectors. The project will implement sustainable technology applications and develop a strategic policy framework to de-risk green investments in tourism. It will enhance capacities through trainings, raise awareness, and safeguard biodiversity while reducing GHG emissions.
Type of Technology	Climate-smart agricultural technologies and innovative farming practices for resilience and sustainability.	Climate-smart technologies for tourism, energy, and transport infrastructure
Channel	Bilateral (via Canada)	Multilateral (via GEF, Government of Egypt)
Recipient Entity	Egyptian Government	Egyptian Environmental Affairs Agency (EEAA), Organization for Urban Development and Architecture (OUDA)
Implementing Entity	Food and Agriculture Organization (FAO)	UNIDO
Time Frame	Start Date: 2023 Planned Completion Date: 2027	2022
Sector	Agriculture	Tourism
Subsector	Sustainable Agriculture, Climate Change, Food Security	Sustainable Tourism
Type of Support	Cross-cutting	Cross-cutting
Status of Activity	Builds capacity for 4,536 farmers to adopt climate-smart agricultural technologies, promoting resilience and improving food security in targeted rural areas, including empowering women and addressing climate challenges.	Supports the integration of climate-smart technologies in Hurghada's tourism, energy, and transport infrastructure to reduce emissions and enhance sustainability.
Use of Support	Ongoing	Enhances the capacity of Hurghada's sectors to adopt biodiversity conservation practices and integrate eco-friendly technologies, fostering resilience to climate change.
Impact	The project supports the implementation of sustainable agricultural practices and promotes biodiversity in rural Egypt, specifically targeting climate resilience for local farming communities.	Ongoing
Estimated Results	The initiative aims to reduce poverty, enhance food security, and increase agricultural productivity by fostering climate adaptation in Egypt's vulnerable rural areas.	The project will support the integration of sustainable technologies and practices in Hurghada's coastal areas to mitigate GHG emissions and conserve biodiversity, contributing to the city's green economy.

Information Category	Details	
Title of Activity/Programme/Project	**Red Sea Wind Energy Project – Ras Ghareb Onshore Wind Farm**	**Enhancing and Showcasing Egypt's Leadership in Cleantech Innovation for Climate Action and Energy Transition**
Programme/Project Description	The Japan Bank for International Cooperation (JBIC) signed a $240 million loan agreement with RED SEA WIND ENERGY S.A.E. to finance a 500 MW onshore wind farm in Ras Ghareb, Egypt. The project is co-financed by EBRD, Sumitomo Mitsui Banking Corporation, Norinchukin Bank, and Société Générale, bringing the total co-financing to $501 million. This wind farm will sell electricity to Egyptian Electricity Transmission Company for 25 years.	The project aims to support cleantech solutions in Egypt through capacity building of SMEs and start-ups, improving their ability to develop and invest in climate and clean energy technologies. The project also focuses on strengthening national expertise and capacities to meet Egypt's NDC commitments through private sector engagement. By enhancing local SMEs' ability to commercialize cleantech solutions and increasing awareness in the financial sector, this project will help Egypt leverage private sector potential to achieve climate and clean energy goals. The project is managed by UNIDO and funded by the Green Climate Fund (GCF).
Type of Technology	Onshore wind energy technologies.	Cleantech solutions and clean energy technologies for SMEs and start-ups.
Channel	Bilateral (via JBIC)	Bilateral: Green Climate Fund
Recipient Entity	RED SEA WIND ENERGY S.A.E., Egyptian Electricity Transmission Company (EETC)	Egyptian Private Sector, SMEs, Start-ups
Implementing Entity	RED SEA WIND ENERGY S.A.E., EETC	United Nations Industrial Development Organization (UNIDO)
Time Frame	Start Date: 2022	Start Date: 2024 Planned Completion Date: Ongoing
Sector	Ongoing	Ongoing
Subsector	Renewable Energy, Climate Change	Climate Action, Clean Energy, Innovation
Type of Support	Wind power, clean energy	Cleantech, SME support, early-stage financing
Status of Activity	Builds capacity for the operation and management of renewable energy facilities in Egypt, particularly in wind energy generation and grid integration.	Enhances the capacity of SMEs and start-ups in Egypt to invest in climate and clean energy solutions and strengthens their ability to scale-up cleantech innovations.
Use of Support	Mitigation	Crosscutting
Impact	The loan is used to finance the construction and operation of a 500 MW onshore wind farm in Ras Ghareb, contributing to Egypt's renewable energy goals.	The project enhances access to early-stage financing for cleantech solutions and supports the development of a cleantech innovation pipeline, contributing to Egypt's green economy.
Estimated Results	The project will significantly increase wind energy generation capacity in Egypt, contribute to carbon emissions reduction, and support Egypt's goal of generating 42% of its energy from renewable sources by 2035.	The project will strengthen Egypt's cleantech ecosystem, promote sustainable innovation, and enhance the private sector's role in achieving climate and energy goals.

5.9 Information on Capacity Building Support Needed by Egypt under Article 11 of the Paris Agreement

5.9.1 Egypt's Approach to Enhancing Capacity Building Support

Egypt has made significant progress in addressing climate change through various capacity-building efforts. Institutional frameworks have been strengthened, with enhancements to the National Climate Change Council (NCCC), increased resources for the Climate Change Central Department (CCCD), and the establishment of climate change units across ministries. Inter-ministerial working groups were also created to address cross-sectoral issues like the water-energy-food nexus. Ministerial capacity has been developed through tailored training programmes, a "train-the-trainers" approach, and integrating climate considerations into national planning and budgeting. International cooperation has been expanded through long-term partnerships, participation in global climate networks, and hosting climate conferences.

5.9.2 Egypt’s Specific Capacity Building Needs

Egypt’s capacity-building needs focus on strengthening institutions, enhancing technical capabilities, and fostering coordinated climate action. Expanding the Climate Change Coordination Division (CCCD) with expertise in climate finance, adaptation, and mitigation is a priority, alongside developing a climate change law to formalize roles and improve coordination with government entities. Training on climate negotiations and adaptation approaches is essential.

Activating climate change units across ministries with defined responsibilities, standardized training, and resources is key, ensuring alignment with the CCCD and developing sector-specific action plans for agriculture, energy, and industry. Institutionalizing a national MRV system with standardized data collection, a centralized climate data platform, and specialist training is critical for compliance with international standards.

Technical capabilities must be enhanced through curricula on climate data management, forecasting, and modeling, with targeted training in climate-resilient agriculture, water management, coastal zones, and renewable energy. Strengthening local manufacturing of renewable energy components and aligning with international reporting standards are also vital. These efforts aim to build Egypt’s capacity for effective climate action.

5.9.3 Constraints and Gaps in Communicating Capacity Building Needs

Egypt faces significant challenges in effectively communicating its capacity-building needs for climate action. Weak institutional coordination and unclear communication channels between the Climate Change Coordination Division (CCCD) and other government entities result in fragmented messaging. The absence of a formalized climate change law further complicates the articulation of priorities, leaving roles and responsibilities undefined and communication inconsistent.

A lack of standardized reporting frameworks hampers the ability to effectively convey needs to international stakeholders. Without a robust MRV (Monitoring, Reporting, and Verification) system or centralized data platform, the process of gathering and sharing accurate, comprehensive information remains inefficient. This limits the alignment of donor support with Egypt's specific capacity gaps.

Sectoral silos also contribute to poor communication, as individual ministries often lack the training and resources to articulate their specific needs in areas such as agriculture, energy, and industry. Inconsistent establishment and activation of climate change units across ministries exacerbate this issue, creating gaps in alignment with national strategies.

5.9.4 How Capacity Building Support Would Improve Information Provision

- **Enhanced MRV System:** A robust MRV system would enable real-time tracking of GHG emissions, provide accurate projections, and facilitate for effective assessment of mitigation and adaptation measures.
- **Improved National Communications:** Enhancing data collection, quality, and frequency of climate data would lead to more comprehensive and accurate national reports, enabling better assessment of climate vulnerabilities and supporting needs.
- **Sectoral Data Improvements:** granular data on sectors such as agriculture, energy, and industry would allow for a deeper analysis of climate risks, facilitating more targeted and effective adaptation and mitigation strategies.
- **Climate Vulnerability Assessments:** Capacity-building initiatives would empower Egypt to conduct detailed, localized vulnerability assessments, improving the identification of vulnerable populations and ecosystems.
- **Evidence-Based Policymaking:** Robust climate data would enable science-driven policy development, allowing Egypt to make informed decisions on climate action and better evaluate the impacts of these policies.

Table 65: Breakdown of Specific Capacity building Support Needed

Category	Institutional Strengthening	Establishing Climate Change Units	Institutionalizing MRV System	Enhancing Technical Capabilities
Title (of activity, programme or project)	Institutional Strengthening	Establishing Climate Change Units	Institutionalizing MRV System	Enhancing Technical Capabilities
Programme/project description	- Expanding the CCCD with experts in climate finance, adaptation, and mitigation.	- Defining clear roles and responsibilities for climate units, with training and resources.	- Designing and implementing a national MRV system.	- Developing a curriculum on climate data management, forecasting, and modeling.
	- Training on climate negotiations and enhancing coordination mechanisms.	- Regular coordination meetings between ministries and CCCD.	- Creating a centralized climate data management platform.	- Strengthening capacity for climate-resilient agriculture and water management.
	- Developing a climate change law to formalize institutional roles.	- Developing sector-specific climate action plans.	- Training specialists for MRV implementation.	- Providing training for coastal zone and renewable energy management.
	- Training on climate adaptation approaches.			- Enhancing local manufacturing of renewable energy components.
Expected time frame	UA	UA	UA	UA
Type of support (mitigation, adaptation, or cross-cutting)	Cross-cutting	Cross-cutting	Cross-cutting	Cross-cutting
Expected use, impact, and estimated results	Enhanced institutional capacity for climate policy formulation and coordination.	Improved policy alignment and sector-specific climate actions.	Streamlined monitoring and reporting aligned with international standards.	Advanced technical expertise and improved implementation of climate-resilient solutions.

5.10 Information on Capacity Building Support Received by Egypt under Article 11 of the Paris Agreement

5.10.1 Key Case Studies of Capacity-Building Support Received

International financial institutions and multilateral development banks have played a key role in supporting Egypt's private sector through programmes such as the Green Economy Financing Facility (GEFF) and the Egyptian Pollution Abatement Project (EPAP). These initiatives have empowered private sector companies by providing technical assistance and capacity-building, enabling them to adopt sustainable practices, reduce pollution, and access climate finance. The support offered has helped businesses align with environmental regulations and enhance their role in Egypt’s transition to a green economy.

5.10.2 Enhancement of Egypt's Capacity to Address Climate Change

The capacity-building support received has enhanced Egypt's ability to address climate change through:

- **Institutional Strengthening:** Egypt has improved institutional frameworks, leading to stronger governance, coordination, and the ability to implement climate strategies. These efforts have also supported more effective strategy and policy planning, aligning climate actions with national goals.
- **Improved Climate Finance Access**: Enhanced technical expertise and better understanding of climate finance mechanisms have enabled Egypt to mobilize additional resources from international climate funds. Structured approaches to managing climate finance have further strengthened its capacity to secure funding for climate initiatives.

5.10.3 Levels of Received Capacity-Building Support

- **National Level**
  - At the national level, support has been primarily focused on institutional strengthening, particularly of the Ministry of Environment, the National Climate Change Council, and other key agencies.
  - Priorities: Developing, activating and, improving MRV systems, and enhancing access to international climate finance.

- **Sub-Regional Level**
  - Egypt has engaged with subregional initiatives such as the African Adaptation Initiative (AAI), which aims to build the resilience of African countries to climate change. Egypt has been part of knowledge-sharing platforms and joint projects focused on capacity-building in water management and agricultural adaptation.
  - Priorities: Regional collaboration on adaptation, particularly in water resources, agriculture, and disaster risk reduction.

- **Regional Level**
  - Egypt has participated in regional climate initiatives through platforms like the Mediterranean Action Plan and cooperation under the UNFCCC for North African countries.
  - Priorities: At the regional level, priorities include addressing transboundary climate risks, such as water scarcity and desertification, and fostering cooperation on renewable energy projects (e.g., solar and wind energy).

5.10.4 Priorities for Capacity Building Support at Each Level

- **National Level:** Strengthening institutional frameworks, enhancing climate finance access, and developing comprehensive climate policies and strategies.

- **Subregional Level:** Improving cross-border collaboration on climate adaptation, particularly in the fields of water and agriculture, and sharing best practices for resilience-building.
- **Regional Level:** Strengthening cooperation on climate mitigation, particularly through the development of renewable energy projects and the exchange of technology and expertise in clean energy and sustainable infrastructure.

5.10.5 Stakeholder Participation and Involvement in Capacity Building Activities

Key sectors in Egypt have been instrumental in capacity-building for climate action. The public sector, led by ministries like the Ministry of Environment, has played a pivotal role in implementing initiatives aimed at enhancing climate resilience and sustainability. The private sector has also been involved, particularly in areas such as renewable energy and environmental protection, contributing to various sustainability projects. Civil society and local communities have actively participated in capacity-building efforts, focusing on sustainable practices and adaptation strategies through awareness campaigns and community engagement. Meanwhile, academia and research institutions have significantly contributed to advancing climate-related research and collaborating with international partners to enhance Egypt's scientific and technical capacities.

5.11 Breakdown of Received Capacity Building Support

Table 66: Breakdown of Received Capacity Building Support

Information Category	Details	
Title of Activity/Programme/Project	**Transforming Financial Systems for Climate in Egypt (TFSC Egypt) I**	**Transforming Financial Systems for Climate (TFSC) – Egypt II**
Programme/Project Description	The TFSC project aims to build a climate finance system in Egypt, supporting the implementation of the National Climate Change Strategy 2050. It integrates the environmental dimension into national banking projects and establishes climate units within banks, mobilizing public and private funding for climate projects. The project contributes to Egypt's climate action goals.	The TFSC Egypt activity focuses on helping the National Bank of Egypt (NBE) develop its Climate Change Strategy and Environmental and Social Risk Management System (ESRM). It supports climate finance, promotes green growth, and assists NBE in identifying and managing environmental and social risks for climate-related projects. The activity also helps promote gender equality in investment projects.
Recipient Entity	Government of Egypt	National Bank of Egypt (NBE)
Implementing Entity	United Nations Development Programme (UNDP)	DAI
Time Frame	Start Date: 2023	Start Date: 2022 Planned Completion Date: 2024
Sector	Finance, Climate Change	Finance, Climate Change
Subsector	Climate finance, sustainable development, bank climate units	Climate finance, environmental risk management, gender policy
Type of Support	Cross-cutting	Cross-cutting
Status of Activity	Ongoing	Ongoing
Impact	The project will enable Egypt to mobilize public and private funding for climate-related projects, build a climate-resilient economy, and strengthen climate governance within national banks, supporting the country's National Climate Change Strategy 2050	The project helps NBE promote green investments, manage environmental risks, and enhance gender equality within its financial systems, supporting Egypt's National Climate Change Strategy 2050.
Estimated Results	Establishment of climate units within national banks, increased capacity for climate finance, enhanced ability to mobilize both public and private funding for climate action.	Implementation of climate finance strategies, enhanced E&S risk management, and identification of bankable climate projects with improved gender equality in investment practices.

Information Category	Details	
Title of Activity/Programme/Project	**National Solid Waste Management Programme (NSWMP) – EU Green**	**Green Hydrogen Development in Egypt**
Programme/Project Description	The NSWMP focuses on promoting a climate-sensitive waste management system and transitioning Egypt to a circular economy. The programme is co-funded by the German government with a $21 million grant and works across four governorates (Kafr El-Sheikh, Gharbia, Qena, Assiut). It enhances institutional capacity for implementing climate-focused waste management strategies, supports green private sector investments, and integrates climate mitigation and adaptation measures. The programme runs from 2022 to 2026.	This project, part of a strategic agreement between Egypt and France, aims to develop the green hydrogen sector in Egypt. The agreement, signed in May 2022, provides €500,000 in funding from the French Development Agency (AFD). The project focuses on launching Egypt's green hydrogen strategy and facilitating technical cooperation between Egypt and France for renewable energy production, with a focus on green hydrogen.
Recipient Entity	Ministry of Environment, Waste Management Regulatory Authority (WMRA)	Ministry of Electricity and Renewable Energy
Implementing Entity	GIZ, Egyptian Environmental Affairs Agency (EEAA), WMRA	French Development Agency (AFD)

Information Category	Details	
Title of Activity/Programme/Project	**30 by 30 Egypt – Climate Finance Initiative**	**IESG Egypt FI – Environmental, Social, and Governance (ESG) Integration**
Programme/Project Description	The 30 by 30 Egypt initiative, led by IFC, is designed to help Egypt's financial sector achieve 30% climate finance by 2030. The project includes partnerships with CIB and Banque du Caire, with activities starting in 2023, focusing on integrating climate risk management and promoting green finance strategies to align with Egypt's National Climate Change Strategy 2050.	The IESG Egypt FI project focuses on strengthening the integration of environmental, social, and governance (ESG) practices in financial institutions (FIs) in Egypt. Supported by IFC, the project offers advisory services aimed at enhancing the capacity of Egyptian financial institutions to manage ESG risks, improve sustainability, and support climate finance and green investments aligned with ESG standards.
Recipient Entity	FIs	Egyptian Financial Institutions (FIs)
Implementing Entity	International Finance Corporation (IFC)	International Finance Corporation (IFC)
Time Frame	2023 (CIB & Banque du Caire)	Start Date: 2023
Sector	Finance, Climate Change	Finance, Environmental, Social, Governance (ESG)
Subsector	Climate finance, climate risk management	ESG risk management, sustainable finance
Type of Support	Crosscutting	Crosscutting
Status of Activity	Ongoing	Ongoing
Impact	Contributes to Egypt's National Climate Change Strategy and supports the financial sector in reaching 30% climate finance by 2030, improving resilience to climate risks.	The project will enhance the capacity of Egyptian financial institutions to manage ESG risks, promote sustainable investments, and contribute to the development of green finance in Egypt.
Estimated Results	Enhanced ability to manage climate risks, increased financing for green projects, and alignment with climate finance targets.	Improved ESG risk management frameworks, enhanced financing for sustainable projects, and increased alignment with international ESG standards in Egypt's financial sector.
Time Frame	Start Date: 2022 - Planned Completion Date: 2026	2022
Sector	Waste Management, Climate Change, Circular Economy	Renewable Energy, Green Hydrogen
Subsector	Waste management, private sector involvement, environmental sustainability, circular economy	Hydrogen production, renewable energy infrastructure
Type of Support	Crosscutting	Mitigation
Status of Activity	Completed	..
Impact	Improved waste management practices in four governorates, increased private sector participation, and enhanced environmental sustainability through the promotion of climate-friendly circular economy models.	This project supports Egypt's goals to become a leader in green hydrogen production in the global market and helps reduce carbon emissions, improving the country's contribution to climate mitigation efforts.

Information Category	Details		
Title of Activity/Programme/Project	**Climate Finance Accelerator (CFA)**	**Green Growth and Jobs Accelerator**	**Green Sharm El Sheikh**
Programme/Project Description	The Climate Finance Accelerator (CFA) is a technical assistance programme implemented in 10 countries, including Egypt, to help countries mobilize climate finance to meet their Nationally Determined Contributions (NDCs) under the Paris Agreement. The project has provided capacity building support for over 135 low carbon projects worth more than $2.9 billion. In Egypt, the 16-week accelerator programme targets 8-12 climate mitigation entrepreneurs with innovative and scalable solutions to challenges posed by climate change. The project is implemented by Acumen, Flat6Labs, and PwC.	The Green Growth and Jobs Accelerator is a UNDP initiative aimed at promoting green growth in the Arab States, including Egypt, through the creation of sustainable jobs and innovative business models. The accelerator focuses on driving economic growth while aligning with climate and environmental goals, enhancing youth and women's participation, and supporting green technology and sustainable agriculture solutions.	The project aims to turn Sharm El Sheikh into a model of integrated, ecologically sustainable tourism through the adoption of low-carbon technologies, improved waste management, and enhanced protection of natural capital. It will develop the Sharm El-Sheikh Sustainable Development Strategy (SESSDS) and Action Plan, focusing on technical assistance, capacity building, and pilot investments. The project will promote behavioral change and integrate climate change mitigation and waste management solutions in line with national priorities.
Recipient Entity	Egyptian Government, Financial Institutions, Private Sector	Egypt, Arab States, Local Governments, Private Sector	Ministry of Environment, Egypt
Implementing Entity	Acumen, Flat6Labs, PwC	United Nations Development Programme (UNDP) in partnership with local Business Development Organizations.	United Nations Development Programme (UNDP)
Time Frame	Started 2022	42024	Start Date: 2022
Sector	finance,	Crosscutting	Tourism, , Waste Management
Subsector	Climate Finance	Crosscutting	Sustainable Tourism
Type of Support	Crosscutting	Crosscutting	Crosscutting
Status of Activity	The initiative supports mobilizing climate finance and creating pipelines of climate projects in Egypt, focusing on clean energy, sustainable infrastructure, and resilience.	The programme promotes sustainable economic growth, focusing on the development of green jobs and innovation, supporting countries in achieving climate goals while generating inclusive economic opportunities.	The project promotes sustainable tourism practices by improving waste management, adopting low-carbon technologies, and protecting Sharm El Sheikh's natural capital.
Impact	Increased climate finance mobilization, enhanced project pipelines for green infrastructure, and progress towards meeting Egypt's NDCs.	Increased creation of green jobs, development of sustainable business models, and enhanced youth and women participation in the green economy.	The project promotes sustainable tourism practices by improving waste management, adopting low-carbon technologies, and protecting Sharm El Sheikh's natural capital.

5.12 Information on Support Needed and Received by Egypt for the Implementation of Article 13 of the Paris Agreement and Transparency Related Activities, including Transparency Related Capacity Building

Egypt's receipt of capacity-building support under Article 11 of the Paris Agreement has played a crucial role in enhancing its ability to address climate change. This support has led to significant improvements in institutional capacities, financial access, transparency, and public participation. Through a coordinated approach involving international collaboration and national leadership, Egypt has strengthened its resilience and adaptive capacities, aligning its climate actions with global goals while also addressing its unique national challenges.

5.12.1 Support Needed for Preparing Reports Pursuant to Article 13 of the Paris Agreement

Support Needed for Preparing Reports Pursuant to Article 13 of the Paris Agreement

Egypt requires support to enhance its capacity for preparing reports under Article 13 of the Paris Agreement. Key priorities include institutionalizing MRV systems to track emissions and NDC progress through strengthened inter-ministerial collaboration, sector-specific training, and improved data-sharing mechanisms. Capacity building is essential for data collection, QA/QC protocols, and the use of advanced tools for GHG inventory preparation, emissions tracking, and scenario modeling aligned with IPCC guidelines.

Financial and technical assistance is needed to establish standardized methodologies and secure resources for maintaining robust MRV systems. Training for CCCD, CAPMAS, and ministerial climate units is critical for effective data management and reporting, supported by the development of a centralized climate data platform.

Additional resources are required for workshops, national reports, country-specific emission factors, and enhanced climate modeling to improve vulnerability and adaptation reporting. These efforts aim to ensure Egypt meets its reporting obligations under the Paris Agreement effectively and transparently.

Table 67: Breakdown of Support Needed Related Capacity Building

Category	Institutionalizing MRV Systems	Capacity Building for Data Collection and QA/QC	Access to Advanced Climate Data Tools	Financial and Technical Assistance
Objectives and description	- Institutionalize MRV systems across key sectors (energy, agriculture, transportation, industry, waste management).	- Enhance data collection systems and QA/QC protocols for national climate data reliability.	- Acquire advanced tools for GHG inventory preparation and emissions tracking aligned with IPCC.	- Secure resources to establish and maintain MRV systems.
Recipient entity	UA	UA	UA	UA
Channel	UA	UA	UA	UA
Amount (in domestic currency and in United States dollars)	UA	UA	UA	UA
Time frame	UA	UA	UA	UA
Status of activity (planned, ongoing or completed)	UA	UA	UA	UA
Use, impact and estimated results	Consistent GHG accounting and emissions tracking aligned with NDC goals.	Improved reliability and accuracy of national climate data.	Enhanced GHG projections and reporting.	Sustained MRV systems and enhanced climate reporting.

Category	Capacity Building for Key Institutions	Centralized Climate Data Management	Workshops and National Reports	Country-Specific Emission Factors	Climate Modeling and Projections
Objectives and description	- Train CCCD, CAPMAS, and ministerial staff in data management.	- Develop and maintain a centralized climate data platform.	- Provide resources for national communications workshops.	- Develop country-specific emission factors for GHG inventories.	- Enhance climate modeling and projections for adaptation reporting.
Recipient entity	UA	UA	UA	UA	UA
Channel	UA	UA	UA	UA	UA
Amount (in domestic currency and in United States dollars)	UA	UA	UA	UA	UA
Time frame	UA	UA	UA	UA	UA
Status of activity (planned, ongoing or completed)	UA	UA	UA	UA	UA
Use, impact and estimated results	Improved institutional capacity for data management and reporting.	Efficient and accessible data management.	Strengthening reporting capacity for international obligations.	Better GHG inventories and accurate activity data.	Improved adaptation and vulnerability reporting.

5.12.2 Support Received for Preparing Reports Pursuant to Article 13 of the Paris Agreement

Egypt has received support for its climate reporting obligations under Article 13 of the Paris Agreement, particularly through projects funded by the Global Environment Facility (GEF). One notable project is the Fourth National Communication (FNC) initiative, which aims to enhance Egypt's capacity to prepare and submit national communications to the UNFCCC. This project builds upon previous communications and reports, such as the First Biennial Update Report and other climate-related studies. The Fourth National Communication Project, implemented by the Egyptian Environmental Affairs Agency (EEAA) and supported by UNDP, has provided technical and financial assistance to strengthen national climate reporting. The project focuses on updating Egypt's GHG inventory, improving data collection systems, and enhancing the technical capacity of national experts.

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Annexes

Annex I: GHGI Summary Tables

2022 GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
Total National Emissions and Removals	**293,106.59**	**1,892.80**	**107.18**	**7,194.36**	**4,213.44**	**291.35**	**386,208.18**
1 - Energy	252,169.38	68.51	4.17	0.00	0.00	0.00	255,192.57
1.A - Fuel Combustion Activities	**243,559.62**	**37.30**	**3.87**	**0.00**	**0.00**	**0.00**	**245,630.54**
1.A.1 - Energy Industries	106,616.56	2.32	0.31				106,762.62
1.A.2 - Manufacturing Industries and Construction	55,781.07	3.18	0.32				55,954.66
1.A.3 - Transport	63,738.62	17.68	3.15				65,068.11
1.A.4 - Other Sectors	17,423.37	14.12	0.10				17,845.15
1.A.5 - non-specified	0.00	0.00	0.00				0.00
1.B - Fugitive emissions from fuels	**8,609.76**	**31.21**	**0.30**	**0.00**	**0.00**	**0.00**	**9,562.03**
1.B.1 - Solid Fuels	0.00	0.00	0.00				0.00
1.B.2 - Oil and Natural Gas	8,609.76	31.21	0.30				9,562.03
1.B.3 - Other emissions from Energy Production	0.00	0.00	0.00				0.00
1.C - Carbon dioxide Transport and Storage	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
1.C.1 - Transport of CO2	0.00						0.00
1.C.2 - Injection and Storage	0.00						0.00
1.C.3 - Other	0.00						0.00
2 - Industrial Processes and Product Use	**39,407.98**	**5.92**	**3.50**	**7,194.36**	**4,213.44**	**291.35**	**52,200.35**
2.A - Mineral Industry	**26,558.10**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**26,558.10**
2.A.1 - Cement production	25,276.12						25,276.12
2.A.2 - Lime production	611.25						611.25
2.A.3 - Glass Production	347.53						347.53
2.A.4 - Other Process Uses of Carbonates	323.20						323.20
2.A.5 - Other (please specify)	0.00	0.00	0.00				0.00
2.B - Chemical Industry	**6,868.55**	**5.86**	**3.50**	**0.00**	**0.00**	**0.00**	**7,960.06**
2.B.1 - Ammonia Production	5,340.58						5,340.58
2.B.2 - Nitric Acid Production			3.50				927.50
2.B.3 - Adipic Acid Production			0.00				0.00
2.B.4 - Caprolactam, Glyoxal and Glyoxylic Acid Production			0.00				0.00
2.B.5 - Carbide Production	0.00	0.00					0.00
2.B.6 - Titanium Dioxide Production	0.00						0.00
2.B.7 - Soda Ash Production	0.00						0.00
2.B.8 - Petrochemical and Carbon Black Production	1,527.97	5.86					1,691.98
2.B.9 - Fluorochemical Production				0.00	0.00	0.00	0.00
2.B.10 - Hydrogen Production	0.00	0.00	0.00				0.00

2022	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Gg			Gg CO_2e			Gg CO_2e
2.B.11 - Other (Please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.C - Metal Industry	5,664.18	0.06	0.00	0.00	4,213.44	0.00	9,879.33
2.C.1 - Iron and Steel Production	4,984.00	0.00					4,984.00
2.C.2 - Ferroalloys Production	219.60	0.06					221.31
2.C.3 - Aluminum production	448.00				4,213.44		4,661.44
2.C.4 - Magnesium production	0.00					0.00	0.00
2.C.5 - Lead Production	10.00						10.00
2.C.6 - Zinc Production	2.58						2.58
2.C.7 - Rare Earths Production	0.00				0.00		0.00
2.C.8 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.D - Non-Energy Products from Fuels and Solvent Use	317.15	0.00	0.00	0.00	0.00	0.00	317.15
2.D.1 - Lubricant Use	275.47						275.47
2.D.2 - Paraffin Wax Use	41.68						41.68
2.D.3 - Solvent Use							0.00
2.D.4 - Other (please specify)	0.00	0.00	0.00				0.00
2.E - Electronics Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.E.1 - Integrated Circuit or Semiconductor			0.00	0.00	0.00	0.00	0.00
2.E.2 - TFT Flat Panel Display			0.00	0.00	0.00	0.00	0.00
2.E.3 - Photovoltaics				0.00	0.00	0.00	0.00
2.E.4 - Heat Transfer Fluid					0.00		0.00
2.E.5 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.F - Product Uses as Substitutes for Ozone Depleting Substances	0.00	0.00	0.00	7,194.36	0.00	0.00	7,194.36
2.F.1 - Refrigeration and Air Conditioning				5,834.06	0.00		5,834.06
2.F.2 - Foam Blowing Agents				1,039.77	0.00		1,039.77
2.F.3 - Fire Protection				294.11	0.00		294.11
2.F.4 - Aerosols				0.00	0.00		0.00
2.F.5 - Solvents				0.00	0.00		0.00
2.F.6 - Other Applications (please specify)				26.42	0.00	0.00	26.42
2.G - Other Product Manufacture and Use	0.00	0.00	0.00	0.00	0.00	291.35	291.35
2.G.1 - Electrical Equipment					0.00	291.35	291.35
2.G.2 - SF6 and PFCs from Other Product Uses				0.00	0.00	0.00	0.00
2.G.3 - N2O from Product Uses			0.00				0.00
2.G.4 - Other (Please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.H - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.H.1 - Pulp and Paper Industry	0.00	0.00	0.00				0.00
2.H.2 - Food and Beverages Industry	0.00	0.00	0.00				0.00
2.H.3 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2022

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
3 - Agriculture, Forestry, and Other Land Use	1,472.53	563.87	91.70	0.00	0.00	0.00	41,560.65
3.A - Livestock	0.00	402.92	26.18	0.00	0.00	0.00	18,218.85
3.A.1 - Enteric Fermentation		367.52					10,290.67
3.A.2 - Manure Management		35.40	26.18				7,928.19
3.B - Land	-2.65	0.00	0.00	0.00	0.00	0.00	-2.65
3.B.1 - Forest land	0.00						0.00
3.B.2 - Cropland	0.00						0.00
3.B.3 - Grassland	0.00						0.00
3.B.4 - Wetlands	0.00						0.00
3.B.5 - Settlements	-2.65						-2.65
3.B.6 - Other Land	0.00						0.00
3.C - Aggregate sources and non-CO2 emissions sources on land	1,475.18	160.95	65.52	0.00	0.00	0.00	23,344.46
3.C.1 - Burning	0.00	0.00	0.00				0.00
3.C.2 - Liming	0.00						0.00
3.C.3 - Urea application	1,475.18						1,475.18
3.C.4 - Direct N2O Emissions from managed soils			48.37				12,819.17
3.C.5 - Indirect N2O Emissions from managed soils			6.20				1,643.82
3.C.6 - Indirect N2O Emissions from manure management			10.94				2,899.73
3.C.7 - Rice cultivation		160.95					4,506.56
3.C.8 - CH4 from Drained Organic Soils		0.00					0.00
3.C.9 - CH4 from Drainage Ditches on Organic Soils		0.00					0.00
3.C.10 - CH4 from Rewetting of Organic Soils		0.00					0.00
3.C.11 - CH4 Emissions from Rewetting of Mangroves and Tidal Marshes		0.00					0.00
3.C.12 - N2O Emissions from Aquaculture			0.00				0.00
3.C.13 - CH4 Emissions from Rewetted and Created Wetlands on Inland Wetland Mineral Soils		0.00					0.00
3.C.14 - Other (please specify)	0.00	0.00	0.00				0.00
3.D - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.D.1 - Harvested Wood Products	0.00						0.00
3.D.2 - Other (please specify)	0.00	0.00	0.00				0.00
4 - Waste	**56.69**	**1,254.50**	**7.82**	**0.00**	**0.00**	**0.00**	**37,254.60**
4.A - Solid Waste Disposal		601.86					16,852.03
4.B - Biological Treatment of Solid Waste		7.83	0.59				374.70
4.C - Incineration and Open Burning of Waste	56.69	17.27	0.23				600.92
4.D - Wastewater Treatment and Discharge		627.54	7.00				19,426.96
4.E - Other (please specify)	0.00	0.00	0.00				0.00
5 - Other	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
5.A - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOx and NH3			0.00				0.00

2022 GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
5.B - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
5.C - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
							0.00
Memo Items (5)							0.00
International Bunkers	3,852.08	0.16	0.11	0.00	0.00	0.00	3,884.73
1.A.3.a.i - International Aviation (International Bunkers)	2,324.07	0.02	0.07				2,342.13
1.A.3.a.i - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.3.a.i - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
1.A.3.d.i - International water-borne navigation (International bunkers)	1,528.01	0.14	0.04				1,542.60
1.A.3.d.i - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.3.d.i - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
1.A.5.c - Multilateral Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.A.5.c - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.5.c - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00

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GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
Total National Emissions and Removals	**274,173.03**	**1,815.95**	**109.92**	**5,467.87**	**3,912.48**	**291.35**	**363,820.10**
1 - Energy	232,309.29	59.41	3.50	0.00	0.00	0.00	234,900.58
1.A - Fuel Combustion Activities	223,644.82	24.57	3.20	0.00	0.00	0.00	225,182.06
1.A.1 - Energy Industries	101,935.27	1.98	0.24				102,054.69
1.A.2 - Manufacturing Industries and Construction	48,851.81	1.50	0.20				48,945.81
1.A.3 - Transport	55,925.70	15.18	2.71				57,068.63
1.A.4 - Other Sectors	16,932.04	5.91	0.06				17,112.93
1.A.5 - non-specified	0.00	0.00	0.00				0.00
1.B - Fugitive emissions from fuels	8,664.47	34.84	0.30	0.00	0.00	0.00	9,718.52
1.B.1 - Solid Fuels	0.00	0.00	0.00				0.00
1.B.2 - Oil and Natural Gas	8,664.47	34.84	0.30				9,718.52
1.B.3 - Other emissions from Energy Production	0.00	0.00	0.00				0.00
1.C - Carbon dioxide Transport and Storage	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.C.1 - Transport of CO2	0.00						0.00
1.C.2 - Injection and Storage	0.00						0.00
1.C.3 - Other	0.00						0.00
2 - Industrial Processes and Product Use	40,290.93	5.74	3.50	5,467.87	3,912.48	291.35	51,050.93
2.A - Mineral Industry	27,972.53	0.00	0.00	0.00	0.00	0.00	27,972.53
2.A.1 - Cement production	26,661.91						26,661.91
2.A.2 - Lime production	652.50						652.50
2.A.3 - Glass Production	344.31						344.31
2.A.4 - Other Process Uses of Carbonates	313.81						313.81
2.A.5 - Other (please specify)	0.00	0.00	0.00				0.00
2.B - Chemical Industry	6,794.10	5.68	3.50	0.00	0.00	0.00	7,880.70
2.B.1 - Ammonia Production	5,294.96						5,294.96
2.B.2 - Nitric Acid Production			3.50				927.50
2.B.3 - Adipic Acid Production			0.00				0.00
2.B.4 - Caprolactam, Glyoxal and Glyoxylic Acid Production			0.00				0.00
2.B.5 - Carbide Production	0.00	0.00					0.00
2.B.6 - Titanium Dioxide Production	0.00						0.00
2.B.7 - Soda Ash Production	0.00						0.00
2.B.8 - Petrochemical and Carbon Black Production	1,499.14	5.68					1,658.24
2.B.9 - Fluorochemical Production				0.00	0.00	0.00	0.00
2.B.10 - Hydrogen Production	0.00	0.00	0.00				0.00
2.B.11 - Other (Please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.C - Metal Industry	5,216.60	0.06	0.00	0.00	3,912.48	0.00	9,130.76

2021

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
2.C.1 - Iron and Steel Production	4,572.02	0.00					4,572.02
2.C.2 - Ferroalloys Production	216.00	0.06					217.68
2.C.3 - Aluminum production	416.00				3,912.48		4,328.48
2.C.4 - Magnesium production	0.00					0.00	0.00
2.C.5 - Lead Production	10.00						10.00
2.C.6 - Zinc Production	2.58						2.58
2.C.7 - Rare Earths Production	0.00				0.00		0.00
2.C.8 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.D - Non-Energy Products from Fuels and Solvent Use	307.71	0.00	0.00	0.00	0.00	0.00	307.71
2.D.1 - Lubricant Use	266.02						266.02
2.D.2 - Paraffin Wax Use	41.68						41.68
2.D.3 - Solvent Use							0.00
2.D.4 - Other (please specify)	0.00	0.00	0.00				0.00
2.E - Electronics Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.E.1 - Integrated Circuit or Semiconductor			0.00	0.00	0.00	0.00	0.00
2.E.2 - TFT Flat Panel Display			0.00	0.00	0.00	0.00	0.00
2.E.3 - Photovoltaics				0.00	0.00	0.00	0.00
2.E.4 - Heat Transfer Fluid					0.00		0.00
2.E.5 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.F - Product Uses as Substitutes for Ozone Depleting Substances	0.00	0.00	0.00	5,467.87	0.00	0.00	5,467.87
2.F.1 - Refrigeration and Air Conditioning				4,247.39	0.00		4,247.39
2.F.2 - Foam Blowing Agents				957.33	0.00		957.33
2.F.3 - Fire Protection				238.12	0.00		238.12
2.F.4 - Aerosols				0.00	0.00		0.00
2.F.5 - Solvents				0.00	0.00		0.00
2.F.6 - Other Applications (please specify)				25.03	0.00	0.00	25.03
2.G - Other Product Manufacture and Use	0.00	0.00	0.00	0.00	0.00	291.35	291.35
2.G.1 - Electrical Equipment					0.00	291.35	291.35
2.G.2 - SF6 and PFCs from Other Product Uses				0.00	0.00	0.00	0.00
2.G.3 - N2O from Product Uses			0.00				0.00
2.G.4 - Other (Please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.H - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.H.1 - Pulp and Paper Industry	0.00	0.00	0.00				0.00
2.H.2 - Food and Beverages Industry	0.00	0.00	0.00				0.00
2.H.3 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 - Agriculture, Forestry, and Other Land Use	1,512.74	533.19	95.25	0.00	0.00	0.00	41,684.49
3.A - Livestock	0.00	378.48	26.94	0.00	0.00	0.00	17,735.65

2021 GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
3.A.1 - Enteric Fermentation		342.02					9,576.66
3.A.2 - Manure Management		36.45	26.94				8,159.00
3.B - Land	-2.65	0.00	0.00	0.00	0.00	0.00	-2.65
3.B.1 - Forest land	0.00						0.00
3.B.2 - Cropland	0.00						0.00
3.B.3 - Grassland	0.00						0.00
3.B.4 - Wetlands	0.00						0.00
3.B.5 - Settlements	-2.65						-2.65
3.B.6 - Other Land	0.00						0.00
3.C - Aggregate sources and non-CO2 emissions sources on land	1,515.40	154.71	68.32	0.00	0.00	0.00	23,951.49
3.C.1 - Burning	0.00	0.00	0.00				0.00
3.C.2 - Liming	0.00						0.00
3.C.3 - Urea application	1,515.40						1,515.40
3.C.4 - Direct N2O Emissions from managed soils			50.60				13,409.77
3.C.5 - Indirect N2O Emissions from managed soils			6.43				1,703.92
3.C.6 - Indirect N2O Emissions from manure management			11.29				2,990.57
3.C.7 - Rice cultivation		154.71					4,331.84
3.C.8 - CH4 from Drained Organic Soils		0.00					0.00
3.C.9 - CH4 from Drainage Ditches on Organic Soils		0.00					0.00
3.C.10 - CH4 from Rewetting of Organic Soils		0.00					0.00
3.C.11 - CH4 Emissions from Rewetting of Mangroves and Tidal Marshes		0.00					0.00
3.C.12 - N2O Emissions from Aquaculture			0.00				0.00
3.C.13 - CH4 Emissions from Rewetted and Created Wetlands on Inland Wetland Mineral Soils		0.00					0.00
3.C.14 - Other (please specify)	0.00	0.00	0.00				0.00
3.D - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.D.1 - Harvested Wood Products	0.00						0.00
3.D.2 - Other (please specify)	0.00	0.00	0.00				0.00
4 - Waste	60.06	1,217.61	7.66	0.00	0.00	0.00	36,184.10
4.A - Solid Waste Disposal		599.48					16,785.48
4.B - Biological Treatment of Solid Waste		7.24	0.54				346.39
4.C - Incineration and Open Burning of Waste	60.06	17.03	0.23				596.50
4.D - Wastewater Treatment and Discharge		593.87	6.90				18,455.74
4.E - Other (please specify)	0.00	0.00	0.00				0.00
5 - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.A - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOx and NH3			0.00				0.00
5.B - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
5.C - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2021

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
							0.00
Memo Items (5)							0.00
International Bunkers	3,589.14	0.13	0.10	0.00	0.00	0.00	3,619.27
1.A.3.a.i - International Aviation (International Bunkers)	2,324.07	0.02	0.07				2,342.13
1.A.3.a.i - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.3.a.i - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
1.A.3.d.i - International water-borne navigation (International bunkers)	1,265.07	0.12	0.03				1,277.14
1.A.3.d.i - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.3.d.i - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
1.A.5.c - Multilateral Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.A.5.c - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.5.c - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00

2020

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
Total National Emissions and Removals	**251,438.88**	**1,813.61**	**98.68**	**5,061.36**	**3,912.48**	**291.35**	**337,634.28**
1 - Energy	214,742.40	57.18	3.15	0.00	0.00	0.00	217,177.91
1.A - Fuel Combustion Activities	206,838.51	22.30	2.88	0.00	0.00	0.00	208,226.29
1.A.1 - Energy Industries	96,540.34	1.86	0.23				96,652.16
1.A.2 - Manufacturing Industries and Construction	43,913.60	1.12	0.14				43,983.23
1.A.3 - Transport	49,949.81	13.46	2.46				50,977.34
1.A.4 - Other Sectors	16,434.76	5.86	0.06				16,613.57
1.A.5 - non-specified	0.00	0.00	0.00				0.00
1.B - Fugitive emissions from fuels	7,903.89	34.87	0.27	0.00	0.00	0.00	8,951.62
1.B.1 - Solid Fuels	0.00	0.00	0.00				0.00
1.B.2 - Oil and Natural Gas	7,903.89	34.87	0.27				8,951.62
1.B.3 - Other emissions from Energy Production	0.00	0.00	0.00				0.00
1.C - Carbon dioxide Transport and Storage	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.C.1 - Transport of CO2	0.00						0.00
1.C.2 - Injection and Storage	0.00						0.00
1.C.3 - Other	0.00						0.00
2 - Industrial Processes and Product Use	35,185.07	5.92	3.50	5,061.36	3,912.48	291.35	45,543.40
2.A - Mineral Industry	22,867.78	0.00	0.00	0.00	0.00	0.00	22,867.78

2020

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
2.A.1 - Cement production	21,614.74						21,614.74
2.A.2 - Lime production	607.50						607.50
2.A.3 - Glass Production	341.12						341.12
2.A.4 - Other Process Uses of Carbonates	304.42						304.42
2.A.5 - Other (please specify)	0.00	0.00	0.00				0.00
2.B - Chemical Industry	7,126.46	5.86	3.50	0.00	0.00	0.00	8,217.92
2.B.1 - Ammonia Production	5,596.37						5,596.37
2.B.2 - Nitric Acid Production			3.50				927.50
2.B.3 - Adipic Acid Production			0.00				0.00
2.B.4 - Caprolactam, Glyoxal and Glyoxylic Acid Production			0.00				0.00
2.B.5 - Carbide Production	0.00	0.00					0.00
2.B.6 - Titanium Dioxide Production	0.00						0.00
2.B.7 - Soda Ash Production	0.00						0.00
2.B.8 - Petrochemical and Carbon Black Production	1,530.09	5.86					1,694.05
2.B.9 - Fluorochemical Production				0.00	0.00	0.00	0.00
2.B.10 - Hydrogen Production	0.00	0.00	0.00				0.00
2.B.11 - Other (Please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.C - Metal Industry	4,892.58	0.06	0.00	0.00	3,912.48	0.00	8,806.74
2.C.1 - Iron and Steel Production	4,248.00	0.00					4,248.00
2.C.2 - Ferroalloys Production	216.00	0.06					217.68
2.C.3 - Aluminum production	416.00				3,912.48		4,328.48
2.C.4 - Magnesium production	0.00					0.00	0.00
2.C.5 - Lead Production	10.00						10.00
2.C.6 - Zinc Production	2.58						2.58
2.C.7 - Rare Earths Production	0.00				0.00		0.00
2.C.8 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.D - Non-Energy Products from Fuels and Solvent Use	298.25	0.00	0.00	0.00	0.00	0.00	298.25
2.D.1 - Lubricant Use	256.56						256.56
2.D.2 - Paraffin Wax Use	41.68						41.68
2.D.3 - Solvent Use							0.00
2.D.4 - Other (please specify)	0.00	0.00	0.00				0.00
2.E - Electronics Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.E.1 - Integrated Circuit or Semiconductor			0.00	0.00	0.00	0.00	0.00
2.E.2 - TFT Flat Panel Display			0.00	0.00	0.00	0.00	0.00
2.E.3 - Photovoltaics				0.00	0.00	0.00	0.00
2.E.4 - Heat Transfer Fluid					0.00		0.00
2.E.5 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2020

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
2.F - Product Uses as Substitutes for Ozone Depleting Substances	0.00	0.00	0.00	5,061.36	0.00	0.00	5,061.36
2.F.1 - Refrigeration and Air Conditioning				3,959.86	0.00		3,959.86
2.F.2 - Foam Blowing Agents				874.82	0.00		874.82
2.F.3 - Fire Protection				212.95	0.00		212.95
2.F.4 - Aerosols				0.00	0.00		0.00
2.F.5 - Solvents				0.00	0.00		0.00
2.F.6 - Other Applications (please specify)				13.73	0.00	0.00	13.73
2.G - Other Product Manufacture and Use	0.00	0.00	0.00	0.00	0.00	291.35	291.35
2.G.1 - Electrical Equipment					0.00	291.35	291.35
2.G.2 - SF6 and PFCs from Other Product Uses				0.00	0.00	0.00	0.00
2.G.3 - N2O from Product Uses			0.00				0.00
2.G.4 - Other (Please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.H - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.H.1 - Pulp and Paper Industry	0.00	0.00	0.00				0.00
2.H.2 - Food and Beverages Industry	0.00	0.00	0.00				0.00
2.H.3 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 - Agriculture, Forestry, and Other Land Use	1,454.09	517.77	84.49	0.00	0.00	0.00	38,341.77
3.A - Livestock	0.00	351.35	26.08	0.00	0.00	0.00	16,749.23
3.A.1 - Enteric Fermentation		316.09					8,850.62
3.A.2 - Manure Management		35.25	26.08				7,898.61
3.B - Land	-7.05	0.00	0.00	0.00	0.00	0.00	-7.05
3.B.1 - Forest land	0.00						0.00
3.B.2 - Cropland	0.00						0.00
3.B.3 - Grassland	0.00						0.00
3.B.4 - Wetlands	0.00						0.00
3.B.5 - Settlements	-7.05						-7.05
3.B.6 - Other Land	0.00						0.00
3.C - Aggregate sources and non-CO2 emissions sources on land	1,461.15	166.42	58.41	0.00	0.00	0.00	21,599.59
3.C.1 - Burning	0.00	0.00	0.00				0.00
3.C.2 - Liming	0.00						0.00
3.C.3 - Urea application	1,461.15						1,461.15
3.C.4 - Direct N2O Emissions from managed soils			41.07				10,883.43
3.C.5 - Indirect N2O Emissions from managed soils			6.39				1,694.55
3.C.6 - Indirect N2O Emissions from manure management			10.95				2,900.79
3.C.7 - Rice cultivation		166.42					4,659.67
3.C.8 - CH4 from Drained Organic Soils		0.00					0.00
3.C.9 - CH4 from Drainage Ditches on Organic Soils		0.00					0.00

2020

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
3.C.10 - CH4 from Rewetting of Organic Soils		0.00					0.00
3.C.11 - CH4 Emissions from Rewetting of Mangroves and Tidal Marshes		0.00					0.00
3.C.12 - N2O Emissions from Aquaculture			0.00				0.00
3.C.13 - CH4 Emissions from Rewetted and Created Wetlands on Inland Wetland Mineral Soils		0.00					0.00
3.C.14 - Other (please specify)	0.00	0.00	0.00				0.00
3.D - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.D.1 - Harvested Wood Products	0.00						0.00
3.D.2 - Other (please specify)	0.00	0.00	0.00				0.00
4 - Waste	57.32	1,232.75	7.54	0.00	0.00	0.00	36,571.20
4.A - Solid Waste Disposal		610.25					17,086.89
4.B - Biological Treatment of Solid Waste		7.04	0.53				337.00
4.C - Incineration and Open Burning of Waste	57.32	17.03	0.23				593.71
4.D - Wastewater Treatment and Discharge		598.44	6.78				18,553.60
4.E - Other (please specify)	0.00	0.00	0.00				0.00
5 - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.A - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOx and NH3			0.00				0.00
5.B - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
5.C - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
							0.00
Memo Items (5)							0.00
International Bunkers	2,123.01	0.12	0.06	0.00	0.00	0.00	2,141.51
1.A.3.a.i - International Aviation (International Bunkers)	914.49	0.01	0.03				921.44
1.A.3.a.i - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.3.a.i - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
1.A.3.d.i - International water-borne navigation (International bunkers)	1,208.53	0.11	0.03				1,220.07
1.A.3.d.i - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.3.d.i - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
1.A.5.c - Multilateral Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.A.5.c - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.5.c - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00

2019

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
Total National Emissions and Removals	**260,395.10**	**1,850.60**	**88.85**	**4,037.10**	**4,514.40**	**291.35**	**344,599.77**
1 - Energy	222,903.83	56.80	3.19	0.00	0.00	0.00	225,340.00
1.A - Fuel Combustion Activities	214,534.06	22.20	2.91	0.00	0.00	0.00	215,925.98
1.A.1 - Energy Industries	100,438.33	2.01	0.26				100,562.46
1.A.2 - Manufacturing Industries and Construction	49,425.09	1.65	0.23				49,531.66
1.A.3 - Transport	48,602.08	12.73	2.37				49,585.71
1.A.4 - Other Sectors	16,068.55	5.82	0.06				16,246.14
1.A.5 - non-specified	0.00	0.00	0.00				0.00
1.B - Fugitive emissions from fuels	8,369.77	34.59	0.29	0.00	0.00	0.00	9,414.03
1.B.1 - Solid Fuels	0.00	0.00	0.00				0.00
1.B.2 - Oil and Natural Gas	8,369.77	34.59	0.29				9,414.03
1.B.3 - Other emissions from Energy Production	0.00	0.00	0.00				0.00
1.C - Carbon dioxide Transport and Storage	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.C.1 - Transport of CO2	0.00						0.00
1.C.2 - Injection and Storage	0.00						0.00
1.C.3 - Other	0.00						0.00
2 - Industrial Processes and Product Use	36,127.71	5.98	3.50	4,037.10	4,514.40	291.35	46,065.44
2.A - Mineral Industry	23,986.40	0.00	0.00	0.00	0.00	0.00	23,986.40
2.A.1 - Cement production	22,768.41						22,768.41
2.A.2 - Lime production	585.00						585.00
2.A.3 - Glass Production	337.96						337.96
2.A.4 - Other Process Uses of Carbonates	295.03						295.03
2.A.5 - Other (please specify)	0.00	0.00	0.00				0.00
2.B - Chemical Industry	7,144.74	5.92	3.50	0.00	0.00	0.00	8,237.91
2.B.1 - Ammonia Production	5,596.37						5,596.37
2.B.2 - Nitric Acid Production			3.50				927.50
2.B.3 - Adipic Acid Production			0.00				0.00
2.B.4 - Caprolactam, Glyoxal and Glyoxylic Acid Production			0.00				0.00
2.B.5 - Carbide Production	0.00	0.00					0.00
2.B.6 - Titanium Dioxide Production	0.00						0.00
2.B.7 - Soda Ash Production	0.00						0.00
2.B.8 - Petrochemical and Carbon Black Production	1,548.37	5.92					1,714.03

2019	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Gg			Gg CO_2e			Gg CO_2e
2.B.9 - Fluorochemical Production				0.00	0.00	0.00	0.00
2.B.10 - Hydrogen Production	0.00	0.00	0.00				0.00
2.B.11 - Other (Please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.C - Metal Industry	4,707.76	0.06	0.00	0.00	4,514.40	0.00	9,223.87
2.C.1 - Iron and Steel Production	3,995.58	0.00					3,995.58
2.C.2 - Ferroalloys Production	219.60	0.06					221.31
2.C.3 - Aluminum production	480.00				4,514.40		4,994.40
2.C.4 - Magnesium production	0.00					0.00	0.00
2.C.5 - Lead Production	10.00						10.00
2.C.6 - Zinc Production	2.58						2.58
2.C.7 - Rare Earths Production	0.00				0.00		0.00
2.C.8 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.D - Non-Energy Products from Fuels and Solvent Use	288.80	0.00	0.00	0.00	0.00	0.00	288.80
2.D.1 - Lubricant Use	247.12						247.12
2.D.2 - Paraffin Wax Use	41.68						41.68
2.D.3 - Solvent Use							0.00
2.D.4 - Other (please specify)	0.00	0.00	0.00				0.00
2.E - Electronics Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.E.1 - Integrated Circuit or Semiconductor			0.00	0.00	0.00	0.00	0.00
2.E.2 - TFT Flat Panel Display			0.00	0.00	0.00	0.00	0.00
2.E.3 - Photovoltaics				0.00	0.00	0.00	0.00
2.E.4 - Heat Transfer Fluid					0.00		0.00
2.E.5 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.F - Product Uses as Substitutes for Ozone Depleting Substances	0.00	0.00	0.00	4,037.10	0.00	0.00	4,037.10
2.F.1 - Refrigeration and Air Conditioning				3,064.58	0.00		3,064.58
2.F.2 - Foam Blowing Agents				795.08	0.00		795.08
2.F.3 - Fire Protection				113.43	0.00		113.43
2.F.4 - Aerosols				0.00	0.00		0.00
2.F.5 - Solvents				0.00	0.00		0.00
2.F.6 - Other Applications (please specify)				64.01	0.00	0.00	64.01
2.G - Other Product Manufacture and Use	0.00	0.00	0.00	0.00	0.00	291.35	291.35

2019	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Gg			Gg CO_2e			Gg CO_2e
2.G.1 - Electrical Equipment					0.00	291.35	291.35
2.G.2 - SF6 and PFCs from Other Product Uses				0.00	0.00	0.00	0.00
2.G.3 - N2O from Product Uses			0.00				0.00
2.G.4 - Other (Please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.H - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.H.1 - Pulp and Paper Industry	0.00	0.00	0.00				0.00
2.H.2 - Food and Beverages Industry	0.00	0.00	0.00				0.00
2.H.3 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 - Agriculture, Forestry, and Other Land Use	1,313.70	526.50	74.76	0.00	0.00	0.00	35,866.75
3.A - Livestock	0.00	343.69	17.51	0.00	0.00	0.00	14,263.08
3.A.1 - Enteric Fermentation		320.06					8,961.82
3.A.2 - Manure Management		23.62	17.51				5,301.26
3.B - Land	-5.82	0.00	0.00	0.00	0.00	0.00	-5.82
3.B.1 - Forest land	0.00						0.00
3.B.2 - Cropland	0.00						0.00
3.B.3 - Grassland	0.00						0.00
3.B.4 - Wetlands	0.00						0.00
3.B.5 - Settlements	-5.82						-5.82
3.B.6 - Other Land	0.00						0.00
3.C - Aggregate sources and non-CO2 emissions sources on land	1,319.53	182.81	57.25	0.00	0.00	0.00	21,609.49
3.C.1 - Burning	0.00	0.00	0.00				0.00
3.C.2 - Liming	0.00						0.00
3.C.3 - Urea application	1,319.53						1,319.53
3.C.4 - Direct N2O Emissions from managed soils			44.67				11,837.72
3.C.5 - Indirect N2O Emissions from managed soils			5.32				1,409.40
3.C.6 - Indirect N2O Emissions from manure management			7.26				1,924.21
3.C.7 - Rice cultivation		182.81					5,118.63
3.C.8 - CH4 from Drained Organic Soils		0.00					0.00
3.C.9 - CH4 from Drainage Ditches on Organic Soils		0.00					0.00
3.C.10 - CH4 from Rewetting of Organic Soils		0.00					0.00
3.C.11 - CH4 Emissions from Rewetting of Mangroves and Tidal Marshes		0.00					0.00

2019	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Gg			Gg CO_2e			Gg CO_2e
3.C.12 - N2O Emissions from Aquaculture			0.00				0.00
3.C.13 - CH4 Emissions from Rewetted and Created Wetlands on Inland Wetland Mineral Soils		0.00					0.00
3.C.14 - Other (please specify)	0.00	0.00	0.00				0.00
3.D - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.D.1 - Harvested Wood Products	0.00						0.00
3.D.2 - Other (please specify)	0.00	0.00	0.00				0.00
4 - Waste	49.86	1,261.33	7.40	0.00	0.00	0.00	37,327.58
4.A - Solid Waste Disposal		645.79					18,082.17
4.B - Biological Treatment of Solid Waste		6.85	0.51				327.89
4.C - Incineration and Open Burning of Waste	49.86	16.78	0.22				578.48
4.D - Wastewater Treatment and Discharge		591.91	6.66				18,339.05
4.E - Other (please specify)	0.00	0.00	0.00				0.00
5 - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.A - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOx and NH3			0.00				0.00
5.B - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
5.C - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
							0.00
Memo Items (5)							0.00
International Bunkers	3,198.97	0.13	0.09	0.00	0.00	0.00	3,225.79
1.A.3.a.i - International Aviation (International Bunkers)	1,918.85	0.01	0.05				1,933.44
1.A.3.a.i - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.3.a.i - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
1.A.3.d.i - International water-borne navigation (International bunkers)	1,280.12	0.12	0.03				1,292.34
1.A.3.d.i - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.3.d.i - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
1.A.5.c - Multilateral Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.A.5.c - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.5.c - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00

2018

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	Gg			Gg CO_2e			Gg CO_2e
Total National Emissions and Removals	**274,384.32**	**2,107.30**	**98.45**	**3,216.93**	**4,514.40**	**291.35**	**367,501.25**
1 - Energy	234,637.38	58.69	3.44	0.00	0.00	0.00	237,192.43
1.A - Fuel Combustion Activities	226,726.21	23.08	3.17	0.00	0.00	0.00	228,212.81
1.A.1 - Energy Industries	106,096.51	2.20	0.29				106,235.18
1.A.2 - Manufacturing Industries and Construction	50,762.65	1.99	0.29				50,894.64
1.A.3 - Transport	52,381.13	12.98	2.54				53,416.43
1.A.4 - Other Sectors	17,485.92	5.91	0.06				17,666.56
1.A.5 - non-specified	0.00	0.00	0.00				0.00
1.B - Fugitive emissions from fuels	7,911.16	35.62	0.27	0.00	0.00	0.00	8,979.62
1.B.1 - Solid Fuels	0.00	0.00	0.00				0.00
1.B.2 - Oil and Natural Gas	7,911.16	35.62	0.27				8,979.62
1.B.3 - Other emissions from Energy Production	0.00	0.00	0.00				0.00
1.C - Carbon dioxide Transport and Storage	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.C.1 - Transport of CO2	0.00						0.00
1.C.2 - Injection and Storage	0.00						0.00
1.C.3 - Other	0.00						0.00
2 - Industrial Processes and Product Use	38,353.26	6.23	3.50	3,216.93	4,514.40	291.35	47,477.76
2.A - Mineral Industry	25,354.54	0.00	0.00	0.00	0.00	0.00	25,354.54
2.A.1 - Cement production	24,134.07						24,134.07
2.A.2 - Lime production	600.00						600.00
2.A.3 - Glass Production	334.83						334.83
2.A.4 - Other Process Uses of Carbonates	285.63						285.63
2.A.5 - Other (please specify)	0.00	0.00	0.00				0.00
2.B - Chemical Industry	7,090.00	6.16	3.50	0.00	0.00	0.00	8,190.11
2.B.1 - Ammonia Production	5,482.33						5,482.33
2.B.2 - Nitric Acid Production			3.50				927.50
2.B.3 - Adipic Acid Production			0.00				0.00
2.B.4 - Caprolactam, Glyoxal and Glyoxylic Acid Production			0.00				0.00
2.B.5 - Carbide Production	0.00	0.00					0.00
2.B.6 - Titanium Dioxide Production	0.00						0.00
2.B.7 - Soda Ash Production	0.00						0.00
2.B.8 - Petrochemical and Carbon Black Production	1,607.66	6.16					1,780.27

2018	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Gg			Gg CO_2e			Gg CO_2e
2.B.9 - Fluorochemical Production				0.00	0.00	0.00	0.00
2.B.10 - Hydrogen Production	0.00	0.00	0.00				0.00
2.B.11 - Other (Please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.C - Metal Industry	5,629.38	0.06	0.00	0.00	4,514.40	0.00	10,145.49
2.C.1 - Iron and Steel Production	4,917.20	0.00					4,917.20
2.C.2 - Ferroalloys Production	219.60	0.06					221.31
2.C.3 - Aluminum production	480.00				4,514.40		4,994.40
2.C.4 - Magnesium production	0.00					0.00	0.00
2.C.5 - Lead Production	10.00						10.00
2.C.6 - Zinc Production	2.58						2.58
2.C.7 - Rare Earths Production	0.00				0.00		0.00
2.C.8 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.D - Non-Energy Products from Fuels and Solvent Use	279.34	0.00	0.00	0.00	0.00	0.00	279.34
2.D.1 - Lubricant Use	237.66						237.66
2.D.2 - Paraffin Wax Use	41.68						41.68
2.D.3 - Solvent Use							0.00
2.D.4 - Other (please specify)	0.00	0.00	0.00				0.00
2.E - Electronics Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.E.1 - Integrated Circuit or Semiconductor			0.00	0.00	0.00	0.00	0.00
2.E.2 - TFT Flat Panel Display			0.00	0.00	0.00	0.00	0.00
2.E.3 - Photovoltaics				0.00	0.00	0.00	0.00
2.E.4 - Heat Transfer Fluid					0.00		0.00
2.E.5 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.F - Product Uses as Substitutes for Ozone Depleting Substances	0.00	0.00	0.00	3,216.93	0.00	0.00	3,216.93
2.F.1 - Refrigeration and Air Conditioning				2,326.65	0.00		2,326.65
2.F.2 - Foam Blowing Agents				725.46	0.00		725.46
2.F.3 - Fire Protection				113.15	0.00		113.15
2.F.4 - Aerosols				0.00	0.00		0.00
2.F.5 - Solvents				0.00	0.00		0.00
2.F.6 - Other Applications (please specify)				51.68	0.00	0.00	51.68
2.G - Other Product Manufacture and Use	0.00	0.00	0.00	0.00	0.00	291.35	291.35

2018	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Gg			Gg CO_2e			Gg CO_2e
2.G.1 - Electrical Equipment					0.00	291.35	291.35
2.G.2 - SF6 and PFCs from Other Product Uses				0.00	0.00	0.00	0.00
2.G.3 - N2O from Product Uses			0.00				0.00
2.G.4 - Other (Please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.H - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.H.1 - Pulp and Paper Industry	0.00	0.00	0.00				0.00
2.H.2 - Food and Beverages Industry	0.00	0.00	0.00				0.00
2.H.3 - Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 - Agriculture, Forestry, and Other Land Use	1,345.79	721.78	84.25	0.00	0.00	0.00	43,882.10
3.A - Livestock	0.00	601.45	18.92	0.00	0.00	0.00	21,853.42
3.A.1 - Enteric Fermentation		575.93					16,126.08
3.A.2 - Manure Management		25.51	18.92				5,727.34
3.B - Land	-10.01	0.00	0.00	0.00	0.00	0.00	-10.01
3.B.1 - Forest land	0.00						0.00
3.B.2 - Cropland	0.00						0.00
3.B.3 - Grassland	0.00						0.00
3.B.4 - Wetlands	0.00						0.00
3.B.5 - Settlements	-10.01						-10.01
3.B.6 - Other Land	0.00						0.00
3.C - Aggregate sources and non-CO2 emissions sources on land	1,355.80	120.33	65.33	0.00	0.00	0.00	22,038.69
3.C.1 - Burning	0.00	0.00	0.00				0.00
3.C.2 - Liming	0.00						0.00
3.C.3 - Urea application	1,355.80						1,355.80
3.C.4 - Direct N2O Emissions from managed soils			46.24				12,254.12
3.C.5 - Indirect N2O Emissions from managed soils			11.42				3,026.47
3.C.6 - Indirect N2O Emissions from manure management			7.67				2,033.00
3.C.7 - Rice cultivation		120.33					3,369.29
3.C.8 - CH4 from Drained Organic Soils		0.00					0.00
3.C.9 - CH4 from Drainage Ditches on Organic Soils		0.00					0.00
3.C.10 - CH4 from Rewetting of Organic Soils		0.00					0.00

2018	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Gg			Gg CO_2e			Gg CO_2e
3.C.11 - CH4 Emissions from Rewetting of Mangroves and Tidal Marshes		0.00					0.00
3.C.12 - N2O Emissions from Aquaculture			0.00				0.00
3.C.13 - CH4 Emissions from Rewetted and Created Wetlands on Inland Wetland Mineral Soils		0.00					0.00
3.C.14 - Other (please specify)	0.00	0.00	0.00				0.00
3.D - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.D.1 - Harvested Wood Products	0.00						0.00
3.D.2 - Other (please specify)	0.00	0.00	0.00				0.00
4 - Waste	47.89	1,320.60	7.26	0.00	0.00	0.00	38,948.96
4.A - Solid Waste Disposal		728.43					20,395.96
4.B - Biological Treatment of Solid Waste		6.66	0.50				319.04
4.C - Incineration and Open Burning of Waste	47.89	16.54	0.22				568.74
4.D - Wastewater Treatment and Discharge		568.98	6.54				17,665.21
4.E - Other (please specify)	0.00	0.00	0.00				0.00
5 - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.A - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOx and NH3			0.00				0.00
5.B - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
5.C - Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
							0.00
Memo Items (5)							0.00
International Bunkers	3,568.68	0.14	0.10	0.00	0.00	0.00	3,598.46
1.A.3.a.i - International Aviation (International Bunkers)	2,149.36	0.02	0.06				2,165.71
1.A.3.a.i - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.3.a.i - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
1.A.3.d.i - International water-borne navigation (International bunkers)	1,419.31	0.13	0.04				1,432.75
1.A.3.d.i - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.3.d.i - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00
1.A.5.c - Multilateral Operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.A.5.c - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOX and NH3			0.00				0.00
1.A.5.c - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	0.00						0.00

Annex II: Key Categories Analysis

Approach 1 - Level Assessment (2022)

Category Code	IPCC Category	GHG	Ex.t Gg CO_2e	|Ex.t| Gg CO_2e	Lx,t	Cumulative total
1.A.1	**Energy Industries - Gaseous Fuels**	**CO_2**	**87,952.75**	**87,952.75**	**0.2277**	**0.227730906**
1.A.3.b	**Road Transportation - Liquid Fuels**	**CO_2**	**61,272.80**	**61,272.80**	**0.1587**	**0.386380979**
1.A.2	**Manufacturing Industries - Gaseous Fuels**	**CO_2**	**39,049.95**	**39,049.95**	**0.1011**	**0.487490721**
2.A.1	**Cement production**	**CO_2**	**25,276.12**	**25,276.12**	**0.0654**	**0.552936693**
1.A.1	**Energy Industries - Liquid Fuels**	**CO_2**	**18,663.81**	**18,663.81**	**0.0483**	**0.601261806**
4.D	**Wastewater Treatment and Discharge**	**CH_4**	**17,571.25**	**17,571.25**	**0.0455**	**0.646758005**
4.A	**Solid Waste Disposal**	**CH_4**	**16,852.03**	**16,852.03**	**0.0436**	**0.690391982**
3.C.4	**Direct N2O Emissions from managed soils**	**N_2O**	**12,819.17**	**12,819.17**	**0.0332**	**0.723583898**
1.A.2	**Manufacturing Industries - Solid Fuels**	**CO_2**	**10,762.38**	**10,762.38**	**0.0279**	**0.751450287**
3.A.1	**Enteric Fermentation**	**CH_4**	**10,290.67**	**10,290.67**	**0.0266**	**0.778095304**
1.A.4	**Other Sectors - Liquid Fuels**	**CO_2**	**10,218.96**	**10,218.96**	**0.0265**	**0.804554663**
1.A.4	**Other Sectors - Gaseous Fuels**	**CO_2**	**7,204.41**	**7,204.41**	**0.0187**	**0.823208613**
1.B.2.b	**Natural Gas**	**CO_2**	**7,033.89**	**7,033.89**	**0.0182**	**0.841421061**
3.A.2	**Manure Management**	**N_2O**	**6,937.06**	**6,937.06**	**0.0180**	**0.859382792**
1.A.2	**Manufacturing Industries - Liquid Fuels**	**CO_2**	**5,968.75**	**5,968.75**	**0.0155**	**0.874837335**
2.F.1	**Refrigeration and Air Conditioning**	**HFCs, PFCs**	**5,834.06**	**5,834.06**	**0.0151**	**0.889943119**
2.B.1	**Ammonia Production**	**CO_2**	**5,340.58**	**5,340.58**	**0.0138**	**0.90377116**
2.C.1	**Iron and Steel Production**	**CO_2**	**4,984.00**	**4,984.00**	**0.0129**	**0.91667594**
3.C.7	**Rice cultivation**	**CH_4**	**4,506.56**	**4,506.56**	**0.0117**	**0.928344515**
2.C.3	**Aluminum production**	**PFCs**	**4,213.44**	**4,213.44**	**0.0109**	**0.939254129**
3.C.6	**Indirect N2O Emissions from manure management**	**N_2O**	**2,899.73**	**2,899.73**	**0.0075**	**0.946762224**
1.A.3.b	**Road Transportation - Gaseous Fuels**	**CO_2**	**2,465.82**	**2,465.82**	**0.0064**	**0.953146822**
4.D	Wastewater Treatment and Discharge	N_2O	1855.710919	1855.710919	0.004804884	0.957951705
3.C.5	Indirect N2O Emissions from managed soils	N_2O	1643.819633	1643.819633	0.004256246	0.962207951
1.B.2.a	Oil	CO_2	1575.871413	1575.871413	0.004080312	0.966288263
2.B.8	Petrochemical and Carbon Black Production	CO_2	1527.971	1527.971	0.003956286	0.970244549
3.C.3	Urea application	CO_2	1475.182867	1475.182867	0.003819605	0.974064154
2.F.2	Foam Blowing Agents	HFCs	1039.770427	1039.770427	0.002692217	0.97675637
3.A.2	Manure Management	CH_4	991.1244272	991.1244272	0.002566261	0.979322631
2.B.2	Nitric Acid Production	N_2O	927.5	927.5	0.002401521	0.981724152
1.B.2.a	Oil	CH_4	802.839422	802.839422	0.002078745	0.983802898
1.A.3.b	Road Transportation - Liquid Fuels	N_2O	799.3207985	799.3207985	0.002069635	0.985872532
2.A.2	Lime production	CO_2	611.25	611.25	0.001582674	0.987455206

Category Code	IPCC Category	GHG	Ex.t Gg CO_2e	|Ex.t| Gg CO_2e	Lx,t	Cumulative total
4.C	Incineration and Open Burning of Waste	CH_4	483.6223234	483.6223234	0.001252215	0.988707421
2.C.3	Aluminum production	CO_2	448	448	0.00115998	0.989867401
1.A.3.b	Road Transportation - Liquid Fuels	CH_4	380.931306	380.931306	0.000986323	0.990853724
1.A.4	Other Sectors - Biomass - solid	CH_4	352.5592	352.5592	0.000912861	0.991766585
2.A.3	Glass Production	CO_2	347.5323	347.5323	0.000899845	0.99266643
2.A.4	Other Process Uses of Carbonates	CO_2	323.2020741	323.2020741	0.000836848	0.993503279
2.D	Non-Energy Products from Fuels and Solvent Use	CO_2	317.152	317.152	0.000821183	0.994324462
2.F.3	Fire Protection	HFCs, PFCs	294.1058939	294.1058939	0.000761511	0.995085973
2.G	Other Product Manufacture and Use	SF6, PFCs	291.353	291.353	0.000754383	0.995840356
2.C.2	Ferroalloys Production	CO_2	219.6	219.6	0.000568597	0.996408954
4.B	Biological Treatment of Solid Waste	CH_4	219.1441896	219.1441896	0.000567417	0.996976371
2.B.8	Petrochemical and Carbon Black Production	CH_4	164.0102072	164.0102072	0.000424662	0.997401033
4.B	Biological Treatment of Solid Waste	N_2O	155.5532417	155.5532417	0.000402765	0.997803798
1.A.3.b	Road Transportation - Gaseous Fuels	CH_4	114.044672	114.044672	0.000295289	0.998099087
1.B.2.b	Natural Gas	CH_4	71.14969963	71.14969963	0.000184224	0.998283311
1.B.2.b	Natural Gas	N_2O	66.24977822	66.24977822	0.000171537	0.998454847
4.C	Incineration and Open Burning of Waste	N_2O	60.60264725	60.60264725	0.000156915	0.998611762
4.C	Incineration and Open Burning of Waste	CO_2	56.69495512	56.69495512	0.000146797	0.998758559
1.A.1	Energy Industries - Gaseous Fuels	CH_4	44.215612	44.215612	0.000114485	0.998873044
1.A.2	Manufacturing Industries and Construction - Solid Fuels	N_2O	43.5202875	43.5202875	0.000112685	0.998985729
1.A.1	Energy Industries - Gaseous Fuels	N_2O	41.8469185	41.8469185	0.000108352	0.99909408
1.A.1	Energy Industries - Liquid Fuels	N_2O	39.258531	39.258531	0.00010165	0.99919573
1.A.3.b	Road Transportation - Gaseous Fuels	N_2O	35.19624	35.19624	9.11316E-05	0.999286862
1.A.2	Manufacturing Industries and Construction - Solid Fuels	CH_4	30.6558	30.6558	7.93753E-05	0.999366237
1.A.2	Manufacturing Industries and Construction - Biomass - solid	CH_4	28.84	28.84	7.46737E-05	0.999440911
2.F.6	Other Applications (please specify)	HFCs, PFCs	26.424	26.424	6.84181E-05	0.999509329
1.A.4	Other Sectors - Liquid Fuels	CH_4	24.60248	24.60248	6.37018E-05	0.999573031
1.A.1	Energy Industries - Liquid Fuels	CH_4	20.740356	20.740356	5.37018E-05	0.999626733
1.A.2	Manufacturing Industries and Construction - Gaseous Fuels	CH_4	19.631192	19.631192	5.08299E-05	0.999677562
1.A.2	Manufacturing Industries and Construction - Gaseous Fuels	N_2O	18.579521	18.579521	4.81069E-05	0.999725669
1.A.4	Other Sectors - Gaseous Fuels	N_2O	18.109	18.109	4.68886E-05	0.999772558
1.A.4	Other Sectors - Biomass - solid	N_2O	16.683605	16.683605	4.31979E-05	0.999815756
1.A.2	Manufacturing Industries and Construction - Liquid Fuels	N_2O	12.597941	12.597941	3.26191E-05	0.999848375
1.B.2.a	Oil	N_2O	12.026707	12.026707	3.114E-05	0.999879515
2.C.5	Lead Production	CO_2	10	10	2.58924E-05	0.999905407

Category Code	IPCC Category	GHG	Ex.t Gg CO_2e	|Ex.t| Gg CO_2e	Lx,t	Cumulative total
1.A.2	Manufacturing Industries and Construction - Liquid Fuels	CH_4	6.664784	6.664784	1.72567E-05	0.999922664
1.A.4	Other Sectors - Liquid Fuels	N_2O	6.402612	6.402612	1.65779E-05	0.999939242
1.A.2	Manufacturing Industries and Construction - Biomass - solid	N_2O	5.459	5.459	1.41347E-05	0.999953377
1.A.2	Manufacturing Industries and Construction - Biomass - other	N_2O	4.26014	4.26014	1.10305E-05	0.999964407
1.A.4	Other Sectors - Gaseous Fuels	N_2O	3.427775	3.427775	8.87534E-06	0.999973282
1.A.2	Manufacturing Industries and Construction - Biomass - other	CH_4	3.37596	3.37596	8.74118E-06	0.999982024
3.B.5.a	Settlements Remaining Settlements	CO_2	-2.654700767	2.654700767	6.87366E-06	0.999988897
2.C.6	Zinc Production	CO_2	2.58	2.58	6.68024E-06	0.999995578
2.C.2	Ferroalloys Production	CH_4	1.708	1.708	4.42242E-06	1
Total			**386,208.18109**	**386,213.49049**	**1**	

Approach 1 - Trend Assessment (2022)

Category Code	IPCC Category	GHG	1990 Ex.t Gg CO_2e	2022 Ex.t Gg CO_2e	Trend Assessment Txt	Contribution to trend (%)	Cumulative total
1.A.1	Energy Industries - Gaseous Fuels	CO_2	9,329.54	87,952.75	0.4365	0.1845	0.1845
1.A.2	Manufacturing Industries - Liquid Fuels	CO_2	20,311.94	5,968.75	0.3378	0.1428	0.3273
1.A.2	Manufacturing Industries - Gaseous Fuels	CO_2	3,100.48	39,049.95	0.2132	0.0902	0.4175
3.C.4	Direct N2O Emissions from managed soils	N_2O	13,700.60	12,819.17	0.1668	0.0705	0.4880
1.A.1	Energy Industries - Liquid Fuels	CO_2	15,113.62	18,663.81	0.1526	0.0645	0.5525
1.A.3.b	Road Transportation - Liquid Fuels	CO_2	15,098.97	61,272.80	0.1435	0.0607	0.6132
1.A.4	Other Sectors - Liquid Fuels	CO_2	9,325.74	10,218.96	0.1032	0.0436	0.6568
3.A.1	Enteric Fermentation	CH_4	8,812.04	10,290.67	0.0931	0.0394	0.6962
2.A.1	Cement production	CO_2	4,433.20	25,276.12	0.0927	0.0392	0.7354
4.A	Solid Waste Disposal	CH_4	9,858.12	16,852.03	0.0671	0.0283	0.7637
1.A.4	Other Sectors - Gaseous Fuels	CO_2	151.47	7,204.41	0.0472	0.0200	0.7837
2.F.1	Refrigeration and Air Conditioning	HFCs, PFCs	0.00	5,834.06	0.0405	0.0171	0.8008
1.B.2.b	Natural Gas	CO_2	533.59	7,033.89	0.0389	0.0164	0.8172
1.B.2.a	Oil	CO_2	2,530.82	1,575.87	0.0363	0.0154	0.8326
2.B.1	Ammonia Production	CO_2	(202.77)	5,340.58	0.0361	0.0153	0.8479
3.A.2	Manure Management	N_2O	677.76	6,937.06	0.0355	0.0150	0.8629
3.C.7	Rice cultivation	CH_4	3,469.28	4,506.56	0.0335	0.0142	0.8770
3.C.3	Urea application	CO_2	2,317.34	1,475.18	0.0330	0.0140	0.8910
2.C.1	Iron and Steel Production	CO_2	3,579.66	4,984.00	0.0322	0.0136	0.9046
1.A.2	Manufacturing Industries - Solid Fuels	CO_2	2,763.25	10,762.38	0.0231	0.0098	0.9144

Category Code	IPCC Category	GHG	1990 Ex.t Gg CO_2e	2022 Ex.t Gg CO_2e	Trend Assessment Txt	Contribution to trend (%)	Cumulative total
2.C.3	Aluminum production	PFCs	2,674.03	4,213.44	0.0207	0.0087	0.9231
1.B.2.a	Oil	CH_4	1,289.34	802.84	0.0185	0.0078	0.9310
1.A.1	Energy Industries - Biomass - solid	CH_4	980.97	0.00	0.0183	0.0077	0.9387
1.A.3.b	Road Transportation - Gaseous Fuels	CO_2	0.00	2,465.82	0.0171	0.0072	0.9459
3.C.6	Indirect N2O Emissions from manure management	N_2O	183.97	2,899.73	0.0167	0.0071	0.9530
4.D	Wastewater Treatment and Discharge	CH_4	7419.144833	17571.24576	0.016519656	0.006984215	0.959981434
3.C.5	Indirect N2O Emissions from managed soils	N_2O	1423.731342	1643.819633	0.015168493	0.006412967	0.966394401
2.B.2	Nitric Acid Production	N_2O	927.5	927.5	0.010877115	0.004598649	0.97099305
2.B.8	Petrochemical and Carbon Black Production	CO_2	0	1527.971	0.010608883	0.004485246	0.975478296
1.A.1	Energy Industries - Solid Fuels	CO_2	415.82376	0	0.007763623	0.003282321	0.978760616
2.F.2	Foam Blowing Agents	HFCs	0	1039.770427	0.007219249	0.003052169	0.981812785
4.D	Wastewater Treatment and Discharge	N_2O	938.4715489	1855.710919	0.004637281	0.001960559	0.983773345
3.A.2	Manure Management	CH_4	591.188136	991.1244272	0.004156264	0.001757194	0.985530539
2.A.2	Lime production	CO_2	53.25	611.25	0.003249779	0.001373948	0.986904487
3.C.1	Burning	CH_4	169.0488273	0	0.00315622	0.001334393	0.98823888
2.A.3	Glass Production	CO_2	0	347.5323	0.002412958	0.001020155	0.989259035
2.A.4	Other Process Uses of Carbonates	CO_2	0	323.2020741	0.00224403	0.000948736	0.990207771
2.C.3	Aluminum production	CO_2	284.32	448	0.00219787	0.00092922	0.991136991
2.F.3	Fire Protection	HFCs, PFCs	0	294.1058939	0.002042012	0.000863326	0.992000317
4.C	Incineration and Open Burning of Waste	CH_4	281.8926455	483.6223234	0.00190522	0.000805493	0.99280581
1.A.3.b	Road Transportation - Liquid Fuels	N_2O	199.1837838	799.3207985	0.001830925	0.000774082	0.993579892
2.D	Non-Energy Products from Fuels and Solvent Use	CO_2	28.62288	317.152	0.001667621	0.00070504	0.994284932
2.C.2	Ferroalloys Production	CO_2	0	219.6	0.001524709	0.00064462	0.994929552
2.B.7	Soda Ash Production	CO_2	65.362044	0	0.00122034	0.000515938	0.99544549
2.B.8	Petrochemical and Carbon Black Production	CH_4	0	164.0102072	0.001138742	0.00048144	0.99592693
1.A.3.b	Road Transportation - Gaseous Fuels	CH_4	0	114.044672	0.000791826	0.00033477	0.996261699
3.C.1	Burning	N_2O	41.47957335	0	0.000774443	0.000327421	0.99658912
1.A.3.b	Road Transportation - Liquid Fuels	CH_4	101.331468	380.931306	0.000752945	0.000318332	0.996907452
1.A.4	Other Sectors - Biomass - solid	CH_4	168.3388	352.5592	0.000695104	0.000293877	0.997201329
2.G	Other Product Manufacture and Use	SF_6, PFCs	71.7925	291.353	0.000682499	0.000288548	0.997489877
1.A.2	Manufacturing Industries and Construction - Liquid Fuels	N_2O	41.2143105	12.597941	0.000682021	0.000288346	0.997778224
1.B.2.b	Natural Gas	CH_4	0.19137888	71.14969963	0.000490428	0.000207344	0.997985568
1.B.2.b	Natural Gas	N_2O	0.051456375	66.24977822	0.000459019	0.000194065	0.998179633
1.A.4	Other Sectors - Liquid Fuels	CH_4	32.42141	24.60248	0.000434505	0.000183701	0.998363334
1.A.2	Manufacturing Industries and Construction - Liquid Fuels	CH_4	22.2220152	6.664784	0.000368621	0.000155846	0.99851918
1.A.1	Energy Industries - Liquid Fuels	N_2O	31.161774	39.258531	0.000309228	0.000130736	0.998649916

Category Code	IPCC Category	GHG	1990 Ex.t Gg CO_2e	2022 Ex.t Gg CO_2e	Trend Assessment Txt	Contribution to trend (%)	Cumulative total
1.A.4	Other Sectors - Liquid Fuels	N_2O	16.45785415	6.402612	0.000262822	0.000111116	0.998761032
1.A.2	Manufacturing Industries and Construction - Solid Fuels	N_2O	2.320923	43.5202875	0.000258834	0.00010943	0.998870463
1.A.3.b	Road Transportation - Gaseous Fuels	N_2O	0	35.19624	0.000244372	0.000103316	0.998973779
4.C	Incineration and Open Burning of Waste	N_2O	35.10832038	60.60264725	0.000234717	9.92343E-05	0.999073013
1.A.1	Energy Industries - Gaseous Fuels	CH_4	4.656456	44.215612	0.000220056	9.30357E-05	0.999166049
1.A.1	Energy Industries - Gaseous Fuels	N_2O	4.407003	41.8469185	0.000208267	8.80517E-05	0.9992541
1.A.2	Manufacturing Industries and Construction - Biomass - solid	CH_4	0	28.84	0.00020024	8.46577E-05	0.999338758
2.F.6	Other Applications (please specify)	HFCs, PFCs	0	26.424	0.000183465	7.75657E-05	0.999416324
1.A.2	Manufacturing Industries and Construction - Solid Fuels	CH_4	1.713796	30.6558	0.000180849	7.64599E-05	0.999492784
1.A.1	Energy Industries - Liquid Fuels	CH_4	16.462824	20.740356	0.000163366	6.90682E-05	0.999561852
1.A.4	Other Sectors - Gaseous Fuels	CH_4	0.378	18.109	0.000118675	5.01739E-05	0.999612026
1.B.2.a	Oil	N_2O	10.4850854	12.026707	0.000112259	4.74609E-05	0.999659487
1.A.2	Manufacturing Industries and Construction - Gaseous Fuels	CH_4	1.547476	19.631192	0.00010741	4.54108E-05	0.999704897
1.A.2	Manufacturing Industries and Construction - Gaseous Fuels	N_2O	1.4645755	18.579521	0.000101655	4.29781E-05	0.999747876
4.B	Biological Treatment of Solid Waste	CH_4	86.64626828	219.1441896	9.61822E-05	4.06641E-05	0.99978854
2.C.1	Iron and Steel Production	CH_4	4.6803232	0	8.73838E-05	3.69443E-05	0.999825484
4.C	Incineration and Open Burning of Waste	CO_2	24.8898481	56.69495512	7.10653E-05	3.00451E-05	0.999855529
2.C.5	Lead Production	CO_2	0	10	6.94312E-05	2.93543E-05	0.999884883
4.B	Biological Treatment of Solid Waste	N_2O	61.50337793	155.5532417	6.82722E-05	2.88643E-05	0.999913748
1.A.2	Manufacturing Industries and Construction - Biomass - solid	N_2O	0	5.459	3.79025E-05	1.60245E-05	0.999929772
1.A.4	Other Sectors - Biomass - solid	N_2O	7.9660325	16.683605	3.28933E-05	1.39067E-05	0.999943679
1.A.2	Manufacturing Industries and Construction - Biomass - other	N_2O	0	4.26014	2.95787E-05	1.25053E-05	0.999956184
1.A.2	Manufacturing Industries and Construction - Biomass - other	CH_4	0	3.37596	2.34397E-05	9.90988E-06	0.999966094
1.A.4	Other Sectors - Gaseous Fuels	N_2O	0.07155	3.427775	2.24636E-05	9.4972E-06	0.999975591
3.B.5.a	Settlements Remaining Settlements	CO_2	0	-2.654700767	1.84319E-05	7.79268E-06	0.999983384
2.C.6	Zinc Production	CO_2	0	2.58	1.79132E-05	7.5734E-06	0.999990957
2.C.2	Ferroalloys Production	CH_4	0	1.708	1.18588E-05	5.01371E-06	0.999995971
1.A.1	Energy Industries - Solid Fuels	CH_4	0.2622312	0	4.89598E-06	2.06993E-06	0.999998041
1.A.1	Energy Industries - Solid Fuels	N_2O	0.2481831	0	4.63369E-06	1.95904E-06	100
Total				**386,208.18109**	**2.36528**	**100**	

Annex III: Uncertainty Assessment

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
1.A - Fuel Combustion Activities												
1.A.1.a.i - Electricity Generation - Liquid Fuels	CO2	12946.9379	16233.8274	2.0000	2.0000	2.8284	0.0140	0.1309	0.1132	0.2618	0.3201	0.1710
1.A.1.a.i - Electricity Generation - Liquid Fuels	CH4	0.5022	0.6421	2.0000	4.0000	4.4721	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1.a.i - Electricity Generation - Liquid Fuels	N2O	0.1004	0.1284	2.0000	6.0000	6.3246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1.a.i - Electricity Generation - Gaseous Fuels	CO2	9329.5422	75044.1327	2.0000	2.0000	2.8284	0.2992	0.3470	0.5232	0.6940	1.4798	2.6716
1.A.1.a.i - Electricity Generation - Gaseous Fuels	CH4	0.1663	1.3474	2.0000	4.0000	4.4721	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1.a.i - Electricity Generation - Gaseous Fuels	N2O	0.0166	0.1347	2.0000	6.0000	6.3246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1.b - Petroleum Refining - Liquid Fuels	CO2	2166.6808	1612.6388	2.0000	2.0000	2.8284	0.0001	0.0296	0.0112	0.0592	0.0318	0.0045
1.A.1.b - Petroleum Refining - Liquid Fuels	CH4	0.0857	0.0652	2.0000	4.0000	4.4721	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1.b - Petroleum Refining - Liquid Fuels	N2O	0.0171	0.0130	2.0000	6.0000	6.3246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1.b - Petroleum Refining - Gaseous Fuels	CO2	0.0000	2024.0847	5.0000	2.0000	5.3852	0.0008	0.0141	0.0141	0.0282	0.0998	0.0108
1.A.1.b - Petroleum Refining - Gaseous Fuels	CH4	0.0000	0.0363	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
1.A.1.b - Petroleum Refining - Gaseous Fuels	N2O	0.0000	0.0036	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
1.A.1.c.i - Manufacture of Solid Fuels - Solid Fuels	CO2	831.6475	0.0000	5.0000	2.0000	5.3852	0.0000	0.0157	0.0000	0.0314	0.0000	0.0010
1.A.1.c.i - Manufacture of Solid Fuels - Solid Fuels	CH4	981.2370	0.0000	5.0000	4.0000	6.4031	0.0000	0.0185	0.0000	0.0740	0.0000	0.0055
1.A.1.c.i - Manufacture of Solid Fuels - Solid Fuels	N2O	0.2491	0.0000	5.0000	6.0000	7.8102	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1.c.i - Manufacture of Solid Fuels - Biomass - solid	CO2	0.0000	0.0000	2.0000	5.0000	5.3852	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1.c.i - Manufacture of Solid Fuels - Biomass - solid	CH4	35.0345	0.0000	2.0000	10.0000	10.1980	0.0000	0.0007	0.0000	0.0066	0.0000	0.0000
1.A.1.c.i - Manufacture of Solid Fuels - Biomass - solid	N2O	0.0000	0.0000	2.0000	15.0000	15.1327	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.a - Commercial/Institutional - Liquid Fuels	CO2	0.0000	221.7157	2.0000	2.0000	2.8284	0.0000	0.0015	0.0015	0.0031	0.0044	0.0000
1.A.4.a - Commercial/Institutional - Liquid Fuels	CH4	0.0000	0.0282	2.0000	4.0000	4.4721	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.a - Commercial/Institutional - Liquid Fuels	N2O	0.0000	0.0016	2.0000	6.0000	6.3246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.a - Commercial/Institutional - Gaseous Fuels	CO2	0.0000	1967.1623	5.0000	3.9216	6.3544	0.0010	0.0137	0.0137	0.0538	0.0970	0.0123
1.A.4.a - Commercial/Institutional - Gaseous Fuels	CH4	0.0000	0.1766	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000
1.A.4.a - Commercial/Institutional - Gaseous Fuels	N2O	0.0000	0.0035	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
1.A.4.a - Commercial/Institutional - Biomass - solid	CO2	0.0000	0.0000	2.0000	3.0000	3.6056	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.a - Commercial/Institutional - Biomass - solid	CH4	0.6018	0.0000	2.0000	6.0000	6.3246	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
1.A.4.a - Commercial/Institutional - Biomass - solid	N2O	0.0030	0.0000	2.0000	9.0000	9.2195	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.b - Residential - Liquid Fuels	CO2	9325.7428	8974.7761	2.0000	2.0000	2.8284	0.0043	0.1132	0.0626	0.2265	0.1770	0.0826
1.A.4.b - Residential - Liquid Fuels	CH4	1.1579	0.7112	2.0000	4.0000	4.4721	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
1.A.4.b - Residential - Liquid Fuels	N2O	0.0621	0.0142	2.0000	6.0000	6.3246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.b - Residential - Gaseous Fuels	CO2	151.4700	5237.2446	2.0000	2.0000	2.8284	0.0015	0.0337	0.0365	0.0673	0.1033	0.0152
1.A.4.b - Residential - Gaseous Fuels	CH4	0.0135	0.4702	2.0000	4.0000	4.4721	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.b - Residential - Gaseous Fuels	N2O	0.0003	0.0094	2.0000	6.0000	6.3246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.b - Residential - Biomass - solid	CO2	0.0000	0.0000	2.0000	3.0000	3.6056	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.b - Residential - Biomass - solid	CH4	5.4103	12.5914	2.0000	6.0000	6.3246	0.0000	0.0000	0.0001	0.0001	0.0002	0.0000
1.A.4.b - Residential - Biomass - solid	N2O	0.0271	0.0630	2.0000	9.0000	9.2195	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.c.i - Stationary - Liquid Fuels	CO2	0.0000	1022.4695	2.0000	4.0000	4.4721	0.0001	0.0071	0.0071	0.0285	0.0202	0.0012
1.A.4.c.i - Stationary - Liquid Fuels	CH4	0.0000	0.1393	2.0000	4.0000	4.4721	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.4.c.i - Stationary - Liquid Fuels	N2O	0.0000	0.0084	2.0000	8.0000	8.2462	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1.c.ii - Other Energy Industries - Liquid Fuels	CO2	0.0000	817.3444	5.0000	6.1362	7.9153	0.0003	0.0057	0.0057	0.0350	0.0403	0.0028

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
1.A.1.c.ii - Other Energy Industries - Liquid Fuels	CH4	0.0000	0.0334	5.0000	228.7879	228.8425	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
1.A.1.c.ii - Other Energy Industries - Liquid Fuels	N2O	0.0000	0.0067	5.0000	228.7879	228.8425	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.1.c.ii - Other Energy Industries - Gaseous Fuels	CO2	0.0000	10884.5305	5.0000	3.9216	6.3544	0.0318	0.0759	0.0759	0.2976	0.5366	0.3765
1.A.1.c.ii - Other Energy Industries - Gaseous Fuels	CH4	0.0000	0.1954	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000
1.A.1.c.ii - Other Energy Industries - Gaseous Fuels	N2O	0.0000	0.0195	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.2.m - Non-specified Industry - Liquid Fuels	CO2	20311.9429	5968.7529	5.0000	6.1362	7.9153	0.0148	0.3410	0.0416	2.0925	0.2943	4.4651
1.A.2.m - Non-specified Industry - Liquid Fuels	CH4	0.7936	0.2380	5.0000	228.7879	228.8425	0.0000	0.0000	0.0000	0.0030	0.0000	0.0000
1.A.2.m - Non-specified Industry - Liquid Fuels	N2O	0.1555	0.0475	5.0000	228.7879	228.8425	0.0000	0.0000	0.0000	0.0006	0.0000	0.0000
1.A.2.m - Non-specified Industry - Solid Fuels	CO2	2763.2450	10762.3755	5.0000	12.4601	13.4258	0.1387	0.0229	0.0750	0.2855	0.5306	0.3630
1.A.2.m - Non-specified Industry - Solid Fuels	CH4	0.0612	1.0949	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0013	0.0001	0.0000
1.A.2.m - Non-specified Industry - Solid Fuels	N2O	0.0088	0.1642	5.0000	222.2222	222.2785	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000
1.A.2.m - Non-specified Industry - Gaseous Fuels	CO2	3100.4787	39049.9465	5.0000	3.9216	6.3544	0.4089	0.2137	0.2723	0.8381	1.9251	4.4085
1.A.2.m - Non-specified Industry - Gaseous Fuels	CH4	0.0553	0.7011	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000
1.A.2.m - Non-specified Industry - Gaseous Fuels	N2O	0.0055	0.0701	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
1.A.2.m - Non-specified Industry - Biomass - solid	CO2	0.0000	0.0000	5.0000	17.5714	18.2690	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
1.A.2.m - Non-specified Industry - Biomass - solid	CH4	0.0000	1.0300	5.0000	222.2222	222.2785	0.0000	0.0000	0.0000	0.0016	0.0001	0.0000
1.A.2.m - Non-specified Industry - Biomass - solid	N2O	0.0000	0.0206	5.0000	275.0000	275.0455	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.2.m - Non-specified Industry - Biomass - other	CO2	0.0000	0.0000	5.0000	17.0000	17.7200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.2.m - Non-specified Industry - Biomass - other	CH4	0.0000	0.1206	5.0000	233.3333	233.3869	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000
1.A.2.m - Non-specified Industry - Biomass - other	N2O	0.0000	0.0161	5.0000	62.5000	62.6997	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.3.a.i - International Aviation (International Bunkers) - Liquid Fuels	CO2	0.0000	2324.0700	2.0000	5.0000	5.3852	0.0010	0.0162	0.0162	0.0810	0.0458	0.0087
1.A.3.a.i - International Aviation (International Bunkers) - Liquid Fuels	CH4	0.0000	0.0166	2.0000	10.0000	10.1980	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.3.a.i - International Aviation (International Bunkers) - Liquid Fuels	N2O	0.0000	0.0664	2.0000	15.0000	15.1327	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.3.b.i - Cars - Liquid Fuels	CO2	15098.9681	61272.7988	5.0000	3.0683	5.8664	0.8581	0.1423	0.4272	0.4365	3.0207	9.3150
1.A.3.b.i - Cars - Liquid Fuels	CH4	3.6190	13.6047	5.0000	244.6928	244.7438	0.0001	0.0000	0.0001	0.0065	0.0007	0.0000
1.A.3.b.i - Cars - Liquid Fuels	N2O	0.7516	3.0163	5.0000	209.9376	209.9971	0.0000	0.0000	0.0000	0.0014	0.0001	0.0000
1.A.3.b.i - Cars - Gaseous Fuels	CO2	0.0000	2465.8176	5.0000	3.9216	6.3544	0.0016	0.0172	0.0172	0.0674	0.1216	0.0193
1.A.3.b.i - Cars - Gaseous Fuels	CH4	0.0000	4.0730	5.0000	1573.9130	1573.9210	0.0003	0.0000	0.0000	0.0447	0.0002	0.0020
1.A.3.b.i - Cars - Gaseous Fuels	N2O	0.0000	0.1328	5.0000	2466.6667	2466.6717	0.0000	0.0000	0.0000	0.0023	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
1.A.3.b.vi - Urea-based catalysts	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.3.d.i - International water-borne navigation (International bunkers) - Liquid Fuels	CO2	0.0000	1528.0122	5.0000	4.3014	6.5956	0.0007	0.0107	0.0107	0.0458	0.0753	0.0078
1.A.3.d.i - International water-borne navigation (International bunkers) - Liquid Fuels	CH4	0.0000	0.1407	5.0000	50.0000	50.2494	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.A.3.d.i - International water-borne navigation (International bunkers) - Liquid Fuels	N2O	0.0000	0.0402	5.0000	140.0000	140.0893	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1 - Fugitive Emissions from Fuels - Solid Fuels												
1.B.1.a.i.1 - Mining	CO2	0.0000	0.0000	5.0000	100.0000	100.1249	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.i.1 - Mining	CH4	0.0000	0.0000	5.0000	100.0000	100.1249	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.i.2 - Post-mining seam gas emissions	CO2	0.0000	0.0000	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.i.2 - Post-mining seam gas emissions	CH4	0.0000	0.0000	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.i.3 - Abandoned underground mines	CH4	0.0000	0.0000	5.0000	0.0000	5.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.i.3 - Abandoned underground mines	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.i.4 - Flaring of drained methane or conversion of methane to CO2	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.i.4 - Flaring of drained methane or	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

A	B	C	D	E	F	G	H	I	J	K	L	M
			Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)		Combined Uncertainty (%)				Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	
conversion of methane to CO2												
1.B.1.a.ii.1 - Mining	CO2	0.0000	0.0000	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.ii.1 - Mining	CH4	0.0000	0.0000	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.ii.2 - Post-mining seam gas emissions	CO2	0.0000	0.0000	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.ii.2 - Post-mining seam gas emissions	CH4	0.0000	0.0000	5.0000	200.0000	200.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.ii.3 - Abandoned surface mines	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.a.ii.3 - Abandoned surface mines	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.c.i - Charcoal and Biochar production	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.c.i - Charcoal and Biochar production	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.c.i - Charcoal and Biochar production	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.c.ii - Coke production	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.c.ii - Coke production	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.c.ii - Coke production	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.c.iv - Gasification transformation	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.c.iv - Gasification transformation	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.1.c.iv - Gasification transformation	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2 - Fugitive Emissions from Fuels - Oil and Natural Gas												

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
1.B.2.a.i - Venting	CO2	5.8569	3.6469	2.0000	2.0000	2.8284	0.0000	0.0001	0.0000	0.0002	0.0001	0.0000
1.B.2.a.i - Venting	CH4	1246.3403	776.0630	2.0000	4.0000	4.4721	0.0001	0.0181	0.0054	0.0724	0.0153	0.0055
1.B.2.a.i - Venting	N2O	0.0000	5.4979	2.0000	0.0000	2.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
1.B.2.a.ii - Flaring	CO2	2524.9585	1572.2245	2.0000	2.0000	2.8284	0.0001	0.0367	0.0110	0.0733	0.0310	0.0063
1.B.2.a.ii - Flaring	CH4	43.0024	26.7764	2.0000	4.0000	4.4721	0.0000	0.0006	0.0002	0.0025	0.0005	0.0000
1.B.2.a.ii - Flaring	N2O	10.4851	6.5288	2.0000	6.0000	6.3246	0.0000	0.0002	0.0000	0.0009	0.0001	0.0000
1.B.2.a.iii.1 - Exploration	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.1 - Exploration	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.1 - Exploration	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.2 - Production and Upgrading	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.2 - Production and Upgrading	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.2 - Production and Upgrading	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.3 - Transport	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.3 - Transport	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.3 - Transport	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.4 - Refining	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.4 - Refining	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.4 - Refining	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
1.B.2.a.iii.5 - Distribution of oil products	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.5 - Distribution of oil products	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.5 - Distribution of oil products	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.6 - Other	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.6 - Other	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.a.iii.6 - Other	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.i - Venting	CO2	524.2725	6942.6285	2.0000	2.0000	2.8284	0.0026	0.0385	0.0484	0.0770	0.1369	0.0247
1.B.2.b.i - Venting	CH4	0.0000	69.5434	2.0000	4.0000	4.4721	0.0000	0.0005	0.0005	0.0019	0.0014	0.0000
1.B.2.b.i - Venting	N2O	0.0000	65.8179	2.0000	0.0000	2.0000	0.0000	0.0005	0.0005	0.0000	0.0013	0.0000
1.B.2.b.ii - Flaring	CO2	9.3204	91.2646	2.0000	2.0000	2.8284	0.0000	0.0005	0.0006	0.0009	0.0018	0.0000
1.B.2.b.ii - Flaring	CH4	0.1914	1.6063	2.0000	4.0000	4.4721	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.ii - Flaring	N2O	0.0515	0.4319	2.0000	6.0000	6.3246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.1 - Exploration	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.1 - Exploration	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.1 - Exploration	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.2 - Production	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
1.B.2.b.iii.2 - Production	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.2 - Production	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.3 - Processing	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.3 - Processing	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.3 - Processing	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.4 - Transmission and Storage	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.4 - Transmission and Storage	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.4 - Transmission and Storage	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.5 - Distribution	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.5 - Distribution	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.5 - Distribution	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.6 - Other	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.6 - Other	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.2.b.iii.6 - Other	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.3 - Other emissions from Energy Production	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.B.3 - Other emissions from Energy Production	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
1.B.3 - Other emissions from Energy Production	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.C - CO2 Transport Injection and Storage												
1.C.1.a - Pipelines	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.C.1.b - Ships	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.C.1.c - Other (please specify)	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.C.2.a - Injection	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.C.2.b - Storage	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.C.3 - Other	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.A - Mineral Industry												
2.A.1 - Cement production	CO2	4433.1964	25276.1172	78.2624	0.0000	78.2624	25.9893	0.0926	0.1762	0.0000	19.5042	380.4152
2.A.2 - Lime production	CO2	53.2500	611.2500	55.4527	6.0000	55.7763	0.0077	0.0033	0.0043	0.0195	0.3342	0.1121
2.A.3 - Glass Production	CO2	0.0000	347.5323	40.3113	60.0000	72.2842	0.0042	0.0024	0.0024	0.1454	0.1381	0.0402
2.A.4.a - Ceramics	CO2	0.0000	323.2021	30.0000	5.0000	30.4138	0.0006	0.0023	0.0023	0.0113	0.0956	0.0093
2.A.4.b - Other Uses of Soda Ash	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.A.4.c - Non Metallurgical Magnesia Production	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.A.4.d - Other (please specify)	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.A.5 - Other (please specify)	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.A.5 - Other (please specify)	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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2.A.5 - Other (please specify)	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B - Chemical Industry												
2.B.1 - Ammonia Production	CO2	-202.7736	5340.5763	5.0000	7.0000	8.6023	0.0140	0.0411	0.0372	0.2874	0.2633	0.1519
2.B.2 - Nitric Acid Production	N2O	927.5000	927.5000	30.0000	20.0000	36.0555	0.0074	0.0110	0.0065	0.2205	0.2743	0.1239
2.B.3 - Adipic Acid Production	N2O	0.0000	0.0000	2.0000	0.0000	2.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.4 - Caprolactam, Glyoxal and Glyoxylic Acid Production	N2O	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.5 - Carbide Production	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.5 - Carbide Production	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.6 - Titanium Dioxide Production	CO2	0.0000	0.0000	7.0711	0.0000	7.0711	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.7 - Soda Ash Production	CO2	65.3620	0.0000	5.0000	0.0000	5.0000	0.0000	0.0012	0.0000	0.0000	0.0000	0.0000
2.B.8.a - Methanol	CO2	0.0000	549.6820	31.6228	30.0000	43.5890	0.0038	0.0038	0.0038	0.1150	0.1714	0.0426
2.B.8.a - Methanol	CH4	0.0000	71.2264	30.0000	30.0000	42.4264	0.0001	0.0005	0.0005	0.0149	0.0211	0.0007
2.B.8.b - Ethylene	CO2	0.0000	680.4850	11.1803	30.0000	32.0156	0.0032	0.0047	0.0047	0.1423	0.0750	0.0259
2.B.8.b - Ethylene	CH4	0.0000	92.5680	5.0000	30.0000	30.4138	0.0001	0.0006	0.0006	0.0194	0.0046	0.0004
2.B.8.c - Ethylene Dichloride and Vinyl Chloride Monomer	CO2	0.0000	9.6040	10.1980	50.0000	51.0294	0.0000	0.0001	0.0001	0.0033	0.0010	0.0000
2.B.8.c - Ethylene Dichloride and Vinyl Chloride Monomer	CH4	0.0000	0.0310	2.0000	50.0000	50.0400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.8.d - Ethylene Oxide	CO2	0.0000	0.0000	14.1421	0.0000	14.1421	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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2.B.8.d - Ethylene Oxide	CH4	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.8.e - Acrylonitrile	CO2	0.0000	0.0000	14.1421	0.0000	14.1421	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.8.e - Acrylonitrile	CH4	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.8.f - Carbon Black	CO2	0.0000	288.2000	14.1421	0.0000	14.1421	0.0001	0.0020	0.0020	0.0000	0.0402	0.0016
2.B.8.f - Carbon Black	CH4	0.0000	0.1848	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.8.x - Other petrochemical production	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.8.x - Other petrochemical production	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.9.a - By-product emissions	CHF3	0.0000	0.0000	14.1421	0.0000	14.1421	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.10 - Hydrogen Production	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.10 - Hydrogen Production	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.B.10 - Hydrogen Production	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.C - Metal Industry												
2.C.1 - Iron and Steel Production	CO2	3579.6600	4984.0000	26.4575	25.0000	36.4005	0.2186	0.0328	0.0347	0.8190	1.3001	2.3612
2.C.1 - Iron and Steel Production	CH4	4.6803	0.0000	14.1421	0.0000	14.1421	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
2.C.2 - Ferroalloys Production	CO2	0.0000	219.6000	25.0000	0.0000	25.0000	0.0002	0.0015	0.0015	0.0000	0.0541	0.0029
2.C.2 - Ferroalloys Production	CH4	0.0000	1.7080	5.0000	25.0000	25.4951	0.0000	0.0000	0.0000	0.0003	0.0001	0.0000
2.C.3 - Aluminium production	CO2	284.3200	448.0000	20.0998	10.0000	22.4499	0.0007	0.0022	0.0031	0.0224	0.0888	0.0084

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2.C.3 - Aluminium production	CF4	1885.0416	2970.2400	3.4641	10.0000	10.5830	0.0066	0.0148	0.0207	0.1484	0.1014	0.0323
2.C.3 - Aluminium production	C2F6	788.9880	1243.2000	3.4641	10.0000	10.5830	0.0011	0.0062	0.0087	0.0621	0.0425	0.0057
2.C.4 - Magnesium production	CO2	0.0000	0.0000	14.1421	0.0000	14.1421	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.C.4 - Magnesium production	SF6	0.0000	0.0000	14.1421	0.0000	14.1421	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.C.5 - Lead Production	CO2	0.0000	10.0000	10.0000	20.0000	22.3607	0.0000	0.0001	0.0001	0.0014	0.0010	0.0000
2.C.6 - Zinc Production	CO2	0.0000	2.5800	10.0000	20.0000	22.3607	0.0000	0.0000	0.0000	0.0004	0.0003	0.0000
2.C.7 - Rare Earths Production	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.C.7 - Rare Earths Production	CF4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.C.7 - Rare Earths Production	C2F6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.C.7 - Rare Earths Production	C3F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.D - Non-Energy Products from Fuels and Solvent Use												
2.D.1 - Lubricant Use	CO2	26.0773	275.4693	15.0000	50.0000	52.2015	0.0014	0.0014	0.0019	0.0714	0.0407	0.0068
2.D.2 - Paraffin Wax Use	CO2	2.5455	41.6827	10.0000	0.0000	10.0000	0.0000	0.0002	0.0003	0.0000	0.0041	0.0000
2.D.4 - Other (please specify)	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.D.4 - Other (please specify)	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.D.4 - Other (please specify)	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E - Electronics Industry												

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2.E.1 - Integrated Circuit or Semiconductor	CHF3	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor	CF4	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor	C2F6	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor	C3F8	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor	SF6	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor	NF3	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor	CH2F2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor	CHF2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor	c-C4F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor	NF3 Remote	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.1 - Integrated Circuit or Semiconductor	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display	CF4	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display	SF6	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display	NF3	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display	CHF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display	CH2F2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display	CHF2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display	C2F6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
2.E.2 - TFT Flat Panel Display	C3F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display	c-C4F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display	NF3 Remote	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.2 - TFT Flat Panel Display	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics	CF4	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics	C2F6	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics	CHF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics	CH2F2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics	CHF2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics	C3F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics	c-C4F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics	SF6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics	NF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.3 - Photovoltaics	NF3 Remote	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.4 - Heat Transfer Fluid	n-C6F14	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.5 - Other (please specify)	CF4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.5 - Other (please specify)	c-C4F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.E.5 - Other (please specify)	SF6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

A	B	C	D	E	F	G	H	I	J	K	L	M
			Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)		Combined Uncertainty (%)				Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	
2.F - Product Uses as Substitutes for Ozone Depleting Substances												
2.F.1.a - Refrigeration and Stationary Air Conditioning	CHF3	0.0000	1.2445	5.0000	0.0000	5.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	CH2F2	0.0000	266.6763	5.0000	0.0000	5.0000	0.0000	0.0019	0.0019	0.0000	0.0131	0.0002
2.F.1.a - Refrigeration and Stationary Air Conditioning	CHF2CF3	0.0000	2094.0760	5.0000	0.0000	5.0000	0.0007	0.0146	0.0146	0.0000	0.1032	0.0107
2.F.1.a - Refrigeration and Stationary Air Conditioning	CH2FCF3	0.0000	2565.4408	5.0000	0.0000	5.0000	0.0011	0.0179	0.0179	0.0000	0.1265	0.0160
2.F.1.a - Refrigeration and Stationary Air Conditioning	CH3CHF2	0.0000	3.2902	5.0000	0.0000	5.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	CH3CF3	0.0000	903.3296	5.0000	0.0000	5.0000	0.0001	0.0063	0.0063	0.0000	0.0445	0.0020
2.F.1.a - Refrigeration and Stationary Air Conditioning	CF3CHFCHFCF2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	CF3CHFCF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	CF3CH2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	CHF2CH2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	CH3CF2CH2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
2.F.1.a - Refrigeration and Stationary Air Conditioning	CF4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	C2F6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	C3F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	C4F10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	c-C4F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	n-C5F12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.a - Refrigeration and Stationary Air Conditioning	n-C6F14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CH2FCF3	0.0000	0.0000	5.0000	0.0000	5.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CH3CHF2	0.0000	0.0000	5.0000	0.0000	5.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CHF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CH2F2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CF3CHFCHFCF2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CHF2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CH3CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
2.F.1.b - Mobile Air Conditioning	CF3CHFCF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CF3CH2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CHF2CH2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CH3CF2CH2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	CF4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	C2F6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	C3F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	C4F10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	c-C4F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	n-C5F12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.1.b - Mobile Air Conditioning	n-C6F14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CH2FCF3	0.0000	901.4928	0.0000	0.0000	0.0000	0.0000	0.0063	0.0063	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CH3CHF2	0.0000	17.1262	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CF3CHFCF3	0.0000	91.1555	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CHF2CH2CF3	0.0000	23.6110	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CH3CF2CH2CF3	0.0000	6.3850	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CHF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CH2F2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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2.F.2 - Foam Blowing Agents	CF3CHFCHFCF2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CHF2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CH3CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CF3CH2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	CF4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	C2F6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	C3F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	C4F10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	c-C4F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	n-C5F12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.2 - Foam Blowing Agents	n-C6F14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.3 - Fire Protection	CHF2CF3	0.0000	95.2993	0.0000	0.0000	0.0000	0.0000	0.0007	0.0007	0.0000	0.0000	0.0000
2.F.3 - Fire Protection	CH2FCF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.3 - Fire Protection	CH3CHF2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.3 - Fire Protection	CF3CHFCF3	0.0000	197.9482	0.0000	0.0000	0.0000	0.0000	0.0014	0.0014	0.0000	0.0000	0.0000
2.F.3 - Fire Protection	CF3CH2CF3	0.0000	0.8584	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.5 - Solvents	CF3CHFCHFCF2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.5 - Solvents	CH3CF2CH2CF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
2.F.5 - Solvents	n-C6F14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.F.6 - Other Applications (please specify)	CHF3	0.0000	4.4640	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000
2.F.6 - Other Applications (please specify)	CH3CF3	0.0000	21.9600	10.0000	0.0000	10.0000	0.0000	0.0002	0.0002	0.0000	0.0022	0.0000
2.G - Electrical Equipment												
2.G.1 - Electrical Equipment	CF4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1 - Electrical Equipment	C2F6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1 - Electrical Equipment	C3F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1 - Electrical Equipment	C4F10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1 - Electrical Equipment	c-C4F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1 - Electrical Equipment	n-C5F12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1 - Electrical Equipment	n-C6F14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1 - Electrical Equipment	SF6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.a - Manufacture of Electrical Equipment	CF4	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.a - Manufacture of Electrical Equipment	C2F6	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.a - Manufacture of Electrical Equipment	C3F8	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.a - Manufacture of Electrical Equipment	C4F10	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.a - Manufacture of Electrical Equipment	c-C4F8	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
2.G.1.a - Manufacture of Electrical Equipment	n-C5F12	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.a - Manufacture of Electrical Equipment	n-C6F14	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.a - Manufacture of Electrical Equipment	SF6	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.b - Use of Electrical Equipment	CF4	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.b - Use of Electrical Equipment	C2F6	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.b - Use of Electrical Equipment	C3F8	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.b - Use of Electrical Equipment	C4F10	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.b - Use of Electrical Equipment	c-C4F8	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.b - Use of Electrical Equipment	n-C5F12	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.b - Use of Electrical Equipment	n-C6F14	0.0000	0.0000	30.0000	30.0000	42.4264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.b - Use of Electrical Equipment	SF6	71.7925	291.3530	30.0000	30.0000	42.4264	0.0010	0.0007	0.0020	0.0203	0.0862	0.0078
2.G.1.c - Disposal of Electrical Equipment	CF4	0.0000	0.0000	40.0000	40.0000	56.5685	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.c - Disposal of Electrical Equipment	C2F6	0.0000	0.0000	40.0000	40.0000	56.5685	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.c - Disposal of Electrical Equipment	C3F8	0.0000	0.0000	40.0000	40.0000	56.5685	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.c - Disposal of Electrical Equipment	C4F10	0.0000	0.0000	40.0000	40.0000	56.5685	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.c - Disposal of Electrical Equipment	c-C4F8	0.0000	0.0000	40.0000	40.0000	56.5685	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.c - Disposal of Electrical Equipment	n-C5F12	0.0000	0.0000	40.0000	40.0000	56.5685	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.1.c - Disposal of Electrical Equipment	n-C6F14	0.0000	0.0000	40.0000	40.0000	56.5685	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
2.G.1.c - Disposal of Electrical Equipment	SF6	0.0000	0.0000	40.0000	40.0000	56.5685	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.a - Military Applications	CF4	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.a - Military Applications	C2F6	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.a - Military Applications	C3F8	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.a - Military Applications	C4F10	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.a - Military Applications	c-C4F8	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.a - Military Applications	n-C5F12	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.a - Military Applications	n-C6F14	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.a - Military Applications	SF6	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.b - Accelerators	CF4	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.b - Accelerators	C2F6	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.b - Accelerators	C3F8	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.b - Accelerators	C4F10	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.b - Accelerators	c-C4F8	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.b - Accelerators	n-C5F12	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.b - Accelerators	n-C6F14	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.b - Accelerators	SF6	0.0000	0.0000	10.0000	0.0000	10.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.c - Other (please specify)	CF4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
2.G.2.c - Other (please specify)	C2F6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.c - Other (please specify)	c-C3F6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.c - Other (please specify)	C3F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.c - Other (please specify)	C4F10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.c - Other (please specify)	c-C4F8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.c - Other (please specify)	n-C5F12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.c - Other (please specify)	n-C6F14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.c - Other (please specify)	SF6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.2.c - Other (please specify)	CHF3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.3.a - Medical Applications	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.3.b - Propellant for pressure and aerosol products	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.G.3.c - Other (Please specify)	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.H - Other												
2.H.1 - Pulp and Paper Industry	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.H.1 - Pulp and Paper Industry	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.H.1 - Pulp and Paper Industry	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.H.2 - Food and Beverages Industry	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.H.2 - Food and Beverages Industry	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

A	B	C	D	E	F	G	H	I	J	K	L	M
			Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)		Combined Uncertainty (%)				Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	
2.H.2 - Food and Beverages Industry	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.A - Livestock												
3.A.1.a.i - Dairy Cows	CH4	1653.7920	1545.2906	20.0000	20.0000	28.2843	0.0127	0.0204	0.0108	0.4083	0.3047	0.2596
3.A.1.a.ii - Other Cattle	CH4	1183.9520	4194.6111	20.0000	20.0000	28.2843	0.0935	0.0069	0.0292	0.1383	0.8272	0.7033
3.A.1.b - Buffalo	CH4	4660.0400	3442.1601	20.0000	20.0000	28.2843	0.0630	0.0639	0.0240	1.2775	0.6788	2.0927
3.A.1.c - Sheep	CH4	535.3600	298.4908	20.0000	30.0000	36.0555	0.0008	0.0080	0.0021	0.2405	0.0589	0.0613
3.A.1.d - Goats	CH4	378.1400	174.1104	20.0000	30.0000	36.0555	0.0003	0.0059	0.0012	0.1775	0.0343	0.0327
3.A.1.e - Camels	CH4	177.8728	338.6152	20.0000	30.0000	36.0555	0.0010	0.0010	0.0024	0.0298	0.0668	0.0053
3.A.1.f - Horses	CH4	15.1200	42.9957	20.0000	30.0000	36.0555	0.0000	0.0000	0.0003	0.0004	0.0085	0.0001
3.A.1.g - Mules and Asses	CH4	207.7600	250.8173	20.0000	30.0000	36.0555	0.0005	0.0022	0.0017	0.0651	0.0495	0.0067
3.A.1.h - Swine	CH4	0.0000	0.5880	20.0000	30.0000	36.0555	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000
3.A.1.i - Poultry	CH4	0.0000	0.0000	20.0000	30.0000	36.0555	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.A.1.j - Other (please specify)	CH4	0.0000	2.9859	20.0000	30.0000	36.0555	0.0000	0.0000	0.0000	0.0006	0.0006	0.0000
3.A.2.a.i - Dairy cows	CH4	71.9040	12.4115	20.0000	20.0000	28.2843	0.0000	0.0013	0.0001	0.0254	0.0024	0.0007
3.A.2.a.i - Dairy cows	N2O	450.8275	246.4373	20.0000	20.0000	28.2843	0.0003	0.0068	0.0017	0.1357	0.0486	0.0208
3.A.2.a.ii - Other cattle	CH4	38.1920	6.6589	20.0000	20.0000	28.2843	0.0000	0.0007	0.0000	0.0135	0.0013	0.0002
3.A.2.a.ii - Other cattle	N2O	71.8375	115.7950	20.0000	20.0000	28.2843	0.0001	0.0005	0.0008	0.0110	0.0228	0.0006
3.A.2.b - Buffalo	CH4	423.6400	7.0949	20.0000	20.0000	28.2843	0.0000	0.0079	0.0000	0.1588	0.0014	0.0252

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
3.A.2.b - Buffalo	N2O	111.8577	173.1374	20.0000	20.0000	28.2843	0.0002	0.0009	0.0012	0.0181	0.0341	0.0015
3.A.2.c - Sheep	CH4	16.0608	8.9547	20.0000	30.0000	36.0555	0.0000	0.0002	0.0001	0.0072	0.0018	0.0001
3.A.2.c - Sheep	N2O	11.5317	6.4295	20.0000	30.0000	36.0555	0.0000	0.0002	0.0000	0.0052	0.0013	0.0000
3.A.2.d - Goats	CH4	12.8568	5.9198	20.0000	30.0000	36.0555	0.0000	0.0002	0.0000	0.0060	0.0012	0.0000
3.A.2.d - Goats	N2O	6.7001	3.0850	20.0000	30.0000	36.0555	0.0000	0.0001	0.0000	0.0031	0.0006	0.0000
3.A.2.e - Camels	CH4	7.4243	14.1335	20.0000	30.0000	36.0555	0.0000	0.0000	0.0001	0.0012	0.0028	0.0000
3.A.2.e - Camels	N2O	3.2796	6.2433	20.0000	30.0000	36.0555	0.0000	0.0000	0.0000	0.0005	0.0012	0.0000
3.A.2.f - Horses	CH4	1.3776	3.9174	20.0000	30.0000	36.0555	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000
3.A.2.f - Horses	N2O	0.9984	2.8392	20.0000	30.0000	36.0555	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000
3.A.2.g - Mules and Asses	CH4	18.6984	22.5736	20.0000	30.0000	36.0555	0.0000	0.0002	0.0002	0.0059	0.0045	0.0001
3.A.2.g - Mules and Asses	N2O	13.4886	16.2841	20.0000	30.0000	36.0555	0.0000	0.0001	0.0001	0.0042	0.0032	0.0000
3.A.2.h - Swine	CH4	0.0000	0.5880	20.0000	30.0000	36.0555	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000
3.A.2.h - Swine	N2O	0.0000	2.1627	20.0000	30.0000	36.0555	0.0000	0.0000	0.0000	0.0005	0.0004	0.0000
3.A.2.i - Poultry	CH4	1.0343	905.8862	20.0000	30.0000	36.0555	0.0071	0.0063	0.0063	0.1889	0.1786	0.0676
3.A.2.i - Poultry	N2O	7.2430	6343.6429	20.0000	30.0000	36.0555	0.3474	0.0441	0.0442	1.3227	1.2509	3.3144
3.A.2.j - Other (please specify)	CH4	0.0000	2.9859	20.0000	30.0000	36.0555	0.0000	0.0000	0.0000	0.0006	0.0006	0.0000
3.A.2.j - Other (please specify)	N2O	0.0000	21.0067	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000
3.B - Land												

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
3.B.1.a - Forest land Remaining Forest land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.1.b.i - Cropland converted to Forest Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.1.b.ii - Grassland converted to Forest Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.1.b.iii - Wetlands converted to Forest Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.1.b.iv - Settlements converted to Forest Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.1.b.v - Other Land converted to Forest Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.2.a - Cropland Remaining Cropland	CO2	0.0000	0.0000	20.0000	50.0000	53.8516	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.2.b.i - Forest Land converted to Cropland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.2.b.ii - Grassland converted to Cropland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.2.b.iii - Wetlands converted to Cropland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.2.b.iv - Settlements converted to Cropland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.2.b.v - Other Land converted to Cropland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.3.a - Grassland Remaining Grassland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.3.b.i - Forest Land converted to Grassland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.3.b.ii - Cropland converted to Grassland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
3.B.3.b.iii - Wetlands converted to Grassland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.3.b.iv - Settlements converted to Grassland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.3.b.v - Other Land converted to Grassland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.4.a.i - Peat Extraction remaining Peat Extraction	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.4.a.iii - Other Wetlands Remaining Other Wetlands	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.4.b.i - Land converted for Peat Extraction	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.4.b.ii - Land converted to Flooded Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.4.b.iii - Land converted to Other Wetlands	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.5.a - Settlements Remaining Settlements	CO2	0.0000	-2.6547	20.0000	50.0000	53.8516	0.0000	0.0000	0.0000	0.0009	0.0005	0.0000
3.B.5.b.i - Forest Land converted to Settlements	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.5.b.ii - Cropland converted to Settlements	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.5.b.iii - Grassland converted to Settlements	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.5.b.iv - Wetlands converted to Settlements	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
3.B.5.b.v - Other Land converted to Settlements	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.6.b.i - Forest Land converted to Other Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.6.b.ii - Cropland converted to Other Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.6.b.iii - Grassland converted to Other Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.6.b.iv - Wetlands converted to Other Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.B.6.b.v - Settlements converted to Other Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C - Aggregate sources and non-CO2 emissions sources on land												
3.C.1.a - Burning in Forest Land	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.1.a - Burning in Forest Land	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.1.a - Burning in Forest Land	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.1.b - Burning in Cropland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.1.b - Burning in Cropland	CH4	169.0488	0.0000	0.0000	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	0.0000	0.0000
3.C.1.b - Burning in Cropland	N2O	41.4796	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000	0.0000	0.0000
3.C.1.c - Burning in Grassland	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
3.C.1.c - Burning in Grassland	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.1.c - Burning in Grassland	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.1.d - Burning in all other land uses	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.1.d - Burning in all other land uses	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.1.d - Burning in all other land uses	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.2 - Liming	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.3 - Urea application	CO2	2317.3391	1475.1829	20.0000	50.0000	53.8516	0.0419	0.0334	0.0103	1.6709	0.2909	2.8764
3.C.4 - Direct N2O Emissions from managed soils	N2O	13700.6033	12819.1656	28.2843	93.1556	97.3548	10.3443	0.1689	0.0894	15.7315	3.5750	260.2605
3.C.5 - Indirect N2O Emissions from managed soils	N2O	1423.7313	1643.8196	20.0000	80.0000	82.4621	0.1220	0.0154	0.0115	1.2313	0.3242	1.6211
3.C.6 - Indirect N2O Emissions from manure management	N2O	183.9741	2899.7277	20.0000	80.0000	82.4621	0.3797	0.0167	0.0202	1.3397	0.5718	2.1218
3.C.7 - Rice cultivation	CH4	3469.2763	4506.5612	20.0000	34.0000	39.4462	0.2099	0.0340	0.0314	1.1562	0.8887	2.1266
3.C.8 - CH4 from Drained Organic Soils	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.9 - CH4 from Drainage Ditches on Organic Soils	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.10 - CH4 from Rewetting of Organic Soils	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.11 - CH4 Emissions from Rewetting of	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

A	B	C	D	E	F	G	H	I	J	K	L	M
			Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)		Combined Uncertainty (%)				Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	
Mangroves and Tidal Marshes												
3.C.12 - N2O Emissions from Aquaculture	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.13 - CH4 Emissions from Rewetted and Created Wetlands on Inland Wetland Mineral Soils	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.14 - Other (please specify)	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.14 - Other (please specify)	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.C.14 - Other (please specify)	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.D - Other												
3.D.1 - Harvested Wood Products	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.D.2 - Other (please specify)	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.D.2 - Other (please specify)	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.D.2 - Other (please specify)	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.A - Solid Waste Disposal												
4.A.1 - Managed Waste Disposal Sites	CH4	817.7678	1397.9388	30.0000	50.0000	58.3095	0.0441	0.0057	0.0097	0.2839	0.4135	0.2516
4.A.2 - Unmanaged Waste Disposal Sites	CH4	3899.7596	6666.4710	30.0000	50.0000	58.3095	1.0035	0.0271	0.0465	1.3534	1.9719	5.7201
4.A.3 - Uncategorised Waste Disposal Sites	CH4	5140.5922	8787.6209	30.0000	50.0000	58.3095	1.7438	0.0357	0.0613	1.7839	2.5993	9.9387
4.B - Biological Treatment of Solid Waste												

			D	E		G				K	L	
A	B	C	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)	F	Combined Uncertainty (%)	H	I	J	Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	M
4.B - Biological Treatment of Solid Waste	CH4	86.6463	219.1442	30.0000	100.0000	104.4031	0.0035	0.0001	0.0015	0.0106	0.0648	0.0043
4.B - Biological Treatment of Solid Waste	N2O	61.5034	155.5532	30.0000	150.0000	152.9706	0.0038	0.0001	0.0011	0.0113	0.0460	0.0022
4.C - Incineration and Open Burning of Waste												
4.C.1 - Waste Incineration	CO2	0.8576	15.4683	100.0000	40.0000	107.7033	0.0000	0.0001	0.0001	0.0037	0.0153	0.0002
4.C.1 - Waste Incineration	CH4	0.0017	0.0454	100.0000	100.0000	141.4214	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.C.1 - Waste Incineration	N2O	0.0152	0.4013	100.0000	100.0000	141.4214	0.0000	0.0000	0.0000	0.0003	0.0004	0.0000
4.C.2 - Open Burning of Waste	CO2	24.0322	41.2267	50.0000	40.0000	64.0312	0.0000	0.0002	0.0003	0.0066	0.0203	0.0005
4.C.2 - Open Burning of Waste	CH4	281.8909	483.5769	50.0000	100.0000	111.8034	0.0194	0.0019	0.0034	0.1945	0.2384	0.0947
4.C.2 - Open Burning of Waste	N2O	35.0931	60.2013	50.0000	100.0000	111.8034	0.0003	0.0002	0.0004	0.0242	0.0297	0.0015
4.D - Wastewater Treatment and Discharge												
4.D.1 - Domestic Wastewater Treatment and Discharge	CH4	4230.7215	8098.0231	10.0000	30.0000	31.6228	0.4355	0.0233	0.0565	0.6999	0.7984	1.1274
4.D.1 - Domestic Wastewater Treatment and Discharge	N2O	938.4715	1855.7109	0.0000	0.0000	0.0000	0.0000	0.0048	0.0129	0.0000	0.0000	0.0000
4.D.2 - Industrial Wastewater Treatment and Discharge	CH4	3188.4233	9473.2227	50.0000	30.0000	58.3095	2.0265	0.0059	0.0660	0.1772	4.6702	21.8420
4.D.2 - Industrial Wastewater Treatment and Discharge	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

A	B	C	D	E	F	G	H	I	J	K	L	M
			Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)		Combined Uncertainty (%)				Uncertainty in trend in national emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in national emissions introduced by activity data uncertainty (%)	
4.E - Other (please specify)												
4.E - Other (please specify)	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.E - Other (please specify)	CH4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.E - Other (please specify)	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.A - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOx and NH3												
5.A - Indirect N2O emissions from the atmospheric deposition of nitrogen in NOx and NH3	N2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.B - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC												
5.B - Indirect CO2 emissions from the atmospheric oxidation of CH4, CO and NMVOC	CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.C - Other												
Total												
		Sum(C): 143,433.129	**Sum(D): 388,030.776**			**Sum(H): 44.947**					**Sum(M): 719.941**	
						Uncertainty in total inventory: 6.704					Trend uncertainty: 26.832	

Annex IV: Common Tabular Formats (CTF Tables)