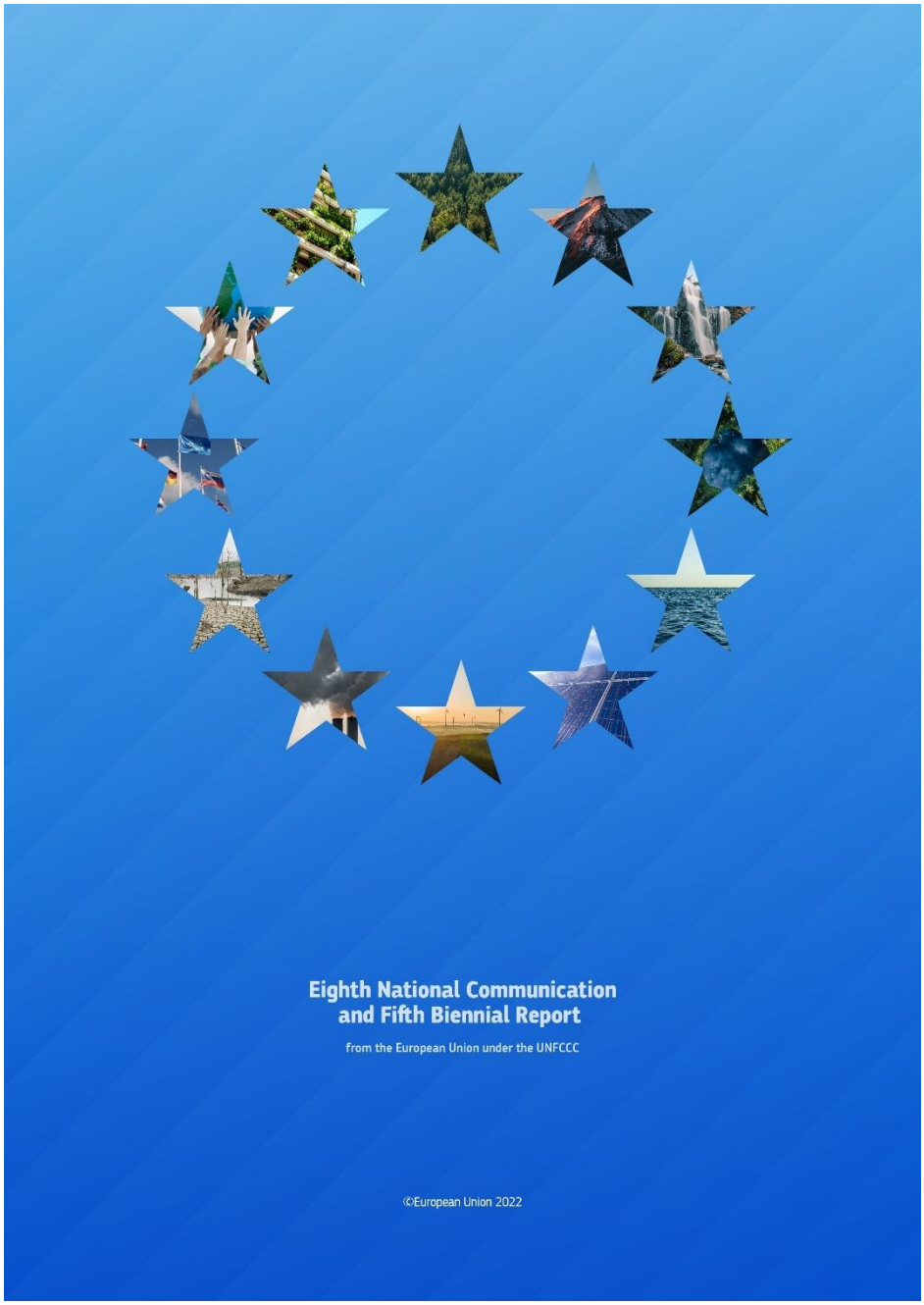
European Commission

Eighth National Communication and Fifth Biennial Report

from the European Union under the UNFCCC

Climate Action



C(2022) 6298 REPORT FROM THE COMMISSION Eighth National Communication and Fifth Biennial Report from the European Union under the UN Framework Convention on Climate Change (UNFCCC) (required under the UNFCCC and the Kyoto Protocol)

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EXECUTIVE SUMMARY

Introduction

The impacts of climate change are increasingly visible across the globe, and urgent action is needed to mitigate the emissions of greenhouse gases and to adapt to a changing climate. The European Union (EU) and its Member States, both jointly and individually, have engaged in domestic and international action on climate change for a number of years. This has resulted in significant emission reductions. Since the EU submitted its last Biennial Report to the UNFCCC secretariat in 2019, the European Green Deal was introduced.

The European Green Deal sets out a roadmap to reduce net greenhouse gas (GHG) emissions by at least 55% by 2030, compared to 1990 levels, and to make the EU climate neutral by 2050. It covers all sectors of the economy, notably transport, energy, agriculture, forestry, land use, buildings, and industries such as steel, cement, information and communications technology, textiles and chemicals. It also outlines the investments needed and financing tools available for GHG reduction and explains how to ensure a just and inclusive transition that leaves no person and no place behind.

This report and its accompanying Staff Working Documents (SWD) constitute the eighth National Communication (NC8) and the fifth Biennial Report (BR5) of the EU. The NC8 and BR5 are required under Article 12 of the United Nations Framework Convention on Climate Change (UNFCCC) and Article 7 paragraph 2 of the Kyoto Protocol, and under Article 18(1) of Regulation (EU) No 525/2013 and Decision 2/CP.17 of the Conference of the Parties under the UNFCCC, respectively. The EU has opted to submit its fifth Biennial Report as an annex to this eighth National Communication.

The eighth National Communication of the European Union under the UNFCCC provides information on historic and projected GHG emissions and removals, on policies and measures to mitigate, and adapt to climate change, on support provided to developing countries and on climate change-related research, systematic observation, education, training and public awareness. The EU's fifth Biennial Report includes information on GHG emissions and trends and on the progress made by the EU in achieving its quantified economy-wide emission reduction target (QEWERT) for 2020 under the UNFCCC. It also has information on policies and measures in place to meet mitigation targets and promote climate change adaptation, as well as on provisions for financial, technological and capacity-building support to developing countries.

The EU and its Member States have been at the forefront of climate action for many years under the UNFCCC and have committed to a joint target to cut GHG emissions and annual energy consumption of the EU by 20%, respectively, by 2020. Under the Paris Agreement, the EU and its Member States are furthermore committed to substantive GHG emission reductions by 2030 and to climate neutrality by 2050. The 2050 climate neutrality objective and the target of reducing GHG by 55% by 2030 were laid down in the European Climate Law that was adopted in 2021.

National Circumstances relevant to greenhouse gas emissions and removals

The EU comprises 27 Member States. The United Kingdom was an EU Member State until 31 January 2020, when it withdrew from the Union. The 27 EU Member States had a population of 447 million in 2020, 6.8% more than in 1990. As GHG emissions decreased by 34.4% in the same period, GHG emissions per capita decreased by approximately 38%.

The EU covers a surface area of roughly 4.1 million square kilometres. Approximately 41% is woodland, 24% for cropland, and 17% for grassland. The Member States of the EU cover a wide range of climatic zones. In Northern and Central Europe, large amounts of energy are needed for space heating, and there is an increasing need for cooling in the southern Member States. In recent decades, rising average temperatures were observed in all Member States.

The EU's economy is still dependent on imports of fossil fuels. However, electricity production from renewable energy sources has more than doubled between 2005 and 2020, while electricity production from solid fossil fuels, oil, and nuclear energy decreased in the same period by 57%, 67%, and 25 %, respectively. In 2020, electricity production from renewable energy sources exceeded the second most important electricity source – nuclear – by more than 50%, and it exceeded the combined electricity production from natural gas, oil and coal. Total GHG emissions from public electricity and heat production decreased by approximately 51% between 1990 and 2020.

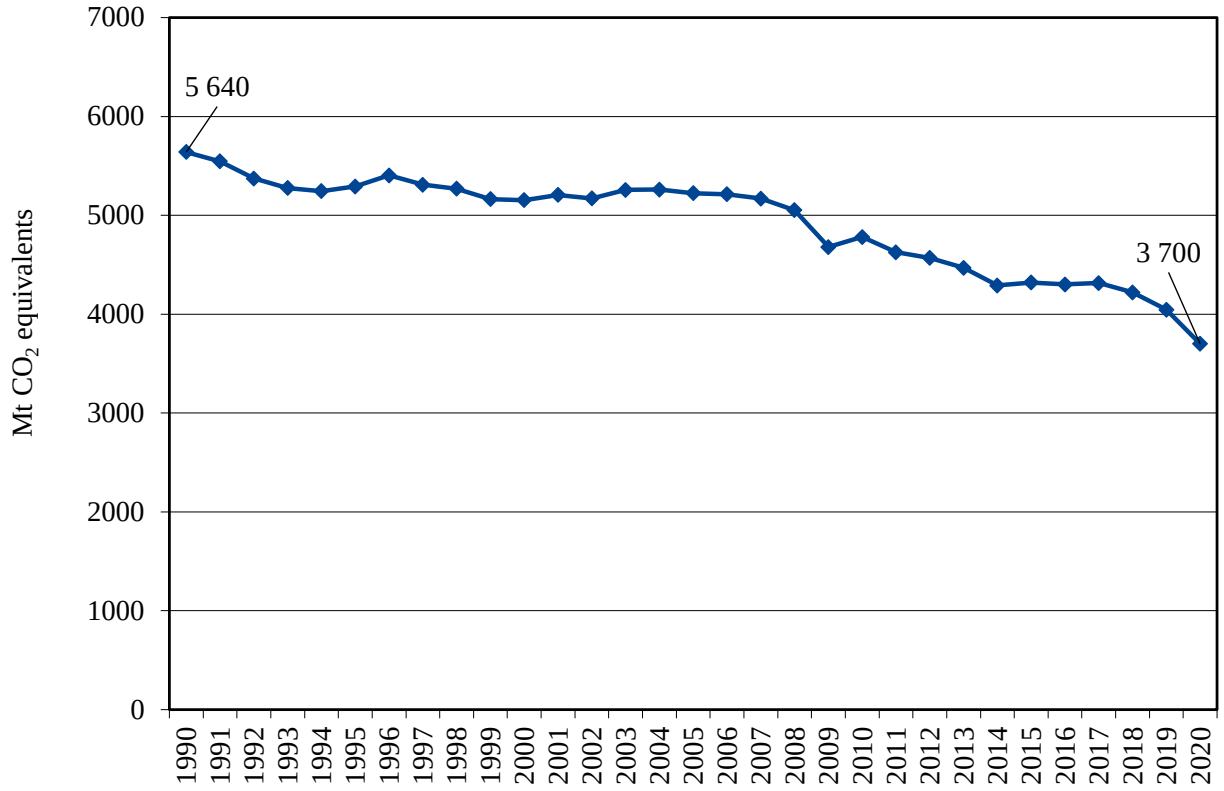
Indicators such as final energy consumption, landfilled waste and fertilizer application have decreased in recent years, contributing to an overall reduction of GHG emissions over time.

Greenhouse gas inventory information

Total GHG emissions in the 27 Member States of the EU and the United Kingdom were 3 700 million tonnes of carbon dioxide equivalent (CO_2eq) in 2020. Although the United Kingdom is no longer a Member State of the EU, its GHG inventory data is included in this report because it was a Member State until 2020 and took part in the GHG emission reduction target of the EU for 2020. Taking into account emissions and removals from the Land Use, Land Use Change and Forestry (LULUCF) sector, total net emissions in 2020 were 3 474 million tonnes CO_2-eq.

Total GHG emissions (without LULUCF) decreased by 34.4% from 1990 to 2020. In absolute terms, the largest emission reduction was achieved in CO_2 from public electricity and heat production (-732 million tonnes between 1990 and 2020). With these important decreases of emissions in recent years, the EU, its Member States, and the United Kingdom overachieved their emission reduction target under the Convention, which was a 20% reduction in 2020 compared to 1990.

Figure 1 **Greenhouse gas emissions of the European Union (including the United Kingdom) 1990–2020 (excluding LULUCF)**



Source: Annual European Union greenhouse gas inventory 1990-2020.

The overall reduction in GHG emissions in the last 30 years was due to a variety of factors, such as the growing share in the use of renewables, the use of less carbon-intensive fossil fuels, and improvements in energy efficiency, as well as to structural changes in the economy. These developments also led to reduced emissions of air pollutants and ozone precursors from many stationary emission sources. The recession linked to the COVID-19 pandemic contributed to greater emission reductions in 2020. However, the 2020 reduction target was already reached before the pandemic, and approximated GHG inventory data indicate a rebound of emissions in 2021 to a level below 2019 emissions. The fuel mix available in the years ahead is associated with high uncertainties following the invasion of Ukraine by the Russian Federation.

Progress in achieving the economy wide emissions reduction targets – EU policies and measures and their effects

The European Union and its Member States have a comprehensive system of policies and measures in place, which helps them fulfil their climate change mitigation commitments under the Convention, under the Kyoto Protocol, and the Paris Agreement. In addition, the **European Green Deal**, a comprehensive and holistic plan to become the first carbon-neutral continent by 2050 acts as a catalyst for more ambitious targets.

The European Union and its Member States have implemented mitigation policies and measures for many years, which have already contributed successfully to the reduction of GHG emissions. Since 2005, these include the European Union Emissions Trading System (EU ETS) and a wide range of policies and measures addressing all sectors of the economy.

To meet its 2020 targets, the 2020 Climate and Energy Package that was agreed by the EU in 2009 included:

- a revision of the EU ETS for the period 2013 to 2020,
- the Effort Sharing Decision, which set national emission reduction targets for the sectors not included in the EU ETS,
- the Renewable Energy Directive setting binding national targets for increasing the share of renewable energy sources in the energy mix,
- the Energy Efficiency Directive requiring each EU Member State to implement and monitor its own national energy efficiency targets.

The European Union's 2030 Climate and Energy Framework was put in place in 2018 to ensure that the EU and its Member States achieve their climate change mitigation commitments under the Paris Agreement, as communicated in the EU's Nationally Determined Contribution (NDC), which stipulated a 40% reduction of GHG gross emissions by 2030 compared to 1990. In 2020, the EU submitted its updated NDC of an economy-wide net domestic emission reduction of at least 55% by 2030 compared to 1990.

As more action is urgently needed, the EU is enhancing and extending its climate change policies and measures – to deliver the European Green Deal, the Paris Agreement and to ensure that the EU and its Member States will achieve their updated NDC target. While the policies and measures currently in place were developed in line with the target of the first NDC of the EU, they are now under revision to make them fit for the -55% target communicated in the updated NDC and made legally binding on the European Union under the European Climate Law.

The **EU ETS** was one of the main instruments that helped reduce GHG emissions in the period from 2013 to 2020. It operates in all EU countries plus Iceland, Liechtenstein, and Norway, and it limits emissions from around 10, 000 installations in the power sector and manufacturing industry, as well as airlines operating between these countries. For the period from 2021 to 2030, the annual reduction of the emissions cap was strengthened and the market stability reserve (the mechanism to reduce the surplus of emission allowances in the carbon market) was reinforced. The EU ETS is currently under revision to ensure that it will contribute substantially to the EU's revised 2030 target.

The **Effort Sharing Decision** provided emission target paths for EU Member States for the period 2013-2020. Most EU Member States overachieved their targets, while some made use of flexibilities provided under this decision to achieve their targets. For the period up to 2030, the **Effort Sharing Regulation**, which was adopted in 2018, sets new target paths with more ambitious emission reductions. This regulation is also under revision to ensure that it is in line with the EU's new 2030 target.

The amended **Energy Efficiency Directive** is the main legal provision addressing energy efficiency in the EU across electricity, heating and cooling, and transport. The amendment introduced a new headline EU energy efficiency target for 2030 of at least 32.5% (relative to the 2007 consumption projections). The directive is under revision; among other things, a higher target for reducing primary and final energy consumption has been introduced for 2030. The **Energy Performance of Buildings Directive** complements the Energy Efficiency Directive and is the main legal act addressing energy efficiency increases in buildings. It is under revision to accelerate the renovation of the existing building stock through strengthened long-term renovation strategies and the mobilisation of related investments.

The **Renewable Energy Directive** is the main legal act addressing the use of renewable energies in the EU. Since the introduction of the Renewable Energy Directive (2009/28/EC) in 2009, the deployment of renewables has kept growing yearly, reaching more than 22% in 2020. The directive currently includes a binding renewable energy target for the EU for 2030 of at least 32% for the overall share of energy from renewable sources in gross final energy consumption. In July 2021, the European Commission proposed a revision to accelerate the take-up of renewables in the EU and to help reaching the 2030 energy and climate objectives. That proposal sought to increase the current target to at least 40% renewable energy sources in the EU's overall energy mix by 2030.

In 2022, the European Commission proposed further increases for both the energy efficiency and renewable energy targets, as part of the REPowerEU plan. This includes further increasing the energy efficiency target for 2030 and accelerating the uptake of renewable energy sources to reach at least 45% of renewable energy in the EU's energy mix by 2030.

With regards to **passenger cars and freight transport**, there are regulations in place since 2009, which set fleet-wide CO_2 emission performance standards for cars, vans, and heavy-duty vehicles. These standards were updated in 2014 and 2019 and are currently under revision with a view to a 100% CO_2 reduction for new cars and vans from 2035 onwards and more ambitious CO_2 emission reductions for heavy-duty vehicles.

The **Industrial Emissions Directive** is the main EU instrument for preventing and reducing the emissions of air pollutants from large industrial plants and intensive livestock farms in Europe. It also regulates emissions of CO_2 and N_2O to the extent that they are not covered by the EU ETS, as well as methane emissions from livestock installations. A proposal for a revised directive includes, inter alia, energy efficiency requirements as part of permits and a more transparent reporting on fluorinated gases (F-gases). Emissions of these gases are addressed by the **F-gas Regulation**, which limits the total amount of the most important F-gases that can be sold in the EU from 2015 onwards and phases them down in steps to one-fifth of the baseline in 2030.

Under the current **Common Agricultural Policy** (CAP), running until 2022, the EU promotes several climate-relevant actions. The new CAP starting in 2023 increases the emphasis on climate action. In total, 40% of the budget will be dedicated to climate-related measures, up from 25% in the previous period, including improved rules and monitoring requirements. The EU has put in place several strategies and plans to reduce emissions in the agriculture sector. Quantitative targets exist to reduce nutrient losses and fertilizer application, to increase the area of organic farming and to reduce food waste.

The LULUCF sector has become increasingly important in the context of the EU climate targets. In 2018, the EU implemented a domestic LULUCF accounting framework and introduced binding commitments for the periods 2021 to 2025 and 2026 to 2030 for all Member States. The 'no-debit rule' in the **LULUCF Regulation** requires each Member State to ensure that accounted emissions from land use are entirely compensated by an equivalent accounted removal of CO_2 from the atmosphere through action in the LULUCF sector. In 2021, in the context of the European Green Deal, the European Commission proposed a revised LULUCF Regulation in which EU Member States are to be assigned national LULUCF targets for 2030 and the current EU-wide LULUCF net removals are increased to 310 Mt of CO_2eq in 2030. The revision of the LULUCF Regulation also proposes requiring Member States to better integrate mitigation, adaptation, and nature restoration measures in the land-use, forestry, and agriculture sectors.

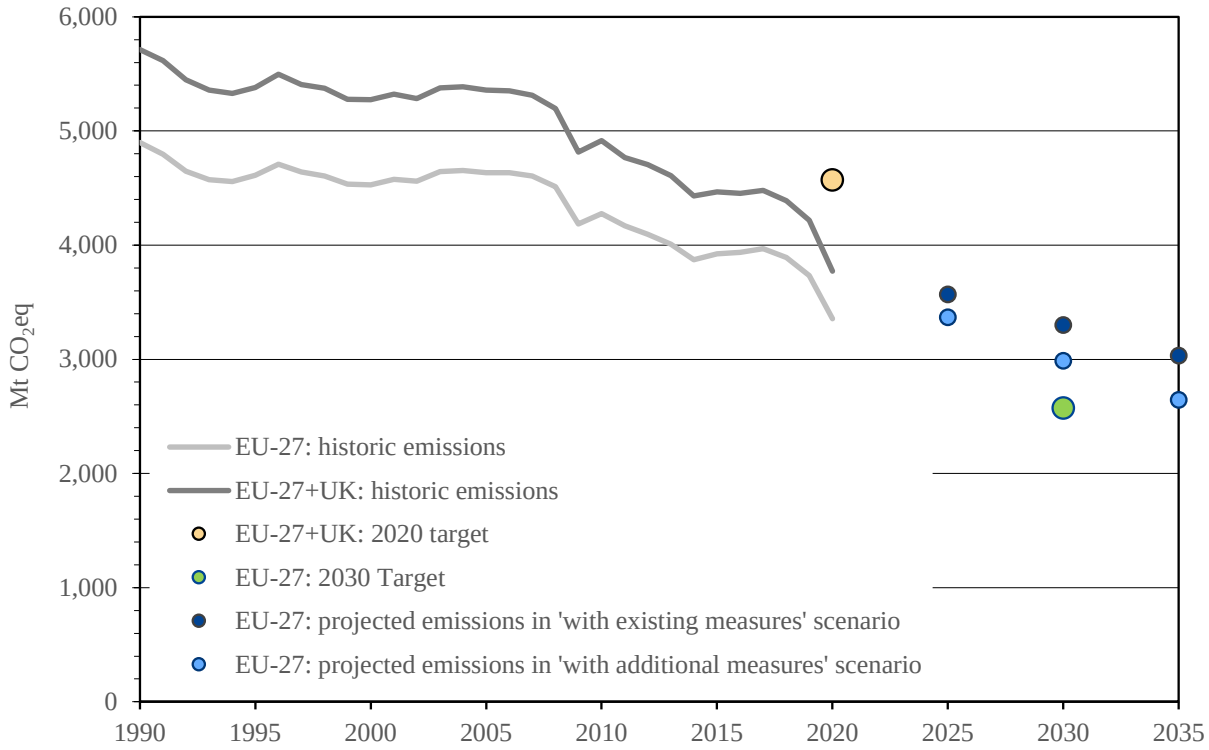
In addition, the EU has launched several initiatives and strategies to increase carbon removals on the one hand and to improve land management on the other hand in the next decades, e.g. through carbon farming practices and new forestry, soil, and biodiversity strategies.

The EU's **Waste Framework Directive** has been continuously extended and elaborated to address different waste streams. It explains when waste ceases to be waste and becomes a secondary raw material, and how to distinguish between waste and by-products. The Directive also introduces the "polluter pays principle" and the "extended producer responsibility". The EU aims to further strengthen the circular economy to reduce the material use rate and to significantly reduce waste generation in the EU. To achieve these objectives, new strategies targeting plastic waste and textiles have been published recently; existing waste legislation is being amended; and, in the context of the Waste Framework Directive, separate waste collection will be enforced.

Progress in achieving the economy wide emissions reduction targets – Projections

Projections of GHG emissions and removals indicate that considering existing measures, the emissions in 2030 will be 33% below the level of 1990. When planned measures are taken into account ('with additional measures' scenario), the emission reduction in 2030 compared to 1990 is projected to be 39%. It should be noted that these projections do not yet take into account the update of policies and measures following the adoption in 2021 of the more ambitious EU target for 2030. Also, changes in energy prices or other factors can substantially alter economic development and hence the level of GHG emissions in the years ahead.

Figure 2: **Historic and projected EU-wide total greenhouse gas emissions (excluding LULUCF, including international aviation), 1990-2035**



Sources: Annual European Union greenhouse gas inventory 1990-2020, European Member States greenhouse gas emission projections submitted in 2021 and 2022 under the Governance Regulation.

GHG emissions from the energy sector (without transport) are projected to decrease by 46% in 2030 compared to 1990 taking into account existing measures, and to 52% below 1990 levels when additional measures are also taken into account. The decreases in energy emissions are mainly due to the increased use of renewables, a transition from solid and liquid fuels to gas, increased energy and technical efficiency, and decreases in fuel combustion in manufacturing industries.

Under existing measures, GHG emissions from domestic transport in 2030 are projected to be 9% higher than 1990 levels. Taking into account additional measures brings projected values for 2030 to 6% below 1990 levels. The GHG emissions of industrial processes are projected to decrease by approximately 36% in 2030 compared to 1990 under existing measures and to 37% below 1990 levels when additional measures are also taken into account. Measures driving this decline include EU ETS and the F-gas Regulation.

Agricultural GHG emissions in 2030 are projected to decrease by 21% with existing measures and by 24% when additional measures are also considered. Changes in agricultural policy and increased productivity contributed to reduced animal numbers, reduced nitrogen fertiliser production and use, and improved manure management. GHG emissions are projected to steadily decrease in the waste sector. Compared to 1990, emissions in 2030 are projected to decrease by 46% considering existing measures and by 48% when additional measures are also taken into account. Past and future emission decreases can largely be attributed to regulations for landfilled waste.

Emissions from international aviation are projected to continue increasing, to more than 150% above 1990 levels by 2030. A key factor influencing emission projections from international aviation is the historical and expected increase in demand for international travel.

Vulnerability assessment, climate change impacts and adaptation measures

While the global mean near-surface temperature has increased by approximately 1 °C compared to the pre-industrial level, in Europe it has increased by approximately 2 °C. People in Europe are already experiencing more climate-related extreme events, while impacts differ from region to region. Economic losses due to climate-related extremes in the 27 Member States of the EU are estimated to amount to approximately EUR 487 billion between 1980 and 2020.

The Intergovernmental Panel on Climate Change (IPCC) Working Group I Sixth Assessment Report concludes with high confidence that warming in Europe will continue to rise faster than the global mean, widening risk disparities across Europe and deepening inequalities. The key risks identified for Europe include mortality and morbidity of people and changes in ecosystems due to heat, heat and drought stress on crops, water scarcity, flooding, and sea level rise. Southern regions in Europe are projected to be much more impacted than other parts of Europe. Limiting global warming to well below 2 °C would considerably reduce climate change impacts in Europe.

The evaluation of the first EU strategy on adaptation to climate change, adopted in 2013, showed that the EU adaptation strategy has been fit for its purpose, but the adaptation needs be intensified and diversified. As part of the Green Deal, the EU adopted a new adaptation strategy in 2021 with the principal objectives of making adaptation smarter, faster, and more systemic, and of stepping up international action on adaptation to climate change.

The European Climate Law commits the EU and its Member States to making continuous progress to boost adaptive capacity, strengthening resilience, and reducing vulnerability to climate change. The platform Climate-ADAPT has been further developed as the one-stop shop for adaptation information in Europe and, since 2021, it has hosted the European Climate and Health Observatory, which provides access to resources related to climate change and human health.

The EU's multiannual financial framework for 2021 – 2027 ensures that the EU budget's contribution to achieving climate objectives, both mitigation and adaptation, is set at a minimum 30% for the entire period.

Financial, technological and capacity-building support to developing countries

Climate finance by the EU, its Member States, and the European Investment Bank (EIB) has increased over the past seven years, from EUR 9.5 billion in 2013 to EUR 23.5 billion in 2020. The European Commission and the EIB committed EUR 5.7 billion for climate finance to developing countries in 2019 and EUR 5.4 billion in 2020. In addition, since 2018 the EU is putting in place a sustainable finance framework to facilitate the financing of activities in line with our climate objectives, in particular through increased transparency over sustainability risks and impacts.

The EU has increased targeted support to the poorest and most vulnerable countries, through a variety of policies and measures, specifically through the Neighbourhood, Development and International Cooperation Instrument, and the EU Global Climate Change Alliance Plus Initiative.

The EU has mainstreamed technology transfer activities into many development cooperation activities and is contributing to the transfer of technology to developing countries by financing climate action and development projects with a technology dimension, as well as through research collaboration. Similarly, the EU has integrated capacity-building activities into all development assistance, in line with the provisions of the Paris Declaration on Aid Effectiveness and the Accra Agenda for Action.

Research and systematic observation

Research and innovation play a crucial role in the EU's efforts to tackle climate change and to help the European Union to achieve its objective of becoming the world's first climate-neutral continent by 2050. The EU's systematic observation systems are producing important measurement data for monitoring climate change and climate action in the EU and beyond.

Current research and innovation activities in the EU related to climate action focus on climate science, polar and ocean research, climate resilience and adaptation to climate change, knowledge for climate neutrality, forest fires and extreme weather events, land, oceans and water, nature-based solutions, education on climate change, citizen engagement and behaviour change and biodiversity. In terms of systematic observation, the EU's earth observation programme, Copernicus, integrates measurement data from dedicated and contributing satellite missions, and in situ networks, to generate climate-relevant information through the Copernicus services. There are six thematic streams of the Copernicus services: Climate Change, Atmosphere, Marine, Land, Emergency and Security.

One of the key developments since the publication of the seventh National Communication is the transition from the EU's research and innovation funding programme Horizon 2020 to the new improved funding programme **Horizon Europe**. Horizon Europe has a budget of EUR 95.5 billion to fund research in the period 2021 to 2027 and has an even stronger commitment of resources towards the development of technologies and actions capable, for instance, of increasing efficiency and renewables production and use, mitigating impacts and reducing climate-affecting emissions, and a 35% expenditures target for climate objectives.

Education, training and public awareness

In line with Article 6 of the UNFCCC and Article 12 of the Paris Agreement, and as part of the International Action for Climate Empowerment process, the EU has been investing significant efforts and resources in raising citizens' awareness of the challenges posed by climate change and of ways to reduce GHG emissions. Actions in the field of education, training, public information and engagement campaigns, communication activities, and international cooperation have all played an important role in this endeavour. The European Green Deal has had a major impact on all EU policy areas including education, training, and public awareness raising since its introduction in 2019.

Green education has become one of the focus areas for collaboration within the European Education Area, which is the overarching framework under which the EU Member States work together on education and training systems. The EU is encouraging the education and training sector to take action to contribute to the green transition and to strengthen the sustainability competences of all learners.

The European Green Deal has also boosted activities related to public awareness of engagement in climate action. One flagship initiative in this area is the **European Climate Pact**, which the European Commission launched in 2020 to bring together people, industry, civil society, and public authorities at all levels to participate in climate action and to build a greener Europe.

The discussions in the framework of the **Conference on the Future of Europe** have also contributed to the involvement of citizens in implementing the Green Deal and to the dissemination of its objectives.

Conclusions

The domestic and international action taken by the EU and its Member States through the climate and energy package has resulted in significant emission reductions. In 2020, EU-27 greenhouse gas emissions were 33% lower than in 1990 (34% for the EU-27 and the UK). This constitutes a substantial overachievement of the 20% reduction target by 2020. Largely decoupled from economic development, the falling emission levels have been driven by a wide range of policies and measures that support more sustainable practices in all economic sectors. In the EU-27, the 33% reduction of GHG emissions since 1990 coincides with an expansion of real GDP by 52%. Already in 2019, pre-COVID, emissions in the EU-27 were approximatively 25% below the 1990 level, while GDP had increased by 62%.

The downward trend is expected to accelerate in the coming years in line with the even more ambitious targets of the European Green Deal. The EU has continued to strengthen the evidence base for decision-making on climate change adaptation and has strengthened efforts to improve climate resilience in Europe. Furthermore, by stepping up the support and assistance it provides to developing countries, the EU has helped to enhance action globally.

EIGHTH NATIONAL COMMUNICATION OF THE EU

[NC8] 1 INTRODUCTION

The European Union (EU) and its Member States are committed to climate action and support under the United Nations Framework Convention on Climate Change (UNFCCC). Between 1990 and 2020, the EU's emissions of greenhouse gases decreased by more than 30 %, and the EU and its Member States committed to ambitious further emission reductions under the Paris Agreement.

Besides mitigation and adaptation actions and support to developing countries, the obligations under the UNFCCC also include the regular reporting of climate change related information. Under Article 12 of the UNFCCC, Parties are required to communicate information related to the implementation of the Convention[1]. The information to be reported is laid out in the 'Reporting guidelines on national communications'[2]; additional information required under the Kyoto Protocol is specified in the 'Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol'[3].

This report constitutes the Eighth National Communication of the EU, which is due by the end of 2022. It provides a comprehensive overview of:

- national circumstances relevant to greenhouse gas emissions and removals (section 2),
- greenhouse gas inventory information (section 3),
- policies and measures (section 4),
- projections (section 5),
- vulnerability assessment, climate change impacts and adaptation measures (section 6),
- financial, technological and capacity-building support (section 7),
- research and systematic observation (section 8) and
- training, education and public awareness (section 9).

The information provided in this report covers the greenhouse gas emissions and removals of all EU Member States. Information on policies and measures, adaptation, support, research and systematic observation, and training, education and public awareness focuses on EU-wide initiatives. Details at Member State level can be found in the individual national communications of each Member State, which are submitted under the UNFCCC[4].

In addition to these national communications, developed countries submit annual inventories of greenhouse gas emissions and removals; the most recent national inventory report of the EU was submitted in May 2022[5]. Starting in 2014, developed countries also have provided biennial reports. The Fifth Biennial Report of the EU is submitted as an annex to this national communication.

[1] United Nations Framework Convention on Climate Change, https://unfccc.int/sites/default/files/convention_text_with_annexes_english_for_posting.pdf
[2] Decision 6/CM.25, https://unfccc.int/documents/210471.
[3] Decision 15/CMP.1, https://unfccc.int/documents/4253.
[4] Seventh National Communications – Annex I, https://unfccc.int/NC8.
[5] Annual European Union greenhouse gas inventory 1990-2020 and inventory report 2022, https://unfccc.int/documents/461931.

In order to avoid duplication of information, the national communication refers to this biennial report for information which would be identical in both reports. References to chapters in the biennial report are marked with [BR5], while references to chapters in the national communications are marked with [NC8].

[NC8] 2 NATIONAL CIRCUMSTANCES

[NC8] 2.1 Introduction and key developments

The ways how the emissions of greenhouse gases (GHGs) are mitigated differ from Party to Party, as they depend on national circumstances. These include the government structure, population, geographical and climate profile, economic indicators and information on each sector of the economy. This chapter provides an overview of the European Union's national circumstances which are relevant to its GHG emissions and removals. Information on circumstances related to climate change impacts and adaptation can be found in chapter [NC8] 6 of this National Communication.

The following key developments are relevant for the EU's national circumstances:

- The population of the European Union increased by 6.8 % between 1990 and 2020, while greenhouse gas emissions per capita decreased by approximately 38 % in the same period.
- During the past decade, the energy requirements for heating were lower than in previous decades, and energy requirements for cooling were higher, which is an indication of rising temperatures in Europe.
- In the past 15 years, electricity production from renewable energy sources more than doubled, while electricity production from solid fossil fuels, oil and nuclear energy decreased in the same period.
- In 2020, electricity production from renewable energy sources exceeded the second most important electricity source – nuclear – by more than 50 %, and it exceeded the electricity production from natural gas, oil and coal combined.
- Although the supply of fossil fuels decreased in recent years due to higher energy efficiency and renewable energy generation, the EU is still dependent on imports of fossil fuels, in particular oil and natural gas.
- Between 2018 and 2020, the number of newly registered battery electric cars more than doubled each year. At the end of 2020, approximately 1.5 million battery and plug-in hybrid electric cars were on European roads.
- The amount of landfilled municipal waste was reduced by more than half between 2000 and 2020. Almost three quarters of all municipal waste are recycled, composted or incinerated with energy recovery.

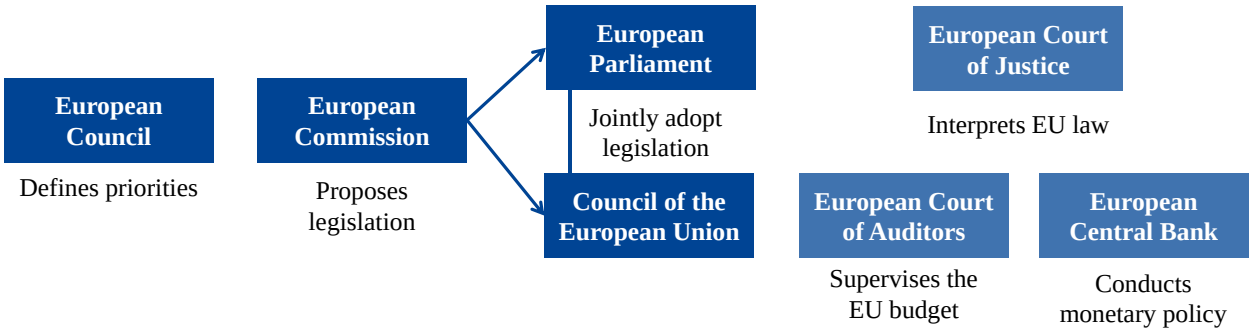
- The United Kingdom (UK) withdrew from the European Union in 2020. However, up to 2020, the commitments observed by the EU included the United Kingdom. For the period after 2020, the UK is pursuing its own policies independently of the EU.

[NC8] 2.2 Government structure

The European Union comprises 27 Member States. The UK, which was an EU Member State until 2020, withdrew from the EU under the EU-UK withdrawal agreement, which entered into force on 1 February 2020[6].

Every action taken by the EU is founded on treaties that have been approved by all Member States. Under these treaties, EU institutions adopt legislation, which the Member States implement[7]. The main legislative and executive institutions of the European Union include the European Parliament, the European Council, the Council of the European Union, and the European Commission[8], as depicted in Figure 3.

Figure 3: Institutions of the European Union



Source: Based on 'European Union – types of institutions and bodies', https://european-union.europa.eu/institutions-law-budget/institutions-and-bodies/types-institutions-and-bodies_en.

The European Parliament represents the citizens of EU countries, and the members of the European Parliament are directly elected by them. It takes decisions on European laws jointly with the Council of the European Union. It also approves the EU budget.

The European Council is the meeting of the heads of state or government. They define the general political direction and priorities of the EU. A separate body, the Council of the European Union, is the meeting of national ministers, which adopts legislation and coordinates policies. The Council of the EU takes decisions on European laws jointly with the European Parliament.

The European Commission is the EU's main executive body. It puts forward proposals for new laws, which are scrutinised and adopted by the European Parliament and the Council of the European

[6] The EU-UK Withdrawal, https://ec.europa.eu/info/strategy/relations-non-eu-countries/relations-united-kingdom/eu-uk-withdrawal-agreement_en.
[7] Founding agreements, https://european-union.europa.eu/principles-countries-history/principles-and-values/founding-agreements_en.
[8] Types of institutions and bodies, https://european-union.europa.eu/institutions-law-budget/institutions-and-bodies/types-institutions-and-bodies_en.

Union. Proposals for new laws are supplemented by impact assessments, which set out the advantages and disadvantages of policy options. These impact assessments include input from non-governmental organisations, national authorities and expert groups that give advice on technical issues[9]. The European Commission manages EU policies and the EU's budget and ensures that countries apply EU law correctly.

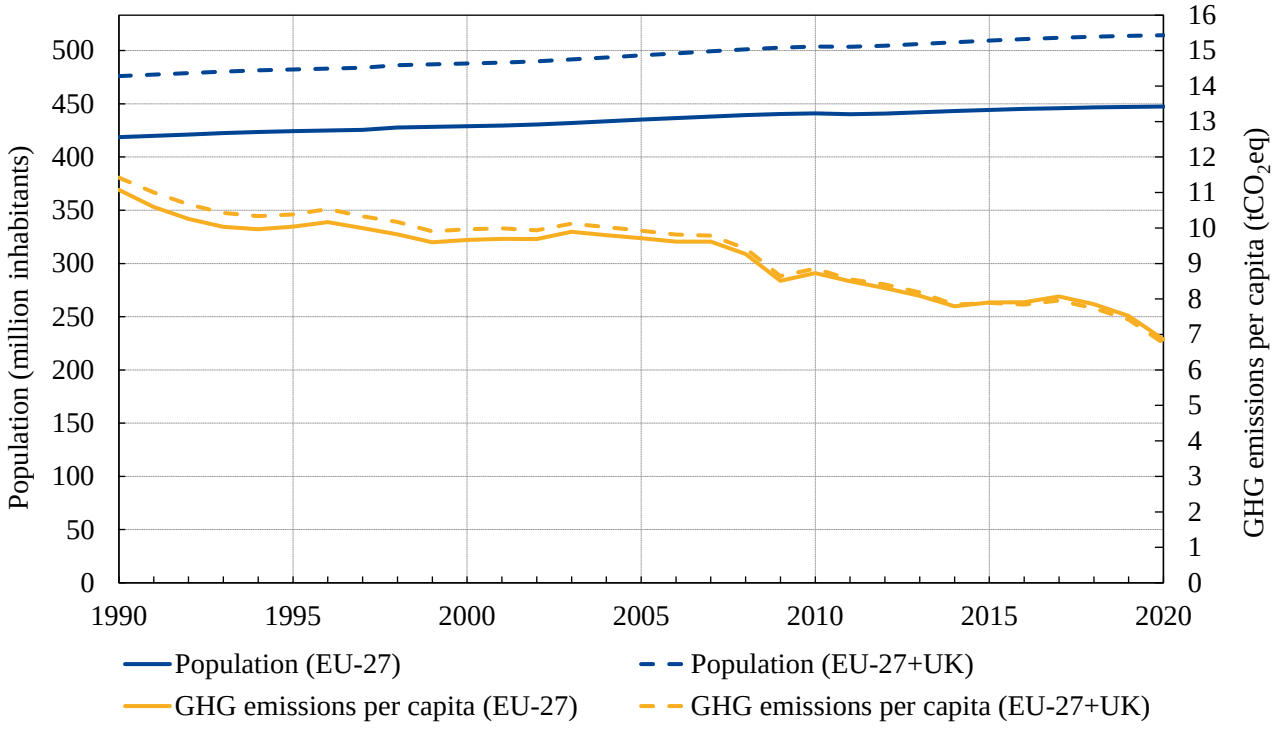
The work of these main EU institutions, which covers the legislative and executive tasks of the EU, is complemented by the work of the Court of Justice of the European Union, the European Central Bank and the European Court of Auditors. These three institutions are responsible for managing the judicial, financial and external audit aspects of the European Union.

[NC8] 2.3 Population profile

The 27 Member States of the European Union had a population of 447 million inhabitants in 2020. Their population has increased by 6.8 % since 1990. Figure 4 provides the population trend of the 27 Member States of the EU (EU-27) from 1990 to 2020. The trend of the 27 Member States plus the United Kingdom (EU-27+UK) is also shown.

GHG emissions (including Land Use, Land Use Change and Forestry – LULUCF) per capita showed a marked decrease over this period and reached 6.9 tonnes of CO_2 equivalents in 2020, approximately 38 % below the level of 1990 (for EU-27). For EU-27+UK, GHG emissions per capita decreased by 41 % below the level of 1990 and reached 6.8 tonnes of CO_2 equivalents in 2020.

Figure 4: Population of the EU and greenhouse gas emissions per capita, 1990-2020

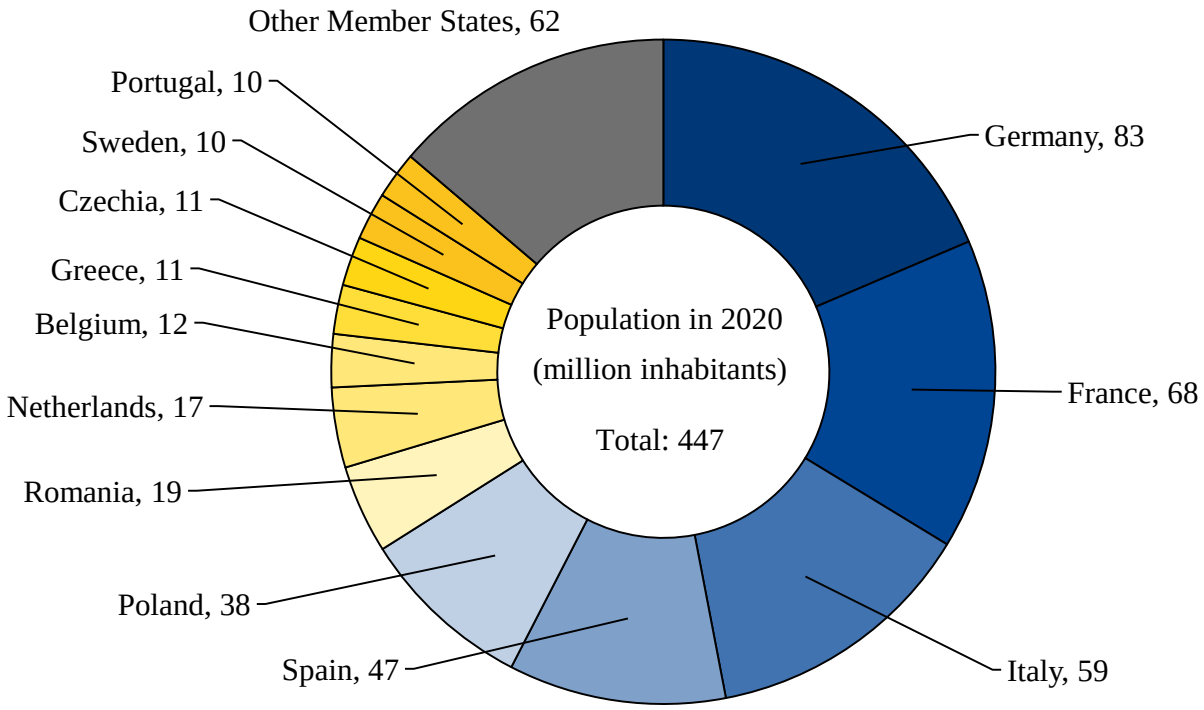


[9] European Union policy area setting process, https://european-union.europa.eu/institutions-law-budget/decision-making-process/legislation_en.

Source: Eurostat; Annual European Union greenhouse gas inventory 1990-2020. Greenhouse gas emissions are including LULUCF.

The EU's population is distributed unevenly across Member States, as depicted in **Figure 5**. The five most populous Member States make up approximately two thirds of the EU's population. In addition to these Member States, seven Member States have a population of over 10 million. They make up 20 % of the EU population, and the remaining 15 Member States add up to 14 % of the EU population.

Figure 5: Population of EU Member States

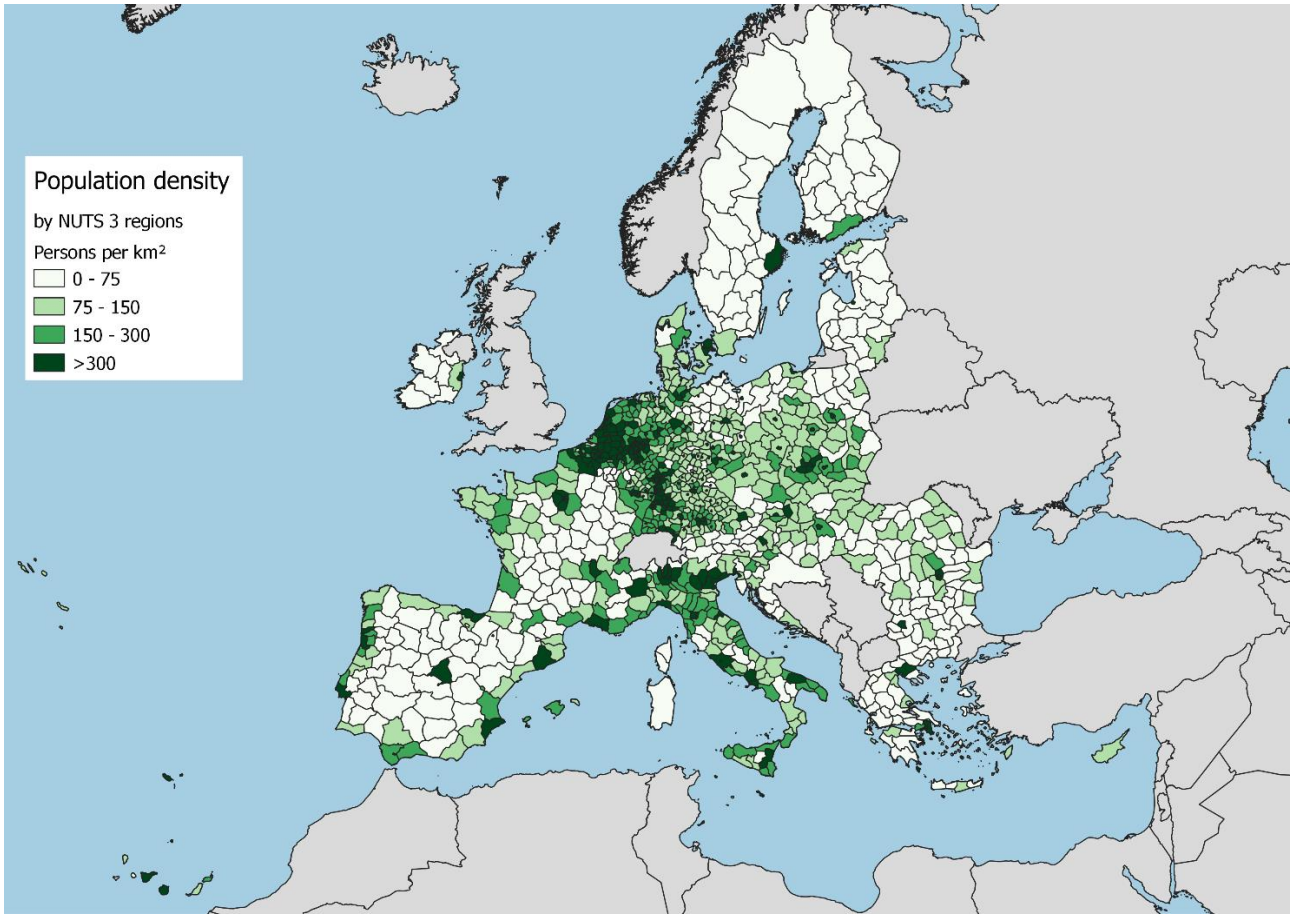


Source: Eurostat.

Like the population of Member States, population density varies considerably across the EU. **Figure 6** depicts the population density across the EU for each of its regions. Regions are provided according to the Nomenclature of Territorial Units for Statistics (NUTS) level 3[10]. High population densities abound in central Europe, while most regions in western, northern and south-eastern Europe show population densities below 75 persons per square kilometre (km^2). The average population density in the EU amounts to approximately 106 inhabitants per km^2.

[10] NUTS – Nomenclature of territorial units for statistics: Background, https://ec.europa.eu/eurostat/web/nuts/background.

Figure 6: Population density in the EU



Source: Eurostat.

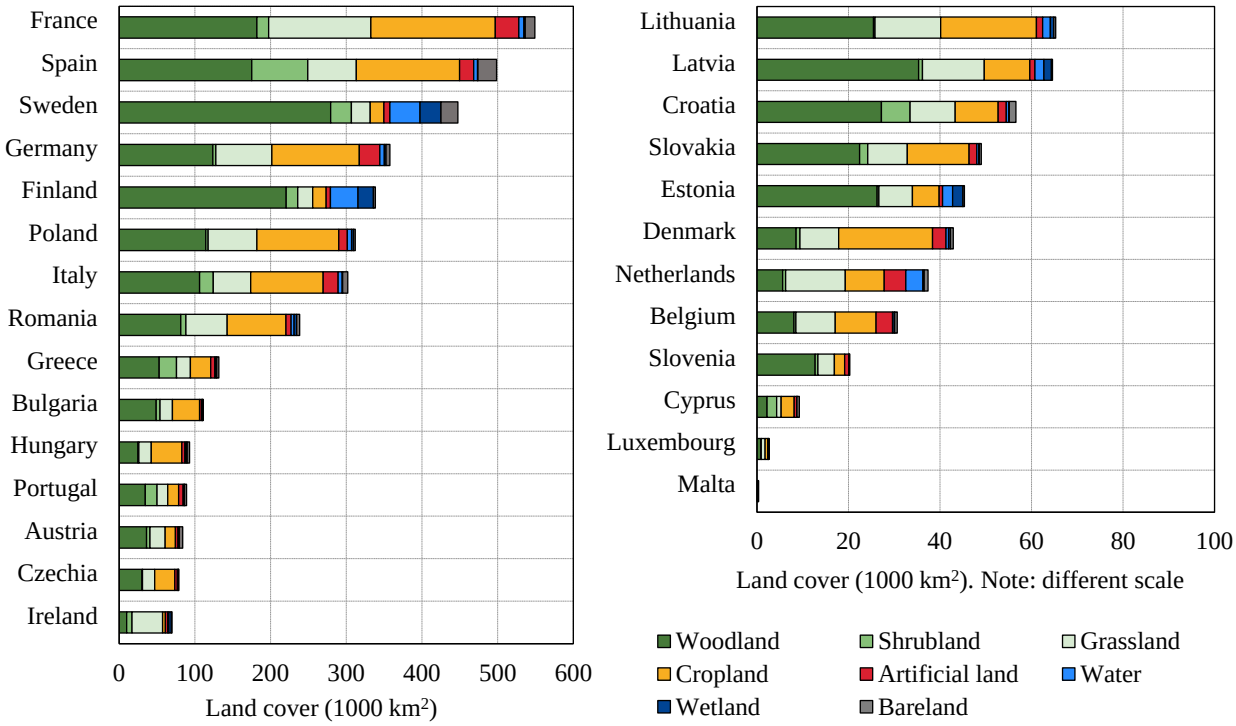
[NC8] 2.4 Geographical profile

The 27 Member States of the European Union are situated in the western part of the Eurasian continent. Various overseas territories of France, Spain and Portugal, the so-called "outermost regions," form part of the European Union. These include several islands in the Atlantic and the Pacific, and French Guiana on the Atlantic coast of South America[11]. Some overseas countries and territories have a special relationship with an EU Member State but do not form part of the EU. These include Greenland, which is part of the Danish realm, and several French and Dutch territories. The European Union covers an area of approximately 4.1 million square kilometres[12].

As can be seen in **Figure 7**, large parts of many European Member States are covered by woodland. Sweden and Finland stand out with particularly large areas of woodland and relatively small agricultural areas, due to their less favourable climate for agriculture. Overall, approximately 41 % of the area of the EU accounts for woodland, 24 % for cropland and 17 % for grassland.

[11] EU & outermost regions, https://ec.europa.eu/regional_policy/en/policy/themes/outermost-regions/.
[12] Land cover overview by NUTS 2 regions, https://ec.europa.eu/eurostat/databrowser/view/LAN_LCV_OVW__custom_2785001.

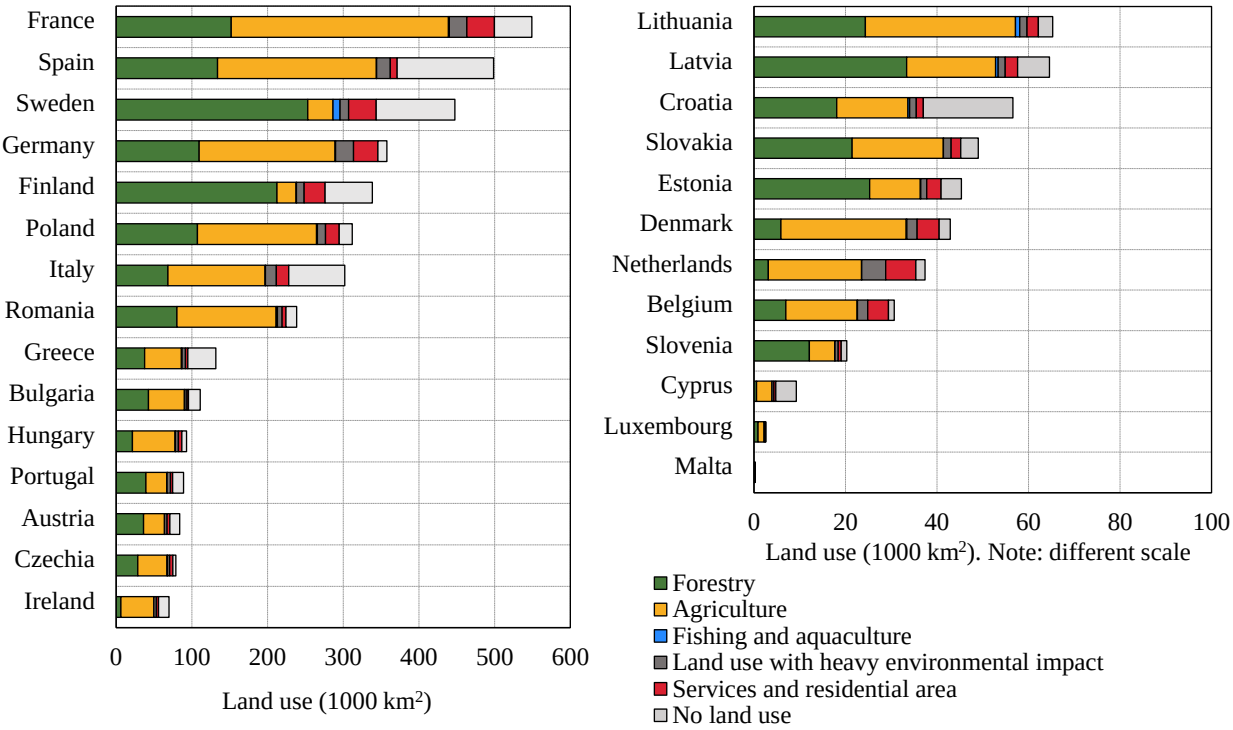
Figure 7: Land cover types in the EU Member States in 2018



Source: Eurostat.

Figure 8 provides an overview of land use types in the EU Member States. Agriculture is the most common land use category in most EU Member States. It accounts for approximately 39 % of all land use in the EU, followed by forestry with 36 %. In some Southern European Member States (such as Spain or Italy) and some Northern European Member States (such as Sweden or Finland), considerable areas are not used because they are not suitable for agriculture or forestry.

Figure 8: Land use types in the EU Member States in 2018



Source: Eurostat.

[NC8] 2.5 Climate profile

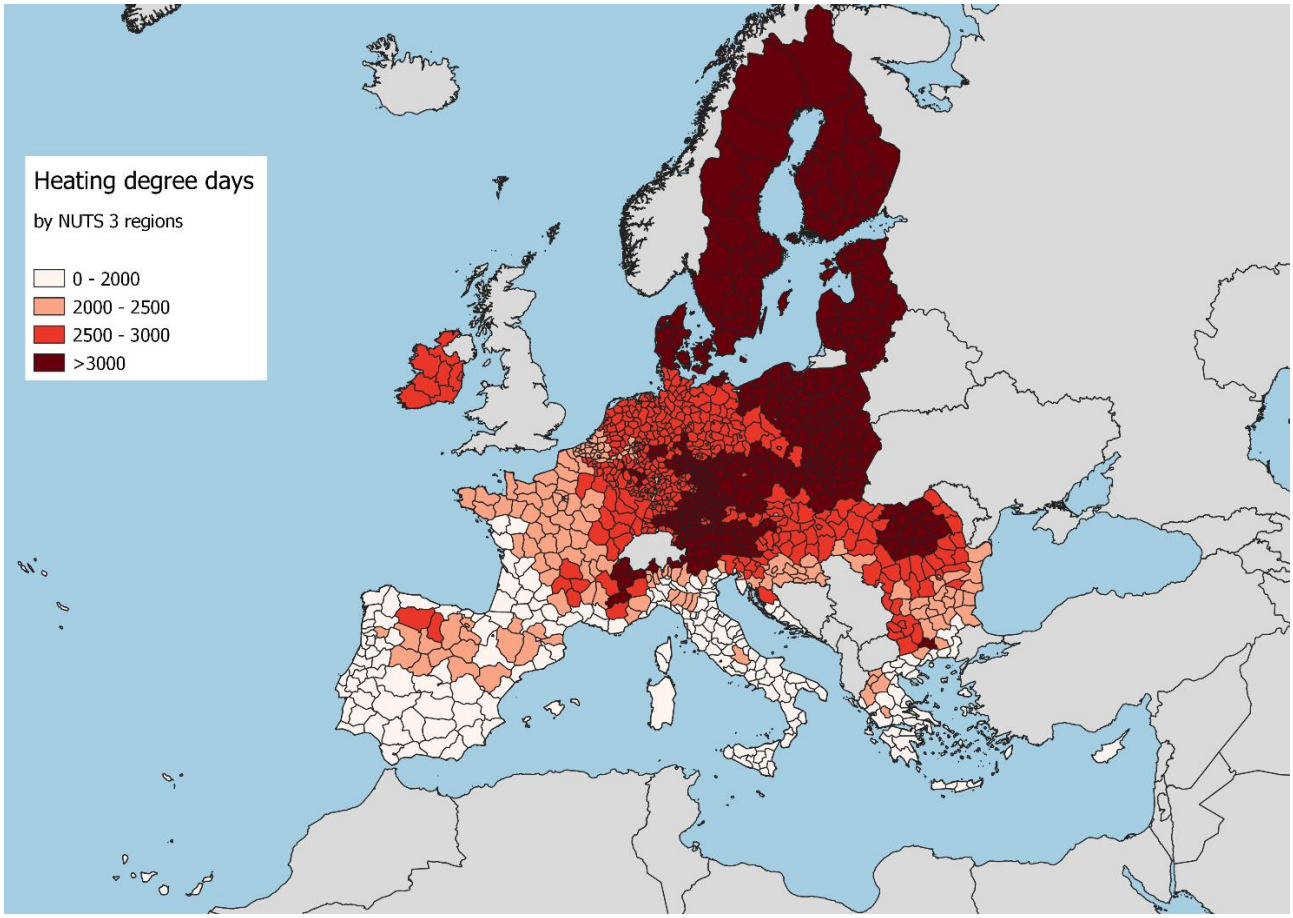
The Member States of the EU cover a wide range of climatic zones. Low temperatures in winter are particularly relevant for greenhouse gas emissions, as they require heating, which in many cases depends on fossil fuels. High temperatures in summer require cooling, which is energy-intensive and may contribute to emissions of fluorinated gases.

As a measure for the energy requirements of buildings, heating degree days and cooling degree days are commonly used. The number of heating degree days is determined from the number of days with average daily temperatures below 15 °C and the temperature difference to a base temperature of 18 °C. The higher the number of such days in a year and the higher the temperature differences, the higher the resulting number of heating degree days. Likewise, the number of cooling degree days is determined from the number of days with average daily temperatures above 24 °C and the temperature difference to a base temperature of 21 °C13.

Figure 9 shows that a high number of heating degree days abounds in northern Europe, but also in mountainous areas in central Europe and in the eastern parts of the European Union, which are characterised by a continental climate with low temperatures in winter.

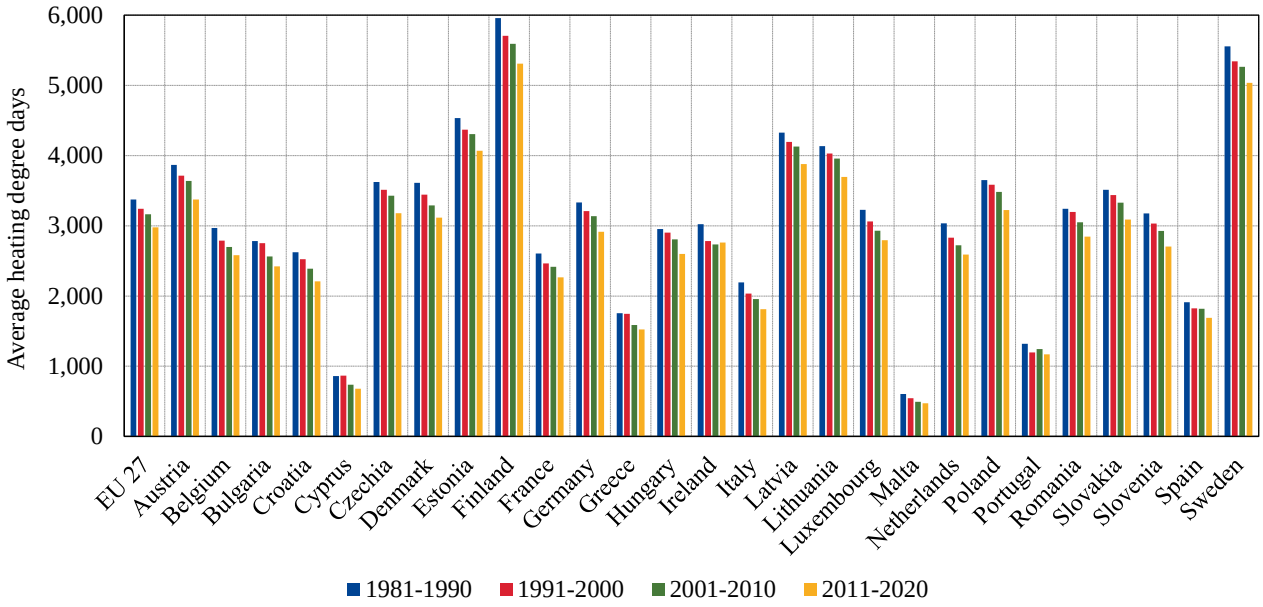
[13] Eurostat (2022), Heating and cooling degree days – statistics, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Heating_and_cooling_degree_days_-_statistics.

Figure 9: Heating degree days in regions of the EU (average 2010-2020)



Source: Eurostat.

Figure 10: Heating degree days in EU Member States

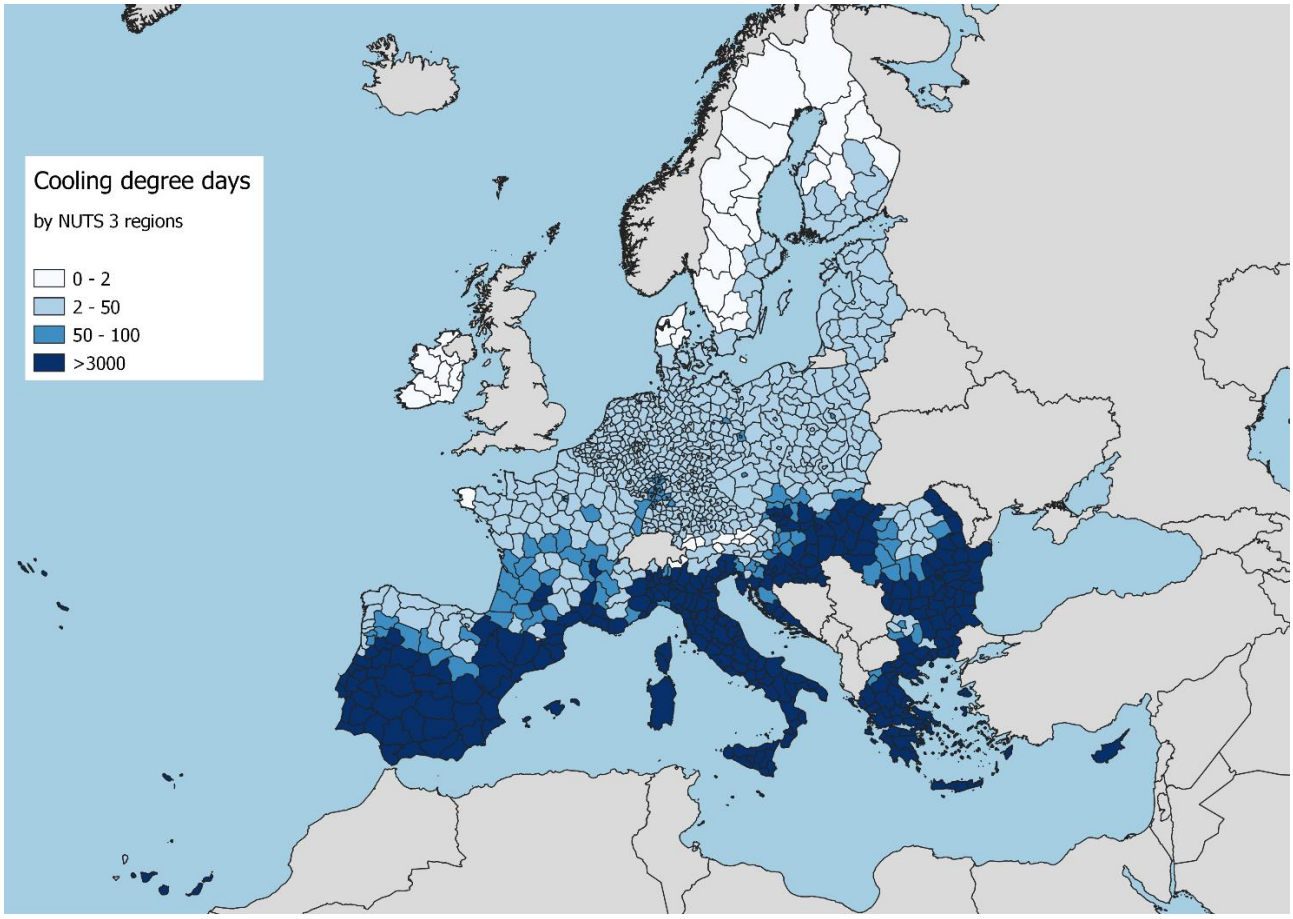


Source: Eurostat.

Average heating degree days for each EU Member States are depicted in Figure 10. The highest numbers of heating degree days are observed in the northern European countries Finland and Sweden, the lowest numbers on the Mediterranean islands of Malta and Cyprus. Figure 10 also shows that the average heating degree days in the EU-27 followed a decreasing trend from 1981-2020, which is an indication of an overall temperature increase due to a changing climate.

Like heating degree days, cooling degree days show distinct differences between northern and southern regions (Figure 11).

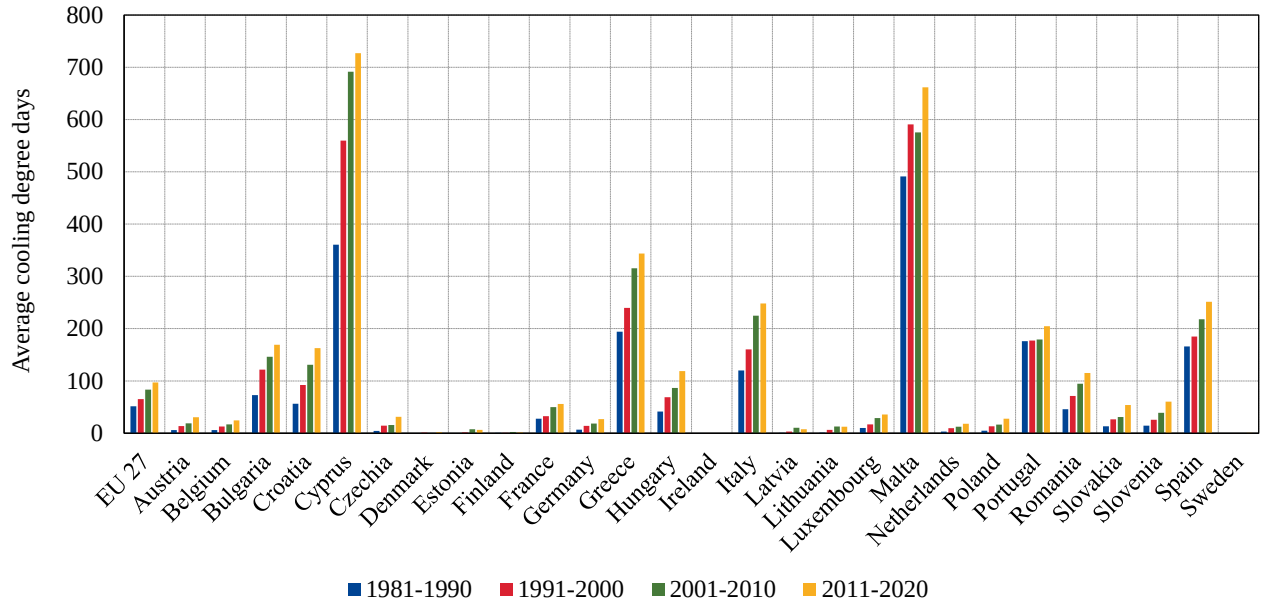
Figure 11: Cooling degree days in regions of the EU (average 2010-2020)



Source: Eurostat.

As can be seen in Figure 12, the Member States with the highest number of cooling degree days are the Mediterranean islands of Cyprus and Malta. This figure also shows that the number of cooling degree days has risen on average between 1981 and 2020.

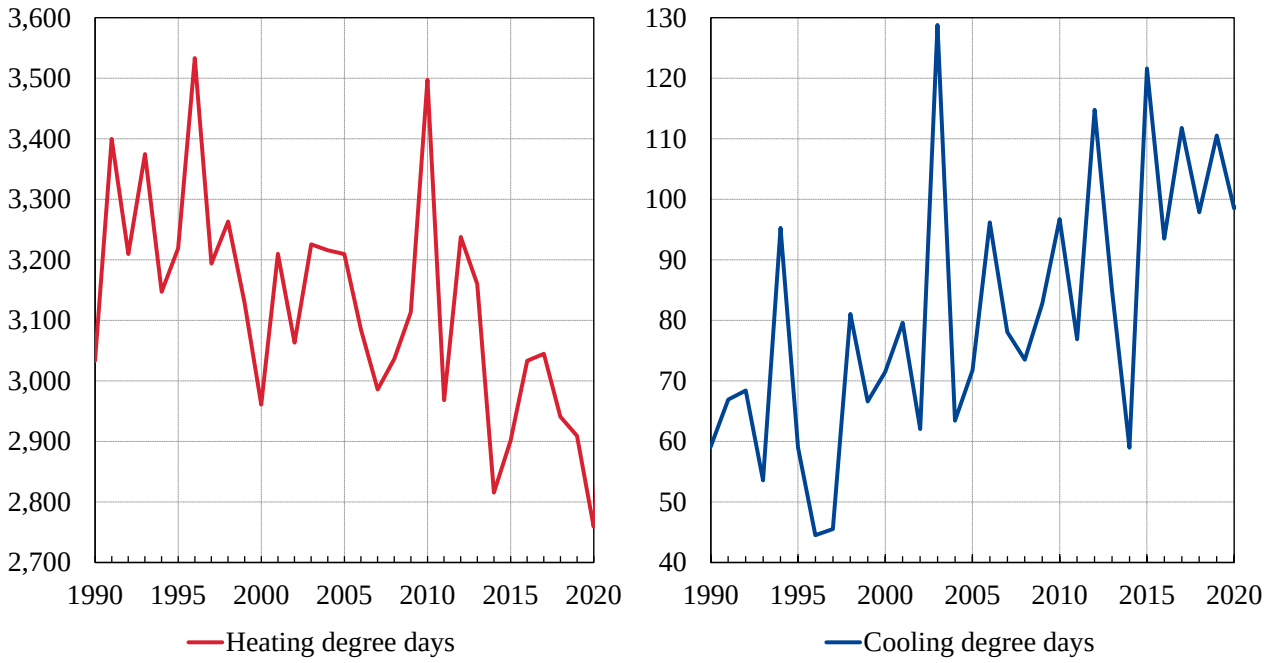
Figure 12: Cooling degree days in EU Member States



Source: Eurostat.

Finally, when looking at the annual averages of heating and cooling degree days across Member States between 1990 and 2020 (Figure 13), the effects of a warming climate can be observed, with decreasing heating demand in winter and growing cooling demand in summer.

Figure 13: Time series of heating and cooling degree days (annual values; averages of values for all Member States)



Source: Eurostat.

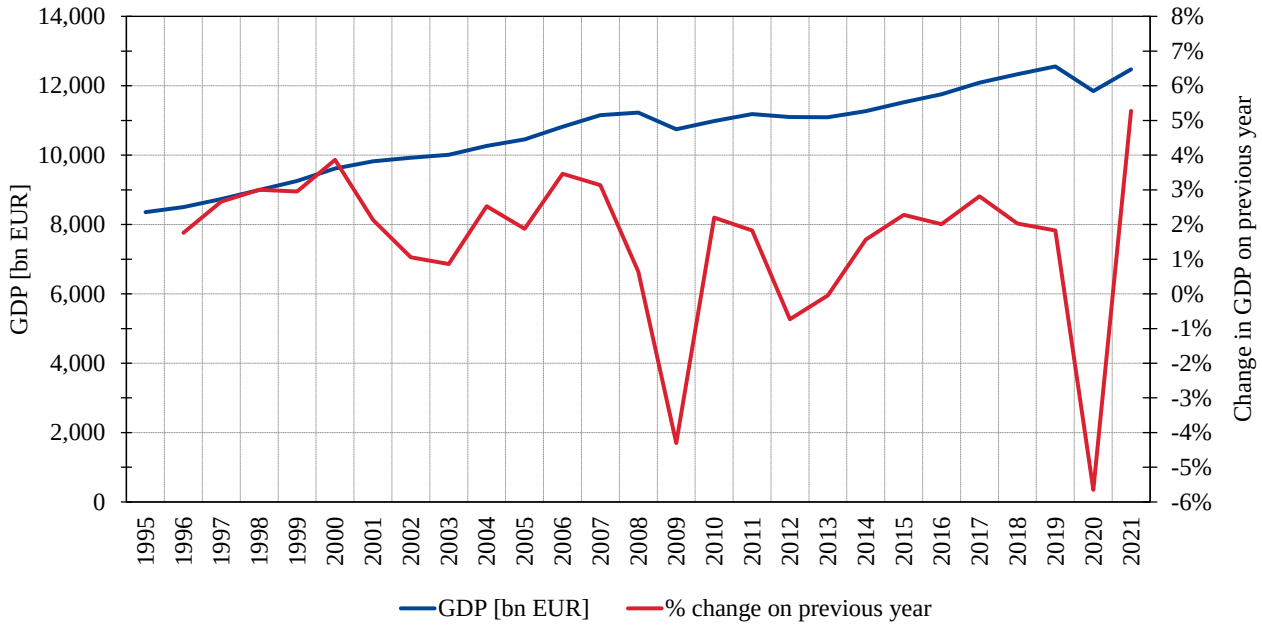
As can be seen in **Figure 13**, heating and cooling degree days show large inter-annual variations. This variability is particularly important because it affects energy consumption. Energy systems have to deal with periods of higher energy demand due to hot or cold weather, and during periods of low temperatures the share of fossil fuels used for heating may increase. While most of Europe is in the temperate climate zone, extreme weather events such as heatwaves are expected to become more frequent in the future[14]. More information on extreme weather events such as heatwaves and intense rainfall can be found in section [NC8] 6.3.

[NC8] 2.6 Economic profile

While GHG emissions in the European Union have decreased in recent years despite a growing economy, economic indicators are still key to the understanding of the trends in GHG emissions and the effects of climate change mitigation policies.

Figure 14 shows the development of the gross domestic product (GDP) in the EU. While the overall GDP of the EU has grown in most years since 1995, the years 2009 and 2020 saw decreases in GDP of more than 4 % due to the global economic crisis and the COVID-19 pandemic, respectively.

Figure 14: GDP: Trend and year-by-year changes

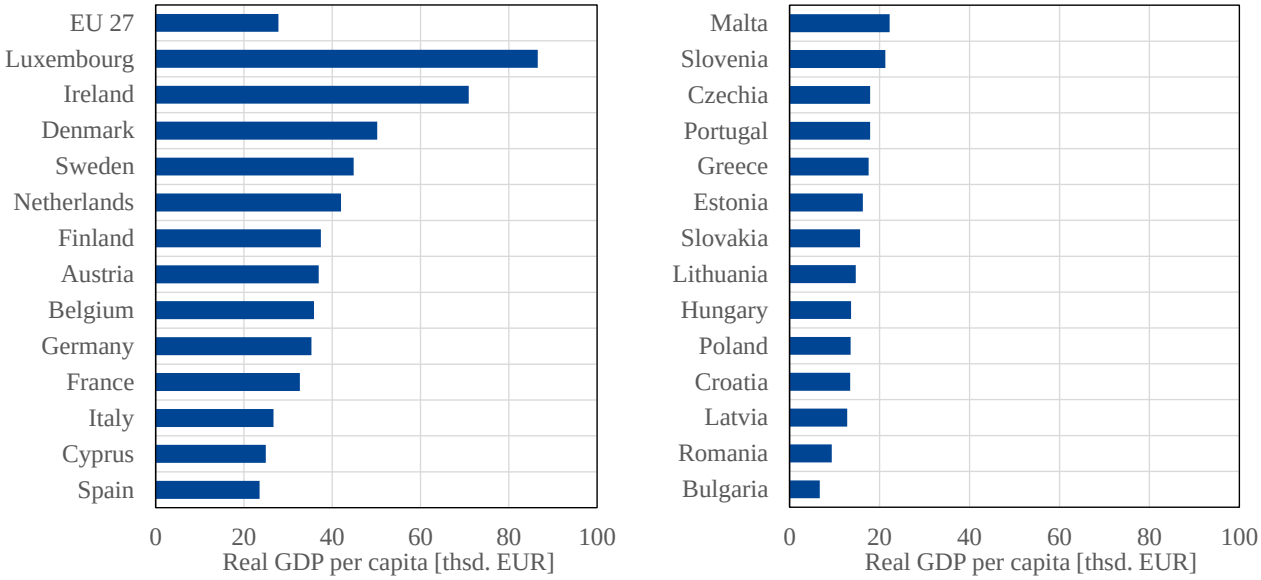


Source: Eurostat.
Note: The GDP is provided for EU-27 and shown at 2010 prices throughout the time series.

[14] IPCC AR6 WGI 2021 Regional Fact Sheet for Europe.
https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC_AR6_WGI_Regional_Fact_Sheet_Europe.pdf.

GDP per capita is distributed unevenly between Member States, as depicted in **Figure 15**. Luxembourg and Ireland are the Member States with the highest GDP per capita.

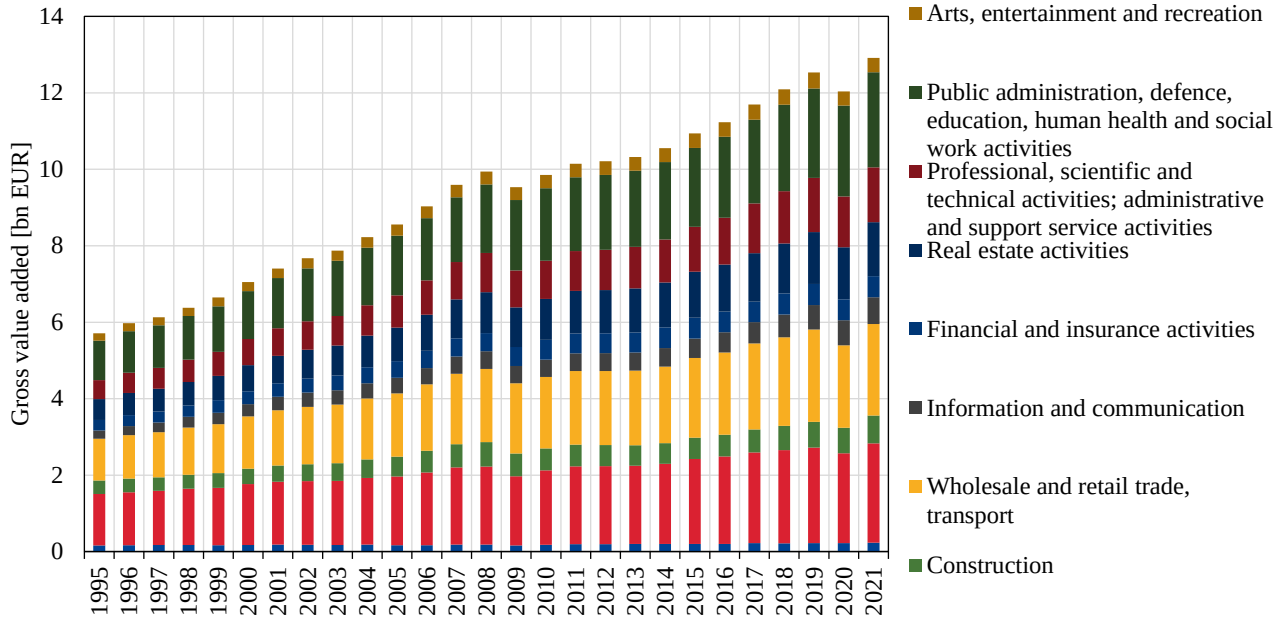
Figure 15: GDP per capita in EU Member States, 2021



Source: Eurostat.

When looking at the various sectors of the economy, gross value added (GVA) increased in all sectors over the past 25 years, with 'wholesale and retail trade and transport' showing a particularly high increase (Figure 16).

Figure 16: Gross value added per sector in the EU-27

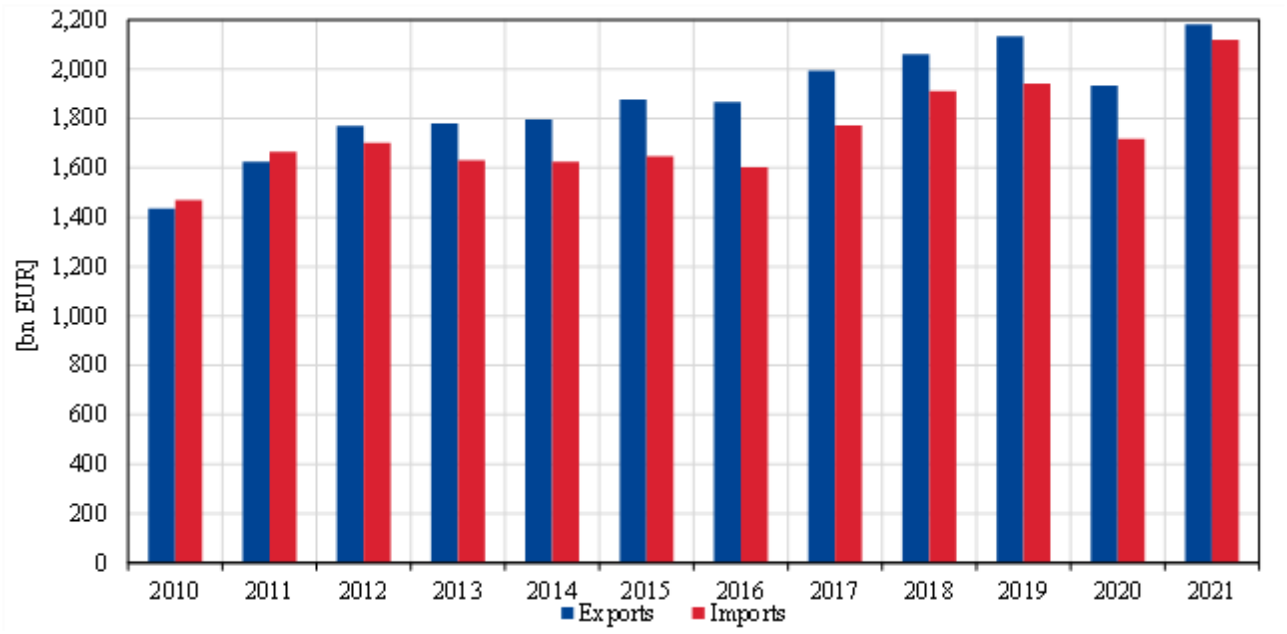


Source: Eurostat.

Note: The GVA is provided for EU-27 and shown at *current* prices throughout the time series.

Since 2012 total exports have exceeded total imports in most years, and they showed general upwards trends, except in 2020, which was due to the COVID-19 pandemic (Figure 17).

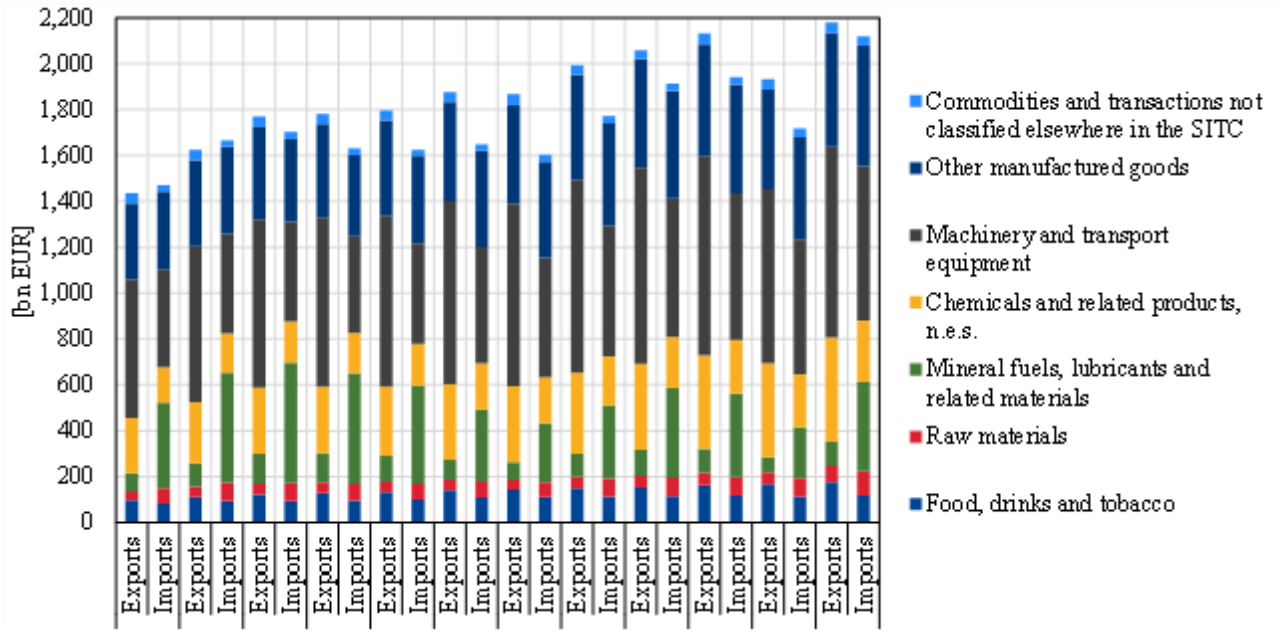
Figure 17: Development of extra-EU-27 exports and imports



Source: Eurostat.

Looking at the commodities which are traded, it can be seen that the EU is a net importer of mineral fuels, lubricants and related materials (marked in green in **Figure 18**), while it is, inter alia, a net exporter of machinery and transport equipment, as well as chemicals and related products.

Figure 18: Development of extra-EU trade by commodities



Source: Eurostat.
Note: SITC: Standard International Trade Classification.

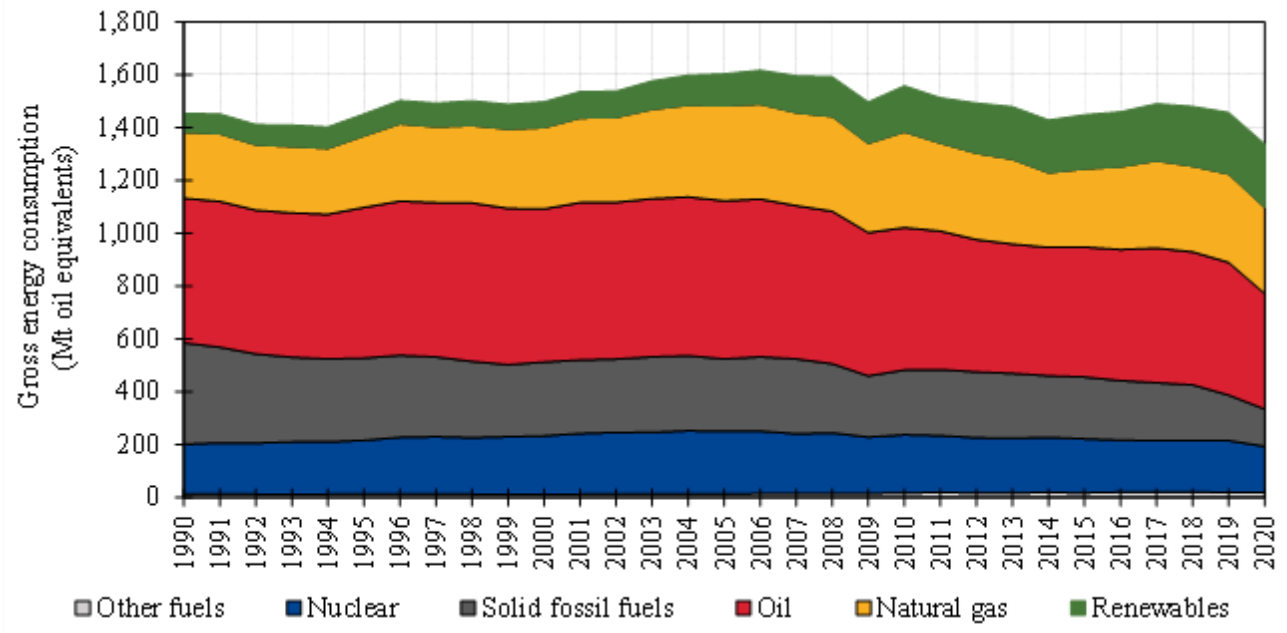
[NC8] 2.7 Energy

The energy sector is the most important source of greenhouse gas emissions in the European Union, and it is currently undergoing major transformations. Besides an accelerating shift towards renewable energy sources, the EU and its Member States are working on reducing their dependence on fuel imports in response to uncertainties in the energy system due to the Russian Federation's invasion of Ukraine (see also the 'REPowerEU' plan, section [BR] 4.3.1.1 in the attached Biennial Report).

As can be seen in Figure 19, gross inland energy consumption in the European Union peaked in 2006 and has shown a decreasing trend since then. Major decreases occurred in 2009 in the wake of the global financial crisis and in 2020 due to the COVID-19 pandemic. The overall decreasing trend over the past 15 years – despite a growing economy – can be attributed, inter alia, to a series of EU-wide energy efficiency policies and measures (cf. section [BR] 4.3.1.2 in the attached Biennial Report).

Over the whole time period shown, the use of solid fossil fuels decreased markedly (-63 % between 1990 and 2020), while the use of renewable energy sources more than tripled (+237 % between 1990 and 2020). However, the use of natural gas also increased between 1990 and 2020 (+31 %).

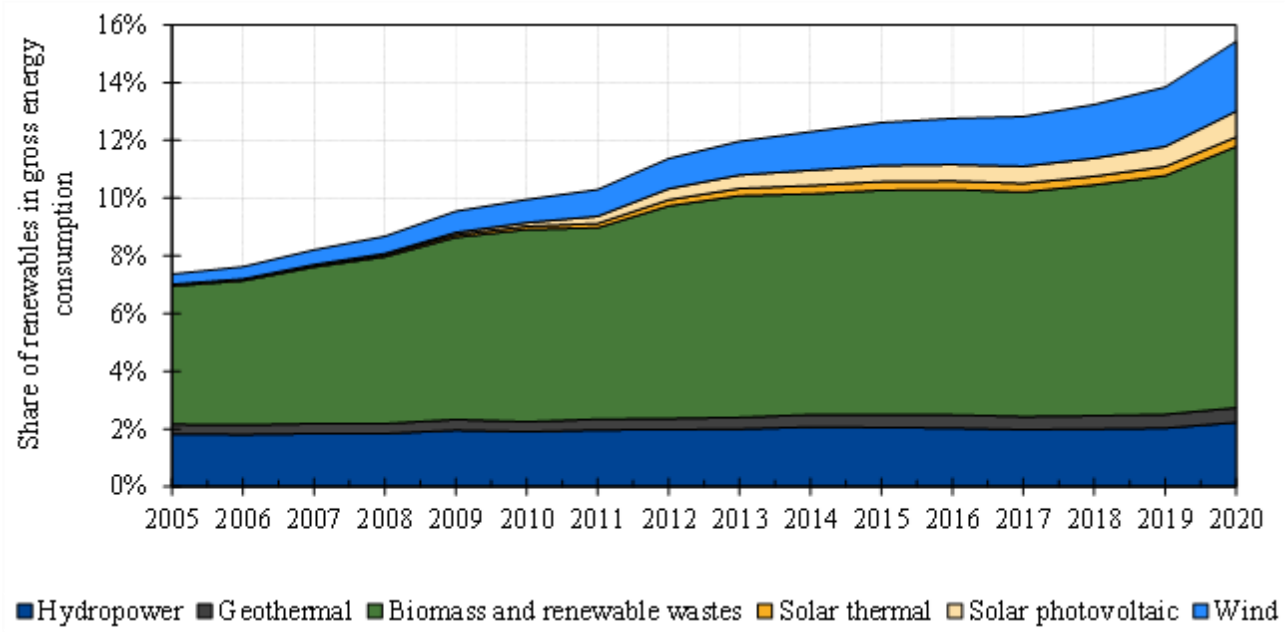
Figure 19: Gross inland energy consumption by fuel in the EU-27, 1990-2020



Source: Eurostat.

In 2020, fossil fuels made up 69 % of the EU's energy mix, while nuclear energy accounted for 13 % and renewables for 18 % of gross inland energy consumption, respectively (**Figure 19**). Energy consumption from renewable sources has increased significantly since 2005, as depicted in Figure 20.

Figure 20: Share of renewable energy in gross inland energy consumption in the EU-27, 1990-2020

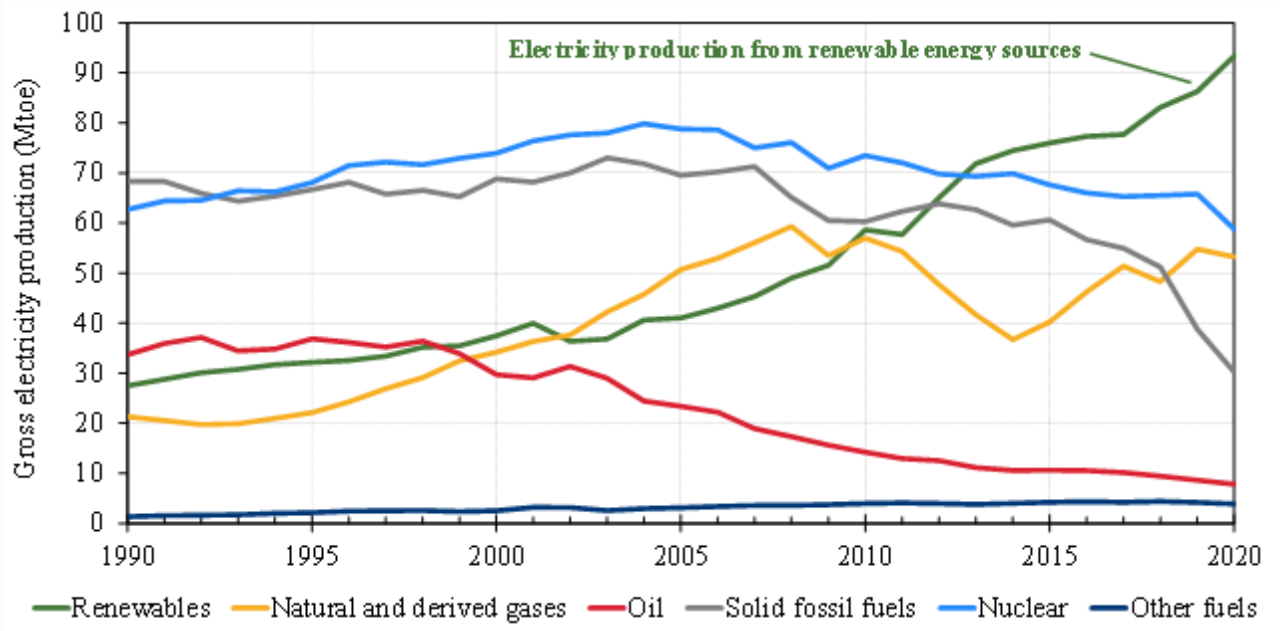


Source: Eurostat.

While biomass and hydropower constitute the main renewable energy sources, there have been important increases in wind and solar energy in recent years. These increases are particularly pronounced in electricity production, where renewable energy sources surpassed all other energy sources in 2013 (Figure 21). In 2020, gross electricity production from renewable energy sources exceeded the second most important electricity source – nuclear – by more than 50 %, and it exceeded the electricity production from natural gas, oil and coal combined in that year.

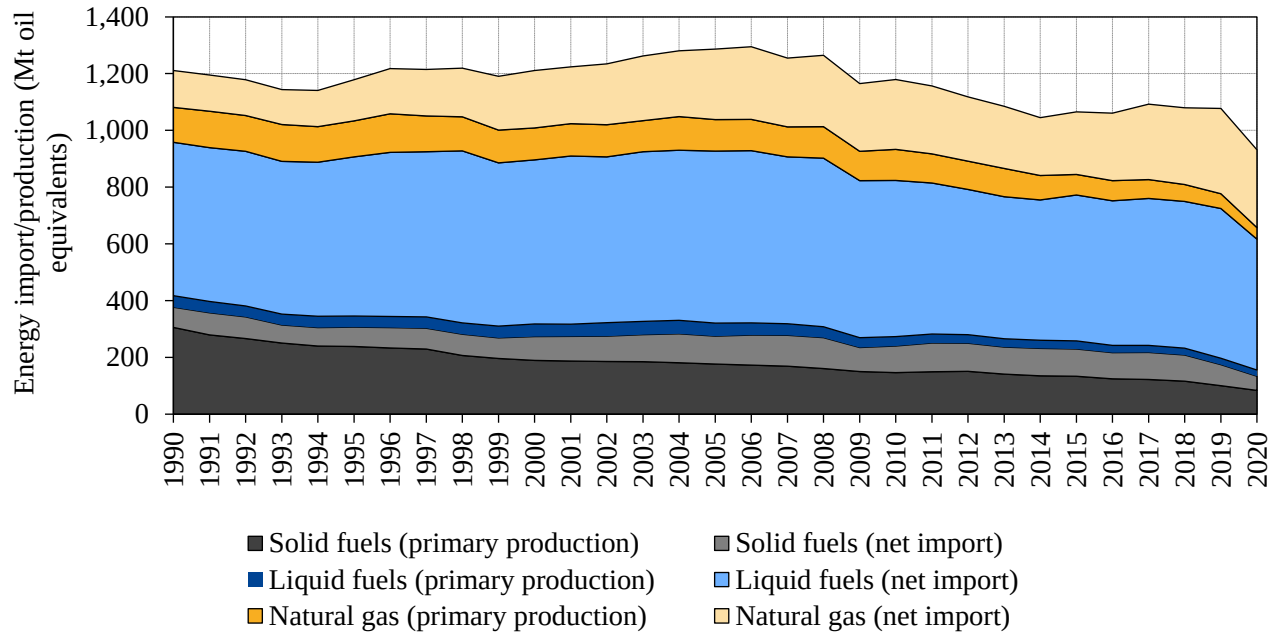
In the past 15 years, electricity production from renewable energy sources more than doubled, while electricity production from solid fossil fuels, oil and nuclear energy decreased in the same period. Natural gas continues to be an important fuel for electricity generation, and it shows distinct annual variations.

Figure 21: Gross electricity production by fuel in the EU-27, 1990-2020



Source: Eurostat.

Figure 22: Supply of fossil fuels in the EU-27



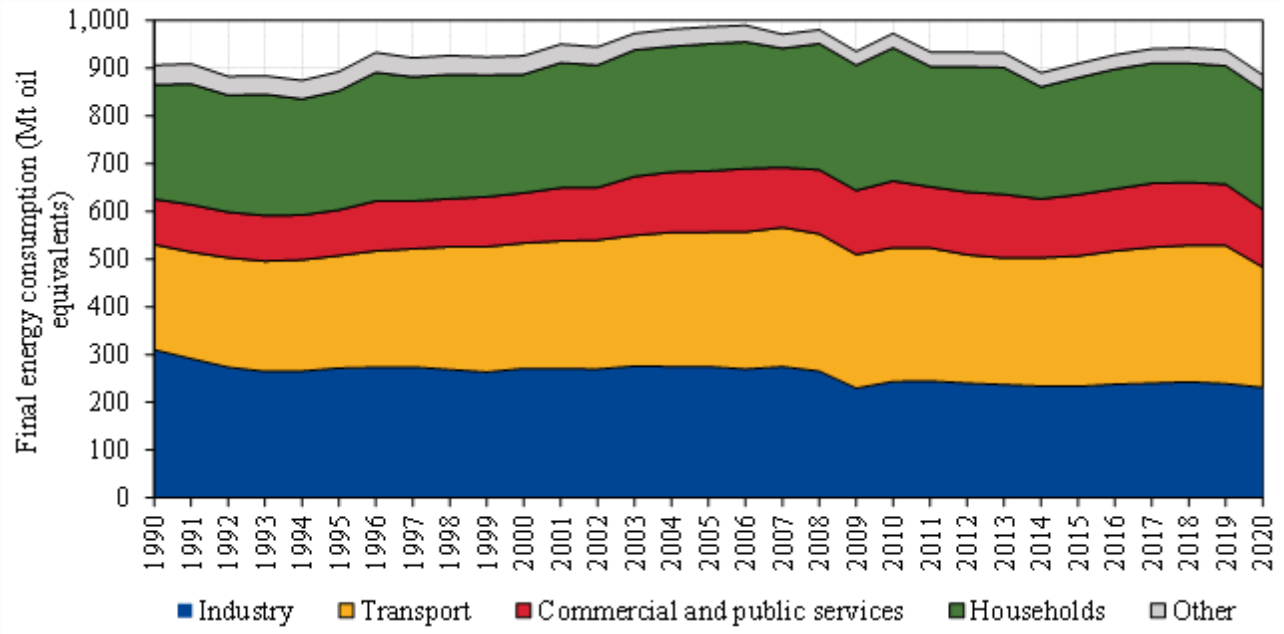
Source: Eurostat.

While renewable energy sources have exceeded other sources in electricity productions, fossil fuels are still widely in use in the transport, buildings, industry and other sectors. Figure 22 shows the supply of fossil fuels from 1990 to 2020. The overall supply of fossil fuels decreased over this period, but this decrease is mostly due to a decline in primary production within the EU (depicted in dark

colours), while net imports (depicted in light colours) continue to play an important role. Net imports of natural gas more than doubled between 1990 and 2020.

In the same period, final energy consumption (which includes the consumption of energy from fossil and renewable sources) remained at roughly the same level, as depicted in Figure 23. While in 1990, approx. 1.3 units of fossil fuels were produced or imported for each unit of final energy consumed, in 2020 approx. 1.1 units of fossil fuels were required for each unit of final energy consumed. This shift can be explained by the increase of renewable sources in the energy mix and by an increased efficiency of the energy system.

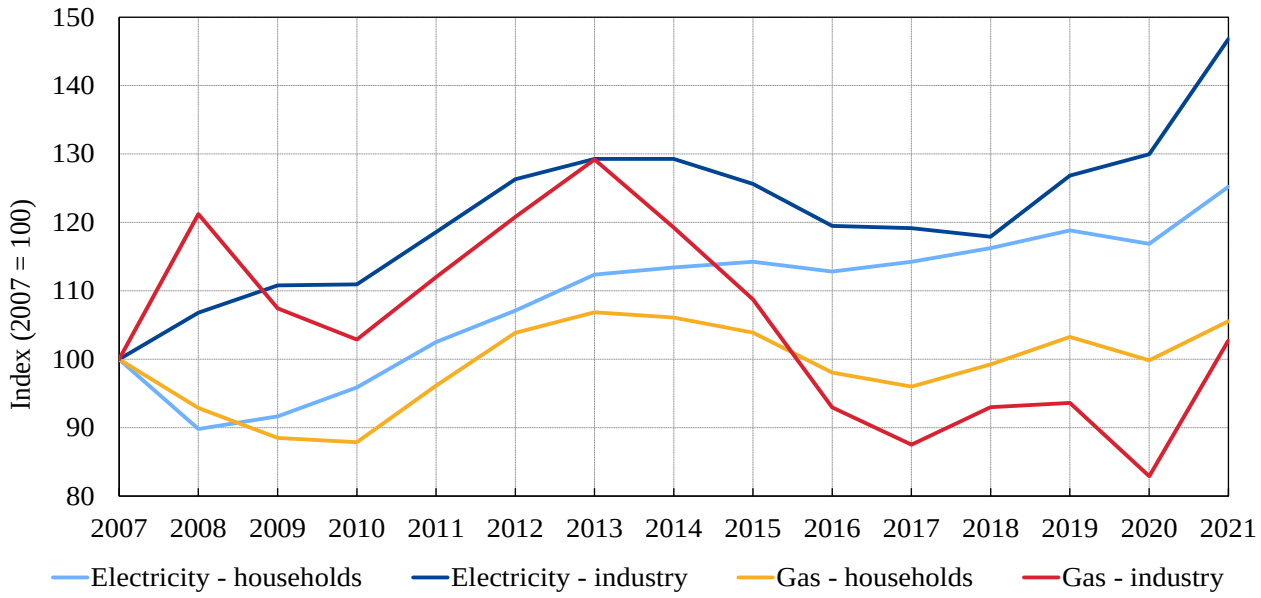
Figure 23: Final energy consumption by sector in the EU-27



Source: Eurostat.

The development of end-user energy prices is depicted in Figure 24. Prices for electricity have increased modestly since 2007, with a significant increase in 2021. Natural gas prices remained at a level similar to 2007 until 2020. However, during 2022 electricity and gas prices showed strong increases in the EU, as a consequence of uncertainties due to the Russian Federation's invasion of Ukraine. At the time of writing, the market does not anticipate a return to past price levels in the short-term.

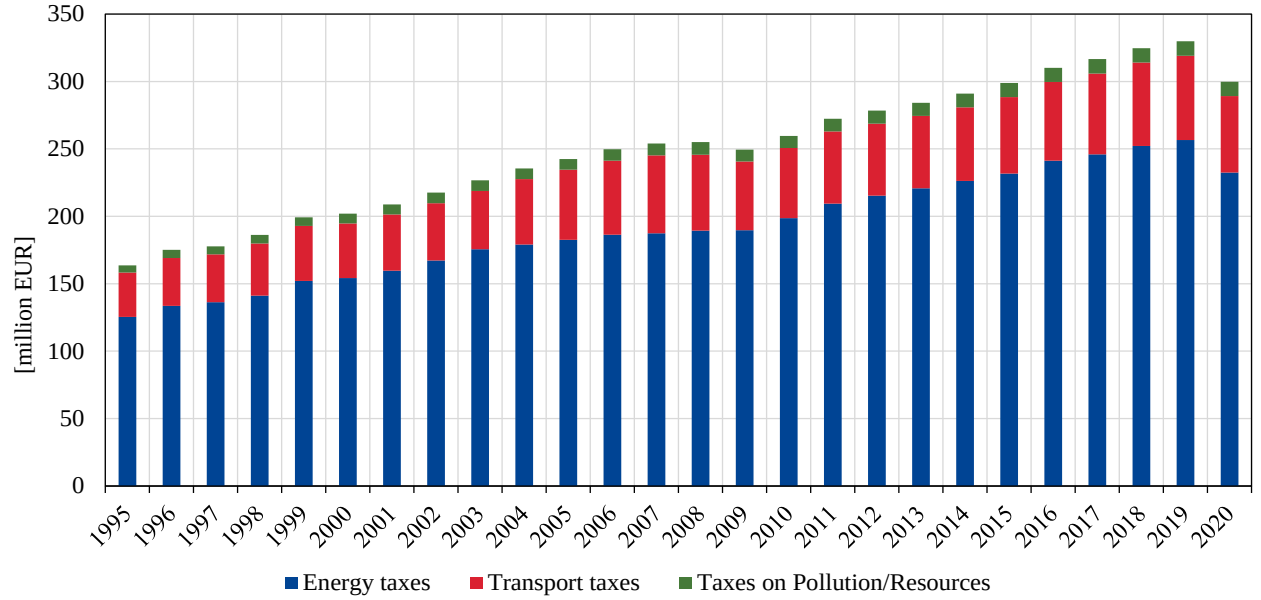
Figure 24: Average end-user energy prices in the EU-27, 2007-2021



Source: Eurostat.

Taxes are one of the instruments used to help reach climate change mitigation goals. **Figure 25** shows the developments of revenues from environmental taxes in the EU (i.e. taxes whose tax base is a physical unit of something that has a proven, specific negative impact on the environment)[15]. Revenues of such taxes increased from 2002 to 2019; energy taxes amounted to more than three quarters of environmental taxes in all recent years.

Figure 25: Environmental tax revenue by type, 2002-2020



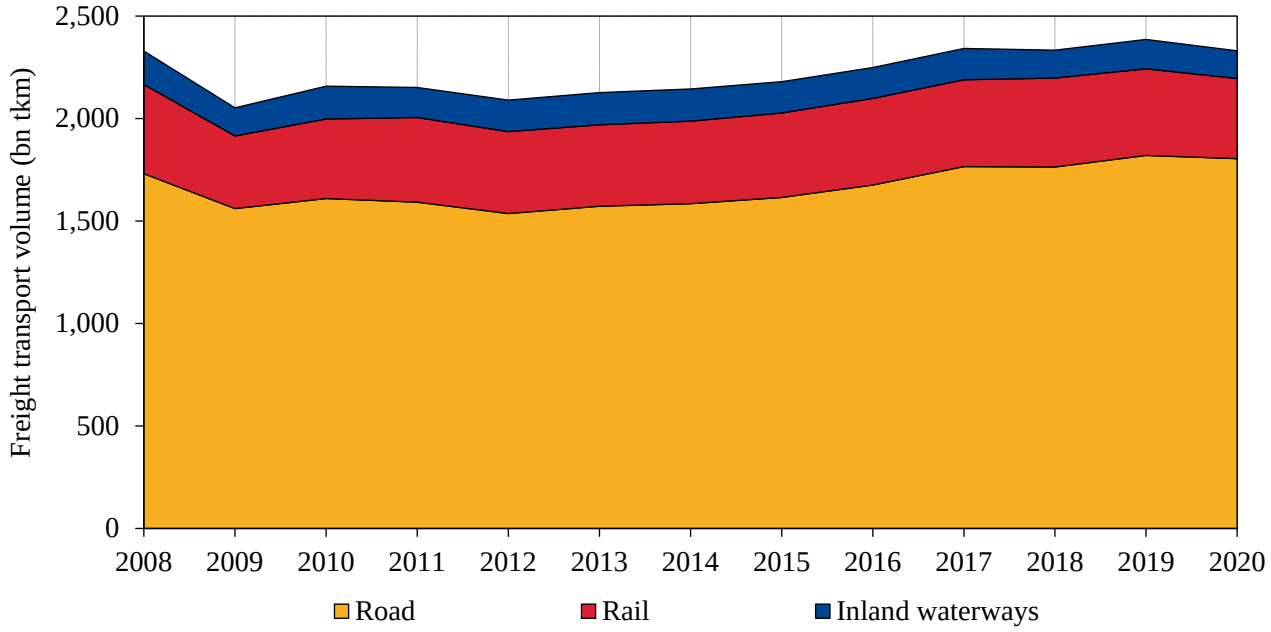
Source: Eurostat.

[15] Eurostat, Environmental tax statistics, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Environmental_tax_statistics.

[NC8] 2.8 Transport

Currently, the transport sector is largely based on fossil fuels and constitutes an important source of greenhouse gas emissions. As can be seen in Figure 26, the volume of freight transport (expressed in tonne-kilometres – tkm) saw a decrease in 2009 due to the global economic crisis but has increased slowly since then. In 2020, the year in which the Covid-19 pandemic started, transport volumes decreased only slightly. Freight transport within the EU is dominated by road transport, which in 2020 accounted for approximatively 77 % of all freight transport expressed in tonne-kilometres.

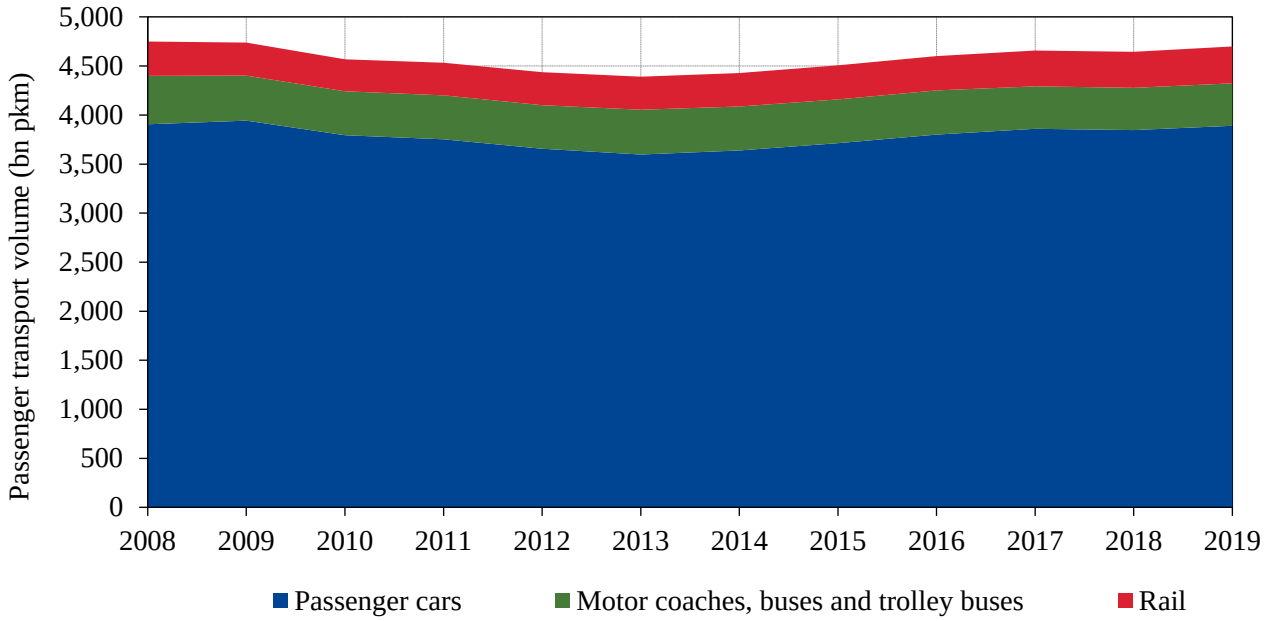
Figure 26: Freight transport volume in the EU-27



Source: Eurostat.

Like freight transport, passenger transport in the European Union is dominated by road transport. Total passenger transport has shown small year-to-year changes in recent years, as depicted in Figure 27. In 2019, cars accounted for 83 % of all passenger transport expressed in passenger kilometres (pkm). The average travel distance per capita per year in 2019 amounted to approximately 9 400 km by car, 1 000 km by motor coaches, buses and trolley buses, and 900 km by rail.

Figure 27: Passenger transport volume in the EU-27

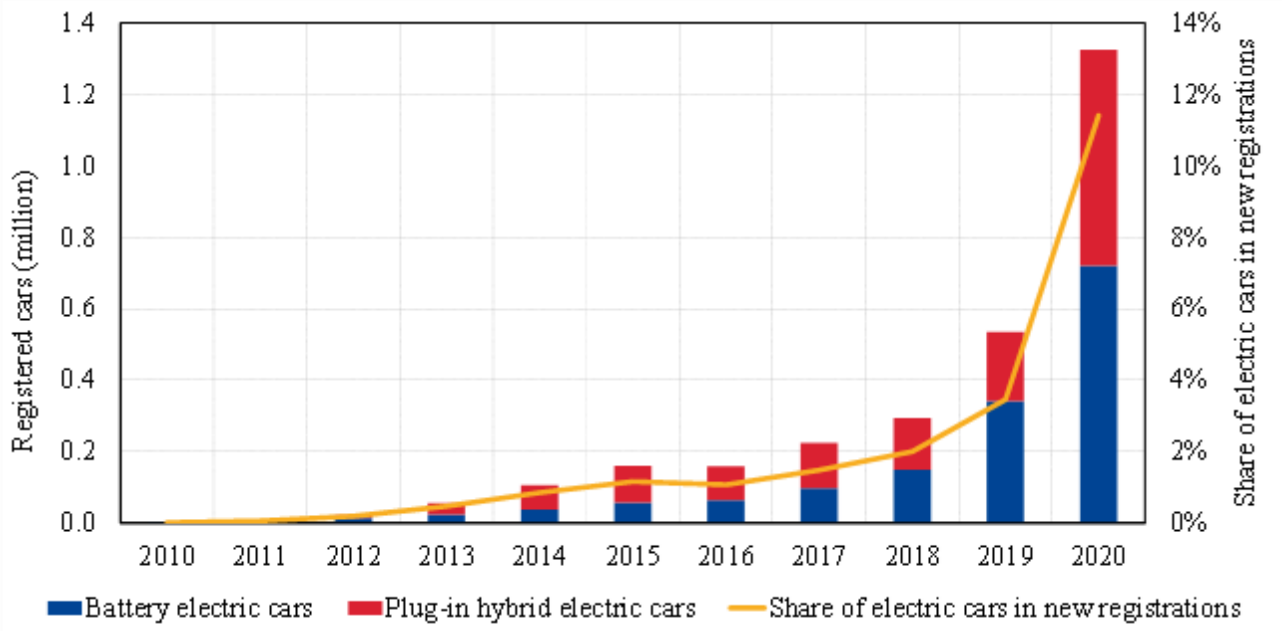


Source: Eurostat. Data for Estonia, Greece, Hungary, Luxembourg and Portugal are not included.

While fossil fuels currently dominate road transport, electric vehicles showed a strong increase in recent years and were supported by EU and national policies (cf. section [BR] 4.3.2] in the attached Biennial Report). Electric cars (battery electric and plug-in hybrid electric) accounted for approximately 11 % of all cars newly registered in 2020, and an exponential growth of registrations can be observed (Figure 28). In the years ahead, electric passenger cars will play a key role in mitigating greenhouse gas emissions from road transport. A typical battery electric vehicle in Europe offers a reduction in GHG emissions across its life cycle, compared with an equivalent internal combustion engine vehicle. The extent to which the GHG emissions advantage is realised during the use phase depends strongly on the electricity mix[16].

[16] EEA (2018), Electric vehicles from life cycle and circular economy perspectives, https://www.eea.europa.eu/publications/electric-vehicles-from-life-cycle.

Figure 28: New registrations of electric vehicles in Europe, 2010-2020



Source: European Environment Agency.
Note: Total of EU-27, United Kingdom and Norway.

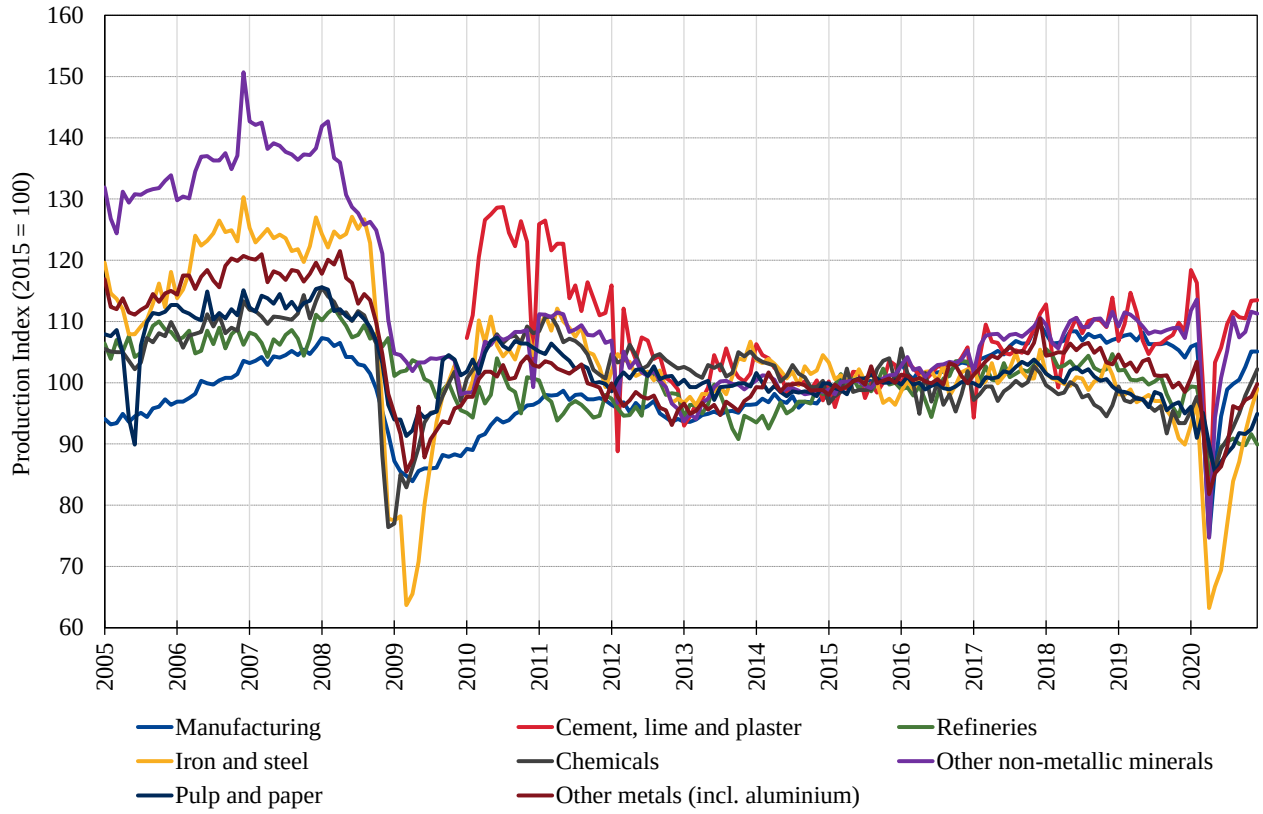
[NC8] 2.9 Industry

The industry sector accounted for approx. 20 % of total GVA in the EU in 2020. The most important industrial sub-sector in the EU was the manufacture of motor vehicle (12 % of GVA of the industry sector), followed by manufacture of basic metals and manufacture of textiles, accounting for 10 % each of the GVA of the industry sector[17].

Production values in most sectors showed only small fluctuations between 2012 and 2019 (Figure 29). Large dips in productions were observed in 2009 in the wake of the global economic crisis and in 2020 due to the COVID-19 pandemic. These decreases were most pronounced in the iron and steel sector. The production values in most industrial sectors continue to be below the levels before the global economic crisis. This is particularly the case for manufacturing.

[17] National accounts aggregates by industry, https://ec.europa.eu/eurostat/databrowser/view/NAMA_10_A64__custom_2949903/default/table?lang=en.

Figure 29: Trends in production values of different industry sub-sectors in the EU-27, 2005-2020



Note: Information on cement, lime and plaster is available from 2010 onwards only.

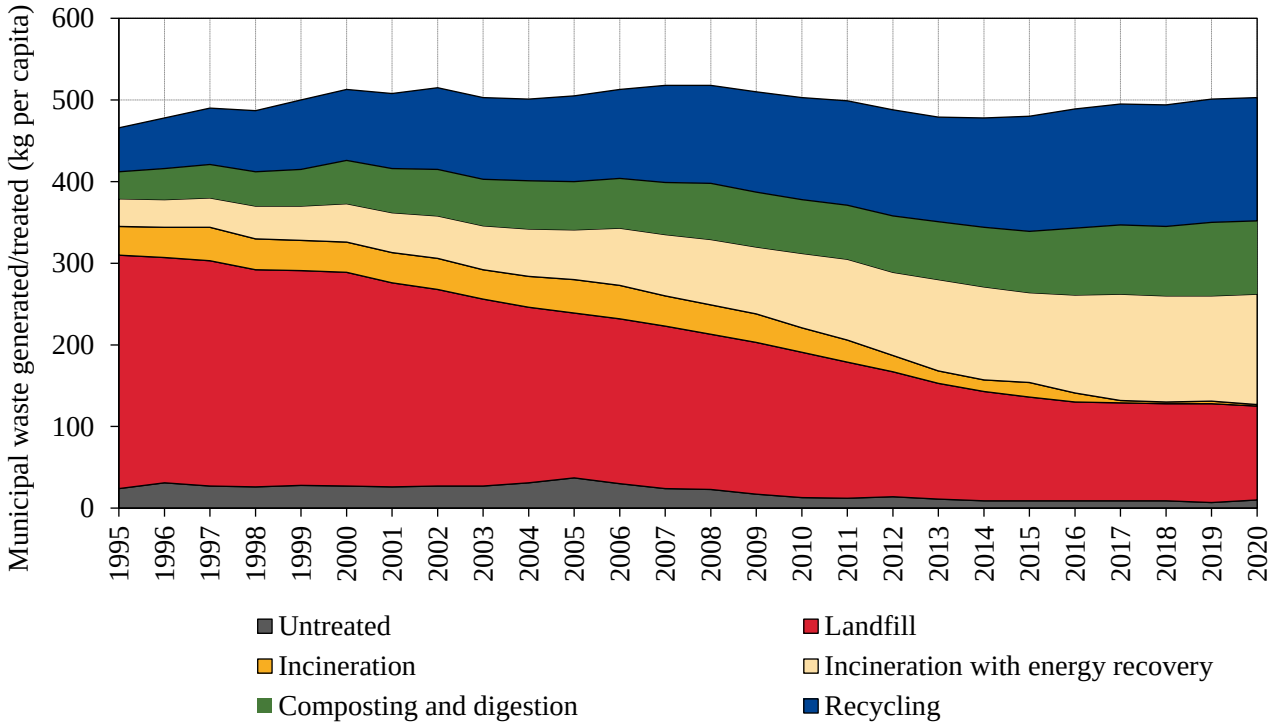
Source: ETC/CME[18], based on Eurostat data.

[NC8] 2.10 Waste

While the overall amount of municipal waste generated in Europe has shown little variation in the past two decades, an important shift in waste treatment has occurred, from landfilling towards incineration with energy recovery, composting/digestion and recycling (Figure 30). This shift is due to EU-wide policies explained in section [BR] 4.5.3 and is important for the mitigation of greenhouse gas emissions. The shift away from landfills reduces the emissions of methane. Waste incineration causes CO_2 emissions, but with energy recovery it can substitute the incineration of fossil fuels for heat or electricity generation.

[18] ETC/CME Report 9/2021: Trends and projections in the EU ETS in 2021, https://www.eionet.europa.eu/etcs/etc-cme/products/etc-cme-reports/etc-cme-report-9-2021-trends-and-projections-in-the-eu-ets-in-2021-the-eu-emissions-trading-system-in-numbers.

Figure 30: Treatment of municipal waste in the EU-27, 1990-2020



Source: Eurostat.

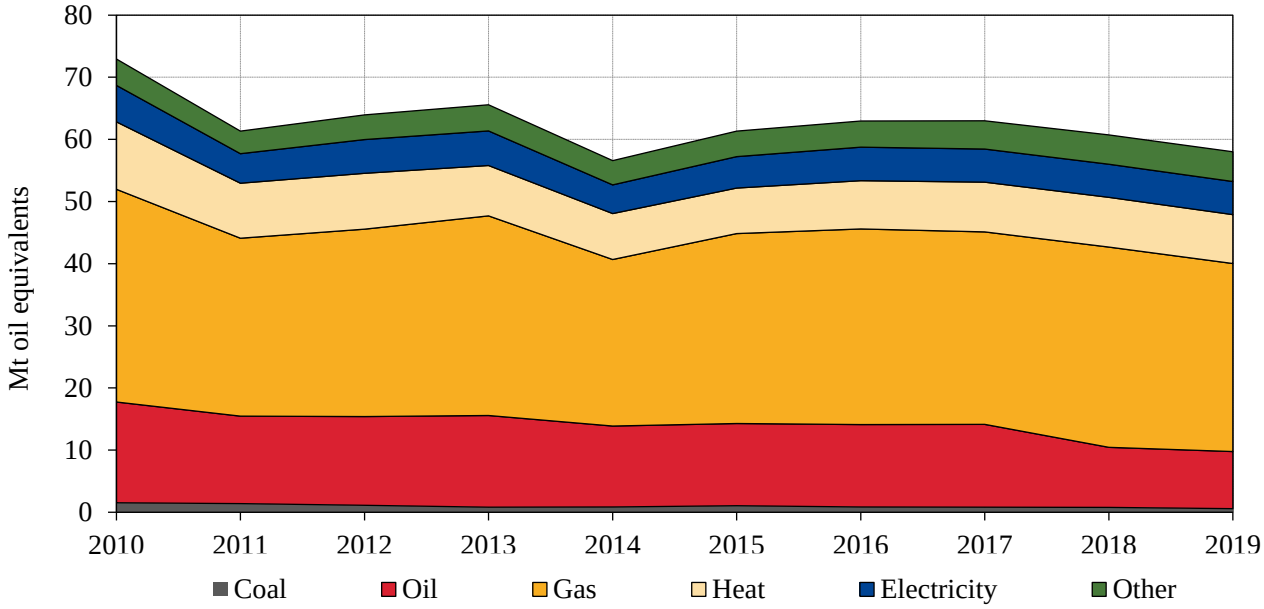
[NC8] 2.11 Building stock and urban structure

The buildings sector is an important source of GHG emissions. In 2020, it accounted for approximately 14 % of total EU GHG emissions[19], which mostly originate from space heating. Additional emissions occur during the production of building materials and during the production of electricity and heat used in buildings.

Figure 31 depicts the trends in energy consumption of residential space heating. Trends in energy consumption of commercial buildings are shown in Figure 32. Energy consumption in buildings shows a downward trend in recent years, in particular the consumption of oil (-32 % in households and -43 % in commercial buildings) between 2010 and 2019. Annual variations can be explained by climatic conditions. Lower consumption in 2011 and 2014 is associated with milder winters (lower average of heating degree days) in these years, as shown in **Figure 10** (section [NC8] 2.5).

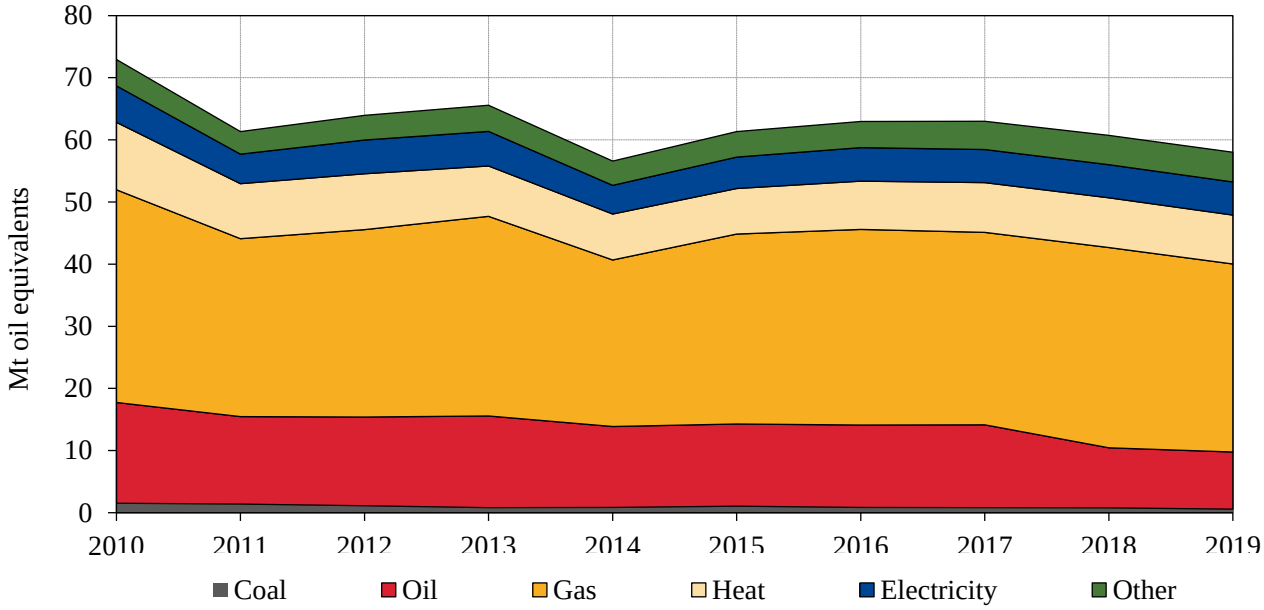
[19] Annual European Union greenhouse gas inventory 1990-2020 and inventory report 2022, https://unfccc.int/documents/461931.

Figure 31: Energy consumption of residential space heating in EU-27



Source: Odyssee database.

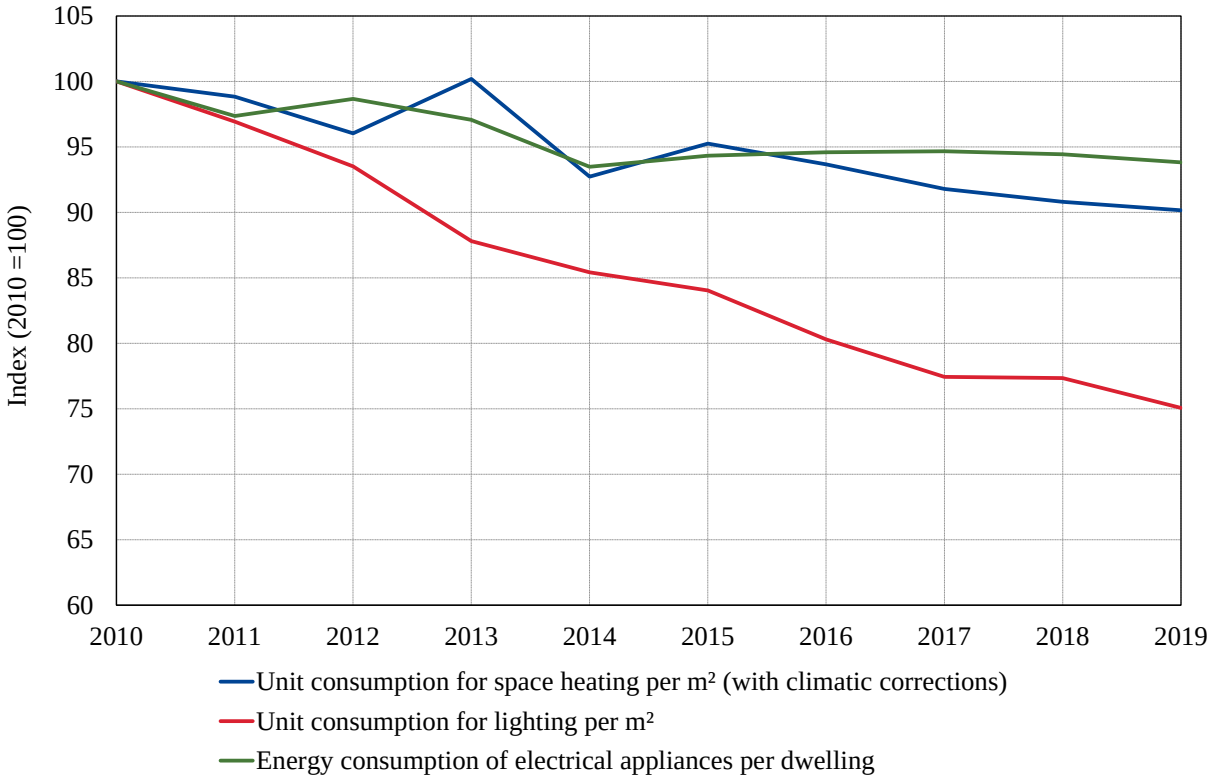
Figure 32: Energy consumption of commercial buildings



Source: Odyssee database.

Besides space heating, lighting and electrical appliances consume important amounts of energy, but this energy consumption can be reduced through energy efficiency measures. In Figure 33, the development in energy consumption is shown relative to 2010. Unit consumption for space heating per m^2 and energy consumption of electrical appliances per dwelling show slight decreases. Unit consumption for lighting per m^2 decreased by approximately 25 % in nine years, inter alia as a consequence of eco-design requirements for lighting (cf. section [BR5] 4.3.1.2).

Figure 33: Energy consumption (per m^2) for space heating, lighting and electrical appliances



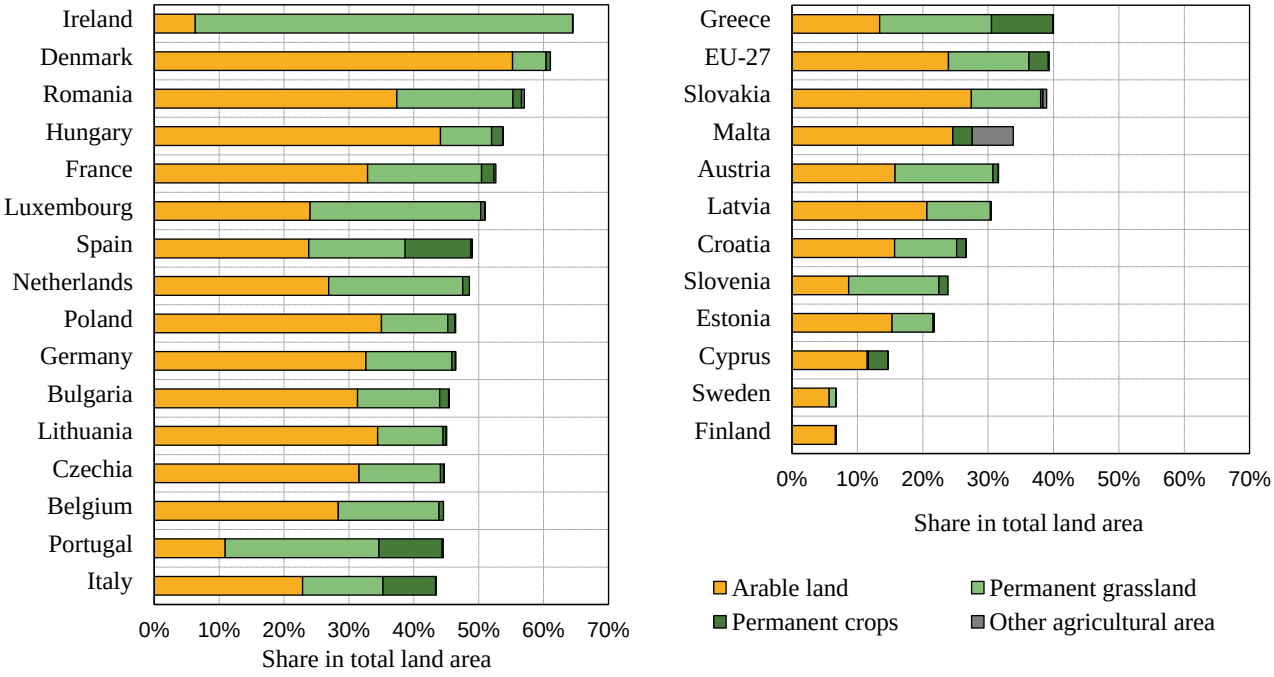
Source: Odyssee database.

[NC8] 2.12 Agriculture

The share of agricultural land in total land area varies widely between Member States (Figure 34). Ireland has the highest share of agricultural area. However, it is predominantly grassland. Finland and Sweden have the smallest shares of agricultural areas, and these areas are mostly arable land. Overall, approximately 39 % of the EU area is used for agriculture. Of this area, 61 % is arable land, 31 % is permanent grasslands and 8 % is permanent crops.

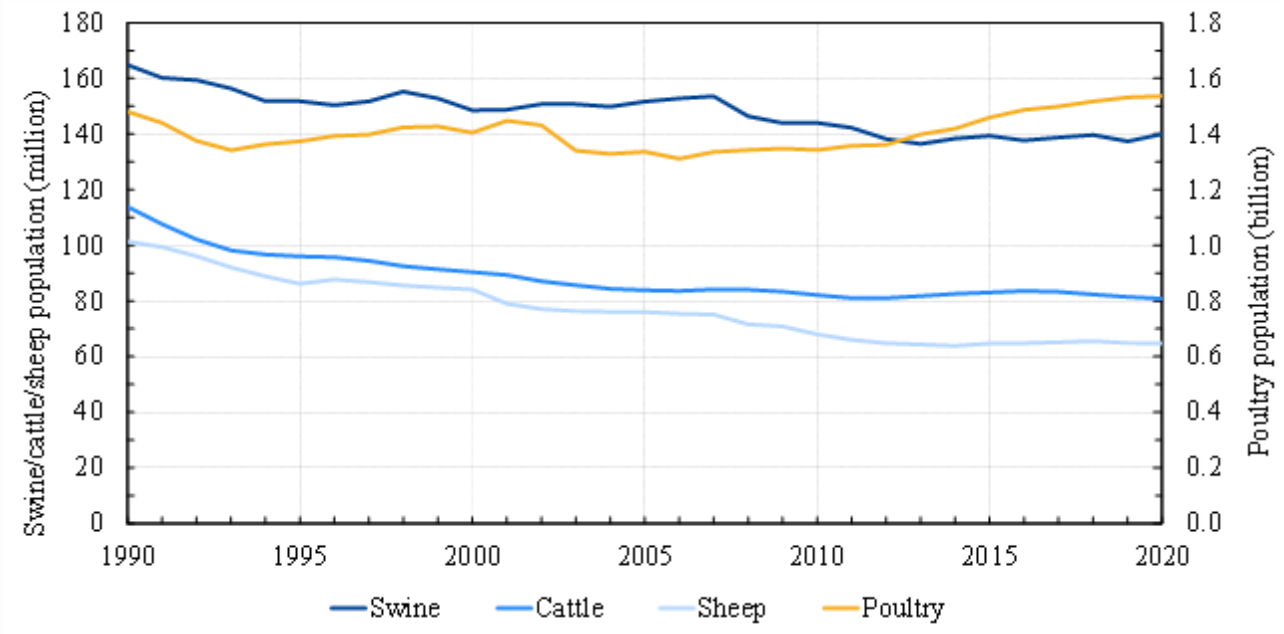
The main sources of greenhouse gas emissions from agriculture include methane emissions from enteric fermentation and manure management, plus some nitrous oxide emissions from manure management, which all depend, inter alia, on livestock size. Livestock populations in the European Union showed varying trends in the past three decades (Figure 35). The swine, cattle and sheep populations decreased between 1990 and 2020 by 18 %, 41 % and 57 %, respectively, while the population of poultry increased by 4 % in the same time period.

Figure 34: Share of agricultural land in total land area in the EU Member States in 2020



Source: Eurostat.

Figure 35: Livestock population in the EU-27, 1990-2020

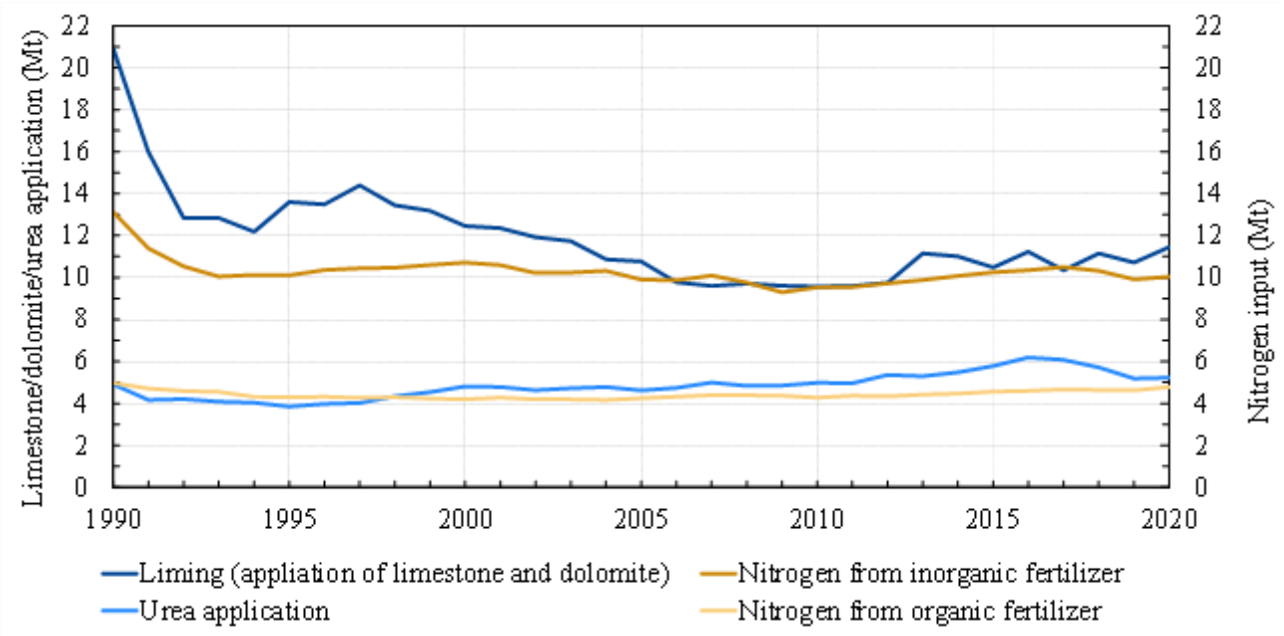


Source: Annual European Union greenhouse gas inventory 1990-2020[20].

[20] Annual European Union greenhouse gas inventory 1990-2020 and inventory report 2022, https://unfccc.int/documents/461931.

The application of fertilizers is another important source of greenhouse gases. These include nitrous oxides from nitrogen containing fertilizers and CO_2 from the application of limestone, dolomite and urea-based fertilizers. As can be seen in Figure 36, liming and the application of inorganic fertilizer decreased considerably between 1990 and 2020 (by 82 % and 31 %, respectively), while urea application increased by 6 % and nitrogen from organic fertilizer decreased by 4 %.

Figure 36: Fertilizer application in the EU-27, 1990-2020

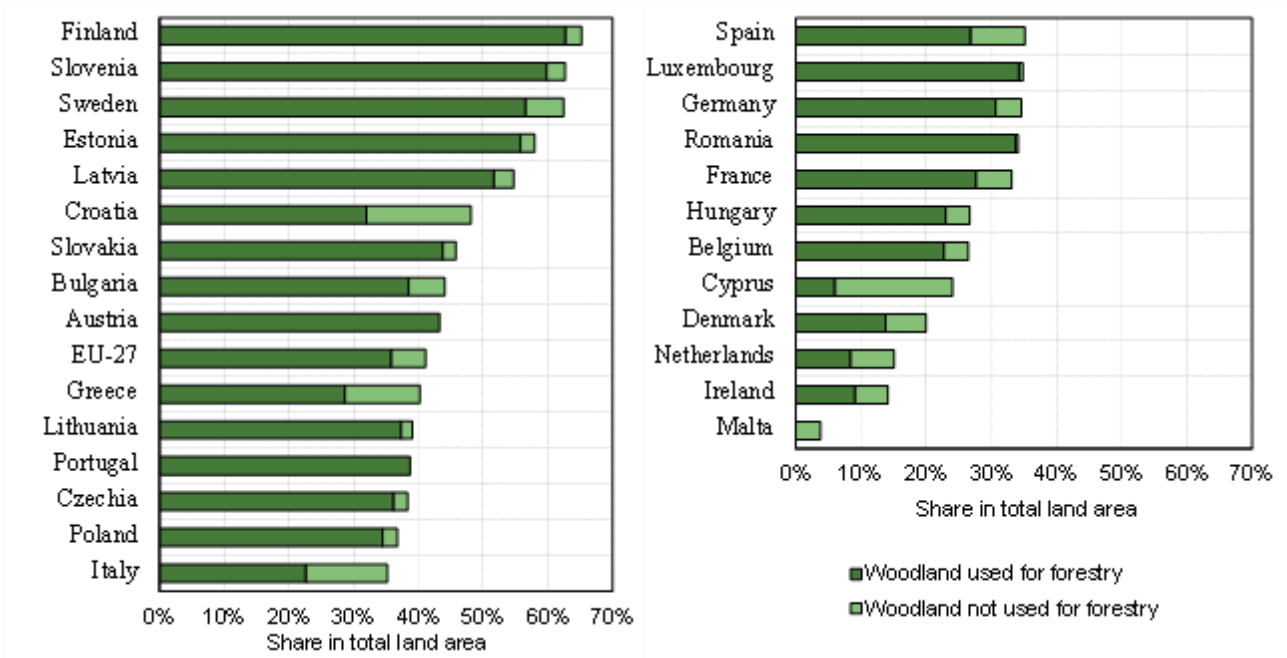


Source: Annual European Union greenhouse gas inventory 1990-2020.

[NC8] 2.13 Forest

As already mentioned in section [NC8] 2.4, woodland is the most important land category in the EU, accounting for 41 % of all land. The share of woodland in individual Member States ranges from 4 % in Malta to 65 % in Finland, as shown in Figure 37. The vast majority of all woodland is used for forestry. Mostly in southern European Member States, larger shares of woodland are not used for forestry. The management of the EU's forests plays an important role in climate change mitigation because they constitute and important carbon sink, as explained in chapter [NC8] 3.

Figure 37: Share of woodland in total land area in the Member States of the EU in 2020



Source: Eurostat.

[NC8] 2.14 Other circumstances

The number of Member States constituting the European Union has evolved over time – from 12 on 1990 up to 28 by 2013 and down to 27 in 2020. The information on national circumstances provided consistently in this chapter relates to the current 27 Member States. Historical information, such as population or energy consumption, is provided for the same 27 countries for the entire time series from 1990 to 2020, even if they were not members of the EU in earlier years. For greenhouse gas inventory information (chapters [NC8] 3 and [BR5] 3), a different approach is taken: data for 1990 to 2020 are provided for the 27 EU Member States plus the UK, because the UK took part in the GHG emission reduction target of the EU for 2020.

[NC8] 3 GREENHOUSE GAS INVENTORY INFORMATION

[NC8] 3.1 Introduction and key developments

This chapter provides key information about the EU GHG inventory. Further detail is given in the Fifth Biennial Report, which is submitted with this National Communication.

The European Union, as a Party to the United Nations Framework Convention on Climate Change (UNFCCC), reports annually on GHG inventories for the years between 1990 and the current calendar year (t) minus two (t-2), for emissions and removals within the area covered by its Member States. The GHG inventory data presented in this chapter of the National Communication is consistent with the GHG inventory of the EU-27+UK as submitted on 27 May 2022 under the Convention[21]. In addition to the GHG inventory data contained in this report, the EU may choose to provide updated GHG emissions and removal data to reflect any updates in the GHG inventory which were submitted after the May 2022 submission.

Although the UK is no longer a Member State of the EU, its GHG inventory data is still included because it was a Member State until 2020 and took part in the GHG emission reduction target of the EU for 2020. As the EU inventory is the sum of the individual inventories, the EU-27+UK inventory covers the same geographical area as the inventories of the 27 Member States and the United Kingdom (territory coverage as listed in Table 2).

The sectoral scope of the emissions presented in this chapter aligns with the reporting requirements of the second commitment period under the Kyoto Protocol. Indirect emissions of CO_2 are included in all the emission data quoted in the National Communication, while emissions from international aviation are excluded from the national total. Summary tables of GHG emissions for EU-27+UK in the common tabular format (CTF) are presented in an annex to the Fifth Biennial Report.

The recent key developments in GHG emissions in the EU can be summarised as follows:

- Total greenhouse gas emissions in the EU-27+UK (without LULUCF) and without international aviation, but including indirect CO_2 emissions, and NF_3 emissions) were 3 700 million tonnes CO_2 equivalent in 2020. Total GHG emissions decreased by 34.4 % from 1990 to 2020. In absolute terms, the largest emission reduction were achieved in CO_2 from Public electricity and heat production (-732 million tonnes between 1990 and 2020).
- In 2020, total GHG emissions in the EU-27+UK (without LULUCF and without international aviation, but including indirect CO_2 emissions, and NF_3 emissions) decreased by 345 million tonnes, or 8.5 % compared to 2019. This important drop in emisions was triggered by the contraction in economic activity caused by the Covid-19 pandemic. At EU level, almost 70 % of the net reduction in GHG emissions in 2020 took place in road transportation and public electricity and heat production. Almost all economic sectors saw significant emission reductions in 2020.

[21] European Union (Convention). 2022 Common Reporting Format (CRF) Table, https://unfccc.int/documents/461928.

[NC8] 3.2 Summary of greenhouse gas (GHG) emission trends

This section provides a brief description of the trends in GHG emissions. For a full description of the trends, see relevant sections in the EU National Inventory Report (NIR)[22] and [BR5] Section 2.3.

[NC8] 3.2.1 Trends in total GHG emissions

In 2020, total GHG emissions in the EU-27+UK, without LULUCF, were 34.3 % (-1 940 million tonnes CO_2 equivalents) below 1990 levels. Emissions decreased by 8.5 % (345 million tonnes CO_2 equivalents) between 2019 and 2020 (Table 1). Emissions from international aviation and marine transport are excluded from national totals.

Table 1: EU-27+UK GHG emissions by gas, 1990 to 2020

GHG emissions (Mt CO_2eq)	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CO_2 (excluding LULUCF)	4,470	4,207	4,177	4,313	3,952	3,811	3,755	3,662	3,487	3,523	3,507	3,518	3,437	3,279	2,955
Net CO_2 emissions/removals	4,242	3,896	3,858	3,982	3,607	3,467	3,404	3,312	3,154	3,197	3,187	3,248	3,163	3,020	2,703
CH_4 (including LULUCF)	723	668	607	547	491	481	477	466	458	458	452	453	444	436	430
N_2O (including LULUCF)	399	362	318	299	252	246	244	244	247	248	247	252	248	245	242
HFCs	29.1	43.3	52.7	73.2	98.7	102.6	105.6	109.0	111.6	105.9	107.5	107.2	103	99.8	88.8
PFCs	25.9	17.3	12.2	7.3	3.9	4.2	3.5	3.6	3.3	3.4	3.8	3.4	3.5	2.7	2.1
Unspecified mix of HFCs and PFCs	5.9	5.9	2.2	1.1	0.5	0.4	0.8	1.0	0.8	0.8	0.8	1.1	1.8	1.7	1.6
SF_6	10.9	15.0	10.3	7.8	6.3	6.0	6.1	6.0	5.7	6.0	6.3	6.6	6.7	6.7	5.5
NF_3	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Indirect CO_2 emissions	4.3	3.6	3.0	2.6	2.3	2.2	2.1	1.9	1.9	1.9	1.8	1.8	1.7	1.6	1.5
Total (without LULUCF, with indirect CO2)	**5,640**	**5,292**	**5,154**	**5,224**	**4,781**	**4,627**	**4,569**	**4,469**	**4,291**	**4,321**	**4,300**	**4,314**	**4,220**	**4,046**	**3,700**
Total (with net CO_2 emissions/ removals, with indirect CO_2)	**5,440**	**5,011**	**4,863**	**4,920**	**4,462**	**4,309**	**4,244**	**4,144**	**3,983**	**4,021**	**4,007**	**4,073**	**3,973**	**3,813**	**3,474**
International bunkers: Aviation	69	86	115	131	132	136	134	135	138	142	149	160	167	170	70
International bunkers: Marine	112	112	137	163	162	163	151	143	140	141	145	147	149	147	131

Source: European Union (Convention) 2022 Common Reporting Format Table[23].

[NC8] 3.2.2 Trends in emissions by GHG

CTF Table 1 in Appendix I to the Fifth Biennial Report provides an overview of the main trends in EU-27+UK GHG emissions and removals for 1990–2020. In the EU-27+UK the most important GHG is CO_2, accounting for 80 % of total EU-27+UK emissions in 2020 excluding LULUCF. In 2020, CO_2 emissions excluding LULUCF were 2 957 Mt, which was 34 % below 1990 levels. Compared to 2019, CO_2 emissions, CH_4 emissions and N_2O emissions decreased each by 9.9 %, 1.3 % and 1.2 % respectively. Fluorinated gases (HFCs, PFCs, SF_6 and NF_3), especially HFCs have been increasing since 1990. In 2020 fluorinated gases account for the remaining 2.7 % of total GHG emissions.

[22] Annual European Union greenhouse gas inventory 1990-2020 and inventory report 2022, https://unfccc.int/documents/461931.
[23] European Union (Convention). 2022 Common Reporting Format (CRF) Table, https://unfccc.int/documents/461928.

[NC8] 3.2.3 Trends in emissions by main source and sink categories

The most important sector in terms of GHG emissions is energy (i.e. combustion and fugitive emissions), which contributed 76 % to total GHG emissions in 2020. GHG emissions from this sector decreased by 35 % from 4 319 in 1990 to 2798 million tonnes in 2020. This reduction in GHG emissions over the last 30 years was due to a variety of factors, such as the growing share in the use of renewables, the use of less carbon-intensive fossil fuels and improvements in energy efficiency, as well as to structural changes in the economy. In addition to these long-lasting changes, which account for the main share in the reduction in GHG emissions, the economic recession linked to the Covid-19 pandemic also played an important role in additional reductions in 2020.

Agriculture is the second largest sector and contributed 11 % to total GHG emissions in 2020. Total GHG emissions from this sector decreased by 20 % from 531 million tonnes CO_2 equivalent in 1990 to 423 million tonnes CO_2 equivalent in 2020, reflecting, among other developments, falling trends in cattle population and lower fertiliser and manure use on agricultural soils.

The industrial processes and product use sector is the third largest source of emissions, with a share in total EU-27+UK GHG emissions of 9 % in 2020. Total GHG emissions from this sector decreased by 36 % from 547 million tonnes CO_2 equivalent in 1990 to 348 million tonnes CO_2 equivalent in 2020, mainly due to emission reduction measures in adipic acid production, nitric acid production and production of halocarbons.

More detailed trend descriptions are included in the EU National Inventory Report's individual sector chapters (chapters 3-7) and chapter 9 on indirect CO_2 emissions.

The international bunker emissions of the EU inventory are the sum of the aviation bunker and maritime bunker emissions of the Member States. These emissions are reported as memo items and excluded from national totals. At EU-27+UK level, GHG emissions from international aviation increased by 145 % between 1990 and 2019. Due to the decline in air transport during the Covid-19 pandemic, they dropped by 59 % between 2019 and 2020. Overall, emissions from international aviation were almost at 1990 levels in 2020. GHG emissions from international shipping increased by 32 % during 1990-2019, and dropped by 11 % due to the economic downturn. In 2020, they were 17 % above 1990 levels. In 2020, international aviation accounted for 71 million tonnes CO_2 equivalent (compared to 171 million tonnes in 2019) and international shipping for 131 million tonnes CO_2 equivalent (compared to 148 million tonnes in 2019).

For detailed information on emissions from international bunkers, see Section 3.7 of the EU NIR 2022.

[NC8] 3.2.4 Further details about the GHG inventory and interpretation of results

Sections in the BR5 provide further details about the following points:

- Changes in emissions from key categories by gas (see [BR5] Section 2.3.3);
- Key drivers affecting emission trends (see [BR5] Section 2.3.2);

- Details of Quality Assurance/Quality Control (QA/QC) including the gap filling procedure (see [BR5] Section 2.5).

[NC8] 3.2.5 Changes since the Seventh National Communication

Since the publication of the NC7, various updates and revisions to methodologies have been implemented in the EU GHG inventory, which have impacted on the time-series of emissions. As the 2017 EU GHG inventory was used in the NC7, changes to the GHG inventory used in this Communication are a result of five GHG inventory updates. However, no major methodological or structural updates occurred between 2017 and 2022 since the 2006 guidelines of the Intergovernmental Panel on Climate Change (IPCC) continue to be the methodological reference to be used for GHG inventories under the Convention.

[NC8] 3.3 National Inventory Arrangements/National System

The legal basis for the compilation of the Union greenhouse gas inventory is the Monitoring Mechanism Regulation (MMR)[24] From 2023 onwards, the Governance Regulation (cf. section [NC8] 4.3.2) will provide the legal basis for inventory compilation. In accordance with the MMR Article 6(1), the EU has established a Union Inventory System to ensure the timeliness, transparency, accuracy, consistency, comparability and completeness of reporting by the Union and its Member State national inventories to the UNFCCC Secretariat. Commission delegated regulation (EU) 666/2014 establishes the substantive requirements for the EU national system. This in turn ensures the integrity and coherence of the Union greenhouse gas inventory.

[NC8] 3.3.1 Institutional, legal and procedural arrangements

This section summarises the legal, institutional, and procedural arrangements of the EU for preparing, reporting and checking its GHG inventory.

Legal arrangements

The legal basis for the compilation of the Union greenhouse gas inventory is the MMR. Commission delegated regulation (EU) 666/2014 establishes the substantive requirements for the EU national system. The EU national inventory system as well as the QA/QC programme is described in more detail in Commission Staff Working Document SWD (2013) 308 final[25].

Institutional and procedural arrangements

The Directorate-General (DG) for Climate Action of the European Commission is the overall body responsible for preparing the inventory of the EU. As Annex I Parties to the UNFCCC, each Member State (MS) has commited itself to prepare its national GHG inventory and to submit it to the UNFCCC

[24] Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change, https://eur-lex.europa.eu/eli/reg/2013/525/oj.

[25] Elements of the Union greenhouse gas inventory system and the Quality Assurance and Control (QA/QC) programme, https://ec.europa.eu/clima/system/files/2016-11/swd_2013_308_en.pdf

Secretariat by 15 April each year. These individual MS inventories provide the basic input for the inventory of the EU, which is the sum of MS inventories.

DG Climate Action is supported in the compilation of the EU GHG inventory by the following main institutions:

- European Environment Agency (EEA) and its European Topic Centre on Climate Change Mitigation (ETC/CM);
- Eurostat (also a Directorate-General of the European Commission); and
- Joint Research Centre (JRC, also a Directorate-General of the European Commission).

The roles and responsibilities of various agencies and entities in relation to the Union inventory development process, as well as the institutional, legal and procedural arrangements made to prepare the inventory are shown schematically in Figure 38 below.

DG Climate Action is assisted by the EEA, which is an agency of the EU. The legal basis for the cooperation between the European Commission and the EEA is provided by Article 24 of the MMR. The EEA's main responsibility in the inventory process is to compile the Union inventory and preparation of the Union inventory report. The EEA is assisted in this task by the ETC/CM) which is an international consortium working with the EEA under a framework partnership agreement. The Commission's DGs Eurostat and JRC are also involved in the process of inventory preparation, with their respective roles related to energy statistics for Eurostat and LULUCF and agriculture for JRC.

The Union inventory for the complete time series, including the base year, is established on the basis of the inventories submitted by Member States. Member States are responsible for the quality of activity data, emission factors and other parameters used for their national inventories as well as the correct application of methodologies provided in the IPCC Guidelines. Member States are also responsible for establishing QA/QC programmes for their inventories. The QA/QC activities of each MS are described in the respective national inventory reports and summarised in the Union inventory report.

The total estimates in the Union GHG inventory should accurately reflect the sum of Member States' national GHG inventories. The quality of the Union inventory thus depends on the quality of Member States' inventories. The only case where this is different is with regard to the CO_2 emissions for the Reference Approach based on Eurostat energy data. The Reference Approach is a top-down approach which uses high-level energy supply data to calculate the CO_2 emissions from the combustion of (mainly) fossil fuels.

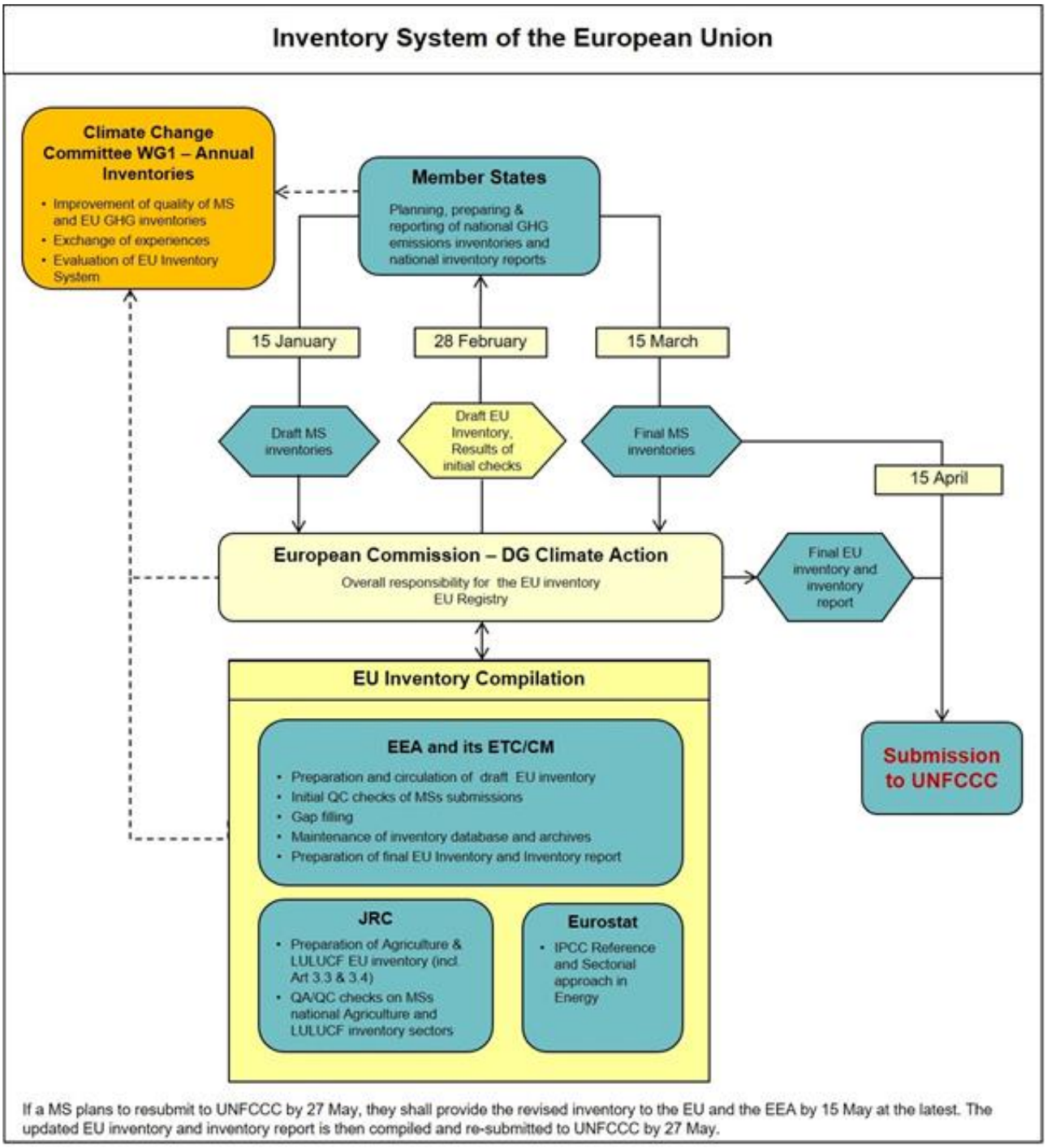
The detailed QA/QC activities of the Union inventory system are described in the EU NIR and summarised in Section 3.3.3 of this report.

The MMR sets out the annual cycle for the preparation of the Union inventory, as shown schematically in Figure 38. By 15 January each year, Member States submit draft national inventories to the European Commission. The EEA, assisted by its ETC/CM, Eurostat and JRC, implements QA/QC procedures of the EU GHG inventory national system and prepares a draft EU inventory by 28 February. Member States submit final inventories (Common Reporting Format - CRF tables and

national inventory reports) to the European Commission by 15 March, which contain the same information as the submission to the UNFCCC Secretariat on 15 April. The EEA, assisted by the ETC/ACM, Eurostat and JRC, and with DG Climate Action then prepare the final EU inventory (CRF tables and EU national inventory report). Both the EU and Member States individually make their official submissions to the UNFCCC Secretariat on 15 April.

The consultation between the DG Climate Action and the Member States takes place in the Climate Change Committee established under Article 26 of the MMR. The Committee is composed of the representatives of the Member States and chaired by the representative of the DG Climate Action. Procedures within the Committee for decision-making, adoption of measures and voting are outlined in the rules of procedure, adopted in November 2003. In order to facilitate decision-making in the Committee, working groups have been established, such as the Working Group 1 on 'Annual GHG inventories' (Figure 38).

Figure 38 Inventory system of the European Union



Source: EU National Inventory Report[26].

[26] Annual European Union greenhouse gas inventory 1990-2020 and inventory report 2022, https://unfccc.int/documents/461931.

[NC8] 3.3.2 The EU inventory methodology and data

Table 2: Geographical coverage of the Union's GHG inventory

Member State	Geographical coverage	EU and MS Party coverage (Kyoto Protocol, 2nd commitment period)	EU territory coverage (UNFCCC)	Party coverage (UNFCCC)
Austria	Austria	√	√	√
Belgium	Belgium consisting of Flemish Region, Walloon Region and Brussels Region	√	√	√
Bulgaria	Bulgaria	√	√	√
Croatia	Croatia	√	√	√
Cyprus	Area under the effective control of the Republic of Cyprus	√	√	√
Czechia	Czech Republic	√	√	√
Denmark	Denmark (excluding Greenland and the Faeroe Islands)	√	√	
Estonia	Estonia	√	√	√
Finland	Finland including Åland Islands	√	√	√
France	Metropolitan France, the overseas departments (Guadeloupe, Martinique, French Guiana, Réunion and Mayotte) and the overseas community Saint-Martin; excluding the overseas communities French Polynesia, Wallis and Futuna, Saint-Pierre and Miquelon, and Saint-Barthélemy; and excluding the overseas territories (the French Southern and Antarctic Lands) and New Caledonia.	√	√	
	Metropolitan France, the overseas departments, the overseas communities and overseas territories and New Caledonia.			√
Germany	Germany	√	√	√
Greece	Greece	√	√	√
Hungary	Hungary	√	√	√
Ireland	Ireland	√	√	√
Italy	Italy	√	√	√
Latvia	Latvia	√	√	√
Lithuania	Lithuania	√	√	√
Luxembourg	Luxembourg	√	√	√
Malta	Malta	√	√	√
Netherlands	The reported emissions are those that derive from the legal territory of the Netherlands. This includes a 12-mile zone out from the coastline and inland water bodies. It excludes the Dutch Caribbean territories Aruba, Curaçao and Sint Maarten, which are constituent countries of the Kingdom of the Netherlands. It also excludes Bonaire, Saba and Sint Eustatius, which since 10 October 2010 have been public bodies (openbare lichamen) which have their own legislation that is not applicable to the European part of the Netherlands.	√	√	√

Member State	Geographical coverage	EU and MS Party coverage (Kyoto Protocol, 2nd commitment period)	EU territory coverage (UNFCCC)	Party coverage (UNFCCC)
	Emissions from offshore oil and gas production on the Dutch part of the continental shelf are included.			
Poland	Poland	√	√	√
Portugal	Mainland Portugal and the two Autonomous regions of Madeira and Azores Islands. Includes also emissions from air traffic and navigation bunkers realised between these areas.	√	√	√
Romania	Romania	√	√	√
Slovakia	Slovakia	√	√	√
Slovenia	Slovenia	√	√	√
Spain	Spanish part of Iberian mainland, Canary Islands, Balearic Islands, Ceuta and Melilla	√	√	√
Sweden	Sweden	√	√	√
United Kingdom	England, Scotland, Wales and Northern Ireland, and Gibraltar, excluding the UK Crown Dependencies (Jersey, Guernsey and the Isle of Man) and the UK Overseas Territories (except Gibraltar).		√	
	England, Scotland, Wales and Northern Ireland, and the UK Overseas Territories and UK Crown Dependencies to whom the UK's ratification of the Kyoto Protocol has been extended and whose emissions are included for the second commitment period (the Cayman Islands, the Falkland Islands, Gibraltar, Jersey, Guernsey and the Isle of Man.	√		
	England, Scotland, Wales and Northern Ireland, and the UK Overseas Territories and UK Crown Dependencies for whom the UK's ratification of the UN Framework Convention on Climate Change is extended (the Cayman Islands, the Falkland Islands, Gibraltar, Bermuda, Jersey, Guernsey and the Isle of Man.			√
EU27+UK	**EU-27+GBE**		√	√

[NC8] 3.3.3 Quality Assurance/Quality Control (QA/QC) procedures

Section 2.5 of the EU BR5 provides a summary of the QA/QC procedures that are applied to the EU GHG inventory 2020. Section 3.4 'Sector-specific quality assurance and quality control' of the EU NIR provides further details.

[NC8] 3.3.4 Accuracy/Uncertainty of the data

This section of the NC8 provides a summary of the uncertainty associated with the EU-27+UK inventory. Full details of the uncertainty analysis are provided in the EU NIR; see Section 1.6 'General uncertainty evaluation'.

The uncertainty analysis was made on the basis of the Tier 1 uncertainty estimates, which were submitted by EU Member States and United Kingdom under Article 7(1)(p) of the MMR. Uncertainties were estimated at detailed level and aggregated to six main sectors 'Energy,' 'Fugitive emissions,' Industrial processes and product use,' 'Agriculture,' 'LULUCF' and 'Waste'.

For the total GHG emissions (excluding LULUCF), the uncertainty estimate in the level was 4.5 %, and the estimate uncertainty in the trend was 1.7 %[27].

[NC8] 3.4 National registry

Directive 2009/29/EC adopted in 2009, provides for the centralization of the EU ETS operations into a single European Union registry operated by the European Commission as well as for the inclusion of the aviation sector. At the same time, and with a view to increasing efficiency in the operations of their respective national registries, the EU Member States who are also Parties to the Kyoto Protocol plus Iceland, Liechtenstein and Norway decided to operate their registries in a consolidated manner in accordance with all relevant decisions applicable to the establishment of Party registries - in particular Decision 13/CMP.1 and Decision 24/CP.8.

The consolidated platform which implements the national registries in a consolidated manner (including the registry of the EU) is called the Union registry and was developed with the new EU registry on the basis of the following modalities:

- Each Party retains its organisation designated as its registry administrator to maintain the national registry of that Party and remains responsible for all the obligations of Parties that are to be fulfilled through registries;

- Each Kyoto unit issued by the Parties in such a consolidated system is issued by one of the constituent Parties and continues to carry the Party of origin identifier in its unique serial number;

- Each Party retains its own set of national accounts as required by paragraph 21 of the Annex to Decision 15/CMP.1. Each account within a national registry keeps a unique account number comprising the identifier of the Party and a unique number within the Party where the account is maintained;

- Kyoto transactions continue to be forwarded to and checked by the UNFCCC Independent Transaction Log (ITL), which remains responsible for verifying the accuracy and validity of those transactions;

- The transaction log and registries continue to reconcile their data with each other in order to ensure data consistency and facilitate the automated checks of the ITL;

- The requirements of paragraphs 44 to 48 of the Annex to Decision 13/CMP.1 concerning making non-confidential information accessible to the public is fulfilled by each Party through a publicly available web page hosted by the Union registry;

[27] The uncertainty analysis was conducted for the geographical coverage under the Kyoto Protocol (cf. Table 2).

• All registries reside on a consolidated IT platform sharing the same infrastructure technologies. The chosen architecture implements modalities to ensure that the consolidated national registries are uniquely identifiable, protected and distinguishable from each other.

The following changes to the national registry have occurred since the last NC report.

Table 3: Changes to the EU national registry since publication of the NC7

Reporting item	Description
15/CMP.1 annex II.E paragraph 32.(a) Change of name or contact	None
15/CMP.1 annex II.E paragraph 32.(b) Change regarding cooperation arrangement	There was a change in the cooperation arrangement during the reported period as the United Kingdom of Great Britain and Northern Ireland no longer operate their registry in a consolidated manner within the Consolidated System of EU registries.
15/CMP.1 annex II.E paragraph 32.(c) Change to database structure or the capacity of national registry	The registry has been updagted to version 13.5.2. No changes were applied to the database. No change was required to the application backup plan or to the disaster recovery plan No change to the capacity of the national registry occurred during the reported period.
15/CMP.1 Annex II.E paragraph 32.(d) Change regarding conformance to technical standards	Each release of the registry is subject to both regression testing and tests related to new functionality. These tests also include thorough testing and were successfully carried out prior to each release of a new version in Production. No other change in the registry's conformance to the technical standards occurred for the reported period.
15/CMP.1 Annex II.E paragraph 32.(e) Change to discrepancies procedures	No change of discrepancies procedures occurred during the reported period.
15/CMP.1 Annex II.E paragraph 32.(f) Change regarding security	The mandatory use of hardware tokens for authentication and signature was introduced for registry administrators. In 2020, the use of soft tokens for authentication and signature was introduced for the registry end users.
15/CMP.1 Annex II.E paragraph 32.(g) Change to list of publicly available information	Publicly available information is provided via the Union registry homepage[28].
15/CMP.1 Annex II.E paragraph 32.(h) Change of Internet address	No change of the registry internet address occurred during the reporting period.
15/CMP.1 Annex II.E paragraph 32.(i) Change regarding data integrity measures	No change of data integrity measures occurred during the reporting period.
15/CMP.1 Annex II.E paragraph 32.(j) Change regarding test results	Both regression testing and tests on the new functionality are carried out prior to release of the new versions in production. The site acceptance tests are carried out by quality assurance consultants on behalf of and assisted by the European Commission.

[28] Union Registry, https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/union-registry_en.

[NC8] 4 POLICIES AND MEASURES

[NC8] 4.1 Introduction and key developments

In order to mitigate global climate change, there is an urgent need to reduce the emissions of greenhouse gases and to enhance the removals of greenhouse gases by sinks. The European Union and its Member States have implemented mitigation policies and measures for many years, which has already contributed successfully to the reduction of greenhouse gas emissions in recent years. These include the European Union Emissions Trading System (EU ETS) and a wide range of policies and measures addressing all sectors of the economy.

As highlighted by the latest Intergovernmental Panel on Climate Change (IPCC), the evidence shows more immediate action is urgently needed. The EU is enhancing and extending its climate change policies and measures – to ensure that the EU and its Member States will achieve their updated NDC target of an economy-wide net domestic emission reduction of at least 55 % by 2030 compared to 1990. The focus of this chapter lies on the overall EU policymaking context and on key policies and measures which are currently in place. More details on individual policies and measures can be found in chapter [BR5] 4 of the EU's Fifth Biennial Report, which is submitted together with this report.

The cornerstones of the EU climate change mitigation policies are the following:

- The EU ETS was one of the main instruments that helped reduce GHG emissions in the period from 2013 to 2020. For the period up to 2030, the annual reduction of the emissions cap was strengthened and the market stability reserve (the mechanism to reduce the surplus of emission allowances in the carbon market) was reinforced. The EU ETS is currently under revision to ensure that it will contribute substantially to the EU's new 2030 target.

- The Effort Sharing Decision provided emission target paths for EU Member States which they had to follow in the period 2013-2020. Most EU Member States overachieved their targets, while some made use of flexibilities provided by the system to achieve their targets. For the period up to 2030, the Effort Sharing Regulation provides new target paths with more ambitious emission reductions. This Regulation is also under revision to ensure that it will be in line with the EU's new 2030 target.

Other cross-sectorial policies are the following:

- The Methane Strategy sets out measures to cut methane emissions, including in Europe. It presents legislative and non-legislative actions in the energy, agriculture and waste sectors, which account for around 95% of methane emissions associated with human activity worldwide.

- Policies for sustainable carbon cycles are being implemented, setting out how to increase removals of carbon from the atmosphere. Short- to medium-term actions are set out to support carbon farming and upscale green business model to better reward land managers for carbon sequestration and biodiversity protection. By 2030, carbon farming initiatives should contribute 42Mt of CO2 storage to Europe's natural carbon sinks. New industrial value chains

for sustainable capture, use, transport and storage of carbon are also promoted, including through the creation of a market for capture, use and storage of CO2. A robust certification system to reward carbon removals has been announced for 2022.

In the various sectors, the following key developments took place in recent years:

Energy:

- The amended Energy Efficiency Directive is the main legal provision addressing energy efficiency in the EU. The amendment introduced a new headline EU energy efficiency target for 2030 of at least 32.5% (relative to the 2007 consumption projections). The Directive is under revision and, among other things, a higher target for reducing primary and final (energy consumption has been introduced for 2030.

- The EU Energy Performance of Buildings Directive is the main legal provision addressing energy efficiency increases in buildings. A major goal of the amended directive is to accelerate the renovation of the existing building stock through strengthened long-term renovation strategies and the mobilisation of related investments. The European Commission proposed a revision of this Directive which aims at contributing to meeting the target of at least -60 % emission reductions by 2030 in the building sector in comparison to 2015 and sets out how Europe can achieve a zero-emission and fully decarbonised building stock by 2050.

- The recast Renewable Energy Directive is the main legal provision addressing the use of renewable energies in the EU. It includes a binding renewable energy target for the EU for 2030 of at least 32 % for the overall share of energy from renewable sources in the EU's gross final consumption of energy in 2030. To meet the higher climate ambition, the European Commission proposed a revision of the Renewable Energy Directive, which seeks to increase the current target to at least 40 % renewable energy sources in the EU’s overall energy mix by 2030.

- The EU Methane Strategy adopted in 2020 outlines a comprehensive policy framework addressing methane emissions in the energy, agriculture and waste sectors. The EU also promotes the mitigation of methane emissions internationally, e.g. under the Global Methane Pledge. To reduce methane emissions in the energy sector, a proposal provides for improved measurement, reporting and verification of energy sector methane emissions and for immediate reduction of emissions through mandatory leak detection and repair and a ban on venting and flaring.

Transport:

- Regarding passenger cars, the most important legal provision is the regulation which sets CO2 emission performance standards for cars and vans. This regulation sets EU fleet-wide CO2 emission targets that apply from 2020, 2025 and 2030 and includes a mechanism to incentivise the uptake of zero- and low-emission vehicles. This regulation is currently under revision with a view to a 100 % CO2 reduction for new cars and vans from 2035 onwards.

- As for freight transport, the regulation setting CO2 emission performance standards for heavy duty vehicles is the most significant legislation. This regulation sets CO2 reduction targets of 15 % in 2025 and 30 % in 2030 compared to the EU average in the reference period (July 2019 to June 2020).

- The Renewable Energy Directive is also relevant for transport. The current Directive aims to accelerate the uptake of renewable energy in the transport sector with the aim of achieving a 14 % share of renewable energy in transport by 2030. A proposal of the European Commission introduced a target for reducing the greenhouse gas intensity of transport fuels by 13 % by 2030. Moreover, the proposal includes additional sub-targets for advanced biofuels and for renewable fuels from non-biological origin.

Industry:

- The Industrial Emissions Directive is the main EU instrument for preventing and reducing pollution from over 30 000 large industrial plants and over 20 000 intensive livestock farms in Europe. The IED is also relevant for greenhouse gas emissions abatement as it regulates industrial emissions to the extent that they are not covered by the EU ETS, methane emissions from livestock installations, and indirect greenhouse gases and short-lived climate forcers. In April 2022, a revised Directive was proposed with several main elements related to decarbonisation: Inclusion of energy efficiency requirements as integral part of permits; inclusion of the largest livestock farms representing 43% of the EU's livestock methane emissions; and more transparent reporting of fluorinated gas emissions. The REPowerEU Plan presented by the European Commission in 2022 in response to the global energy market disruption caused by the Russian Federation's invasion of Ukraine proposes measures to bring down emissions and energy costs for consumers and industry including by accelerating the roll out of renewable energy projects.

    - The main legal provision for reducing fluorinated gas (F-gas) emissions in the EU is the F-gas Regulation. This regulation limits the total amount of the most important F-gases that can be sold in the EU from 2015 onwards and phases them down in steps to one-fifth of the baseline in 2030. In April 2022, a proposal was made to update the F-gas Regulation with a view to reducing the amount of hydrofluorocarbons placed on the market by 98 % by 2050 (compared to 2015).

Agriculture:

- Under the previous CAP period which ended in 2020, the EU already promoted several climate relevant actions. However, an evaluation in 2021 showed that the mitigation effects are very difficult to quantify due to limited data availability and the complexity of the implementation architecture.

- The new CAP period will start in 2023 and will increase the emphasis on climate action. 40 % of the total budget will be dedicated to climate-related measures, including improved rules and monitoring requirements.

- In the context of the Green Deal, the EU has put in place several strategies and plans to reduce emissions in the agriculture sector with concrete targets to reduce nutrient losses and fertilizer application and to increase the area of organic farming.

- The Methane Strategy includes measures to improve reporting of emissions from agriculture through better data collection, and to promote opportunities to reduce emissions with support from the Common Agricultural Policy. The main focus is put on best practice sharing for innovative methane-reducing technologies, animal diets, and breeding management.

LULUCF:

- The LULUCF sector has become increasingly important in the context of the EU climate targets and the Green Deal. In recent years, the EU prepared for a robust monitoring and accounting framework of the LULUCF sector which is applied from 2021 onwards. The current legislative proposal foresees an EU-wide mitigation target of -310 million tonnes of carbon dioxide equivalent (Mt CO_2eq) in 2030, the implementation of national LULUCF targets for Member States for 2030 and a better integration better integration of mitigation, adaptation and nature restoration measures in land monitoring systems.

- In addition, the EU has launched several initiatives and strategies to increase carbon removals on the one hand and to improve land management on the other hand in the decades ahead, e.g., through carbon farming practices and new forestry, soil and biodiversity strategies.

Waste:

- The waste policy framework of the EU has been continuously extended and elaborated to address different waste streams. The EU aims to further strengthen the circular economy to reduce material use rate and to significantly reduce waste generation in the EU. To achieve these objectives, new strategies targeting plastic waste and textiles have been published recently; existing waste legislation was or is going to be amended; and, in the context of the Waste Framework Directive, separate waste collection will be enforced (e.g. for biowaste, textiles, hazardous waste and plastic bottles).

- The Methane Strategy includes action to improve the management of landfill gas, harnessing its potential for energy use while reducing emissions, and aims to minimize the disposal of biodegradable waste in landfills to avoid methane formation.

This chapter on policies and measures is structured as follows:

- Section [NC8] 4.2 provides an overview of the policymaking process in the EU.

- In Section [NC8] 4.3, the overall climate change policy context is presented.

- Section [NC8] 4.4 lists the policies and measures at the EU level. More detailed information on each policy and measure and on its effect can be found in the EU's Fifth Biennial Report and in is annexes, which are submitted together with this National Communication.

- Section [NC8] 4.5 provides additional information related to policies and measures, including information which is required under the Kyoto Protocol.

[NC8] 4.2 EU policymaking process

EU policies and laws are carefully designed to bring benefits to citizens, businesses and other stakeholders. So-called 'better regulation tools' ensure that policy is based on evidence and the best available practice[29]. One of the responsibilities of the European Commission is to propose new policies. Before proposing a new policy or law, it describes the initiative in a roadmap, examines the potential economic, social and environmental consequences in an impact assessment and requests input from the public and from stakeholders, for example via public consultations. Citizens can suggest new EU policies or laws through the European Citizens' Initiative[30].

As a critical component of the EU policymaking process, impact assessments are carried out on all initiatives expected to have significant economic, social or environmental impacts[31]. The findings of the impact assessment process are summarised in an impact assessment report which lays out the environmental, social and economic impacts, the stakeholders that will be affected by the initiative and the ways that they are affected. The impact assessment report also provides information on the consultation strategy and the results obtained from it.

Impact assessment reports are published with the proposals or with acts adopted by the European Commission. They are also sent to the EU lawmakers, the Parliament and Council, to consider as they decide on whether to adopt the proposed law. All proposals for new laws pass through a number of stages. Most EU laws are adopted by what is known as the ordinary legislative procedure, which involves the European Parliament and Council as co-legislators.

Current polices and laws are regularly evaluated so as to improve them, so that they achieve their objectives in the most efficient and effective way possible.

[NC8] 4.3 The overall climate change policy context in the EU

The European Union and its Member States have a comprehensive system in place which helps them fulfil their climate change mitigation commitments under the Convention, under the Kyoto Protocol and under the Paris Agreement. In addition, since 2020, the European Green Deal, a comprehensive and holistic plan to become the first carbon neutral continent by 2050 has been adopted. It acts as a catalyst for more ambitious targets.

[29] Decision-making process, https://ec.europa.eu/info/strategy/decision-making-process/how- decisions-are-made_en.
[30] European Citizens' Initiative, https://europa.eu/citizens-initiative/_en.
[31] Impact assessments, https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/impact-assessments_en.

[NC8] 4.3.1 The 2020 Climate and Energy Package

The 2020 Climate and Energy Package provided the framework for the EU and its Member States to fulfil its greenhouse gas emission reduction commitments by 2020 under the Convention and under the Kyoto Protocol[32]. It set three key targets for 2020:

- to reduce greenhouse gas emission by at least 20 % compared to 1990;
- to achieve 20 % of gross final energy consumption from renewable sources and
- to improve energy efficiency by 20 %, expressed in a reduction of primary energy consumption compared to a baseline.

In order to achieve these targets, the 2020 Climate and Energy Package included a revision of the **EU ETS** for the period 2013 to 2020[33], the **Effort Sharing Decision**[34], which set national emission reduction targets for the sectors not included in the EU ETS[35], a Renewable Energy Directive setting binding national targets for increasing the share of renewable energy sources in the energy mix[36] and an Energy Efficiency Directive requiring each EU Member State to implement and monitor its own national energy efficiency targets[37].

Detailed information on the EU ETS, effort sharing, renewable energy and energy efficiency can be found in section [BR5] 4 of the EU's Fifth Biennial Report, which is submitted together with this National Communication.

The EU and its Member States have successfully implemented the 2020 Climate and Energy Package. Total greenhouse gas emissions in the period 2013 to 2020, as shown in section [NC8] 3.2.1, were below the target paths as defined under the package, and the 20 % reduction target was overachieved. Chapter [BR5] 3 of the EU's Fifth Biennial Report provides more details on the EU's emission reduction commitment for 2020 under the Convention, and section [BR5] 4.6 discusses its achievement.

The integrated nature of the 2020 Climate and Energy Package, which helps mitigate greenhouse gas emissions across all sectors, and the practice of impact assessments, ensures that no policies are put in place that would encourage activities that lead to increases in GHG emissions. Hence, the EU does not have any policies in place that lead to greater levels of GHG emissions than would otherwise occur.

[32] 2020 Climate & Energy Package, https://ec.europa.eu/clima/eu-action/climate-strategies-targets/2020-climate-energy-package_en.
[33] Consolidated text: Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, https://eur-lex.europa.eu/eli/dir/2003/87/2021-01-01.
[34] Decision No 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, http://data.europa.eu/eli/dec/2009/406/oj.
[35] Decision No 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, http://data.europa.eu/eli/dec/2009/406/oj.
[36] Renewable Energy Directive, https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-directive_en.
[37] Directive (EU) 2018/2002 amending Directive 2012/27/EU on energy efficiency. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0210.01.ENG.

[NC8] 4.3.2 The 2030 Climate and Energy Framework

The European Union's 2030 Climate and Energy Framework was put in place to ensure that the EU and its Member States achieve their climate change mitigation commitments under the Paris Agreement, as communicated in the EU's NDC. The main elements of the 2030 Climate and Energy Framework are the EU ETS, the Effort Sharing Regulation and the LULUCF Regulation. Details on this legislation can be found in sections [BR5] 4.2.1, [BR] 4.2.2 and [BR 4.3.5.2], respectively.

The 2030 Climate and Energy Framework was first established in line with the EU's original NDC of 2015, which stipulated a 40 % reduction of GHG emissions by 2030 compared to 1990[38]. In 2020, the EU and its Member States updated their NDC and committed to a net GHG emission reduction of at least 55 % by 2030 compared to 1990[39].While the policies and measures currently in place were developed in line with the target of the first NDC of the EU, they are now in the process of a revision to make them fit for the -55 % target communicated in the updated NDC. A comprehensive set of proposals was presented by the European Commission in July 2021[40]. The key elements of these proposals are:

- more rapid emission reductions in the period up to 2030 under the EU ETS;
- a strengthening of the emission reductions to be achieved by EU Member States by 2030 under the Effort Sharing Regulation;
- strengthened renewable energy and energy efficiency targets;
- various updates to existing legislation, such as stricter CO_2 emission standards for cars and
- new proposals, including a carbon border adjustment mechanism and a social climate fund.

Based on these proposals, major new legislation is in the process of being finalised by the European Parliament and the Council. In this Eight National Communication, policies and measures are listed which are currently in place. In chapter [BR] 4 of the annexed Fifth Biennial Report, both the current policies and the proposed new legislation are described.

These polices and measures show various interactions. As an example, transport policies such as CO_2 emission standards contribute to the reduction of greenhouse gas emissions in the transport sector and hence help Member States achieve their overall emission reduction targets under the Effort Sharing Regulation. As another example, the EU ETS provides an incentive to switch from fossil fuels to

[38] Intended Nationally Determined Contribution of the EU and its Member States, https://unfccc.int/sites/default/files/LV-03-06-EU%20INDC.pdf
[39] The update of the nationally determined contribution of the European Union and its Member States, https://unfccc.int/sites/default/files/NDC/2022-06/EU_NDC_Submission_December%202020.pdf
[40] Delivering the European Green Deal, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en.

renewable electricity generation. Hence, it contributes to the achievement of the renewable energy target.

The monitoring and evaluation of progress constitutes an important aspect of the 2030 climate and energy framework. With the Regulation on the Governance of the Energy Union and Climate Action ('Governance Regulation')[41], the EU has adopted integrated rules to ensure planning, monitoring and reporting of progress towards its 2030 climate and energy targets and its international commitments under the Paris Agreement. The Governance Regulation requires EU Member States to communicate and implement Integrated National Energy and Climate Plans and to regularly report on their progress in implementing them. The Governance Regulation also lays out the detailed reporting obligations on GHG emissions, policies and measures, projections, adaptation and support provided to developing countries.

[NC8] 4.3.3 The EU's long-term strategy and the climate law

In addition to the 2030 target, the EU and its Member States committed to the objective of a climate-neutral EU by 2050. This objective was agreed by the European Council in December 2019 and communicated as the EU's long-term low greenhouse gas emission development strategy under the Paris Agreement in March 2020[42]. With the submission of its long-term strategy, the EU became the first large economy that committed to climate neutrality. Besides the EU as a whole, several Member States communicated their own long-term strategies under the Paris Agreement[43].

The binding objective of climate neutrality by 2050 is enshrined in the European Climate Law[44], which entered into force in July 2021. The European Climate Law also contains the 2030 climate target of reducing domestic emissions by at least 55 % compared to 1990. It constitutes a net target, i.e. removals of CO_2 from the atmosphere are taken into account. However, the total amount of removals which can be counted towards the achievement of the target is limited to a maximum of 225 Mt CO_2eq.

The European Climate Law also lays out the process for developing the 2040 climate target, which will take into account an indicative greenhouse gas budget for the period 2030 to 2050. Finally, the European Climate Law establishes a European Scientific Advisory Board on Climate Change, requires the adoption of adaptation strategies and lays out the rules for assessing the progress towards the climate targets.

[NC8] 4.3.4 The Environment Action Programmes

The overall environmental policy of the European Union is guided by Environment Action Programmes. The 7th Environment Action Programme addressed the period up to 2020. It identified

[41] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, http://data.europa.eu/eli/reg/2018/1999/oj.
[42] Long-term low greenhouse gas emission development strategy of the European Union and its Member States, https://unfccc.int/sites/default/files/resource/HR-03-06-2020%20EU%20Submission%20on%20Long%20term%20strategy.pdf.
[43] Communication of long-term strategies, https://unfccc.int/process/the-paris-agreement/long-term-strategies.
[44] Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), http://data.europa.eu/eli/reg/2021/1119/oj.

the key objectives to protect, conserve and enhance the EU's natural capital, to turn the EU into a resource-efficient, green and competitive low-carbon economy and to safeguard the Union's citizens from environment-related pressures[45].

An evaluation of the action programme in 2019 found that it has been an important governance tool and has facilitated a shift in policymaking by recognising that climate and environmental protection is a driver for green growth, a healthy planet and improved wellbeing for individuals[46].

The 8th Environment Action Programme, which entered into force in May 2022, constitutes the EU's legally agreed common agenda for environment policy up to 2030. It contains six priority objectives, several of which are directly related to climate action[47]:

- to achieve the 2030 GHG emission reduction target and climate neutrality by 2050;
- to enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change;
- to advance towards a regenerative growth model, decoupling economic growth from resource use and environmental degradation, and accelerating the transition to a circular economy;
- to pursue a zero-pollution ambition, including for air, water and soil and protecting the health and well-being of citizens;
- to protect, preserve and restore biodiversity, and enhance natural capital; and
- to reduce environmental and climate pressures related to production and consumption.

The European Commission, supported by the European Environment Agency and the European Chemicals Agency, monitors, assesses and reports annually on progress on these priority objectives. A mid-term evaluation will be completed by 2024, and a full evaluation by 2029.

[NC8] 4.4 Information on EU-level policies and measures

In this section, an overview of the European Union's climate change mitigation policies and measures is provided. More detailed information can be found in the EU's Fifth Biennial Report and in the annexed tables (CTF), which are submitted together with this National Communication. In particular, the Fifth Biennial Report and its annex include information on the sector or sectors affected, the greenhouse gases affected, objectives/activities, whether the policy or measure makes use of economic, fiscal, regulatory or other instruments, the start year and status of implementation, responsibilities and – as far as available – information on the mitigation impact, costs, non-GHG mitigation benefits and interactions with other policies and measures.

[45] Environment Action Programme to 2020, https://ec.europa.eu/environment/action-programme/.
[46] Environment Action Programme to 2020 – Evaluation, https://ec.europa.eu/environment/action-programme/evaluation.htm.
[47] Environmental Action Programme to 2030, https://environment.ec.europa.eu/strategy/environment-action-programme-2030_en.

[NC8] 4.4.1 Overview of cross-sectoral and sectoral policies and measures

In the following tables, the EU's main policies and measures are presented. Table 4 lists cross-sectoral policies and measures, followed by separate tables for policies and measures in each relevant sector of the economy.

Table 4: Main cross-sectoral policies and measures

Policy/measures	Section of the Fifth Biennial Report
EU Emissions Trading System	[BR5] 4.2.1
Effort Sharing Regulation	[BR5] 4.2.2
Methane Strategy	[BR5] 4.2.3.1
CCS Directive	[BR5] 4.2.3.2
Sustainable carbon cycles	[BR5] 4.2.3.2
Taxonomy Regulation	[BR5] 4.2.3.4
Other cross-cutting policies and measures: Funds	[BR5] 4.2.4

Source: The Fifth Biennial Report of the European Union (annexed to this report).
Note: The policies and measures listed in this table are currently in the implementation phase. Information on polices and measures for the period up to 2020, on proposals for updates and on strategies can be found in chapter [BR 4.2].

Table 5: Main policies and measures in the energy sector

Policy/measures	Section of the Fifth Biennial Report
Energy Efficiency Directive	[BR5] 4.3.1.2
Energy Performance of Buildings Directive	[BR5] 4.3.1.2
Energy Labelling Framework Directive	[BR5] 4.3.1.2
Renewable Energy Directive	[BR5] 4.3.1.3
Energy Taxation Directive	[BR5] 4.3.1.4

Source: The Fifth Biennial Report of the European Union (annexed to this report).
Note: The policies and measures listed in this table are currently in the implementation phase. Information on polices and measures for the period up to 2020, on proposals for updates and on strategies can be found in chapter [BR 4.3.1].

Table 6: Main policies and measures in the transport sector

Policy/measures	Section of the Fifth Biennial Report
Regulation on CO_2 emission performance standards for passenger cars and vans	[BR5] 4.3.2.3
Regulation on CO_2 emission performance standards for heavy-duty vehicles	[BR5] 4.3.2.3
Directive on the promotion of clean and energy-efficient road transport vehicles	[BR5] 4.3.2.3
Fuel Quality Directive	[BR5] 4.3.2.4
Directive on the deployment of alternative fuels infrastructure	[BR5] 4.3.2.5
Eurovignette Directive	[BR5] 4.3.2.5

Source: The Fifth Biennial Report of the European Union (annexed to this report).
Note: The policies and measures listed in this table are currently in the implementation phase. Information on polices and measures for the period up to 2020, on proposals for updates and on strategies can be found in chapter [BR 4.3.2].

Table 7: Main policies and measures in the industry/industrial processes and product use sector

Policy/measures	Section of the Fifth Biennial Report
Industrial Emissions Directive	[BR5] 4.3.3.1
Mobile Air Conditioning Directive	[BR5] 4.3.3.2
F-gas regulation	[BR5] 4.3.3.2

Source: The Fifth Biennial Report of the European Union (annexed to this report).
Note: The policies and measures listed in this table are currently in the implementation phase. Information on polices and measures for the period up to 2020, on proposals for updates and on strategies can be found in chapter [BR 4.3.3].

Table 8: Main policies and measures in the agriculture sector

Policy/measures	Section of the Fifth Biennial Report
Regulations for the Common Agricultural Policy (CAP)	[BR5] 4.3.4.1
Nitrates Directive	[BR5] 4.3.4.2

Source: The Fifth Biennial Report of the European Union (annexed to this report).
Note: The policies and measures listed in this table are currently in the implementation phase. Information on polices and measures for the period up to 2020, on proposals for updates and on strategies can be found in chapter [BR 4.3.4].

Table 9: Main policies and measures in the LULUCF sector

Policy/measures	Section of the Fifth Biennial Report
LULUCF Regulation	[BR5] 4.3.5.2

Source: The Fifth Biennial Report of the European Union (annexed to this report).
Note: The policies and measures listed in this table are currently in the implementation phase. Information on polices and measures for the period up to 2020, on proposals for updates and on strategies can be found in chapter [BR 4.3.5].

Table 10: Main policies and measures in the waste sector

Policy/measures	Section of the Fifth Biennial Report
Waste Framework Directive	[BR5] 4.3.6.2
Urban Waste Water Directive	[BR5] 4.3.6.4
Directive on Packaging and Packaging Waste	[BR5] 4.3.6.5
Landfill Directive	[BR5] 4.3.6.5
Directive on the reduction of the impact of certain plastic products on the environment	[BR5] 4.3.6.5
Directive on End-of-Life Vehicles	[BR5] 4.3.6.5

Source: The Fifth Biennial Report of the European Union (annexed to this report).
Note: The policies and measures listed in this table are currently in the implementation phase. Information on polices and measures for the period up to 2020, on proposals for updates and on strategies can be found in chapter [BR 4.3.6].

More detailed information on each policy and measure can be found in chapter [BR] 4 of the EU's Fifth Biennial Report and in the annexed tables ('Common Tabular Format' – CTF), which are submitted together with this National Communication.

[NC8] 4.4.2 Policies and measures no longer in place

The European Union's climate change mitigation policies and measures are revised and updated regularly, which is imperative in light of the urgent need to step up climate action in all sectors of the economy. Typically, the scope and ambition of current policies and measures is enhanced, and new policies and measures are adopted. There are no climate change mitigation policies or measures which have been abandoned, hence there are no 'policies and measures no longer in place'.

[NC8] 4.4.3 Effects of policies and measures on the modification of longer-term trends

The policies and measures introduced in this chapter contribute to the reduction of greenhouse gas emissions and to the removals of greenhouse gases by sinks. While some measures mainly show effects in the short term, others are effective in the medium to long term.

As an example, vehicle emission standards help reduce greenhouse gas emissions from new vehicles. As they only affect new vehicles entering the market, they become more effective over time, once

more and more old vehicles are replaced by those adhering to the new standard. Similarly, research programmes can contribute to long-term rather than short-term climate change mitigation.

The European Union observed decreasing trends in GHG emissions over the past decade. Table 1 in section [NC8] 3.2.1 shows emission reductions despite a growing economy. This trend can be attributed to policies such as the EU ETS and the Effort Sharing Decision. Both set mandatory and decreasing emission limits over time, and they can be considered the key drivers behind the emission reductions in the EU in recent years.

Both the ETS and the effort sharing system have been extended until 2030, with more stringent emission limits. Hence, they will contribute to further emission reductions and to a continuing downward trend of greenhouse gas emissions. The results of GHG emission projections also suggest that greenhouse gas emissions in the EU will continue to decrease in the years ahead (cf. Figure 39 in section [NC8] 5.1).

EU policies and measures will continue to contribute to downward emission trends, also given that the EU Climate Law was recently adopted (cf. section [NC8] 4.3.2). With the climate law, a system was put in place that requires corrective action in case the observed trends of GHG emission do not follow the path needed to achieve the EU's climate neutrality objective.

[NC8] 4.5 Other information on policies and measures

In this section, additional information related to policies and measures is provided:

- Information on the assessment of the economic and social consequences of policies and measures (pursuant to paragraph 13 of the UNFCCC reporting guidelines on national communications[48]).
- Information on how the use of mechanisms under the Kyoto Protocol is supplemental to domestic action (pursuant to paragraph 33 of the Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol[49] – the 'Kyoto Protocol Article 7 Guidelines').
- Information on policies and measures promoting sustainable development, policies and measures in the areas of international aviation and marine transport, and information on the minimisation of adverse effects (pursuant to paragraphs 34 to 36 of the 'Kyoto Protocol Article 7 Guidelines').
- Information on legislative arrangements (pursuant to paragraphs 37 and 38 of the 'Kyoto Protocol Article 7 Guidelines').

[48] Decision 6/CP.25, Annex, https://unfccc.int/documents/210471.
[49] Decision 15/CMP.1, Annex, https://unfccc.int/documents/4253.

[NC8] 4.5.1 Assessment of the economic and social consequences of response measures

The planning of climate change mitigation policies and measures (also known as response measures) cannot be viewed in isolation, because each policy and measure can have positive and negative social and economic consequences. The key instrument in the EU policymaking process used to assess such consequences is the impact assessment.

Information on impact assessments can be found in sections [NC8] 2.2 and [NC8] 4.2. In addition, section [BR] 4.5 of the attached Fifth Biennial Report provides more information on how the economic and social consequences (both in the EU and in developing countries) of policies and measures are assessed.

[NC8] 4.5.2 Supplementarity relating to Kyoto Protocol mechanisms

The Kyoto Protocol provided for three mechanisms which supported its Parties in the achievement of their emission limitation and reduction targets: The emissions trading between developed countries; the Clean Development Mechanism, which allowed accounting for emission reduction projects in developing countries; and Joint Implementation, which made use of emission reductions or the enhancement of greenhouse gas removals by sinks in other developed countries. However, it was important under the Kyoto Protocol that these mechanisms do not discourage domestic action, i.e. that these mechanisms are supplemental to domestic action, rather than being the main element used to meet the targets under the Kyoto Protocol.

For the European Union, the Kyoto Protocol mechanisms constituted a supplemental element only, and domestic action constituted the key element. This can be seen in the greenhouse gas inventory data presented in chapter [NC8] 3.2.1 and in the Fifth Biennial Report and its annex. For the first commitment period (2008-2012), average annual GHG emissions amounted to approximately 4.7 Gt CO_2eq, which is approximately 16 % below the 1990 level. For the second commitment period, it should be noted that a trajectory was defined and the accounting for this period has not yet been completed. However, as emissions continued to decrease overall in the period 2013 to 2020, it can be stated that the EU saw substantial decreases in domestic GHG emissions in both commitment periods, and the targets both for the first and for the second commitment period have been largely achieved through domestic emission reductions.

As explained in chapter [BR5] 4 of the Fifth Biennial Report, these emission reductions can be attributed to various key EU policies such as the EU ETS and the effort sharing decision. Hence it can be concluded that domestic action was the key driver for meeting the Kyoto protocol targets of the EU, and the Kyoto Protocol mechanisms played a supplemental role only.

[NC8] 4.5.3 Policies and measures in accordance with Article 2 of the Kyoto Protocol

Article 2 of the Kyoto Protocol[50] addresses policies and measures, and the Kyoto Protocol Article 7 Guidelines request the reporting of policies and measures which are implemented in order to promote

[50] Kyoto Protocol, http://unfccc.int/resource/docs/convkp/kpeng.pdf.

sustainable development. Of the policies and measures listed in section [NC8] 4.4, above, many promote sustainable development in the EU and in other countries.

As an example, under the Renewable Energy Directive (cf. chapter [BR] 4.3.1.3), biofuels need to fulfil a set of sustainability criteria including minimum emission reduction, biodiversity aspects, and requirements for various land types. The EU also supports developing countries in the transition to low-carbon sustainable development, e.g. by funding renewable energy and other projects under the Neighbourhood, Development and International Cooperation Instrument[51].

In addition, the Kyoto Protocol Article 7 Guidelines require the provision on information on steps taken to promote and/or implement decisions by the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO) in order to limit or reduce GHG emissions from bunker fuels, i.e., from fuels used in international aviation and maritime transport.

As an instrument to limit GHG emissions from international aviation, ICAO adopted in 2016 the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), with the aim to avoid or offset CO_2 emission growth from international aviation from 2020 onwards. The first voluntary phase of this scheme started in 2021, and all EU Member States are implementing CORSIA in this first phase[52].

For international maritime transport, the IMO established a data collection system which started in 2019 and requires large ships to report fuel consumption data[53]. Large ships calling into EU ports report on their fuel consumption both under the IMO system and under the EU-internal Monitoring, Reporting and Verification Regulation[54]. While there is currently no carbon market instrument in place for international shipping under the IMO, the EU is planning to include GHG emissions from international shipping in the EU ETS from 2023 onwards[55].

Finally, the Kyoto Protocol Article 7 Guidelines request information on how policies and measures are implemented in such a way as to minimise adverse effects, including:

- the adverse effects of climate change;
- effects on international trade; and
- social, environmental and economic impacts on other Parties, especially developing country Parties.

All policies and measures listed in this chapter aim at reducing greenhouse gas emissions and/or increasing the capacity of sinks and thereby contribute to minimising the adverse effects of climate change. As far as international trade is concerned, the EU aims at contributing to the economic

[51] International cooperation – climate action, https://ec.europa.eu/international-partnerships/sdg/climate-action_en.
[52] CORSIA states for Chapter 3 state pairs, https://www.icao.int/environmental-protection/CORSIA/Documents/CORSIA_States_for_Chapter3_State_Pairs_Jul2020.pdf.
[53] Data collection system for fuel oil consumption of ships, https://www.imo.org/en/OurWork/Environment/Pages/Data-Collection-System.aspx.
[54] Regulation (EU) 2015/757 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015R0757.
[55] Reducing emissions from the shipping sector, https://ec.europa.eu/clima/eu-action/transport-emissions/reducing-emissions-shipping-sector_en.

recovery after the COVID-19 pandemic through support for the green and digital transformations, as well as a renewed focus on strengthening multilateralism and reforming global trade rules to ensure that they are fair and sustainable. This approach is laid out in the European Commission's 2021 trade strategy[56].

Social, environmental and economic impacts of policies and measures on other countries are assessed in the course of the impact assessment (see also section [BR] 4.5 of the Fifth Biennial Report). In addition, the EU and its Member States have committed to Policy Coherence for Development (PCD). Through PCD, they seek to take account of development objectives in policies that are likely to have an impact in developing countries[57]. A specific process is available in the Better Regulation Toolbox for analysing the potential impact of EU policy initiatives on developing countries[58].

[NC8] 4.5.4 Legislative Arrangements and Enforcement/Administrative Procedures Relevant to Kyoto Protocol Implementation

This section provides specific information on domestic and regional legislative arrangements and enforcement/administrative procedures relating to the implementation of the Kyoto Protocol, as required under the Kyoto Protocol Article 7 Guidelines.

For the second commitment period of the Kyoto Protocol (2013-2020), the Effort Sharing Decision (cf. section [BR 4.2.2]) established emission reduction targets for the non-ETS sector for each Member State individually for each year and includes an annual compliance mechanism. The institutional arrangements to coordinate activities relating to participation in the Kyoto Protocol mechanisms are laid out in the Effort Sharing Decision, the ETS Directive[59] and the Monitoring Mechanism Regulation[60]. These legal acts are publicly accessible, and the progress towards the 2020 targets has been published annually in the 'Trends and Projections in Europe' reports[61].

Finally, the Kyoto Protocol Article 7 Guidelines require information related to the conservation of biodiversity and sustainable use of natural resources. The EU has specific arrangements in place to help ensure that the implementation of policies and measures also contribute to the conservation of biodiversity and sustainable use of natural resources. As an example, under the Renewable Energy Directive (cf. chapter [BR] 4.3.1.3), biofuels need to fulfil a set of sustainability criteria including minimum emission reduction, biodiversity aspects, and requirements for various land types. Several related initiatives were recently adopted by the European Commission: A new EU forestry strategy, a biodiversity strategy, a communication in sustainable carbon cycles, a carbon farming initiative and an EU soil strategy (cf. chapter [BR5] 4.3.3.4).

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[56] Trade Policy Review - An Open, Sustainable and Assertive Trade Policy, COM(2021) 66 final, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52021DC0066.
[57] Policy coherence for development, https://ec.europa.eu/international-partnerships/policy-coherence-development_en.
[58] Better regulation toolbox, Tool 35, https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox_en.
[59] Consolidated text: Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, https://eur-lex.europa.eu/eli/dir/2003/87/2021-01-01.
[60] Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change, https://eur-lex.europa.eu/eli/reg/2013/525/oj.
[61] Trends and projections in Europe, https://www.eea.europa.eu/themes/climate/trends-and-projections-in-europe.

[NC8] 5 PROJECTIONS AND TOTAL EFFECT OF POLICIES AND MEASURES

[NC8] 5.1 Introduction and key developments

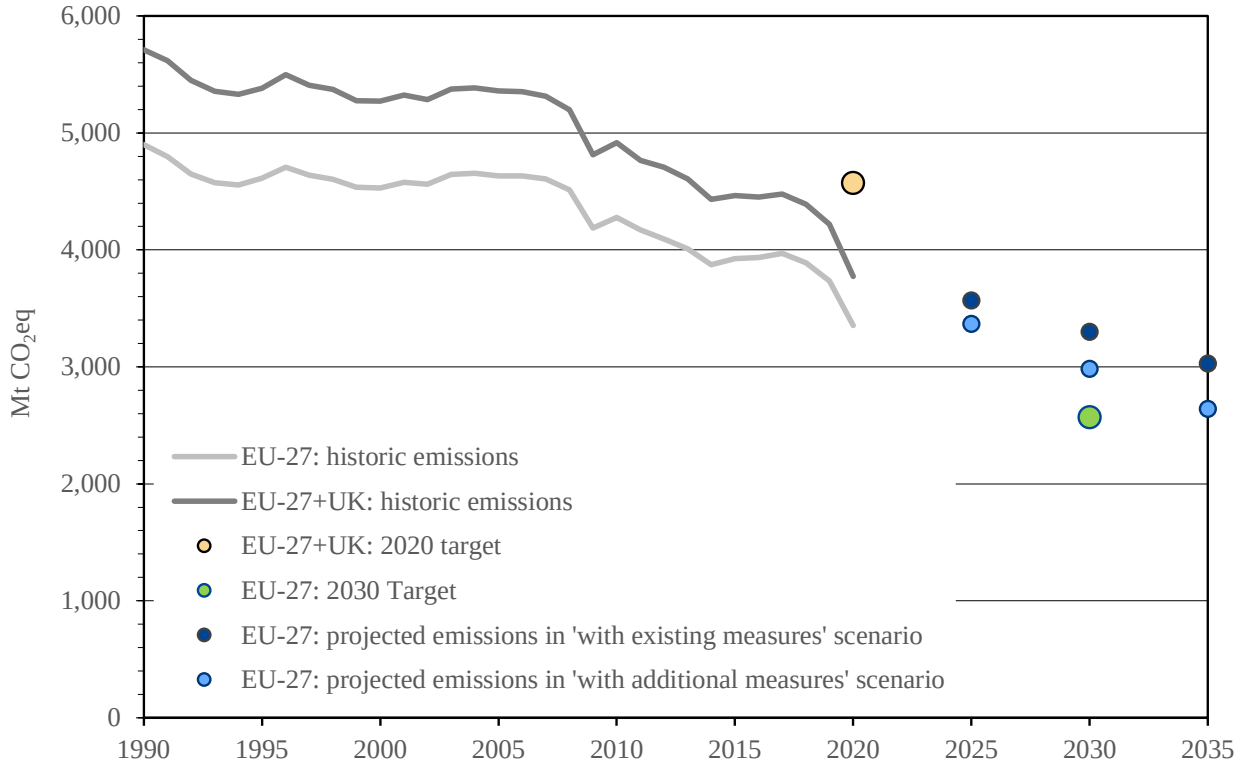
This chapter presents EU-27 projections of greenhouse gas emissions for the 'with existing measures scenario' and the 'with additional measures' scenario. Figure 39 represents historic and projected total GHG emissions on EU level. The data excludes LULUCF but includes international aviation - to reflect the scope of the EU's 2020 target. Historic data are represented for EU-27+UK. This is because the 2020 target, represented as a yellow circle, applies to the EU-27+UK. Historic and projected data are also represented for the EU-27, the current composition of the EU.

The figure shows that the EU-27+UK has met its 2020 target under the Convention, which was a reduction of 20 % compared to 1990 levels. In 2020, the EU-27+UK had reduced its greenhouse gas emissions by 34 % compared to 1990 levels (cf. section [NC8] 3.2.1). The substantive emission reductions between 2019 and 2020, which can be seen in the figure, are exceptional and are on the account of the COVID-19 pandemic. Projected emissions start in the year 2025 and are displayed for mandatory reporting years under the Governance Regulation (five-year time steps) [62].

Projections for the EU-27 which consider existing measures indicate a greenhouse gas emission reduction of 33 % in 2030 (compared to 1990 levels). When planned measures are taken into account, the emission reduction in 2030 compared to 1990 is projected at 39 %. It should be noted that these projections do not yet take into account the update of policies and measures following the adoption of the more ambitious EU target for 2030. Once these policies and measures have been updated in 2023, new projections can be expected to show a stronger decrease in emissions. Like all projections, they come with considerable uncertainties. Changes in energy prices or disruptions in supply chains can substantially alter the economic development and hence the level of GHG emissions in the years ahead.

[62] The latest mandatory reporting deadline for projections under the EU Governance Regulation was March 2021. In 2022, a non-mandatory reporting year, three European Member States (Denmark, Ireland, Latvia) provided updated projections. Detailed methodology can be found in section [BR5]5.6.1.1

Figure 39: Historic and projected EU-wide total greenhouse gas emissions excluding LULUCF, including international aviation



Sources: Annual European Union greenhouse gas inventory 1990-2020, European Member States greenhouse gas emission projections submitted in 2021 and 2022 under the Governance Regulation.

For more detailed projections data, please refer to Chapter [BR5] 5 and CTF Table 6 for the data reported in kilotons of CO_2-equivalent.

[NC8] 5.2 Projections

Projections are reported in the EU's Fifth Biennial report. Projections by sector can be found in Section [BR5] 5.2, projections by gas in Section [BR] 5.3. Insights into European Member States sensitivity analyses on projections can be found in Section [BR] 5.4. Methodology related to projections is documented in Section [BR] 5.6.1 and [BR] 5.6.2.

[NC8] 5.3 Assessment of aggregate effects of policies and measures

Projected, aggregated effects of policies and measures in the 'with existing measures' scenario were calculated based on the EEA database on greenhouse gas policies and measures in Europe[63]. The detailed methodology on how the effects were calculated is documented in Section [NC8] 5.5.1..

[63] EEA database on greenhouse gas policies and measures in Europe. http://pam.apps.eea.europa.eu, data dated 19 August 2022.

The projected aggregate effect of policies and measures reported under the 'with existing measures' scenario[64] was obtained by adding together the respective data of individual EU Member States submitted to the European Commission under the Governance Regulation[65]. While all Member States have to submit projections under the 'with existing measures' scenario, and to report on policies and measures, reporting on the projected effects of the policies and measures included is requested where available.

Thus, the effects calculated below should be viewed only as an approximation of the actual magnitude of the aggregated effect. This also stems from the fact that a varying subset of EU Member States reports effects in the different projected years. More information on this and the methodology can be found in Section [NC8] 5.5.1.

All European Member States reported information on national policies and measures. These national policies and measures are mostly regulations or economic policy instruments which are targeted at energy consumption, energy supply or the transport sector and are implemented in response to a Union policy. Such Union policies are, for example, the Energy Efficiency Directive, Renewable Energy Directive or Effort Sharing Decision/Regulation. National policies and measures that started in 2019 or after are also subject to the Governance Regulation. For several of the new policies and measures reported in 2021, completeness of information was lower because key details of these still need to be defined. Therefore, reporting on quantitative information still remains incomplete. [66]

Table 11: Total aggregated effect of policies and measures in the 'with existing measures' scenario

Scenario	Unit	Gases	Sectors	2025	2030	2035
'with existing measures'	Mt CO_2eq	All	All	359.3	538.6	450.9

Source: Own calculation based on EEA database on greenhouse gas policies and measures in Europe[63].
Note: The data considered came from data submitted by European Member States in 2021 and updated data in 2022. 2021 was a mandatory reporting year, 2022 was not. Updated data on policies and measures in 2022 were supplied by Germany.

Note: 17 Member States provided information for 2025, 18 EU Member States for 2030 and 17 EU Member States for 2035

[64] Information on projected aggregate effects of policies and measures reported by European Member States under the 'with additional measures' scenario are not reported below. This scenario is not a mandatory reporting requirement under the EU Governance Regulation.
Information on aggregate effects of policies and measures in historic years (e.g. 1990-2019) cannot be provided as a 'without measures' scenario is not a mandatory reporting requirement under the Governance Regulation and sufficient data is not available.
[65]Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, http://data.europa.eu/eli/reg/2018/1999/oj.
[66] ETC/CME (2021): Overview of reported national greenhouse gas policies and measures in Europe in 2021, https://www.eionet.europa.eu/etcs/etc-cme/products/etc-cme-reports/etc-cme-report-5-2021-overview-of-reported-national-greenhouse-gas-policies-and-measures-in-europe-in-2021.

Table 12: Aggregated effect of policies and measures in the 'with existing measures' scenario split by gas

Gas	Unit	2025	2030	2035
CO_2	Mt CO_2eq	279.1	371.8	365.7
CH_4	Mt CO_2eq	2.8	3.7	2.2
N_2O	Mt CO_2eq	2.4	5.6	5.1
CO_2, CH_4, N_2O	Mt CO_2eq	37.8	112.8	47.5
F-Gases	Mt CO_2eq	35.2	41.6	30.2
Mix of gases[67]	Mt CO_2eq	2.1	2.9	0.0
Total	Mt CO_2eq	359.3	538.6	450.9

Source: own calculation based on EEA database on greenhouse gas policies and measures in Europe[63].

Note: the distinction into gases reflects how EU Member States indicated which gas(es) a reported policy and measure would affect. For policies and measures where more than one gas was indicated, an ex-post disaggregation into single gases is not possible without adding further uncertainties.

[NC8] 5.4 Sensitivity analysis

Please refer to Section [BR5] 5.4.

[NC8] 5.5 Methodology

The methodology for calculating the aggregate effects of policies and measures is documented in Section [NC8] 5.5.1.

For the remaining methodologies, please refer to Section [BR5] 5.6.

[NC8] 5.5.1 Calculation of the aggregate effects of policies and measures

The aggregate effects of policies and measures reported in Section [NC8] 5.3were determined for the 'with existing measures' scenario. The data was compiled using the EEA database on greenhouse gas policies and measures in Europe[68] and split into gases and groups of gases based on how the data was reported. The data considered came from data submitted by European Member States in 2021 and updated data in 2022. 2021 was a mandatory reporting year, 2022 was not. Updated data on policies and measures in 2022 were supplied by Denmark, Ireland and Latvia.

Under EU legislation, effects of policies and measures are to be reported where available. Thus, a varying subset of the European Member States provided information for the years 2025, 2030 and 2035: 17 Member States provided information for 2025, 18 EU Member States for 2030 and 15 EU Member States for 2035. Detailed information on how many policies and measures were reported and how many also included ex-ante effects can be filtered from the interactive figure 'Number of

[67] The reported 'mix of gases' includes F-gases and at least one or more of the gases CO_2, CH_4, N_2O.
[68] EEA database on greenhouse gas policies and measures in Europe, http://pam.apps.eea.europa.eu.

policies and measures with reported expected (ex-ante) and achieved (ex-post) emission savings.' This figure shows data per Member State. A policy or measure is counted as being reported with ex-ante effects if all ex-ante years are reported.

The aggregated effect of policies and measures in the 'with existing measures' scenario in Section [NC8] 5.3 thus needs to be understood as an approximation under uncertainty. This is due not only to the fact that only a subset of Member States reported that information, but also to projections themselves exhibiting uncertainties.

Projected aggregate effects of policies and measures reported by European Member States under the 'with additional measures' scenario were not calculated. This scenario is not a mandatory reporting requirement under the Governance Regulation; this report data, which would add to uncertainty in case data, was thus aggregated to EU level.

Information on aggregate effects of policies and measures in historic years (e.g. 1990-2020) were not provided as a 'without measures' scenario is not a mandatory reporting requirement under the EU Governance Regulation; this report data, which would add to uncertainty in case data, was thus aggregated to EU-level.

[NC8] 5.5.2 Methodological changes

This methodology has changed slightly compared to the EU's Seventh National Communication. In this Eighth National Communication, the calculation of aggregate effects of policies and measures was simplified to improve the understanding of the data in view of how it is reported and of its uncertainties.

- The aggregate effects were only calculated for the scenario that is a mandatory scenario to report under the Governance Regulation[69]: the 'with existing measures' scenario.

  While all EU Member States report greenhouse gas emission projections for that scenario, the effects of policies and measures are only to be reported where available and ex-ante effects were thus reported by only a subset of Member States.

  In the previous National Communication, the aggregate effects of policies and measures were also calculated for the non-mandatory 'with additional measures' scenario. Not all European Member States provide GHG emission projections for that scenario and thus even fewer Member States report the effects of policies and measures of this scenario.

- No attribution of the aggregate effect of policies and measures into sectors was made. This is due to the fact that reported policies and measures could affect more than one sector. An ex-post attribution of the ex-ante effects to different sectors would add further uncertainties to the analysis.

- The distinction of the aggregate ex-ante effect of policies and measures into gases takes into account how data was reported. When a mix of gases was reported, no ex-post attribution of

[69] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, http://data.europa.eu/eli/reg/2018/1999/oj.

the total effect to single gases was undertaken. The mix of gases was specified instead, where possible. This approach was chosen, as an ex-post attribution of the effects reported to affect more than one gas into single gases would add further uncertainties to the analysis.

[NC8] 6 VULNERABILITY ASSESSMENT, CLIMATE CHANGE IMPACTS AND ADAPTATION MEASURES

[NC8] 6.1 Introduction and key developments

Scientists have made it clear that climate change is one of the biggest threats for humanity and seriously affects people and nature[70]. Most Europeans agree. More than nine of every ten people surveyed by the 'Eurobarometer' survey in 2021 consider climate change to be a serious problem (93%)[71], despite the pandemic and the economic hardship Europeans are facing.

As a result of human activity, the average temperature on Earth has been steadily rising since industrialisation began. While the global mean near-surface temperature has increased by approximately 1 °C compared to the pre-industrial level, in Europe it has increased by approximately 2 °C[72]. People in Europe are already experiencing more climate-related events[73], while impacts differ from region to region. For example, the frequency of heatwaves observed has increased and accounted for 85 % of the approximately 90 000 fatalities caused by weather-related and geophysical disasters in the EU over the period 1980-2017[74]. Although analysing trends in economic losses due to climate-related extremes is difficult, an estimation is available for EU-27 Member States between 1980 and 2020, totalling to EUR 487 billion, which is equivalent to EUR 11.9 billion/year[75].

The IPCC Working Group (WG) I Sixth Assessment Report (AR6)[76] concludes with high confidence that warming in Europe will continue to rise faster than the global mean, widening risk disparities across Europe and deepening inequalities. Four key risks have been identified for Europe in the WG II IPCC AR6[77]: (i) Key Risk 1: Mortality and morbidity of people and changes in ecosystems due to heat; (ii) Key Risk 2: Heat and drought stress on crops; (iii) Key Risk 3: Water scarcity and (iv) Key Risk 4: Flooding and sea level rise. Southern regions in Europe are projected to be much more impacted than other parts of Europe, especially through the effects of extreme heat, water scarcity, drought, forest fires and agriculture losses. Limiting global warming to well below 2°C would considerably reduce climate change impacts in Europe[78].

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[70] Feyen L., et al. (editors) (2020), Climate change impacts and adaptation in Europe. JRC PESETA IV final report. Publications Office of the European Union, Luxembourg, ISBN 978-92-76-18123-1, https://joint-research-centre.ec.europa.eu/system/files/2020-05/pesetaiv_summary_final_report.pdf.

[71] Eurobarometer Survey: Europeans consider climate change to be the most serious problem facing the world, https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3156.

[72] EEA Indicators 202,1 https://www.eea.europa.eu/ims/global-and-european-temperatures.

[73] IPCC AR6 WGII 2022 Fact Sheet Europe, https://www.ipcc.ch/report/ar6/wg2/downloads/outreach/IPCC_AR6_WGII_FactSheet_Europe.pdf.

[74] MunichRe/EEA49 in EC 2021 Natural and man-made disaster risks in the EU, https://op.europa.eu/en/publication-detail/-/publication/89fcf0fc-edb9-11eb-a71c-01aa75ed71a1.

[75] EEA Report on Economic losses from climate related impacts, https://www.eea.europa.eu/ims/economic-losses-from-climate-related.

[76] IPCC AR6 WGI 2021 Regional Fact Sheet for Europe, https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC_AR6_WGI_Regional_Fact_Sheet_Europe.pdf.

[77] IPCC AR6 WGII 2022 Fact Sheet Europe, https://www.ipcc.ch/report/ar6/wg2/downloads/outreach/IPCC_AR6_WGII_FactSheet_Europe.pdf.

[78] Feyen L., et al. (editors) (2020). Climate change impacts and adaptation in Europe. JRC PESETA IV final report. Publications Office of the European Union, Luxembourg, ISBN 978-92-76-18123-1, https://joint-research-centre.ec.europa.eu/system/files/2020-05/pesetaiv_summary_final_report.pdf.

The Paris Agreement[79] sets a cornerstone in fighting the climate crisis with the aim of limiting global warming to well below 2 °C, preferably to 1.5 °C, compared to pre-industrial levels. Adaptation to climate change is recognised as a necessary and indispensable complement to climate change mitigation and key component in the response to climate change. The Agreement requires under Article 7 'all Parties, as appropriate, to engage in adaptation planning and implementation'. The EU and its Member States are fully committed to the Paris Agreement and contribute to its objectives through many processes and activities[80].

Key developments

Since the EU's Seventh National Communication was published at the end of 2017, the EU has continued to bundle forces to minimise current and future impacts of climate change and the following key developments can be reported:

- The first EU Strategy on adaptation to climate change, adopted in 2013[81], was evaluated and results were published in 2018[82]. The evaluation showed that the EU adaptation strategy has been fit for its purpose, but the European Commission recognises that adaptation needs for meeting the challenges of the climate crisis have intensified and diversified[83].

- In 2019, the second reporting on adaptation under the 2014 European Union Greenhouse Gas Monitoring Mechanism Regulation (MMR) took place[84].

- The 2018 Regulation on the Governance of the Energy Union and Climate Action[85] repeals the MMR and new reporting requirements are specified in an implementing act[86]. Since 15 March 2021, and every two years thereafter, Member States report to the European Commission information on their national adaptation actions and the information is publicly available on the country pages of the European Climate Adaptation Platform (Climate-ADAPT)[87].

[79] Paris Agreement, entered into force in 2016, https://unfccc.int/sites/default/files/english_paris_agreement.pdf.
[80] Adaptation Communication of the European Union, 2021, https://unfccc.int/documents/307266.
[81] An EU Strategy on adaptation to climate change COM (2013) 216 final, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0216&from=EN.
[82] Report from the Commission to the European Parliament and the Council on the implementation of the EU Strategy on adaptation to climate change, COM(2018) 738 final, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0738&from=EN.
[83] Report from the Commission to the European Parliament and the Council on the implementation of the EU Strategy on adaptation to climate change COM(2018) 738 final, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0738&from=EN, cf. page 17.
[84] Regulation (EU) No 525/2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change, https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1400596096197&uri=CELEX:32013R0525.
[85] Regulation on the Governance of the Energy Union and Climate Action, https://eur-lex.europa.eu/legal-content/EN/TXT/?toc=OJ:L:2018:328:TOC&uri=uriserv:OJ.L_.2018.328.01.0001.01.ENG.
[86] Implementing act, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R1208
[87] European Climate Adaptation Platform Climate-ADAPT, https://climate-adapt.eea.europa.eu/.

- The European Green Deal was adopted in 2019 and sets the goal of being the world's first carbon-neutral continent by 2050 and to promote a transition towards climate-resilient activities [88].

- In 2020, the EU adopted the Sustainable Finance Taxonomy Regulation[89]. It is a classification system aiming to create a common understanding for sustainable activities, focusing on adaptation as one of the six environmental objectives addressed.

- As part of the European Green Deal, the EU adopted a new Adaptation strategy[90] in 2021, taking into account the learnings and evaluation results of the 2013 EU Strategy on adaptation. The 2021 Strategy has four principle objectives: to make adaptation smarter, faster and more systemic, and to step up international action on adaptation to climate change.

- The Climate Law 2021 commits the EU and its Member States to making continuous progress to boost adaptive capacity, to strengthening resilience and to reducing vulnerability to climate change[91].

- In 2021, all 27 EU Member States had adaptation strategies and/or plans adopted[92].

- In 2021, more than 3 400 cities and towns in the EU participated in the Covenant of Mayors[93], showing that the topic is of increasing importance.

- The European Climate Adaptation Platform (Climate-ADAPT) further developed as the one-stop shop for adaptation information in Europe and since 2021, it hosts the European Climate and Health Observatory[94] and the European Climate Data Explorer that provides interactive access to many climate indices from the Climate Data Store of the Copernicus Climate Change Service (C3S)[95].

- In 2021, the European Commission launched an EU Mission on adaptation to climate change, which aims to foster adaptation at the sub-national and regional scale and supports at least 150 European regions and communities in becoming climate-resilient by 2030[96].

[88] EC; The European Green Deal, https://ec.europa.eu/neighbourhood-enlargement/news/european-green-deal-sets-out-how-make-europe-first-climate-neutral-continent-2050-boosting-economy-2019-12-11_en.
[89] Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment, https://ec.europa.eu/info/law/sustainable-finance-taxonomy-regulation-eu-2020-852_en.
[90] EU Adaptation Strategy 2021, https://ec.europa.eu/clima/eu-action/adaptation-climate-change/eu-adaptation-strategy_en.
[91] European Climate Law, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119.
[92] Adaptation Communication of the European Union 2021, https://unfccc.int/documents/307266.
[93] Covenant of Mayors, https://www.eumayors.eu/en/.
[94] European Climate and Health Observatory, https://climate-adapt.eea.europa.eu/observatory.
[95] European Climate Data Explorer, https://climate-adapt.eea.europa.eu/en/knowledge/european-climate-data-explorer/. https://climate-adapt.eea.europa.eu/en/knowledge/european-climate-data-explorer/
[96] Mission area: Adaptation to climate change, https://climate-adapt.eea.europa.eu/eu-adaptation-policy/eu-mission-on-adaptation.

- The 2021 – 2027 Multiannual Financial Framework ensures that the EU budget's contribution to achieve climate objectives, both mitigation and adaptation, is set at a minimum of 25 % and rise to 30 % no later than 2027[97].

[NC8] 6.2 Observed patterns of climate change, climate modelling, projections and scenarios

In Europe and globally, significant changes in climate can already be observed today and a further warming is projected. In the following, observed and projected changes in temperature (cf. chapter [NC8] 6.2.1) and precipitation (cf. chapter[NC8] 6.2.2) due to climate change are summarised.

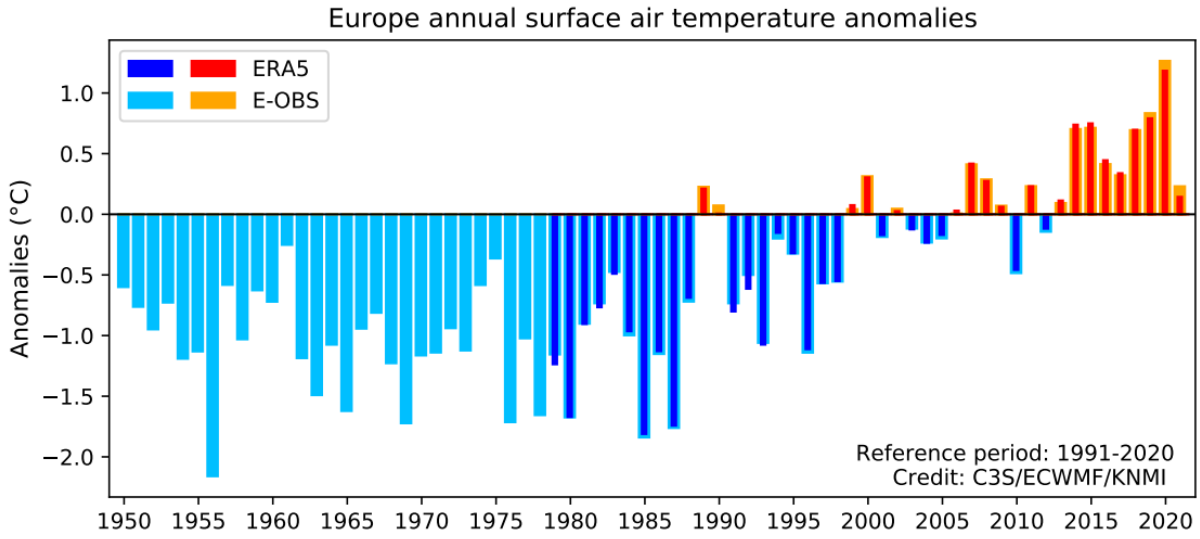
Information on possible future climate developments is simulated by climate projections (typically until 2100). They are the result of the application of climate models that 'are based on assumed 'scenarios' for the concentrations of greenhouse gases, aerosols, and other atmospheric constituents that affect the planet's radiative balance'[98]. In recent years, a large number of regional projections for the European area have been run under the CORDEX project[99] to assess signals of climate change. Further work is underway by C3S and others to provide additional high-resolution regional projections for Europe that are coordinated in such a way as to facilitate the estimation of the main sources of uncertainty[100].

[NC8] 6.2.1 Observed and projected changes in mean air temperature

European near-surface temperatures have increased by approximately 2 °C compared to the pre-industrial level. This increase is approximately 1 °C higher than the global increase[101]. Recent published data from Copernicus Climate Change Service shows that the annual surface air temperature over Europe has a long-term warming trend from the year 2000 onwards[102](cf. **Figure 40**).

[97] Multiannual financial framework, https://www.europarl.europa.eu/factsheets/en/sheet/29/multiannual-financial-framework.
[98] Definition from Copernicus, https://climate.copernicus.eu/climate-projections#:~:text=Climate%20projections%20are%20simulations%20of,affect%20the%20planet%27s%20radiative%20balance.
[99] EuroCordex, https://euro-cordex.net/.
[100] Copernicus, https://climate.copernicus.eu/climate-projections#:~:text=Climate%20projections%20are%20simulations%20of,affect%20the%20planet%27s%20radiative%20balance.
[101] EEA Indicators 2021, https://www.eea.europa.eu/ims/global-and-european-temperatures.
[102] C3S/ECMWF/KNMI, https://climate.copernicus.eu/esotc/2021/temperature.

Figure 40: Annual European surface air temperature anomalies for 1950 to 2021, relative to the 1991–2020 reference period.



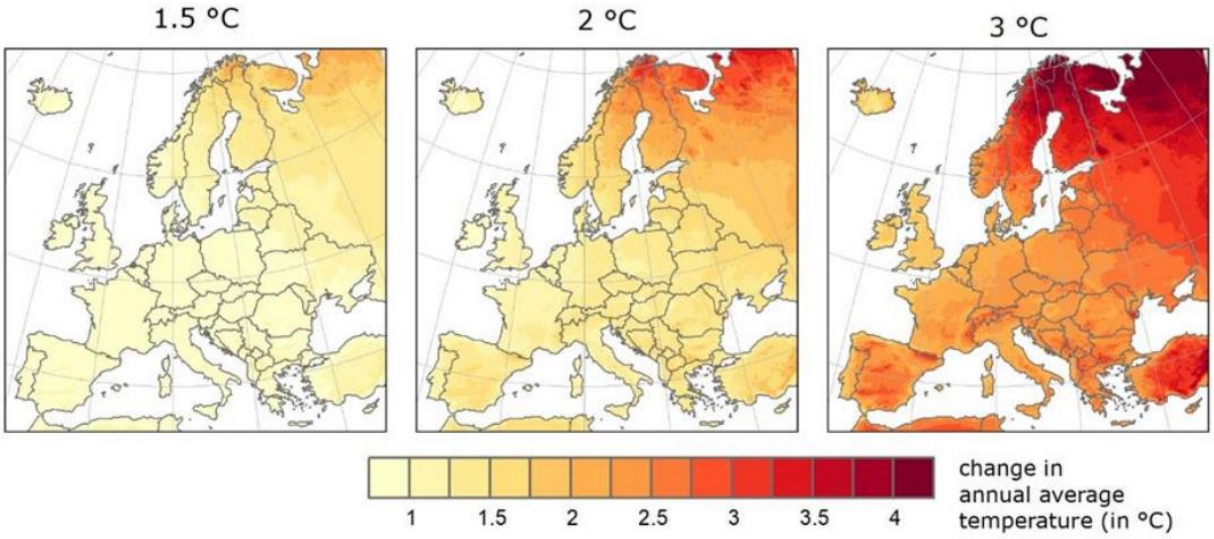
Data source: ERA5 and EOBS. Credit: C3S/ECMWF/KNMI103.

The ten warmest years in Europe were recorded from 2000onwards, and the eight warmest years were 2007 and 2014–2020[104]. Particularly high warming has been observed over Eastern Europe, Scandinavia and the eastern part of the Iberian Peninsula[105].

The latest IPCC AR6 WGI report[106] concludes that warming will continue in Europe and that it will be larger than the global mean, with the largest winter warming occurring in Northern Europe and Eastern Europe and largest summer warming in Southern Europe (high confidence). **Figure 40** presents the projected change in annual average temperature across Europe for the three global warming scenarios 1.5 °C, 2 °C and 3 °C[107].

[103] Copernicus, https://climate.copernicus.eu/esotc/2021/temperature.
[104] C3S/ECMWF/KNMI, https://climate.copernicus.eu/esotc/2021/temperature.
[105] EEA Indicators 2021, https://www.eea.europa.eu/ims/global-and-european-temperatures.
[106] IPCC AR6 WGI 2021 Regional Fact Sheet for Europe, https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC_AR6_WGI_Regional_Fact_Sheet_Europe.pdf.
[107] Feyen L., et al. (editors) (2020). Climate change impacts and adaptation in Europe. JRC PESETA IV final report. Publications Office of the European Union, Luxembourg, ISBN 978-92-76-18123-1. https://joint-research-centre.ec.europa.eu/system/files/2020-05/pesetaiv_summary_final_report.pdf.

Figure 41: Changes from references (1981-2020) in annual average temperature for the three global warming scenarios used in PESETA IV



Scenarios: 1.5 °C, 2 °C and 3 °C warmer than pre-industrial period[108]

A recent study concludes that 'even when limiting global warming to 1.5 °C a large fraction of Europe is projected to face an increase in temperature of 1 °C or more relative to the reference period. Under the 2 °C and 3 °C global warming scenarios, the spatial temperature differences become more apparent, with Northern Europe and parts of Southern Europe showing stronger warming'[109].

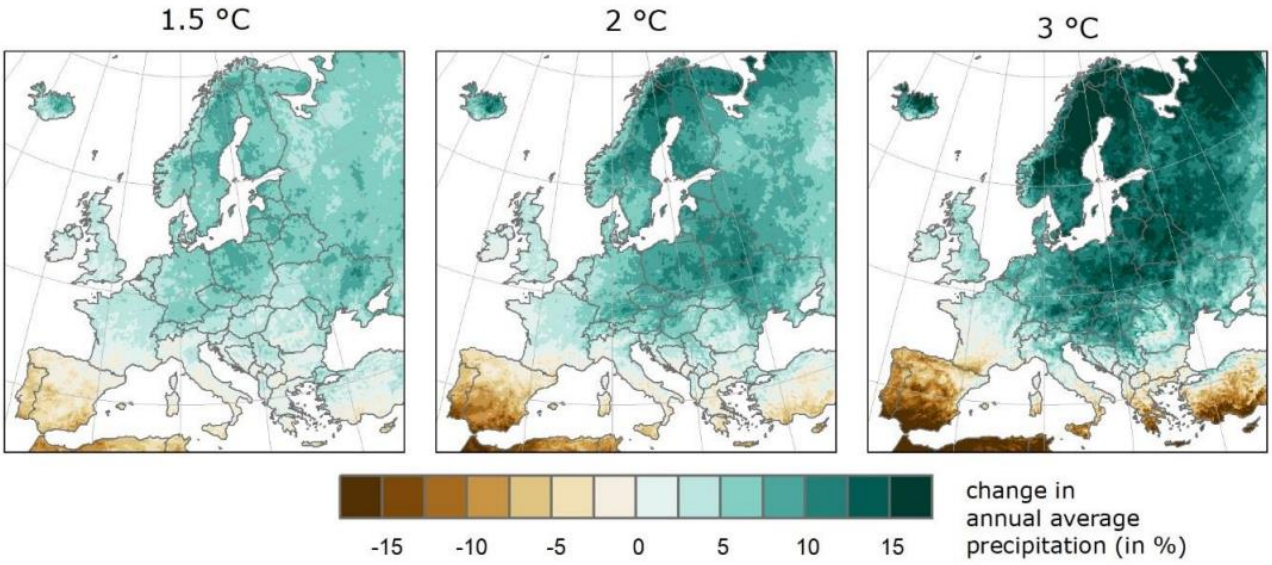
[NC8] 6.2.2 Observed and projected changes in precipitation

The assessment of climate change in the IPCC AR6 WGI report[110] states that during recent decades mean precipitation has increased over Northern, West, Central and Eastern Europe, as well as extreme precipitation, while magnitude and sign of observed trends in Southern Europe are not clear yet, as they depend substantially on time period and study region. Recent EEA assessments, however, show a trend of decreasing mean precipitation in Southern Europe since 1960.[111]

Moderate changes in annual average precipitation from reference (1981–2020) are projected (cf. **Figure 42**)[112]. With 3 °C global warming, significant spatial differences are expected, showing an increase for North-Central Eastern Europe and a decline for most parts of the Mediterranean.

[108] Feyen L., et al. (editors) (2020). Climate change impacts and adaptation in Europe. JRC PESETA IV final report. Publications Office of the European Union, Luxembourg, ISBN 978-92-76-18123-1, https://joint-research-centre.ec.europa.eu/system/files/2020-05/pesetaiv_summary_final_report.pdf.
[109] See above.
[110] IPCC AR6 WGI 2021 Regional Fact Sheet for Europe.
[111] Europe's changing climate hazards, https://www.eea.europa.eu/publications/europes-changing-climate-hazards-1/wet-and-dry-1/wet-and-dry-mean-precipitation and https://www.eea.europa.eu/publications/europes-changing-climate-hazards-1/what-will-the-future-bring.
[112] Feyen L., et al. (editors) (2020). Climate change impacts and adaptation in Europe. JRC PESETA IV final report. Publications Office of the European Union, Luxembourg, ISBN 978-92-76-18123-1.

Figure 42: Changes from references (1981-2020) in annual average precipitation for the three global warming scenarios used in PESETA IV



Scenarios: 1,5 °C, 2 °C and 3 °C warmer than pre-industrial period[113]

Seasonal changes in precipitation are projected, especially in summer. A recently conducted study concludes that the 'increase in summer precipitation in Northern Europe is less strong than that in annual terms, while the decrease in summer precipitation in Southern Europe is much stronger (up to 30 %) compared to that on an annual basis (up to 15 %). Summer precipitation is also projected to decline in Western Europe and parts of Central and Eastern Europe, even when annual average precipitation is projected to increase' [114].

[NC8] 6.3 Climate change impacts

The IPCC AR6 WGII report states with very high confidence that the current warming is already affecting natural and human systems in Europe and further impacts are projected[115], while impacts differ from region to region. For example, in Southern Europe, an increase in heat, water scarcity, drought and wildfires is projected, while in Northern Europe, reduced ice cover and more floods are expected[116].

Although analysing trends in economic losses due to climate-related extremes is difficult, it has been estimated that these losses for EU-27 Member States total EUR 487 billion between 1980 and 2020, which is equivalent to EUR 11.9 billion/year (acknowledging the variability from year to year)[117].

[113] Feyen L., et al. (editors) (2020). Climate change impacts and adaptation in Europe. JRC PESETA IV final report. Publications Office of the European Union, Luxembourg, ISBN 978-92-76-18123-1.
[114] See above.
[115] IPCC AR6 WGII 2022 Fact Sheet Europe, https://www.ipcc.ch/report/ar6/wg2/downloads/outreach/IPCC_AR6_WGII_FactSheet_Europe.pdf.
[116] IPCC AR6 WGII 2022 Fact Sheet Europe.
[117] EEA Report on Economic losses from climate related impacts, https://www.eea.europa.eu/ims/economic-losses-from-climate-related.

In 2020, the Joint Research Centre (the European Commission's science and knowledge service, JRC in short) published the PESETA IV report[118], also including an updated compilation of observed and projected impacts across Europe. The PESETA IV project quantitatively assesses selected sectoral climate change impacts in the future when climate policy actions (mitigation and adaptation) take place compared to a situation where no policy actions are undertaken. For the scenario without mitigation and adaptation, impacts are assessed at global warming of 3 °C; policy actions are taken into account by estimating impacts with a 1.5 °C and a 2 °C global warming level (GWL)[119].

The report concludes that 3 °C global warming above pre-industrial levels (with no policy action) would result in an annual loss of at least EUR 175 billion for the EU economy (1.38 % of EU GDP)[120]. Compared to 3 °C, limiting global warming to 2 °C would reduce additional welfare losses by 50 %, while 1.5 °C would lower additional welfare losses by 75 %[121]. Although this economic assessment does not cover all possible climate impacts in the EU, it demonstrates clearly the benefits of mitigation and adaptation actions, which would be even larger than presented in the PESETA IV report[122].

In the following sections [NC8] 6.3.1 to [NC8] 6.3.7, information on a number of observed and projected climate change impacts with importance for Europe are presented. It is important to note that in the literature, climate change impacts are partly also described as hazard or risks, depending on the underlying results of the evolving concept to which they refer. In this chapter, the findings of the PESETA IV report are summarised and supplemented by further relevant and recently published studies, e.g. from the IPCC, Copernicus, European Commission, and the European Environment Agency.

[NC8] 6.3.1 Heat

The IPCC AR6 WGI report[123] concludes that the frequency and intensity of heatwaves observed in Europe has increased in recent decades due to human-induced climate change. In the past, heatwaves accounted for 85 % of the approximately 90 000 fatalities caused by weather-related and geophysical disasters in the EU over the period 1980 to 2017[124].

There is clear evidence that climate change will progressively increase both the frequency and severity of heatwaves; this trend is very strong across Europe, but most dominant in Southern European countries[125]. Thus, one of the four risks identified by the IPCC AR6 WG II report for

[118] Feyen L., et al. (editors) (2020). Climate change impacts and adaptation in Europe. JRC PESETA IV final report. Publications Office of the European Union, Luxembourg, ISBN 978-92-76-18123-1.
[119] See above.
[120] Welfare losses from climate change impacts, https://joint-research-centre.ec.europa.eu/system/files/2020-09/14_peseta iv_economic_impacts_sc_august2020_en.pdf.
[121] Welfare losses from climate change impacts.
[122] Feyen L., et al. (editors) (2020). Climate change impacts and adaptation in Europe. JRC PESETA IV final report. Publications Office of the European Union, Luxembourg, ISBN 978-92-76-18123-1.
[123] IPCC AR6 WGI 2021 Regional Fact Sheet for Europe.
[124] MunichRe/EEA49 in EC 2021 Natural and man-made disaster risks in the EU https://op.europa.eu/en/publication-detail/-/publication/89fcf0fc-edb9-11eb-a71c-01aa75ed71a1.
[125] Naumann G., et al. (2020) Global warming and human impacts of heat and cold extremes in the EU, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12954-7, https://joint-research-centre.ec.europa.eu/peseta-projects/jrc-peseta-iv/human-mortality-extreme-heat-and-cold_en.

Europe is mortality and morbidity of people and changes in ecosystems due to heat[126]. If the global warming could be stabilised at 1.5 °C, each year, more than 100 million Europeans (including United Kingdom residents) would be exposed to a present intense heatwave (which is defined as a heatwave under present climate that is expected to happen once every 50 years)[127]. Compared to today (using 1981-2010), 10 times more people would be affected. With a 3 °C GWL in 2100, nearly 300 million/year would be exposed to a heatwave, which is more than half of the European population.[128] In other words, a current 50-year heatwave may occur almost every year in Southern Europe and every three to five years in other European regions[129]. The IPCC AR6 WGII report[130] states that the number of deaths from heatwaves will increase two- to threefold at 3 ºC GWL compared with 1.5 ºC.

[NC8] 6.3.2 Water scarcity and drought

Water scarcity and drought belong to the four key risks identified by the IPCC WG II AR6 report for Europe[131]. Both are expected to further challenge regions across Europe, especially in the south.

Water scarcity is already an issue today in Europe, with around 52 million people (EU+UK) living in areas considered to be under water stress for at least one month of the year[132]. In Southern Europe, more than a third of the population will be exposed to water scarcity at 2 °C GWL and significant economic losses in water and energy dependent sectors may arise. For Western Central and Southern Europe, the risk of water scarcity will increase strongly under 3 °C[133] GWL and 65 million people (or 15 % of the EU population) will live in areas experiencing water scarcity[134].

At present, drought results into annual losses of around EUR 9 billion/year for the EU+UK, with the highest losses related to agriculture and energy[135]. It is expected that with global warming, agricultural, ecological and hydrological droughts will happen more frequently, last longer and become more intense[136]. Limiting warming to 1.5 °C would still result in an increase in drought frequency over two-thirds of the Mediterranean and one-third of the Atlantic region. In contrast, drought hazard declines with warming in Boreal Europe and the North-Eastern parts of Continental

[126] IPCC AR6 WGII 2022, Fact sheet Europe.
[127] Naumann G., et al. (2020) Global warming and human impacts of heat and cold extremes in the EU, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12954-7.
[128] PESETA IV 2020 https://joint-research-centre.ec.europa.eu/system/files/2020-09/11_pesetaiv_heat_and_cold_sc_august2020_en.pdf.
[129] Naumann G., et al. (2020) Global warming and human impacts of heat and cold extremes in the EU, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12954-7.
[130] IPCC AR6 WG II 2022, Fact sheet Europe, https://www.ipcc.ch/report/ar6/wg2/downloads/outreach/IPCC_AR6_WGII_FactSheet_Europe.pdf.
[131] IPCC AR6 WG II 2022, Fact sheet Europe.
[132] Bisselink B et al. (2020) Climate change and Europe's water resources, Office of the European Union, Luxembourg, ISBN 978-92-76-10398-1, https://joint-research-centre.ec.europa.eu/peseta-projects/jrc-peseta-iv/water-resources_en.
[133] IPCC AR6 WG II 2022, Fact sheet Europe.
[134] Bisselink B et al. (2020) Climate change and Europe's water resources, Office of the European Union, Luxembourg, ISBN 978-92-76-10398-1.
[135] Cammalleri et al (2020) Global warming and drought impacts in the EU, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12947-9, https://joint-research-centre.ec.europa.eu/system/files/2020-09/07_pesetaiv_droughts_sc_august2020_en.pdf.
[136] IPCC AR6 WG I 2021, Fact sheet Europe.

Europe, due to increases in precipitation[137]. With 3 °C global warming in 2100, total drought losses for the EU+UK would increase fivefold to EUR 45 billion/year[138].

[NC8] 6.3.3 Sea level rise

Sea level rise, together with flooding (cf. [NC8] 6.3.4) has been identified as the fourth key risk by the IPCC AR6 WG II report for Europe[139]. Between 1993 and 2021, mean sea level already increased by 2–4 mm/year in most coastal areas of Europe[140]. In Europe, nearly 50 million people live within 10 m above mean sea level and the people at risk are projected to increase due to population growth[141]. Every year, approximately 100 000 people are exposed to coastal flooding[142].

By the end of this century, projections expect a global sea level rise by as much as one metre or more[143144], with the strongest signals for the North Sea and Atlantic coasts, followed by the Black Sea and the Southern part of the Baltic Seas[145146]. Besides the rise of sea level, global warming intensifies coastal storms, resulting in more frequent coastal flooding which is projected to increase strongly in Europe[147]. Expected annual (direct) damages due to coastal flooding are expected to rise from EUR 1.3 billion today to EUR 13-39 billion by 2050 between 2 °C and 2.5 °C GWL and EUR 93-960 billion by 2100 between 2.5 ° and 4.4 °C GWL, largely depending on socio-economic developments[148].

[NC8] 6.3.4 Floods

In Europe, the highest number of river floods in the past 500 years occurred in the last 30 years[149]. Each year, 170 000 people were exposed and economic losses of around EUR 8 billion/year (EU+UK) resulted[150]. The flood disaster in the summer of 2021 in the Ahr valley in Germany, in which 134

[137] Cammalleri et al 2020. Global warming and drought impacts in the EU, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12947-9.
[138] See above
[139] IPCC AR6 WG II 2022, Fact sheet Europe.
[140] Copernicus Indicator Sea level rise, https://climate.copernicus.eu/climate-indicators/sea-level.
[141] IPCC WG II AR6 chapter 13, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf
[142] Cammalleri et al 2020. Global warming and drought impacts in the EU, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12947-9
[143] Vousdoukas M., et al. 2020. Adapting to rising coastal flood risk in the EU under climate change, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12990-5, https://joint-research-centre.ec.europa.eu/system/files/2020-09/06_pesetaiv_coastal_floods_sc_august2020_en.pdf.
[144] EEA Indicator - Global and European sea level rise, https://www.eea.europa.eu/ims/global-and-european-sea-level-rise.
[145] Ranasinghe, et al. 2021. Climate Change Information for Regional Impact and for Risk Assessment. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change doi:10.1017/9781009157896.014.
[146] EEA Indicator - Global and European sea level rise, https://www.eea.europa.eu/ims/global-and-european-sea-level-rise.
[147] Vousdoukas M., et al. 2020. Adapting to rising coastal flood risk in the EU under climate change, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12990-5, https://joint-research-centre.ec.europa.eu/system/files/2020-09/06_pesetaiv_coastal_floods_sc_august2020_en.pdf.
[148] IPCC WG II AR6 chapter 13, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[149] See above
[150] Dottori F, et al. 2020. Adapting to rising river flood risk in the EU under climate change, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12946-2, https://joint-research-centre.ec.europa.eu/system/files/2020-09/05_pesetaiv_river_floods_sc_august2020_en.pdf.

people died, showed the dramatic consequences of climate change impacts.[151] The affected regions will need years to repair the damage, if such repair is possible at all. In addition, pluvial flooding and flash floods due to intense rainfall also constitute a substantial risk for various European regions[152]. Heavy precipitation frequency trends have been observed for Northern Europe and the Alpine regions.

At 2 °C GWL, projections indicate an increase of river floods frequency in Western and Central Europe of 10 % and a decrease in Northern and Southern Europe, making Europe one of the regions with the largest projected increases in flood risk[153]. Projected social and economic growth will further increase the exposure to river flood events[154]. With low adaptation, damages from river flooding are projected to be 4 times higher at 2 °C GWL, and 6 times higher at 3 °C GWL[155].

Extreme precipitation and pluvial flooding are projected to increase at global warming levels exceeding 1.5 °C in all regions except the Mediterranean[156]. Growing urbanisation is projected to increase the risk of pluvial flooding[157].

[NC8] 6.3.5 Melting glaciers, permafrost and snow cover

As pointed out by IPCC Working Group I in its regional factsheet for Europe, 'strong declines in glaciers, permafrost, snow cover extent, and snow seasonal duration at high latitudes/altitudes are observed and will continue in a warming world'[158].

According to the Copernicus Climate Change Service, the monitored glaciers in Europe have lost between 9 m (in northern Scandinavia) and 30 m (in the Alps) of ice since 1997[159]. It is virtually certain that glaciers will shrink in the future[160]. Central Europe is one of the regions where glaciers are projected to lose substantial mass even when a low GWL is assumed[161].

Thaw and degradation of permafrost in high mountains and in Scandinavia has been observed, and will very likely continue over the 21st century under all global warming scenarios. Over the 21st

[151] Helmholtz Climate Initiative – One year after the flood, https://www.helmholtz-klima.de/en/aktuelles/one-year-after-flood.
[152] IPCC WG II AR6 chapter 13, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[153] Ranasinghe, et al. 2021: Climate Change Information for Regional Impact and for Risk Assessment. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change doi:10.1017/9781009157896.014.
[154] Spinoni J et al. 2020 Global warming and windstorm impacts in the EU, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12955-4 https://joint-research-centre.ec.europa.eu/system/files/2020-09/13_pesetaiv_windstorms_sc_august2020_en.pdf.
[155] IPCC WG II AR6 chapter 13, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[156] IPCC AR6 WGI 2021, Factsheet Europe.
[157] IPCC WG II AR6 chapter 13, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[158] IPCC AR6 WGI 2021, Factsheet Europe.
[159] Copernicus Indicator Glaciers, https://climate.copernicus.eu/climate-indicators/glaciers.
[160] Ranasinghe, et al. 2021: Climate Change Information for Regional Impact and for Risk Assessment. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change doi:10.1017/9781009157896.014
[161] See above

century, it is very likely that permafrost will undergo increasing thaw and degradation under all scenarios and that its extent and volume will decrease[162].

As stated by an interactive EEA Report 2022[163], a decrease in annual snowfall and snow cover extent has been observed especially at lower elevations across Europe. The duration of snow seasons has generally decreased in Northern, Western and Eastern Europe as a result of earlier snowmelt in spring. In the future, snowfall is projected to decrease substantially in Central and Southern Europe; the signal for Northern Europe is not yet clear. The duration of the snow season is also projected to decrease substantially, by more than 100 days by the end of the century in some regions[164].

[NC8] 6.3.6 Windstorms

Windstorms are amongst the most damaging natural hazards in Europe, resulting in an annual loss of approximately EUR 5 billion in the EU+UK[165]. Each year approximately 16 million citizens are exposed to windstorms (with an intensity that happens only once every 30 years), resulting in nearly 80 deaths every year on average[166] and fatalities are expected to rise[167]. The IPCC AR6 WGI report diagnoses large uncertainties in past evolutions of windstorms and extreme winds in Europe, as decreasing and increasing patterns have been observed, varying from region to region[168].

Limited data and inherent weaknesses in current climate models make projections for windstorms uncertain[169]. At a 2 °C GWL, windstorm intensity is projected to slightly increase in the future in Northern, Western and Central Europe as well as off the coasts by 2100[170], while an increase of frequency is expected for Northern and Central Europe, a decrease is expected for Southern Europe[171]. Nevertheless, it can be expected that the absolute damages caused by windstorms will increase in the future due to rising asset values[172].

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[162] See above
[163] EEA report 2021 Europe's changing climate hazards — an index-based interactive EEA report, https://www.eea.europa.eu/publications/europes-changing-climate-hazards-1/snow-and-ice/snow-and-ice-snow.
[164] EEA report 2021 Europe's changing climate hazards — an index-based interactive EEA report
[165] Spinoni J et al. 2020 Global warming and windstorm impacts in the EU, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12955-4, https://joint-research-centre.ec.europa.eu/system/files/2020-09/13_pesetaiv_windstorms_sc_august2020_en.pdf.
[166] See above
[167] IPCC WG II AR6 chapter 13: 1830, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[168] Ranasinghe, et al. 2021: Climate Change Information for Regional Impact and for Risk Assessment. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change doi:10.1017/9781009157896.014, https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter12.pdf.
[169] EEA Briefing 2021 What will the future bring when it comes to climate hazards? https://www.eea.europa.eu/publications/europes-changing-climate-hazards-1/what-will-the-future-bring.
[170] Ranasinghe, et al. 2021: Climate Change Information for Regional Impact and for Risk Assessment. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change doi:10.1017/9781009157896.014.
[171] EEA Briefing 2021 What will the future bring when it comes to climate hazards?
[172] Spinoni J et al. 2020 Global warming and windstorm impacts in the EU, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-12955-4 .

[NC8] 6.3.7 Wildfire

In recent years, large wildfires have affected Europe. Fires affect over 400 000 hectares (ha) every year, with 85 % of the area located in Southern Europe, where 'fire weather' conditions (determined by temperature, precipitation, wind speed and relative humidity) are most pronounced. Human activities caused more than 90-95 % of the fires, except in Eastern Europe, where natural ignition is the main factor[173].

Projections of future wildfire risks are uncertain due to multiple factors, such as vegetation interaction and social factors[174]. With increased drying and heat combined, an increase in burned area of 40 % and 100 % for a 2 °C and 3 °C GWL[175] can be expected in Mediterranean areas. Furthermore, projections suggest that new fire-prone regions in Europe could emerge in future in Western and Central Europe and Northern Europe, where wildfires have been uncommon in the past[176].

[NC8] 6.4 Assessment of risks and vulnerability to climate

Climate hazards in Europe have increased substantially, particularly by the frequency of extreme events, and hazards of warming and precipitation[177]. This resulted in significant economic and non-economic losses.. Impacts vary greatly across Europe but are generally more severe in Southern regions, for poor households, and for traditional lifestyles. Due to the inertia of the climate system, these impacts are locked-in over the next two decades, leaving adaptation as the only short-term relief[178]. While globally the leeway for adaptation has increased – through enhanced legal and policy frameworks, public and corporate awareness – adaptation action remained 'largely incremental with only a few examples of local transformative action'[179].

Future climate risks expand the intensity and scope of current vulnerabilities, as warming in Europe progresses faster than the global mean. This will deepen regional, social, and economic inequalities. Additionally, transboundary climate risks emerge through global supply chains, financial markets, and shared resources[180]. In general, four key risks are evolving (cf. section [NC8] 6.3): (1) Heat, leading to mortality and morbidity of people, and ecosystems disruptions. (2) Agricultural production, facing substantial losses due to a combination of heat and drought. (3) Water scarcity increasing

[173] IPCC WG II AR6 chapter 13, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[174] See above
[175] Ranasinghe, et al. 2021: Climate Change Information for Regional Impact and for Risk Assessment. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change doi:10.1017/9781009157896.014
[176] IPCC WG II AR6 chapter 13, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[177] EEA (2021): Europe's changing climate hazards — an index-based interactive EEA report. Report no. 15/2021. https://doi.org/10.2800/458052.
[178] COACCH (2021). The Economic Cost of Climate Change in Europe: European Results. Policy brief by the COACCH project. https://www.coacch.eu/wp-content/uploads/2018/03/Policy-brief-Policy-maker-EUROPE-final.pdf.
[179] IPCC WG II AR6 chapter 13: 1819, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[180] European Commission, Directorate-General for European Civil Protection and Humanitarian Aid Operations (ECHO), Overview of natural and man-made disaster risks the European Union may face : 2020 edition, Publications Office, 2021, https://data.europa.eu/doi/10.2795/1521.

across all sectors, especially in Southern Europe. (4) Coastal, riverine, and pluvial flooding that harm people, economies and infrastructure[181].

Overall, a profound and comprehensive climate risk assessment on European level remains a key challenge[182]. So far, the most reliable assessments stem from the PESETA IV project, the IPCC WG II AR6 chapter 13 on Europe, and selected EEA technical reports. This highlights the need to develop an overarching European Climate Risk Assessment.

[181] IPCC WG II AR6 chapter 13: 1819, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[182] EEA (2022): Economic losses and fatalities from weather- and climate-related events in Europe. Briefing no. 21/2021, https://data.europa.eu/doi/10.2800/530599.

Figure 43: Climate risk typology of NUTS 3 regions in Europe

North west coasts

C: coastal
KH: coastal flooding
E: high (high exposure of population and infrastructure to coastal hazards)
S: average
AC: average

Lowlands and estuaries

C: coastal
KH: coastal and river flooding, heavy precipitation
E: very high exposure of population and infrastructure to coastal hazards and river flooding
S: average (relatively low proportion of population at risk of poverty)
AC: relatively high (relatively high GDP, good infrastructure provision, higher than average innovation levels)

North west urban

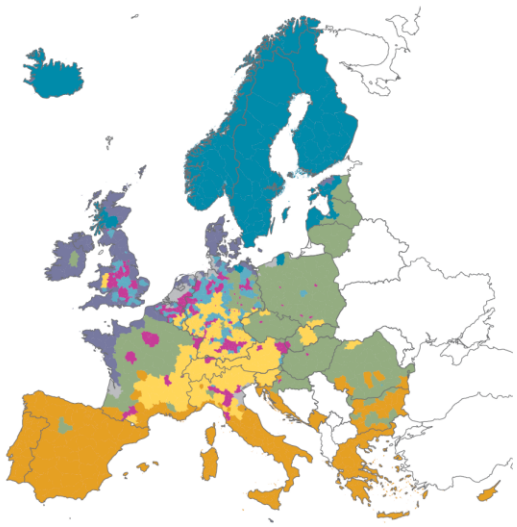
C: mainly inland cities
KH: heavy precipitation
E: lower than average exposure of population and infrastructure to fluvial flooding and landslides
S: average
AC: relatively high (high transport infrastructure density, higher than average GDP, relatively high innovation levels)

Inland and urbanised

C: inland, large cities, including capital cities
KH: river flooding, heavy precipitation
E: relatively high exposure of population and transport infrastructure to river flooding
S: low (projected increase of young people)
AC: high (affluent cities, high provision of critical infrastructure, high innovation levels)

Northern lands

C: low density, green cities and small rural settlements
KH: coastal hazards; heavy precipitation; low and high temperatures
E: higher than average exposure of population and infrastructure to coastal flooding
S: low (projected increase of young people and immigrants)
AC: high (high provision of critical infrastructure, high innovation levels)



Inland hinterlands

C: peri-urban and rural settings, relatively low population densities
KH: multiple climate hazards
E: relatively high exposure of population and transport infrastructure to river flooding
S: average (projected decrease in young people)
AC: lower than average (lower than average GDP and employment opportunities; high priority allocation funding; low innovation levels)

Landlocked and elevated

C: mountainous and upland areas, relatively low population densities
KH: landslides, river flooding, heavy precipitation
E: high exposure of population and infrastructure to landslides
S: lower than average (lower than average proportion of people at risk of poverty)
AC: higher than average (relatively affluent areas, dense road infrastructure; relatively high innovation levels)

Southern lands

C: Mediterranean, high density
KH: high temperatures, droughts, wildfires, landslides, coastal hazards
E: higher than average exposure of transport infrastructure and population to landslides
S: relatively high (higher than average population at risk of poverty)
AC: relatively low (lower than average GDP, relatively low critical infrastructure provision, lower than average innovation levels)

Notes: For full description of groups in the risk typology, see http://european-crt.org/map.html. The Urban Adaptation Map Viewer provides information about Urban Audit cities in the respective groups.

C, city type; KH, key hazard; E, exposure; S, sensitivity; AC, adaptive capacity.

GDP, gross domestic product.

Source: Adapted from Climate resilient cities and infrastructures (RESIN) climate risk typology, http://european-crt.org/map.html.

Source: EEA 2020, Urban adaptation in Europe. EEA Report No 12/2020, page 21[183].

[NC8] 6.4.1 Food production and supply

Agriculture continues to be the primary user of land in Europe and supplies approximately one third of global agricultural trade[184]. The climatic trends alter warming and precipitation, resulting in a

[183] EEA 2020, Urban adaptation in Europe, https://www.eea.europa.eu/publications/urban-adaptation-in-europe.
[184] IPCC WG II AR6 chapter 13: 1843, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.

northward movement of agro-climatic zones in Europe. The current negative impacts of climate change on the agriculture sector in Europe will hereby continue in the future[185]. These impacts and their socio-economic effects are generally more severe in Southern Europe compared to Northern and Central Europe.

The key risk for European agriculture is a combination of heat and drought in summer, aggravated by compound effects of cold winters and excessive precipitation in autumn and spring. In 2012, 2016, and 2018, these meteorological extremes accounted for 30 % production loss relative to expectations[186]. In the future, yields for grain maize and wheat will decrease substantially; the losses in Southern Europe will reach 50 %[187]. While Northern and Central Europe will face lower effects, and for some crops even see increased yields[188], the growing numbers of climate extremes, tripling in frequency over the past 50 years[189], will cause losses that outweigh these gains in the long run[190]. Moreover, increasing water scarcity will limit the availability of irrigation as an adaptation option across all Europe, further adding to net yield losses.[191]

The production of livestock is affected in all open barns and outdoors. Increasing events of heat affect the health, nutrition, behaviour and welfare, performance and product quality of livestock[192]. Furthermore, climate change alters the prevalence, distribution and load of pathogens and their vectors.

Generally, food and fodder security will not be an issue in Europe, but cascading climate change impacts outside of Europe can affect the price, quantity and quality of products[193]. Consequently, the economic output from agriculture is projected to decrease by 7 % across all of Europe and by 10 % in Southern Europe; the prices for farmland in Southern Europe will decrease by 5 to 9 % per degree of warming[194]. Adaptation is necessary to counterbalance these effects. However, measures at farm level are often not implemented due to a lack of financial resources, policy initiatives, institutional capacity, and access to adaptation knowledge[195].

[185] EEA 2019, Climate change adaptation in the agriculture sector in Europe. Report No 4/2019, https://doi.org/10.2800/537176.
[186] IPCC WG II AR6 chapter 13: 1844 https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[187] IPCC WG II AR6 chapter 13: 1820, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[188] PESETA IV (2020), https://joint-research-centre.ec.europa.eu/system/files/2020-09/02_pesetaiv_agriculture_sc_august2020_en.pdf.
[189] IPCC WG II AR6 chapter 13: 1844 https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[190] IPCC WG II AR6 chapter 13: 1820, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[191] IPCC WG II AR6 chapter 13: 1820, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[192] IPCC WG II AR6 chapter 13: 1844, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[193] EEA 2019, Climate change adaptation in the agriculture sector in Europe. Report No 4/2019, https://doi.org/10.2800/537176.
[194] IPCC WG II AR6 chapter 13: 1844, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[195] EEA 2019, Climate change adaptation in the agriculture sector in Europe. Report No 4/2019, https://doi.org/10.2800/537176.

[NC8] 6.4.2 Forestry

'*Drought, excessive rain, and the compound hazards of drought and heat increased costs and cause economic losses in forest productivity*'[196]

The key risks for European forests are changes in temperature, precipitation, CO_2 levels, pests and wildfires[197]. All of them are altered by the northward movement of climatic zones in Europe, leading to generally warmer and drier summers, as well as to increased events of extreme heat or drought. Despite some positive effects (e.g. extended growing seasons) for forests in cold areas of Europe, the general trend indicates that climate change has significantly increased forest mortality. Singular extreme events, like the drought in 2018, have resulted in significant disruptions of the timber market and permanent damages to forests[198].

In a 3°C scenario, the potential forest productivity of pine and spruce will increase, while decreases of beech and oak will occur. However, water stress in combination with wildfires will cancel out productivity gains, and lead to an overall decline in forest productivity[199]. The increasing frequency of wildfires will expose 24% more people to high-to-extreme fire hazards[200], whereas no increase is projected for the frequency of windstorms and related forest damages[201].

[NC8] 6.4.3 Water resources and fisheries

European water systems are affected both by the abundance (coastal, river, pluvial floods) and by the lack of water (drought, water scarcity). Overall, climate impacts are more severe in Southern Europe, but more people and a greater amount value are at risk in Western and Northern Europe.

Fishery and related industries (80 % marine, 18 % aquaculture, 3 % freshwater) provide a living for over 250 000 people, mostly in Southern Europe. The northward movement of climatic zones negatively affects yields from fisheries, with losses of 15-35 % during the last decade. However, the main impact on European fisheries is extraction, with 69 % of stocks being overfished and 51 % outside safe biological limits[202].

High adaptive capacity, low economic dependency on fishery, and low exposure to climate hazards make European countries the least vulnerable to climate change in global comparison[203]. Future

[196] IPCC WG II AR6 chapter 13: 1844, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[197] IPCC WG II AR6 chapter 13: 1836 https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[198] IPCC WG II AR6 chapter 13: 1847, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[199] IPCC WG II AR6 chapter 13: 1847, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[200] PESETA IV 2020, https://joint-research-centre.ec.europa.eu/system/files/2020-09/09_pesetaiv_wildfires_sc_august2020_en.pdf.
[201] PESETA IV 2020, https://joint-research-centre.ec.europa.eu/system/files/2020-09/13_pesetaiv_windstorms_sc_august2020_en.pdf.
[202] IPCC WG II AR6 chapter 13: 1844, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[203] IPCC AR6 WG II 2022, Fact sheet Europe

climate risks vary greatly between regions, sectors, and species. Overall, the abundance of most commercial fish stocks is projected to reduce by 35 % (up to 90% for individual stocks) in a 4 °C scenario. Here, ocean acidification will develop into a key risk for marine food production.[204]

[NC8] 6.4.4 Infrastructure and Urban Settlements

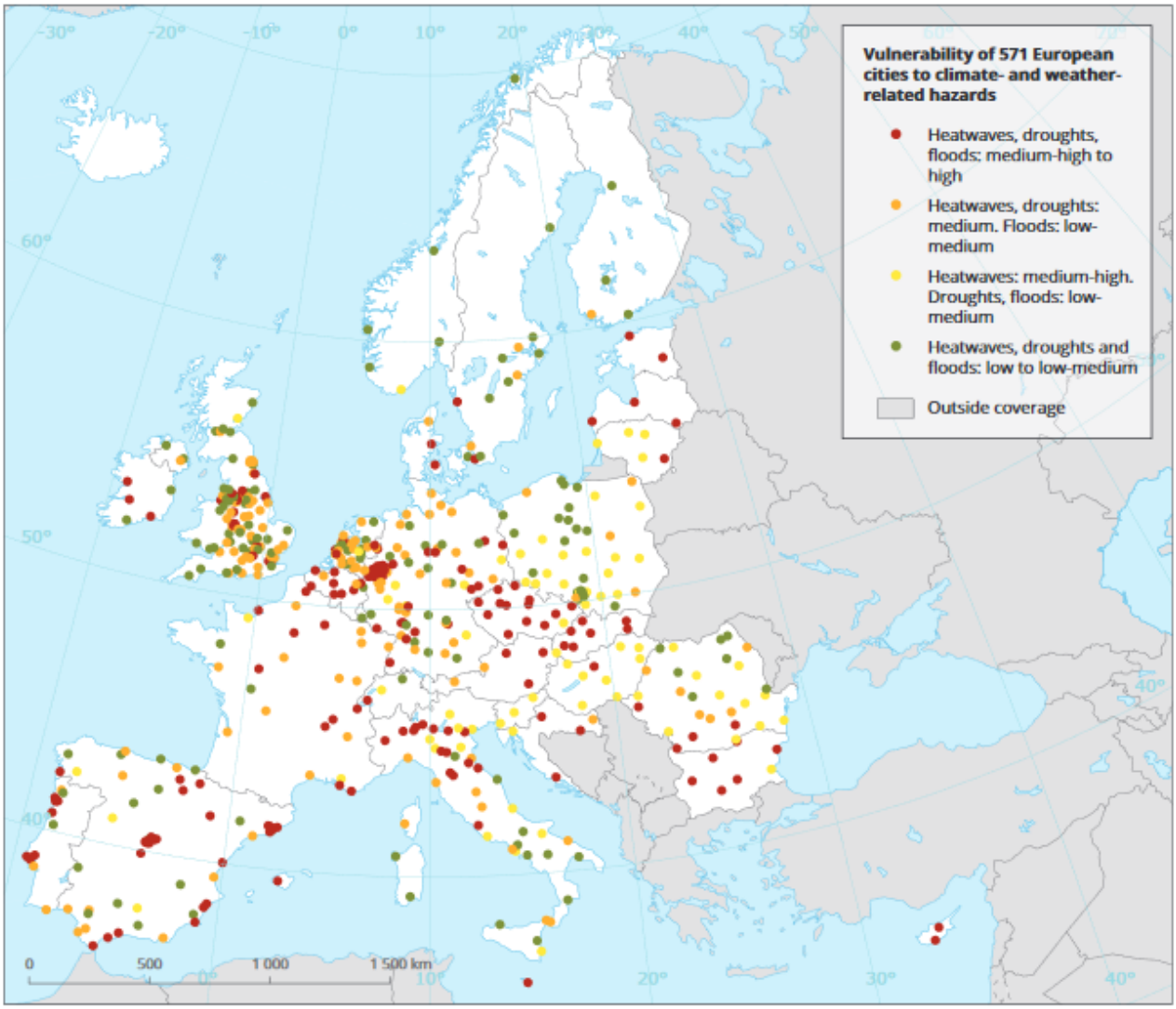
[NC8] 6.4.4.1 Urban areas

'74 % of Europeans live in urban areas, where the effect of heatwaves on human health is exacerbated by microclimates due to buildings and infrastructure, heat island effects, and air pollution', states the IPCC[205]. The multiple risks for urban areas that follow increasing global temperatures can generally be clustered into extreme heat, floods, droughts, wildfires, and vector-borne diseases[206]. Already in a 2 °C scenario, widespread impacts on infrastructure and businesses can be expected, including risks for energy supply, transport infrastructure, and increased demands for water and air conditioning[207]. Even today, heatwaves claim more human lives than any other weather event, and over 10 % of the European population lives in potential river floodplains[208]. The related risks are aggravated by development tendencies such as increased surface sealing, urban sprawl, and unprepared social infrastructure (e.g. cooling in schools and hospitals, lack of green spaces, outdated sewage systems). The EEA[209] concludes that despite early warnings 'Europe is unprepared and extremely vulnerable' to the expected extreme events.

Between the European regions, more severe consequences (e.g. heatwaves, urban heat islands, water stress, vector-borne diseases) are projected in the south compared to the north. Overall, the number of people exposed to the four IPCC key risks (heat, drought, water scarcity, floods) will double, causing substantial damage to socio-economic and natural systems. However, a significant knowledge gap exists regarding the exact interaction of different risks (climatic and non-climatic) with each other. This 'prevents the precise assessment of systemic risks, socio-ecological tipping points and limits to adaptation'[210].
The map in Figure 44 shows the climate vulnerability of 571 European cities, assessing hazards such as heatwaves, flooding and droughts. Clear spatial patterns of climate risks among European cities are hardly identifiable, suggesting that their vulnerability depends more on local context conditions than on geographical features.

[204] IPCC WG II AR6 chapter 13: 1846,https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[205] IPCC WG II AR6 chapter 13: 1860, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[206] EEA 2020: Urban Adaptation Report, https://www.eea.europa.eu/publications/urban-adaptation-in-europe.
[207] IPCC WG II AR6 chapter 13: 1820, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[208] EEA 2020: Urban Adaptation Report, https://www.eea.europa.eu/publications/urban-adaptation-in-europe.
[209] EEA 2020: Urban Adaptation Report, https://www.eea.europa.eu/publications/urban-adaptation-in-europe.
[210] IPCC WG II AR6 chapter 13: 1821, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.

Figure 44: Climate and weather vulnerability of 571 European cities



Note: Based on investigation into 571 European cities included in the Geographic Information System of the Commission Urban Audit 2004 Database. The information on individual cities included in this analysis, following the original classification into seven clusters, is available through the Urban Adaptation Map Viewer (factsheets).

Source: Adapted from Tapia et al. (2017).

Source: EEA 2020, Urban adaptation in Europe. EEA Report No 12/2020, page 20[211].

[NC8] 6.4.4.2 Buildings

Especially in cities, buildings are impacted by the urban heat island effect, exposing an increasing amount of vulnerable people (e.g. children and the elderly) to heat, e.g. in schools, hospitals and social housing. Overheating of buildings during summer will happen more frequently, decreasing the amount of thermal comfort hours by 74 % in Southern Europe[212]. Particularly buildings with insufficient ventilation or solar protection and highly insulated buildings are at risk of overheating.

[211] EEA 2020, Urban adaptation in Europe, https://www.eea.europa.eu/publications/urban-adaptation-in-europe.
[212] IPCC WG II AR6 chapter 13: 1854, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.

This risk is generally higher for cities in Northern and Western Europe, as solar shading and air conditioning are less common in buildings. At the same time, the energy demand for cooling will increase significantly: By 81-104 % (2035) and 91-244 % (2065) in Southern Europe compared to 1961-1990, and by 31-73 % (2035) and 165-323 % (2100) in Northern Europe compared to 1996-2005[213]. The energy demand strongly depends on the degree of global warming and how adaptation measures are implemented. Building infrastructure thus bears a significant potential for adaptation (e.g. cooling, ventilation, greening, flood protection) with possible co-benefits for health and biodiversity. However, under high global warming scenarios, adaptation options will no longer be sufficient to remove risks caused by overheating[214].

In regions with permafrost, buildings and infrastructure are exposed to a growing number of thawing-freezing cycles, increased debris- and mudflow, permafrost melting, and modern tectonic processes that lead to their accelerated ageing.[215]

[NC8] 6.4.5 Transport

Transport infrastructure faces significant climate and non-climate risks, similar to the developments in urban areas (see above). Overall, these risks develop around the increasing impacts from extreme heat, floods and droughts, and the subsequent risks for businesses and energy supply. Recent heat waves have already led to road melting, railway asset failures, and speed restrictions, yet the resulting risks for disruptions of supply chains are insufficiently understood[216].

Future risks for **maritime transport** include sea level rise that disturbs port operations especially in Northern and Western Europe, while Southern European ports could face increased hours of non-operability due to changing of waves agitation.[217] Low water levels can disturb **riverine transport** in the Rhine and Danube. In a 3 °C global warming scenario, **road transport** faces risks of blow-up and rutting during summer, especially in low-altitude regions in Western, Central, and Eastern Europe. Northern European roads will be exposed to higher frequencies of freezing-thawing cycles, and thus age faster. A two- to tenfold increase of heavy precipitation events is projected to severely damage roads across Europe during autumn and winter, while landslides will threaten road networks particularly in Western and Southern Europe.[218] A tripling of flood risks, especially in Western Europe, will increase public expenditure for **railway transport** by approximately EUR 1.2 billion annually, in addition to the increased need for saloon cooling in passenger transport. Future risks for **airborne transportation** mainly result from inundation events and storm surges, which are projected

[213] IPCC WG II AR6 chapter 13: 1854, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[214] IPCC WG II AR6 chapter 13: 1858, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[215] IPCC WG II AR6 chapter 13: 1856, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[216] IPCC WG II AR6 chapter 13: 1851, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[217] IPCC WG II AR6 chapter 13: 1851, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[218] IPCC WG II AR6 chapter 13: 1851, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.

to double between 2030 and 2080. The reduced lift generation of warm air could lead to weight restrictions for large aircrafts. The possible effects of increasing extreme weather events for European airports are yet not sufficiently quantified[219].

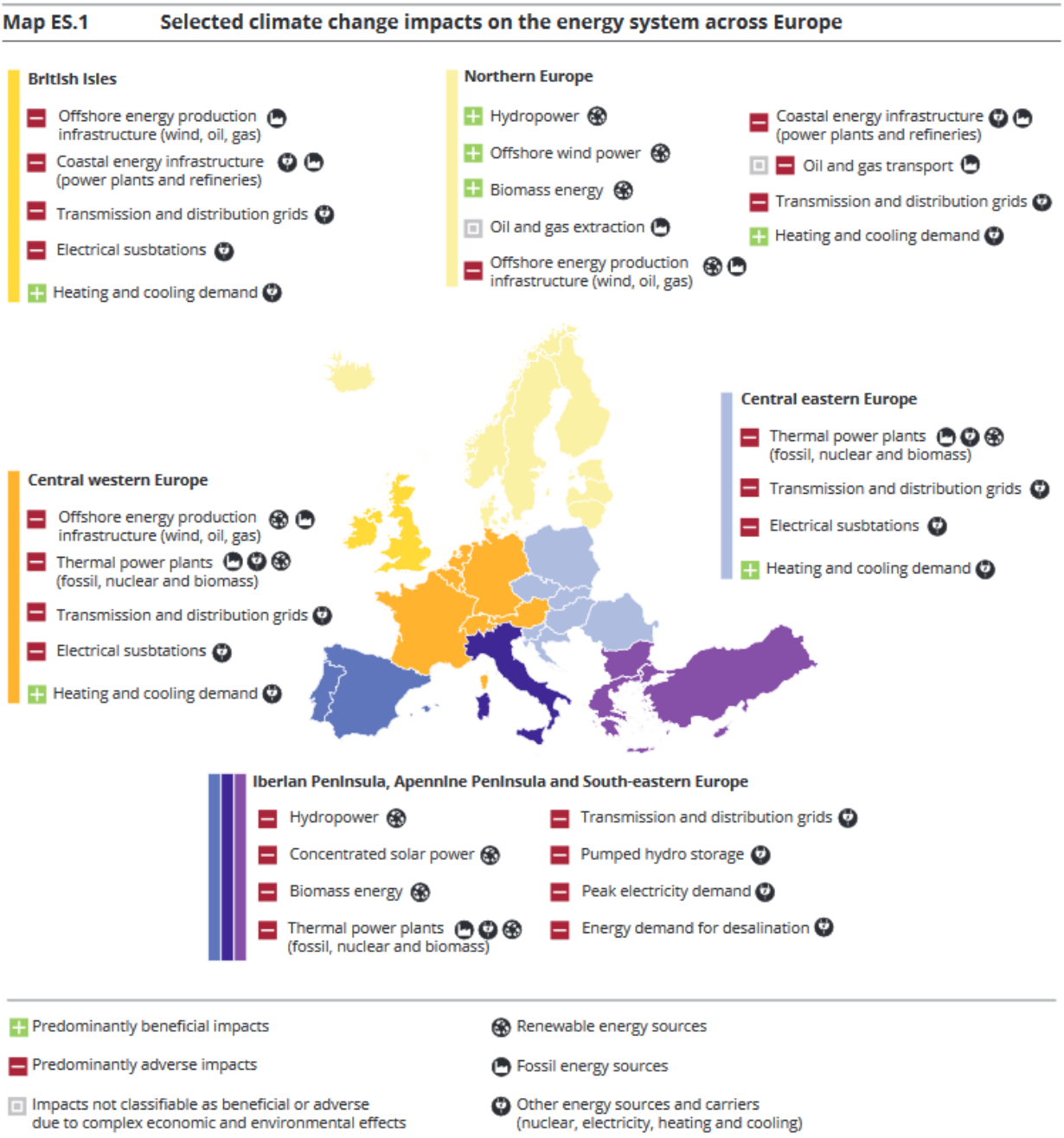
[NC8] 6.4.6 Energy

The European energy supply faces risks resulting from climate change and extreme weather events, which affect the availability, transformation, transmission, distribution, storage, and demand of energy. These risks are accelerated not only by the progression of climate change, but also by an increasing dependency on a reliable energy supply and a growing share of climate-sensitive renewable energy sources. While almost all European Member States address energy security in their national risk assessments or adaptation strategies, further action is required to consider climate change impacts in the development of long-term energy strategies on national and European level[220].

The energy sector is generally a large user of land and water and thus heavily affected by climate change impacts. Changes in mean air and water temperatures, sudden extremes, and changes in water availability make the sector essentially vulnerable.[221]. It is projected that water availability will increase in Northern and decrease in Southern Europe This will affect whether and how water can be used in thermal power plants (for cooling), as hydropower, in the production of bioenergy, in river-borne fuel transportation, and will increase the energy needed to provide water. Of these, the IPCC highlights the risks for thermoelectric power generation and hydropower, especially during heatwaves and in combination with droughts, where increased energy demand for cooling meets a decreasing availability of energy due to a lack of water. Moreover, extreme water inflow to dams after events of heavy precipitation and floods is projected to increase flood risks in power plants, while increasing temperatures could reduce the efficiency of steam and gas turbines[222]. The effects of extreme weather events, especially in combination, could amount to 'billions of euros per year'[223] in direct damage, with unquantified sums of indirect costs. The precise impacts vary largely by region but are generally more harmful in Southern Europe[224]. Overall, a shift of peak energy load from winter to summer could occur in many regions, challenging the stability of electricity networks, and thus leading to power curtailments or outages during climatic extremes as well as to increased electricity prices.

[219] IPCC WG II AR6 chapter 13: 1851, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[220] EEA 2019: Adaptation challenges and opportunities for the European energy system. Building a climate-resilient low-carbon energy system. EEA Report No 1/2019, https://www.eea.europa.eu/publications/adaptation-in-energy-system.
[221] EEA 2019: Adaptation challenges and opportunities for the European energy system. Building a climate-resilient low-carbon energy system. EEA Report No 1/2019, https://www.eea.europa.eu/publications/adaptation-in-energy-system.
[222] IPCC WG II AR6 chapter 13: 1850, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[223] EEA 2019: Adaptation challenges and opportunities for the European energy system. Building a climate-resilient low-carbon energy system. EEA Report No 1/2019, https://www.eea.europa.eu/publications/adaptation-in-energy-system.
[224] IPCC WG II AR6 chapter 13: 1850, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.

Figure 45: Climate change impacts on the energy system in Europe



Source: EEA 2019: Adaptation challenges and opportunities for the European energy system. EEA Report No 1/2019, page 7 [225].

[NC8] 6.4.7 Biodiversity

While biodiversity overall could remain stable, significant changes in species are projected to occur, leading to losses in native species and the establishment of non-native species in most European regions. Along with the general northward shift of climatic zones, a northward expansion of warmth-

[225] EEA 2019, Adaptation challenges and opportunities for the European energy system. Building a climate-resilient low-carbon energy system EEA Report No 1/2019, https://www.eea.europa.eu/publications/adaptation-in-energy-system.

adapted species is observed.[226] Furthermore, a change in timing of many natural processes – such as spring leaf unfolding, autumn senescence, and species flight dates – due to changes in seasonal temperatures, water and light availability. The associated impacts for terrestrial ecosystems are rated as high in a 2 °C global warming scenario, and very high in an over 3 °C global warming scenario. Amplified by land use changes, intensive land use, and disruption of habitat connectivity, the risks of species extinction become significant, particularly in the alpine tundra habitat[227] and the Pyrenees. The largest relative species losses are projected for plants and insects.[228] During the progressive subtropicalisation in Southern Europe, expanding into Western and Central Europe in a 3 °C GWL scenario, native species will be gradually replaced by warmth-adapted taxa. Here, European forests are particularly vulnerable. Due to reduced quantity and quality of harvested timber, increasing economic losses are expected[229].

[NC8] 6.4.8 Ecosystems and Ecosystem Services

Climate change has already resulted in significant losses of and damages to ecosystems and their services and will continue to do so. In a 2 °C global warming scenario, the suitable habitat space for current terrestrial and marine ecosystems will decrease, with irreversible changes occurring above 2 °C. [230]

Heat and drought in combination with land use changes display the key risk for functional **ecosystems on land**, causing possible long-term effects to local climates, pollination and soil protection services. Without increased restoration efforts, projections expect the **carbon storage** capacity of peatlands to shrink above 1.7 °C global warming, making them carbon emitters at 3 °C.[231] Moreover, fire-prone areas are projected to expand across Europe. Currently, the range of **pollinators** decreases and changes significantly throughout Europe, and lags in the response to changing climatic conditions are likely to strengthen these effects in the future. Moreover, non-climate impacts accelerate the decline of pollinators, such as habitat loss, pollution, pesticides, pathogens, and invasive alien species. Climate-driven **soil erosion** affects Southern and Western Europe most; however, the dominant causes of soil erosion are non-climatic: land use changes and management.[232]

Marine ecosystems are exposed to increased risks in response to further warming, including changes in community composition and biodiversity patterns. Coastal fish stocks are projected to decrease by

[226] IPCC WG II AR6 chapter 13: 1834, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[227] PESETA IV 2020, https://joint-research-centre.ec.europa.eu/system/files/2020-09/08_pesetaiv_alpine_tundra_habitat_loss_sc_august2020_en.pdf.
[228] IPCC WG II AR6 chapter 13: 1837, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[229] IPCC WG II AR6 chapter 13: 1835, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[230] IPCC WG II AR6 chapter 13: 1820, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[231] IPCC WG II AR6 chapter 13: 1835, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[232] IPCC WG II AR6 chapter 13: 1838, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.

10 % (1.5 °C global warming) to 60 % (4 °C global warming), intensified by overexploitation.[233] Marine heat waves will put many species under threat, particularly in Southern Europe, increasing risks for biodiversity and ecosystem services. Ocean acidification, as a direct result of global warming and the rise in CO_2, is projected to rise in all European waters, influencing growth and reproductive success of calcifying organisms with negative effects for marine habitats and the whole food-web structure. Climate-related deoxygenation impacts are expected in the Baltic and the Black Sea, where warming and eutrophication have altered ecosystem functioning and anoxic dead zones are projected to increase[234], [235].

[NC8] 6.4.9 Health

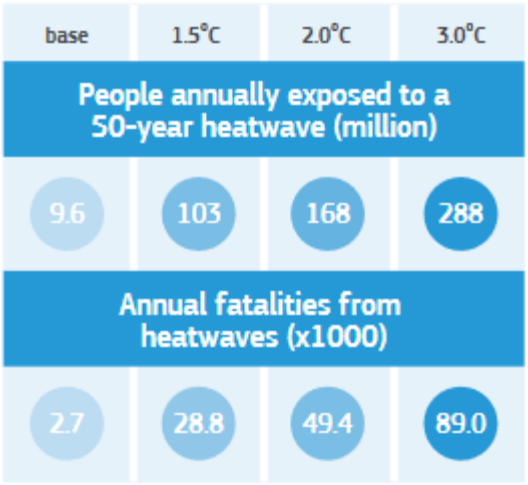
Key risks for human health are associated with three environmental development trends – environmental pollution, degradation, and climate change – that intersect with three social development trends: an aging European population, urbanization and inequity. However, reliable risk assessments are obstructed by a lack of environmental health data.[236]

Climate-related health risks will become more severe in Southern and Western Europe, and particularly in urban areas, where currently 74 % of Europeans live. Thermal comfort hours during summer will decrease by as much as 74 % in Southern Europe in a 3 °C global warming scenario.[237] Above 3 °C, people and health systems will meet adaptation limits, particularly in regions where health systems are already under pressure. The social groups most vulnerable to heat are elderly, children, pregnant women, socially isolated people, people with low physical fitness and those suffering from pre-existing medical conditions[238]. Here, health-risks from heat gradually increase, as the European population is aging. Consequently, mortality from extreme heat could increase by 30 times up to 2100, resulting in 90 000 annual deaths in a 3 °C global warming scenario[239]. This is approximately as much as the total amount of heat-related deaths between 1980-2020[240]. In the same scenario, nearly 300 million Europeans per year will be exposed to a heatwave that is seen as 'intense'

[233] IPCC WG II AR6 chapter 13: 1841, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[234] IPCC WG II AR6 chapter 13: 1840f., https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[235] IPCC WG II AR6 chapter 13: 1842, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[236] To assess how many deaths are attributable to the environment in the EU, the EEA 2020 refers to the 'most recent available data', collected by the WHO for the year 2012 and published in 2016. See: EEA 2020b: Healthy environment, healthy lives: how the environment influences health and well-being in Europe. EEA Report No 21/2019, p. 6. https://www.eea.europa.eu/publications/healthy-environment-healthy-lives.
[237] IPCC WG II AR6 chapter 13: 1854, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[238] IPCC WG II AR6 chapter 13: 1860, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[239] PESETA IV 2020, https://joint-research-centre.ec.europa.eu/system/files/2020-09/11_pesetaiv_heat_and_cold_sc_august2020_en.pdf.
[240] EEA 2022, Economic losses and fatalities from weather- and climate-related events in Europe, https://www.eea.europa.eu/publications/economic-losses-and-fatalities-from

today[241]. Vector-borne diseases are projected to increase due to a northward shift of climatic zones in Europe[242], posing health risks that are yet insufficiently understood.

Figure 46: Exposure to and fatalities from heatwaves in Europe, in present and for three global warming scenarios in 2100



Source: PESETA IV Summary Fact Sheet "Climate change impacts of heat and cold extremes on humans", page 1.[243]

[NC8] 6.4.10 Economic activity and employment

Links between climate change and economic activity are mostly related to drought, heat, and extreme events. Generally, a strong distributional pattern of economic costs is projected across Europe, with higher costs in Southern and South-Eastern Europe[244]. These costs rise towards the end of the century, linked to rising temperatures. Direct economic benefits of ambitious climate mitigation policies can only be expected after 2050, due to lags in response of the climate system.

Drought damages increase significantly in a 3 °C global warming scenario and could be five times higher than today, increasing from EUR 9 to 45 billion per year[245]. The strongest increase in damages is expected in the Mediterranean and Atlantic regions.

Heat waves in Europe have been linked with an increased risk of occupational injuries and changes in labour productivity, thus decreasing economic activity. Here, the most vulnerable sectors are agriculture, construction, and manufacturing and service sectors without air-conditioning. The

[241] PESETA IV 2020, https://joint-research-centre.ec.europa.eu/system/files/2020-09/11_pesetaiv_heat_and_cold_sc_august2020_en.pdf.
[242] EEA 2020a, Urban Adaptation Report, https://www.eea.europa.eu/publications/urban-adaptation-in-europe.
[243] PESETA IV Summary Fact Sheet, Climate change impacts of heat and cold extremes on humans, https://joint-research-centre.ec.europa.eu/system/files/2020-09/11_pesetaiv_heat_and_cold_sc_august2020_en; Urban Adaptation Report, https://www.eea.europa.eu/publications/urban-adaptation-in-europe.
[244] COACCH 2021, The Economic Cost of Climate Change in Europe: European Results. Policy brief by the COACCH project, https://www.coacch.eu/wp-content/uploads/2018/03/Policy-brief-Policy-maker-EUROPE-final.pdf.
[245] PESETA IV 2020, https://joint-research-centre.ec.europa.eu/system/files/2020-09/07_pesetaiv_droughts_sc_august2020_en.pdf.

resulting GDP losses are projected to increase fivefold compared to 1981-2010 and are highest in Southern Europe[246].

Loss and damage from climate and weather extreme events in 32 European countries[247] amounted to EUR 450-520 billion between 1980 and 2020, with one quarter to one third of the losses insured and 3 % of all events being responsible for 60 % of the damages[248].

Despite an expected increase in the frequency of extreme climate and weather events, the risks caused by specific environmental hazards (e.g. heavy precipitation, vector-borne diseases, shifts in biodiversity and ecosystem services) are not yet assessed for many economic sectors.

[NC8] 6.4.11 Social issues

Social risks and vulnerabilities emerge mainly around the issues of poverty and inequality, migration, loss and damage to livelihoods and cultural heritage. They generally show many interlinkages and synergetic effects with other issues such as health, economic activity and urban settlements.

Poor and marginalised households tend to be affected stronger by climate and weather extremes – particularly heat, drought, flooding, and diseases – and have less adaptive capacities. Energy-poor households, for example, often live in thermally inefficient homes but cannot afford air conditioning to avoid overheating in summer. While energy poverty was traditionally more prevalent in Southern and Eastern Europe, climate change will increase its relevance in regions where cooling in summer was not necessary. An exception to this tendency is residential waterside developments in Western Europe, which will see increased flood vulnerability for high-income residents[249].

Migration and displacement in Europe today take place mostly within regions and national borders and are mainly triggered by economic disparities, with indications towards a small share of climate-driven impacts[250]. However, uneven distribution of future risks and adaptive capacities may increase pressure for migration.

Loss and damage to **livelihoods** occurs in indigenous communities in Europe, especially in the polar region (e.g. Sámi reindeer herder). Cultural heritage is at risk along the coasts of the North Sea and the Mediterranean, potentially causing income loss due to reduced tourism[251].

[246] IPCC WG II AR6 chapter 13: 1863, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[247] The 32 member countries of the European Environment Agency, i.e., the EU-27, Iceland, Liechtenstein, Norway, Switzerland and Turkey.
[248] EEA 2022: Economic losses and fatalities from weather- and climate-related events in Europe. Briefing no. 21/2021. https://data.europa.eu/doi/10.2800/530599.
[249] IPCC WG II AR6 chapter 13: 1865, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[250] IPCC WG II AR6 chapter 13: 1865, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
IPCC WG II AR6 chapter 13, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.

[NC8] 6.4.12 Finance

Included into this report for the first time, the available information on climate risks for finance in Europe is yet sparse. Though there is emerging evidence that financial markets are affected by climate risks[252], assessments regarding concrete effects are insufficient[253].

The IPCC WGII AR 6 chapter 13 (2022) includes climate risks for finance under the headings "multiple climate risks" and "transboundary risks" and specifies that available models may underestimate their importance due to their complexity.[254] However, regarding risks from coastal and riverine floods, emerging literature suggests that they "could be amplified through the global financial system, and generate a systemic financial crisis"[255].The EEA 2019[256] finds that in the course of sustainability transitions, public spending on the environment must expand beyond the current 1.5 % of total budgets, and entail a tax reform that takes into consideration that meeting the EU's climate and energy targets will erode the current energy tax base.[257] Moreover, the increasing awareness of climate risks can cause many investors to choose financing activities that are perceived as climate-risk free, eroding the financing for climate-risk prone activities[258].

In their final report of 2018, the High-Level Expert Group on Sustainable Finance proposed nine "early recommendations" for climate risk mitigation.[259] As another example for concrete suggestions, the PLACARD project[260] (2015-2019) suggested five measures to prepare financial markets for climate extreme events. However, an assessment of climate risks for finance is lacking here. Even among the finance industry, climate risks still seem to be neglected, as only 5% of EU pension funds have considered their effects.[261] Consequently, the HLEG concludes that "a proper understanding of the dynamic of these risks over time is essential for the sector as a whole"[262].

[252] IPCC WG II AR6 chapter 13: 1821, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[253] IPCC WG II AR6 chapter 13: 1859, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[254] IPCC WG II AR6 chapter 13: 1881, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[255] IPCC WG II AR6 chapter 13: 1871, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[256] The sustainability transition in Europe in an age of demographic and technological change. An exploration of implications for fiscal and financial strategies. EEA Report No 23/2019, https://www.eea.europa.eu/publications/sustainability-transition-in-europe.
[257] The sustainability transition in Europe in an age of demographic and technological change. An exploration of implications for fiscal and financial strategies. EEA Report No 23/2019: 46, https://www.eea.europa.eu/publications/sustainability-transition-in-europe.
[258] The sustainability transition in Europe in an age of demographic and technological change. An exploration of implications for fiscal and financial strategies. EEA Report No 23/2019, https://www.eea.europa.eu/publications/sustainability-transition-in-europe.
[259] HLEG 2018, https://finance.ec.europa.eu/publications/high-level-expert-group-sustainable-finance-hleg_en.
[260] PLACARD, https://www.placard-network.eu/about-us/.
[261] HLEG 2018: 20, https://finance.ec.europa.eu/publications/high-level-expert-group-sustainable-finance-hleg_en.
[262] HLEG 2018: 71, https://finance.ec.europa.eu/publications/high-level-expert-group-sustainable-finance-hleg_en.

[NC8] 6.5 Adaptation policies and strategies

As shown in the previous three sub-chapters, climate change is happening today and will continue, as greenhouse gas emissions are still growing. The EU and its Member States are committed in the Paris Agreement to keeping global warming well below 2°C compared to pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels[263]. In addition, the European Climate Law proposal provides the foundation for increased ambition and policy coherence on adaptation. It sets to minimise current and future impacts of climate change, enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change in its Member States through a range of policies and instruments, acknowledging that climate change is an area of shared competence between the EU and its Member States.

Chapter 6.4 of the EU's Seventh National Communication (NC7) provides information on the development of an EU-wide framework for adaptation, which started in 2005[264] and led to the adoption of the EU strategy on adaptation to climate change in 2013[265]. The EU Adaptation strategy[266] aimed to contribute to a more climate-resilient Europe and to develop a coherent approach in adaptation. The NC7 summarises in chapter 6.6 the progress of implementation along the three objectives and eight actions achieved up to 2017. As stated in the EU Adaptation strategy, a report of the European Commission on the state of its implementation to the European Parliament and the Council was submitted in November 2018[267]. Building on the evaluation of the 2013 EU Adaptation Strategy (cf. [NC8] 6.6.1), the European Commission announced in 2019 a new, more ambitious EU Adaptation to deepen and expand adaptation actions in the European Green Deal[268]. The new EU Adaptation Strategy was published on 24 February 2021[269].

With the European Green Deal, the EU is striving to care for nature in Europe and to improve the well-being and health of people and aspires to be the first carbon-neutral continent in the world by 2050. It is a roadmap to transform the EU`s economy, and includes a package of ambitious targets and initiatives. Regarding climate change adaptation, it sets out to strengthen the efforts on climate proofing, resilience building, prevention and preparedness as crucial components. Furthermore, work on adaptation should ensure that 'across the EU, investors, insurers, businesses, cities and citizens are able to access data and to develop instruments to integrate climate change into their risk management practices'[270]. In order to reach the objectives of the European Green Deal, the EU adopted the

[263] Adaptation Communication of the European Union, https://unfccc.int/documents/307266.
264 Report from the Commission to the European Parliament and the Council on the implementation of the EU Strategy on adaptation to climate change COM(2018) 738 final, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0738&from=EN.
[265] Seventh National Communication of the European Union, https://unfccc.int/documents/198246.
[266] An EU Strategy on adaptation to climate change, COM(2013) 216 final, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0216&from=EN.
[267] Report from the Commission to the European Parliament and the Council on the implementation of the EU Strategy on adaptation to climate change COM(2018) 738 final.
[268] The European Green Deal COM(2019) 640 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640.
[269] Adaptation to Climate Change: Blueprint for a new, more ambitious EU strategy, https://ec.europa.eu/clima/system/files/2020-05/blueprint_en.pdf .
[270] The European Green Deal, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

Taxonomy Regulation[271] in 2020 (cf. section [BR5] 3.1.1.4 in the annexed Fifth Biennial Report). This is a classification system that aims to create a common understanding for sustainable activities, focusing on adaptation as one of the six environmental objectives addressed.

In May 2020, the European Commission has published a blueprint for the new EU Adaptation Strategy[272] and launched an open public consultation[273] to invite stakeholders and citizens to inform the design of the new strategy. The European Commission adopted its new EU strategy on adaptation to climate change in February 2021[274]. It outlines a long-term vision for the EU to become a climate-resilient society, fully adapted to the unavoidable impacts of climate change by 2050. The strategy aims to reinforce the adaptive capacity of the EU and minimise vulnerability to the impacts of climate change, in line with the Paris Agreement[275] and the European Climate Law[276], which provide the framework for increased ambition on adaptation by 2050. The Climate Law commits the EU and its Member States to make continuous progress to boost adaptive capacity, strengthen resilience and reduce vulnerability to climate change[277].

The new EU Adaptation Strategy 2021 pursues three objectives and proposes a range of actions in order to meet them[278]:

- To make adaptation smarter: improving knowledge and managing uncertainty
    - pushing the frontiers of knowledge on adaptation (e.g. by closing knowledge gaps on climate impacts and resilience through Horizon Europe[279], Digital Europe[280], Copernicus[281] and EMODnet[282]);
    - securing more and better data on climate-related risk and losses (e.g. by supporting the use of Risk Data Hub, extending the scope of public access to environmental information); and
    - enhancing and expanding the European Climate Adaptation Platform (Climate-ADAPT) as the European platform for adaptation knowledge (e.g. by establishing a European climate and health observatory under Climate-ADAPT).

[271] Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32020R0852.
[272] Adaptation to Climate Change: Blueprint for a new, more ambitious EU strategy, https://ec.europa.eu/clima/system/files/2020-05/blueprint_en.pdf.
[273] Commission launches online public consultation on new EU strategy on adaptation to climate change, https://ec.europa.eu/clima/news-your-voice/news/commission-launches-online-public-consultation-new-eu-strategy-adaptation-climate-change-2020-05-14_en.
[274] Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Chang,e https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0082&from=EN.
[275] The Paris Agreement https://www.un.org/en/climatechange/paris-agreement.
[276] Proposal for an European Climate Law https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0082&from=EN.
[277] European Climate Law https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119.
[278] EU Adaptation Strategy https://ec.europa.eu/clima/eu-action/adaptation-climate-change/eu-adaptation-strategy_en.
[279] Horizon Europe, https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en.
[280] Digital Europe, https://www.digitaleurope.org/.
[281] Copernicus, https://www.copernicus.eu/en.
[282] EMODNET, https://emodnet.ec.europa.eu/en.

- To make adaptation more systemic: supporting policy development at all levels of governance and sectors
    - improving adaptation strategies and plans (e.g. by offering support to build administrative capacity in Member States through its Technical Support Instrument, updating the guidelines, harmonizing monitoring, reporting and evaluation);
    - supporting local adaptation action (e.g. by launching an adaptation support facility under the EU Covenant of Mayors);
    - integrating climate resilience in macro-fiscal policy (e.g. developing ways to measure the potential impact of climate-related risks on public finances); and
    - promoting nature-based solutions for adaptation (e.g. by developing the financial aspects of nature-based solutions and foster the development of financial approaches and products that also cover nature-based adaptation).
- To speed up adaptation across the board: bridging the adaptation gap
    - accelerating the roll-out of adaptation solutions (e.g. by implementing the Horizon Europe Mission on Adaptation, integrating adaptation in the update of 'Natura 2000' – the EU network of protected areas, in the Forest Strategy, etc.);
    - reducing climate-related risk (e.g. by enhancing climate proofing guidance and increasing cooperation with standardisation organizations, developing an EU-wide climate risk assessment);
    - closing the climate protection gap (e.g. by helping to examine natural disaster insurance penetration in Member States, exploring the wider use of financial instruments), and
    - ensuring the availability and sustainability of freshwater (e.g. helping to ensure climate-resilient, sustainable use and management of water across sectors and borders by improving coordination of thematic plans).

In addition, the new EU Adaptation Strategy aims to increase the support for international climate resilience and preparedness. The aim is to provide resources, prioritise action and increase effectiveness, through the scaling up of international finance and through stronger global engagement and exchanges on adaptation. It acknowledges a number of global agreements such as the Paris Agreement, the Sendai Framework for Disaster Risk Reduction and the Sustainable Development Agenda.

First actions included in the EU Adaptation Strategy 2021 have already been implemented, as presented in [NC8] 6.6.2. The strategy states that the 'full implementation of the actions would put Europe in a much better position to face climate impacts by 2030'.

Monitoring and evaluation framework

Monitoring progress on adaptation implementation is critical to assess whether and when further actions are needed and evaluating whether adaptation is successful[283]. As documented in chapter 6.5 in the EU's Seventh National Communication, monitoring, reporting and evaluation frameworks were at a very early stage in 2017, and they have advanced since then. Thus, in the EU, monitoring, reporting and evaluation has been planned or implemented at different levels, for different purposes and objectives.

On the EU level, the 2013 EU Adaptation Strategy was evaluated in 2018 in line with the 'Better Regulation Guidelines'[284] of the European Commission. The evaluation addressed five criteria: (i) effectiveness, (ii) efficiency, (iii) relevance, (iv) coherence and (v) EU added value. The results of the evaluation are presented in chapter [NC8] 6.6.1.

On the EU Member States level, formal reporting up to 2019 was based on the 2014 European Union Greenhouse Gas MMR[285] (cf. section [NC8] 3.3.1). Article 15 of the MMR focused on adaptation reporting by presenting key elements of their national adaptation actions including plans, strategies and implemented or planned actions to facilitate adaptation to climate change. Two reporting cycles under the MMR took place in 2015 and 2019 and the information was used to inform the country profiles on Climate-ADAPT[286].

Starting in 2021, the MMR was repealed by the adaptation reporting requirements set out under the Regulation on the Governance of the Energy Union and Climate Action, which aims to support achieving the energy and climate targets of the EU set for 2030[287]. This regulation asks Member States to develop an integrated National Energy and Climate Plan (NECP) for the 10-year period of 2021-2030. The final plans had to be submitted by the end of 2019 and are available online[288]; updates to these plans will be submitted by 30 June 2024 (final version). As of 2023, Member States will report on implementation of the NECPs biennially. The submitted information on the national adaptation actions need to be in accordance with the Commission Implementing Regulation adopted in 2020[289]. The structure itself takes into account and is in line with the UNFCCC and the Paris Agreement requirements. The related Commission Implementing Regulation includes, in Annex I, a list of information to be provided on national adaptation actions (e.g. on climate modelling, assessment of climate impacts, vulnerability and risks, legal and policy framework and institutional arrangements). The European Commission monitors the progress of the EU as a whole and based on

[283] IPCC WG II AR6 chapter 13, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[284] Communication Better regulation: Joining forces to make better laws, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:219:FIN.
[285] European Union Greenhouse Gas Monitoring Mechanism Regulation, https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1400596096197&uri=CELEX:32013R0525.
[286] The European Climate Adaptation Platform (Climate-ADAPT), https://climate-adapt.eea.europa.eu/countries-regions/countries.
[287] Regulation on the Governance of the Energy Union and Climate Action, https://eur-lex.europa.eu/legal-content/EN/TXT/?toc=OJ:L:2018:328:TOC&uri=uriserv:OJ.L_.2018.328.01.0001.01.ENG.
[288] National energy and climate plans, https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans_en#final-necps.
[289] Commission Implementing Regulation, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R1208.

the first NECP, an EU-wide assessment was published in 2020[290]. This report states that even though adaptation strategies are available in all Member States, around a quarter of them have not listed climate adaptation goals. Overall, the information provided in the NECP will facilitate the assessment of the EU's adaptation goals defined in the EU adaptation strategy and the European Climate Law[291], enable Member States and the European Union to exchange good practice and to evaluate their level of preparedness to deal with climate change. The country profiles on the European Climate Adaptation Platform (Climate-ADAPT) show the information reported by countries under the Governance Regulation[292].

The European Climate Law[293] entered into force in July 2021 and sets out an obligation for Member States to adopt national adaptation strategies and plans, in line with the EU adaptation strategy. The European Climate Law foresees that the European Commission regularly assesses the progress in adapting to climate change based on the reports submitted by the Member States.

[NC8] 6.6 Progress and outcomes of adaptation action

The IPCC AR6 WGII report concludes that in recent years, the EU and its Member States have significantly increased (i) the knowledge on adaptation in public and private sectors, (ii) the number of policy and legal frameworks and (iii) dedicated spending on adaptation[294]. While the range of available adaptation options has increased in most of Europe in recent years, information provision, technical measures and government policies are the most common ones implemented[295]. Transformative adaptation actions across Europe are limited to only a few local examples[296], thus, many regions remain under-prepared. The IPCC Report further concludes that current adaptation implementation is not happening at the 'scale, depth and speed needed to avoid risks' and that 'existing and planned adaptation measures are not sufficient to avoid the residual risk, especially beyond 1.5 °C global warming level'[297]. It highlights limited resources, lack of private sector and citizen engagement, insufficient mobilisation of finance, lack of political leadership, and low sense of urgency as key barriers constraining the implementation of adaptation[298]. The IPCC authors suggest closing the adaptation gap by moving more quickly beyond short-term planning and increasing the understanding of which inclusive, equitable adaptation options are feasible and effective in their specific context.

[290] An EU-wide assessment of National Energy and Climate Plans, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0564&from=EN.
[291] European Climate Law https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119.
[292] Country profiles at Climate - ADAPT https://climate-adapt.eea.europa.eu/countries-regions/countries.
[293] European Climate Law, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119.
[294] IPCC WG II AR6 chapter 13, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[295] See above.
[296] IPCC WG II AR6 chapter 13: 1819, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[297] IPCC WG II AR6 chapter 13: 1821, https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter13.pdf.
[298] See above.

[NC8] 6.6.1 Implementation of the 2013 EU strategy on adaptation to climate change

The four principle objectives of the new EU Adaptation Strategy adopted in 2021 are to make adaptation (i) smarter, (ii) faster and (iii) more systemic, and to (iv) step up international action on adaptation to climate change. This strategy was based on the evaluation and learnings of the 2013 EU Strategy on adaptation to climate change. The aim of the evaluation was to examine the implementation and performance of the Strategy, looking at its relevance, effectiveness, efficiency, coherence and added value for the EU.

Overall, the evaluation report published in 2018[299] shows that the strategy has delivered on its three specific objectives and eight actions. Chapter 6.6 of the EU's Seventh National Communication provides information on the implementation progress up to spring 2017. In the following, the results of the evaluation report 2018, completed with additional information, on the implementation of the eight actions are summarised.

Objective 1: Promoting action by Member States

- Encourage all Member States to adopt comprehensive adaptation strategies:
    - When the EU strategy was adopted in 2013, 15 Member States had a national adaptation strategy or plan in place. In 2021, all 27 have adopted such strategies and plans[300].
- Provide L'Instrument Financier pour l'Environnement (LIFE) programme funding to support capacity building and step up adaptation action in Europe (2013-2020):
    - From 2014-2018, LIFE funded 60 adaptation-related projects with EUR 184 million, which after their completion are estimated to impact one fourth of the EU territory through replication and transfer[301].
- Introduce adaptation in the Covenant of Mayors framework:
    - By 2018, more than 1 000 signatories from 25 EU Member States, representing around 60 million inhabitants, had committed to conducting vulnerability and risk assessments, to developing and implementing adaptation plans, and to reporting on their implementation[302]. In 2021, already more than 3 400 cities and towns in the EU participate in the Covenant of Mayors[303], showing the increasing importance of the topic.

[299] Report from the Commission to the European Parliament and the Council on the implementation of the EU Strategy on adaptation to climate change COM(2018) 738 final https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0738&from=EN.
[300] Adaptation Communication of the European Union 2021, https://unfccc.int/documents/307266.
[301] Report from the Commission to the European Parliament and the Council on the implementation of the EU Strategy on adaptation to climate change, COM(2018) 738 final.
[302] See above.
[303] Adaptation Communication of the European Union 2021, https://unfccc.int/documents/307266.

Objective 2: Better informed decision-making

- Bridge the knowledge gap:
    - As a result of the EU's research and innovation Framework Programmes, a substantial increase of adaptation knowledge can be recognized, although none of the priority knowledge gaps have been closed and new gaps have emerged[304].
- Further develop the European Climate Adaptation Platform (Climate-ADAPT) as the one-stop shop for adaptation information in Europe:
    - The evaluation of the European Climate Adaptation Platform (Climate-ADAPT) in 2018 showed that the three targets to (i) share the knowledge, (ii) assist the update of information and (iii) support cooperation among sectors and governance levels are still relevant. It has added value beyond national and transnational platforms as it is the main reference for state of the art of adaptation in Europe[305].

Objective 3: Climate-proofing EU action: promoting adaptation in key vulnerable sectors

- Facilitate the climate proofing of the CAP, the cohesion policy and the common fisheries policy:
    - Progress has been made in mainstreaming adaptation in EU policies and programmes, although there is clear room for improvement in some EU common policies, such as trade and fisheries. Under the European Regional Development Fund and Cohesion Fund, a substantial amount of funding can be directly tracked to adaptation-related investments[306].
- Ensure more resilient infrastructure:
    - The European Commission has requested that the European Standardisation Organisations update standards for climate-resilient infrastructure in the transport, energy and building sectors. Nevertheless, there is room to further expand the integration of adaptation in infrastructure, e.g. by prescribing climate proofing for any infrastructure funded by the EU[307].
- Promote insurance and other financial products for resilient investment and business decisions:

[304] Report from the Commission to the European Parliament and the Council on the implementation of the EU Strategy on adaptation to climate change, COM(2018) 738 final.
[305] The Evaluation of Climate ADAPT, https://climate-adapt.eea.europa.eu/metadata/videos/2018-fourth-webinar-on-the-evaluation-of-climate-adapt#:~:text=The%20Evaluation%20of%20Climate%20ADAPT%20The%20fourth%20webinar,it%20was%20held%20on%2028th%20of%20June%202018.
[306] Report from the Commission to the European Parliament and the Council on the implementation of the EU Strategy on adaptation to climate change, COM(2018) 738 final.
[307] See above.

- The strategy's action on insurance, especially in climate risk management, has not brought clear results yet, apart from enabling cooperation and raising awareness. In addition, the financial sector may not have been sufficient to overcome hurdles for public-private cooperation[308].

The outcome of the evaluation illustrates that the EU Strategy, a policy instrument with few administrative implications for most stakeholders, has succeeded in focusing decision-makers on the need to prepare for climate risks, in generating knowledge on adaptation and in mainstreaming adaptation into relevant EU level policies and financing instruments[309]. Thus, the European Commission concludes that the EU strategy is fit for its purpose but recognises that adaptation needs have intensified and diversified since 2013. Over the evaluation process, the European Commission has gained valuable insights on the first five years of putting the strategy into practice and deduced a list on lessons learned which has informed the new EU Adaptation Strategy.

[NC8] 6.6.2 Implementation of the EU Adaptation Strategy adopted in 2021

The Communication on the EU Adaptation Strategy[310] was adopted in February 2021. As a first concrete outcome, the European Climate and Health Observatory[311] was launched in March 2021 on the European Climate Adaptation Platform (Climate-ADAPT) to provide easy access to relevant resources (e.g. publications, tools, websites) related to climate change and human health. It is a joint initiative of the European Commission, the European Environment Agency and many other organisations.

In September 2021, the European Commission launched five EU missions to tackle big challenges in health, climate and the environment, and to achieve ambitious and inspiring goals in these areas. By 2030, the 'Mission on adaptation to climate change'[312] will deliver on the following specific objectives[313]:

- Preparing and planning for climate resilience, e.g. by providing general support to European regions and communities to better understand, prepare for and manage climate risks and opportunities, by preparing guidance for the development of comprehensive risk management plans;

- Accelerating transformations to climate resilience, e.g. by working with at least 150 regions and communities to accelerate their transformation to a climate-resilient future; and

[308] Report from the Commission to the European Parliament and the Council on the implementation of the EU Strategy on adaptation to climate change COM(2018) 738 final.
[309] See above.
[310] Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change, COM (2021) 82 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN.
[311] European Climate and Health Observatory https://climate-adapt.eea.europa.eu/observatory.
[312] Mission area: Adaptation to climate change https://climate-adapt.eea.europa.eu/eu-adaptation-policy/eu-mission-on-adaptation.
[313] European Mission on Adaptation to Climate Change, Implementation Plan https://ec.europa.eu/info/sites/default/files/research_and_innovation/funding/documents/climat_mission_implementation_plan_final_for_publication.pdf.

- Demonstrating systemic transformations to climate resilience, e.g. by delivering at least 75 large-scale demonstrations of systemic transformations to climate resilience across European regions and communities.

Potential resources directly available to the Mission from Horizon Europe are estimated at approximately EUR 368 million for the building up phase (2021-2023); further potential sources for financing are e.g. the European Regional Development Fund, the European Social Fund Plus and many others (cf. Mission Implementation Plan p. 28[314]).

The EU has a number of instruments in place to finance adaptation to climate change in Europe. The 2021 – 2027 Multiannual Financial Framework ensures that the EU budget`s (amounting to approximately EUR 1 800 billion in 2018 prices[315]) contribution to achieve climate objectives, both mitigation and adaptation, is set at a minimum of 25 % and rise to 30 % no later than 2027[316]. Therefore, climate change adaptation was implemented into major EU spending programmes.

The Recovery and Resilience Facility[317] is the key instrument at the heart of the 'NextGenerationEU' recovery funding programme, which amounts to EUR 723.8 billion (EUR 385.8 billion in loans, EUR 338 billion in grants). This facility 'aims to mitigate the economic and social impact of the COVID-19 crisis and make European economies and societies more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions'. EU Member States are developing national recovery and resilience plans approved by the Council for the period 2021-2026, which contain investments and reforms to address the key challenges identified in the 'European Semester' framework[318]. This also includes the new EU Strategy on Adaptation to Climate Change to make Europe a climate-resilient society by 2050.

In addition, at least 30% of the European Regional Development Fund and 37% of the Cohesion Fund investments will contribute to climate objectives. Accordingly, the Cohesion Fund and the European Regional Development Fund are expected to invest more than EUR 100 billion in projects related to climate and environment over the 2021-2027 period, more than 30% of the total envelope. At the heart of our climate-neutrality objective is the Just Transition Mechanism (JTM) and the Just Transition Fund (JTF). With a total allocation of EUR 19,2 billion, the JTF will alleviate the socio-economic impact resulting from the transition specifically in fossil-fuel dependent and carbon-intensive regions.

Further important funding streams related to adaptation are, for example, the European Structural and Investment Funds[319] (including the European Regional Development Fund for investments in a e.g. smarter, greener Europe[320] – INTERREG and the Cohesion fund to support investments in

[314] European Mission on Adaptation to Climate Change, Implementation Plan.
[315] Infographic - Multiannual financial framework 2021-2027 and Next Generation EU, https://www.consilium.europa.eu/en/infographics/mff2021-2027-ngeu-final/ .
[316] Multiannual financial framework, https://www.europarl.europa.eu/factsheets/en/sheet/29/multiannual-financial-framework.
[317] Recovery and Resilience Facility, https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en.
[318] The European Semester, https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester/framework/european-semester-explained_en.
[319] European Structural and Investment Funds, https://ec.europa.eu/info/funding-tenders/funding-opportunities/funding-programmes/overview-funding-programmes/european-structural-and-investment-funds_en.
[320] European Regional Development Fund, https://ec.europa.eu/info/funding-tenders/funding-opportunities/funding-programmes/overview-funding-programmes/european-structural-and-investment-funds_en.

environment and trans-European networks in transport infrastructure[321]) under the 2014-2020 programming period, the Common Agricultural Policy[322], the LIFE Programme with a sub-programme for adaptation[323], and the Horizon Europe programme funding research and innovation[324]. As one of the world's main financiers of climate action, the EIB announced, in its new climate roadmap, full support for the EU's new Adaptation Strategy. The EIB 'will ensure that all the operations it supports are climate-proof and will actively pursue investment opportunities in the development and deployment of climate-resilient technologies, products and services'[325]. Further EU funding of adaptation is summarised in the European Climate Adaptation Platform, CLIMATE-ADAPT[326].

[321] Cohesion Fund, https://ec.europa.eu/regional_policy/en/funding/cohesion-fund/.
[322] Common agriculture policy, https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-glance_en.
[323] LIFE Programme, https://cinea.ec.europa.eu/programmes/life_en.
[324] Horizon 2020, https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en.
[325] European Investment Bank, https://www.eib.org/en/about/priorities/climate-action/index.htm.
[326] EU funding of adaptation, https://climate-adapt.eea.europa.eu/eu-adaptation-policy/funding.

[NC8] 7 FINANCIAL, TECHNOLOGICAL AND CAPACITY-BUILDING SUPPORT

[NC8] 7.1 Introduction and key developments

This chapter includes information on the financial, technological and capacity-building support provided by the EU and its Member States. The EU support reported here is provided by EU institutions and the European Investment Bank (EIB) to developing countries that are Parties to the UNFCCC. In line with the national communication reporting guidelines, the information covers the calendar years of 2019 and 2020. Summary information on financial support provided in earlier years can be found in section [BR] 6.2. More specific information on climate finance provided by individual EU Member States is provided in respective Member States' National Communications or Biennial Reports.

The methodology used to track EU institutions and EIB support is outlined in Section [BR5] 6.2.3. This includes details on how support has been categorised as 'new and additional,' and how the purpose of the support has been defined as either mitigation, adaptation or cross-cutting.

Where the reporting guidelines require similar information to be provided in both the National Communication and the Biennial Report, such information has been provided in the Biennial Report only. In these cases, the reader will be referred to the respective chapter in the Biennial Report.

Key developments

- Climate finance by the EU, its Member States and the EIB have increased over the past 7 years, from EUR 9.5 billion in 2013 to EUR 23.5 billion in 2020, which amounts to an increase of almost 150%.
- The European Commission (EC) and the EIB committed EUR 5.7 billion climate finance to developing countries in 2019 and EUR 5.4 billion in 2020.
- Of the bilateral support committed to developing countries (total of EUR 5.1 billion in 2019-2020), EUR 2.1 billion were dedicated to climate change adaptation..

The EU has increased targeted support to the poorest and most vulnerable countries, through a variety of policies and measures, but specifically through the European Development Fund, Development Cooperation Instrument, and the EU Global Climate Change Alliance Plus (GCCA+) Initiative with respective commitments of EUR 30 500 million, EUR 19 600 million and EUR 432 million during 2014-2020.

[NC8] 7.2 Provision of 'new and additional' resources

The financial resources reported in the EU's Fifth Biennial Report/Eighth National Communication are considered 'new and additional resources,' meaning that they were committed after and not included in the previous National Communication or Biennial Report (i.e. the new and additional resources were committed in either 2019 or 2020). As EU budgets are determined on an annual basis, each annual commitment cycle represents new and additional resources.

This methodology, along with the process of allocating Rio Markers to projects and apportioning the resulting support, are described in detail in Section [BR5] 6.2.3 ‘Methodology for tracking the provision of finance, technology and capacity building support’.

Further information on the EU’s approach to the provision of climate finance, including the provision of new and additional resources, can be found in [BR5] Section 6.2.

[NC8] 7.3 Assistance to developing country Parties that are particularly vulnerable to climate change

The EU remains committed to supporting developing country Parties that are particularly vulnerable to climate change. Of total climate finance provided by the EC in 2019 and 2020, almost EUR 1 billion (19.4 %) was provided to Least Developed Countries (LDCs). The reason this reads ‘at least’ is because the EC marks its funding by country and by region, but in some cases climate finance goes to a collection of countries, and only a regional marker is used as a result, rendering it not possible to assign specific amounts to the individual countries in this regional group. Of the total climate finance provided in 2019 and 2020 to LDCs, at least EUR 426 million was marked for mitigation, EUR 477 million for adaptation and EUR 89 million for cross-cutting.

The EIB further entered into a memorandum of understanding with the Global Center on Adaptation to strengthen cooperation on climate change adaptation with a focus on the most vulnerable regions.

In addition, the EU is a member of the ‘InsuRelisience Global Partnership for Climate and Disaster Risk Finance and Insurance Solutions’ which brings together countries, civil society, international organisations, the private sector, and academia to support access to direct or indirect insurance coverage against the negative impact of climate- change-related hazards.

Further information on EU assistance to developing country Parties that are particularly vulnerable to climate change can be found in [BR5] section 6.2.

[NC8] 7.4 Provision of financial resources through multilateral channels

The EC’s statistical system categorises the large majority of its climate finance support as bilateral with multiple recipients, even where the finance is delivered through a multilateral organisation. Multilateral contributions to multilateral institutions operating in the field of climate change that are not earmarked for specific purposes are reported as climate-specific multilateral support.

The contribution of financial support by the EIB included in the EU’s Eighth National Communication/Fifth Biennial Report is categorised as multilateral since the EIB is considered a multilateral development bank as one of the largest multilateral providers of climate finance worldwide. All EIB funds that are reported here are provided in the form of loans alongside several equity investments, grants and guarantees. Multilateral support by the EC is provided in the form of grants.

Table 13 provides an overview of multilateral support committed by the EIB and the EC in 2019-2020.

Table 13: Multilateral financial support committed by the EIB and the EC in 2019-2020

Year	Mitigation		Adaptation		Cross-cutting		Total	
	EUR bn	USD bn	EUR bn	USD bn	EUR bn	USD bn	EUR bn	USD bn
EIB 2019	2.83	3.17	0.36	0.40	-	-	3.18	3.57
EC 2019	-	-	-	-	0.004	0.005	0.004	0.005
EIB 2020	2.16	2.42	0.65	0.73	-	-	2.81	3.15
EC 2020	-	-	-	-	-	-	-	-
Total	**4.99**	**5.59**	**1.01**	**1.13**	**0.004**	**0.005**	**6.00**	**6.72**

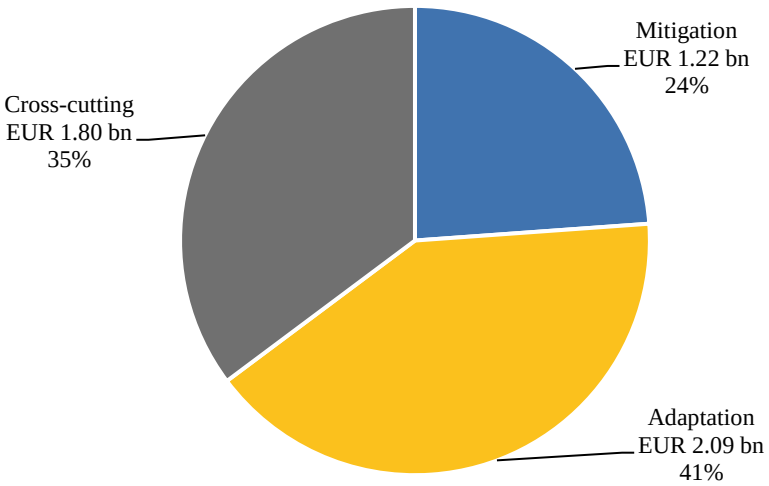
Source: European Commission and EIB.

Further information on EU provision of financial resources through multilateral channels can be found in [BR5] Section 6.3. A detailed breakdown of the climate finance provided by the EIB to developing countries is provided in Annex II of the EU's Fifth Biennial Report.

[NC8] 7.5 Provision of financial resources through bilateral channels

All of the European Commission's climate finance committed to developing countries through bilateral channels in 2019 and 2020 was in the form of grants and classified as official development assistance (ODA). This climate finance was marked by the Rio markers, as described in section [BR5] 1.3.2. In 2019 and 2020, the EC committed EUR 5.11 billion bilateral climate finance to developing countries. Of this total bilateral climate finance committed, EUR 1.2 billion was marked for mitigation, EUR 2.1 billion for adaptation, and EUR 1.8 billion as cross-cutting, as depicted in Figure 47.

Figure 47: EC bilateral climate finance committed (total of 2019 and 2020)



Source: European Commission.

Further information on EU provision of financial resources through bilateral channels including a split of bilateral climate finance according to recipient regions and sectors can be found in section [BR] 6.3.

[NC8] 7.6 Activities related to the transfer of technology and capacity building

The EU has mainstreamed technology transfer activities into many development cooperation activities. Since these activities form one component of a larger project, disaggregating the finance dedicated to these activities alone is not currently possible. The EU is contributing significantly to the transfer of technology to developing countries by financing climate action and development projects with a technology dimension, as well as through research collaboration. These include the EU's research framework programme, Horizon 2020[327], the Network for the Coordination and Advancement of Sub-Saharan Africa-EU Science and Technology Cooperation, the African, Caribbean and Pacific EU Technical Centre for Agricultural and Rural Cooperation[328] or the SWITCH to Green Flagship initiative[329].

Similarly, the EU has mainstreamed capacity-building activities into all development assistance, in line with the provisions of the Paris Declaration on Aid Effectiveness and the Accra Agenda for Action. Since these activities form one component of a larger project, disaggregating the finance dedicated to these activities alone is currently not possible. The EUROCLIMA+ regional programme[330] is an example of an important capacity building initiative by the EU. It supports Latin American countries in order to contribute to the achievement of the objectives of the Paris Agreement. To this end, the Programme provides a platform for highly articulated cooperation between the EU and the 18 Latin American partner countries that is capable of accompanying diverse processes and generating numerous results. With more than ten years of experience in the region, the Programme seeks to generate the enabling conditions and drive sustainable transformation processes through the implementation and/or updating of NDCs, and the configuration of a long-term vision that aims at carbon neutrality and resilience that is fair, leaves no one behind and contributes to post-pandemic recovery processes. EUROCLIMA+ offers support to partner countries to foster institutional strengthening processes. It does this in a variety of ways, from formal training on specific topics, to participation in specific events and workshops.

Further information on EU activities related to the transfer of technology and capacity building can be found in sections [BR5] 6.4 and [BR5] 6.5.

[327] Horizon 2020, https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020_en.
[328] Technical Centre for Agriculture and Rural Development, http://www.cta.int/en/.
[329] The EU SWITCH to Green Flagship Initiative, https://www.switchtogreen.eu/the-flagship-intiative/.
[330] EUROCLIMA+, https://europa.eu/capacity4dev/articles/euroclima-combatting-climate-change-latin-america.

[NC8] 8 RESEARCH AND SYSTEMATIC OBSERVATION

[NC8] 8.1 Introduction and key developments

EU research and systematic observation (RSO) have significantly furthered our understanding of- and ability to monitor the drivers and impacts of climate change. Today's pressing challenge is to explore and forecast the impacts of climate change and provide effective responses to it. Research and innovation play a crucial role in the EU's efforts to tackle climate change and to help the EU to achieve its objective of becoming the world's first climate-neutral continent by 2050. Furthermore, the bloc's systematic observation systems are producing important measurement data with which climate change and climate action can be monitored in the EU and beyond.

Current research and innovation activities in the EU related to climate action focus on the following topics: climate science, polar and ocean research, climate resilience and adaptation to climate change, knowledge for climate neutrality, forest fires and extreme weather events, nature-based solutions, education on climate change, citizen engagement and behaviour change and biodiversity[331]. In terms of systematic observation, the EU's earth observation programme, Copernicus, integrates measurement data from dedicated and contributing satellite missions, as well as in situ networks, to generate climate relevant information through the Copernicus services. There are six thematic streams of the Copernicus services: Atmosphere, Marine, Land, Climate Change, Security and Emergency[332].

One of the key developments since the last NC is the transition from the EU's research and innovation funding programme Horizon 2020 (2014-2020) to the new and improved funding programme Horizon Europe (2021-2027). Horizon Europe has a budget of 95.5 billion[333] to fund research, which is an increase of 30 % compared to the budget of Horizon 2020[334]. One new feature of Horizon Europe is the introduction of the 'missions', result-oriented actions focussing on key challenges. Of the five Horizon Europe missions launched to date, four are focussed on or highly relevant to climate action.

In terms of systematic observation, a key development since NC7 is the transition from the previous Copernicus programme to the next phase of Copernicus dubbed Copernicus 2.0. After establishing the new 2021-2027 EU Space Programme[335], which in addition to Copernicus includes components such as Galileo/EGNOS, Space and Situational Awareness (SSA) and Governmental Satellite Communication (GOVSATCOM), the 2021-2027 multiannual split of tasks and budget between the entrusted entities implementing Copernicus was adopted in 2021[336].

[331] Climate action research, funding, collaboration, projects and results, publications, news and events, https://ec.europa.eu/info/research-and-innovation/research-area/environment/climate-action_en.
[332] Copernicus website, https://www.copernicus.eu/en.
[333] including EUR 5.4 billion from 'Next Generation Europe' – programme of EU for Recovery from COVID-19 crisis.
[334] Horizon Europe, budget https://op.europa.eu/en/publication-detail/-/publication/1f107d76-acbe-11eb-9767-01aa75ed71a1.
[335] Regulation (EU) 2021/696, https://eur-lex.europa.eu/eli/reg/2021/696/oj.
[336] Annex 2 to Commission Implementing Decision C(2021)4316, https://www.copernicus.eu/sites/default/files/2021-06/Financing_Decision_C_2021_4316_final-Annex_2_Copernicus_Work_Programme.pdf.

[NC8] 8.2 General policy on and funding of research and systematic observation

[NC8] 8.2.1 General policy on research and systematic observation

Research, technological development and space are a shared competence of the EU and its Member States. Cooperation between the EU and Member States takes place within the framework of the European research area (ERA), which was established in the year 2000 to ensure a better organisation of research in Europe. Joint Programming Initiatives (JPI) are an instrument designed for the implementation of the ERA to promote concerted and joint planning, implementation and evaluation of national research programmes. Particularly relevant in the context of climate change are JPI-Climate[337], JPI Oceans[338] and the JPI on Agriculture, Food Security and Climate Change[339]. Another instrument of the ERA is the ERA-NET scheme, which supports coordination and cooperation of national and regional research programmes. In 2018, the EU started to revitalise the ERA. This process led to the adoption of the 'Pact for Research and Innovation in Europe'[340] in November 2021, which sets out commonly agreed values and principles and identifies the areas where Member States will jointly develop priority actions, supporting in this way the implementation of the vision and objectives of the new ERA[341,342].

Research activities in Member States towards low-carbon energy are planned through the Strategic Energy Technology Plan (SET-Plan), which the European Union adopted in 2008. In parallel to the launch of the SET-Plan, the European Energy Research Alliance was created to align the research and development activities of individual research organisations with the needs of the SET-Plan priorities, and to establish a joint programming framework at the EU level[343].

The European Commission outlines the EU's research and innovation strategy in strategy documents. The current research and innovation strategy for 2021-2024 specifies that the current goals are to help the European Commission to deliver its six priorities for the period 2019-2024. The first of these priorities is the implementation of the European Green Deal. The EU sees European research as a key driver and enabler for combating climate change and achieving the EU's objective of becoming the world's first climate-neutral continent by 2050.

The European Commission considers a modernised European Research Area and the new EU Research and Innovation Framework Programme Horizon Europe for the years 2021-2027 the main tools in the area of research to accelerate the achievement of the EU climate goals[344]. Horizon Europe furthermore continues the tradition of Horizon 2020 that research and systematic observation are tightly linked to one another. Copernicus, for example, was and is able to influence the setting of the

[337] JPI Climate, https://jpi-climate.eu/about-us/.
[338] JPI Oceans, https://www.jpi-oceans.eu/en.
[339] FACCEJPI, https://www.faccejpi.net/en/faccejpi.htm.
[340] Council Recommendations (EU) 2021/2122 on a Pact for Research and Innovation.
[341] History of the European Research Area, https://ec.europa.eu/info/sites/default/files/research_and_innovation/knowledge_publications_tools_and_data/documents/ec_rtd_factsheet-era-history.pdf.
[342] European Research Area, https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/our-digital-future/era_en#what.
[343] The EU SET-Plan, https://www.eera-set.eu/eera-in-context/set-plan.html.
[344] Strategic Plan 2020-2024, https://ec.europa.eu/info/sites/default/files/rtd_sp_2020_2024_en.pdf.

Horizon 2020/Horizon Europe research agenda and thus benefit from advances in research to expand its observation component and further evolve its services. Moreover, emerging and expanding long-term datasets from Europe's systematic observation systems are of course being utilised by European and international science to address pressing, climate-related research questions. Such mechanisms thus help to maintain and expand systematic observations. Indeed, while work programmes can only be formally developed for the near to medium term, EU policy and legislation aims to support the sustainability of its systematic observations.

Finally, another fundamental principle guiding general policy on RSO is that of open access. For example, legal provisions in the Horizon Europe grant agreements increasingly strengthen open access rights and obligations for beneficiaries[345], including the FAIR principles[346], while Copernicus Earth observation and services data are available to users on a free, full, and open basis[347]. Furthermore, implementation of the 2019 Open Data Directive[348] has begun to make national, climate-relevant 'high value datasets' available free of charge and in machine-readable formats. Examples of the aspects of general policy on RSO are given in the following subchapters.

[NC8] 8.2.2 Main research and systematic observation (RSO) actors

The main EU-level actors in research and systematic observation were described in the EU's NC6 and NC7. Therefore, this National Communication only addresses actors at EU level that were not already included in NC6 and NC7.

- European Innovation Council (EIC)

  The European Innovation Council has been established under the EU Horizon Europe programme. It has a budget of EUR 10.1 billion to support innovations throughout the lifecycle from early stage research, to proof-of-concept, technology transfer, and the financing and scale-up of start-ups and SMEs[349].

  The fully-fledged European Innovation Council (EIC) was launched in March 2021. The launch of the Council was preceded by an EIC pilot phase from 2018-2020 under the Horizon 2020 programme, during which over 430 projects on Future and Emerging Technologies and over 5 700 start-ups and SMEs were supported[350].

- EISMEA

  The EISMEA was established in April 2021 and groups together all activities of the European Innovation Council and the programmes related to small and medium-sized enterprises. EISMEA is the successor agency of the Executive Agency for small and Medium-sized Enterprises (EASME). ESMEA's mission is to implement the European Innovation Council

[345] Horizon Europe, open science, https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/9570017e-cd82-11eb-ac72-01aa75ed71a1.
[346] FAIR (Findable, Accessible, Interoperable, Reusable)
[347] Copernicus, access to data, https://www.copernicus.eu/en/access-data.
[348] Directive (EU) 2019/1024 on open data and the re-use of public sector information, https://eur-lex.europa.eu/eli/dir/2019/1024/oj.
[349] European Innovation Council, https://eic.ec.europa.eu/.
[350] About the European Innovation Council, https://eic.ec.europa.eu/about-european-innovation-council_en.

and manage other EU programmes focusing on SME support, innovation and the single market[351].

- European Climate Infrastructure and Environment Executive Agency (CINEA)

  CINEA was established in February 2021 and is the successor organisation of the Innovation and Networks Agency (INEA). CINEA started its activities in April 2021 in order to implement parts of certain EU programmes, including the cluster on Climate, Energy and Mobility (Cluster 5) from the Horizon Europe Programme and the LIFE Programme[352].

- European Research Council Executive Agency (ERCEA)

  The European Research Council Executive Agency (ERCEA) implements the strategy of the European Research Council (ERC) as set by the Scientific Council and oversees the day-to-day grant administration[353].

- European Strategy Forum on Research Infrastructures (ESFRI)

  The European Strategy Forum on Research Infrastructures is mandated by the EU Council to support a coherent and strategy-led approach to policy-making on research infrastructures in Europe, and to facilitate multilateral initiatives leading to the better use and development of research infrastructures, at EU and international level[354]. Its latest roadmap[355] was published in 2021 and prioritises 41 implemented pan-European research infrastructures and 22 ongoing projects, mobilising over EUR 24 billion investments. The roadmap includes 11 research infrastructures in the field of environment, almost all of them with observing capacities.

- European Union Agency for the Space Programme (EUSPA)

  In 2021, in line with the new EU Space Regulation, the EU created the EUSPA. EUSPA is responsible for operational management of the EGNOS and Galileo satellite navigation programmes and for ensuring the continuous provision of their services. An important element of EUSPA's work is to support the development of downstream and integrated applications based on Galileo, EGNOS and Copernicus and to promote user uptake of the data, information and services offered by Copernicus[356].

[NC8] 8.2.3 International cooperation and support

International cooperation in research and innovation is a strategic priority for the EU to meet its international commitments like the Sustainable Development Goals (SDGs). The European Commission leads many global research partnerships and contributes to and/or financially supports international institutions, research initiatives and programmes, such as the UNFCCC, the IPCC, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the International Resources Panel, the Group on Earth Observation (GEO) and GEO's Global Earth

[351] About ESMEA, https://eismea.ec.europa.eu/about-eismea_en.
[352] About CINEA, https://cinea.ec.europa.eu/about-us_en.
[353] ERC Executive Agency, https://erc.europa.eu/about-erc/erc-executive-agency.
[354] ESFRI Background, https://www.esfri.eu/background.
[355] Strategy Report on Research Infrastructures – Roadmap 2021, https://roadmap2021.esfri.eu/.
[356] EUSPA website, https://www.euspa.europa.eu/.

Observation System of Systems (GEOSS), the Belmont Forum, Mission Innovation and the Future Earth Initiative.

The European Commission's Strategic Forum for International scientific and technological Cooperation (SFIC) develops, implements and monitors the international dimension of the European Research Area. SFIC identifies areas for coordinated or joint initiatives with countries and regions outside the EU. SFIC is made up of the European Commission, all EU countries and several non-EU countries as observers[357].

The European Union, through its successive funding programmes for research and innovation, is among the top funders of the evidence base underpinning the IPCC and IPBES reports, contributing to improving the effectiveness of both national and international climate and biodiversity policies and processes, and building public support for more ambitious climate and biodiversity action. Coinciding with the approval of the IPCC Working Group III (WG III) report on Mitigation of Climate Change, the European Commission published a brochure that put a spotlight on the contribution of EU-funded projects to IPCC Working Group III on Mitigation[358], followed by a similar publication on the contributions to Working Group II on Impacts, Adaptation and Vulnerability[359]. Preliminary results of an analysis of the contribution of the Framework Programmes (FP7 and H2020) to the knowledge base of IPCC reports of the sixth assessment cycle[360] found over 2 500 publications cited by the IPCC to which the two Framework Programmes have – at least partially – contributed, corresponding to about 12% of all references cited in the reports covered. In addition, the current funding programme Horizon Europe is one of the main tools to implement the EU's global approach to research and innovation. Horizon Europe is open to researchers around the globe who are encouraged to team up with EU partners – but not always with funding. The programme also includes targeted actions with key partners from non-EU countries, including the development of the Africa initiative[361,362].

Information on research projects with international cooperation can be found in subsection [NC8] 8.3. Information on support to developing countries in the area of systematic observation can be found in subsection [NC8] 8.4.5.

[NC8] 8.2.4 Systematic observation – transforming measurement data into actionable information

The Copernicus programme boasts a fleet of dedicated earth observation satellites, the Sentinels. The European Space Agency (ESA) is responsible for the development of the Copernicus space component and operates the fleet of Sentinels together with the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). These entities, together with national public

[357] Strategic forum for international scientific and technological cooperation, https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/europe-world/international-cooperation/sfic_en.
[358] Science for climate action. EU research contribution to IPCC working group III on mitigation, https://op.europa.eu/s/w5FO.
[359] Science for climate action. EU research contributing to IPCC working group II on impacts, adaptation and vulnerability: providing solutions, enabling resilient development, https://op.europa.eu/s/w5Ay.
[360] Informing global climate action. Contribution of the Framework Programmes (FP7 and H2020) to the knowledge base of recent IPCC reports based on openly available data, https://op.europa.eu/s/w5Az.
[361] International cooperation in Horizon Europe, https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/europe-world/international-cooperation_en#Horizon-Europe.
[362] List of Participating Countries in Horizon Europe, https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/list-3rd-country-participation_horizon-euratom_en.pdf.

and private facilities, also coordinate delivery of data to Copernicus from the Sentinels and other satellite missions (the Contributing Missions) that are operated by other national, European or international organisations[363]. In addition to the space component, Copernicus relies on data from national and international ground-based monitoring networks. These data, on the one hand, serve to calibrate and validate the satellite measurements and, on the other one hand, complement the satellite observations with additional environmental measurements. The coordination of this in situ component is led by the EEA[364].

It is important to note that the Copernicus programme goes beyond operating satellites and managing environmental observation data streams. A unique aspect of Copernicus is the integration of this data and the production of climate-relevant information products through the six thematic streams of the Copernicus services: Atmosphere, Marine, Land, Climate Change, Security and Emergency. For instance, under the Atmosphere and Climate Change themes, the Copernicus Atmospheric Monitoring Service (CAMS) and C3S integrate satellite data and observations from in situ networks (Integrated Carbon Observation System (ICOS); World Meteorological Organization Global Atmospheric Watch programme, for high-resolution and consistent monitoring of global CO_2 and CH_4 concentrations[365]. While Copernicus constitutes the EU's main satellite-based programme for climate-relevant monitoring, EUMETSAT's network of eight Satellite Application Facilities (SAFs)[366] should also be mentioned. Besides its contribution to the Copernicus "space and ground segments," EUMETSAT coordinates and supervises a number of SAFs generating thematic data products and services that are relevant to climate monitoring e.g. CM SAF[367], LSA SAF[368] and OSI SAF[369].

The adoption of the EU Space Programme Regulation[370] represents an important key policy development since the publication of the NC7 for sustaining systematic observation. The regulation provides the legal framework for continuing and expanding Copernicus (as well as the Galileo/EGNOS, SSA and GOVSATCOM components) over the 2021-2027 period and solidifies a long-term perspective after 2027. The regulation furthermore refers explicitly to the link between Horizon Europe and EU Space Programme and that inter alia the research and innovation needs of the space sector, as well as innovative opportunities for use of space data and services, are identified and established as part of the strategic research and innovation planning process.

In terms of ground-based observations, the EU Space Programme Regulation mentions the collective role of the Commission and Member States to develop the in situ component of Copernicus. Indeed, the establishment and operation of in situ observation stations is ultimately the responsibility of the individual countries. Nonetheless, the European Commission supports establishment, expansion, governance and sustainability of networks of stations by supporting the creation of pan-European

[363] Copernicus Infrastructure, https://www.copernicus.eu/en/about-copernicus/infrastructure-overview
[364] Copernicus In Situ, https://insitu.copernicus.eu/.
[365] Copernicus, observation of greenhouse gases https://atmosphere.copernicus.eu/ghg-services/observing-greenhouse-gases.
[366] EUMETSAT Satellite Application Facilities (SAFs).
[367] SAF on Climate Monitoring.
[368] SAF on Land Surface Analysis.
[369] SAF on Ocean and Sea Ice.
[370] Regulation (EU) 2021/696 establishing the Union Space Programme and the European Union Agency for the Space Programme, https://eur-lex.europa.eu/eli/reg/2021/696/oj.

Research Infrastructures. Over the last 20 years, the European Commission has worked with Member States and the scientific community within the ESFRI to establish over 60 European Research Infrastructures[371]. In addition to the respective Member State investments, Research Infrastructures have been funded through the European Regional Development Funds and the Horizon 2020 programme. Funding to support the further development of European Research Infrastructures is foreseen under Pillar I of Horizon Europe. Funding these Research Infrastructures aims primarily to promote European science and innovation and achieve strategic research targets of the Horizon Europe programme. However, the policies of Research Infrastructures are very much relevant to systematic observations, in particular Copernicus. Indeed, the EU Space Regulation states, within the context of the link between Copernicus and Horizon Europe, that Research Infrastructures, in particular in-situ observing networks, would constitute essential elements of the in-situ observation infrastructure enabling the Copernicus Services.

[NC8] 8.2.5 Action to overcome barriers to free and open international exchange of data and information

One of the principles of Horizon Europe is to reinforce open science, meaning better dissemination and exploitation of research and innovation results and support to active engagement of society. This is achieved within Horizon Europe by mandatory open access to publications and by ensuring open access to research data in line with the principle 'as open as possible, as closed as necessary'[372].

As mentioned previously, Copernicus is seen as a public good and the earth observation data and products from the services are available to users on a free, full, and open basis. This data policy is furthermore seen as a mechanism for Copernicus to access data from external sources. Access to Copernicus data and information draws increasing interest from various international partners and the EU seeks reciprocity in the data exchanges for the benefit of the Copernicus programme[373].

Data and physical access policies for Research Infrastructures vary and are defined by the research infrastructures themselves. Nonetheless, the European Commission's Charter for Access[374] sets out principles and guidelines as a reference when defining access policies for Research Infrastructures and is a requirement for EU funding of transnational access. For those research infrastructures established as a European Research Infrastructure Consortium[375], effective access and dissemination of the results are also a requirement.

Finally, a key development since the publication of NC7 is the 2019 Open Data Directive. Implementation of this legislation may be highly relevant for future RSO with the European

[371] Horizon Europe, pillar I excellent science, https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/27473ee8-ce53-11eb-ac72-01aa75ed71a1 and updated and complete list of 22 ESFRI Projects and 41 ESFRI Landmarks.
[372] Horizon Europe, Open science, https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/9570017e-cd82-11eb-ac72-01aa75ed71a1.
[373] Copernicus, International Cooperation, https://www.copernicus.eu/en/about-copernicus/international-cooperation.
[374] European Charter of Access for Research Infrastructures, https://op.europa.eu/en/publication-detail/-/publication/78e87306-48bc-11e6-9c64-01aa75ed71a1/.
[375] Council Regulation (EC) No 723/2009 of 25 June 2009 on the Community legal framework for a European Research Infrastructure Consortium (ERIC), https://eur-lex.europa.eu/eli/reg/2009/723/oj.

Commission proposing an Implementing Act on High Value Datasets (HVDs) in 2022[376]. The Open Data Directive currently defines six categories of HVDs: geospatial, earth observation and environment, meteorological, statistics, companies and company ownership, mobility. Member States would be legally obliged to make national datasets categorised as HVDs available free of charge and in machine-readable formats.

[NC8] 8.2.6 Funding of research and systematic observation

In the 2014-2020 multiannual financial framework, the European Commission implemented climate mainstreaming to dedicate resources, including resources for research and systematic observation, to the fight against climate change. For a description of the methodology how the EU marks climate finance see Section [BR5] 6.3.1 in the attached Biennial Report.

The EU budget laid down in the 2021-2027 Multiannual Financial Framework (MFF) will deliver at least 30 % of climate expenditures, of the MFF and the 'NextGenerationEU – recovery programme from the COVID-19 crisis' budget. Table 14 outlines the climate contributions in 2021-2027 of individual programmes that are relevant for research and systematic observation[377,378].

Table 14: Climate expenditures 2021-2027 in EUR million, totals by programme

Description	2021	2022	2023	2024	2025	2026	2027	Total 2021-2027	% of climate expenditure on total envelope
Horizon Europe	4 750	5 100	4 750	4 208	4 318	4 404	4 696	32 226	35%
LIFE	375	426	406	417	432	452	471	2 979	55%
European Space Programme (includes Copernicus)	254	289	305	314	317	328	334	2 140	15%

Source: Extract of the Programme Statement for Operational Expenditures – DB 2023 Working Document I https://ec.europa.eu/info/sites/default/files/about_the_european_commission/eu_budget/financing_of_horizontal_policy_priorities_in_the_eu_budget.pdf

The EU offers various programmes that provide funding for research and systematic observation related to climate change[379]. These are described in the following sub-sections.

In addition to directly funding research and systematic relevant for climate change, the EU's Innovation Fund supports projects in which innovative low-carbon technologies are demonstrated.

[376] Commission seeks views on the Implementing Act on High Value Datasets.
[377] Climate mainstreaming, https://ec.europa.eu/info/strategy/eu-budget/performance-and-reporting/mainstreaming/climate-mainstreaming_en.
[378] Extract of the Programme Statement for Operational Expenditures – DB 2023 Working Document I, https://ec.europa.eu/info/sites/default/files/about_the_european_commission/eu_budget/financing_of_horizontal_policy_priorities_in_the_eu_budget.pdf.
[379] Climate action research, funding, https://ec.europa.eu/info/research-and-innovation/research-area/environment/climate-action_en.

The Innovation Fund is funded by the auction revenues from the EU ETS and is expected to amount to about EUR 38 billion from 2020 to 2030, depending on the carbon price[380].

[NC8] 8.2.7 Horizon 2020

The EU Framework Programmes for Research and Innovation are the EU's main funding programme for research and innovation. The eighth Framework Programme, called Horizon 2020, covered the period 2014-2020. According to calculations made by the European Commission, of its overall budget of nearly EUR 80 billion, EUR 20.3 billion were dedicated to research related to climate change[381]. For the EU's 2021-2027 MFF, the EU climate tracking methodology has been significantly strengthened, in particular by moving away from marking climate relevance based on the intent of an intervention to basing it on its expected effect; ensuring enhanced coherence of the methodology across EU funding programmes; and requiring compliance with the principle of 'Do No Significant Harm' (DNSH) to the EU's climate and environmental objectives as enshrined in the European Green Deal.

In September 2020, the European Commission launched a EUR 1 billion call under Horizon 2020 for research and innovation projects that respond to the climate crisis and help protect Europe's unique ecosystems and biodiversity. The European Green Deal Call was the last and biggest call under Horizon 2020 and included eight thematic areas and two horizontal areas. Among the thematic areas featured: 1. Increasing climate ambition: cross-sectoral challenges, 2. Clean, affordable and secure energy, 4. Energy and resource efficient buildings and 5. Sustainable and smart mobility[382,383]. The European Commission selected 72 research and innovation projects under the European Green Deal Call, which involve almost 1800 participants from the research community, the public and private sectors, and civil society organisations[384].

More information on Horizon 2020 can be found in chapter 8.2.2.1 of NC7.

[NC8] 8.2.8 Horizon Europe

Horizon Europe has introduced several new elements compared to its predecessor Horizon 2020.

First, the European Innovation Council has been established to support game changing innovations and the financing and scale-up of start-ups and SMEs (see section [NC8] 8.2.2 on main RSO actors). Second, EU Missions have been established, which operate as a portfolio of actions – such as research

[380] Innovation Fund, https://ec.europa.eu/clima/eu-action/funding-climate-action/innovation-fund/policy-development_en.
[381] Annual management and performance report 2020 https://ec.europa.eu/info/publications/annual-management-and-performance-report-2020_en.
[382] European Green Deal Call: EUR 1 billion investment to boost the green and digital transition, https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1669.
[383] Horizon 2020 European Green Deal Call https://op.europa.eu/en/publication-detail/-/publication/cc10c455-f98c-11ea-b44f-01aa75ed71a1/.
[384] European Green Deal Call: Commission funds 72 projects with €1 billion to boost the EU's green recovery, https://ec.europa.eu/info/news/european-green-deal-call-commission-funds-72-projects-eu1-billion-boost-eus-green-recovery-2021-jun-03_en.

projects, policy measures or even legislative initiatives[385]. Out of the five missions agreed so far, four are linked to climate change. The EU Mission on adaptation to climate change[386] and the Mission on climate-neutral and smart cities[387] are specifically oriented to climate action, whilst the Missions on Oceans[388] and Soils[389] are highly relevant to both mitigation and adaptation. The missions started in 2021 and are currently in the build-up phase[390]. Other new elements are the open science policy (see chapter [NC8] 8.2.5) and more objective-driven and ambitious European Partnerships. These European Partnerships bring the European Commission and private and/or public partners together to address some of Europe's most pressing challenges through concerted research and innovation initiatives. Horizon Europe has a number of European Partnerships in the field of climate and energy, e.g. on zero-emission road transport and for the clean energy transition[391,392].

Horizon Europe is structured into the three pillars: 1 Excellent Science; 2 Global challenges and European industrial competitiveness; and 3 Innovative Europe. These three pillars are complemented by cross-cutting activities to widen participation and strengthen the European research area. Horizon Europe has an overall budget of EUR 95.5 billion (compare Figure 48) including EUR 5.4 billion from the NextGenerationEU instrument[393]. In real terms and excluding the participation of UK beneficiaries in Horizon 2020, there is a 30 % increase in Horizon Europe's budget compared to Horizon 2020. Thirty-five percent of the budget will contribute to climate objectives (compare Table 14)[394]. The first work programme (2021-2022) has a budget of EUR 14.7 billion.

[385] What is Horizon Europe? https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en.
[386] EU Mission: Adaptation to Climate Change, https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/adaptation-climate-change_en.
[387] EU Mission: Climate-Neutral and Smart Cities, https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en.
[388] EU Mission: Restore our Ocean and Waters, https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/restore-our-ocean-and-waters_en.
[389] EU Mission: A Soil Deal for Europe, https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/soil-health-and-food_en.
[390] What are EU missions? https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe_en.
[391] European Partnerships in Horizon Europe, https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe_en.
[392] European Partnerships in climate, energy and mobility, https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe/climate-energy-and-mobility_en.
[393] Including EUR 5.4 billion from 'Next Generation Europe' – programme of EU for recovery from the COVID-19 crisis.
[394] Horizon Europe, budget, https://op.europa.eu/en/publication-detail/-/publication/1f107d76-acbe-11eb-9767-01aa75ed71a1.

Figure 48: Horizon Europe programme structure and budget

		Total in EUR million
EXCELLENT SCIENCE *of which*		25 011
The European Research Council (ERC)	16 004	
Marie Skłodowska-Curie Actions (MSCA)	6 602	
Research infrastructures	2 406	
GLOBAL CHALLENGES AND EUROPEAN INDUSTRIAL COMPETITIVENESS *of which*		53 516
Health	8246	
Culture, creativity and inclusive society	2 280	
Civil Security for Society	1 596	
Digital, Industry and Space	15 349	
Climate, Energy and Mobility		15 123
Food, Bioeconomy, Natural Resources, Agriculture and Environment	8 952	
Non-nuclear direct actions of the Joint Research Centre (JRC)	1 970	
INNOVATIVE EUROPE *of which*		13 597
European Innovation Council (EIC)	10 105	
European innovation ecosystems	527	
European Institute of Innovation and Technology (EIT)	2 965	
WIDENING PARTICIPATION & STRENGTHENING THE ERA *of which*		3 393
Widening participation and spreading excellence	2 955	
Reforming and enhancing the European R&I System	438	
Total Horizon Europe		**95 517**

ERA…European Research Area
Source: Horizon Europe budget, https://op.europa.eu/en/publication-detail/-/publication/1f107d76-acbe-11eb-9767-01aa75ed71a1

Within Pillar II on global challenges, Cluster 5 on Climate, Energy & Mobility with a budget of EUR 15.1 billion aims to fight climate change by better understanding its causes, evolution, risks, impacts and opportunities, and by making the energy and transport sectors more climate and environment-friendly, more efficient and competitive, smarter, safer and more resilient. Funding for systematic observation is also included in Cluster 4 on Digital, Industry and Space, which has a budget of EUR 15.3 billion. Furthermore, Horizon Europe foresees EUR 2.4 billion for research infrastructures, which are particularly relevant for systematic observation (see Figure 48).

It should be noted that funding for research on climate change related activities is thus not limited to Cluster 5, but climate change is also addressed in other thematic clusters (notably Cluster 6, on Food, Bioeconomy, Natural Resources and Environment) and other parts of the Horizon Europe programme, e.g. the Marie Sklodowska-Curie Actions (see section [NC8] 9.2.6), the European Research Council, the European Innovation Council (see section [NC8] 8.2.2), the European Institute of Innovation and Technology (see section [NC8] 9.2.7) and Research infrastructures[395,396].

[395] Horizon Europe funding opportunities 2021-2022 for Earth & Environmental Observation, https://op.europa.eu/en/publication-detail/-/publication/aa9f1843-f013-11eb-a71c-01aa75ed71a1.
[396] Cluster 5: Climate, Energy and Mobility, https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/cluster-5-climate-energy-and-mobility_en.

[NC8] 8.2.9 LIFE

The LIFE Programme (French: L'Instrument Financier pour l'Environnement) is an EU funding programme dedicated to environmental, climate and energy objectives. It contributes to the shift towards a clean, circular, energy efficient, climate-neutral and climate-resilient economy. In terms of specific objectives, the programme seeks to develop, demonstrate and promote innovative techniques, methods and approaches to reach EU environmental and climate goals. To date, LIFE has co-financed more than 5 000 projects.

The LIFE Programme for 2014-2020 had a budget of EUR 3.4 billion, of which EUR 1.6 billion were marked as relevant for climate change[397]. The new LIFE programme 2021-2027 has a budget of EUR 5.4 billion, with EUR 3 billion marked as relevant for climate change in the context of climate mainstreaming (compare Table 14)[398]. The LIFE Programme 2021-2027 is divided into the two fields Environment and Climate Action. Climate Action with a budget of EUR 1.94 billion[399] is further divided into the sub-programme Climate change mitigation and adaptation (EUR 997 million) and the sub-programme Clean Energy Transition (EUR 997 million). The Climate Change Mitigation and Adaptation sub-programme aims at contributing to the shift towards a sustainable, energy-efficient, renewable energy-based, climate-neutral and resilient economy, thereby contributing to sustainable development. It provides co-financing for climate change mitigation and adaptation research, supporting the transition to a low-carbon and climate-resilient economy[400].

[NC8] 8.2.10 COST Actions

COST (European Cooperation in Science and Technology) funds interdisciplinary research networks called COST Actions. These Actions bring together researchers, innovators and other professionals including industry specialists, who are based in Europe and beyond, to collaborate on research topics of their choice for a period of 4 years. The funding a COST Action receives covers the expenses of networking activities rather than research and as such is used to organise meetings, training schools, short term scientific missions, and other networking activities. By funding networking, COST acts therefore as a pre-portal for further research and innovation funding such as Horizon Europe[401].

[NC8] 8.2.11 European Space Programme

Among the objectives of the European Space Programme is to protect the environment and help tackle climate change. The new EU Space Programme Regulation (2021/696) was adopted in 2021 and committed a 2021-2027 financial envelope for implementation of the whole programme (and

[397] Climate mainstreaming, https://ec.europa.eu/info/strategy/eu-budget/performance-and-reporting/mainstreaming/climate-mainstreaming_en.
[398] Extract of the Programme Statement for Operational Expenditures – DB 2023 Working Document I, https://ec.europa.eu/info/sites/default/files/about_the_european_commission/eu_budget/financing_of_horizontal_policy_priorities_in_the_eu_budget.pdf.
[399] The difference between the EUR 1.93 billion for Climate Action and the EUR 3 billion marked as relevant for climate change in the context of climate mainstreaming is due to the fact that the field Environment also includes climate-relevant activities.
[400] LIFE Programme https://ec.europa.eu/growth/industry/strategy/hydrogen/funding-guide/eu-programmes-funds/life-programme_en.
[401] COST – European Cooperation in Science & Technology https://www.cost.eu/.

associated risks) that amounted to EUR 14.88 billion (2021 prices), of which EUR 2.1 billion have been marked as relevant for climate change (compare Table 14). Of the total 2021-2027 Space Programme budget, EUR 5.421 billion was committed to implementing the next phase of the Copernicus programme. In the previous Copernicus programme, a 2014-2020 implementation budget of EUR 4.291 billion (2014 prices) was adopted in the Regulation (EU) No 377/2014 for establishing the Copernicus programme[402].

After the EU Space Programme Regulation (cf. section [NC8] 8.2.4) was adopted in April 2021, the Commission Implementing Decision[403] on its financing was adopted. Annex 2[404] to this Implementing Decision outlines the 2021-2027 multiannual split of tasks and budget between the entrusted entities responsible for implementing Copernicus.

[NC8] 8.3 Research

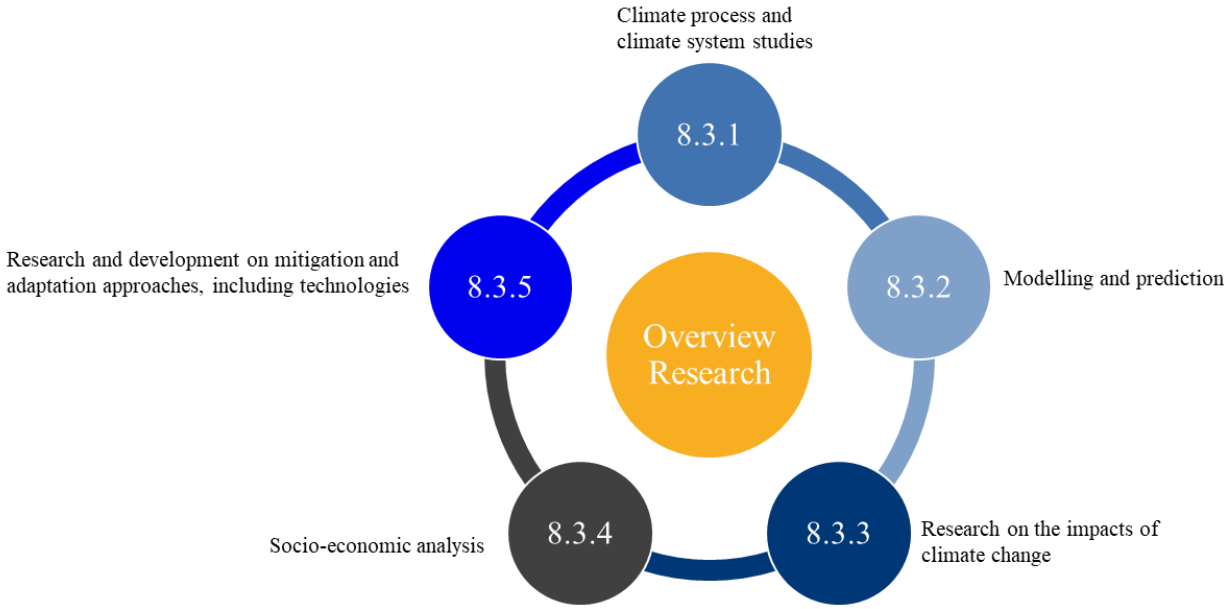
As mentioned in the previous chapters, research on climate change is a priority in the EU; and the EU is a major funder of research projects. This chapter highlights selected EU research projects on climate change given the high number of EU-funded research projects on climate change. Since NC7 covered projects with end dates in 2017-2021, NC8 includes ongoing projects with end dates in 2022 or later in order to ensure continuity and avoid duplication. The listed projects have all been funded under Horizon 2020. Projects that are funded under Horizon Europe have not been included at this stage because they are still in an early phase and have not yet been included in the Community Research and Development Information Service (CORDIS), the EU's database on research results[405].

Figure 49 provides an overview of the main areas for research projects and the subsections where these are covered in this National Communication.

The following sub-section lists selected research projects in the respective area and highlights one project that is described in more detail. Projects that involve international cooperation are specifically highlighted.

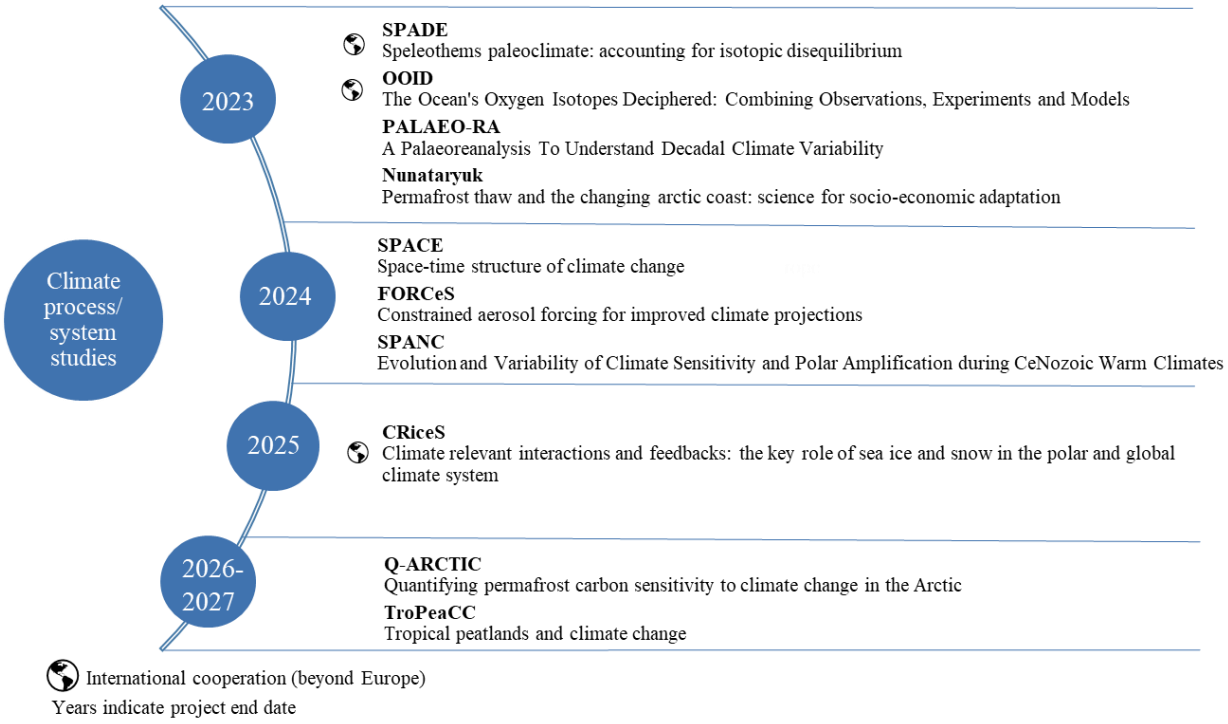
[402]Regulation (EU) 377/2014 establishing the Copernicus Programme, https://eur-lex.europa.eu/eli/reg/2014/377/oj.
[403] Commission Implementing Decision on the financing of the Union Space Programme and the adoption of the work programmes for 2021 (direct management) and 2021-2027 (indirect management) C(2021) 4316 final, https://www.copernicus.eu/sites/default/files/2021-06/Financing_Decision_C_2021_4316_final.pdf.
[404] Annex 2 to C(2021) 4316 final, https://www.copernicus.eu/sites/default/files/2021-06/Financing_Decision_C_2021_4316_final-Annex_2_Copernicus_Work_Programme.pdf.
[405] CORDIS EU research results, https://cordis.europa.eu/.

Figure 49: Overview of main areas of research projects and section numbers in this report



[NC8] 8.3.1 Climate process and climate system studies, including paleoclimate studies

Figure 50: Projects in the area of climate system studies



Source: CORDIS database on EU research results, https://cordis.europa.eu/

- **Project example: CRiceS**

Project name:
Climate relevant interactions and feedbacks: the key role of sea ice and snow in the polar and global climate system (CRiceS)

Description:
Climate and Earth system Models (ESMs) are key tools for projecting future climate change; however, these models have significant shortcomings regarding their descriptions of polar ocean-ice/snow-atmosphere interactions, limiting their effectiveness. The EU-funded CRiceS project will increase understanding of how rapid sea ice decline is interlinked with physical and chemical changes in the polar oceans and atmosphere. Consortium members will quantify the controlling chemical, biogeochemical and physical processes/interactions within the coupled ocean-ice/snow-atmosphere system through a comprehensive analysis of new and emerging in-situ and satellite observations. CRiceS will improve process, regional and climate models/ESMs to deliver improved quantification of feedback mechanisms within the Earth system.

Project coordinator and participating countries:
ILMATIETEEN LAITOS (Finland).
India, France, Norway, Sweden, Italy, South Africa, Germany, Spain, United Kingdom, Switzerland, Netherlands, Canada, Russia[406]

Total investment; EU contribution:
EUR 8 507 794; EUR 7 999 266

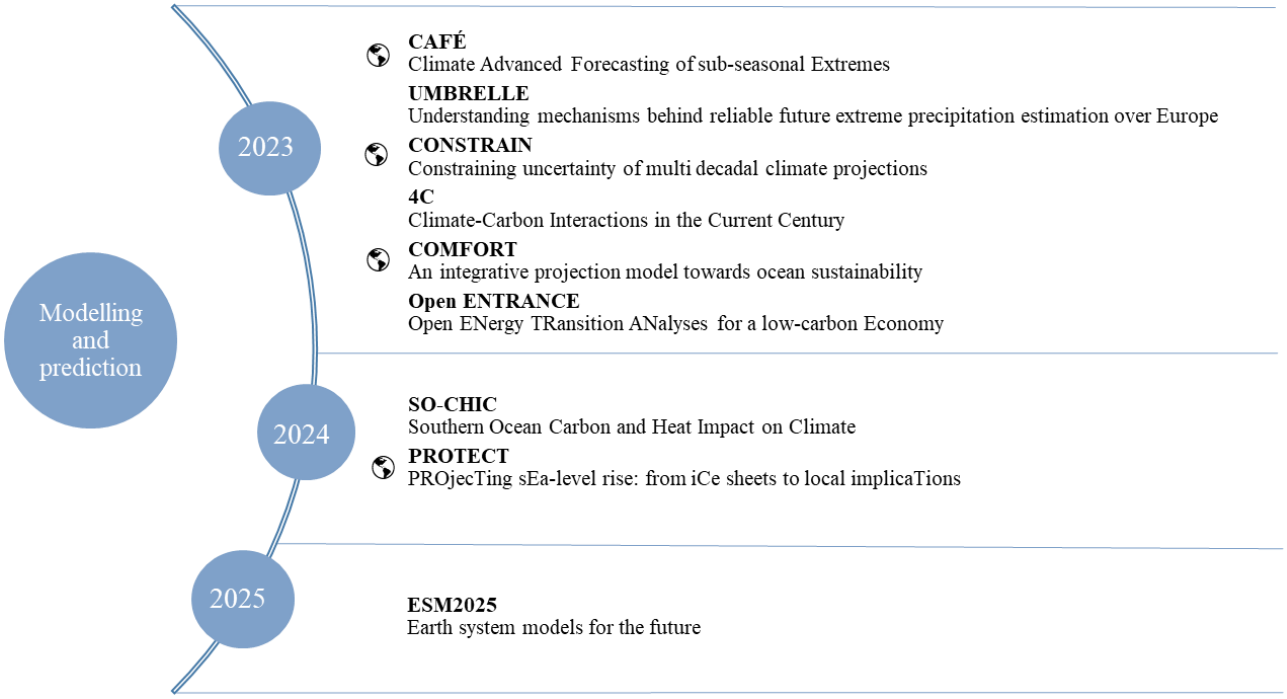
Start and end dates (Duration):
September 2021 to August 2025 (4 years)

Website:
www.crices-h2020.eu

[406] Canada, India and the Russian Federation do not receive EU funding under this project.

[NC8] 8.3.2 Modelling and prediction, including general circulation models (A.2)

Figure 51: Projects in the area of modelling and prediction



Source: CORDIS database on EU research results, https://cordis.europa.eu/

• Project example: CONSTRAIN

Project name:
Constraining uncertainty of multi decadal climate projections (CONSTRAIN)

Description:
Climate change is all around us – from longer periods of drought to an increase in the number of tropical storms, and from the loss of sea ice to more intense heat waves. Global climate is projected to further change over this century, but there is also a need for improved information about the extent of the change beyond the next few decades. The EU-funded CONSTRAIN project aims to fill climate science and related policy-making knowledge gaps through a better understanding of how natural and human factors affect multi-decadal regional climate change. It will help scientists make climate projections for the next 20 to 50 years. The project's findings will benefit the EU's adaptation and mitigation strategy.

Project coordinator and participating countries:
University of Leeds (United Kingdom).
Switzerland, Germany, France, Norway, Netherlands, United Kingdom, Sweden, Israel, Austria

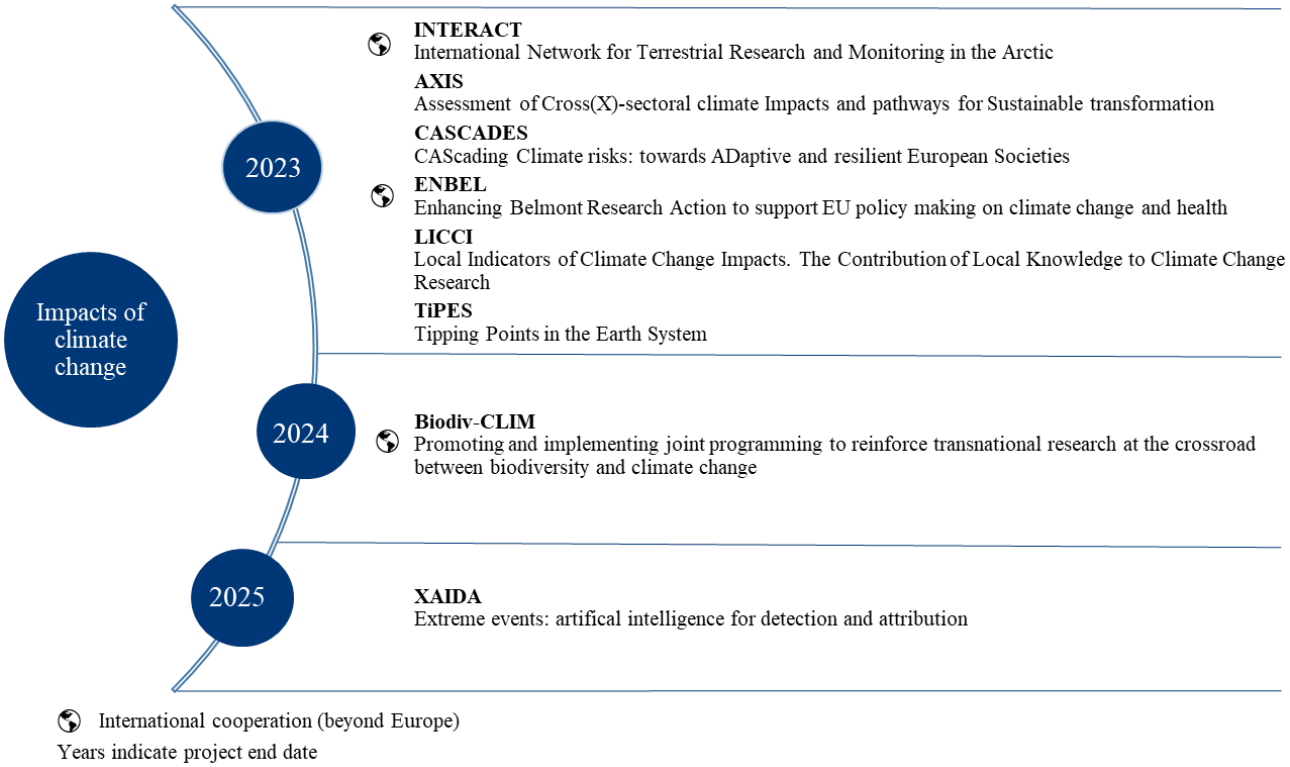
Total investment; EU contribution:
EUR 7 999 804; EUR 7 999 804

Start and end dates (Duration):
July 2019 to June 2023 (4 years)

Website:
https://constrain.eu-org

[NC8] 8.3.3 Research on the impacts of climate change

Figure 52: Projects in the area of impacts of climate change



Source: CORDIS database on EU research results, https://cordis.europa.eu/

• Project example: AXIS

Project name:
Assessment of Cross(X)-sectoral climate Impacts and pathways for Sustainable transformation (AXIS)

Description:
The AXIS consortium is set up to enhance integration of an array of research disciplines connected to climate research around the common goal to enhance the assessment of potential impacts of climate change on the bio-physical systems and human society. To this end AXIS plans to launch and implement a single transnational call – funded by 11 European research funders. Through an open process AXIS has developed three topics for this call. Each topic is intended to enhance collaboration across typical community borders: between different sectoral views of climate impacts as well as between bio-physical climate impacts and socio-economic effects. For all topics stakeholder engagement is given a high relevance in the call, thus representing another dimension of interaction across boundaries: interaction of the science community with end-users (stakeholders) of the created knowledge (transdisciplinarity). The three anticipated research areas (topics) are: (1) Cross-sectoral and cross-scale climate change impact assessments; (2) Integration of biophysical climate change impacts estimates with economic models; (3) Developing pathways to achieve the long-term goals of the Paris Agreement, taking into account interactions with SDGs closely linked to SDG 13 (“climate action”).

Project coordinator and participating countries:
Deutsches Zentrum für Luft- und Raumfahrt EV (Germany)
Austria, Belgium, Spain, France, Moldova, Ireland, Netherlands, Norway, Sweden

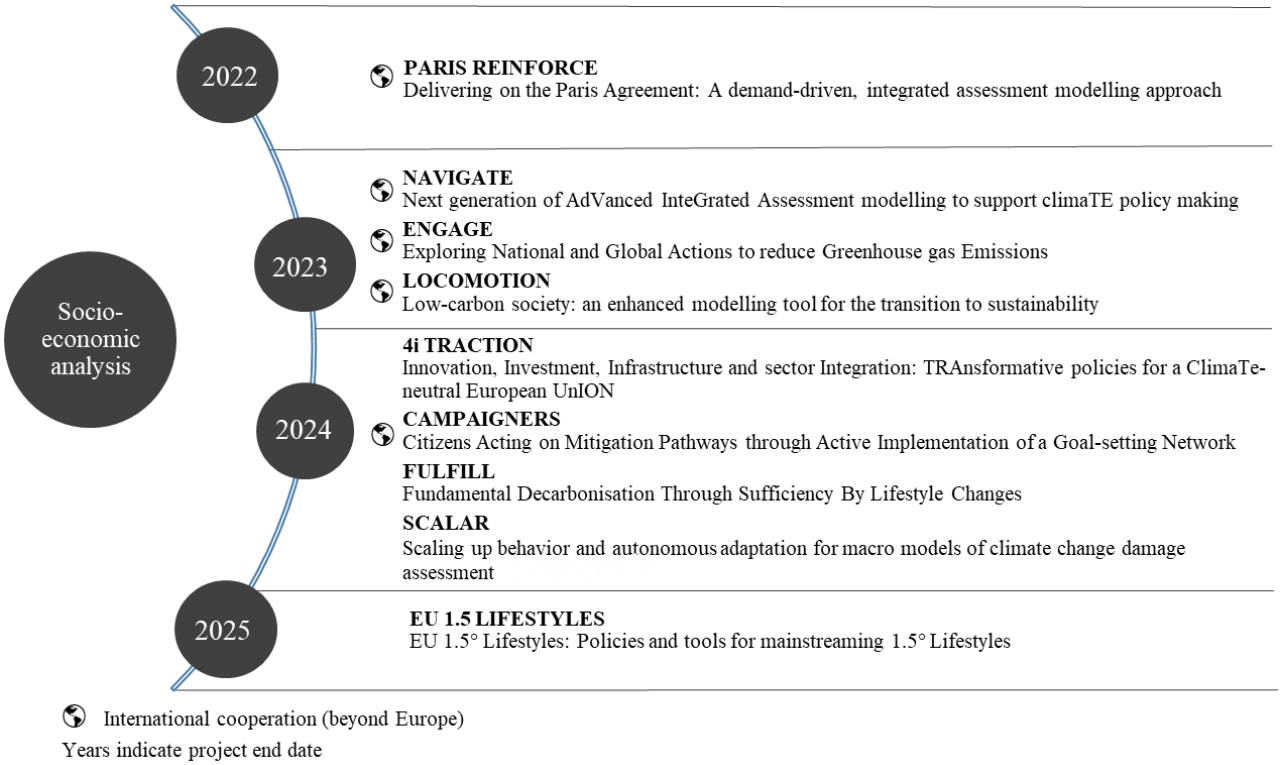
Total investment; EU contribution:
EUR 15 586 070; EUR 5 143 403

Start and end dates (Duration):
January 2018 – December 2023 (6 years)

Website:
https://jpi-climate.eu/programme/axis/

[NC8] 8.3.4 Socio-economic analysis, including analysis of both the impacts of climate change and response options

Figure 53: Projects in the area of socio-economic analysis



Source: CORDIS database on EU research results, https://cordis.europa.eu/

Science for Climate Action https://op.europa.eu/en/publication-detail/-/publication/7fb0a7de-b3bc-11ec-9d96-01aa75ed71a

Project example: NAVIGATE

Project name:
Next generation of AdVanced InteGrated Assessment modelling to support climaTE policy making (NAVIGATE)

Description:
Integrated assessment models (IAMs) integrate energy, economy, land, water, and climate into a consistent modelling framework that provides regionally and sectorally differentiated climate-change-mitigation pathways. IAMs offer valuable information to support the design and evaluation of climate policies. The EU-funded NAVIGATE project aims to advance IAMs capability in two directions. First, it will improve the representation of transformative structural and technological change in the economy and different sectors such as industry and land-use and analyse changes in lifestyle and consumption and their implications. Secondly, it will depict the distributional implications of climate policies, the impacts of climate change and the benefits of mitigation and adaptation strategies in terms of avoided damages and reduced inequality. The project aims to offer new knowledge to effectively support international climate policy processes like the global stocktake in 2023 and related EU climate policy discussions.

Project coordinator and participating countries:
Potsdam-Institut für Klimafolgenforschung e.V. (Germany).
Italy, Austria, Netherlands, France, Greece, United Kingdom, Switzerland, Sweden, Norway, Brazil, China, Poland.

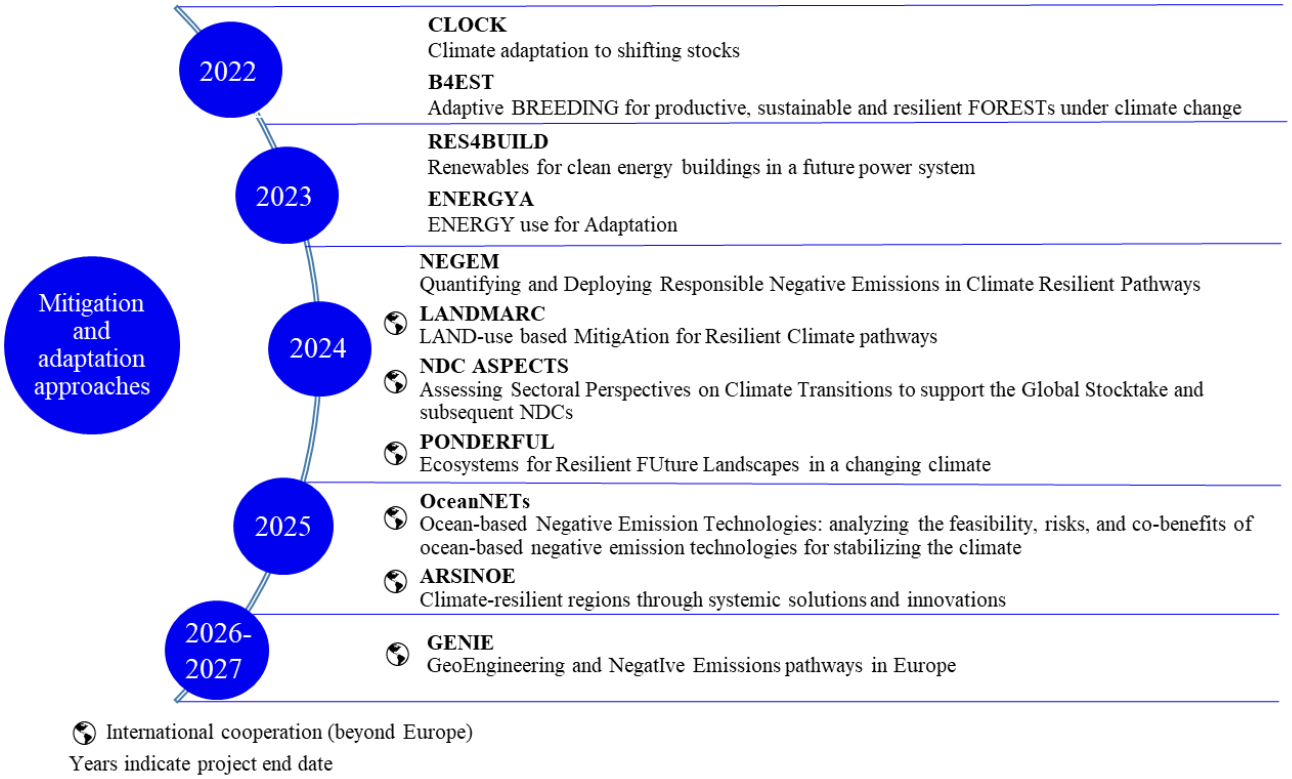
Total investment; EU contribution:
EUR 6 998 342; EUR 6 998 342

Start and end dates (Duration):
September 2019 to August 2023 (4 years)

Website:
www.navigate-h2020.eu

[NC8] 8.3.5 Research and development on mitigation and adaptation approaches, including technologies

Figure 54: Projects in the area of mitigation and adaptation approaches



Source: CORDIS database on EU research results, https://cordis.europa.eu/; Science for Climate Action https://op.europa.eu/en/publication-detail/-/publication/7fb0a7de-b3bc-11ec-9d96-01aa75ed71a

Project example: LANDMARC

Project name:
LAND-use based Mitigation for Resilient Climate pathways (LANDMARC)

Description:
Land-based removals of CO_2 from the atmosphere are included as a mitigation measure in many NDCs under the Paris Agreement. These removals can play an important role in the global efforts to achieve climate targets and the SDGs. However, there are still significant questions and risks regarding the efficiency and effectiveness of land-based removals. The EU-funded LANDMARC project will estimate the climate impact, potential for upscaling, and associated co-benefits and trade-offs of various land-based removals, such as net sinks for greenhouse gases in agriculture. The project will apply earth observation monitoring, a mix of climate, land-use and economic simulation models as well as local and regional stakeholder engagement activities across 16 case studies and five regional platforms.

Project coordinator and participating countries:
Technische Universiteit Delft (Netherlands).
Germany, Switzerland, Spain, Sweden, Portugal, United Kingdom, Colombia, Venezuela, Indonesia, Nepal, Kenya, South Africa, Burkina Faso, Vietnam and Canada.

Total investment; EU contribution:
EUR 7 062 988; EUR 6 999 988

Start and end dates (Duration):
July 2020 to June 2024 (4 years)

Website:
www.landmarc2020.eu

[NC8] 8.4 Systematic observation

The Copernicus programme and Research Infrastructures constitute the main European systems for systematically observing the climate. As introduced previously, Copernicus is the EU's earth observation programme and has a dedicated fleet of satellites, the Sentinels, that are currently observing a variety of earth surface and atmospheric variables from space. These data, together with data from the Contributing Missions (i.e. satellite missions from other national or regional space agencies), feed into the Copernicus Services, which process observation data into information products. These data value-adding activities are streamlined through six thematic streams by the following Copernicus services:

- Atmosphere – Copernicus Atmosphere Monitoring Service (CAMS)[407]
- Marine – Copernicus Marine Environment Monitoring Service (CMEMS)[408]

[407] Copernicus Atmosphere Monitoring Service, https://atmosphere.copernicus.eu/.
[408] Copernicus Marine Service, https://marine.copernicus.eu/.

- Land – Copernicus Land Monitoring Service (CLMS)[409]
- Climate Change – Copernicus Climate Change Service (C3S)[410]
- Emergency – Copernicus Emergency Management Service (EMS)[411]
- Security – Copernicus service for Security[412]

In addition to streams of satellite data, the above services rely on data from in situ monitoring networks that complement the earth observation data and/or are used for calibration/validation purposes. In terms of climate-relevant monitoring, data from Research Infrastructures constitute a particular important stream of ground-based observation data and furthermore constitute systematic observation systems in their own right. While Research Infrastructures are constructed and operated jointly by EU Member States (and other countries), the EU contributes strategically and financially to the establishment, governance and expansion of Research Infrastructures[413].

The following sub-chapters highlight specific elements of these observing systems that contribute to climate-relevant monitoring of the atmosphere, ocean, terrestrial biosphere and cryosphere. Each sub-chapter summarises the observations and services that are operational, as well as the expansion of observations and service evolution that are currently underway. Of the Copernicus Services, the following sub-chapters focus on the portfolios of CAMS, CMEMS, CLMS and C3S in terms of monitoring of the atmosphere, ocean, terrestrial biosphere and cryosphere. Nonetheless, it is important to also point out the contribution of EMS to the systematic observation of climate extremes in Europe and globally. The EMS services provide continuous observations and forecasts for floods[414,415], forest fires[416] and droughts[417,418]. The last two sub-chapters finally describe how the EU supports the establishment and maintenance of monitoring systems in developing countries and how the EU contributes to global systematic observations.

[NC8] 8.4.1 Atmospheric climate observing systems, including those measuring atmospheric constituents

The Copernicus Sentinel-5 Precursor mission (Sentinel 5P) was launched in October 2017 and is the first Copernicus mission dedicated to monitoring the atmosphere. In addition to providing observations of air pollutant concentrations, the satellite instrument measures total column concentrations of climate-relevant constituents e.g. ozone and methane[419]. In the years ahead, Sentinel

[409] Copernicus Land Monitoring Service, https://land.copernicus.eu/.
[410] Copernicus Climate Change Service, https://climate.copernicus.eu/.
[411] Copernicus Emergency Management Service, https://emergency.copernicus.eu/.
[412] Copernicus Security, https://www.copernicus.eu/en/copernicus-services/security.
[413] European Research Infrastructures, https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/our-digital-future/european-research-infrastructures_en.
[414] European Flood Awareness System (EFAS).
[415] Global Flood Awareness System (GloFAS), https://www.globalfloods.eu/.
[416] European Forest Fire Information System (EFFIS).
[417] European Drought Observatory (EDO).
[418] Global Drought Observatory (GDO).
[419] Sentinel-5P, https://sentinel.esa.int/web/sentinel/missions/sentinel-5p.

5P, which is a precursor mission with global coverage, will be complemented by Sentinels 4[420] and 5[421], which are expected to be launched in 2024. Both missions will again have an air quality focus. However, Sentinel 4, a geostationary satellite focusing on hourly measurements over Europe, will also measure ozone, while Sentinel 5, which will provide daily measurements with a global coverage, will provide measurements of both methane and ozone. Finally, a flagship mission earmarked for launch in 2026 is the Copernicus CO2M mission, Sentinel 7[422]. This mission will provide global coverage measurements of, inter alia, total column CO_2 and CH_4 concentrations at a 4 km^2 resolution every 2-3 days[423].

The C3S and CAMS represent the main services providing information products relevant to the atmospheric climate and climate relevant constituents. Both services are implemented by the European Centre for Medium-Range Weather Forecasts. Through the Climate Data Store, C3S together with ESA's Climate Change Initiative offers a large number of data products for a wide variety of Essential Climate Variables (ECVs), e.g. satellite-based datasets on precipitation, surface radiation budget, water vapour, ozone, aerosols and greenhouse gases. The C3S also provides climate re-analysis datasets, whereby past observations are combined with models to generate consistent time series of multiple climate variables that are resolved in time and space, e.g. the ERA5 datasets. Such reanalysis data products are also produced by CAMS (e.g. global reanalysis of greenhouse gases), which produces information products on, inter alia, radiative forcing and observation-based monitoring of net surface-atmosphere fluxes of GHGs.

Both C3S and CAMS rely on satellite observations, particularly from the Contributing Missions, and on streams of ground-based observational data. CAMS, for example, relies on European air quality data from the European Environment Information and Observation Network and the European Monitoring and Evaluation Programme as well as observation data from other regional and global networks. Additionally, CAMS relies on data from the following European Research Infrastructures:

- In-service Aircraft for a Global Observing System (IAGOS)[424]
- The Aerosol, Clouds and Trace Gases Research Infrastructure (ACTRIS)[425]
- ICOS[426]

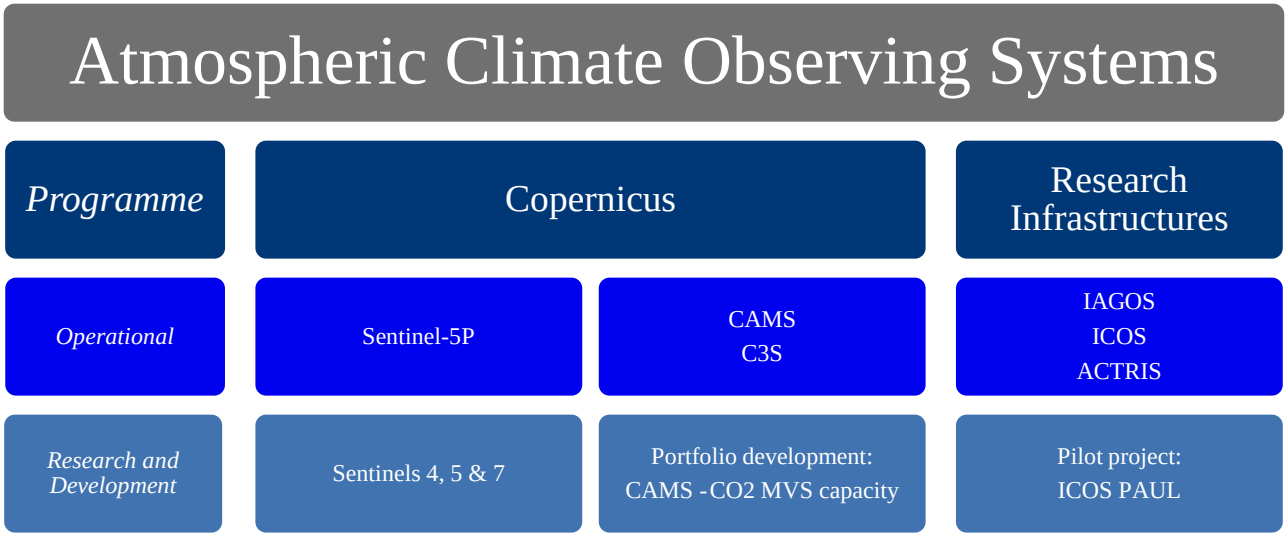
While CAMS uses these ground-based (ICOS and ACTRIS) and aircraft-based observations (IAGOS) of atmospheric composition for evaluation and quality assurance of certain services, these Research Infrastructures constitute atmospheric observation systems in their own right. For example,

[420] Sentinel-4, https://sentinel.esa.int/web/sentinel/missions/sentinel-4 .
[421] Sentinel-5, https://sentinel.esa.int/web/sentinel/missions/sentinel-5.
[422] A brief outlook on future Copernicus Missions, https://sentinel.esa.int/web/sentinel/missions/copernicus-expansion-missions.
[423] Talk by ESA at the CAMS 5th General Assembly, https://atmosphere.copernicus.eu/sites/default/files/custom-uploads/CAMS-5thGA/day2/Meijer%20Y_ESA_Observation%20based%20emissions%20fluxes.pdf.
[424] IAGOS – In-service Aircraft for a Global Observing System, https://www.iagos.org/.
[425] ACTRIS – The Aerosol, Clouds and Trace Gases Research infrastructure, https://www.actris.eu/.
[426] ICOS – Integrated Carbon Observation System, https://www.icos-cp.eu/.

ICOS produces updated time series of hourly averaged measurements of mole fractions of, inter alia, CO_2, CH_4 and N_2O made at the ICOS Atmosphere stations[427].

In terms of maintaining and expanding systematic observation of the atmosphere, it is important to mention the Copernicus services evolution. In addition to the afore-mentioned Sentinels that are due to be launched between 2023 and 2026, it is also planned that the portfolio of the Copernicus services will be expanded. A noteworthy addition to the CAMS portfolio over the 2021-2027 period will be observation-based emissions estimates of GHGs and the CO_2 monitoring and verification support capacity. Through this, CAMS plans to develop operational services that integrate satellite and ground-based measurements of GHGs and models of atmospheric transport and chemistry to derive independent GHG emissions estimates at national and subnational level. Horizon 2020 projects, CHE[428], VERIFY[429] and CoCO2[430] have been contributing to the research and development on this front. Furthermore, in terms of expanding ground-based atmospheric observations, ICOS is currently leading the Horizon 2020 project PAUL[431], which is developing and evaluating innovative GHG measurement technologies and observatories in urban areas.

Figure 55: Overview of Atmospheric Climate Observing Systems



[NC8] 8.4.2 Ocean climate observing systems

Sentinels 1 and 3 contribute to Copernicus's observation of the Ocean and allow for monitoring of, inter alia, ocean wind fields, swell spectra (Sentinel 1), ocean colour, sea surface height and sea surface temperature (Sentinel 3)[432].

[427] ICOS RI. (2021). ICOS Atmosphere Release 2021-1 of Level 2 Greenhouse Gas Mole Fractions of CO2, CH4, N2O, CO, meteorology and 14CO2 (1.0). ICOS ERIC - Carbon Portal, https://doi.org/10.18160/WJY7-5D06.
[428] CO2 Human Emissions, https://cordis.europa.eu/project/id/776186.
[429] Observation-based system for monitoring and verification of greenhouse gases, https://cordis.europa.eu/project/id/776810.
[430] Prototype system for a Copernicus CO_2 service, https://cordis.europa.eu/project/id/958927.
[431] Pilot Application in Urban Landscapes - Towards integrated city observatories for greenhouse gases, https://cordis.europa.eu/project/id/101037319.
[432] Marine Monitoring Overview, https://sentinels.copernicus.eu/web/sentinel/thematic-areas/marine-monitoring.

The Copernicus Marine Environment Monitoring Service represents the main service providing information products relevant to monitoring the ocean climate. This service is implemented by Mercator Ocean International and integrates global and regional models with data from the aforementioned Sentinels, the Contributing Missions and in situ observation networks to allow monitoring of different marine variables. The variables are divided between three thematic areas of marine monitoring:

- The Blue Ocean, e.g. ocean temperature, ocean heat content, ocean salinity;
- the Green Ocean, e.g. ocean phytoplankton and nutrients; and
- the White Ocean, e.g. sea ice and icebergs.

As such, CMEMS is able to produce re-analysis and forecasting datasets of global ocean physical and biogeochemical variables that are resolved in both time and space, e.g. the Global Ocean Physics Reanalysis[433] and the Global Ocean Biogeochemistry Hindcast[434] data products. The service has also produced an annual Ocean State Report since 2018[435].

As mentioned above, in situ data are also utilised by CMEMS, with data coming from profiling floats, research vessels, buoys, tide gauges and sensors on marine mammals. In addition to data from global networks, national providers or regional networks outside of Europe, CMEMS also relies on streams of European seas data from the following European Research Infrastructures and networks[436]:

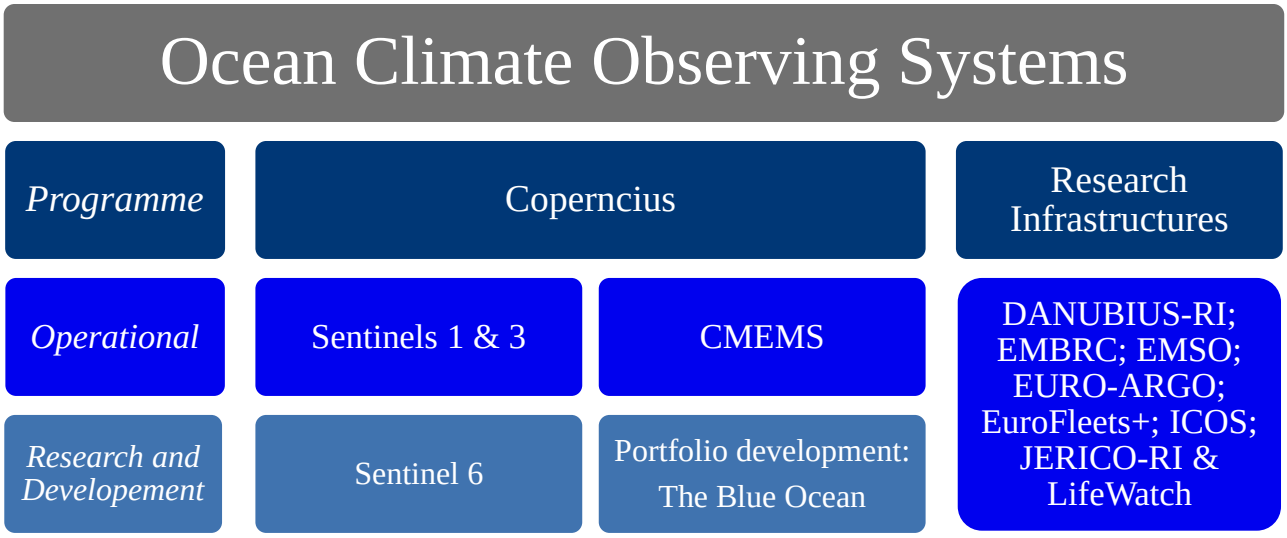
- The International Centre for Advanced Studies on River-Sea Systems;
- The European Marine Biological Resource Centre;
- European Multidisciplinary Seafloor and water column Observatory;
- Euro-Argo Research Infrastructure Sustainability and Enhancement;
- EuroFleets+ – An alliance of European marine research infrastructure;
- Integrated Carbon Observation System;
- Joint Research Infrastructure of Coastal Observations; and the
- LifeWatch European Research Infrastructure Consortium.

In terms of developing and expanding ocean climate observations, it is important to mention the recent launch of Sentinel 6 in 2020 that will extend the legacy of sea-surface height measurements

[433] Global Ocean Physics Reanalysis, https://resources.marine.copernicus.eu/product-detail/GLOBAL_MULTIYEAR_PHY_001_030/INFORMATION.
[434] Global ocean biogeochemistry hindcast, https://resources.marine.copernicus.eu/product-detail/GLOBAL_MULTIYEAR_BGC_001_029/INFORMATION.
[435] 5th edition of the Copernicus Marine Service Ocean State Report (OSR 5), https://marine.copernicus.eu/access-data/ocean-state-report/ocean-state-report-5.
[436] Global Ocean: In Situ Data Providers, https://marine.copernicus.eu/explainers/operational-oceanography/monitoring-forecasting/in-situ/data-providers.

until at least 2030[437]. Indeed, a large part of the 2021-2027 service evolution foreseen for CMEMS will be focused on ingesting the Sentinel 6 data and improving the observation and modelling products under the Blue Ocean portfolio[438].

Figure 56: Overview of Ocean Climate Observing Systems



[NC8] 8.4.3 Terrestrial climate observing systems

Sentinels 1, 2 and 3 contribute to Copernicus's observation of the terrestrial surface and allow for monitoring of, inter alia, land cover and land cover change (Sentinel 1 and particularly Sentinel 2) and land surface temperature and colour (Sentinel 3)[439].

The CLMS represents the main service providing information products with respect to the climate-relevant monitoring of the terrestrial surface[440]. The service is implemented jointly by the EEA and the European Commission's JRC and ingests observation data to produce land surface data products at the global, pan-European and local scale. For instance, the Copernicus Global Land Service[441] offers temporally and spatially resolved data products of land surface temperature and surface temperature of inland water bodies. In terms of inland waters, the service also provides data on the extent and the level of these global water bodies. With respect to monitoring climate impacts on terrestrial vegetation, CLMS offers a number of data products on vegetation indices with a global coverage (e.g. Normalized Difference Vegetation Index; Vegetation Condition Index; Vegetation Productivity Index) as well as higher-resolution products (the High-Resolution Vegetation Phenology and Productivity products) for the pan-European domain.

Within the climate system, the land surface not only responds to climate change but also influences climate change via biogeochemical and bio geophysical impacts on the atmosphere. In this regard,

[437] Copernicus Sentinel-6 Michael Freilich, https://sentinels.copernicus.eu/web/sentinel/missions/sentinel-6.
[438] New Sentinel-6A satellite sea level and wave data, https://marine.copernicus.eu/news/sentinel-6a-satellite-sea-level-wave-data#EvolutioninCopernicusMarineportfolio.
[439] Discover our satellites, https://www.copernicus.eu/en/about-copernicus/infrastructure/discover-our-satellites.
[440] Copernicus Land Monitoring Service, https://land.copernicus.eu/.
[441] Copernicus Global land Service, https://land.copernicus.eu/global/.

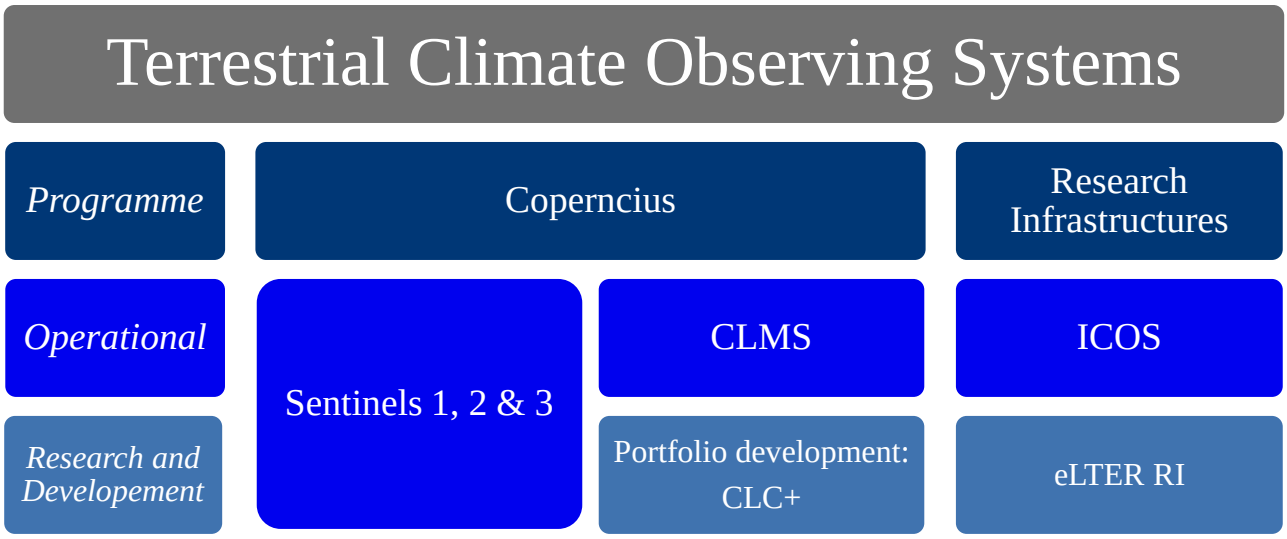
CLMS also offers global coverage data on land cover and burnt areas. At the pan-European scale[442], it is important to mention the Corine Land Cover (CLC) datasets that track land cover and changes in land cover in Europe since 1990 as well as a variety of status and change cover products under the High-Resolution Layers portfolio and the local scale Urban Atlas portfolio.

In terms of service evolution, the development of the second generation of the CORINE (Coordination of Information on the Environment)[443] Land Cover, referred to as CLC+[444] should be noted. Like the previous system, CLC+ will retain a land cover backbone. However, the ability of the expanded database approach will allow the CLC+ core component to ingest other spatial datasets and produce land cover and land use products, the CLC+ instances, to support key EU policy needs. In May 2022, the EEA announced the tender for projects to produce the first CLC+ instances for inter alia LULUCF reporting and EU Common Agriculture Policy monitoring[445].

For many data products, particularly the global scale data, CLMS relies on the Ground-Based Observations for Validation (GBOV) service[446] for in situ reference measurements (e.g. leaf area index, surface radiation measurements, soil moisture). The GBOV service sources and processes these data from monitoring stations belonging to international in situ networks (e.g. Fluxnet) as well as European Research Infrastructures (e.g. ICOS). Furthermore, with measurements of, inter alia, surface-atmosphere fluxes of GHGs at its sites, ICOS itself constitutes an important system for monitoring the status of Europe's terrestrial ecosystems. In this respect, another important European in situ network to mention is the European part of Long-Term Ecosystem Research (LTER) networks. At LTER-Europe sites, many ecosystem variables ranging from ecosystem biogeochemistry to biodiversity are monitored. Building on the national sites and networks within LTER-Europe, the European Commission is currently supporting the development of a fully-fledged Research Infrastructure[447], through two Horizon 2020 projects[448,449].

[442] Pan-European, https://land.copernicus.eu/pan-european.
[443] CORINE Land Cover https://land.copernicus.eu/pan-european/corine-land-cover.
[444] CLC+, https://land.copernicus.eu/pan-european/clc-plus.
[445] Call for tenders Production of CLC+ Instances, https://etendering.ted.europa.eu/cft/cft-display.html?cftId=11003; https://land.copernicus.eu/global/gbov/overview/.
[447] eLTER RI, Integrated European Long-Term Ecosystem, critical zone and socio-ecological Research, https://elter-ri.eu/.
[448] eLTER Preparatory Phase Projekt (eLTER PPP), https://elter-ri.eu/elter-ppp.
[449] European long-term ecosystem, critical zone and socio-ecological systems research infrastructure Advanced Community project (eLTER PLUS), https://elter-ri.eu/elter-plus.

Figure 57: Overview of Terrestrial Climate Observing Systems



[NC8] 8.4.4 Cryosphere climate observing systems

Given the wide geographical coverage of earth observation and the in situ networks, the above-mentioned Research Infrastructures and Copernicus observation systems also contribute to climate-relevant monitoring of the Cryosphere, i.e. portions of Earth's surface where water is in solid form. For example, some stations belonging to ICOS[450] and LTER-Europe[451] are located north of the Arctic Circle and at high elevations within the European Alps.

In addition to the cryospheric coverage of the remote and in situ observations and associated datasets, a number of Copernicus services furthermore produce specific regional products dedicated to, for example, the Artic, as well as a number of information products for monitoring specific environmental variables of the Cryosphere. For instance, in addition to the global weather reanalysis dataset ERA5, the C3S service has also produced a dedicated European Arctic Regional Reanalysis dataset[452]. Under the thematic area of the White Ocean, CMEMS monitors sea/ocean ice cover and volume, and under CLMS, information products for monitoring lake ice extent, snow cover extent and snow water equivalent are produced under the Cryosphere theme of the global land service portfolio[453]. Furthermore, CLMS has developed a High Resolution Snow and Ice Monitoring data portfolio[454] for the pan-European domain.

[450] ICOS Station Map, https://www.icos-cp.eu/station-map.
[451] eLTER Site Catalogue, https://www.lter-europe.net/elter/outputs/site-catalogue.
[452] Copernicus Arctic Regional Reanalysis Service, https://climate.copernicus.eu/copernicus-arctic-regional-reanalysis-service.
[453] Cryosphere, https://land.copernicus.eu/global/themes/cryosphere.
[454] High Resolution Snow and Ice Monitoring, https://land.copernicus.eu/pan-european/biophysical-parameters/high-resolution-snow-and-ice-monitoring.

[NC8] 8.4.5 Support for developing countries to establish and maintain observing systems, related data and monitoring systems

The EU supports systematic observation in developing countries by providing access to Copernicus data and services and by supporting the development of climate-relevant Research Infrastructures in partner countries.

As mentioned previously, the vast majority of data/information delivered by Copernicus is made available and accessible to any citizen and any organisation around the world on a free, full, and open basis[455]. The programme is furthermore active in terms of international outreach. Within the scope of the EU Global Action on Space[456], webinars targeting inter alia South-East Asian, South American and Central American stakeholders have been organised to inform on opportunities and benefits for using Copernicus data for climate monitoring. In addition to this open data policy and outreach, Copernicus offers trainings on how to access and use the data. For example, the C3S User Learning Service co-organised a webinar on the use of the C3S Climate Data Store that targeted African climate and hydrology experts from all over the continent[457].

As well as providing and facilitating access to Copernicus data, the EU also supports development of ground-based observation networks beyond Europe through cooperation between regional Research Infrastructures. The Horizon 2020 project RI-VIS[458], which aims to increase the visibility of European Research Infrastructures to new communities in Europe and beyond, published respective White Papers in 2021 on recommendations on how to increase collaboration between European research infrastructures and counterparts from Africa and Latin America. Another example of this approach is the Horizon 2020 project SEACRIFOG[459] which aims to build an integrative network for long-term and sustainable cooperation among African and European environmental Research Infrastructures with a focus on, inter alia, greenhouse gas observations.

[NC8] 8.4.6 Contribution to global systematic observation

Copernicus and Research Infrastructures make an important contribution to global systematic observations. The World Meteorological Organization Global Climate Observing System (GCOS)[460] regularly assesses the status of global climate observations of the atmosphere, land and ocean and acknowledges the important contributions made by the EU and its Copernicus programme. Since 2020, the EU has supported the work of the GCOS secretariat[461]. Moreover, the 2021 GCOS Status

[455] Access to data, https://www.copernicus.eu/en/access-data.
[456] EU Global Action on Space, https://eu-global-space.eu/.
[457] First User Learning Services training for Africa successfully completed, https://climate.copernicus.eu/first-user-learning-services-training-africa-successfully-completed.
[458] RI-VIS publishes three white papers on international cooperation between Research infrastructures, https://www.eric-forum.eu/2021/02/19/ri-vis-publishes-three-white-papers-on-international-cooperation-between-research-infrastructures/.
[459] SEACRIFOG – Supporting EU-African Cooperation on Research Infrastructures for Food Security and Greenhouse Gas Observations, https://www.seacrifog.eu/.
[460] Global Climate Observing System (GCOS), https://gcos.wmo.int/en/home.
[461] About GCOS, https://gcos.wmo.int/en/about/eu.

Report[462] and the 2022 GCOS Implementation Plan[463] acknowledge the contributions made by Copernicus to monitoring the ECV that GCOS defines as critically contributing to the characterisation of Earth's climate. Indeed, ECVs from the CS3 services as well as data products from CAMS have furthermore contributed to the IPCC's Working Group 1 contribution to the Sixth Assessment Report[464].

The European Research Infrastructures as described in this National Communication also contribute to global in situ observation systems. For instance, in addition to Copernicus, the 2021 GCOS Status Report mentions the contributions of inter alia ICOS, ACTRIS and IAGOS to the global climate observing system. Another noteworthy development is the Global Ecosystem Research Infrastructure agreement that was signed by six different continental-scale ecosystem observing infrastructures[465]. With ICOS and the European LTER, Europe contributes two of the six regional infrastructures.

Finally, with respect to global climate monitoring, it is important to mention ongoing work to develop the aforementioned Copernicus CO_2 monitoring and verification support capacity[466]. The foreseen system will infer global CO_2 and CH_4 emissions at national and subnational scale from the planned measurements of the CO2M mission and should be operational after 2026. It is foreseen that the monitoring and verification support capacity provides independent emissions estimates that will complement the Paris Agreement's enhanced transparency framework and contribute to the second Global Stocktake.

[462] The Global Climate Observing System 2021: The GCOS Status Report, https://gcos.wmo.int/en/gcos-status-report-2021.
[463] The 2022 GCOS Implementation Plan, https://library.wmo.int/doc_num.php?explnum_id=11317.
[464] Support for the IPCC WG1 6th Assessment Report, https://climate.copernicus.eu/support-ipcc-wg1-6th-assessment-report.
[465] Global Ecosystem Research Infrastructure (GERI) agreement signed, https://elter-ri.eu/news/global-ecosystem-research-infrastructure-geri-agreement-signed.
[466] Toward an Operational Anthropogenic CO_2 Emissions Monitoring and Verification Support Capacity, https://doi.org/10.1175/BAMS-D-19-0017.1.

[NC8] 9 EDUCATION, TRAINING AND PUBLIC AWARENESS

[NC8] 9.1 Introduction and key developments

Sustainable development is a core principle of the European Union and delivering on the UN's Sustainable Development Goals is a priority objective for the European Union's internal and external policies. Like all sectors, education and training must also take action to respond to the climate emergency and planetary crisis. Furthermore, the European Green Deal, with its objective of making Europe climate-neutral by 2050, has had a major impact on all EU policy areas, including education, training and public awareness raising, since its publication in 2019.

In line with Article 6 of the UN Framework Convention on Climate Change and Article 12 of the Paris Agreement, and as part of international ACE, the EU has been investing significant efforts and resources in raising its citizens' awareness of the challenges posed by climate change and of ways to reduce GHG emissions. Actions in the field of education, training, public information and engagement campaigns, communication activities and international cooperation have all played an important role in this endeavour.

Learning for the green transition has become one of the focus areas for collaboration within the European Education Area, which is the overarching framework under which the European Union Member States and the European Commission work together on education and training systems. The EU is encouraging the education and training sector to take action to contribute to the green transition and to strengthen the sustainability competences of all learners. Key initiatives in this area are the Council Recommendation on learning for the green transition and sustainable development[467] and the European competence framework on sustainability[468].

The European Green Deal has also boosted activities related to public awareness of engagement in climate action. One flagship initiative in this area is the European Climate Pact, which the European Commission launched in 2020 to bring together people, industry, civil society and public authorities at all levels to participate in climate action and build a greener Europe[469].

[NC8] 9.2 Primary, secondary and higher education and training programmes

In the European Union, education and training policy is in the jurisdiction of the Member States. The EU can implement direct or indirect measures on education on training. It can indirectly support and guide Member States' activities on education and training. In addition, the EU can directly implement initiatives, e.g. on mutual learning and financial support, to complement Member States' activities. Furthermore, EU measures on education and training can be categorised into policy measures and funding measures (e.g. Erasmus+, see section [NC8] 9.2.9).

[467] Proposal for a Council Recommendation on learning for the green transition and sustainable development, https://data.consilium.europa.eu/doc/document/ST-9242-2022-INIT/en/pdf.
[468] GreenComp – The European sustainability competence framework, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC128040/jrc128040_greencomp_f2.pdf.
[469] European Climate Pact, https://ec.europa.eu/clima/eu-action/european-green-deal/european-climate-pact_en.

As mentioned in section [NC8] 9.1, one of the focus areas of the European Education Area is learning for the green transition. The most important EU initiatives in this area are presented in the following:

[NC8] 9.2.1 Council Recommendation on learning for the green transition and sustainable development

On 16 June 2022, the Council of the European Union adopted a Recommendation on learning for the green transition and sustainable development[470]. The aim of the Recommendation is to support Member States, schools, higher education institutions, non-governmental organisations and all education providers in equipping learners with knowledge, skills and attitudes to live, work and act in a sustainable manner. The European Commission will support the implementation of the Recommendation through peer learning and exchange on sustainability in education, including a dedicated EU Working Group on this topic. It will also develop resources for educators and policy-makers, including an online course for teachers on whole-school actions on sustainability[471].

[NC8] 9.2.2 European competence framework on sustainability

The above Council Recommendation is accompanied by a new European competence framework on sustainability. The 'GreenComp' framework defines a set of sustainability competences to feed into education programmes and can be used in education and training programmes and policies in formal, non-formal and informal settings. The framework defines four competence groups that should be acquired by learners of all ages related to sustainability: embodying sustainability values, embracing complexity in sustainability, envisioning sustainable futures and acting for sustainability. Each competence area comprises three competences, e.g. embodying sustainability values comprises the competences valuing sustainability, supporting fairness and promoting nature[472, 473].

[NC8] 9.2.3 EU working group on sustainability in school education

In 2022, the European Commission established a new EU working group on sustainability in school education, which is one of several working groups within the framework of the European Education Area. The working group consists of representatives from ministries of education and the environment, social partners and stakeholder organisations from more than 30 European countries. The first of its regular meetings took place at the start of 2022 to discuss how schools, communities, education policies and programmes can best support learning about and for the environment and sustainability. The working group has produced several documents including key messages on

[470] Learning for the green transition and sustainable development, https://education.ec.europa.eu/news/learning-for-the-green-transition-and-sustainable-development.
[471] Learning for environmental sustainability, https://education.ec.europa.eu/focus-topics/green-education/learning-for-environmental-sustainability.
[472] GreenComp – The European sustainability competence framework, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC128040/jrc128040_greencomp_f2.pdf.
[473] European competence framework on sustainability, https://education.ec.europa.eu/focus-topics/green-education/learning-for-environmental-sustainability.

effective policy design in learning for sustainability as well as whole school approaches to learning for sustainability[474][475].

[NC8] 9.2.4 European strategy for universities

In January 2022, the European Commission adopted a European strategy for universities. One of the four key objectives of the strategy is to engage universities in unfolding green and digital transitions[476]. For this purpose, the Strategy foresees several measures. These measures include the support of the development by universities of short learning courses on green skills and the support of Higher Education Climate Frontrunners – a platform for transnational partnerships between students, academics, universities, employers and communities on climate challenges. The Strategy also calls on Member States to support universities in their whole-institutional approaches to sustainability, including on green skills[477].

[NC8] 9.2.5 Education for Climate Coalition

The European Commission launched the Education for Climate Coalition in December 2020. It is a participatory education community to support the changes needed for a climate-neutral society. Its priorities are to train teachers, bridge education with science, develop green skills and competences, raise awareness and change behaviours. To achieve these objectives, the Coalition aspires to create a community led by students and teachers with their schools and networks and other educational actors and learn from as many relevant experiences as possible[478].

To facilitate collaboration within this community, the Education for Climate Coalition has launched a collaborative online community platform[479]. The platform allows members to connect to each other in the peer area, co-create concrete education actions in participatory challenges and explore existing education solutions in the knowledge library.

[NC8] 9.2.6 Researchers at Schools initiative

The Researchers at Schools initiative allows researchers to showcase their work and to engage with teachers and pupils on challenges such as climate change and sustainable development[480].

[NC8] 9.2.7 European Institute of Innovation and Technology Climate-KIC and InnoEnergy

The European Institute of Innovation & Technology has established two innovation communities that include training and education programmes related to climate change. Climate-KIC is a Knowledge

[474] First meeting of EU working group on sustainability in school education, https://education.ec.europa.eu/news/first-meeting-of-eu-working-group-on-sustainability-in-school-education.
[475] Document library, https://education.ec.europa.eu/resources-and-tools/documents?facets__field_eac_topics=381.
[476] Higher education initiatives https://education.ec.europa.eu/es/node/1717 .
[477] Communication from the Commission on a European strategy for universities https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022DC0016.
[478] Education for Climate, https://education-for-climate.ec.europa.eu/sites/default/files/EducationForClimate_about_EN_0.pdf.
[479] Welcome to the Education for Climate Community, https://education-for-climate.ec.europa.eu/community/home.
[480] MSCA & Citizens, https://marie-sklodowska-curie-actions.ec.europa.eu/actions/msca-citizens.

and Innovation Community (KIC) that aims at accelerating the transition to a zero-carbon, climate-resilient society by creating networks of expertise[481]. Climate KIC has an education component, which provides for knowledge sharing and free online courses[482]. InnoEnergy aims at accelerating sustainable energy innovations and provides Master's and PhD School programmes[483].

[NC8] 9.2.8 ManagEnergy

Launched in 2002, ManagEnergy is a technical support initiative financed under the Intelligent Energy – Europe programme and managed by the European Commission's Executive Agency for SMEs (EASME). It supports local and regional energy actions in the fields of energy efficiency and renewable energy. Its main target groups include local and regional public authorities, energy agencies and other organisations. ManagEnergy offers training in the form of master classes (3-day programme in Brussels, delivered by leading energy experts), expert missions (providing know-how to energy agencies in the field of energy efficiency financing in their own region/city), networking events and public talks[484].

[NC8] 9.2.9 Erasmus+

Erasmus+ is the EU's programme to support education in Europe with an estimate budget of EUR26.2 billion for the period 2021-2027. Following on from the earlier Erasmus programme, Erasmus+ offers mobility and cooperation opportunities in higher education, vocational education and training, school education (including early childhood education and care) and adult education.

The 2021-2027 Erasmus+ programme places a strong focus on the green transition in education and training. Participating organisations are encouraged to promote environmental sustainability, e.g. by raising awareness among their participants and sharing best practices. Erasmus+ gives increased support for green travel to promote the use of sustainable means of transport. In the 2022 annual work programme, priority is given to projects developing green competences and skills, future-oriented curricula and planned approaches to sustainability by education providers[485].

[NC8] 9.3 Public information and engagement campaigns

The EU institutions are very active in providing the public with information on climate change and in engaging the public on the topic. Many of the campaigns use digital and social media tools, but usually also include opportunities for personal live interaction (excluding during the peak of the Covid-19 pandemic when many events took place exclusively online). The campaigns employ websites, Facebook, Instagram and Twitter campaigns, video productions, seminars, workshops and other types of live events.

[481] EIT Climate-KIC, https://www.climate-kic.org/.
[482] What is EIT Climate-KIC Education? https://www.climate-kic.org/programmes/education/.
[483] EIT InnoEnergy, https://eit.europa.eu/our-communities/eit-innoenergy.
[484] ManagEnergy, https://www.managenergy.net/frontpage.
[485] Erasmus+, https://erasmus-plus.ec.europa.eu/.

This section includes a selection of the most important public information and engagement campaigns related to climate change in the following:

[NC8] 9.3.1 EU Climate Diplomacy Weeks

The EU Climate Diplomacy Weeks are an event that EU Delegations around the world first organised in 2015. During Climate Diplomacy Weeks, EU Delegations and embassies of several EU Member States around the world hold various events to foster dialogue and cooperation on climate change, showcase success stories and inspire further action.

In 2018, two Climate Diplomacy weeks took place and focused on the Talanoa Dialogue, a facilitative process to take stock of the collective and individual efforts towards the goals of the Paris Agreement. In 2019, the main theme of the two Climate Diplomacy weeks was youth[486].

In 2020 and 2021, no formal Climate Diplomacy Weeks with set dates took place due to the Covid-19 pandemic. However, the European Commission and the European External Action Service (EU Delegations) organised outreach activities around climate events and milestones, such as the fifth anniversary of the Paris Agreement in December 2020[487].

[NC8] 9.3.2 EU Open Doors Day

Every year, the EU institutions open their doors to the public in early May to celebrate Europe Day, which takes place on 9 May and which includes activities related to climate action.

In 2018, the European Commission Directorate-General for Climate Action had a stand that centred on the idea that everyone can and must contribute to combat climate change. The activities included an information wall on EU climate policies and actions, an action wall describing what each individual can do to help combat climate change, a climate board game and a climate and energy quiz.

In 2019, the European Commission Directorates-General for Climate Action, Environment and Energy had a common stand highlighting the work done by the European Commission in the areas of climate action, energy and environment. The stand focused on actions taken by the EU at all levels to combat climate change, protect our natural environment, and lead the energy transition. The activities included a virtual exhibition, informative panels with climate, energy and environment policies, a bike challenge and a climate and energy quiz.

In 2020 and 2021, no EU Open Door Day took place due to the COVID-19 pandemic.

[486] Climate Diplomacy Weeks, https://ec.europa.eu/clima/news-your-voice/events/climate-diplomacy-weeks_en.
[487] Race to Zero: Bolstering whole of society engagement for climate neutrality and sustainable recovery, https://www.eesc.europa.eu/en/agenda/our-events/events/race-zero-bolstering-whole-society-engagement-climate-neutrality-and-sustainable-recovery.

In 2022, visitors had the opportunity to explore the 'Green Deal Village' where visitors learned what activities and actions the European Union has taken to achieve the goals of the European Green Deal. In addition, visitors had the opportunity to learn how they can help to tackle climate change[488].

[NC8] 9.3.3 European Climate Pact

The European Climate Pact was launched in 2020 to bring together people, industry, civil society and public authorities at all levels to participate in climate action and build a greener Europe. The Pact focuses on raising awareness and supporting actions to help address the climate crisis[489]. Citizens, organisations and groups can get involved in the European Climate Pact in many ways. One of them is to become a Climate Pact Ambassador. Climate Pact Ambassadors[490] inform, inspire and support climate action in their local communities and networks. Another way is to make a pledge, i.e. to commit to take a concrete action and to share these actions with others to inspire them to join[491]. Individuals, businesses and civil society organisations can also organise Climate Pact satellite events[492]. Finally, citizens may hold their own 'Peer Parliament' with a small circle of friends, family, neighbours or colleagues, and discuss how Europe can become climate-neutral[493].

[NC8] 9.3.4 Side events at international climate change conferences

During the annual UNFCCC climate change conferences, the EU hosts side events on a variety of climate-related topics. At 26th Conference of the Parties (2021), for example, the EU hosted over 150 side events at the EU Pavilion in Glasgow, a studio in Brussels and online. These events, organised by a variety of countries and organisations from Europe (including the European Commission and the European Environment Agency) and around the world, addressed a broad range of climate-related issues, such as the energy transition, sustainable finance and research and innovation[494].

[NC8] 9.3.5 Initiatives under the European Year of Youth 2022

Within the framework of the European Year of Youth in 2022, the EU is organising a number of initiatives to highlight the importance of European youth to build a greener, more inclusive and digital future. These activities include initiatives to engage young people in the fight against climate change. They include tips on how the youth can contribute in their daily lives[495], a climate and energy quiz

[488] Europe Day – Open Doors 2022 – Green Deal Village, https://ec.europa.eu/info/events/europe-day-open-doors-2022_en.
[489] European Climate Pact, https://ec.europa.eu/clima/eu-action/european-green-deal/european-climate-pact_en.
[490] Become an Ambassador, https://europa.eu/climate-pact/ambassadors/become-ambassador_en.
[491] Make a pledge today, https://europa.eu/climate-pact/pledges_en.
[492] Events, https://europa.eu/climate-pact/events_en.
[493] Peer Parliaments, https://europa.eu/climate-pact/peer-parliaments_en.
[494] EU at COP26 Climate Change Conference, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/climate-action-and-green-deal/eu-cop26-climate-change-conference_en.
[495] Fighting climate change starts on your plate, https://europa.eu/youth/get-involved/sustainable-development/fighting-climate-change-starts-your-plate_en.

and a climate action board game[496] and the educational online tool 'Our Planet, Our Future: fighting climate change together'[497].

Another initiative in this context is the EU Youth Dialogue, which is a dialogue mechanism between young people and decision makers. The dialogue with policy makers and other dialogue activities happen in 18-month work cycles. Each cycle focuses on a different theme set by the Council of Youth Ministers. The current one (from the beginning of 2022 to mid-2023) is 'A Sustainable and Green Europe'[498]. The policy dialogues have included, for example, a dialogue event in which young people discussed how to kick start a sustainable Europe with the Executive Vice-President of the European Commission, Frans Timmermans[499].

[NC8] 9.3.6 Covenant of Mayors

The European Commission launched the Covenant of Mayors in Europe in 2008 with the ambition of gathering local governments voluntarily committed to achieving and exceeding the EU climate and energy targets. The initiative now brings together over 9,000 local and regional authorities across 57 countries[500,501].

The commitments for Covenant signatories are linked to the EU's climate and energy policy framework. Covenant signatories commit to adopting an integrated approach to climate change mitigation and adaptation.[502]. For additional information, please see section [BR] 3.1.1.5 of the Fifth Biennial Report, which is submitted together with this report.

[NC8] 9.3.7 EU Sustainable Energy Week

The European Sustainable Energy Week (EUSEW) brings together public authorities, private companies, projects, non-governmental organisations and consumers to promote initiatives to save energy and move towards renewables for clean, secure and efficient energies. It was launched in 2006 by the European Commission and since then has been organised annually by EASME in close cooperation with the European Commission's Directorate-General for Energy.

Since 2020, the European Youth Energy Day is organised in the context of the EUSEW. It gives young participants (aged 18-34) the chance to get involved in Europe's sustainable energy transition[503].

[496] Youth & climate, https://ec.europa.eu/clima/citizens/youth-climate_en.
[497] Our Planet Our Future, https://ec.europa.eu/clima/sites/youth/node_en.
[498] EU Youth Dialogue, https://europa.eu/youth/eu-youth-dialogue_en.
[499] Family of Policy Dialogues 2: Kick-starting a sustainable Europe – with young people! https://europa.eu/youth/news/family-of-policy-dialogues-2-kick-starting-sustainable-europe-young-people_en.
[500] Covenant of Mayors for Climate & Energy Europe, https://www.covenantofmayors.eu/en/.
[501] Flashback: The origins of the Covenant of Mayors, https://www.covenantofmayors.eu/about/covenant-initiative/origins-and-development.html.
[502] Covenant community, https://www.covenantofmayors.eu/about/covenant-community/signatories.html.
[503] European Youth Energy Day, https://www.eusew.eu/european-youth-energy-day

As part of the EUSEW, the Sustainable Energy Awards are awarded annually to recognise outstanding individuals and projects for their innovation and efforts in the field of energy efficiency and renewables[504].

[NC8] 9.3.8 European Business Awards for the Environment

The European Business Awards for the Environment were established by the European Commission and held every two years from 1990-2020. After the last awards ceremony in November 2020, the European Commission decided to discontinue the awards following an in-depth assessment. The awards aimed to recognise and reward European companies that set an example by successfully bringing together innovation, economic viability and environmental concerns. Prizes were awarded in five categories: management, product & services, process, developing country cooperation and business and biodiversity [505].

[NC8] 9.3.9 European Green Capital Award and European Green Leaf Award

The European Green Capital Award is the result of an initiative taken by 15 European cities and the Association of Estonian cities in 2006 in Tallinn, Estonia. Their green vision was translated into a joint Memorandum of Understanding establishing an Award to recognise cities that are leading the way with environmentally friendly urban living. The initiative was launched by the European Commission in 2008.

Starting in 2010, one European city has been selected each year as the European Green Capital of the year. The Award is given to a city that has a consistent record of achieving high environmental standards and provides them with public recognition; is committed to ongoing and ambitious goals for further environmental improvement and sustainable development and can act as a role model to inspire other cities and promote best practices to all other European cities[506].

The European Green Leaf Award was born out of the success of the European Green Capital Award and the need to recognise cities of a smaller size in 2015. The annual competition is open to all towns and cities across Europe with a population of 20 000 and up to 100 000 inhabitants and recognises a city's commitment to better environmental outcomes[507].

[NC8] 9.3.10 EUROPEANMOBILITYWEEK

EUROPEAN**MOBILITY**WEEK was introduced in 2002 and is the European Commission's flagship awareness-raising campaign on sustainable urban mobility. It encourages behavioural change in favour of active mobility, public transport and other clean, intelligent transport solutions.

[504] European Sustainable Energy Week, https://www.eusew.eu/.
[505] European Business Awards for the Environment, https://www.loweurope.eu/portfolio/ebae.
[506] European Green Capital Award – About the EU Green Capital Award, https://ec.europa.eu/environment/european-green-capital-award/about-eu-green-capital-award_en.
[507] European Green Leaf Award – About the European Green Leave Award, https://ec.europa.eu/environment/european-green-leaf-award/about-european-green-leaf-award_en.

The main event takes place from 16-22 September each year, culminating in the popular Car-Free Day. Local authorities are encouraged to use the main week to try out innovative planning measures, promote new infrastructure and technologies, measure air quality, and get feedback from the public[508]. Recent themes have included 'Safe and Healthy with Sustainable Mobility' in 2021 and 'Zero-emission mobility for all' in 2020[509].

The EUROPEAN**MOBILITY**WEEK Awards recognises local authorities who have excelled in raising awareness about sustainable urban mobility. Two awards are given each year: one to a municipality with a population of under 100 000 and one to a municipality with a population of over 100,000. These awards are directly related to local authorities' active participation in the campaign.

[NC8] 9.3.11 EU Mission – Adaptation to climate change

The EU mission 'Adaptation to climate change' focuses on solutions and preparedness for the impact of climate change to protect lives and assets. It also includes aspects of behavioural changes and social aspects by addressing new communities beyond usual stakeholders, which help lead to a societal transformation.

[NC8] 9.4 Monitoring public opinion

To monitor the evolution of public opinion in Europe on different topics related to the European Union the EU institutions use a polling instrument called Eurobarometer. There are Standard Eurobarometer surveys that are conducted twice a year on key trends relevant to the EU as a whole and Special Eurobarometer surveys that focus on specific topics, such as climate change[510].

[NC8] 9.4.1 Special Eurobarometer 490 on Climate Change (2019)

Special Eurobarometer 490 on Climate Change was carried out between 9 and 26 April 2019 in the then 28 EU Member States and 27 655 EU citizens from different social and demographic categories were interviewed face-to-face at home in their native language.

The survey showed that EU citizens increasingly considered climate change not only as a very serious problem, but as the single most serious problem facing the world at that time. Overall, 93 % of respondents thought climate change is a serious problem. Almost eight in ten (79 %) thought climate change is a very serious problem, an increase of five points since 2017.

In terms of policy response, more than nine in ten (92 %) agreed that greenhouse gas emissions should be reduced to a minimum while offsetting the remaining emissions, in order to make the EU economy climate-neutral by 2050.

Personal action on climate change had increased in every EU country. Sixty percent of respondents said they had personally taken action to fight climate change in the previous six months – an increase

[508] The campaign in a nutshell, https://mobilityweek.eu/the-campaign/.
[509] Previous editions of EUROPEANMOBILITYWEEK, https://mobilityweek.eu/previous-editions/.
[510] About Eurobarometer, https://europa.eu/eurobarometer/about/eurobarometer.

of 11 points compared to 2017. When asked about specific actions to tackle climate change, 93 % had taken at least one.

More than half of all respondents thought national governments (55 %) or business and industry (51 %) are responsible for tackling climate change, while almost half (49 %) mentioned the European Union. The proportion of respondents mentioning each of these actors had increased by at least ten points since 2017[511].

[NC8] 9.4.2 Special Eurobarometer 513 on Climate Change (2021)

Special Eurobarometer 513 on Climate Change was carried out between 15 March and 14 April 2021 in the 27 EU Member States. 26 669 EU citizens from different social and demographic categories were interviewed face-to-face or online in their native language.

The survey showed that European citizens believe climate change is the single most serious problem facing the world. More than nine of every ten people surveyed consider climate change to be a serious problem (93 %), with almost eight of every ten people (78 %) considering it to be very serious.

In terms of policy response, nine of every ten Europeans (90 %) agree that greenhouse gas emissions should be reduced to a minimum while offsetting remaining emissions to make the EU climate-neutral by 2050. Close to nine in ten Europeans (87 %) think it is important that the EU sets ambitious targets to increase renewable energy use, and the same percentage believe that it is important that the EU provides support for improving energy efficiency.

A majority (64 %) of EU citizens are already taking individual climate action and consciously making sustainable choices in their daily lives. Nearly all Europeans (96 %) have taken at least one action to help tackle climate change (+3 percentage points since 2019).

When asked who is responsible for tackling climate change, citizens underlined the need for structural reform to accompany individual action, pointing to national governments (63 %), business and industry (58 %) and the EU (57 %)[512,513].

[NC8] 9.5 Other communication activities and online resources

The EU institutions provide a variety of online resources and materials on climate change via different channels, including publications, websites and social media. The EU institutions' resource or information centres on climate change thus exist in the form of online resource centres.

[511] Special Eurobarometer 490 Climate Change, https://ec.europa.eu/clima/system/files/2019-09/report_summary_2019_en.pdf.
[512] Eurobarometer Survey: Europeans consider climate change to be the most serious problem facing the world, https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3156.
[513] Special Eurobarometer 513, Climate Change Report Summary, https://ec.europa.eu/clima/system/files/2021-07/report_summary_2021_en.pdf.

[NC8] 9.5.1 Publications

The EU institutions publish a variety of reports, brochures, factsheets, etc. on climate change and related EU action. All EU publications can be found on the EU Publications website[514] and can be searched by subject, author, and other criteria.

An overview of publications from the Directorate-General Climate Action is available on its website[515]. Examples of such publications include factsheets on delivering the European Green Deal[516] and a factsheet on fluorinated gases and ozone depleting substances[517]. Other Directorates General also publish climate-relevant publications, such as the Joint Research Centre[518], DG Energy[519] on energy efficiency and renewable energy and DG Mobility and Transport[520] on sustainable mobility and transport.

In addition, the European Environment Agency publishes regular assessments on climate change mitigation and adaptation on its website[521], including the annual report on trends and projections on greenhouse emissions, energy efficiency and renewable energy in the EU[522]. Recent publications on climate change adaption include a briefing on economic losses and fatalities from weather and climate related events in Europe[523], a report on Europe's changing climate hazards[524] and a report on nature-based solutions in Europe[525].

[NC8] 9.5.2 Websites and social media

In addition to publications, the EU institutions also actively communicate information on climate change on websites, social media and video sharing platforms. The different EU institutions and Directorate-Generals of the European Commission provide information on climate change on their websites. In addition, they use social media and video sharing platforms as communication channels. DG Climate Action, for example, communicates via Facebook, Twitter, Instagram, LinkedIn and YouTube.

The EEA website offers interactive data viewers[526] to view data related to climate change mitigation and adaptation, e.g. trends in total greenhouse gas emissions, greenhouse gas emission projections

[514] EU Publications, https://op.europa.eu/en/web/general-publications/publications.
[515] Climate Action – Publications, https://ec.europa.eu/clima/about-us/publications_en.
[516] Delivering the European Green Deal https://ec.europa.eu/info/publications/delivering-european-green-deal_en.
[517] Phasing down F-gases and ozone depleting substances to deliver on our climate targets, https://ec.europa.eu/clima/system/files/2022-04/factsheet_on_f-gases_and_ods_en_0.pdf.
[518] JRC Publications Repository, https://publications.jrc.ec.europa.eu/repository/.
[519] DG Energy – Publications, https://energy.ec.europa.eu/publications_en.
[520] Mobility and Transport – Publications, https://transport.ec.europa.eu/media-corner/publications_en.
[521] EEA –Publications, https://www.eea.europa.eu/publications#c14=&c12=&c7=en&c11=5&b_start=0&c5=climate-change-adaptation&c5=climate.
[522] Trends and projections in Europe 202,1 https://www.eea.europa.eu//publications/trends-and-projections-in-europe-2021.
[523] Economic losses and fatalities from weather- and climate-related events in Europe, https://www.eea.europa.eu/publications/economic-losses-and-fatalities-from.
[524] Europe's changing climate hazards — an index-based interactive EEA report, https://www.eea.europa.eu/publications/europes-changing-climate-hazards-1.
[525] Nature-based solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction, https://www.eea.europa.eu/publications/nature-based-solutions-in-europe.
[526] Interactive data viewers, https://www.eea.europa.eu/data-and-maps/data/data-viewers.

and economic damage caused by weather and climate-related extreme events. In the area of adaptation to climate change, the platform Climate-ADAPT[527] serves as the European Climate Adaptation Platform and aims to support Europe in adapting to climate change helping users to access and share data and information. Climate-ADAPT provides a quality-checked knowledge base for climate change impacts, vulnerabilities and adaptation in Europe for different target audiences, including the public, governmental adaptation decision makers at all governance levels in Europe and the organisations supporting them.

Table 15 provides a non-exhaustive list of selected websites, social media and video channels on which EU institutions communicate information on climate change.

[527] Climate-ADAPT, https://climate-adapt.eea.europa.eu/.

Table 15: Websites, social media and video channels

Title	Address
European Commission's political priorities 2019-2024 – A European Green Deal	https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
EU Instagram Channel on EU Environment & Climate	https://www.instagram.com/ourplanet_eu/
EU Climate Action websites and social media and video channels (Directorate-General for Climate Action)	https://ec.europa.eu/clima/ https://ec.europa.eu/clima/citizens/climate-tips_en https://www.facebook.com/EUClimateAction https://twitter.com/EUClimateAction https://www.youtube.com/user/EUClimateAction https://www.linkedin.com/showcase/72333532
Climate-related webpages of other Directorates-General of the European Commission	Agriculture and rural development – Agriculture and climate change Energy Environment EU Science Hub – Climate change Internal market, industry, entrepreneurship and SMEs – Sustainability International Partnerships – Climate action Mobility and transport – Clean transport, Urban transport Mobility and transport – Sustainable transport Regional policy – Low-carbon economy Research and innovation -Climate action Trade – Sustainable development
European Parliament – Combating climate change	https://www.europarl.europa.eu/factsheets/en/sheet/72/combating-climate-change
Council of the European Union – Climate change	https://www.consilium.europa.eu/en/policies/climate-change/
European Environment Agency – Thematic websites, Climate-ADAPT Platform and social media and video channels	https://www.eea.europa.eu/themes/climate https://www.eea.europa.eu/themes/climate-change-adaptation https://www.eea.europa.eu/data-and-maps/data/data-viewers#b_start=0&c5=climate https: https://www.eea.europa.eu/data-and-maps/data/data-viewers#b_start=0&c5=climate-change-adaptation //climate-adapt.eea.europa.eu/ https://twitter.com/EUEnvironment https://www.facebook.com/European.Environment.Agency/ https://www.youtube.com/user/EEAvideos/

[NC8] 9.6 Involvement of the public and non-governmental organizations

[NC8] 9.6.1 Public consultations on new initiatives

The European Commission has been seeking evidence and feedback from citizens, businesses and stakeholders at all stages of the legislative and policymaking process since 2015. Views and ideas on European Commission initiatives across all policy areas can be shared on a dedicated 'Have Your Say' portal[528]. The website can be searched for by topics, e.g. climate action, in order to get a list of initiatives on which feedback can be provided in the 24 official EU languages. In addition to open consultations, it is also possible to see upcoming consultation, to sign up for notifications regarding new developments as initiatives take shape and to see feedback provided in closed consultations[529].

To provide an example, a public consultation on the European Climate Law was carried out from 9 January to 6 February 2020 and received 931 feedback instances[530]. Another example is the public consultation on shaping the European Climate Pact, which took place from 4 March to 17 June 2020[531] and received feedback from around 3 500 organisations and individuals.

This National Communication has been drafted in close cooperation with experts in various services of the European Commission and other EU institutions. No public consultation on this National Communication was carried out.

[NC8] 9.6.2 Feedback on existing laws

In addition to the opportunity for the public to provide feedback on new initiatives, the European Commission is also offering a channel for the public to make suggestions on improving existing laws, including those related to climate change. Via the 'EU Have Your Say: Simplify!' portal the public can make suggestions linked to existing EU laws with potential for burden reduction and simplification[532].

[NC8] 9.7 International cooperation on education, training and public awareness

[NC8] 9.7.1 Monitoring, review and evaluation of the implementation of Action for Climate Empowerment (ACE) under Article 6 of the Convention

In 2016 and 2018, it was decided in Decisions 17/CP.22[533] and 17/CMA.1[534] that efforts related to implementing Article 6 of the Convention and Article 12 of the Paris Agreement should be referred

[528] Welcome to Have your say, https://ec.europa.eu/info/law/better-regulation/have-your-say_en
[529] Published initiatives, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives_en
[530] European climate law – achieving climate neutrality by 2050, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12108-European-climate-law-achieving-climate-neutrality-by-2050_en
[531] European Climate Pact – About this consultation, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12219-European-Climate-Pact/public-consultation_en.
[532] Have your say: Simplify! https://ec.europa.eu/info/law/better-regulation/have-your-say-simplify_en.
[533] Decision 17/CP.22, https://unfccc.int/documents/9674.
[534] Decision 17/CMA.1, https://unfccc.int/documents/193408.

to as ACE, which includes the following six elements: education, training, public awareness, public participation, public access to information and international cooperation on climate change.

The Doha work programme on Article 6 of the Convention was reviewed in 2020. The European Union contributed actively to this review and made a submission in February 2020 that summarised information on steps taken to implement the Doha work programme and in relation to ACE. The submission also included best practices, lessons learned and recommendations to enhance the implementation of Article 6 of the Convention and Article 12 of the Paris Agreement in the future[535]. These proposals on enhancing the implementation of ACE fed into the discussions on the development for a new work programme following the review and conclusion of the Doha work programme on Article 6 of the Convention at the end of 2020[536]. Based on this work, the Conference of the Parties adopted the 10-year 'Glasgow work programme on Action for Climate Empowerment' in 2021.

[NC8] 9.7.2 International cooperation activities under Article 6 of the Convention

The EU has been very active in developing countries and other third countries in implementing the provisions of the Convention. Many of the EU-supported initiatives related to climate change in third countries include components relating to education, training (within the framework of capacity building activities) and public awareness. One example for an international support initiative is the GCCA+, which supports adaption and mitigation and disaster risk reduction efforts in developing countries, in particular LDCs and Small Island Developing States with a focus sector on 'Education and Research'[537].

Another example is the project 'Multilevel Local, Nation- and Regionwide Education and Training in Climate Services, Climate Change Adaptation and Mitigation' – (ClimEd), which runs from 2020 to 2023 and is co-funded by Erasmus+. ClimEd aims at developing competency-based curricula for continuous comprehensive training of specialists in the field of climate services in Ukraine, as well as the initiation and development of additional education in climate change for decision-makers, experts in climate-dependent economic sectors and the general public[538].

For more detailed information on the provision of financial, technological and capacity-building support to developing countries see chapter [BR5] 5 of the Fifth Biennial Report.

[535] Submission by Croatia and the European Commission on behalf of the European Union and its Member States on Information on steps taken to implement the Doha work programme, https://www4.unfccc.int/sites/SubmissionsStaging/Documents/202002141400---HR-02-14-2020%20EU%20submission%20on%20Action%20for%20Climate%20Empowerment.pdf.
[536] Option and ways for future work to enhance the implementation of Article 6 of the Convention and Article 12 of the Paris Agreement, following the review of the Doha work programme, https://unfccc.int/sites/default/files/resource/sbi2020_inf4.pdf.
[537] The Global Climate Change Alliance Plus (GCCA+) https://ec.europa.eu/international-partnerships/programmes/global-climate-change-alliance-plus-gcca_en.
[538] ClimEd, http://climed.network/.

[NC8] 10 LIST OF ABBREVIATIONS

Abbreviation	Description
ACTRIS	Aerosol, Clouds and Trace Gases Research Infrastructure
ACE	Action for Climate Empowerment
AR6	Sixth Assessment Report
AXIS	Assessment of Cross(X)-sectoral climate Impacts and pathways for Sustainable transformation
BR5	Fifth Biennial Report
CAMS	Copernicus Atmospheric Monitoring Service
CAP	Common Agricultural Policy
CH_4	Methane
ClimEd	Multilevel Local, Nation- and Regionwide Education and Training in Climate Services, Climate Change Adaptation and Mitigation
CLMS	Copernicus Land Monitoring Service
CLC	Corine Land Cover
CMEMS	Copernicus Marine Environment Monitoring Service
CONSTRAIN	Constraining uncertainty of multi decadal climate projections
CORDIS	Community Research and Development Information Service
CORINE	Coordination of Information on the Environment
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
COST	European Cooperation in Science and Technology
CO_2	Carbon dioxide
CO_2eq	Carbon dioxide equivalent
COVID-19	Coronavirus Disease 2019
CRF	Common Reporting Format
CRiceS	Climate Relevant interactions and feedbacks: the key role of sea ice and Snow in the polar and global climate system
CTF	Common Tabular Format
C3S	Copernicus Climate Change Service

DG	Directorate-General
EASME	Executive Agency for Small and Medium-sized Enterprises
EC	European Commission
ECVs	Essential Climate Variables
EEA	European Environment Agency
EIB	European Investment Bank
EIC	European Innovation Council
EISMEA	European Innovation Council and SMEs Executive Agency
EMS	Copernicus Emergency Management Service
ERA	European Research Area
ESA	European Space Agency
ESFRI	European Strategy Forum on Research Infrastructures
ESMs	Climate and Earth system Models
ETC/CM	European Topic Centre on Climate Change Mitigation
EU	European Union
EU-27	27 Member States of the EU
EU-27+UK	27 Member States of the EU and the United Kingdom
EUR	Euro
EU ETS	European Union Emissions Trading System
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EUSEW	European Sustainable Energy Week
EUSPA	European Union Agency for the Space Programme
FAIR	Findable, Accessible, Interoperable, Reusable
GBOV	Ground-Based Observations for Validation
GCCA+	Global Climate Change Alliance Plus Initiative
GCOS	Global Climate Observing System
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GOVSATCOM	Governmental Satellite Communication

GVA	Gross Value Added
GWL	Global Warming Level
HVDs	High Value Datasets
HFCs	Hydrofluorocarbons
IAGOS	In-service Aircraft for a Global Observing System
IAM	Integrated Assessment Models
ICAO	International Civil Aviation Organization
ICOS	Integrated Carbon Observation System
IPBES Services	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem
IPCC	Intergovernmental Panel on Climate Change
IMO	International Maritime Organization
ITL	Independent Transaction Log
JPI	Joint Programming Initiative
JRC	Joint Research Centre
km^2	square kilometre
KIC	Knowledge and Innovation Community
LANDMARC	LAND-use based Mitigation for Resilient Climate pathways
LDCs	Least Developed Countries
LIFE	L'Instrument Financier pour l'Environnement – the financial instrument for the environment
LTER	Long-Term Ecosystem Research
LULUCF	Land Use, Land-Use Change and Forestry
MFF	Multiannual Financial Framework
MMR	Monitoring Mechanism Regulation
MS	Member State(s)
N_2O	Nitrous Oxide
NAVIGATE	Next generation of AdVanced InteGrated Assessment modelling to support climaTE policy making
NC7	Seventh National Communication
NC8	Eighth National Communication

NDC	Nationally Determined Contribution
NECP	National Energy and Climate Plan
NF_3	Nitrogen Trifluoride
NIR	National Inventory Report
NUTS	Nomenclature of Territorial Units for Statistics
PCD	Policy Coherence for Development
PFCs	Perfluorinated Compounds
pkm	passenger-kilometre
QA/QC	Quality Assurance/Quality Control
RSO	Research and Systematic Observation
SAFs	Satellite Application Facilities
SDG	Sustainable Development Goal
SET-Plan	Strategic Energy Technology Plan
Sentinel 5P	Copernicus Sentinel-5 Precursor mission
SFIC	International Scientific and Technological Cooperation
SF_6	Sulphur Hexafluoride
SME	Small and Medium Enterprise
SSA	Space and Situational Awareness
tkm	tonne-kilometre
UK	United Kingdom
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WG	Working Group

APPENDIX I: SUMMARY OF THE REPORTING ON SUPPLEMENTARY INFORMATION UNDER ARTICLE 7.2 OF THE KYOTO PROTOCOL

Table 16 table shows a summary of the reporting on supplementary information under Article 7.2 of the Kyoto Protocol and cross-references the reporting requirements to the respective sections of this National Communication.

Table 16: Information to be reported under Article 7.2 of the Kyoto Protocol and sections in the National Communication

Element listed in the reporting guidelines (Decision 15/CMP.1)	Section of NC8
National systems in accordance with Article 5, paragraph 1	3.3
National registries	3.4
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	4.5.2
Policies and measures in accordance with Article 2	4.5.3
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	4.5.4
Information under Article 10:	
Article 10(a): Efforts to improve emission inventories	3.3
Article 10(b): Mitigation and adaptation measures	4.3, 4.4, 6.5
Article 10(c): Technology development and transfer	7.6
Article 10(d): Research and systematic observation	8.3, 8.4
Article 10(e): Education, training and public awareness	9.2, 9.3, 9.6, 9.7
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APPENDIX II: OVERVIEW TABLE OF RECOMMENDATIONS

Table 17 lists the review recommendations from the technical review of the Seventh National Communication of the EU and explains how these recommendations were addressed in the Eighth National Communication.

Table 17: Review recommendations and how they were addressed

Recommendation	This recommendation was addressed as follows	Section of NC8
Table 5, issue 1 Registry administrator and procedures	Information on the registry administrator and procedures was added in section 3.4 – National Registry.	3.4
Table 6, issue 1 Institutional arrangements to coordinate activities relating to participation in the mechanisms under Kyoto Protocol	This information was in included in section 4.5.4 – 'Legislative Arrangements and Enforcement/ Administrative Procedures Relevant to Kyoto Protocol Implementation'.	4.5.4
Table 6, issue 2 How activities contribute to the conservation of biodiversity and the sustainable use of natural resources	This information was included in section 4.5.3 – Policies and measures in accordance with Article 2 of the Kyoto Protocol.	4.5.3
Table 8, issue 1 Modification of longer-term trends	New information was added on how policies and measures modify longer-term trends.	4.4.3
Table 8, issue 2 Policies and practices that encourage activities that lead to greater levels of GHG emissions than would otherwise occur	An explanation was added in why the EU does not have policies and practices in place that encourage activities that lead to greater levels of GHG emissions than would otherwise occur.	4.3.1
Table 8, issue 4 Steps taken to promote and implement any decision of ICAO and IMO to limit GHG emissions from aviation and marine bunker fuels	This information was in included in section 4.5.4 – 'Legislative Arrangements and Enforcement/ Administrative Procedures Relevant to Kyoto Protocol Implementation'.	4.5.3
Table 12, issue 1 Information on factors and activities for each sector to provide the reader with an understanding of past and future emission trends	An explanation is provided why it is difficult to provide this information on the case of EU projections, which are an aggregate of Member State projections. This explanation is provided, together with other methodological information, in the BR5, which is annexed to this report.	[BR5] 5.6.1

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[BR5] 1 INTRODUCTION

The European Union (EU) and its Member States[539] committed jointly to reducing greenhouse gas emissions by 2020 under the United Nations Framework Convention on Climate Change (UNFCCC) and under the Kyoto Protocol (KP). The commitment is to achieve a joint quantified economy-wide greenhouse gas emission reduction target of 20 per cent below the 1990 level by 2020 ('the Cancun pledge'). It is therefore a joint pledge with no separate targets for Member States under the Convention. The United Kingdom (UK) remains part of the joint EU 2020 target together with the 27 EU Member States.

The EU and its Member States also set an ambitious greenhouse gas emissions reduction target up to 2030 under the Paris Agreement and committed to climate neutrality by 2050.

This report constitutes the Fifth Biennial and final report of the European Union, as required under Article 18(1) of Regulation (EU) No 525/2013 and Decision 2/CP.17 of the Conference of the Parties under the UNFCCC.

Therefore, this is the concluding report by the EU on achieving its joint quantified economy-wide emission reduction target under the UNFCCC and on the policies and measures in place to meet mitigation targets, promote climate adaptation and set up the transition to the reporting requirements under the Paris Agreement.

The EU has substantially overachieved its reduction target under the Convention, which means that its Member States and the United Kingdom have also fulfilled their emission reduction obligations under the Convention. As stated in the 2022 EU greenhouse gas inventory submission to the UNFCCC, total greenhouse gas emissions, excluding Land Use, Land Use Change and Forestry (LULUCF) and including international aviation, decreased by 34 % in the 27 Member States and the United Kingdom compared to the base year 1990.

This report follows the requirements of the 'UNFCCC biennial reporting guidelines for developed country Parties'[540]. The report provides information on:

- greenhouse gas emissions and trends (section 2);
- the EU's quantified economy-wide emission reduction target (section 3);
- policies and measures and the achievement of the target (section 4):
- projections (section 5) and
- financial, technological, and capacity-building support (section 6).

The information provided in this report covers the greenhouse gas emissions and removals of all EU Member States and the United Kingdom. Information on policies and measures and support focuses

539 The United Kingdom (UK) left the EU on February 1, 2020, but key provisions of Regulation (EU) No 525/2013 ('Mechanism for Monitoring and Reporting GHG') and of Decision No 406/2009/EC ('Effort Sharing') apply to the UK in respect of greenhouse gases emitted during 2019 and 2020.

540 Annex I to Decision 2/CP.17, https://unfccc.int/documents/7109.

on EU-wide initiatives. Details at Member State level can be found in the individual biennial reports of each Member State, which are submitted under the UNFCCC[541].

In addition to biennial reports, developed country Parties submit annual inventories of greenhouse gas emissions and removals; the most recent national inventory report by the EU was submitted in May 2022[542]. Developed countries also provide national communications approximately every four years, which include a broad range of information on climate action and support and on other climate-change related topics. The Eight National Communication of the EU is submitted together with this biennial report.

In order to avoid duplication of information, the national communication refers to the biennial report for information which would be identical in both reports. References to chapters in the biennial report are marked with [BR5], while references to chapters in the national communications are marked with [NC8].

[541] Biennial Reports – Annex I, https://unfccc.int/BRs.
[542] Annual European Union greenhouse gas inventory 1990-2020 and inventory report 2022, https://unfccc.int/documents/461931.

[BR5] 2 INFORMATION ON GREENHOUSE GAS EMISSIONS AND TRENDS

This section summarises information on the EU's historical greenhouse gas (GHG) emissions since 1990. The GHG emission data presented in this Biennial Report (referred to thereafter as BR5) are consistent with the latest inventory submitted by the EU in 2022 under the Convention to the UNFCCC Secretariat and correspond to the totals in the common reporting format (CRF) tables under the Convention.

[BR5] 2.1 Geographical coverage

The EU submits an inventory for the 27 EU Member States and the United Kingdom (EU-27+UK) under the UNFCCC. The United Kingdom (UK) left the EU on 1 February 2020, but key provisions of Regulation (EU) No 525/2013 ('Mechanism for Monitoring and Reporting GHG') and of Decision No 406/2009/EC ('Effort Sharing Decision') applied to the UK in respect of greenhouse gases emitted in a period from 2013 to 2020. Article 5 of Commission Regulation (EU) No 389/2013 ('EU registry') applies to the UK until the closure of the second commitment period of the Kyoto Protocol. A detailed overview of the geographical coverage of the EU-27 Member States and the United Kingdom is presented in section [NC8] 3.4.2 of the EU's Eighth National Communication.

[BR5] 2.2 Sectoral scope

The sectoral scope of the emissions in this chapter aligns with the reporting requirements of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention (decision 24/CP.19). The GHG emission data reported here for the EU-27+UK do not include emissions and removals from LULUCF. Indirect emissions of CO_2 are included in all the emission data cited in this chapter.

International aviation emissions are excluded from the totals provided in this chapter, but they are within the scope of the EU's 2020 target. In section [BR5] 4.6, which addresses the achievement of the 2020 target, greenhouse gas emissions excluding LULUCF and including international aviation are presented. As another particularity of the EU 2020 target, emissions of NF_3 are not included in that target (they amounted to less than 0.01 % of total emissions in all years), but they are included in the GHG inventory presented in this chapter.

[BR5] 2.3 Summary information on GHG emission trends

The emission data presented here is based on the European Union's national GHG latest inventory covering the period 1990 to 2020, submitted to the UNFCCC Secretariat on 27 May 2022[543]. The inventory is in line with the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention[544] and the EU Monitoring Mechanism Regulation[545]. In addition to the

[543] Annual European Union greenhouse gas inventory 1990-2020 and inventory report 2022, https://unfccc.int/documents/461931.
[544] Decision 24/CP.19, https://unfccc.int/documents/8105.
[545] Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change, https://eur-lex.europa.eu/eli/reg/2013/525/oj.

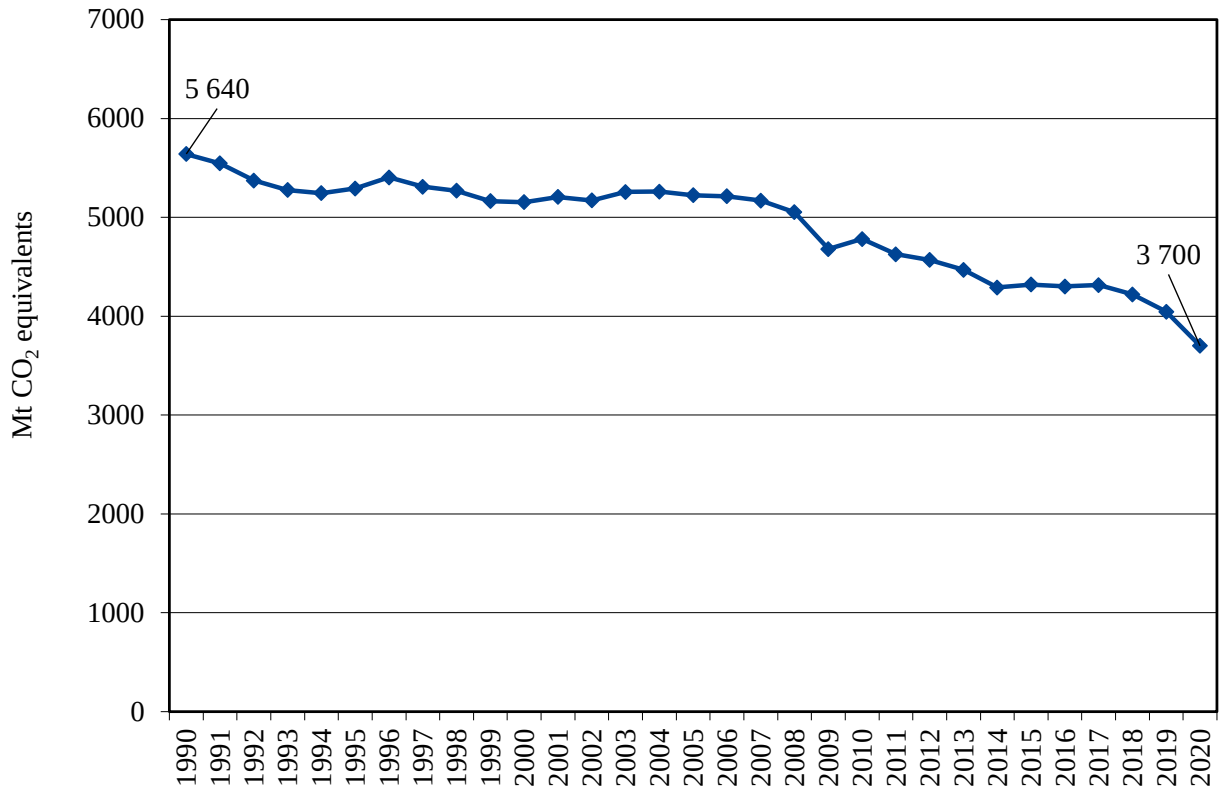
GHG inventory data contained in this report, the EU may choose to provide updated GHG emissions and removal data to reflect any updates in the GHG inventory which were implemented after the May 2022 submission. The latest GHG inventory data is available on the UNFCCC website[546].

[BR5] 2.3.1 Trends in total GHG emissions and by Member States

In 2020, total GHG emissions in the EU-27+UK, without LULUCF were 34.4 % (1 940 million tonnes CO_2 equivalents) below 1990 levels. Emissions decreased by 8.5 % (345 million tonnes CO_2 equivalents) between 2019 and 2020 (Figure 1). This is an unprecedented temporary fall in emissions due to the economic recession linked to the COVID- 2019 pandemic. For comparability with the EU 2020 target, emissions from international aviation would be included in the totals. When these emissions are included, the decrease amounts to 1 939 million tonnes CO_2 equivalents or 34.0% in 2020 compared to 1990.

There has been a progressive decoupling of gross domestic product (GDP) and GHG emissions compared to 1990, with an increase in GDP by 54 % (in real terms) alongside a decrease in emissions of approximately 34 % over the period.

Figure 58 EU-27+UK GHG emissions 1990–2020 (excluding LULUCF)



Source: EEA

[546] National Inventory Submissions 2022, https://unfccc.int/ghg-inventories-annex-i-parties/2022.

Table 18 provides an overview of total GHG emissions (without LULUCF) by countries, illustrating where main changes occurred. EU GHG emissions are the sum of Member State (MS) emissions. Consequently, trends in EU GHG emissions fully reflect emission trends at MS level. Most EU MS reduced GHG emissions between 1990 and 2020 (see Table 18).

The largest emitters in the EU-27+UK inventory in 2020 were Germany (20 %), the UK (11 %) and France (11 %), followed by Italy (10 %), Poland (10 %) and Spain (7 %). Germany and the UK accounted for 47 % of the total EU-27+UK GHG emission reduction between 1990 and 2020. Considered together, Romania, France, Italy, Poland and the Czech Republic have contributed almost another third to the total EU reduction since 1990.

The main reasons for the favourable trend in Germany were an increase in the efficiency of power and heating plants and economic re-structuring after German re-unification in 1990, particularly in the iron and steel sector. Other important reasons include a reduction in the carbon intensity of fossil fuels (with the switch from coal to gas), a strong increase in renewable energy use and waste management measures that reduced the landfilling of organic waste. Lower GHG emissions in the UK were primarily the result of liberalising energy markets and the subsequent fuel switch from oil and coal to gas in electricity production. Other reasons include the shift towards more efficient combined cycle gas turbine stations, decreasing iron and steel production and the implementation of methane recovery systems at landfill sites.

Common drivers of decreasing GHG emissions in most EU countries over the past 30 years, excluding the short-term impact of the economic recession in 2020, have been the use of less carbon intensive fuels, with a switch from coal to gas and a strong increase in the use of renewable energy sources, as well as significant improvements in energy efficiency, both in transformation and end use.

Table 18: EU-27+UK GHG emissions in CO2 equivalents (without LULUCF)

Member States	Emission (million tonnes)			Change (%)	
	1990	2020	2019 - 2020	2019 - 2020	1990-2020
Austria	78.4	73.6	-6.1	-7.7%	-6.2%
Belgium	145.7	106.4	-10.0	-8.6%	-26.9%
Bulgaria	98.4	49.2	-10.3	-17.3%	-50.0%
Croatia	31.4	23.8	-0.9	-3.5%	-24.4%
Cyprus	5.6	8.9	0.0	-0.3%	59.0%
Czechia	198.8	113.3	-10.2	-8.3%	-43.0%
Denmark	71.1	41.7	-2.8	-6.2%	-41.3%
Estonia	40.2	11.6	-3.1	-21.0%	-71.2%
Finland	71.2	47.8	-5.0	-9.5%	-32.9%
France	544.1	393.0	-41.6	-9.6%	-27.8%
Germany	1241.9	728.7	-71.0	-8.9%	-41.3%
Greece	103.5	74.8	-10.8	-12.6%	-27.7%
Hungary	94.8	62.8	-1.8	-2.7%	-33.8%
Ireland	54.4	57.7	-2.1	-3.6%	6.1%
Italy	519.9	381.2	-37.1	-8.9%	-26.7%
Latvia	25.9	10.5	-0.7	-5.9%	-59.6%
Lithuania	47.9	20.2	-0.2	-0.9%	-57.8%
Luxembourg	12.7	9.1	-1.7	-15.5%	-28.8%
Malta	2.6	2.1	0.0	-0.5%	-18.4%
Netherlands	220.5	164.3	-15.9	-8.8%	-25.5%
Poland	475.9	376.0	-14.5	-3.7%	-21.0%
Portugal	58.5	57.6	-6.0	-9.5%	-1.5%
Romania	249.7	109.9	-4.0	-3.5%	-56.0%
Slovakia	73.5	37.0	-2.8	-7.0%	-49.6%
Slovenia	18.6	15.9	-1.2	-7.2%	-14.8%
Spain	290.1	274.7	-39.1	-12.5%	-5.3%
Sweden	71.4	46.3	-4.5	-8.9	-35.2%
EU-27	**4846.6**	**3298.2**	**-303.3**	**-8.4%**	**-31.9%**
United Kingdom	793.4	402.1	-42.1	-9.5%	-49.3%
EU-27+UK	**5640.0**	**3700.3**	**-345.5**	**-8.5%**	**-34.4%**
International bunkers: Aviation	69.5	70.3	0.9	-58.6%	1.2%
International bunkers: Marine	111.7	131.	19.4	-11.0%	17.4%

Source: EEA.

[BR5] 2.3.2 Trends in GHG emissions from source and sink categories

Table 19 provides an overview of EU-27+UK GHG emissions in the main source categories for 1990 to 2020. The most important sector by far is energy (which includes emissions from combustion and fugitive sources), which accounted for 76 % of total EU-27+UK emissions (without LULUCF) in 2020. The second largest sector is agriculture (11 %), followed by industrial processes and product use (9 %).

Table 19: Overview of EU-27+UK GHG emissions in the main source and sink categories 1990 to 2020 in Mt CO_2 equivalents

GHG SOURCE AND SINK	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1. Energy	4,319	4,057	3,990	4,103	3,791	3,647	3,605	3,506	3,319	3,360	3,344	3,347	3,266	3,109	2,798
2. Industrial Processes and Product Use	547	523	479	486	405	402	390	393	400	391	389	398	390	379	348
3. Agriculture	531	465	455	433	418	417	416	419	426	427	429	432	428	424	423
4. Land-Use, Land-Use Change and Forestry	-200	-281	-291	-304	-319	-318	-324	-325	-307	-300	-294	-241	-247	-233	-226
5. Waste	237	243	227	198	165	160	155	149	143	140	137	136	134	132	130
6. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
indirect CO_2 emissions	4	4	3	3	2	2	2	2	2	2	2	2	2	2	1
Total (with net CO_2 emissions/removals)	**5,440**	**5,011**	**4,863**	**4,920**	**4,462**	**4,309**	**4,244**	**4,144**	**3,983**	**4,021**	**4,007**	**4,073**	**3,973**	**3,813**	**3,474**
Total (without LULUCF)	**5,640**	**5,292**	**5,154**	**5,224**	**4,781**	**4,627**	**4,569**	**4,469**	**4,291**	**4,321**	**4,300**	**4,314**	**4,220**	**4,046**	**3,700**
International bunkers: Aviation	69	86	115	131	132	136	134	135	138	142	149	160	167	170	70
International bunkers: Marine	112	112	137	163	162	163	151	143	140	141	145	147	149	147	131

Source: EEA.

[BR5] 2.3.2.1 Main trends by source category, 1990-2020

The reduction in GHG emissions over the 30-year period was due to a variety of factors, including the growing share in the use of renewables, the use of less carbon intensive fossil fuels and improvements in energy efficiency, as well as to structural changes in the economy. In addition to these long-lasting changes, which account for the main share in the reduction in GHG emissions, the economic recession linked to the COVID-19 pandemic also played a role in 2020.

The long-lasting changes have resulted in a lower energy intensity of the economy and in a lower carbon intensity of energy production and consumption in 2020 compared to 1990. Demand for energy for space heating has also been lower, as Europe has experienced milder winters on average since 1990, which has also helped reduce emissions.

GHG emissions decreased in the majority of sectors between 1990 and 2020, with the notable exception of transport, and refrigeration and air conditioning (Table 20). At the aggregate level, emission reductions were the largest for manufacturing industries and construction, electricity and heat production, iron and steel production (including energy-related emissions) and residential fuel combustion. Besides the 2020 economic recession, a combination of factors explains lower emissions in industrial sectors, such as improved efficiency and lower carbon intensity as well as structural changes in the economy, with a higher share of services and a lower share of more-energy-intensive industry in total GDP.

Emissions from electricity and heat production have decreased strongly since 1990. In addition to improved energy efficiency, there has been a move towards less carbon-intensive fuels. Between 1990 and 2020, the use of solid and liquid fuels in thermal power stations decreased strongly whereas natural gas consumption more than doubled. Coal consumption in 1990 was three times higher than in 2020. The use of renewable energy sources in electricity and heat generation has increased substantially in the EU since 1990. Improved energy efficiency and a less carbon intensive fuel mix have resulted in reduced CO_2 emissions per unit of fossil energy generated.

Emissions in the residential sector also represented one of the largest reductions. Energy efficiency improvements from better insulation standards in buildings, a less carbon-intensive fuel mix and milder winters can partly explain lower demand for space heating in the EU over the past 30 years.

Table 20 shows those sources that made the largest contribution to the change in total GHG emissions in the EU between 1990 and 2020.

Hydrofluorocarbon (HFC) emissions from refrigeration and air conditioning showed an increase between 1990 and 2020 because they were introduced to replace ozone-depleting substances. However, HFC emissions have shown a downward trend in recent years following the limitation of gases with high global warming potentials (GWPs) under EU legislation (see also Table 21).

Table 20 **Overview of EU-27+UK source categories whose emissions increased or decreased by more than 20 million tonnes CO_2 equivalent in the period 1990-2020**

Source category	Mt CO_2eq
Refrigeration and Air conditioning (HFCs from 2.F.1)	+80
Road Transportation (CO_2 from 1.A.3.b)	+53
Aluminium Production (PFCs from 2.C.3)	-20
Agricultural soils: Direct N_2O emissions (N2O from 3.D.1)	-27
Fluorochemical Production (HFCs from 2.B.9)	-28
Cement Production (CO_2 from 2.A.1)	-28
Enteric Fermentation: Cattle (CH_4 from 3.A.1)	-42
Fugitive Emissions from Oil and Natural Gas (CH_4 from 1.B.2)	-42
Nitric Acid Production (N_2O from 2.B.2)	-47
Adipic Acid Production (N_2O from 2.B.3)	-57
Fuels used Commercial/Institutional Sector (CO_2 from 1.A.4.a)	-61
Manufacture of Solid Fuels and Other Energy Industries (CO_2 from 1.A.1.c)	-70
Fugitive Emissions from Solid Fuels (CH_4 from 1.B.1)	-74
Managed Waste Disposal Sites (CH_4 from 5.A.1)	-77
Fuels used Residential Sector (CO_2 from 1.A.4.b)	-138
Iron and Steel Production (CO_2 from 1.A.2.a + 2.C.1)	-144
Manufacturing industries (excl. Iron and steel) (Energy-related CO_2 from 1.A.2 excl. 1.A.2.a)	-274
Public Electricity and Heat Production (CO_2 from 1.A.1.a)	-732
Total	**-1,940**

Notes: As the table only presents sectors whose emissions have increased or decreased by at least 20 million tonnes CO^2 equivalent, the sum of the EU key categories in this table does not match the total change in emissions listed at the bottom of the table, which

includes all emission sources in the EU inventory. Note that LULUCF categories or Memorandum items such as international aviation and international navigation are not included in this table.

Source: EEA.

Besides the key source categories listed in Table 20, CO_2 emissions from international aviation have shown an important upward trend in recent decades. They increased from 69 Mt in 1990 to 170 Mt in 2019. However, due to travel restrictions following the COVID-19 pandemic, these emissions fell sharply to 70 Mt in 2020, which is almost identical to the level of 1990. Emissions from international aviation are not reported in the national total under the Convention but are included in the EU target for 2020.

[BR5] 2.3.2.2 Main trends by source category, 2019-2020

Total GHG emissions (excluding LULUCF and international aviation) decreased in 2020 by 345 million tonnes (Table 21), or 8.5 % compared to 2019; they amounted to 3 700 million tonnes CO_2 equivalent in 2020. The reduction in GHG emissions in 2020 was the second largest in absolute terms and the highest in relative terms year-on-year in the EU since 1990. This was by and large due to the contraction in economic activity caused by the COVID-19 pandemic.

At EU level, almost 70 % of the net reduction in GHG emissions in 2020 took place in road transportation and public electricity and heat production. Almost all economic sectors saw significant emission reductions in 2020.

The CO_2 emissions of road transport decreased by 123 million tonnes (or -14 %) due to a drastic reduction in transport activity resulting from the lockdown measures during the COVID-19 pandemic. Passenger cars accounted for the bulk of emission reductions in road transportation, but emissions from light duty and heavy-duty vehicles also decreased sharply in 2020.

The second largest reduction in CO_2 emissions in 2020 came from electricity and heat production, with 118 million tonnes less than in 2019 (or -14 % year on year). Most of this reduction was linked to lower use of coal in power stations. Greenhouse gas emissions from stationary installations in the EU Emissions Trading System (EU ETS) also decreased by 11.6 %, which represents the largest drop in emissions since the ETS began operating in 2005. It is comparable only to the decrease observed in 2009 at the height of the financial crisis.

Based on Eurostat energy statistics, total electricity production decreased in the EU in 2020 and the use of renewable energy sources in electricity generation increased, mostly from wind, solar and hydro. Higher use of renewables supports the ongoing decarbonisation trend in this sector.

Although less substantial than in road transportation and the power sector, GHG emissions in 2020 also decreased in manufacturing industries and construction, iron and steel, petroleum refining and commercial buildings, among other sectors. Hydrofluorocarbon (HFC) emissions from refrigeration and air conditioning continued the downtrend that started in 2014, which is due to the phase-down of high GWP gases under the F-Gas Regulation (cf. section [BR5] 4.3.3.2).

Table 21 Overview of EU-27+UK source categories whose emissions increased or decreased by more than 3 million tonnes CO_2 equivalent in the period 2019-2020

Source category	Mt CO_2eq
Cement Production (CO_2 from 2.A.1)	-4
Manufacture of Solid Fuels and Other Energy Industries (CO_2 from 1.A.1.c)	-6
Domestic Aviation (CO2 from 1.A.3.a)	-8
Refrigeration and Air conditioning (HFCs from 2.F.1)	-9
Fuels used Commercial/Institutional Sector (CO_2 from 1.A.4.a)	-10
Petroleum Refining (CO_2 from 1.A.1.b)	-11
Manufacturing industries (excl. Iron and steel) (Energy-related CO_2 from 1.A.2 excl. 1.A.2.a)	-17
Iron and Steel Production (CO_2 from 1.A.2.a + 2.C.1)	-18
Public Electricity and Heat Production (CO_2 from 1.A.1.a)	-118
Road Transportation (CO_2 from 1.A.3.b)	-123
Total	**-345**

Source: EEA.

Notes: As the table only presents sectors whose emissions have increased or decreased by at least 3 million tonnes of CO_2 equivalent, the sum of the EU key categories in this table does not match the total change in emissions listed at the bottom of the table, which includes all emission sources in the EU inventory. Note that LULUCF categories or Memorandum items such as international aviation and international navigation are not included in this table.

[BR5] 2.3.3 Trends in GHG emissions by gas

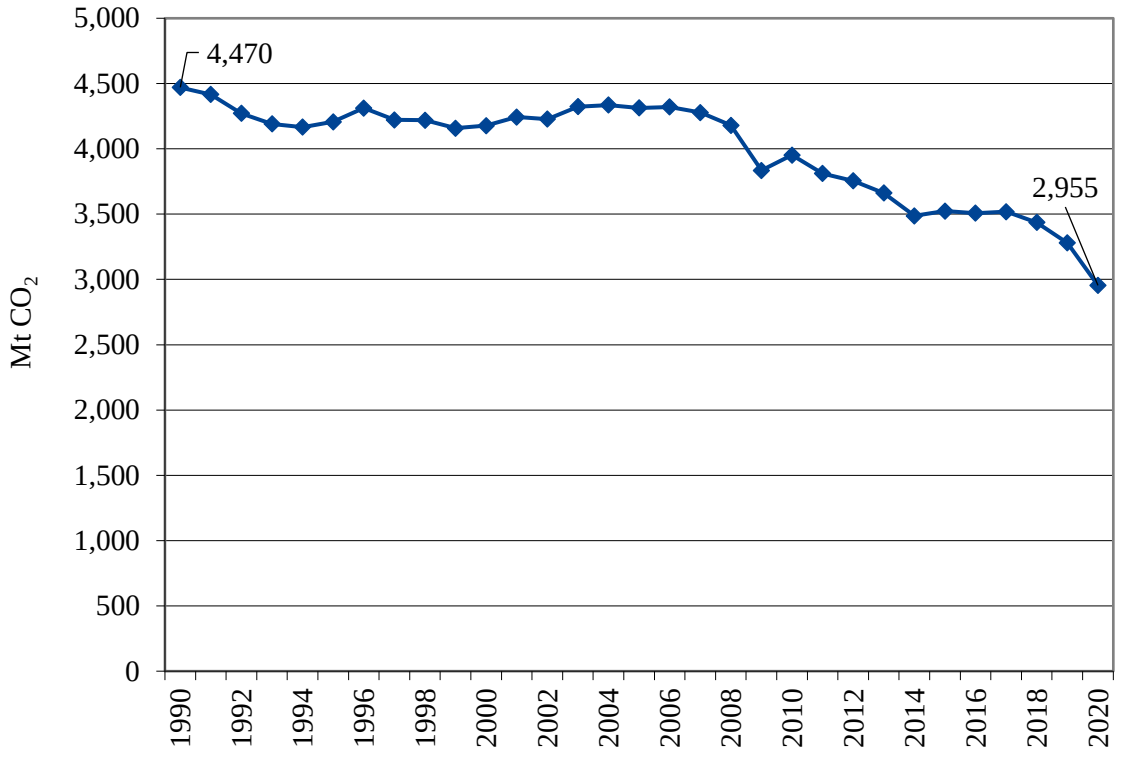
Table 22 provides an overview of the main trends in EU GHG emissions and removals for 1990–2020 by gas. In the EU, the most important GHG is CO_2, accounting for 80 % of total EU emissions in 2020 excluding LULUCF. In 2020, CO_2 emissions excluding LULUCF were 34 %, or 1 515 Mt, below 1990 levels (Figure 59). Compared to 2019, CO_2 emissions, N_2O emissions and CH_4 emissions each decreased by 9.9 %, 1.3 % and 1.2 % respectively.

Table 22: EU-27+UK GHG emissions by gas, 1990 to 2020

GHG emissions (Mt CO_2eq)	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CO_2 (excluding LULUCF)	4,470	4,207	4,177	4,313	3,952	3,811	3,755	3,662	3,487	3,523	3,507	3,518	3,437	3,279	2,955
Net CO_2 emissions/removals	4,242	3,896	3,858	3,982	3,607	3,467	3,404	3,312	3,154	3,197	3,187	3,248	3,163	3,020	2,703
CH_4 (including LULUCF)	723	668	607	547	491	481	477	466	458	458	452	453	444	436	430
N_2O (including LULUCF)	399	362	318	299	252	246	244	244	247	248	247	252	248	245	242
HFCs	29.1	43.3	52.7	73.2	98.7	102.6	105.6	109.0	111.6	105.9	107.5	107.2	103	99.8	88.8
PFCs	25.9	17.3	12.2	7.3	3.9	4.2	3.5	3.6	3.3	3.4	3.8	3.4	3.5	2.7	2.1
Unspecified mix of HFCs and PFCs	5.9	5.9	2.2	1.1	0.5	0.4	0.8	1.0	0.8	0.8	0.8	1.1	1.8	1.7	1.6
SF_6	10.9	15.0	10.3	7.8	6.3	6.0	6.1	6.0	5.7	6.0	6.3	6.6	6.7	6.7	5.5
NF_3	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Indirect CO_2 emissions	4.3	3.6	3.0	2.6	2.3	2.2	2.1	1.9	1.9	1.9	1.8	1.8	1.7	1.6	1.5
Total (without LULUCF, with indirect CO2)	**5,640**	**5,292**	**5,154**	**5,224**	**4,781**	**4,627**	**4,569**	**4,469**	**4,291**	**4,321**	**4,300**	**4,314**	**4,220**	**4,046**	**3,700**
Total (with net CO_2 emissions/ removals, with indirect CO_2)	**5,440**	**5,011**	**4,863**	**4,920**	**4,462**	**4,309**	**4,244**	**4,144**	**3,983**	**4,021**	**4,007**	**4,073**	**3,973**	**3,813**	**3,474**
International bunkers: Aviation	69	86	115	131	132	136	134	135	138	142	149	160	167	170	70
International bunkers: Marine	112	112	137	163	162	163	151	143	140	141	145	147	149	147	131

Source: European Union (Convention) 2022 Common Reporting Format Table[547].

Figure 59: CO_2 emissions 1990 to 2020 (Mt) excluding LULUCF, excluding indirect CO_2

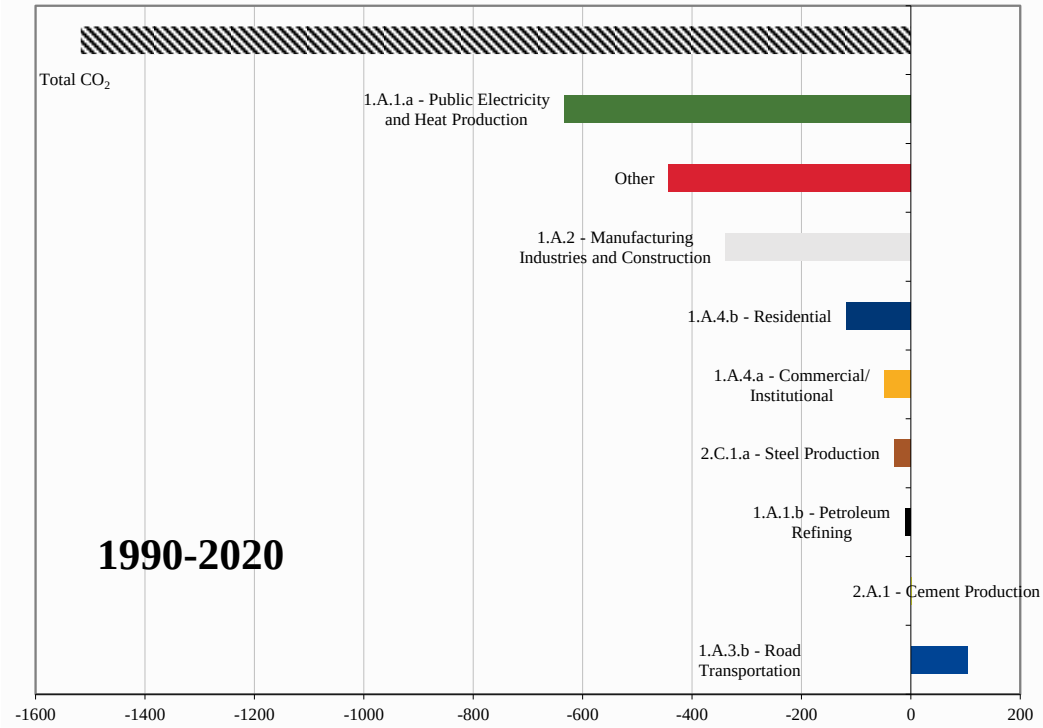


Source: EEA.

[547] European Union (Convention). 2022 Common Reporting Format (CRF) Table, https://unfccc.int/documents/461928.

Emissions from the largest key source categories for CO_2 emissions (Figure 60) were reduced between 1990 and 2020, with the exception of 1.A.3.b Road transportation, which accounts for 31 % of CO_2 emissions in the energy sector in 2020 (Figure 61).

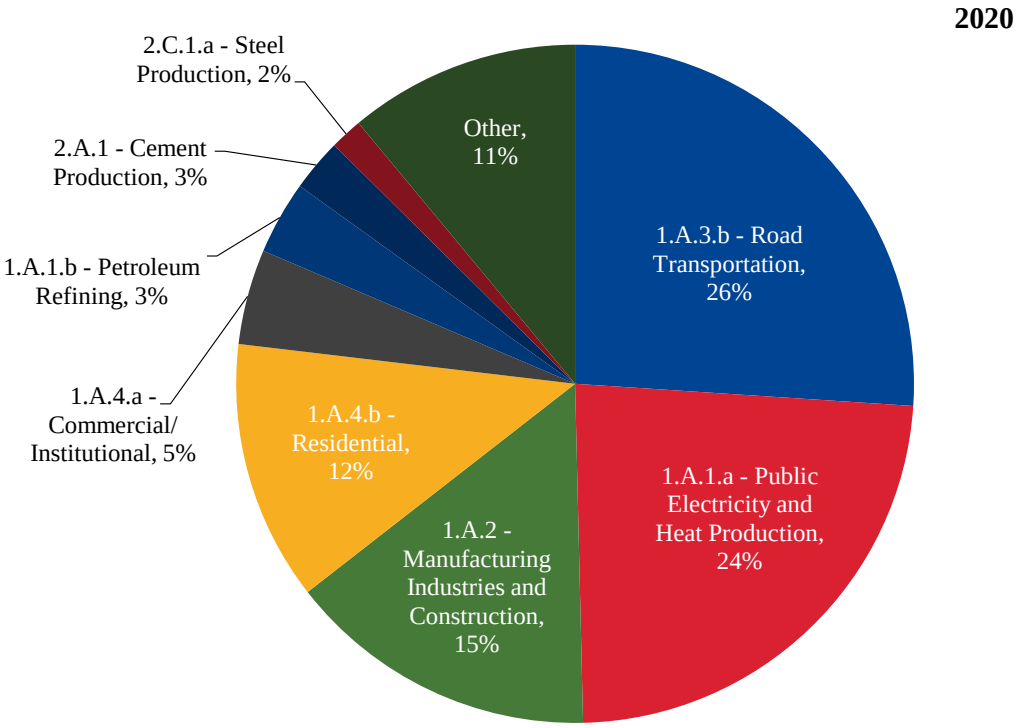
Figure 60: Absolute change of CO_2 emissions by large key source categories 1990 to 2020 in CO_2 equivalents (Mt) for EU-27+UK



Source: EEA.

Note: Other is calculated by subtracting the presented categories from the total.

Figure 61: CO_2 emissions: Share of key source categories and all remaining categories in 2020 for EU-27+UK

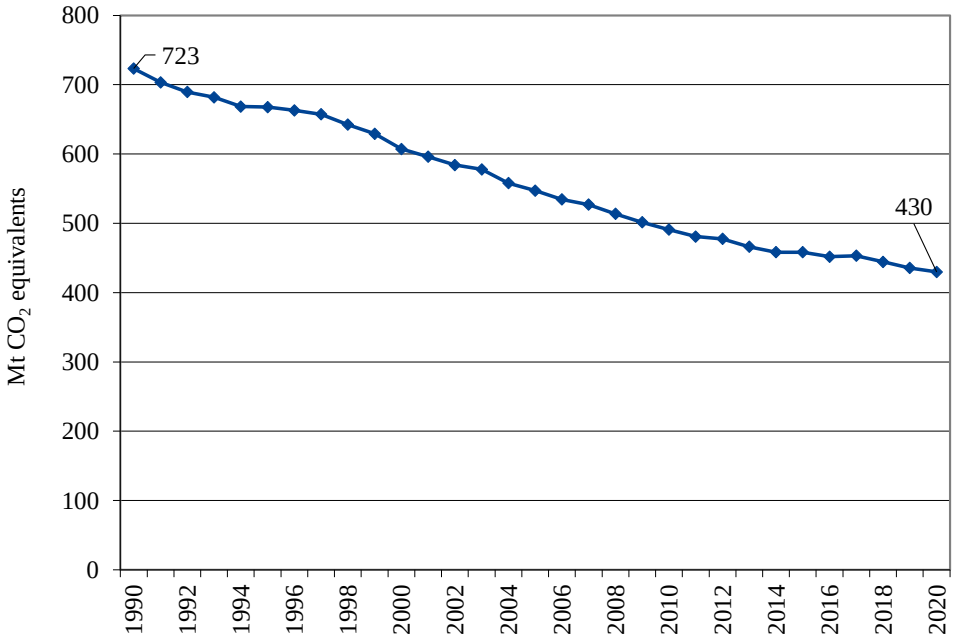


Source: EEA.

Note: Other is calculated by subtracting the presented categories from the sector total. Percentages are rounded and may lead to a sum higher or lower than 100 %.

CH_4 emissions accounted for 12 % of total EU GHG emissions in 2020; they decreased by 41 % since 1990 to 430 Mt CO_2 equivalents in 2020 (**Figure 62**). The two largest key sources are enteric fermentation and anaerobic waste (Figure 64). They account for 63 % of CH_4 emissions in 2020.

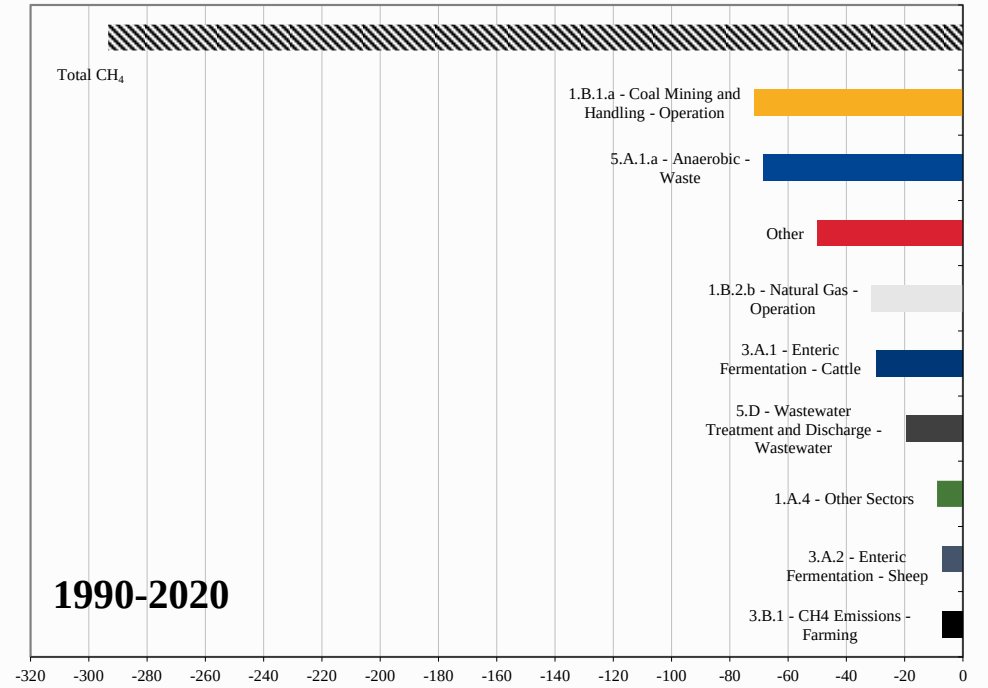
Figure 62: CH_4 emissions 1990 to 2020 in CO_2 equivalents (Mt)



Source: EEA.

Figure 63 shows that the main reasons for decreasing CH4 emissions were reductions in anaerobic waste and coal mining.

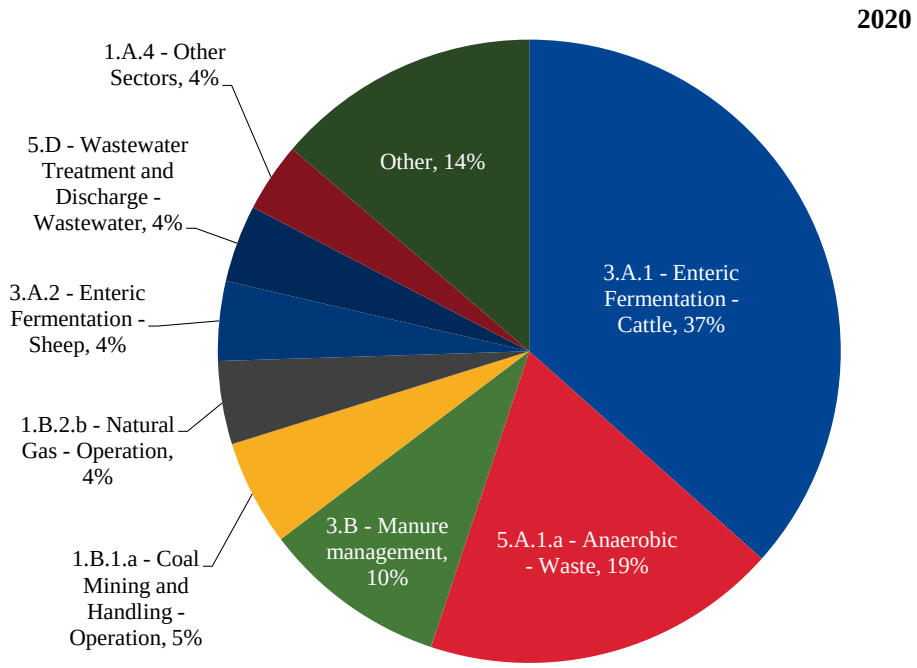
Figure 63: Absolute change of CH_4 emissions by large key source categories 1990 to 2020 in CO_2 equivalents (Mt) for EU-27+UK



Source: EEA.

Note: Other is calculated by subtracting the presented categories from the total

Figure 64: CH_4 emissions: Share of key source categories and all remaining categories in 2020 for EU-27+UK

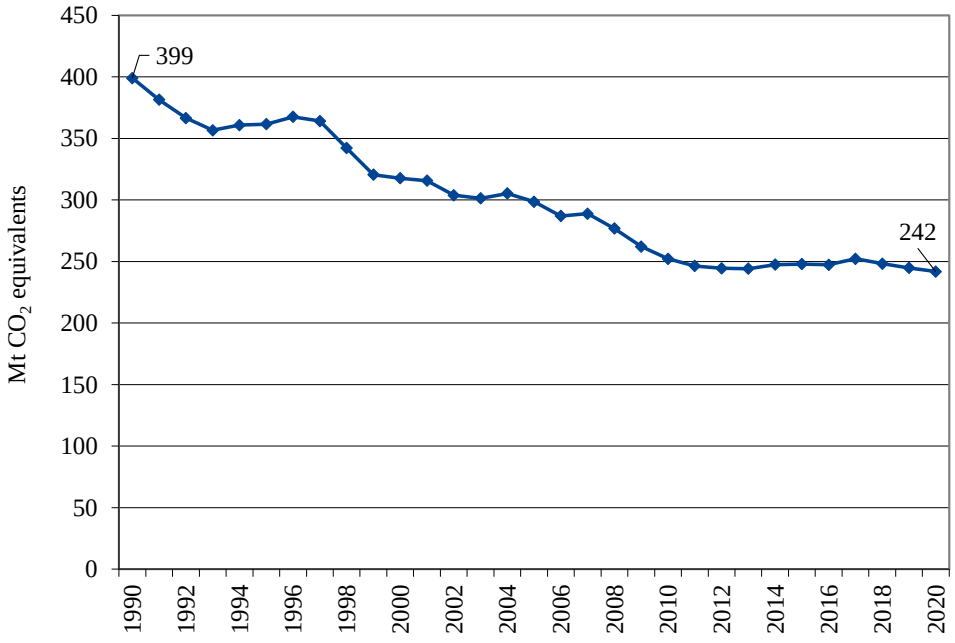


Source: EEA.

Note: Other is calculated by subtracting the presented categories from the sector total. Percentages are rounded and may lead to a sum higher or lower than 100 %.

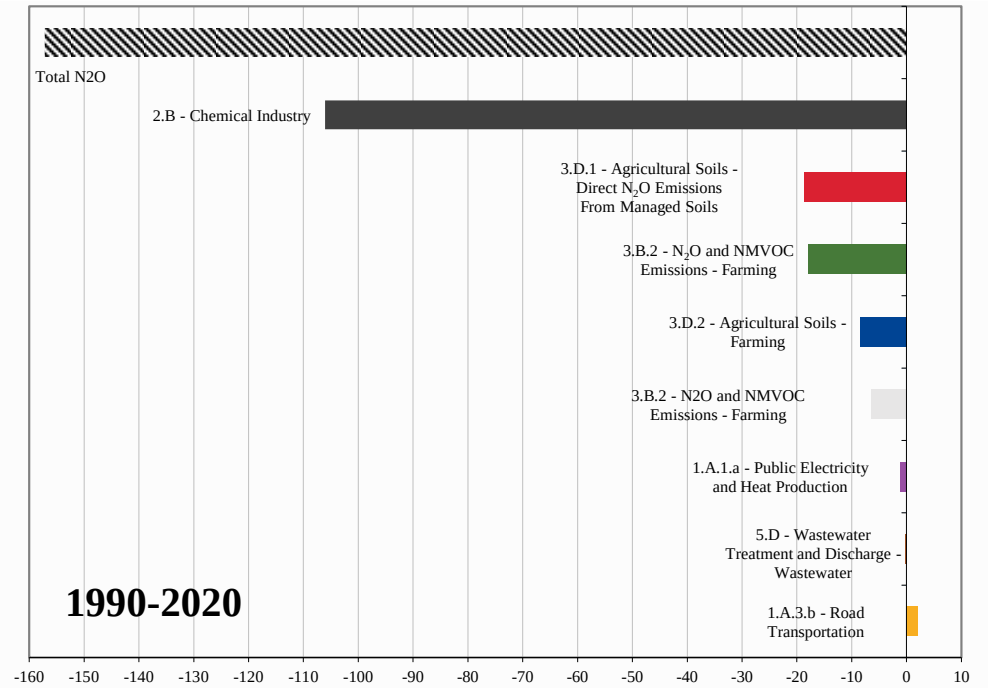
N_2O emissions are responsible for 7 % of total EU GHG emissions and decreased by 39 % to 242 Mt CO_2 equivalents in 2020 (Figure 65). N_2O emissions derive mainly from the agriculture sector. The two largest key sources account for approximately 66 % of N_2O emissions in 2020 (Figure 67). Figure 66 shows that the main reason for large N_2O emission cuts were reductions in chemical industry and agricultural soils.

Figure 65: N_2O emissions 1990 to 2020 in CO_2 equivalents (Mt)



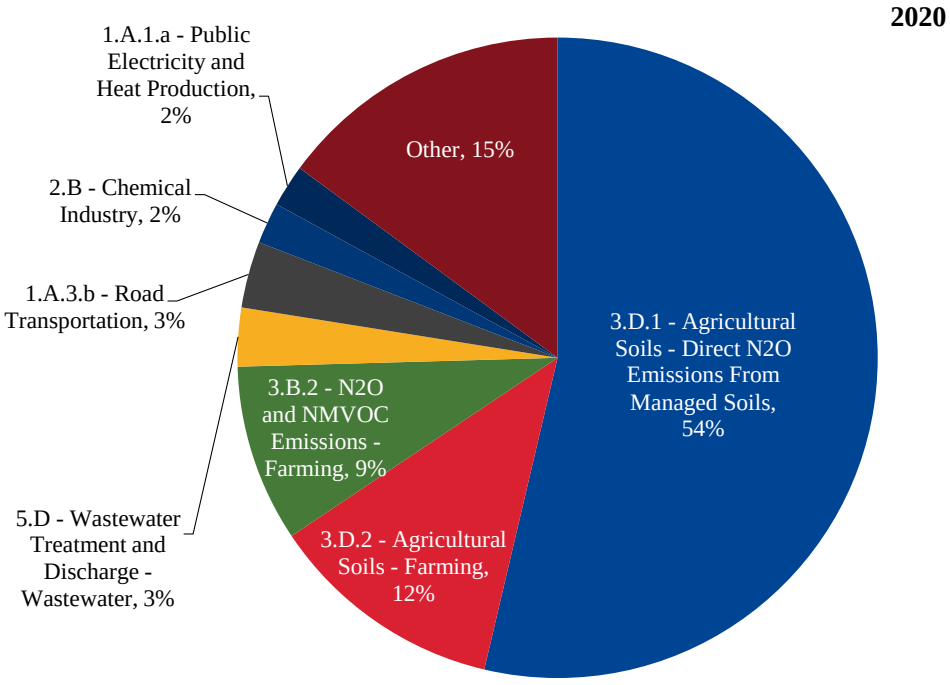
Source: EEA.

Figure 66: Absolute change of N_2O emissions by large key source categories 1990 to 2020 in CO_2 equivalents (Mt) for EU-27+UK



Source: EEA.

Figure 67: N_2O emissions: Share of key source categories and all remaining categories in 2020 for EU-27+UK



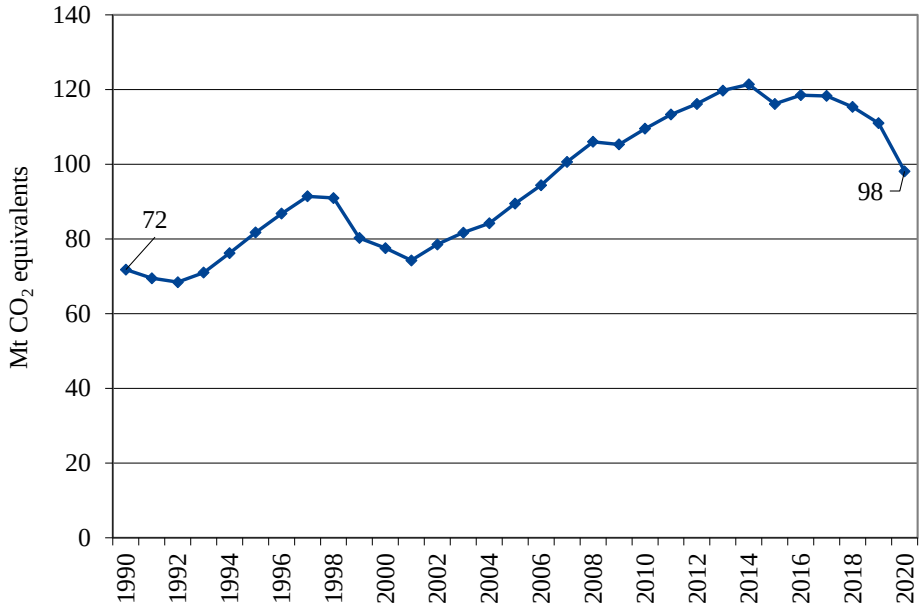
Source: EEA.

Note: Other is calculated by subtracting the presented categories from the sector total.

Percentages are rounded and may add up to a total higher or lower than 100%.

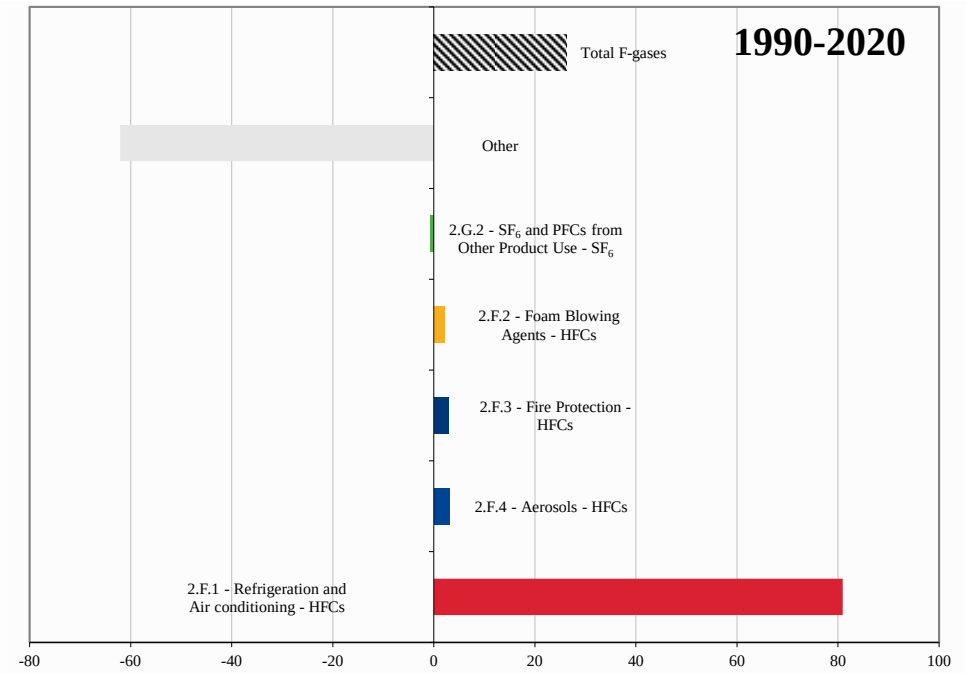
Fluorinated gas emissions (i.e. emissions of HFCs, PFCs, SF_6 and NF_3) account for 2.7 % of total EU GHG emissions in 2020. These emissions amounted to 98 Mt CO_2 equivalents in 2020, which was 37 % above 1990 levels (Figure 68). Refrigeration and air conditioning, the largest key category, accounts for 82 % of fluorinated gas emissions in 2020. Figure 69 reveals that HFCs from refrigeration and air conditioning showed large increases between 1990 and 2020. The main reason for this is the phase-out of ozone-depleting substances such as chlorofluorocarbons under the Montreal Protocol and the replacement of these substances with HFCs (mainly in refrigeration, air conditioning, foam production and as aerosol propellants). At the same time, the sum of fluorinated gas emissions from categories not presented individually in Figure 69 ("Other" in Figure 70) decreased substantially. These other categories include the chemical industry and metal production (mostly aluminium), where F-gas emissions decreased considerably due to improvements in production processes.

Figure 68: Fluorinated gas emissions in CO_2 equivalents (Mt), 1990-2020



Source: EEA.

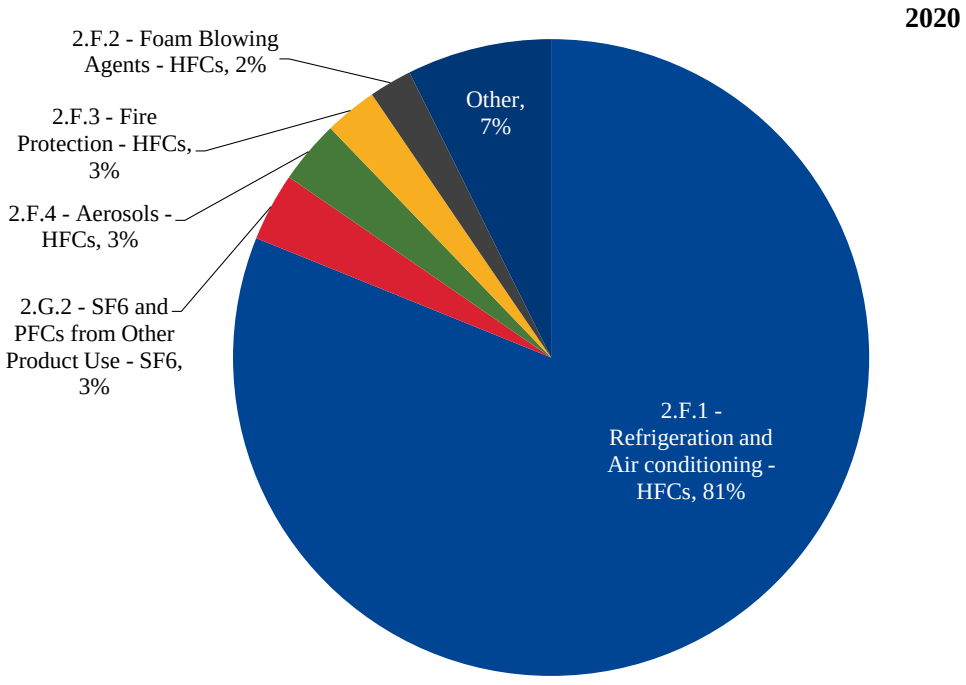
Figure 69: Absolute change of fluorinated gas emissions by large key source categories in CO_2 equivalents (Mt) for EU-27 + UK, 1990-2020



Source: EEA.

Note: 'Other' data is calculated by subtracting the presented categories from the total.

Figure 70: Fluorinated gas: Share of key source categories and all remaining categories in 2020 for EU-27 + UK



Source: EEA.

Note: "Other" data is calculated by subtracting the presented categories from the sector total.

Percentages are rounded and may add up to a total higher or lower than 100%

[BR5] 2.4 The EU inventory arrangements

The legal basis for the compilation of the Union greenhouse gas inventory is the Monitoring Mechanism Regulation (MMR)[548]. In accordance with the MMR Article 6(1), a Union Inventory system is established to ensure the timeliness, transparency, accuracy, consistency, comparability and completeness of national inventories with regard to the Union greenhouse gas inventory.

The main institutions involved in the compilation of the EU GHG inventory are EU Member States, the European Commission's Directorate-General for Climate Action, the European Environment Agency (EEA) and its European Topic Centre on Climate Change Mitigation (ETC/CM), Eurostat, and the European Commission's Joint Research Centre (JRC).

In December 2018, the Regulation on the Governance of the Energy Union and Climate Action (Governance Regulation) [549] entered into force, which applies to climate reporting from 2021 onwards. The Governance Regulation fully integrates the provisions of the existing MMR while aligning them with the provisions of the Paris Agreement.

Both under the MMR and under the Governance Regulation, EU Member States submit their preliminary GHG inventory data by 15 January of each year. These inventory data are subject to initial checks, and Member States submit final GHG inventory data by 15 March of each year. The EU and each of its Member States submit their National Inventory Report (NIR) to the UNFCCC Secretariat by 15 April of each year. As the EU inventory needs to take into account the results of the initial checks and any updates made by the EU Member States, an updated version of the EU's NIR is typically provided by the end of May of each year, within the time period foreseen for updates of GHG inventory submissions under the UNFCCC.

[BR5] 2.5 Quality Assurance/Quality Control (QA/QC) procedures

The European Commission (DG Climate Action) is responsible for coordinating Quality Assurance/Quality Control (QA/QC) procedures for the Union inventory and ensures that the objectives of the QA/QC programme are implemented and the QA/QC plan is developed. The EEA supported by the ETC/CM is responsible for the annual implementation of these QA/QC procedures for the EU inventory.

The quality of the Union GHG inventory largely depends on the quality of the Member States' inventories, the QA/QC procedures of the Member States and the quality of the compilation process of the EU inventory. Member States and the EU as a whole have implemented QA/QC procedures in order to comply with the Intergovernmental Penal on Climate Change's (IPCC) Good Practice Guidance.

The EU QA/QC programme describes the quality objectives and the inventory quality assurance and quality control plan for the Union GHG inventory including responsibilities and the time schedule

[548] Regulation (EU) No 525/2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change, https://eur-lex.europa.eu/eli/reg/2013/525/oj.
[549] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, http://data.europa.eu/eli/reg/2018/1999/oj.

for the performance of the QA/QC procedures. Definitions of quality assurance, quality control and related terms used are those provided in the IPCC 2006 Guidelines and Guidelines for National Systems under the Kyoto Protocol. The EU QA/QC programme is reviewed annually and modified or updated as appropriate.

The overall objectives of the EU QA/QC programme are:

- to establish quality objectives for the Union GHG inventory, taking into account the specific nature of this inventory as a compilation of Member States' GHG inventories;
- to implement the quality objectives in the design of the QA/QC plan, defining general and specific QC procedures for the EU GHG inventory submission;
- to provide a Union inventory of GHG emissions and removals consistent with the sum of Member States' inventories and covering the EU's geographical area;
- to ensure the timeliness of Member States' GHG inventory submissions to the EU;
- to ensure the completeness of the Union GHG inventory, inter alia, by implementing procedures to estimate any data missing from the national inventories, in consultation with the MS concerned;
- to contribute to the improvement of quality of Member States' inventories; and
- to provide assistance for the implementation of national QA/QC programmes.

Several specific objectives have been elaborated in order to ensure that the Union GHG inventory complies with the UNFCCC inventory principles of transparency, completeness, consistency, comparability, accuracy and timeliness.

More detailed information on the QC activities of MS submissions is included in section 1.2.3 of the EU NIR 2022 (cf. section [BR5] 2.3).

QC procedures are performed at different stages during the preparation of the Union inventory. Firstly, a range of checks ('initial checks') are used to determine the consistency and completeness of Member States' data so that they may be compiled in a transparent manner at EU level. Secondly, checks are carried out to ensure that the data is compiled correctly at EU level to meet the overall reporting requirements. Thirdly, a number of checks are conducted with regard to data archiving and documentation to meet various other data quality objectives.

[BR5] 2.5.1 Data gap filling procedure for GHG emissions

The Union GHG inventory is compiled using the inventory submissions of the EU MS. If a MS does not submit all data required for the compilation of the Union inventory by 15 March of a reporting year, the European Commission prepares estimates for data missing for that MS. Gap filling techniques are only used where necessary. The EU NIR 2022 provides a detailed description of the approach taken to 'gap fill', in Section 1.7.3 'Data gaps and gap-filling'.

Since 2011, GHG inventory estimates have been complete for all EU Member States, and therefore no gap filling has been needed.

[BR5] 2.5.2 Data gap filling procedure of activity data

The EU elaborated and implemented a gap filling procedure for gaps in activity data. Due to the large resource needs for gap filling only activity data for key categories for the latest reporting year are gap-filled and only if the following rules apply:

- More than 75 % of the emissions from MS are calculated on the basis of consistent activity data (In cases where activity data varies widely across MS, gap-filled activity data would be associated with high uncertainty).
- The implied emission factor has a reasonable degree of consistency among MS (i.e. standard deviation divided by mean < 50 %).

For more details on activity data gap filling, please refer to Section 1.7.3 of the EU NIR 2022[550].

[550] Annual European Union greenhouse gas inventory 1990-2020 and inventory report 2022, https://unfccc.int/documents/461931.

[BR5] 3 QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET

[BR5] 3.1 The EU target under the Convention

This section explains the EU 2020 emission reduction target under the UNFCCC and the target compliance architecture set up within the EU in order to meet that target. It also provides an overview of other EU emission reduction targets that are helping to achieve the quantified economy-wide emission reduction target under the UNFCCC and provides information on target setting after 2020.

Under the UNFCCC, the EU and its Member States committed to achieving a joint quantified economy wide greenhouse gas emission reduction target of 20 % below the 1990 level by 2020 ('the Cancun pledge'). It is therefore a joint pledge with no separate individual targets for Member States under the Convention. The United Kingdom remains part of the joint EU 2020 target along its 27 EU Member States.

Although the United Kingdom has not been an EU Member State since 1 February 2020, it was part of the EU at the time of target setting. In addition, EU legislation applied until 31 December 2020 in the United Kingdom. For information and for understanding the future target setting, emission figures are reported both for 'EU-27' and 'EU-27 and the United Kingdom' (EU-27+UK).

The target has been overachieved by the EU: emissions in 2020 are 31.6 % below 1990 emissions for EU-27 and 34.0 % lower than 1990 emissions for EU-27 and the United Kingdom.

The reduction objective is divided between emissions covered under the EU ETS and the Effort Sharing Decision (ESD). The emission reduction between 2005 and 2020 was considerably higher under the EU-ETS than under the ESD: While ETS emissions decreased by 41 % for EU-27 (and 43% for EU-27+UK), emissions decreased by 16 % for EU-27 (and 18 % for EU-27+UK) under the ESD.

The definition of the EU target for 2020 under the Convention is documented in a note by the UNFCCC Secretariat on economy-wide emission reduction targets[551]. The EU provided additional information relating to its quantified economy-wide emission reduction target in a submission as part of the process of clarifying the developed country Parties' targets in 2012[552].

The EU's accounting rules for the target under the UNFCCC are more ambitious than the rules under the Kyoto Protocol, for example, including outgoing international flights and adding an annual compliance cycle for emissions under the ESD (see section [BR5] 4.2.2) or higher Clean Development Mechanism (CDM) quality standards under the EU ETS[553]. Accordingly, the following assumptions and conditions apply to the EU's -20% commitment under the UNFCCC:

[551] Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention, FCCC/SB/2011/INF.1/Rev.1, https://unfccc.int/documents/6658.
[552] Additional information relating to the quantified economywide emission reduction targets contained in document FCCC/SB/2011/INF.1/Rev.1, FCCC/AWGLCA/2012/MISC.1, https://unfccc.int/documents/7163.
[553] Quantified economy-wide emission reduction targets by developed country Parties to the Convention: assumptions, conditions, commonalities and differences in approaches and comparison of the level of emission reduction efforts, Technical paper, FCCC/TP/2013/7, https://unfccc.int/documents/7951.

- The EU Convention pledge does not include emissions/removals from land use, land-use change and forestry; however, this sector is estimated to be a net sink over the relevant period. EU GHG inventories include information on emissions and removals from LULUCF in accordance with relevant reporting commitments under the UNFCCC. Accounting for LULUCF activities only takes place under the Kyoto Protocol[554];

- The target covers the following gases: CO_2, CH_4, N_2O, HFCs, PFCs and SF_6;

- The target refers to 1990 as a single base year for all covered gases and all Member States. Emissions from outgoing flights are included in the target;

- A limited number of Certified Emission Reductions (CERs), Emission Reduction Units (ERUs) and units from new market-based mechanisms can be used for compliance under the EU ETS and ESD.

- The GWPs used to aggregate GHG emissions up to 2020 under EU legislation were those based on the Second Assessment Report of the IPCC when the target was submitted. For the implementation until 2020, GWPs from the IPCC's Fourth Assessment Report (AR4) are used consistently with the UNFCCC reporting guidelines for GHG inventories.

Table 23: Key facts of the Convention target of the EU-27+UK

Parameters	Target
Base year	1990
Target year	2020
Emission reduction target	-20 % in 2020 compared to 1990
Gases covered	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6
Global warming potential	AR4
Sectors covered	All IPCC sources and sectors with the exception of LULUCF, as measured by the full annual inventory including international aviation (outgoing flights)
LULUCF	Accounted only under the Kyoto Protocol, reported in EU inventories under the Convention.
Use of international credits (Joint Implementation and CDM)	Possible subject to quantitative and qualitative limits for compliance under the EU ETS and the ESD.

Source: Communication of the EU target[555].

[554] The LULUCF Decision (Decision 529/2013) requires preparing and maintaining annual LULUCF accounts according to the rules set out in the Kyoto Protocol; however, these accounts do not contribute to the achievement of the EU Convention pledge.
[555] Additional information relating to the quantified economywide emission reduction targets contained in document FCCC/SB/2011/INF.1/Rev.1, FCCC/AWGLCA/2012/MISC.1, https://unfccc.int/documents/7163.

[BR5] 3.2 The EU target compliance architecture

[BR5] 3.2.1 The 2020 Climate and Energy Package

The EU has jointly committed to its UNFCCC target and implemented it internally through EU legislation in the 2020 Climate and Energy Package[556] that the EU adopted in 2009. In this package, the EU introduced a clear approach to achieving the 20 % reduction in total GHG emissions from 1990 levels, by dividing the effort between the sectors covered by the EU ETS and the sectors under the ESD. Binding national targets were set for Member States under the ESD. The achievement of EU internal compliance under the 2020 Climate and Energy Package including the national targets under the ESD is not subject to the UNFCCC assessment of the EU's joint commitment under the Convention.

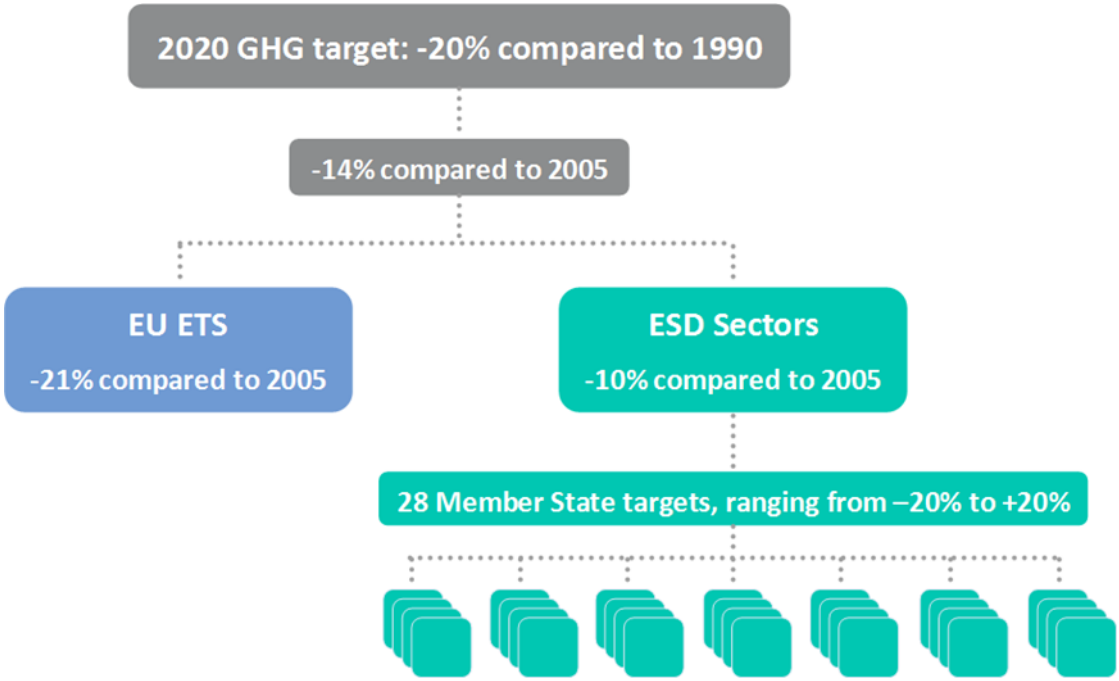
The 2020 Climate and Energy Package underpins the EU implementation of the target under the Convention. The 20 % reduction of total GHG emissions from 1990 levels is equivalent to a 14 % reduction compared to 2005 levels. This 14 % reduction objective is divided between the ETS and ESD sectors. These two sub-targets are:

- a 21 % reduction target compared to 2005 for emissions covered by the EU ETS (including outgoing flights);
- a 10 % reduction target compared to 2005 for ESD sectors, shared between the 27 EU Member States and the United Kingdom through individual national GHG targets.

The distribution of the total target across the ETS and ESD is shown in Figure 71.

Figure 71 GHG targets under the 2020 climate and energy package

[556] 2020 climate & energy package, https://ec.europa.eu/clima/eu-action/climate-strategies-targets/2020-climate-energy-package_en.



Source: European Commission.

Under the EU ETS Directive a single ETS cap covers EU Member States and three participating non-EU countries (Norway, Iceland and Liechtenstein), and there are no further individual caps by country[557]. For further additional information about the EU ETS, see section [BR5] 4.2.1.

The majority of emissions within the EU are addressed under the Effort Sharing Decision. The ESD covers emissions from nearly all sources outside the EU ETS, except for emissions and removals from LULUCF[558]. It thus includes a diverse range of small-scale emitters in a wide range of sectors: transport (cars, lorries), buildings (in particular heating), services, small industrial installations, fugitive emissions from the energy sector, emissions of fluorinated gases from appliances and other sources, agriculture and waste. Such sources accounted for more than 60 % of total GHG emissions in the EU.[559]

While the EU ETS target is to be achieved by the EU as a whole, the ESD target was divided into national targets to be achieved individually by each Member State. Under the Effort Sharing Decision, national emission targets for 2020 are set, expressed as percentage changes from 2005 levels. These changes have been transferred into binding quantified annual emission limits for the period from 2013 to 2020, denominated in annual emission allocations (AEAs). At country level, 2020 targets under the ESD range from -20% to +20%, compared to 2005 levels. For more details about the Effort Sharing Decision, see Section [BR5] 4.2.2.

A limited number of CERs, ERUs and units from new market-based mechanisms have been allowed to be used to achieve the target in the EU ETS and the ESD: The use of international credits was allowed up to specific levels set in the EU ETS Directive, amounting to over 1500 million CER and

[557] Directive 2009/29/EC amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32009L0029.
[558] In addition, CO_2 emissions from domestic aviation, international maritime emissions and NF_3 emissions are excluded from the ESD.
[559]Progress towards national greenhouse gas emissions targets in Europe https://www.eea.europa.eu/data-and-maps/indicators/progress-towards-national-greenhouse-gas/assessment.

ERU entitlements in the period up to 2020. Specific quality standards apply to the use of international credits in the EU ETS since 2013, including not allowing the use of credits from LULUCF projects and certain industrial gas projects. In the ESD sectors, the annual use of international credits in the years 2013-2020 is limited to up to 3 % of each Member State's ESD emissions in 2005, with a limited number of Member States being permitted to use an additional 1 % from projects in least developed countries (LDCs) or small island developing states, subject to conditions. From 2021 onwards, international credits will no longer be used for compliance under the ESD nor for compliance under the EU ETS.

[BR5] 3.2.2 Monitoring of progress to 2020 targets

For the monitoring of GHG emissions at the EU and Member State levels, the MMR has been adopted, which was followed in 2018 by the Governance Regulation; see Section [NC8] 4.3.2. For the effective operation of the EU ETS, robust, transparent, consistent and accurate monitoring and reporting of greenhouse gas emissions are essential; therefore, an annual procedure of monitoring, reporting and verification at the installation level is implemented. Installation and aircraft operators have to monitor, report and verify their annual emissions in accordance with two EU Regulations, the Monitoring and Reporting Regulation and the Accreditation and Verification Regulation. To have more information on the requirements of these regulations, please refer to the webpage on the monitoring, reporting and verification of EU ETS emissions[560]. The complete set of applicable legal texts and guidance documents are provided on the same webpage.

Monitoring, reporting and verification of the ESD targets mainly takes place through the submission of the national GHG inventories by Member States. Chapter III of the Commission Implementing Regulation 749/2014[561] sets out strict criteria by which Member States' national GHG inventories are reviewed annually at the EU level. Based on this review, the European Commission issues an implementing decision on Member States' ESD emissions in the given year.

Information on annual emissions and compliance under the EU-ETS and ESD are available from the European Union Transaction Log[562]. The use of flexible mechanisms by operators in the EU ETS and by governments in the ESD is recorded there, too. This includes the use of CERs and ERUs but also banking and borrowing of AEA between years as well as trading of AEA between Member States in the ESD.

For further information on the EU target compliance architecture, see chapter 3.2 of the EU's Fourth Biennial Report (BR4) and the EEA Trends and Projections report[563].

[560] Monitoring, reporting and verification of EU ETS emissions, https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification-eu-ets-emissions_en.
[561] Commission Implementing Regulation (EU) No 749/2014 on structure, format, submission processes and review of information reported by Member States pursuant to Regulation (EU) No 525/2013, http://data.europa.eu/eli/reg_impl/2014/749/oj.
[562] European Transactions Log, https://ec.europa.eu/clima/ets/welcome.do.
[563] Trends and Projections in Europe 2022, https://www.eea.europa.eu/publications/trends-and-projections-in-europe-2022.

[BR5] 3.3 Other EU emission reduction targets

In addition to the EU target under the Convention, the EU also committed to a legally binding quantified emission limitation reduction commitment for the second commitment period of the Kyoto Protocol (2013-2020).

In 2019, the European Commission presented its idea of a European Green Deal – a roadmap for making the EU's economy sustainable.[564] Days later, the European Council (heads of state or government of the EU Member States, the European Council President and the President of the European Commission) endorsed the objective of achieving a climate-neutral EU by 2050. For this to be achieved, the EU raised the formerly agreed emission reduction target until 2030 from 40 % (compared to 1990 levels) to 55 %. This is laid down with the EU's updated Nationally Determined Contribution (NDC) submitted under the Paris Agreement[565] and in the European Climate law[566]. This target is a joint target of 27 EU Member States. It is a domestic target without contribution of international credits.

In order to achieve the overall 2030 target, the emission reduction target is divided into EU ETS and Effort Sharing Regulation (ESR) sectors as in previous years. Emissions and removals from the LULUCF sector are included for the first time in the EU climate target. The contributions of the EU ETS and the ESR, as well as the amount of emission removals to be achieved from the LULUCF sector, is part of the legislative package proposal which is under discussion at the time of writing intends to reach EU climate targets under the European Green Deal. The revised EU ETS Directive, which will apply for the period 2021-2030, will enable through a mix of interlinked measures to increase the pace of emissions cuts, and to provide robust and fair rules to address the risk of carbon leakage.

Similarly, the energy targets, as formerly agreed under the revised Renewable Energy Directive[567] and the amended Energy Efficiency Directive[568] are in the process of being updated to contribute appropriately to the higher European GHG emission reduction target (cf. sections [BR5] 4.3.1.3 and [BR5] 4.3.1.2).

For the EU's long-term strategy, including the objective to make Europe the first climate neutral continent, please see section [NC8] 4.3.3 of the EUs Eighth National Communication.

[564] The European Green Deal sets out how to make Europe the first climate-neutral continent, https://ec.europa.eu/commission/presscorner/detail/en/ip_19_6691.
[565] The update of the nationally determined contribution of the European Union and its Member States, https://unfccc.int/sites/default/files/NDC/2022-06/EU_NDC_Submission_December%202020.pdf.
[566] Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), http://data.europa.eu/eli/reg/2021/1119/oj.
[567] Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (recast), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG.
[568] Directive (EU) 2018/2002 amending Directive 2012/27/EU on energy efficiency https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0210.01.ENG.

Table 24: The EU target compliance architecture

	International commitments				EU domestic legislation				
	Kyoto Protocol (KP)		UNFCCC	Paris Agreement	Climate and Energy Package		Climate and Energy Framework		
					EU ETS	ESD	EU ETS	ESR	LULUCF
Target year of period	First commitment period (2008-2012)	Second commitment period (2013-2020)	2020	Covers the period post 2020	2013-2020		2021 – 2030		
Emission reduction target	-8%	-20%	-20%	At least -55% net emissions in 2030 compared to 1990	-21% compared to 2005 for ETS emissions	- 10% for ESD sectors compared to 2005 (translated into annual, individual binding targets for Member States)	-43% in 2030 compared to 2005 for ETS emissions Proposed new target: -61%	Annual targets by Member States. In 2030 -30 % compared to 2005 for non-ETS emissions (excl. domestic aviation and LULUCF) Proposed new target: -40%	No-debit target based on accounting rules Proposed new targets: For 2030 the EU target is -310 Mt CO_2eq For 2035 the EU target is a climate neutral land sector (combining LULUCF and emission from agriculture non-CO_2).
					Overall target: -20% GHG emissions reduction vs. 1990		Overall target: at least -55% net domestic reduction vs. 1990		

	International commitments				EU domestic legislation				
	Kyoto Protocol (KP)		UNFCCC	Paris Agreement	Climate and Energy Package		Climate and Energy Framework		
					EU ETS	ESD	EU ETS	ESR	LULUCF
Further targets	-	-	Conditional target of -30 % if other Parties take on adequate commitments	Limiting global warming to well below 2 °C; to set more ambitious targets every 5 years as required by science; report on implementation/ track progress towards the long-term goal through a robust transparency and accountability system; balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century.	Renewable Energy Directive: 20% share of renewable energy of gross final energy consumption Energy Efficiency Directive: Increase energy efficiency by 20% compared to scenario 2007		A binding renewable energy target for the EU for 2030 of at least 32% of gross final energy consumption, including a review clause by 2023 for an upward revision of the EU level target. A headline target of at least 32.5% compared to scenario 2007 for energy efficiency to be achieved collectively by the EU in 2030, with an upward revision clause by 2023. New targets have been proposed to support the revised GHG target 2030 of -55% vs. 1990.		
Base year	1990; KP Flexibility rules (Art 3(5)) regarding F-Gases and Economies in Transition	1990, but subject to flexibility rules. 1995 or 2000 may be used as the base year for NF_3	1990	1990	2005	2005	2005	2005	Subject to accounting rules
					1990 for overall emission reduction target		1990 for overall emission reduction target		

	International commitments				EU domestic legislation				
	Kyoto Protocol (KP)		UNFCCC	Paris Agreement	Climate and Energy Package		Climate and Energy Framework		
					EU ETS	ESD	EU ETS	ESR	LULUCF
LULUCF	**Included:** Afforestation, reforestation and deforestation and forest management, other activities if elected	**Included**: Afforestation, reforestation and deforestation and forest management, other activities if elected (new accounting rules)	**Excluded** from target, but reported in inventories	**Included**: Contributes to the commitment of decreasing net emissions by at least 55%. In order to ensure that sufficient mitigation efforts are deployed up to 2030, the Climate Law limits the contribution of net removals to the Union 2030 climate target to 225 million tonnes of CO_2 equivalent, and provides that the Union shall aim to achieve a higher volume of its net carbon sink in 2030	**Excluded** in ETS and ESD		**Excluded** in ETS and ESR		**Included**
Aviation and navigation[569]	Domestic aviation and navigation included. International aviation excluded	Domestic aviation and navigation included. International aviation not attributed	Aviation in the scope of the EU ETS included. In practice total outgoing flight emissions considered. Domestic navigation included	Civil aviation is included (outgoing flights that start in the EU, emissions calculated on the basis of fuels sold in the EU)., as well as all other emissions by sources as regulated in Union law.	Domestic (national) and intra-EEA international aviation included.	CO_2 from domestic aviation excluded, domestic navigation included	Domestic and intra-EEA international aviation and departing flights to UK and CH included., Proposal to include navigation	CO_2 from domestic aviation excluded, domestic navigation included	Not applicable

[569] May be reviewed in the light of the implementation of ICAO's global measure and the EU's enhanced target.

	International commitments				EU domestic legislation				
	Kyoto Protocol (KP)		UNFCCC	Paris Agreement	Climate and Energy Package		Climate and Energy Framework		
					EU ETS	ESD	EU ETS	ESR	LULUCF
Use of international credits	Use of KP flexible mechanisms subject to KP rules	Use of KP flexible mechanisms subject to KP rules	Subject to quantitative and qualitative limits in ETS and ESD	The EU will not use international credits (according to its NDC)	Subject to quantitative and qualitative limits, see section 3.2.2.1	Subject to quantitative and qualitative limits, see section 3.2.2.1	No[570]	No	No
Carry-over of units from preceding periods	Not applicable	Subject to KP rules including those agreed in the Doha Amendment	Not applicable	Not applicable	EU ETS allowances can be banked into subsequent ETS trading periods since the second trading period	No carry-over from previous period	Indefinite validity of allowances not limited to trading periods, no need to carry over.	No	No
Gases covered	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	CO_2, N_2O, CF_4 and C_2F_6	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6	CO_2, N_2O, CF_4 and C_2F_6	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	CO_2, CH_4, N_2O

[570] A link with the permit system in Switzerland has been ratified.

	International commitments				EU domestic legislation				
	Kyoto Protocol (KP)		UNFCCC	Paris Agreement	Climate and Energy Package		Climate and Energy Framework		
					EU ETS	ESD	EU ETS	ESR	LULUCF
Sectors included	Annex A of KP (Energy, IPPU, agriculture, waste), LULUCF according to KP accounting rules for CP1	Annex A of KP (Energy, IPPU, agriculture, waste), LULUCF according to KP accounting rules for CP2	Energy, IPPU, agriculture, waste, aviation in the scope of the EU ETS	Energy, IPPU, agriculture, waste, LULUCF (all emissions by sources as regulated in Union law)	Power & heat generation, energy-intensive industry sectors, aviation (Annex 1 of ETS directive)	Transport (except aviation), buildings, non-ETS industry, agriculture (non-CO_2) and waste	As under Climate and Energy Package New proposal: Navigation	As under Climate and Energy Package	Land-use, land-use change and forestry
GWPs used	IPCC SAR	IPCC AR4	IPCC AR4	IPCC AR5	IPCC AR4		IPCC AR5		

[BR5] 4 PROGRESS IN THE ACHIEVEMENT OF QUANTIFIED ECONOMY WIDE EMISSION REDUCTION TARGET AND RELEVANT INFORMATION

[BR5] 4.1 Introduction

The EU has substantially overachieved its reduction target under the Convention, which means that also its Member States and the United Kingdom have fulfilled their emission reduction obligations. As stated in the 2022 EU GHG inventory submission to the UNFCCC, total GHG emissions, excluding LULUCF and including international aviation, decreased by 34 % in the EU-27+UK compared to the base year 1990, which corresponds to 1.94 billion tonnes of CO_2 equivalent.

In addition to information on the achievement of the target under the Convention, this chapter provides information on EU policies and measures in all sectors of the economy, and on cross-cutting policies and measures. The focus lies on policies and measures that are currently in place and on some legislative proposals yet to be approved. Information on planned updates is also provided.

Information on the EU policymaking process and overall climate change policy context can be found in chapter [NC] 4 of the EU's Eighth National Communication, which is submitted together with this report.

The policies and measures presented in this report focus on the EU level. Additional policies and measures are implemented at national, regional and local level. Policies at EU level provide the framework, and they help ensure that the greenhouse gas emission reduction commitments of the EU and its Member States are fulfilled. Each EU Member State implements its own policies under this framework. Details on policies and measures of each EU Member State can be found in the biennial reports and national communications submitted by these countries under the UNFCCC[571].

This chapter in structured as follows:

- Section [BR5] 4.2 provides details on the EU cross-cutting policies and measures, including the EU Emissions Trading System, the 'effort sharing' legislation and other strategies and funds which contribute to the mitigation of climate change.
- Section [BR5] 4.3 describes the EU policies and measures in each sector of the economy.
- Section [BR5] 4.4 provides information on the institutional arrangements used for domestic compliance and for the evaluation of progress towards the EU's targets.
- Section [BR5] 4.5 addresses the assessment and mitigation of economic and social consequences of climate change mitigation policies and measures.
- The policies and measures presented in this section contributed to the achievement of the EU's greenhouse gas emission reduction target for 2020 under the Convention. Now that data is

[571] Biennial Reports – Annex I, https://unfccc.in/BRs.

available on greenhouse gas emissions up to 2020, the achievement of the 2020 target is discussed in Section [BR5] 4.6.

In addition to the description of policies and measures in this chapter, structured information on each policy and measure can be found in the Common Tabular Format (CTF) tables, which are available as an annex to this Fifth Biennial Report. CTF table 3 provides the following for each policy and measure:

- name and brief description;
- the sector(s) and greenhouse gas(es) affected;
- the type of instrument (regulatory, fiscal, economic etc.);
- the status (planned, adopted, implemented) and year of implementation;
- the implementation entity or entities and
- an estimate of the mitigation impact if available.

It should be noted that these policies and measures are strongly interlinked. For example, the targets under the EU effort sharing legislation can be achieved only if various EU and national policies are implemented across different sectors, and it is difficult to attribute a planned or achieved emission reduction to a specific policy and measure. In many cases, an estimate of the mitigation impact of a single policy or measure is not available. The main reasons why such estimates are not available are the following:

- Impact assessments are provided for all proposals for new EU legislation; however. the final legislation may differ from the proposal, and it may combine various options addressed by the impact assessment.
- Impact assessments consider the combination of several policies and measures. for example, the impact assessment for the 2030 Climate and Energy Framework considered the combination of increased energy efficiency and renewable shares, and the strengthening of other legislation.
- Some policies and measures address electricity consumption, and quantitative information on reductions in electricity consumption are available. However, the impacts of these policies and measures on GHG emissions depend on the electricity mix, which is in turn affected by other European and national policies, and which changes over time.

[BR5] 4.2 Cross-cutting policies and measures

The main EU cross-cutting policies are the European Union Emissions Trading System and the Effort Sharing Decision legislation. They are supplemented by other cross-cutting policies and initiatives. Information on the overarching climate change policy architecture of the EU – the 2020 Climate and Energy Package and the 2030 Climate and Energy Framework – can be found in section [NC8] 4.3 of the EU's Eighth National Communication.

[BR5] 4.2.1 The EU Emissions Trading System

The EU ETS works on the 'cap and trade' principle. A cap is set on the total amount of certain greenhouse gases that can be emitted by the installations covered by the system. The cap is reduced

over time so that total emissions fall. Within the cap, operators buy emissions allowances, which they can trade with one another as needed. A pilot phase of the EU ETS started in 2005. The second phase was operational from 2008 to 2012, and the third phase, which was in operation from 2013 to 2020, contributed substantially to the achievement of the 2020 target. The fourth phase of the EU ETS is in operation from 2021 to 2030[572].

The EU ETS operates in all EU countries plus Iceland, Liechtenstein and Norway. The EU ETS limits emissions from around 10, 000 installations in the power sector and manufacturing industry, as well as airlines operating between these countries. The EU ETS covers approximately 40 % of the EU's greenhouse gas emissions. The EU ETS is linked to the Swiss ETS under an agreement with Switzerland.

The EU ETS covers the following gases and sectors, focusing on emissions that can be measured, reported and verified with a high level of accuracy:

- carbon dioxide (CO_2) from
  - electricity and heat generation;
  - energy-intensive industry sectors including oil refineries, steel works, and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals;
  - commercial aviation within the European Economic Area;
- N_2O from the production of nitric, adipic and glyoxylic acids and glyoxal; and
- PFCs from the production of aluminium.

Participation in the EU ETS is mandatory for companies in these sectors, but in some sectors, only installations above a certain size are included.

The legislative framework of the EU ETS is elaborated in the ETS Directive[573]. This directive was revised in 2018 to ensure emission reductions in support of the target under the 2030 Climate and Energy Framework. This revision focused on:

- increasing the pace of annual cap reduction to 2.2 % as of 2021, and reinforcing the market stability reserve (the mechanism to reduce the surplus of emission allowances in the carbon market);
- updating the rules for free allocation of allowances, reflecting technological progress; and
- helping industry and the power sector meet the innovation and investment challenges of the low-carbon transition via dedicated funding mechanisms – the innovation fund and the modernisation fund.

The introduction of the Market Stability Reserve in 2019 has resulted in higher and more robust carbon prices, which helped to ensure a year-on-year total emissions reduction of 9 % in 2019, with a 14.9 % reduction in electricity and heat production and a 1.9 % reduction in industry[574].

[572] EU Emissions Trading System (EU ETS), https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets_en.
[573] Consolidated text: Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, https://eur-lex.europa.eu/eli/dir/2003/87/2021-01-01.
[574] EU Emissions Trading System (EU ETS), https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets_en.

Following the update of the EU's 2030 GHG emissions reduction target from -40 % to -55 % under the 2030 Climate and Energy Framework (cf. chapter [NC8] 4.3.2 in the Eighth National Communication), the ETS Directive is currently under revision, to ensure that the EU ETS can contribute substantially to the more ambitious 2030 target.

The proposal by the European Commission,[575] which forms the basis for the negotiations between the European Parliament and Council, foresees a steeper emissions reduction by 2030, a further strengthening of the market stability reserve, reduction of free allocation, and the inclusion of emissions from shipping in the EU ETS.

GHG emissions from sectors under the EU ETS can be estimated with high accuracy since they are subject to detailed monitoring, reporting and verification. However, the impacts of the implementation of the EU ETS on GHG emissions compared to a hypothetical situation without an EU ETS are difficult to estimate because of interactions of several factors such as the development of the GDP, the impacts of other instruments such as the Renewable Energy and Energy Efficiency Directives, and the impacts of specific policies and measures of EU Member States. Hence, there is no ex-post or ex-ante evaluation of the single impact of the EU ETS on GHG emissions available. In this report, the 'targeted impact' of the stationary EU ETS is provided, which is the emissions reduction in the stationary sectors covered by the EU ETS between the base year 2005 and the target years 2020 and 2030. ETS emissions in 2005 are available from the EU ETS data viewer[576], and GHG emissions in the ETS target years 2020 and 2030 can be estimated by applying the ETS targets of -21 % and -43 %, respectively, to the emissions level in 2005, as shown in Table 25.

Table 25: Targeted impacts of the implementation of the EU ETS in 2020 and 2030 on stationary sectors

Year	Base year (2005) GHG emissions	Reduction target	Targeted impact on GHG emissions
2020	2 340 Mt CO_2eq	-21 %	-491 Mt CO_2eq
2030	2 066 Mt CO_2eq	-43 %	-888 Mt CO_2eq

Source: EU ETS data viewer, Directive 2003/87/EC as amended.

Note: Base year emissions for the 2020 target include GHG emissions of EU-27+UK (and Northern Ireland). Therefore, they are larger than the base year emissions for the 2030 target, which exclude ETS emissions of the United Kingdom.

[BR5] 4.2.2 Effort Sharing legislation

For those sectors that fall outside the scope of the EU ETS, binding annual greenhouse gas emission targets have been established for the EU Member States. These sectors, including transport, buildings, agriculture, non-ETS industry and waste, account for almost 60 % of total domestic EU emissions. The effort sharing legislation establishes binding annual greenhouse gas emission targets for Member States for the periods 2013–2020 and 2021–2030.

[575] Proposal for a Directive amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, COM(2021/551 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0551.
[576] EU emissions trading system (ETS) data viewer, https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1.

For the period up to 2020, the Effort Sharing Decision[577] set national emission targets for 2020, expressed as a 10 % reduction compared to 2005 levels. It also defined flexibilities and laid down how the AEAs for each year were to be calculated for each year from 2013 to 2020.

The national targets were based on Member States' relative wealth, measured by GDP per capita. Less wealthy countries had less ambitious targets because their relatively higher economic growth is likely to be a stronger emission driver and they have relatively lower investment capacities. The national targets for 2020 ranged from a 20 % reduction by 2020 (from 2005 levels) for the most wealthy Member States to a 20 % increase for the least wealthy ones[578].

For the period up to 2030, the Effort Sharing Regulation[579] was adopted in 2018. It specified that sectors of the economy not covered by the EU ETS must reduce emissions by 30 % by 2030 compared to 2005 as their contribution to the overall target.

The regulation continued to recognise the different capacities of Member States to take action by differentiating targets according to GDP per capita across Member States. However, an approach for higher income Member States based solely on relative GDP per capita would mean that some would have relatively high costs with regard to reaching their targets. Hence the targets were adjusted to reflect cost-effectiveness for those Member States with an above average GDP per capita. The resulting 2030 targets ranged from 0 % to -40 % compared to 2005 levels. In addition to EU Member States, Iceland and Norway have agreed to implement the Effort Sharing Regulation and to commit to binding annual emission allocations for the period 2021 to 2030[580].

The Effort Sharing Regulation maintains most of the existing flexibilities under the current Effort Sharing Decision. In years in which emissions are lower than their annual emission allocations, Member States can bank surpluses and use them in later years. For high cumulative surpluses, banking limits have been added. In years in which emissions are higher than the annual limit, Member States can borrow a limited amount of allocations from the following year. This gives Member States the flexibility to deal with annual fluctuations in emissions due to weather or economic conditions.

Member States can also buy and sell allocations from and to other Member States. This is an important vehicle to ensure cost-effectiveness. It allows Member States to access emissions reductions where they are the cheapest, and the revenue can be used to invest in modernisation.

As an additional flexibility, the Effort Sharing Regulation provides nine Member States with the possibility of using a limited amount of ETS allowances to offset emissions in the effort sharing sectors from 2021 to 2030. It applies to Member States that have national reduction targets

[577] Decision No 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, http://data.europa.eu/eli/dec/2009/406/oj.
[578] Effort sharing: Member States' emission targets, https://ec.europa.eu/clima/eu-action/effort-sharing-member-states-emission-targets_en.
[579] Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement, http://data.europa.eu/eli/reg/2018/842/oj.
[580] Effort sharing 2021-2030: targets and flexibilities, https://ec.europa.eu/clima/eu-action/effort-sharing-member-states-emission-targets/effort-sharing-2021-2030-targets-and-flexibilities_en.

significantly above both the Union average and their cost-effective reduction potential or did not allocate any EU ETS allowances for free to industrial installations in 2013.

Finally, to stimulate additional action in the land use sector, Member States can use up to 262 million credits from this sector over the entire period 2021 to 2030 to comply with their national targets. All Member States are eligible to make use of this flexibility if needed for achieving their target, while access is higher for Member States with a larger share of emissions from agriculture. This recognises that there is a lower mitigation potential for emissions from the agriculture sector.

Following the update of the EU's 2030 GHG emissions reduction target from -40 % to -55 %, the Effort Sharing Regulation is currently under revision. The European Commission proposed a strengthened target for the Effort Sharing sectors, delivering at least 40 % emission reductions by 2030 compared to 2005 levels. The proposal includes a revision of Member States annual emission allocations and limited adjustments in the way Member States can use existing flexibilities to meet their targets. In addition, the European Commission proposed to establish an additional reserve to help Member States comply with their more ambitious effort sharing targets[581].

As is the case with the EU ETS, the impact of implementation of the effort sharing legislation on GHG emissions compared to a hypothetical situation without this legislation is difficult to estimate due to interactions with other policies and external factors. In this report, the 'targeted impact' of the effort sharing legislation is provided, which is the emissions reduction in the sectors covered by this legislation between the base year 2005 and the target years 2020 and 2030. ESD base year emissions in 2005have been defined as the outcome of the comprehensive ESD review in 2016[582] while ESR base year emissions are published in EU Implementing Decision 2020/2126. GHG emissions in the target years 2020 and 2030 were estimated by applying the effort sharing targets of -10 % and -30 %, respectively, on the emissions levels in 2005, as shown in Table 26.

Table 26: Targeted impacts of the implementation of the effort sharing legislation in 2020 and 2030

Year	Base year (2005) GHG emissions	Reduction target	Targeted impact on GHG emissions
2020	2 887 Mt CO_2eq	-10 %	-289 Mt CO_2eq
2030	2 517 Mt CO_2eq	-30 %	-755 Mt CO_2eq

Source: Decision No 406/2009/EC, Regulation (EU) 2018/842.

Note: Base year emissions for the 2020 target include GHG emissions of EU-27+UK, and the total is calculated using GWPs from the IPCC's Fourth Assessment Report. Base year emissions for the 2030 target include GHG emissions of EU-27 only, and the total is calculated using GWPs from the IPCC's Fifth Assessment Report.

[581] Increasing the ambition of the EU's Effort Sharing Regulation, https://ec.europa.eu/clima/eu-action/european-green-deal/delivering-european-green-deal/increasing-ambition-eus-effort-sharing-regulation_en.
[582] EEA 2022 Technical background document. Accompanying the report Trends and projections in Europe 2022.

[BR5] 4.2.3 Other cross-cutting policies and measures: Strategies and initiatives

[BR5] 4.2.3.1 The Methane Strategy

Methane is the second most important greenhouse gas after carbon dioxide, and there are important mitigations potentials which can lead to methane emission reductions in the short to medium term. In 2020, the European Commission adopted the EU Methane Strategy[583]. This communication sets out a strategy for reducing methane emissions. It outlines a comprehensive policy framework combining concrete cross-sectoral and sector-specific actions within the EU, as well as promoting similar action internationally.

Based on this strategy, a regulation on methane emissions reduction in the energy sector is currently under preparation[584]. In addition to various actions in the energy sector, the strategy also outlines actions in the agriculture and waste sectors. In the agriculture sector, best practices for innovative methane-reducing technologies will be developed and shared (cf. section [BR5] 4.3.4.3), and rural areas will be supported in projects to generate biogas from agricultural waste. In the waste sector, the European Commission will consider further action to improve the management of landfill gas in the review of the Landfill Directive in 2024 (cf. section [BR5] 4.3.6)..

The European Union is an importer of natural gas, oil and coal, and the production and transport of these fuels in third countries generates substantial methane emissions. Hence, the methane strategy includes several initiatives to support third countries in mitigating methane emissions.

In September 2021, the European Commission and the United States Government announced the Global Methane Pledge, which commits its participating countries to the collective goal of reducing global methane emissions by at least 30 percent from 2020 levels by 2030[585]. More than 120 countries, representing nearly 50 % of global anthropogenic methane emissions, have joined the methane pledge by September 2022.

[BR5] 4.2.3.2 The Carbon Capture and Storage Directive and sustainable carbon cycles

Some emissions of GHGs (e.g. from the production of cement) are inherent to industrial processes and are difficult to reduce substantially. In order to minimise such emissions and achieve climate neutrality, the capture and storage of carbon will play an important role. The Carbon Capture and Storage (CCS) Directive[586] constitutes the legal framework for the geological storage of CO_2. It covers all CO_2 storage in geological formations in the EU and the entire lifetime of storage sites. It also contains provisions on the capture and transport components of CCS[587].

[583] EU strategy to reduce methane emissions, COM(2020) 663 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0663.
[584] Proposal for a regulation on methane emissions reduction in the energy sector, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0805.
[585] Global Methane Pledge, https://www.globalmethanepledge.org/.
[586] Directive 2009/31/EC on the geological storage of carbon dioxide, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0031.
[587] A legal framework for the safe geological storage of carbon dioxide, https://ec.europa.eu/clima/eu-action/carbon-capture-use-and-storage/legal-framework-safe-geological-storage-carbon-dioxide_en.

Besides being stored, carbon can be captured for re-use. In its communication 'Sustainable Carbon Cyles,'[588] the European Commission sets the long-term objective to establish sustainable and climate-resilient carbon cycles. Under this objective, the European Commission provides methodological support and funding to support industrial capture, use and storage of CO_2 and will develop a regulatory framework for the certification of carbon removals.

The communication on sustainable carbon cycles also addresses the concept of carbon farming, which aims at managing agricultural lands in a sustainable way in which they help to remove CO_2 from the atmosphere and increase carbon stocks. Finally, 'blue carbon' initiatives aim at increasing the removal of CO_2 in oceanic and coastal ecosystems by regenerating these ecosystems.

[BR5] 4.2.3.3 Bioeconomy Strategy

The Bioeconomy Strategy, which was first adopted by the European Commission in 2012 and updated in 2018, guides the EU's approach to production, consumption, processing, storage, recycling and disposal of biological resources. This strategy aims to ensure food and nutrition security; manage natural resources sustainably; reduce the dependence on non-renewable, unsustainable resources; mitigate and adapt to climate change; and strengthen competitiveness and create jobs.

The updated strategy proposed three main action areas: the strengthening and scaling-up of bio-based sectors, the deployment of local bioeconomies; and understanding the ecological boundaries of the bioeconomy[589]. The EU Bioeconomy Strategy Progress Report[590], published in June 2022, pointed out new national and regional bioeconomy strategies, achievements in Central and Eastern European countries and the mobilisation of private investments and research and innovation in food and other bio-based industries.

[BR5] 4.2.3.4 EU taxonomy for sustainable activities

In order to meet the EU's climate targets, it is vital to direct investments towards low greenhouse gas emissions and climate-resilient development. Making finance flows consistent with such a development is also one of the three goals of the Paris Agreement, as stipulated in Article 2.1.c.

In July 2020, the Taxonomy Regulation[591] entered into force. It established the basis for a classification system for considering certain economic activities as environmentally sustainable. The aim is to provide companies and investors with the criteria under which certain economic activities can be considered environmentally sustainable.

After the Taxonomy Regulation entered into force, the European Commission is mandated to develop delegated acts which define the technical screening criteria under which selected economic activities

[588] Sustainable Carbon Cycles, COM(2021) 800 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0800.
[589] A sustainable Bioeconomy for Europe: Strengthening the connection between economy, society and the environment, COM(2018) 673 final, https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A52018DC0673.
[590] EU Bioeconomy Strategy Progress Report, https://op.europa.eu/s/wqus.
[591] Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32020R0852.

could qualify as substantially contributing to the six environmental objectives. In December 2021, a first delegated act on sustainable activities for climate change mitigation and adaptation objectives was adopted. A complementary delegated act on certain nuclear and gas activities was adopted in March 2022. The delegated act covering the remaining four environmental objectives is under preparation.[592].

[BR5] 4.2.3.5 Covenant of Mayors for Climate and Energy

The Covenant of Mayors for Climate and Energy brings together more than 11 000 local governments voluntarily committed to implementing ambitious climate and energy objectives. Signatory cities pledge action to support the implementation of the EU 55 % GHG emission reduction target by 2030 and the adoption of a joint approach to tackling mitigation and adaptation to climate change.

In order to translate their political commitment into practical measures and projects, Covenant signatories commit to submitting, within two years following the date of the local council decision, a Sustainable Energy and Climate Action Plan outlining the key actions they plan to undertake[593].

[BR5] 4.2.4 Other cross-cutting policies and measures: Funds

The reduction of greenhouse gas emissions requires financial resources and investment choices in line with long-term goals. The funds under the EU budget play and important role in financing this transition. In the following, the most important funds under the 2021-2027 Multiannual Financial Framework (MFF) are listed. Most of these funds already contributed to climate action in the period up to 2020.

For the EU's 2021-2027 MFF, the EU climate tracking methodology has been significantly strengthened, in particular by moving away from marking climate relevance based on the intent of an intervention to basing it on its expected effect; ensuring enhanced coherence of the methodology across EU funding programmes; and requiring compliance with the principle of 'Do No Significant Harm' to the EU's climate and environmental objectives as enshrined in the European Green Deal.

[BR5] 4.2.4.1 European Regional Development Fund

The European Regional Development Fund provides funding to public and private bodies in all EU regions to reduce economic, social and territorial disparities. The fund supports investments through dedicated national or regional programmes. In 2021-2027, the fund enables investments with the objectives to make Europe and its regions more competitive and smarter; greener, low-carbon and resilient; more connected; more social, and closer to citizens[594].

In particular, Policy Objective 2 under the 2021-2027 multiannual financial framework, titled 'A greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe,' promotes

[592] Implementing and delegated acts, https://ec.europa.eu/info/law/sustainable-finance-taxonomy-regulation-eu-2020-852/amending-and-supplementary-acts/implementing-and-delegated-acts_en.
[593] Covenant initiative, https://www.eumayors.eu/about/covenant-initiative/objectives-and-scope.html.
[594] European Regional Development Fund, https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/european-regional-development-fund-erdf_en.

investments at regional and national level in EU Member States on key policy aspects such as energy efficiency, renewable energy, climate change adaptation, sustainable water management, circular economy and biodiversity. Additionally, one of the key objectives of the Cohesion Policy in the 2021-2027 Multiannual Financial Framework is to strengthen technical assistance at sub-national level in EU Member States, allowing for investments to take place at the closest possible level to citizens.

[BR5] 4.2.4.2 European Agricultural Fund for Rural Development

The European Agricultural Fund for Rural Development (EAFRD) provides funding to support rural areas. Rural development programmes encourage sustainable management of natural resources and climate action and aim at achieving a balanced territorial development of rural economies. More information on the role of the EAFRD under the EU's agricultural policy can be found in section [BR5] 4.3.4.1.

[BR5] 4.2.4.3 Cohesion fund

The Cohesion Fund provides support to EU Member States with a gross national income per capita below 90 % of the EU-27 average to strengthen the economic, social and territorial cohesion of the EU. It supports investments through dedicated national or regional programmes. The fund mainly contributes to investments in the field of environment and trans-European networks in the area of transport infrastructure[595].

[BR5] 4.2.4.4 Programme for Environment and Climate Action (LIFE)

The Programme for Environment and Climate Action is also known as LIFE (from L'Instrument Financier pour l'Environnement – the financial instrument for the environment). The financial envelope of the LIFE programme is implemented via four sub-programmes: Nature and biodiversity; circular economy and quality of life; climate change mitigation and adaptation; and clean energy transition. All four sub-programmes have close links to climate change mitigation. The programme supports demonstration, best practice, coordination and support actions, capacity building, and governance projects[596].

[BR5] 4.2.4.5 Just Transition Fund

The transition to a low-carbon economy brings about major socio-economic changes, particularly in regions whose economies are centred around carbon-intensive industries. The Just Transition Fund mitigates the socio-economic impacts of the transition in regions facing the greatest challenges and supports the economic diversification of regions most affected by this transition, inter alia by investing in Small- and Medium-sized Enterprises (SMEs), up- and re-skilling of workers and environmental rehabilitation, with the objective of leaving no region behind in the transition to

[595] Cohesion Fund (CF), https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/cohesion-fund-cf_en.
[596] Programme for Environment and Climate Action (LIFE), https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/programme-environment-and-climate-action-life_en.

climate neutrality in the EU[597]. The fund will alleviate the socio-economic costs triggered by climate transition, supporting the economic diversification and reconversion of the territories concerned.

The Just Transition Platform[598] is the EU's key tool to help Member States and regions unlock the support available through the Just Transition Mechanism, ensuring a fair and 'just' transition that leaves no person or region behind. This platform provides links to relevant information about Working Groups, events and relevant funding opportunities, including through the Just Transition Fund.

[BR5] 4.2.4.6 InvestEU programme

The InvestEU Fund leverages substantial private and public repayable financing (e.g. loans, equity investments) through an EU budget guarantee granted to implementing partners (e.g. the European Investment Bank (EIB) Group, other international financial institutions or national promotional banks). It is deployed under four windows that cover the policy areas of sustainable infrastructure; research, innovation and digitisation; SMEs; and social investment and skills[599]. The InvestEU Advisory Hub complements the InvestEU Fund by supporting the identification, preparation and development of sustainable investment projects across the European Union. Climate change mitigation and adaptation are among the priority areas for receiving InvestEU support. Thereby, the programme contributes to a greener, more digital and resilient Europe.

The InvestEU programme builds on the European Fund for Strategic Investments, which supported investments in the period from 2015 to 2020.

[BR5] 4.2.4.7 Horizon research and innovation programmes

Horizon 2020 and its successor, Horizon Europe (2021-2027) are the EU's main funding programmes for research and innovation. These programmes include specific calls for research and innovation projects that respond to climate change, such as the EUR 1 billion European Green Deal Call which was launched in 2020. Details on the Horizon programmes are provided on section [NC] 8.2.2 of the EU's Eight National Communication, which is submitted together with this report.

[BR5] 4.2.4.8 Recovery and Resilience Facility

In response to the COVID-19 pandemic, the Recovery and Resilience Facility (RFF) was established to mitigate the economic and social impact of the pandemic and make European economies and societies more sustainable and resilient. The facility allows the European Commission to raise funds to help Member States implement reforms and investments that are in line with the EU's priorities.[600] The Member States' national plans for spending RFF support have to meet binding climate and digital

[597] Just Transition Fund, Just transition funding sources, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism/just-transition-funding-sources_en.
[598] Just transition platform, https://ec.europa.eu/regional_policy/en/funding/jtf/just-transition-platform/.
[599] InvestEU, https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/investeu_en.
[600] Recovery and resilience facility, https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en.

goals. Specifically, each recovery and resilience plan has to include a minimum of 37 % of expenditure for climate investments and reforms.

[BR5] 4.3 Sectoral policies and measures

[BR5] 4.3.1 Energy

[BR5] 4.3.1.1 Overview

The EU aims to be climate-neutral by 2050. This objective is at the heart of the European Green Deal and in line with the EU's commitment to global climate action under the Paris Agreement. Consistently with these commitments, the EU adopted in 2019 the 'Clean energy for all Europeans' package[601] to help move away from fossil fuels towards cleaner energy. It consists of eight laws concerning buildings, renewable energy, energy efficiency, electricity market design and the Governance Regulation.

With the Climate Target Plan[602] for 2030, the European Commission proposed raising the EU's ambition on reducing greenhouse gas emissions to at least 55 % below 1990 levels by 2030 and emphasised the need for a higher contribution of energy efficiency and renewable energy to enable achievement of that target most cost-effectively. The European Climate Law[603] entered into force in July 2021 and sets the goal to become climate-neutral by 2050 and the intermediate target of reducing net greenhouse gas emissions by at least 55 % by 2030, compared to 1990 levels.

In July 2021, the European Commission took a major step towards accomplishing this ambitious goal by adopting a package of proposals amending the EU's climate and energy policies ('Delivering on the European Green Deal' package)[604]. This package includes the following proposals related to energy: (1) Proposal for an amendment of the Energy Efficiency Directive[605]; (2) Proposal for an amendment to the Renewable Energy Directive[606]; (3) Proposal for a Directive on the taxation of

[601] Clean energy for all Europeans package, https://energy.ec.europa.eu/topics/energy-strategy/clean-energy-all-europeans-package_en.
[602] Stepping up Europe's 2030 climate ambition Investing in a climate-neutral future for the benefit of our people, COM(2020) 562 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0562.
[603] Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), http://data.europa.eu/eli/reg/2021/1119/oj.
[604] Delivering the European Green Deal, https://ec.europa.eu/clima/news-your-voice/news/delivering-european-green-deal-2021-07-14_en.
[605] Proposal for a Directive on energy efficiency (recast), COM(2021) 558 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0558.
[606] Proposal for a Directive amending Directive (EU) 2018/2001 of the European Parliament and of the Council, Regulation (EU) 2018/1999 of the European Parliament and of the Council and Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652, COM(2021) 557 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0557.

energy products and electricity (recast)[607]. In December 2021, additional 'Fit-for-55' proposals were adopted which included a number of legislative and policy proposals focusing on gas and hydrogen,[608] methane emissions[609] and buildings[610] to enable the EU to meet its new 2030 target.

On 18 May 2022, the European Commission presented the REPowerEU Plan[611] in response to the hardships and global energy market disruption caused by the Russian Federation's invasion of Ukraine. The measures in the REPowerEU Plan relate to energy savings, diversification of energy supplies, and accelerated roll-out of renewable energy to replace fossil fuels in homes, industry and power generation. For the medium-term, it proposes measures to bring down emissions and energy costs for consumers and industry including increasing the 2030 energy efficiency targets to 13 % and increasing the share of renewables in the EU's energy consumption from 22.1 % in 2020 to 45 %, above the 40 % target in the 'Fit for 55' proposal[612]

Along with the REPowerEU Plan, the European Commission has published:[613]

- an EU 'Save Energy' Communication[614] detailing short-term behavioural changes which could cut gas and oil demand by 5 % and encouraging Member States to start specific communication campaigns targeting households and industry;
- a dedicated EU Solar Strategy[615] to double solar photovoltaic capacity by 2025 and install 600 GW by 2030.
- a Biomethane Action Plan[616] setting out tools including a new biomethane industrial partnership and financial incentives to increase production to 35 billion cubic metres by 2030, including through the Common Agricultural Policy.

[607] Proposal for a Council Directive restructuring the Union framework for the taxation of energy products and electricity (recast), COM (2021) 563 final, https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52021PC0563.

[608] Proposal for a Directive on common rules for the internal markets in renewable and natural gases and in hydrogen, COM(2021) 803 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0803.

[609] Proposal for a Regulation on methane emissions reduction in the energy sector, COM(2021) 805 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2021%3A805%3AFIN&qid=1639665806476 .

[610] Proposal for a Directive on the energy performance of buildings (recast), COM(2021) 802 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0802&qid=1641802763889.

[611] REPowerEU Plan, SWD(2022) 230 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=1653033742483.

[612] Renewable energy statistics - Statistics Explained, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Renewable_energy_statistics.

[613] REPowerEU: A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition, https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131.

[614] EU Save Energy, COM(2022) 240 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A240%3AFIN&qid=1653033053936.

[615] EU Solar Energy Strategy, COM(2022) 221 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A221%3AFIN&qid=1653034500503

[616] Implementing the Repower EU Action Plan: Investment needs, hydrogen accelerator and achieving the bio-methane targets, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD%3A2022%3A230%3AFIN&qid=1653033922121

[BR5] 4.3.1.2 Energy efficiency

The Energy Efficiency Directive (EED) is the main legal act addressing energy efficiency in the EU. In December 2018, an amendment[617] to this Directive entered into force and had to be transposed into national law by Member States by 2020.

It introduced a new headline EU energy efficiency target of at least 32.5 % by 2030. This target, which is to be achieved collectively across the EU, is set relative to the 2007 PRIMES modelling projections for 2030. In absolute terms, it means that EU energy consumption should not exceed 1128 Mtoe (million tonnes of equivalent) of primary energy and/or 846 Mtoe of final energy.

Elements included in the amended directive:

- extension to the energy savings obligation in end use. EU countries have to achieve new energy savings of 0.8 % each year of final energy consumption for the 2021-2030 period;
- stronger rules on metering and billing of thermal energy by giving consumers – especially those in multi-apartment building with collective heating systems – clearer rights to receive more frequent and more useful information on their energy consumption, also enabling them to better understand and control their heating bills;
- requiring EU countries to have in place transparent, publicly available national rules on the allocation of the cost of heating, cooling and hot water consumption in multi-apartment and multi-purpose buildings with collective systems for such services;
- monitoring efficiency levels in new energy generation capacities;
- updated Primary Energy Factor for electricity generation; and
- a general review of the Energy Efficiency Directive (required by 2024).

For the period 2021-2030, each EU Member State is required to draw up a 10-year integrated National Energy and Climate Plan (NECP) outlining how it intends to meet the targets for 2030, including energy efficiency, followed every two years by a progress report. The European Commission monitors, as part of the 'State of the Energy Union' report, EU progress as a whole towards achieving the targets.

The most recent energy efficiency statistics of EUROSTAT[618], which were published in December 2021, found that primary energy consumption slightly decreased in 2019 and fell dramatically in 2020 due to COVID-19 pandemic and related restrictions (e.g. lockdowns, curfews and travel restrictions). It reached its lowest levels since 1990 (the first year for which data is available) and was 5.8% higher

[617] Directive (EU) 2018/2002 amending Directive 2012/27/EU on energy efficiency http://data.europa.eu/eli/dir/2018/2002/oj.

[618] Energy efficiency statistics, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_efficiency_statistics#Primary_energy_consumption_and_distance_to_2020_and_2030_targets.

than the efficiency target for 2020 and 9.6% away from the 2030 target, meaning that efforts to improve efficiency need to be maintained in the years ahead.

Final energy consumption in 2020 was 5.4% higher than the efficiency target for 2020 and 7.2% away from the 2030 target.

In July 2021, a proposal for a new directive on energy efficiency[619] was presented by the European Commission, as part of the package 'Delivering on the European Green Deal' (see above). It recasts the whole directive and promotes 'energy efficiency first' as an overall principle of EU energy policy. It seeks to introduce, inter alia, a higher target for reducing primary (39 %) and final (36 %) energy consumption by 2030 (relative to the 2007 consumption projections) than the targets that are currently binding at EU level.

The proposal requires each Member State to determine its indicative national contribution based on a formula of objective criteria and benchmarks, which reflect national circumstances. And it proposes to nearly double the annual energy savings obligations of Member States in end use.

The focus is on sectors with high energy saving potential (heating and cooling, industry and energy services). For heating and cooling, which accounts for 80 % of energy consumption in buildings, a new framework should be established with the aim of reducing emissions in buildings. Existing requirements to ensure higher efficiency in heat production should be extended to smaller energy supply installations as well as to service facilities and data centres with high energy consumption. For district heating and cooling, the definition of efficient systems will be progressively tightened to move away from fossil fuel-based systems. For cogeneration, additional criteria for specific emissions for high-efficiency cogeneration (270 gCO_2/kWh) will be introduced.

The proposal also aims to strengthen the requirements for businesses. The largest energy users (using more than 100 TJ per year) that do not yet have energy management systems in place will need to do so in future. The burden on smaller, less energy-using businesses should be reduced.

In addition, the proposal puts additional emphasis on the public sector, showing the example it can serve in leading the transition. Therefore, it introduces specific energy saving measures for this sector, which include the new obligation for the public sector to reduce annual energy consumption by 1.7 % every year, the enhanced obligation for renovation of 3 % of public building floor area, and the requirement to include energy efficiency requirements more systematically in public procurement procedures.

Another new requirement for Member States is to take measures to implement energy efficiency improvements for people affected by or at risk of energy poverty, vulnerable customers including, where appropriate, people living in social housing. Parts of these measures are expected to be financed via revenues from ETS allowances for building and transport or from the new Social Climate Fund.

[619] Proposal for a Directive on energy efficiency (recast), COM/2021/558 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0558.

Member States will be required to establish one-stop shops providing technical, administrative and financial advice, also for the purposes of facilitating the uptake of energy performance contracting and energy services markets.[620]

The main impact of the measure will be that the Union uses less energy without affecting the delivering of desired services. This reduction in energy use will be accompanied by co-benefits such as improved energy security and reduced environmental impacts. As the combustion of fuels for energy is currently responsible for 75 % of the EU's GHG emissions, reducing energy use is a vital element, along with decarbonising energy supply, in achieving the EU's 2030 emission target.[621]

Buildings

Buildings are responsible for about 40 % of the EU's total energy consumption and for 36 % of energy-related GHG emissions. Currently, about 75 % of the building stock is considered energy inefficient.[622] Therefore, the building sector is crucial for achieving the EU's energy and decarbonisation goals.

The EU has established a legislative framework including the Energy Performance of Buildings Directive (EPBD)[623] amending the previous EPBD and the EED (see above).

A major goal of the amended EPBD is to accelerate the renovation of the existing building stock through strengthened long-term renovation strategies and the mobilisation of related investments. All EU countries must establish a long-term renovation strategy to support the renovation of their national building stock so that this building stock is highly energy efficient and decarbonised by 2050. These strategies form part of the integrated NECPs of EU countries (see above). A second major goal is that all new buildings must be nearly zero-energy buildings from 2021 onwards, while the remaining amount of energy required should be met by renewable sources to a very significant extent. According to the impact assessment accompanying the proposal to revise the EPBD, the provisions could reduce GHG emissions by 38 Mt CO_2 and could improve the GHG emissions in buildings by 1.32 kg CO_2/m^2.[624] In addition to the EPBD, the EED also covers energy efficiency from buildings, such as the goal of carrying out energy efficient renovations on at least 3 % (by floor area) of the buildings owned and occupied by central government. For more details, see BR4.

Due to the more ambitious -55 % target, a further upgrade of the existing regulatory framework is needed. Therefore, in 2021, the European Commission proposed a revision of the Energy

620 European Commission: Commission proposes new Energy Efficiency Directive, News 14.July 2021 https://ec.europa.eu/info/news/commission-proposes-new-energy-efficiency-directive-2021-jul-14_en.

621 Impact Assessment Report Accompanying the Proposal for a Directive of the European Parliament and of the Council on energy efficiency (recast), SWD(2021) 623 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52021SC0623.

622 State of the Energy Union 2021 – Contributing to the European Green Deal and the Union's recovery, COM(2021) 950 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:950:FIN.

623 Directive (EU) 2018/844 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency, http://data.europa.eu/eli/dir/2018/844/oj.

624 Executive Summary of the Impact Assessment Accompanying the document Proposal for a Directive of the European Parliament and of the Council amending Directive 2010/31/EU on the energy performance of buildings, SWD(2016) 414 final, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52016SC0415.

Performance of Buildings Directive[625]. This new proposal aims at contributing to reaching the target of at least -60 % emission reductions by 2030 in the building sector compared to 2015 and sets out how Europe can achieve a zero-emission and fully decarbonised building stock by 2050. The specific objectives are:

- to increase the rate and depth of building renovations (policy area A);
- to improve information on energy performance and sustainability of buildings with the use of digital tools (across all policy areas);
- to ensure that new buildings are in line with the 2050 climate neutrality objective (policy area B); and to integrate buildings into decarbonised and digitalised energy systems (policy area C).

The main measure under policy area A is to introduce Minimum Energy Performance Standards, complemented by stronger energy performance certificates, the introduction of building renovation passports and a definition of deep renovation. The main measure under policy area B is the introduction of a standard for 'Zero-Emission Buildings'. The main measure under policy Area C is strengthened requirements for recharging infrastructure for electric vehicles in buildings. The measures identified for each policy area are packaged in four options with different levels of ambition: low, moderate and high ambition (with two variants, I - II). Option 3 'High ambition I' was the preferred option in the impact assessment. But the legislative proposal has been aligned with the moderate ambition level of option 2 for several aspects, including the renovation of existing buildings. The high ambition level of option 3 was kept for new buildings and their modernisation. Under Option 3, GHG emissions were projected to be 23 % and 53.5 % lower in 2030 and 2050, respectively. Under Option 2, GHG emissions for heating, cooling and domestic hot water will be reduced by 4.2% and by 21% in 2030 and 2050, respectively [626]

In addition, in 2020, the European Commission published the strategy 'A Renovation Wave for Europe – Greening our buildings, creating jobs, improving lives'[627] to boost renovation in the EU. It aims at doubling annual energy renovation rates in the next 10 years. It also aims minimising the footprint of buildings through resource efficiency and circularity combined with turning parts of the construction sector into a carbon sink.

Energy labelling and Ecodesign

The EU's energy labelling and ecodesign legislation helps to improve the energy efficiency of products on the EU market.

[625] Proposal for a Directive on the energy performance of buildings (recast), COM(2021) 802 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0802.
[626] Executive Summary of the Impact Assessment Report accompanying the document Proposal for a Directive of the European Parliament and of the Council on the energy performance of buildings (recast) SWD(2021) 454 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021SC0454.
[627] A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives, COM(2020) 662 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1603122220757&uri=CELEX:52020DC0662.

The EU Energy Labelling Framework Regulation[628] lays down specific labelling requirements for energy-related products placed on the EU market. It is a widely recognised feature on household products, like lightbulbs, television sets or washing machines, and has helped consumers to choose products which are more energy-efficient and encouraged manufacturers to drive innovation by using more energy-efficient technologies.

In an EU-wide survey in 2019[629], 93 % of consumers confirmed that they recognised the label and 79 % confirmed that it had influenced their decision on what product to buy. Together with harmonised minimum performance requirements ('ecodesign'), EU energy labelling rules are estimated to cut consumer expenditure by tens of billions of euros every year, whilst generating multiple other benefits for the environment and for manufacturers and retailers.[630]

Since March 2021, the energy label rating system uses A to G rankings only, instead of the previous A+++ to D ratings. Four product groups were required to introduce the re-scaled labels from 1 March 2021, with new labels for light bulbs and lamps applicable from 1 September 2021.[631]

Ecodesign sets common EU wide minimum standards to definitively eliminate the least performing products from the market. The current Ecodesign Directive[632] has a long track record of delivering benefits to businesses, consumers and the environment. In 2021 alone, the impact of the current ecodesign measures, covering 31 product groups, is estimated to have saved EUR 120 billion in energy expenditure for EU consumers and led to a 10 % lower annual energy consumption by the products in scope[633].

On 30 March 2022, the European Commission proposed a new Ecodesign for Sustainable Products Regulation[634] for more environmentally sustainable and circular products. It extends the existing Ecodesign framework in two ways: firstly, to cover the widest possible range of products; and secondly, to broaden the scope of the requirements with which products are to comply. This means that criteria are set not only for energy efficiency, but also for circularity and an overall reduction of the environmental and climate footprint of products.[635]

[628] Regulation (EU) 2017/1369 setting a framework for energy labelling and repealing Directive 2010/30/EU, http://data.europa.eu/eli/reg/2017/1369/oj.
[629] Eurobarometer on energy, n.492, 2019: https://energy.ec.europa.eu/data-and-analysis/eurobarometer-energy_en?redir=1.
[630] New EU energy labels applicable from 1 March 2021, https://ec.europa.eu/commission/presscorner/detail/en/ip_21_818.
[631] State of the Energy Union 2021 – Contributing to the European Green Deal and the Union's recovery, COM(2021) 950 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:950:FIN.
[632] Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32009L0125.
[633] Ecodesign for sustainable products, https://ec.europa.eu/info/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/sustainable-products/ecodesign-sustainable-products_en.
[634] Proposal for Ecodesign for Sustainable Products Regulation, https://environment.ec.europa.eu/publications/proposal-ecodesign-sustainable-products-regulation_en.
[635] Green Deal: New proposals to make sustainable products the norm and boost Europe's resource independence, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2013.

Along with the new proposal of the Ecodesign Regulation, the European Commission has also adopted an Ecodesign and Energy Labelling Working Plan 2022-2024[636] to cover new energy-related products, update and increase the ambition for products that are already regulated, as a transitionary measure until the new regulation enters into force. [637]

[BR5] 4.3.1.3 Renewable Energy

The recast Renewable Energy Directive (RED)[638] is the main legal act addressing the use of renewable energies in the EU. It entered into force in December 2018 and includes a binding renewable energy target for the EU of at least 32 % for the overall share of energy from renewable sources in the EU's gross final consumption of energy by 2030. It establishes a set of rules to facilitate the increase of renewable energy in electricity, heating and cooling and transport and includes sustainability criteria for bioenergy. It includes provisions to enable citizens to play an active role in the development of renewables by enabling renewable energy communities and self-consumption of renewable energy, an increased 14 % target for the share of renewable fuels in transport by 2030 and strengthened criteria for ensuring bioenergy sustainability.[639]

In 2020, for the first time, renewables overtook fossil fuels as the EU's main source of electricity production (38 %); fossil fuels and nuclear power accounted for 37 % and 25% of electricity production, respectively. The share of renewable energy sources in the overall EU energy mix is expected to amount to at least 22 % although some Member States are at risk of failing to meet their national binding target.[640]

To meet the higher climate ambition, as presented in the European Green Deal, the European Commission proposed a revision of the Renewable Energy Directive[641] in July 2021. It seeks to increase the current target to at least 40 % renewable energy sources in the EU's overall energy mix by 2030.

All core scenarios of the impact assessment achieve the 55 % net GHG target in 2030 and renewable fuels play a major role as they are accounted as having zero emissions in the energy system and, by displacing GHG-emitting fossil fuels, they lead to GHG emissions savings.[642]

[636] Ecodesign and Energy Labelling Working Plan 2022-2024 2022/C 182/01, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022XC0504%2801%29&qid=1651649049970.
[637] Green Deal: New proposals to make sustainable products the norm and boost Europe's resource independence, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2013.
[638] Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (recast), http://data.europa.eu/eli/dir/2018/2001/oj.
[639] Renewable Energy Directive, https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-directive_en.
[640] State of the Energy Union 2021 – Contributing to the European Green Deal and the Union's recovery, COM(2021) 950 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:950:FIN.
[641] Proposal for a Directive amending Directive (EU) 2018/2001 […] as regards the promotion of energy from renewable sources, COM(2021) 557 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0557.
[642] Impact Assessment Report Accompanying the Proposal for a Directive of the European Parliament and the Council amending Directive (EU) 2018/[…] as regards the promotion of energy from renewable sources, SWD(2021) 621 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD:2021:621:FIN.

Offshore renewable energy is of key importance to achieve the EU's ambitious energy and climate targets by 2050. To this end, the European Commission published a dedicated EU strategy on offshore renewable energy[643] in November 2020 that assesses its potential contribution and proposes ways forward to support the long-term sustainable development of this sector. This EU Strategy will set ambitious targets for the growth of the offshore renewable energy sector. It proposes increasing Europe's offshore wind capacity from its current level of 12 GW to at least 60 GW by 2030, and to 300 GW by 2050. The objective for ocean energies (e.g. wave, tidal) is to reach at least 1 GW by 2030 and 40 GW by 2050. In addition, it encourages public and private investment in new infrastructure and research, makes it easier for different regions to work together more efficiently and provides a clear and stable legal framework.[644]

[BR5] 4.3.1.4 Energy Taxation

The Energy Taxation Directive[645] lays down the EU rules for the taxation of energy products used such as motor fuel or heating fuel and electricity.

However, since its adoption in 2003, energy markets and technologies in the EU have experienced significant developments, and the EU's international commitments, including the Paris Agreement, as well as the EU's regulatory framework in the area of energy and climate change, have evolved considerably since then.

In July 2021, the European Commission adopted a proposal for a revision of the Energy Taxation Directive[646]. Its aim is to align the taxation of energy products with EU energy and climate policies, to promote clean technologies and to remove outdated exemptions and reduced rates that currently encourage the use of fossil fuels. The main changes include the following[647]:

- Fuels will start being taxed according to their energy content and environmental performance rather than their volume. In this way, the environmental impact of individual fuels will be better reflected, helping businesses and consumers alike to make cleaner, more climate-friendly choices.
- The way in which energy products are categorised for taxation purposes is simplified to ensure that fuels most harmful to the environment are taxed the most. Products covered by the Directive are grouped and ranked according to their environmental performance. Fuels that have the most negative impact on the environment will be subject to higher minimum rates.
- Exemptions for certain products and home heating will be phased out, so that fossil fuels can no longer be taxed below minimum rates. Member States will be able to support vulnerable households and to protect against energy poverty.

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[643] An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future, COM(2020) 741 final; https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:741:FIN&qid=1605792629666.
[644]Offshore Renewable Energy Strategy, https://ec.europa.eu/commission/presscorner/detail/en/fs_20_2099.
[645] Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity, http://data.europa.eu/eli/dir/2003/96/oj.
[646] Proposal for a Council Directive restructuring the Union framework for the taxation of energy products and electricity (recast), COM/2021/563 final, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52021PC0563.
647 https://taxation-customs.ec.europa.eu/green-taxation-0/revision-energy-taxation-directive_en.

- Fossil fuels used as fuel for intra-EU air transport, maritime transport and fishing should no longer be fully exempt from energy taxation in the EU; this is a crucial measure given the role of these sectors in energy consumption and pollution.

[BR5] 4.3.1.5 Energy system integration and cross-cutting initiatives

In July 2020, the European Commission presented the EU strategy for energy system integration[648]. This strategy proposes concrete policy and legislative measures at EU level to gradually shape a new integrated energy system, while respecting the differing starting points of Member States. Sector integration means linking the various energy carriers – electricity, heat, cold, gas, solid and liquid fuels – with each other and with the end-use sectors such as buildings, transport or industry.[649]

Hydrogen is an important part of the overall EU strategy for energy system integration. The strategy on hydrogen[650] in the EU was adopted in 2020 and elaborated a vision for creating a European hydrogen ecosystem from research and innovation in order to scale up production and infrastructure and make them international. The strategy explores how producing and using renewable hydrogen can help to decarbonise the EU economy in a cost-effective way in line with the European Green Deal. It lists 20 action points that have been implemented by the second quarter of 2022[651].

[BR5] 4.3.2 Transport

In 2020, transport emissions represented around 22 % of the EU's total greenhouse gas emissions[652]. They have increased steadily from 2012 onwards. However, in 2020, due to a drastic reduction in transport activity resulting from the lockdown measures during the Covid-19 pandemic, transport emissions fell sharply (by 14 %) and almost returned to 1990 levels.[653] . CO_2 emission standards for new cars and vans and for heavy-duty vehicles are key drivers for road transport emissions reduction.

To help contribute to the European Green Deal objectives, emissions from transport would need to decrease by 90 %[654] by 2050 relative to 1990. The European Commission presented the Sustainable and Smart Mobility Strategy in December 2020 and has adopted a set of proposals to make the EU's transport policies fit for reducing net greenhouse gas emissions by at least 55 % by 2030, compared to 1990 levels.

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[648] Powering a climate-neutral economy: An EU Strategy for Energy System Integration, COM(2020) 299 final, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2020:299:FIN.

[649] EU strategy on energy systems integration, https://energy.ec.europa.eu/topics/energy-system-integration/eu-strategy-energy-system-integration_en.

[650] A hydrogen strategy for a climate-neutral Europe, COM(2020) 301 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0301.

[651] Energy – Hydrogen, https://energy.ec.europa.eu/topics/energy-system-integration/hydrogen_en.

[652] EEA greenhouse gases - data viewer, https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer.

[653] Annual European Union greenhouse gas inventory 1990–2020 and inventory report 2022, https://unfccc.int/documents/461931.

[654] The European Green Deal; COM/2019/640 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1576150542719&uri=COM%3A2019%3A640%3AFIN .

[BR5] 4.3.2.1 Sustainable and smart mobility

The 'Sustainable and Smart Mobility Strategy' with its Action Plan[655] of 82 initiatives lays the foundation for how the EU transport system can achieve its green and digital transformation and become more resilient to future crises. The most important milestones are:

By 2030:

- at least 30 million zero-emission cars will be in operation on European roads;
- 100 European cities will be climate-neutral;
- high-speed rail traffic will double across Europe;
- scheduled collective travel for journeys within the EU under 500 km should be carbon-neutral;
- automated mobility will be deployed at large scale; and
- zero-emission marine vessels will be market-ready.

By 2035:

- zero-emission large aircraft will be market-ready.

By 2050:

- nearly all cars, vans, buses as well as new heavy-duty vehicles will be zero-emission;
- rail freight traffic will double;
- high-speed rail traffic will triple and
- a fully operational, multimodal Trans-European Transport Network (TEN-T) for sustainable and smart transport with high-speed connectivity.

The strategy identifies a total of 82 initiatives in 10 key areas for action ("flagships"), each with concrete measures:

- boosting the uptake of zero-emission vehicles, vessels and aeroplanes, renewable and low-carbon fuels and related infrastructure;
- creating zero-emission airports and ports;
- making interurban and urban mobility more healthy and sustainable;
- greening freight transport;
- pricing carbon and providing better incentives for users;
- making connected and automated multimodal mobility a reality;
- boosting innovation and the use of data and artificial intelligence for smarter mobility;
- reinforcing the Single Market;
- making mobility fair and just for all; and
- stepping up transport safety and security across all modes.

[655] Sustainable and Smart Mobility Strategy – putting European transport on track for the future, COM(2020) 789 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789.

[BR5] 4.3.2.2 Proposals to deliver the 55 % emission reduction by 2030

To deliver the increased climate ambition, and the at least 55 % GHG emission reduction by 2030, the European Commission launched the following proposals in the area of transport, as part of the 'Fit for 55' package:

- Amendment of the regulation setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles (see Section [BR5] 4.3.2.3);
- Revision to the Alternative Fuels Infrastructure Directive (see Section [BR5] 4.3.2.5);
- Revision of the Energy Taxation Directive (see this section);
- ReFuelEU Aviation Initiative (see Section [BR5] 4.3.2.4);
- FuelEU Maritime Initiative (see Section [BR5] 4.3.2.4); and
- Proposal of the Renewable Energy Directive (see Section 4.3.2.4 and 4.3.1.3).

In addition, other proposals in the package are closely interlinked with the transport section. This is the case for the new separate emissions trading system for fuel distribution for road transport and buildings[656], the phase-out of free emission allowances for aviation[657] and alignment with the Global Carbon Offset and Reduction Scheme for International Aviation[658], and the inclusion of shipping emissions in the EU ETS[659]. The transport sector is also covered by the Effort Sharing Regulation[660] and the Energy Efficiency Directive[661]. For both, the European Commission has proposed revisions as part of the 'Fit for 55' package as well.

[656] European Commission: Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and Regulation (EU) 2015/757, https://ec.europa.eu/info/sites/default/files/revision-eu-ets_with-annex_en_0.pdf.

[657] European Commission: Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC as regards aviation's contribution to the Union's economy-wide emission reduction target and appropriately implementing a global market-based measure COM/2021/552 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0552.

[658] European Commission: Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC as regards aviation's contribution to the Union's economy-wide emission reduction target and appropriately implementing a global market-based measure COM/2021/552 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0552.

[659] European Commission: Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union, Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and Regulation (EU) 2015/757 https://ec.europa.eu/info/sites/default/files/revision-eu-ets_with-annex_en_0.pdf.

[660] European Commission: Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement COM/2021/555 final https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:555:FIN.

[661] European Commission: Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on energy efficiency (recast) COM/2021/558 final https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0558.

Moreover, for transport the following aspects of the proposed revision of the Energy Taxation Directive[662] are directly relevant: Firstly, the proposal introduces a new structure of tax rates based on the energy content and environmental performance of the fuels and electricity. Energy products and electricity will be grouped in general categories by type, which are ranked according to energy content and environmental performance. In this way, the new system will ensure that the most polluting fuels are taxed the highest. This would change, for example, the fact that a lower minimum rate is currently applied to diesel than to petrol used for the same purpose. Secondly, the proposed revision of the Energy Taxation Directive broadens the taxable base by including more products in the scope and by removing some of the current exemptions and reductions. Consequently, kerosene used as fuel in the aviation industry and heavy oil used in the maritime industry will no longer be fully exempt from energy taxation for intra-EU voyages in the EU. Over a period of ten years, the minimum tax rates for these fuels will gradually increase to at least EUR 10.75/gigajoule (GJ) EU-wide while sustainable fuels for these sectors will benefit from a minimum rate of zero to foster their uptake.[663]

[BR5] 4.3.2.3 Efficiency and technical standards

Passenger car and light duty vehicle fuel efficiency: On 1 January 2020, a new Regulation on CO_2 emission performance standards[664] entered into force, setting CO_2 emission performance standards for new passenger cars and vans, with EU fleet-wide CO_2 emission targets applying from 2020, 2025 and 2030. As part of the legislative package to deliver the 55 % emission reduction by 2030, the European Commission proposed revising the Regulation on CO_2 emission performance standards, setting more ambitious CO_2 emission targets for new cars and vans from 2030 onwards (compared to 2021 levels):

- from 1 January 2030: 55 % for cars, and 50 % for vans,
- from 1 January 2035: 100 % for cars, and 100 % for vans.

This is expected to lead to fleetwide CO_2 emission reductions for cars and vans that amount to 32-33% in 2030 and 54-66 % in 2035 compared to 2005.

Average emissions from new cars decreased from 122.3 g CO_2/km in 2019 to 107.5 g CO_2/km in 2020[665].This decrease in emissions was triggered by a surge in zero and low-emitting vehicle registrations, which reached 11.6 % of the fleet in 2020.

[662] Proposal for a Council Directive restructuring the Union framework for the taxation of energy products and electricity (recast), COM(2021) 563 final: https://eur-lex.europa.eu/resource.html?uri=cellar:1b01af2a-e558-11eb-a1a5-01aa75ed71a1.0001.02/DOC_1&format=PDF.

663 European Commission: Press Corner: Revision of the Energy Taxation Directive: Questions https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3662.

[664] Regulation (EU) 2019/631 of the European Parliament and of the Council of 17 April 2019 setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011, http://data.europa.eu/eli/reg/2019/631/oj.

[665] CO_2 performance of new passenger cars in Europe, https://www.eea.europa.eu/ims/co2-performance-of-new-passenger.

Heavy-duty vehicle (HDV) fuel efficiency: The regulation setting CO_2 emission performance standards for new HDV[666] sets targets for fleet-wide average CO_2 emissions from new lorries in a given calendar year. Targets of 15 % in 2025 and 30 % in 2030 are expressed as a percentage reduction of emissions compared to EU average in the reference period (1 July 2019 to 30 June 2020). The legislation for HDVs further includes a specific mechanism to provide additional incentives to market zero- and low-emission vehicles and financial penalties in case of non-compliance with the CO_2 targets. The Regulation requires the European Commission to assess the effectiveness of the Regulation in 2022, with a view to its possible extension to buses and other types of heavy-duty vehicles, and emission reduction targets for 2035 and 2040. The Regulation is expected to reduce around 54 million tonnes of CO_2 in the period 2020-2030[667].

The Monitoring and Reporting Regulation[668] is a pillar on which the HDV Regulation is based. The Monitoring and Reporting Regulation requires that Member States monitor and report to the European Commission information on the heavy-duty vehicles registered for the first time in the Union. In 2021, this regulation was amended by a delegated Regulation[669] to also include special purpose vehicles.

Car tyre labelling: New EU rules on the energy labelling of road tyres,[670] which highlight above all the fuel efficiency, safety and noise performance of new tyres, started to apply at consumer level from 1 May 2021. Updating the label first introduced for car and van tyres in 2012, the new rules require that tyres for buses and lorries must now be labelled and offer a new pictogram, where relevant, to highlight tyres suitable for use in snow or in extreme, icy conditions. Five different classes are available for rolling resistance and for braking in the wet (adjusted from the previous scale of six classes).

Clean vehicles: The revised Directive on the promotion of clean and energy-efficient road transport vehicles[671] promotes clean mobility solutions in public procurement tenders, providing a solid boost to the demand and further deployment of low- and zero-emission vehicles. It makes a number of changes to the original directive to improve its effectiveness. It defines 'clean vehicles' and sets national targets for their public procurement. It applies to different means of public procurement, including purchase, lease, rent and relevant services contracts. CO_2 emission thresholds to qualify as

[666] Regulation (EU) 2019/1242 of the European Parliament and of the Council of 20 June 2019 setting CO_2 emission performance standards for new heavy-duty vehicles and amending Regulations (EC) No 595/2009 and (EU) 2018/956 of the European Parliament and of the Council and Council Directive 96/53/EC, http://data.europa.eu/eli/reg/2019/1242/oj.

[667] Reducing CO_2 emissions from heavy-duty vehicles, https://ec.europa.eu/clima/eu-action/transport-emissions/road-transport-reducing-co2-emissions-vehicles/reducing-co2-emissions-heavy-duty-vehicles_en.

[668] Regulation (EU) 2018/956 of the European Parliament and of the Council of 28 June 2018 on the monitoring and reporting of CO2 emissions from and fuel consumption of new heavy-duty vehicles, http://data.europa.eu/eli/reg/2018/956/2022-03-14.

[669] Commission Delegated Regulation (EU) 2021/1429 amending Regulation (EU) 2018/956 as regards the data on new heavy-duty vehicles to be monitored and reported by Members States, https://eur-lex.europa.eu/eli/reg_del/2021/1429/oj.

[670] Regulation (EU) 2020/740 of the European Parliament and of the Council of 25 May 2020 on the labelling of tyres with respect to fuel efficiency and other parameters, amending Regulation (EU) 2017/1369 and repealing Regulation (EC) No 1222/2009: http://data.europa.eu/eli/reg/2020/740/2020-06-05.

[671] Directive (EU) 2019/1161 of the European Parliament and of the Council of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles: http://data.europa.eu/eli/dir/2019/1161/oj.

a ‘clean’ light-duty vehicle are set at 50 g CO_2/km up to 31 December 2025 and at zero from 1 January 2026. A ‘zero-emission heavy duty vehicle’ is defined as a vehicle using alternative fuels without an internal combustion engine, or with an internal combustion engine that emits less than 1 g CO_2/kWh.

[BR5] 4.3.2.4 Fuels from renewable energy sources

The main EU-wide policies and measures that influence GHG emissions from transport fuels are the RED[672], its recast (RED II)[673] and the Fuel Quality Directive[674].

The **RED** aims to accelerate the uptake of renewable energy in the transport sector. RED II increased the target for the share of renewable energy used in transport to at least 14 % by 2030 compared to 10 % as defined in RED I.

In July 2021, the European Commission published a proposal to revise the Renewable Energy Directive[675] (see section [BR5] 4.3.1.3). In the transport sector, the proposal introduces a target for reducing the greenhouse gas intensity of transport fuels by 13 % by 2030 compared to the new emissions-based benchmark covering all transport modes. Moreover, the proposal includes additional sub-targets for transport, namely for advanced biofuels and for Renewable Fuels from Non-Biological Origin.[676]

A new credit mechanism is aimed at promoting electromobility, under which economic operators that supply renewable electricity to electric vehicles via public charging stations will receive credits they can sell to fuel suppliers who can use them to satisfy the fuel supplier obligation.[677]

The **Fuel Quality Directive**[678] applies to petrol, diesel and biofuels used in road transport and to gasoil used in non-road-mobile machinery and requires the life-cycle GHG emissions intensity of fuels to be reduced by at least 6 % by 2020, compared with 2010. Member States are obliged to ensure that suppliers respect the target of 6 % after 2020. The 13 % target proposal as defined in the proposal to revise the Renewable Energy Directive would repeal the 6 % target set out in the Fuel Quality

672 Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (recast), http://data.europa.eu/eli/dir/2018/2001/oj.

673 Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (recast), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG.

674 Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC, http://data.europa.eu/eli/dir/2009/30/oj.

675 Proposal for a Directive amending Directive (EU) 2018/2001 […] as regards the promotion of energy from renewable sources, COM(2021) 557 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0557.

676 European Commission, Commission presents Renewable Energy Directive revision, News 14.July 2021 https://ec.europa.eu/info/news/commission-presents-renewable-energy-directive-revision-2021-jul-14_en.

677 European Commission, Commission presents Renewable Energy Directive revision, News 14.July 2021 https://ec.europa.eu/info/news/commission-presents-renewable-energy-directive-revision-2021-jul-14_en.

678 Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC http://data.europa.eu/eli/dir/2009/30/oj.

Directive in order to streamline legislation and avoid double regulatory requirements[679]. The average GHG intensity of the fuels and energy supplied in the 28 reporting Member States in 2019 was 90 g CO_2eq/MJ, which is 4.3% lower than the 2010 baseline of 94.1 g CO_2eq/MJ. On average, therefore, they are falling short in their objective of reducing the GHG intensity of transport fuels by 6 % by 2020, compared with 2010[680].

In its **ReFuelEU Aviation initiative,**[681] the European Commission proposes obligations for fuel suppliers to distribute Sustainable Aviation Fuels (SAF), with an increasing share of SAF (including synthetic aviation fuels, commonly known as e-fuels) over time, in order to increase the uptake of SAF by airlines and thereby reduce emissions from aviation. The proposal also includes obligations for airlines to limit the uptake of jet fuel before departing from EU airports to the quantity needed for safe operation of flights, with the aim of ensuring a level playing field for airlines and airports, and avoiding additional emissions related to extra weight of aircraft carrying excessive amounts of fuel.

In its **FuelEU Maritime Regulation,**[682] the European Commission proposes limiting the carbon intensity of the energy used by ships. Accordingly, the proposal sets up a fuel standard for ships and introduces a requirement for the most polluting ship types to use onshore electricity when at berth. It puts the responsibility for compliance on the shipping company.

Based on the second Annual Report from the European Commission on CO_2 Emissions from Maritime Transport[683] and the Commission's Staff Working Document[684], CO_2 emissions from maritime transport increased from 144.2 million tonnes in 2018 to 144.6 million tonnes in 2019. Container ships represented the largest share of total emissions, at 30 %, followed by roll-on/roll-off ships (16 %) and bulk carriers (12 %).

[BR5] 4.3.2.5 Infrastructure

The Directive on the deployment of alternative fuels infrastructure[685] set out a framework of common measures for the deployment of this infrastructure in the EU. It lays down minimum requirements for Member States for building-up alternative fuels infrastructure, including recharging points for electric vehicles and refuelling points for natural gas (liquefied natural gas and compressed natural gas) and hydrogen. A report published by the European Commission on its implementation identified a number of shortcomings, including great variation in setting targets and ambition between Member States and

[679] Quality of petrol and diesel fuel used for road transport in the European Union (Reporting year 2019), COM(2021) 961 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0961&qid=1638048176428.
[680] Quality of petrol and diesel fuel used for road transport in the European Union (Reporting year 2019), COM(2021) 961 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0961&qid=1638048176428.
[681] Proposal for a Regulation on ensuring a level playing field for sustainable air transport, COM(2021) 561 final: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52021PC0561.
[682] Proposal for a Regulation on the use of renewable and low-carbon fuels in maritime transport and amending Directive 2009/16/EC, COM(2021) 562 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0562.
[683] Second annual MRV report on CO_2 emissions from maritime transport covering 2019 emissions, https://ec.europa.eu/clima/system/files/2021-08/swd_2021_228_en.pdf.
[684] Full-length report Accompanying the document Report from the Commission 2020 Annual Report on CO_2 Emissions from Maritime Transport C(2021) 6022 final
[685] Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0094&from=EN.

a lack of comprehensive network of alternative fuels infrastructure. To overcome these shortcomings, the European Commission adopted a proposal for a new Regulation which requires Member States to expand charging capacity in line with zero-emission car registrations, and to install charging and fuelling points for both light and heavy-duty vehicles at regular intervals on major highways (TEN-T network) – every 60 kilometres for electric charging and every 150 kilometres for hydrogen refuelling.

In 2022, the Eurovignette Directive[686] was amended[687] with the aim of moving away from a time-based model of charging (vignettes) to distance-based charges (tolls) for heavy-duty vehicles. These distance-based charges better reflect the polluter-pays and user-pays principles. The scope of the directive has been extended to buses, vans, minibuses and passenger cars. To encourage the wider use of cleaner heavy-duty vehicles, Member States shall either charge reduced rates for zero- and low-emission vehicles and for vehicles more efficient than the average or introduce an external-cost charge related to the cost of CO_2 emissions, or both. To encourage the wider use of cleaner light-duty vehicles, Member States shall charge reduced rates for vans and minibuses according to their environmental performance and may charge reduced rates for light-duty vehicles according to the environmental performance of the vehicle determined by the specific CO_2 emissions. Moreover, Member States may grant exemptions for zero emission heavy-duty vehicles up to 2025 and for zero-emission light-duty vehicles. Member States may introduce an external-cost charge related to the cost of traffic-based air pollution and noise pollution.

[BR5] 4.3.2.6 Other relevant policies and measures

Batteries and end of life of vehicles: see Section [BR5] 4.3.6.5.

[BR5] 4.3.3 Industry

Greenhouse gas emissions arising from industrial processes in the mineral, chemical and metal industry are covered under the EU Emissions Trading System (see Section [BR5] 4.2.1 for more details). In addition, industrial installations are subject to other sectoral policies and measures, in particular energy related policies and measures (see Section [BR5] 4.3.1 for more details). Finally, this chapter also includes policies related the reduction of fluorinated gas emissions.

[BR5] 4.3.3.1 Industrial emissions

The Industrial Emissions Directive (IED)[688] is the main EU instrument for preventing and reducing the emissions of air pollutants from over 30 000 large industrial plants and over 20,000 intensive livestock farms in Europe. It operates via a 'Best Available Techniques' (BAT) permitting system including the development of BAT Reference Documents (BREFs). The IED is also relevant for

[686] Directive 1999/62/EC of the European Parliament and of the Council of 17 June 1999 on the charging of heavy goods vehicles for the use of certain infrastructures, http://data.europa.eu/eli/dir/1999/62/oj.
[687] Directive (EU) 2022/362 of the European Parliament and of the Council of 24 February 2022 amending Directives 1999/62/EC, 1999/37/EC and (EU) 2019/520, as regards the charging of vehicles for the use of certain infrastructures, http://data.europa.eu/eli/dir/2022/362/oj.
[688] Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) (Recast), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN.

greenhouse gas emissions abatement as it regulates (1) industrial emissions of GHG to the extent that they are not covered by the EU ETS; (2) CH_4 from livestock installations, and (3) indirect greenhouse gases such as nitrogen oxides (NO_x) and short-lived climate forcers such as sulphur oxides (SO_X) and black carbon.

BREFs exist for specific agro-industrial activities (sectoral BREFs) and for cross-cutting issues such as energy efficiency, industrial cooling systems or emissions from storage with relevance for industrial manufacturing in general (horizontal BREFs).

Since completion of the BR4, the following important new BREFs have been adopted[689]: (1) Large Combustion Plants, i.e. combustion plants with a total rated thermal input equal to or greater than 50 MW, including electricity and heat production, adopted in November 2021; (2) Surface Treatment Using Organic Solvents including Wood and Wood Products Preservation with Chemicals, adopted in June 2020; (3) Waste incineration, adopted in November 2019; (4) Food, Drink and Milk Industries, adopted in November 2019.

Even if these BREFs do not set emission limits for greenhouse gases, they are nonetheless likely to have an impact on emission levels, e.g. through energy efficiency requirements and co-benefits.

On 5 April 2022, the European Commission adopted proposals for revised EU measures to address pollution from large industrial installations.[690] These proposals concern the revision of the IED and a Regulation on pollutant release and transfer (to create the Industrial Emissions Portal). With regard to decarbonisation, the main improvements in the revised IED are: (1) inclusion of energy efficiency requirements as integral part of permits; (2) inclusion of the largest livestock farms representing 43 % of the EU's livestock methane emissions; (3) more transparent reporting of HFC and PFC emissions, i.e. reporting of individual components of HFC and PFC emissions.

Innovative techniques coming on the market are expected to increasingly reduce emissions of both pollutants and of greenhouse gases from installations within the scope of the IED and the EU ETS Directive.[691] In order to take into account the dynamics of innovation related to both Directives, the European Commission should submit a report reviewing the implementation of the IED by 2028 and every five years thereafter.

[BR5] 4.3.3.2 Emissions from fluorinated gases

To control emissions from F-gases including HFCs in the EU, two legislative acts are in place: the 'Mobile Air Conditioning (MAC) Directive'[692] on air conditioning systems used in small motor

[689] BAT reference documents, https://eippcb.jrc.ec.europa.eu/reference.
[690] Proposal for a Revision of the Industrial Emissions Directive, https://environment.ec.europa.eu/publications/proposal-revision-industrial-emissions-directive_en.
[691] Wood, Deloitte, IEEP (2021), analyse in a report for the European Commission co-benefits and the wider environmental impacts of industry decarbonisation. The authors conclude that there is a variety in the type of technologies and their potential impact on GHG emission reductions, covering both innovative and more established technologies. There are significant uncertainties in terms of direct and indirect environmental impacts, often related to the maturity of the decarbonisation technologies https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp.
[692] Directive 2006/40/EC relating to emissions from air-conditioning systems in motor vehicles and amending Council Directive 70/156/EEC, https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:161:0012:0018:EN:PDF.

vehicles, and the 'F-gas Regulation'[693] which covers all other key applications in which F-gases are used.

The MAC Directive introduced a gradual ban on emissions of fluorinated greenhouse gases from mobile air-conditioning systems with a GWP higher than 150 in passenger cars. Since 1 January 2017, the use of fluorinated greenhouse gases with a GWP higher than 150 in all new passenger cars and certain lorries put on the EU market are totally banned. New vehicles with MAC systems using these gases are not registered, sold, or able to enter into service in the EU.

The F-gas Regulation 517/2014 strengthened previous measures and introduced far-reaching changes by[694]:

- **limiting the total amount** of the most important F-gases (HFCs) that can be sold in the EU from 2015 onwards and phasing them down in steps to one-fifth of the base line (average placed on the EU market between 2008-2012) in 2030. This will be the main driver of the move towards more climate-friendly technologies;
- **banning the use** of F-gases in many new types of equipment where less harmful alternatives are widely available, such as refrigerators in homes or supermarkets, air conditioning, foams; and limiting the GWP for air conditioning equipment depending on size and type; and
- **preventing emissions** of F-gases from existing equipment by obligatory training of service technicians, requiring checks, proper servicing and recovery of the gases at the end of the equipment's life**.**

These measures were built on the successful phase-out of ozone-depleting substances, which was achieved in the EU ten years ahead of the internationally agreed schedule. The action taken by the EU and its Member States under the F-gas Regulation will enable the EU to comply with the Kigali amendment to the Montreal Protocol on a global phase-down of HFCs, which exceeds the phase-down foreseen in the EU F-gas Regulation. The EU has ratified the Kigali amendment, which entered into force on 1 January 2019. EU consumption of HFCs in 2020 was 52 % below the maximum imposed by the Kigali Amendment.

The European Environment Agency annually monitors the EU's progress towards achieving the targets set in the F-gas Regulation[695]. The HFC phase-down under the F-gas Regulation is implemented by imposing annual quantitative limits (quotas) on the placing of HFCs on the EU market by producers and importers. The EU-wide maximum quantity for HFCs has been subject to a stepwise reduction since 2015. In 2020, EU-wide placing of HFCs on the market was 4 % below the 2020 overall market limit set by the quota system (2 % in 2019). As EU industries have been moving to alternatives with low GWP, the demand for HFCs has been decreasing. While the demand for refrigerants remains high, there has been a shift to non-HFC alternatives with lower GWPs, as well as 'natural' refrigerants, like ammonia, (iso)propane/butane, CO_2, water, etc). In 2015, the placing on

[693] Regulation (EU) No 517/2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0517&from=FR.
[694] EU legislation to control F-gases, https://ec.europa.eu/clima/eu-action/fluorinated-greenhouse-gases/eu-legislation-control-f-gases_en.
[695] Fluorinated greenhouse gases 2021, https://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2021.

the EU market of bulk HFCs was 85 % of the maximum quantity and had decreased by 52 % by 2020. A comprehensive report on the effects of the F-gas Regulation will be published by the end of 2022.

On 5 April 2022, the European Commission made a legislative proposal to update the F-gas Regulation. The review intends to[696]:

- deliver higher ambition, e.g. through a tighter quota system for HFCs (HFC phase-down): reduce the amount of HFCs placed on the market by 98 % by 2050 (compared to 2015); new restrictions on the use of F-gases in equipment are also included;
- ensure compliance with the Montreal Protocol, e.g. also taking phase-down steps after 2030 and aligning the EU's HFC phase-down with that foreseen under the Kigali Amendment to the Montreal Protocol;
- improve enforcement and implementation, e.g. by making it easier for customs and surveillance authorities to control imports and exports; a quota price will be introduced, and penalties will become harsher and more homogenous across the EU;
- achieve more comprehensive monitoring, e.g. by covering a broader range of substances and activities and improving the procedures for reporting and verifying data; and
- make countries record information on actual emissions by establishing an electronic registry of amounts filled into equipment and refilled amounts.

On this basis, the European Commission has suggested a package of measures that will prevent emissions amounting to 40 Mt CO_2eq by 2030 and 310 Mt CO_2eq by 2050, in addition to the amount the current regulation would achieve.

[BR5] 4.3.4 Agriculture

The EU key policies and measures to reduce emissions from the agriculture sector target the three GHGs (CO_2, CH_4 and N_2O) related to agricultural activities (i.e. livestock, manure management, fertilisation of soils). In addition, some cross-cutting policies and measures affect the CO_2 emissions and removals in the LULUCF sector (i.e. related to carbon sequestration in biomass and soils due to land management).

Agricultural policy has a long tradition in the EU and with the European Green Deal, the European Commission will strengthen the environmental ambition in the agriculture sector. Some policies and measures are strongly interlinked and overlap with the LULUCF sector. This implies that the effects of the related agricultural practices are accounted for in the LULUCF sector, e.g. policies and measures that aim to enhance carbon sequestration in agricultural soils or in biomass.

[BR5] 4.3.4.1 The Common Agricultural Policy (CAP)

The Common Agricultural Policy (CAP) is the main EU policy in the agriculture sector. It is managed and funded at European level from the resources of the EU's budget with approximately one third of the total EU budget being allocated to the CAP. It is sourced by two main funds: the European agricultural guarantee fund (EAGF) which provides direct support and funds market measures (Pillar

[696] EU legislation to control F-gases, https://ec.europa.eu/clima/eu-action/fluorinated-greenhouse-gases/eu-legislation-control-f-gases_en.

I); and the EAFRD which finances rural development (Pillar II). The CAP was created in 1962 and has undergone several reforms since then. For each CAP period specific programmes and priorities are defined including the budget from the related funds which are assigned to the two main pillars of the CAP.

From 2014 to 2020, the CAP managed a budget of EUR 408.3 billion, of which EUR 308.7 billion were allocated to Pillar I via the EAGF and the remaining EUR 99.6 billion were allocated to Pillar II via the EAFRD. CAP spending for climate totalled EUR 103.2 billion or 25 %[697]. Under the CAP, the cross-compliance framework ensures that farmers who do not respect requirements and standards are sanctioned with a partial or total reduction of the direct payments and other area support. The Good Agricultural and Environmental Conditions and the requirements of EU legislation set mandatory standards related to water (e.g. limiting nitrogen application), soils (e.g. limiting soil erosion) and landscape (e.g. retention of landscape features) for farmers receiving direct payments.

The more specific climate relevant actions of the Pillar I were summarised under the so-called 'greening measures' which included, amongst others, the maintenance of permanent grassland, crop diversification, improvement of soil quality and specific support for ecological focus areas. Under the Pillar II on the rural development, the climate relevant actions included the promotion of resource efficiency, a shift towards a climate-resilient agricultural sector; and restoring, preserving and enhancing ecosystems which are dependent on agriculture and forestry. The focus areas of the Pillar II were further broken down into more specific measures of which the agri-environment-climate measure (AECM) is the most climate relevant one according to the recent CAP evaluation by the European Commission[698]. The AECM is a voluntary measure for farmers which is designed by MS including a wide range of practices that go beyond the mandatory requirements under the CAP. The Rural Development Programmes also support measures in forestry, the impacts of which are accounted for in the LULUCF sector.

In 2021, the European Commission published an evaluation[698] of the CAP 2014-2020 with focus on the impact on GHG emissions. According to this evaluation, the emission reductions in the agriculture sector through the CAP range from 0.3 % for the low scenario, 4.7 % for the medium scenario to 8.8 % for the high scenario compared to a 2016 baseline without CAP, based on the uptake of measures in 2016, i.e. below the target level. Pillar I contributes the most to this reduction, via greening and, more specifically, protection of environmentally sensitive permanent grasslands and the ecological focus areas. The main mitigating impact of the CAP is thus realised through CO_2 removals. However, there were substantial limitations to this modelling exercise, such as the limited availability of data, the challenge to establish a clear link between the CAP measures and the mitigation effects, but also because of the different implementation by the Member States.

A transitional regulation[699] is in force **for the years 2021-2022.**

[697] Estimated climate expenditure in 2021-2027, https://ec.europa.eu/info/strategy/eu-budget/performance-and-reporting/mainstreaming/climate-mainstreaming_en#how-much-do-we-spend.
[698] Evaluation of the impact of the Common Agricultural Policy on climate change and greenhouse gas emissions. SWD(2021) 115 final, https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX:52021SC0115.
[699] Regulation (EU) 2020/2220 laying down certain transitional provisions for support from the European Agricultural Fund for Rural Development (EAFRD) and from the European Agricultural Guarantee Fund (EAGF) in the years 2021 and 2022, http://data.europa.eu/eli/reg/2020/2220/oj.

The **new CAP for the period 2023-2027** was adopted in December 2021[700] and it will start on 1 January 2023. In total, it covers EUR 387 billion, of which 40 % are currently dedicated to climate action. Under the new CAP, the EU Member States have to prepare Strategic Plans[701] in which they lay down how they implement the new CAP at national level. Member States have the legal obligation to clearly show greater ambition than at present with regards to care for the environment and climate. In particular, they have to show how their Strategic Plans will also make a specific contribution to achieving the objectives of EU legislation, including those for climate mitigation and adaptation, and renewable energy. A common set of indicators is proposed at the EU level to allow monitoring of policy implementation and an evaluation of policy impact based on common indicators. A new system of conditionality defines basic obligations for the beneficiaries who receive direct payments and/or other area- or animal-based CAP payments. These requirements and standards will increase the scope of the current cross-compliance, targeting also the protection of wetlands/peatlands, elements of the EU Water Framework Directive and the Directive on the Sustainable Use of Pesticides. Existing requirements will be improved, e.g. farmers have to devote at least 4 % of their arable land to non-productive features. With the new 'Eco-schemes', Member States are required to spend at least 25 % of their direct payments budget on practices that go beyond conditionality and other relevant obligations, e.g. practices related to better nutrient management, agro-ecology, agroforestry, carbon farming or animal welfare (among many others). Regarding the Pillar II on rural development, Member States will have to spend at least 35 % of their respective rural development budgets on actions related to the environment, climate and animal welfare.

A report published by the Joint Research Centre of the European Commission in 2021[702] assessed the potential GHG mitigation effect of the new CAP. Based on the assumptions made and taking into account the limitations of the analysis, it found that four quantitative Green Deal targets from the Farm to Fork and Biodiversity Strategies (i.e. reduction of the risk and use of pesticides, reduction of nutrient surplus, increase of area under organic farming, increase of area for high-diversity landscape features) would reduce GHG emissions by 20% compared to the baseline in 2030 in a 'CAP 2014-2020' scenario, whereas the new CAP (as per legal proposal) would reduce GHG emissions by 28%. Main reason for this positive climate effect is that the new CAP increases the adoption rate of technologies and practices which are better for the climate. Moreover, the new CAP was found to reduce carbon leakage in a setting where the EU was assumed to act alone.

[700] Relevant EU Regulations for CAP 2023-2030: EU Regulation 2021/2116, repealing EU Regulation 1306/2013 on the financing, management and monitoring of the CAP. EU Regulation 2021/2115, establishing rules on support for national CAP strategic plans, and repealing EU Regulations 1305/2013 and 1307/2013. EU Regulation 2021/2117, amending EU Regulations 1308/2013 on the common organisation of the agricultural markets; 1151/2012 on quality schemes for agricultural products; 251/2014 on geographical indications for aromatised wine products; and 228/2013 laying down measures for agriculture in the outermost regions of the EU.

[701] CAP strategic plans: https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-strategic-plans_en.

[702] Barreiro-Hurle, J., Bogonos, M., Himics, M., Hristov, J., Pérez-Domiguez, I., Sahoo, A., Salputra, G., Weiss, F., Baldoni, E., Elleby, C. Modelling environmental and climate ambition in the agricultural sector with the CAPRI model. Exploring the potential effects of selected Farm to Fork and Biodiversity strategies targets in the framework of the 2030 Climate targets and the post 2020 Common Agricultural Policy, EUR 30317 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-20889-1, doi:10.2760/98160, JRC121368.

[BR5] 4.3.4.2 Nitrates Directive

Although the primary objective of the EU Nitrates policy is to improve water quality by reducing nitrates losses, the Nitrates Directive is an important policy related to the reduction of N2O emissions that are caused by nitrogen fertilisers applied to agricultural soils. A detailed description of the Nitrates Directive can be found in Chapter 4.6.5 of the EU's First Biennial Report.

A recent report[703] by the European Commission concludes that since the start of implementation of the directive the nutrient losses from agriculture have been reduced in the past 30 years and that most farmers and Member States have designed and applied measures to mitigate nitrate losses. However, the level of implementation has not been sufficient to reach the objectives of the directive and therefore the European Commission will reinforce its actions to achieve them (e.g. by developing an Integrated Nutrient Management Action Plan in 2022). This will be necessary to reach the directive's target in the context of the EU Green Deal and the Farm to Fork Strategy, namely to reduce nutrient losses by 50 % by 2030. Other climate-relevant policies and measures at EU level for 2030 and beyond.

[BR5] 4.3.4.3 Other climate-relevant policies and measures at EU level with 2030 perspective and beyond

- Farm to Fork Strategy[704]: Published in 2020, the strategy aims to accelerate the transition to a sustainable food system, which has a neutral or positive impact on the environment, helps to mitigate climate change and biodiversity loss, ensures food security and fair prices for producers and consumers. The strategy, which is closely linked to the Green Deal, elaborates the following concrete targets:
    - reduction of the use and risk of chemical pesticides by 50 % by 2030;
    - reduction of nutrient losses by 50 % and reduction of fertilizer application by 20 % by 2030;
    - at least 25 % of the EU's agricultural land under organic farming by 2030;
    - halving per capita food waste at retail and consumer levels by 2030.
- Organic Farming Action Plan[705]: The plan builds on the achievements of the previous action plan on organic farming and contains three axes and different actions to support organic farming in the EU and to achieve the target of 25 % of agricultural land under organic farming by 2030.

[703] Report from the Commission on the implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member State reports for the period 2016–2019, COM(2021) 1000 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2021%3A1000%3AFIN.
[704] A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system, COM(2020) 381 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0381.
[705] Action plan for the development of organic production, COM(2021) 141 final, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52021DC0141.

- EU Strategy to Reduce Methane Emissions[706]: The strategy was published in 2020 and aims to reduce methane emissions in the energy, agriculture and waste sectors (cf. section [BR5] 4.2.3.1), with agriculture being the largest anthropogenic source of methane emissions in the EU. The key actions by the European Commission in this sector include the following: to set up an expert group to analyse life-cycle methane emissions metrics; to identify best practices and available technologies; to promote the wider uptake of innovative mitigating actions with focus on enteric fermentation; and to provide support and tools to calculate carbon balances a farm level.

- Revision of the IED[707]: On 5 April 2022, the European Commission adopted proposals for revised EU measures to address pollution from large industrial installations (cf. section [BR5] 4.3.3.1). It proposes including cattle and would then cover cattle, pig and poultry farms with 150 livestock units or more. It is expected that 12 % of cattle farms, 20 % of pig farms and 11 % of poultry farms will be covered compared to the current 4 % for pigs and 4 % for poultry. This means that 42 % of total cattle heads, 84 % of total pig heads and 86 % of total poultry heads, will be covered by the obligations of the IED. BAT will be updated. Methane emission reduction is estimated at 8 % for cattle and 37 % for pigs (applying the current BAT). Although the phase-in of the new rules will take several years, the revision of the IED will guide long-term investments and innovation.

[BR5] 4.3.5 LULUCF

The LULUCF sector has become increasingly important in the EU-wide climate policy framework in recent years. Taking climate action in the sector is challenging because it is interconnected with many other policy areas, such as agriculture, forestry, spatial and urban planning, biodiversity, energy, etc. In addition, the sector is not only affected by human intervention but also subject to natural disturbances and climate change. The European Green Deal and European Climate Law emphasise the role of the LULUCF sector as a net sink towards the objective of a carbon neutral European Union by 2050 and, as appropriate, achieving net negative emissions across the EU thereafter. A wide range of policies and measures have been issued which will shape the sector in future decades. Current and future policies and measures aim to increase CO_2 removals and to reduce CO_2, CH_4 and N_2O emissions.

[BR5] 4.3.5.1 LULUCF Decision

In the period up to 2020, the LULUCF sector was not counted towards the Union's 20 % GHG emission reduction targets under the Convention due to the absence of a domestic accounting framework. In 2013, the EU adopted the LULUCF Decision[708] in order to establish such a framework

[706] EU strategy to reduce methane emissions, COM(2020) 663 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0663.
[707] Proposal for a Revision of the Industrial Emissions Directive, https://environment.ec.europa.eu/publications/proposal-revision-industrial-emissions-directive_en.
[708] Decision No 529/2013/EU on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013D0529.

to prepare Member States for the EU internal accounting of emissions and removals from the LULUCF sector, consistent with the accounting rules under the Kyoto Protocol. As the activities afforestation, reforestation, deforestation and forest management were already mandatory for the accounting under the Kyoto Protocol at United Nations (UN) level, the LULUCF Decision did not set additional EU domestic accounting or reporting requirements for these activities for the period up to 2020. However, for the activities of cropland management and grazing land management, which were not mandatory under the Kyoto Protocol, the LULUCF Decision required the Member States to report on their systems in place to estimate these activities and to provide the related estimated emissions and removals for the period 2013 to 2020.

In addition, methodological minimum requirements were introduced to improve the estimates across all EU Member States to prepare the GHG inventory systems for future accounting. These results, however, were not considered in domestic accounting until 2020. Under Article 10 of the LULUCF Decision, the EU Member States had to provide information on their LULUCF actions. A recent study[709] summarising the information identified the most commonly reported actions by the countries: Nutrient, tillage and water management, forest management, and biodiversity/conservation measures. Most countries have overarching national forest policies, which aim to support timber production and sustainable forest management. For agriculture, the majority of the reported actions are related to the CAP (rural development - Pillar II) and the EU policies on fertilizers (see section [BR5] 4.3.4).

[BR5] 4.3.5.2 LULUCF Regulation

With the adoption of the 2030 climate and energy policy framework in 2018 (cf. section [NC8] 4.3.2 in the EU's Eighth National Communication), the EU implemented a domestic LULUCF accounting framework by introducing binding commitments for the periods 2021 to 2025 and 2026 to 2030 for all Member States. The 'no-debit-rule' in the LULUCF Regulation requires each Member State to ensure that accounted emissions from land use are entirely compensated by an equivalent accounted removal of CO_2 from the atmosphere through action in the LULUCF sector. The accounting system in the LULUCF Regulation was modified compared to the LULUCF Decision towards a more inventory-oriented system away from the Kyoto Protocol system (Chapter 4.3.5 of the EU's Fourth Biennial Report provides further information). Compliance with this accounting system shall ensure that the EU's LULUCF sector maintains the sink level of approximately -225 Mt CO_2eq up to 2030.

In 2021, in the context of the European Green Deal, the European Commission proposed a revised LULUCF Regulation[710] in which EU Member States are to be assigned national LULUCF targets for 2030 and the current EU LULUCF net removals are increased by -42 Mt to -310 Mt of CO_2eq in 2030. The Revision of the LULUCF Regulation also proposes requiring Member States to better

[709] Kowalczewski, T., Gionfra, S., Bellassen, V., et al., Reviewing the contribution of the land use, land-use change and forestry sector to the Green Deal, Final study, Publications Office, 2021, https://data.europa.eu/doi/10.2834/201100.
[710] Proposal for a Regulation of the European Parliament and of the Council amending Regulations (EU) 2018/841 as regards the scope, simplifying the compliance rules, setting out the targets of the Member States for 2030 and committing to the collective achievement of climate neutrality by 2035 in the land use, forestry and agriculture sector, and (EU) 2018/1999 as regards improvement in monitoring, reporting, tracking of progress and review, COM(2021) 554 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0554.

integrate mitigation, adaptation and nature restoration measures in the land-use, forestry and agriculture sectors.

[BR5] 4.3.5.3 Link to agricultural policies

As the LULUCF and agriculture sectors are strongly linked, many policies and measures contribute to climate action in both sectors, e.g. under the CAP Pillar II, measures are funded related to the forest sector. Climate-relevant actions under CAP Pillar I affect carbon sequestration in agricultural soils. Therefore, in the current proposals under the Green Deal, the European Commission foresees further integration of the two sectors' climate policy framework towards a so-called 'land sector' for the post-2030 period.

[BR5] 4.3.5.4 Other climate-relevant policies and measures with 2030 perspective and beyond at EU level

- New EU Forestry strategy 2030[711]: The strategy will contribute to achieving the EU's biodiversity objectives as well as EU climate targets for 2030 and 2050. The core elements of the strategy are: To protect and restore forests, to ensure that forests are managed sustainably, increase the quality and quantity of EU's forests and to improve forest monitoring and data on forests.

- EU Biodiversity Strategy 2030[712]: The aims of this strategy are to enlarge the protected areas in the EU on land and at sea to at least 30 % of the land, with strict protection for land with high biodiversity and climate value. The EU nature restoration plan will propose binding targets to restore degraded ecosystems and manage them sustainably.

- Communication on Sustainable Carbon Cycles[713]: The communication adopted by the European Commission in 2021 sets out an action plan to develop solutions to increase carbon removals in the EU to achieve carbon neutrality by 2050 and negative emissions thereafter. The communication identifies three main areas of action: reduce the use of fossil carbon, increase carbon removals; and recycle and re-use carbon. Development of Carbon Farming and development of an internal market for capturing, using and storing carbon and the necessary cross-border CO_2 transport infrastructure are among the specific actions the EU is promoting to enhance carbon removals. The European Commission will propose a regulatory EU framework for the certification of carbon removals by the end of 2022 (see following bullet points).

- Carbon Farming Initiative[713]: As part of the Communication on Sustainable Carbon Cycles, the European Commission is promoting carbon farming as one of the main actions to increase carbon sequestration in the land sector. Farmers shall be rewarded for practices that enhance carbon sinks, e.g. afforestation/reforestation, agroforestry, use of catch crops, cover crops and conservation

[711] New EU Forest Strategy for 2030, COM(2021)572 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0572.
[712] EU Biodiversity Strategy for 2030 Bringing nature back into our lives, COM(2020)380 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX:52020DC0380.
[713] Sustainable Carbon Cycles, COM(2021) 800 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0800.

tillage. Member States can provide funding for carbon farming within the new CAP, e.g. via eco-schemes.

- Framework for Carbon Removal Certification[714]: To scale up carbon removals based on carbon farming and industrial solutions; a regulatory EU framework is under development by the European Commission. The framework shall provide clear rules for a transparent monitoring, reporting and verification of carbon removals to ensure the robust accounting of carbon removals.

- EU Soil Strategy for 2030[715]: The strategy was adopted by the European Commission in 2021 and sets concrete actions by 2030 to protect and restore soils and to ensure that they are used sustainably. The long-term vision is to achieve healthy soils by 2050 and a legislative proposal on soil health will be delivered by 2023 to achieve this objective.

- Nature restoration law[716]: the European Commission has proposed a legislation that explicitly targets the restoration of Europe's natural ecosystems. Under this proposal for a Nature Restoration Law, legally binding targets for nature restoration in different ecosystems will apply to every Member State and complement existing laws. Nature restoration helps to address climate change by limiting the progress of global warming through capturing and storing carbon, and by adapting to climate change and by mitigating the impact of increasingly violent natural disasters such as floods, droughts, and heat waves. Restoration of many degraded habitats such as forests and peatlands have a significant potential to store carbon in biomass and in the soil, and in the case of rivers, floodplains, and wetland, helps adapt to climate change by cooling local areas, reducing the impact of heatwaves and significantly reducing the energy needed for air conditioning.

[BR5] 4.3.6 Waste

The history of EU waste policy is going back to the year 1975 when the first piece of legislation was published (Chapter 4.8.2. of the EU's First Biennial Report provides more information on the history of EU waste policy). Since then, the waste policy framework has been continuously elaborated and extended to different kinds of sources of waste and on key waste streams in the EU. The primary focus of the EU waste policy is on management, with reduction and prevention gaining in priority of waste, and not specifically addressing climate action. However, in most cases, these policies and measures also contribute to direct or indirect emission reductions (CO_2, CH_4, N_2O) from waste and waste management.

As a key deliverable of the Green Deal, in 2021, the European Commission adopted the **Zero Pollution Action Plan,**[717] which provides the overall policy framework for reducing pollution of air, water and soils in the EU and is therefore strongly connected to EU waste policy. The plan sets

[714] A regulatory framework for the certification of carbon removals, https://ec.europa.eu/clima/eu-action/forests-and-agriculture/sustainable-carbon-cycles_en#a-regulatory-framework-for-the-certification-of-carbon-removals.
[715] EU Soil Strategy for 2030 Reaping the benefits of healthy soils for people, food, nature and climate. COM(2021) 699 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0699.
[716] Proposal for a Regulation of the European Parliament and of the Council on nature restoration. COM (2022) 304 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022PC0304.
[717] Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil'. COM (2021) 400 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0400.

concrete targets for 2030, namely the reduction of residual municipal waste by 50 % and significant reduction of total waste generation in the EU.

[BR5] 4.3.6.1 Circular economy

The first Circular Economy Action Plan was adopted in 2015 (Chapter 4.3.6.1 of the EU's Fourth Biennial Report provides more information). In 2020, the European Commission adopted the New Circular Economy Action Plan[718] to accelerate the transition to a circular economy and to reduce the EU's consumption footprint and to double the circular material use rate in the next decade. It includes 35 actions to be implemented by the European Commission, which range from product design to waste prevention and include an updated monitoring framework for the circular economy. The main areas with an expected impact on climate change mitigation addressed in the circular economy are described in the following sections.

[BR5] 4.3.6.2 Waste and recycling

The Waste Framework Directive[719] is the key legal framework for treating and managing waste in the EU. It establishes an order of preference for managing and disposing of waste, the so-called 'waste hierarchy'. The Directive set three main targets:

- by 2020, the preparation for re-use and the recycling of waste materials (such as paper, metal, plastic and glass) from households shall be increased to a minimum of overall 50 % by weight;
- by 2020, the preparation for re-use, recycling and other material recovery, including backfilling operations using waste to substitute other materials, of non-hazardous construction and demolition waste shall be increased to a minimum of 70 % by weight; and
- by 2025, the preparation for re-use and the recycling of municipal waste shall be increased to a minimum of 55 %, 60 % and 65 % by weight by 2025, 2030 and 2035 respectively.

The Waste Framework Directive also requires the separate collection of municipal solid waste, which is an important pre-condition for high quality waste management, including composting and recycling. Both have a large influence on GHG emission reduction from waste management. According to the directive, separate collection of biowaste will become mandatory by the end of 2023, and for textiles, hazardous waste and for 77 % of plastic bottles in 2025.

Despite existing legislation, the amount of municipal waste has increased in recent years. To address this, the European Commission is currently working on a revision of the Waste Framework Directive **expected to be adopted in 2023**. The revision aims to implement the polluter-pays-principle and will focus on the following policy areas: prevention, separate collection, waste oils and textiles.

[718] A new Circular Economy Action Plan For a cleaner and more competitive Europe. COM (2020) 98 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A98%3AFIN.
[719] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0098.

[BR5] 4.3.6.3 Sustainable products

In 2022, the European Commission published a proposal for a Regulation on Eco-design for sustainable products[720] which sets new requirements for circularity and an overall reduction of the environmental and climate footprint of products; and thereby extends the existing Eco-design framework which was originally mainly designed for energy efficiency gains of energy-using products (see section [BR5] 4.3.1.2). To make the product-specific information available to the consumers, a digital product passport will be required for all regulated products. The concrete actions are elaborated in the Ecodesign and Energy Labelling Working Plan 2022-2024,[721] which will trigger a number of product-group-specific and horizontal measures on aspects such as durability, recyclability, recycled contents, ability to repair, re-use and upgrade.

[BR5] 4.3.6.4 Waste water/urban waste water

According to an analysis conducted by the EEA,[722] about 90 % of the urban waste waters in the EU are collected and treated in line with the Urban Waste Water Directive (Chapter 4.3.6.6 of the EU's Fourth Biennial Report provides more information). Some EU Member States even treat 100 % of their waste water in line with the Directive's requirements. An evaluation of the Directive in 2019[723] concluded that the Directive has led to reduced GHG emissions in cases in which anaerobic treatments were displaced by aerobic centralised processes. The legislation successfully reduced water pollution from urban waste water; however, improvements were identified in some areas (e.g. connection with EU's energy and climate targets). For this reason, the European Commission will publish an impact assessment in 2022 and propose a revision of the Directive in the light of the Zero Pollution Action Plan and the Green Deal. Improvements are foreseen for waste water from small agglomerations and the treatment of micropollutants in waste water and aim for a better alignment of the Directive with the new objectives for energy and climate, and the circular economy, in particular concerning sewage sludge management.

[BR5] 4.3.6.5 Other EU waste policies targeting specific waste streams

- Packaging waste: The Directive on Packaging and Packaging Waste[724] sets targets for recycling for various packaging materials for the years 2025 and 2030. The latest amendments contain measures to prevent the production of packaging waste and to promote the reuse, recycling and recovery of packaging waste instead of disposal. The European Commission is currently revising the directive taking into account the objectives of the Green Deal ('all packaging on the EU market

[720] Communication on making sustainable products the norm, COM(2022) 140 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022DC0140&qid=1649112555090.
[721] Ecodesign and Energy Labelling Working Plan 2022-2024, 2022/C 182/01, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022XC0504%2801%29&qid=1651649049970.
[722] European Environment Agency, Waste water treatment improves in Europe but large differences remain, https://www.eea.europa.eu/highlights/waste-water-treatment-improves-in.
[723] Evaluation of the Council Directive 91/271/EEC of 21 May 1991, concerning urban waste-water treatment, SWD(2019) 700 final: https://ec.europa.eu/environment/water/water-urbanwaste/pdf/UWWTD%20Evaluation%20SWD%20448-701%20web.pdf.
[724] Directive 94/62/EC of 20 December 1994 on packaging and packaging waste, https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1595836325715&uri=CELEX:01994L0062-20180704.

is reusable or recyclable in an economically viable way by 2030') and the Circular Economy Action Plan.

- Landfilling of waste: The Landfill Directive[725] limits the amount of waste to be landfilled. Its predecessor already contributed to reducing this amount and to decreasing methane emissions from the waste sector. By 2035, the amount of municipal waste landfilled is to be reduced to 10 % or less of the total amount of municipal waste generated.

- Biodegradable waste: There have been no changes since the EU's 4th BR; Chapter 4.3.6.3 of the EU's 4th BR provides more information on this policy.

- Plastics: The EU Plastics Strategy,[726] as part of the Circular Economy Action Plan, aims to transform the way in which plastic products are designed, produced, used and recycled in the EU. Further specific policies in the EU currently focus on single-use plastics, plastic packaging, microplastics, and soon bio-based, biodegradable and compostable plastics. The Directive on the reduction of the impact of certain plastic products on the environment[727] uses a mix of measures tailored to the products covered by the directive, including an EU-wide ban on single-use plastic products whenever alternatives are available.

- Textiles: In 2022, the European Commission adopted the Strategy for Sustainable and Circular Textiles[728] which envisages that all textile products placed on the EU market are durable, repairable and recyclable. The actions will include, inter alia, design requirements for textiles, a digital product passport and measures to stop overconsumption. By end of 2022, an action plan for actors in the textile industry will be published. According to the Waste Framework Directive (cf. section [BR5] 4.3.6.2), separate collection of textiles must be achieved by 1 January 2025.

- Batteries: A proposal for a new Batteries Regulation[729] was published in 2020 with the aim of ensuring that batteries placed on the EU market are sustainable and safe throughout their entire life cycle.

- Vehicles: The Directive on End-of-Life Vehicles is currently under review and a new proposal is expected in 2022.

- Electrical and Electronic Equipment: There have been no changes since the EU's 4th BR. Chapter 4.3.6.5. of the EU's 4th BR provides more information on this policy.[730]

[725] Directive (EU) 2018/850 amending Directive 1990/31/EC on the landfill of waste, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32018L0850.
[726] A European Strategy for Plastics in a Circular Economy, COM(2018) 28 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:28:FIN.
[727] Directive (EU) 2019/904 on the reduction of the impact of certain plastic products on the environment, https://eur-lex.europa.eu/eli/dir/2019/904/oj.
[728] EU Strategy for Sustainable and Circular Textiles, COM(2022) 141 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022DC0141.
[729] Proposal for a Regulation concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation (EU) No 2019/1020, COM (2020) 798 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0798.
[730] Fourth Biennial Report of the European Union, https://unfccc.int/documents/228427.

[BR5] 4.4 Institutional arrangements for the evaluation of progress

As requested in paragraph 7 of the biennial reporting guidelines,[731] this section provides information on changes in domestic institutional arrangements used for domestic compliance, monitoring, reporting and evaluation of the progress towards the 2020 target.

The Monitoring Mechanism Regulation is the key instrument for monitoring progress towards the EU's 2020 greenhouse gas emission reduction targets (domestically, under the Convention and under the Kyoto Protocol). This regulation is described in section [BR5] 3.2.2. There have been no changes in the relevant institutional arrangements in recent years. The most recent information on the EU's progress towards its targets can be found in the 2022 Climate Action Progress Report[732].

It is worth mentioning that new, enhanced arrangements were put in place for the tracking of progress towards the EU's 2030 target under the Paris Agreement. The key legislation is the Regulation on the Governance of the Energy Union and Climate Action ('Governance Regulation')[733]. This regulation contains the rules for planning, monitoring and reporting of progress towards the 2030 climate and energy targets and the EU's international commitments under the Paris Agreement. The Governance Regulation requires EU Member States to communicate and implement Integrated National Energy and Climate Plans and to regularly report on their progress in implementing them. The Governance Regulation also lays out the detailed reporting obligations on GHG emissions, policies and measures, projections, adaptation actions and support provided to developing countries. In addition, the Governance Regulation requires EU Member States to report on their national systems for policies and measures and projections, including the arrangement for planning policies and measures and for evaluating their effects.

[BR5] 4.5 Assessment and mitigation of the economic and social consequences of response measures

Policies and measures to mitigate climate change (also known as 'response measures') often have multiple effects on countries' societies and economies. For example, a shift from fossil to renewable electricity generation can improve air quality and create new jobs, but also jeopardises existing jobs in sectors and in countries that focus on the production of fossil fuels. Hence it is crucial for policies and measures to be designed in a way that realises the co-benefits, while supporting a just transition and minimising adverse economic and social consequences. The Council Recommendation of 16 June 2022[734] on ensuring a fair transition towards climate neutrality provides an EU framework for the development and implementation of policy measures to leave no one behind in the green transition.

The assessment of the economic and social consequences of policies and measures is a key component of the European Union's policy making process. Impact assessments are carried out on all initiatives

[731] Decision 2/CP.17, Annex I, https://unfccc.int/documents/7109.
[732] EU Climate Action Progress Report 2022, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52022DC0514.
[733] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, http://data.europa.eu/eli/reg/2018/1999/oj.
[734] Council Recommendation of 16 June 2022 on ensuring a fair transition towards climate neutrality, 2022/C 243/04, https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32022H0627%2804%29.

which are expected to have significant economic, social or environmental impacts[735]. The findings of the impact assessment process are summarised in an impact assessment report, which lays out the environmental, social and economic impacts, the stakeholders that will be affected by the initiative and the ways in which they are affected. The impact assessment report also provides information on the consultation strategy and the results obtained from it. Impact assessment reports are published with the proposals or with acts adopted by the European Commission.

The economic and social consequences of new policies and measures are not only assessed within the EU, but also related to developing countries which may be affected by them. The EU and its Member States have committed to policy coherence for development (PCD). Through PCD, they seek to take account of development objectives in policies that are likely to have an impact in developing countries. PCD aims at minimising contradictions and building synergies between different EU policies[736]. The Better Regulation Toolbox, which is used by the European Commission when preparing new initiatives, includes specific guidance for analysing the potential impact of EU policy initiatives on developing countries. This helps to ensure that impacts on developing countries are taken into account at an early stage in preparing an initiative[737].

[BR5] 4.6 Achievement of the 2020 target

As explained in chapter [BR5] 3.1, the EU and its Member States committed to reducing greenhouse gas emissions by 2020 by 20 % compared to 1990. In this target, emissions from international aviation are included, but emissions and removals from LULUCF, and the gas NF_3, are not included. The LULUCF sector and the gas NF_3 are included in the targets under the Kyoto Protocol and under the Paris Agreement.

In Table 27, information on the progress made towards the achievement of the 2020 emission reduction target is provided, in accordance with paragraphs 9 and 10 of the biennial reporting guidelines[738].

Table 27: Progress in achievement of the quantified economy-wide emission reduction target for 2020 under the Convention (EU-27+UK)

[735] Impact assessments, https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/impact-assessments_en.
[736] Policy coherence for development, https://ec.europa.eu/international-partnerships/policy-coherence-development_en.
[737] Better regulation toolbox, Tool 34, https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox_en.
[738] Decision 2/CP.17, Annex I, https://unfccc.int/documents/7109.

Year	Total emissions excluding LULUCF, excluding NF_3 and including international aviation (Mt CO_2eq)	Reduction compared to the base year	Contribution from LULUCF	Quantity of units from market-based mechanisms under the Convention (Mt CO_2eq)
1990 (base year)	**5 710**	---	Not applicable. The LULUCF sector is not included in the European Union's 2020 target under the Convention.	Not applicable. Units from market-based mechanisms are not used for achievement of the European Union's 2020 target under the Convention.
2010	4 913	13.9 %		
2011	4 764	16.6 %		
2012	4 703	17.6 %		
2013	4 604	19.4 %		
2014	4 428	22.4 %		
2015	4 463	21.8 %		
2016	4 449	22.1 %		
2017	4 475	21.6 %		
2018	4 387	23.2 %		
2019	4 216	26.2 %		
2020 (target year)	**3 771**	**34.0 %**		

Source: National Greenhouse gas inventory report 2022.

As can be seen in Table 27, greenhouse gas emissions within the scope of the target under the Convention amounted to 3 771 Mt CO_2eq in 2020, which is 34.0 % below the 1990 level of 5 710 Mt CO_2eq. The emissions of the United Kingdom are included here because it was part of the EU at the time of target setting, and EU legislation applied in the United Kingdom until 31 December 2020. Hence, the EU target under the Convention for 2020 has been overachieved by the EU, its Member States and the United Kingdom.

The 34 % emissions reduction in 2020 was partly due to reduced economic activity in that year as a consequence of the COVID-19 pandemic. It should be noted, however, that greenhouse gas emissions in all years from 2014 to 2019 were also more than 20 % below the 1990 level.

When the EU communicated its target in 2010, it included the unconditional 20 % reduction target and a conditional offer to move to a 30 % reduction by 2020 compared to 1990 levels[739]. As can be seen in Table 27, the EU fulfilled both the unconditional and the conditional target under the Convention.

[739] Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention, FCCC/SB/2011/INF.1/Rev.1, https://unfccc.int/documents/6658.

[BR5] 5 PROJECTIONS

[BR5] 5.1 Introduction

This chapter presents EU-27 projections of greenhouse gas emissions for the 'with existing measures scenario' and the 'with additional measures' scenario. Both projections are represented differentiated by sector and by gas. The EU-27 data was compiled by aggregating European Member States greenhouse gas emission projections reported under the Governance Regulation, the detailed methodology is documented in Section [BR5] 5.6.1.

Projections are presented for 2025, 2030 and 2035. Data is displayed as CO_2 equivalent. Projections of emissions related to fuel sold to ships engaged in international transport are not included in the totals reported in this section while indirect CO_2 emissions are included.

[BR5] 5.2 Total greenhouse gas emission projections

Figure 39 represents historic and projected total GHG emissions on EU level. The data excludes LULUCF but includes international aviation to reflect the scope of the EU's 2020 target. Historic data are represented for the EU-27+UK. This is because the 2020 target, represented as a yellow circle, applies to the EU-27+UK. Historic and projected data are represented for the EU-27, reflecting the current composition of the EU.

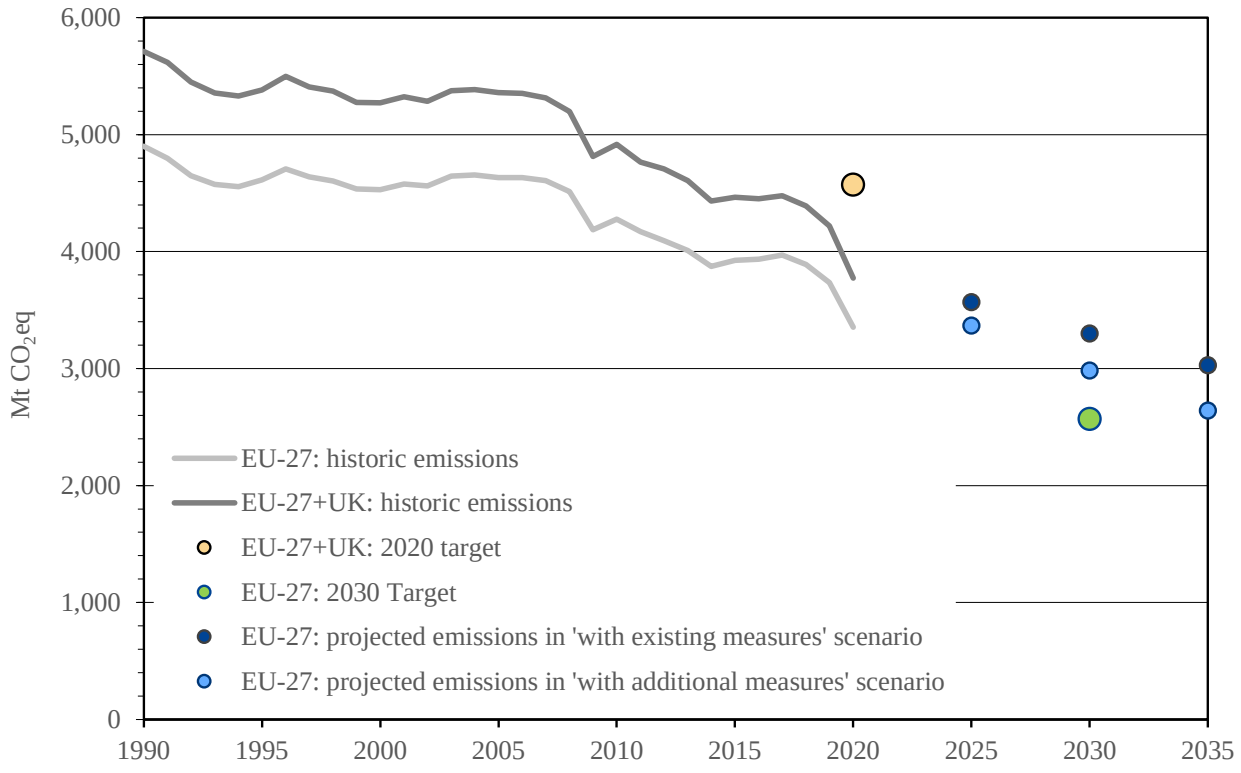
The figure shows that the EU-27+UK has met its 2020 target under the Convention, which was a reduction of 20 % compared to 1990 levels. In 2020, the EU-27+UK had reduced its greenhouse gas emissions by 34 % compared to 1990 levels (cf. section [BR5] 4.6). The substantive emission reductions between 2019 and 2020 that can be seen in the figure are largely attributable to the COVID-19 pandemic. Projected emissions start in the year 2025 and are displayed for mandatory projection years under the Governance Regulation (five-year time steps)[740].

Projections for the EU-27 which consider existing measures indicate greenhouse gas emission reductions of 33 % by 2030 (compared to 1990 levels)[741]. When planned measures are also taken into account (with 'additional measures' scenario in **Figure 39**), the emission reduction in 2030 compared to 1990 is projected to be 39 %[742].

It should be noted that these projections do not yet take into account the update of policies and measures following the adoption of the more ambitious EU target for 2030. Once these policies and measures have been updated in 2023, new projections can be expected to show a stronger decrease in emissions. Like all projections, they come with considerable uncertainties. Changes in energy prices or disruptions in supply chains can substantially alter the economic development and hence the level of GHG emissions in the years ahead.

[740] The latest mandatory reporting deadline for projections under the EU Governance Regulation was March 2021. In 2022, a non-mandatory reporting year, three European Member States (Denmark, Ireland, Latvia) provided updated projections, and these are included in the data provided throughout this chapter. Detailed methodology can be found in Section [BR5] 5.6.1.1.
[741] This total includes indirect CO_2 emissions.
[742] This total includes indirect CO_2 emissions.

Figure 72: Historic and projected EU-wide total greenhouse gas emissions excluding LULUCF, including international aviation



Sources: Annual European Union greenhouse gas inventory 1990-2020, European Member States greenhouse gas emission projections submitted in 2021 and 2022 under the Governance Regulation.

Notes: The totals depicted here includes indirect CO_2 emissions. GHG inventory data are available until 2020. Approximated GHG inventory calculations indicate that emissions increased again in 2021 following the economic recovery.

Please refer to CTF Tables 6 for the data reported in kilotons of CO_2eq, which is available as an annex to this report.

[BR5] 5.3 Projections by sector

Absolute historic and projected greenhouse gas emissions by sector in the EU-27 are represented in Figure 73. The upper part of the figure shows historic data together with the 'with existing measures' scenario, the lower part combines historic data and the 'with additional measures' scenario. Figure 74 provides insights into current and projected sectoral GHG emission shares. Figure 75 shows 2020 (historic) and projected 2030 GHG emission levels compared to 1990 for each sector.

Energy emissions (without transport) are projected to decrease by 46 % in 2030 compared to 1990 taking into account existing measures and to 52 % below 1990 levels when additional measures are also taken into account. Short and steep decreases took place during the financial crisis (2008-2009) and during the COVID-19 pandemic in 2020. The general decreases of energy emissions are mainly due to the increased use of renewables, the switch from fuel to gas, increased energy and technical efficiency and decreases in fuel combustion in manufacturing industries. Policies and measures related to energy (see Section [BR5] 4.3.1 for more details) stimulate these projected changes.

Only the domestic transport sector is projected to exhibit 2030 GHG emissions larger than in 1990. After 2007, a slow but steady decline in transport emissions was visible up to 2013, with emissions slightly increasing again up to 2016. The COVID-19 pandemic in 2020 temporarily reduced the mobility of people and goods. Domestic transport emissions are projected to have a slight downward trend. Relevant measures likely influencing the projected emissions are discussed in Section [BR5] 4.3.2. Under existing measures, GHG emissions from the domestic transport sector in 2030 are projected to be 9 % higher than 1990 levels. Taking into account additional measures brings projected values for 2030 to 6 % below 1990 levels.

The GHG emissions of industrial processes are projected to decrease by approximately 36 % in 2030 compared to 1990 under existing measures and to 37 % below 1990 levels when additional measures are also taken into account. Measures driving this decline include the cross-cutting EU Emissions Trading System and the F-gas Regulation (see Sections [BR5] 4.2.1 and [BR5] 4.3.3.2).

Compared to 1990, agricultural GHG emissions in 2030 are projected to decrease by 21 % with existing measures and by 24 % when additional measures are also considered. Changes in agricultural policy and increased productivity contributed to reduced animal numbers, reduced nitrogen fertiliser production and use and improved manure management resulting in reduced emissions from agricultural soils and livestock (Section [BR5] 4.3.4 elaborates on agricultural policies and measures).

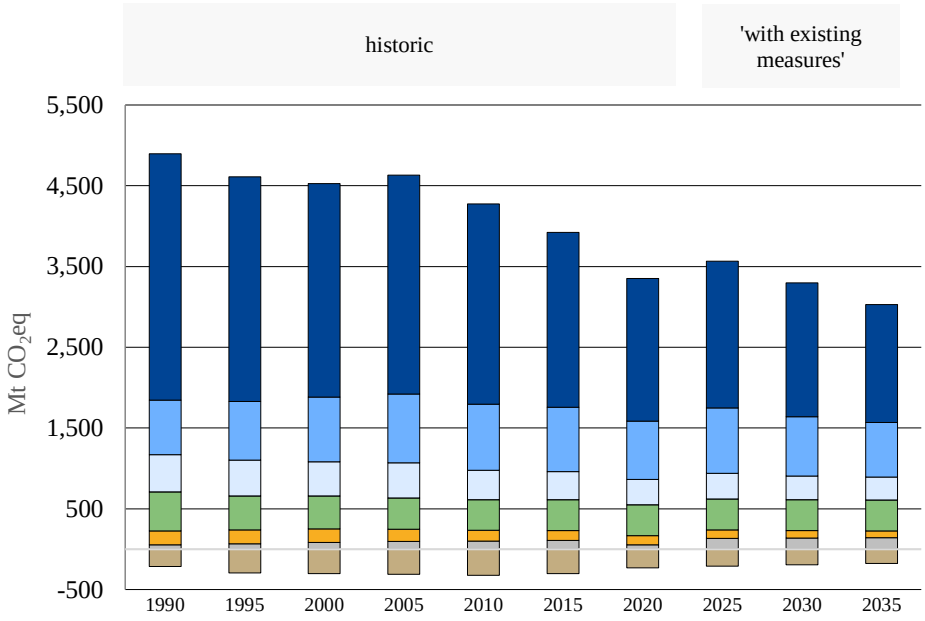
GHG emissions are projected to steadily decrease in the waste sector. Compared to 1990, emissions in 2030 are projected to decrease by 46 % considering existing measures and by 48 % when additional measures are also taken into account. Past and future emission decreases can largely be attributed to successful waste legislation (policies and measures see Section [BR5] 4.3.6 for waste policies and measures).

Emissions from international aviation are projected to continue increasing, reaching more than 150 % above 1990 levels by 2030 in both scenarios[743]. A key factor influencing emission projections from international aviation is the historical and expected increase in demand for international travel.

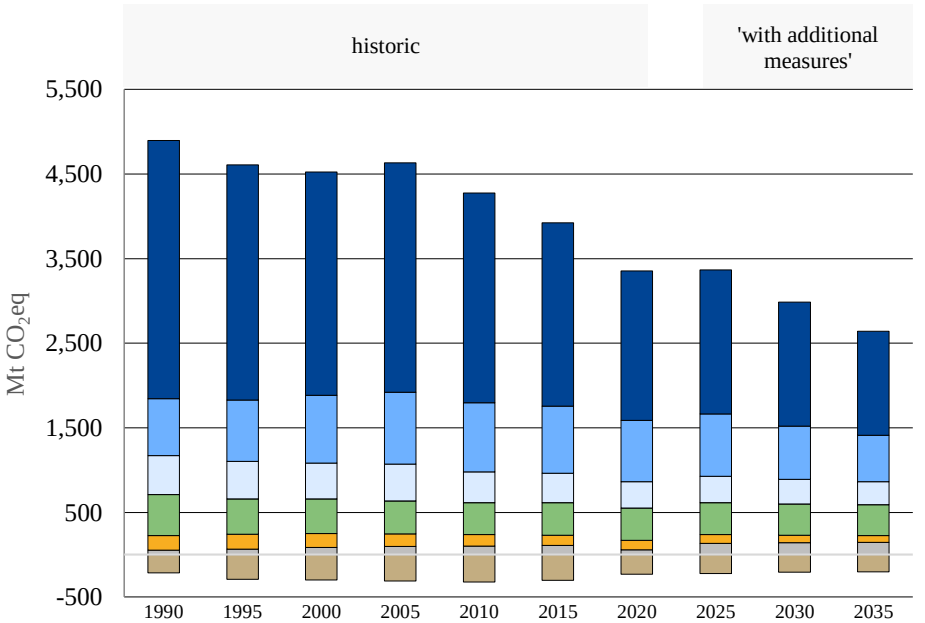
Insights into sector-specific information such as primary energy consumption, electricity generation and transport volume were requested during the technical review but cannot be provided at an aggregate EU level. Please see Section [BR5] 5.6.1.3 for an explanation.

Figure 73: EU-27: Historic and projected total greenhouse gas emissions distinguished by sector

[743] Projected 2030 emissions from international aviation in the 'with additional measures' scenario slightly exceed 2030 emissions in the 'with existing measures scenario' as modal shift measures considered for the Dutch 'with additional measures scenario' are assumed to result in additional international flights starting from the Netherlands' airports.



	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
Energy (excluding transport)	3,051	2,780	2,643	2,710	2,479	2,165	1,767	1,819	1,657	1,462
Domestic transport	673	725	799	848	818	795	721	809	735	672
Industrial processes	462	445	424	436	363	348	314	316	295	287
Agriculture	483	417	409	389	377	386	382	385	380	379
Waste	173	176	165	151	137	121	112	104	93	86
Land Use, Land Use Change and Forestry	-213	-292	-299	-310	-322	-303	-230	-210	-190	-177
International aviation	54	66	85	96	100	109	56	135	138	142



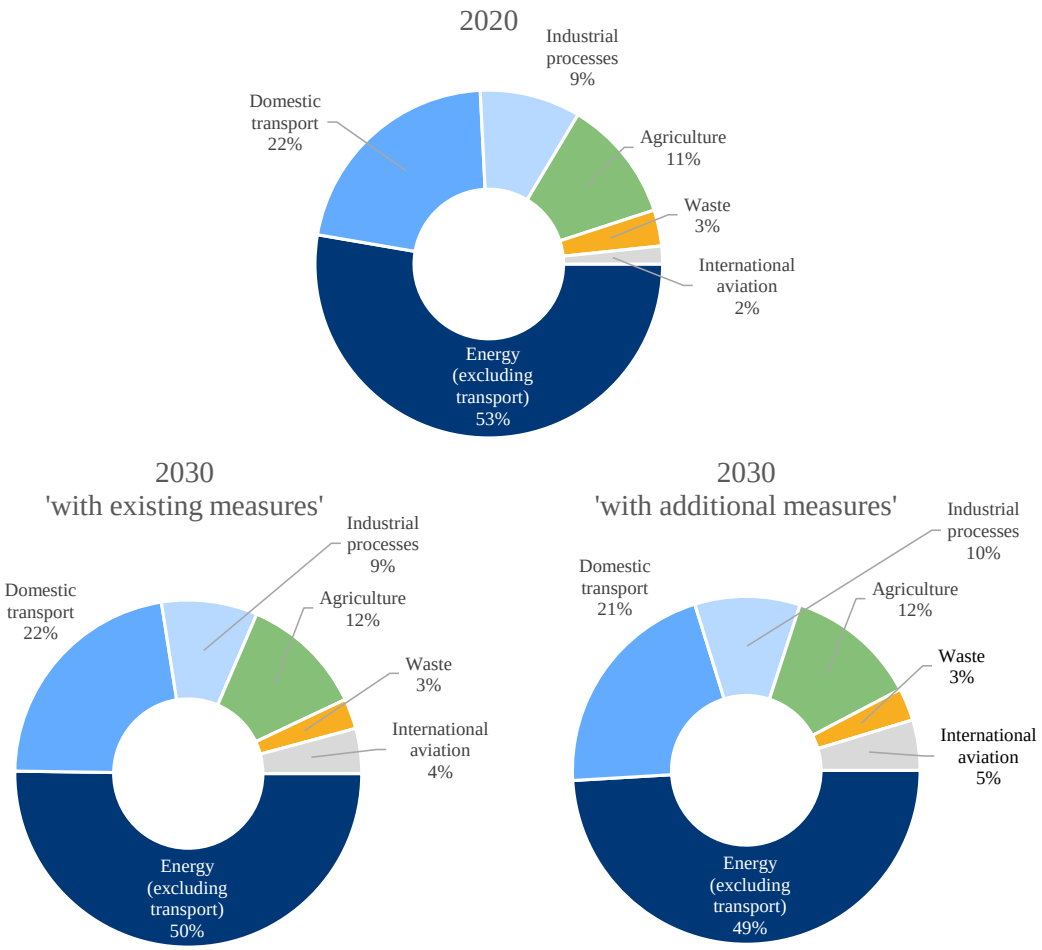
	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
Energy (excluding transport)	3,051	2,780	2,643	2,710	2,479	2,165	1,767	1,702	1,464	1,232
Domestic transport	673	725	799	848	818	795	721	737	631	546
Industrial processes	462	445	424	436	363	348	314	314	292	274
Agriculture	483	417	409	389	377	386	382	378	367	365
Waste	173	176	165	151	137	121	112	102	90	82
Land Use, Land Use Change and Forestry	-213	-292	-299	-310	-322	-303	-230	-222	-209	-201
International aviation	54	66	85	96	100	109	56	134	140	144

Sources: Annual European Union greenhouse gas inventory 1990-2020, European Member States greenhouse gas emission projections submitted in 2021 and 2022 under the Governance Regulation.

Please refer to CTF Tables 6 for the data reported in kilotons of CO_2eq, which is available as an annex to this report.

The energy sector was responsible for the largest share of the EU-27's total GHG emissions in 2020. The transport sector had the second largest share, followed by agriculture, industrial processes and waste. The balance between the sectoral shares is projected to continue, both for the 'with existing measures' and the 'with additional measures' scenario, as Figure 74 shows for 2030 below.

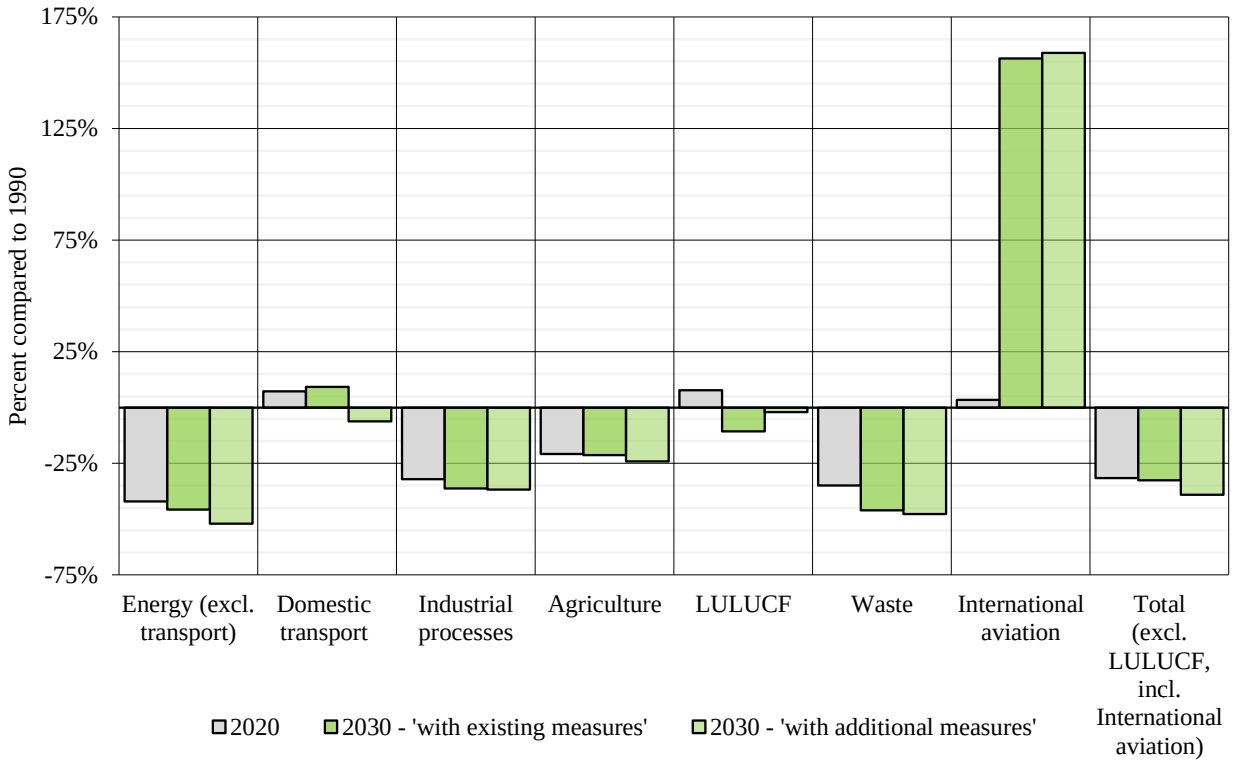
Figure 74: EU-27: Sectoral share on total greenhouse gas emissions (without LULUCF, with international aviation) in 2020 and projected sectoral share for 2030



Sources: Annual European Union greenhouse gas inventory 1990-2020, European Member States greenhouse gas emission projections submitted in 2021 and 2022 under the Governance Regulation.

The largest GHG emission reductions compared to 1990 levels are projected for the energy and waste sectors, as shown in Figure 75.

Figure 75: EU-27: Historic and projected emission changes by sector in 2030 compared to 1990 in 'with existing measures' and 'with additional measures' scenario



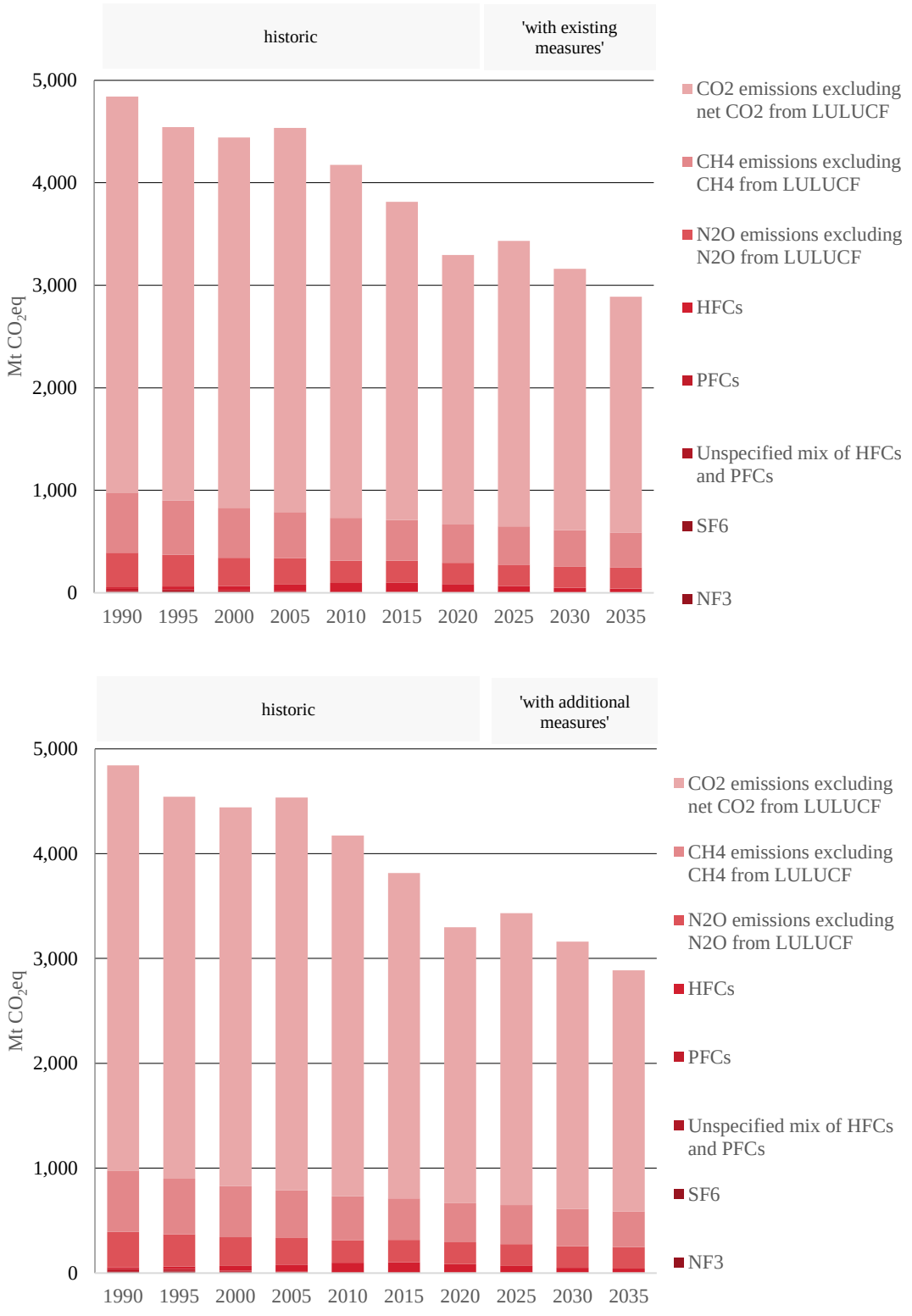
Sources: Annual European Union greenhouse gas inventory 1990-2020, European Member States greenhouse gas emission projections submitted in 2021 and 2022 under the Governance Regulation.

Note: the total reported here includes indirect CO_2 emissions. Please refer to CTF Tables 6 for the detailed data reported in kilotons of CO_2eq.

[BR5] 5.4 Projections by gas

Figure 76 provides historic and projected total GHG emissions by gas.

Figure 76: EU-27: Historic and projected total greenhouse gas emissions by gas



Sources: Annual European Union greenhouse gas inventory 1990-2020, European Member States greenhouse gas emission projections submitted in 2021 and 2022 under the Governance Regulation.

Please refer to CTF Tables 6 for the detailed data reported in kilotons of CO_2eq.

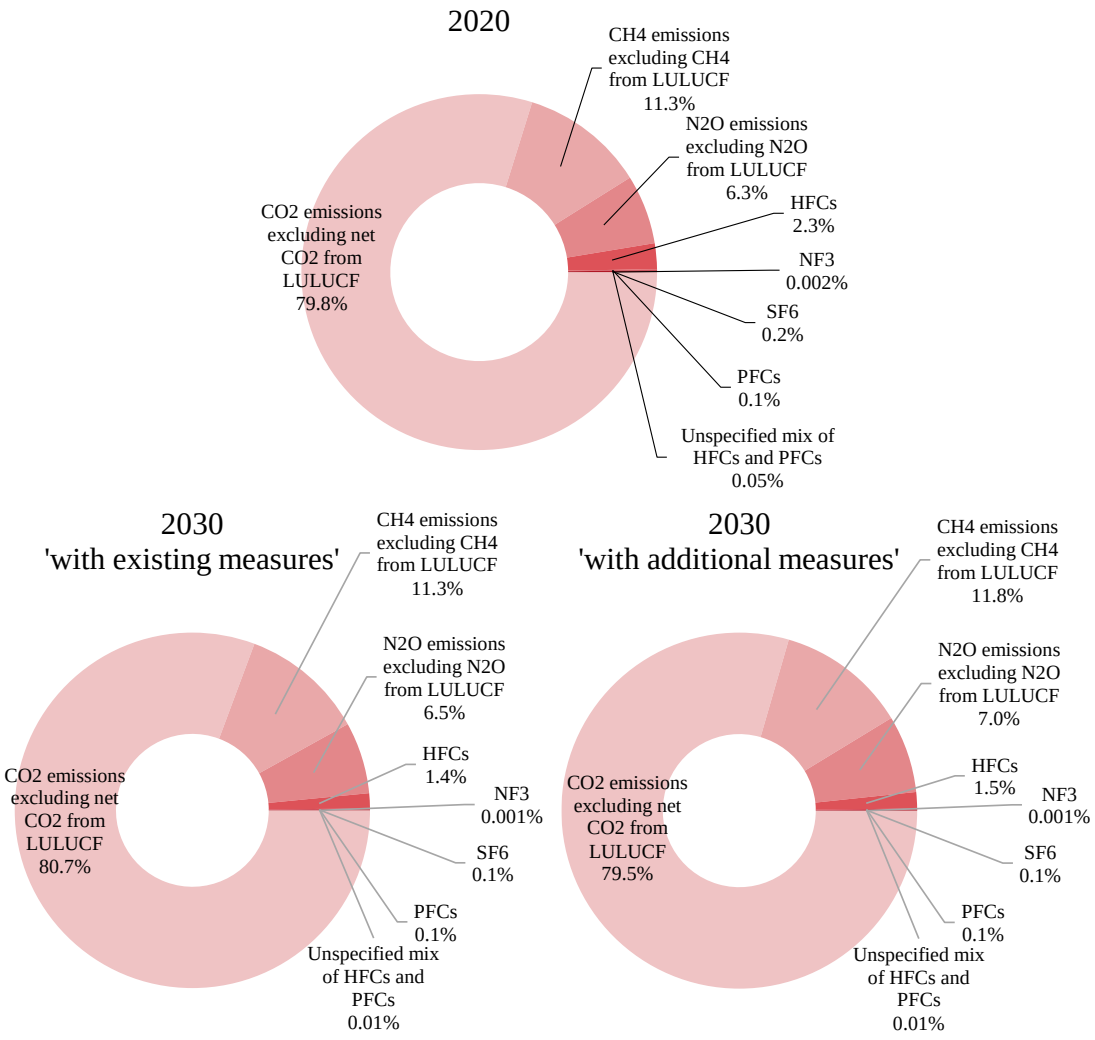
CO_2 emissions were responsible for the largest share of the EU-27's total GHG emissions in 2020 at nearly 80 %, followed by methane emissions (11 %) and nitrous oxide emissions (6 %). Fluorinated

gases added up to 3 %. Projections, both with existing and with additional measures, indicate that this composition pattern will also hold in 2030 with only slight changes.

In 2030 and considering existing measures, CO_2 emissions are projected to decrease by approximately. 34 % compared to 1990. When additional measures are also taken into account, the decrease is projected to be approximately. 41 % compared to 1990. Emissions of CH_4 have decreased steadily in the past and a continuation is projected, albeit at a slower pace: In 2030 these emissions are projected to be 39 % below 1990 levels under existing measures and at 42 % below 1990 levels when additional measures are also taken into account. Emissions of N_2O are projected to slightly decrease to -39 % below 1990 levels in 2030 when considering existing measures only. Taking into account additional measures, a level that is 40 % below 1990 levels is projected for 2030.

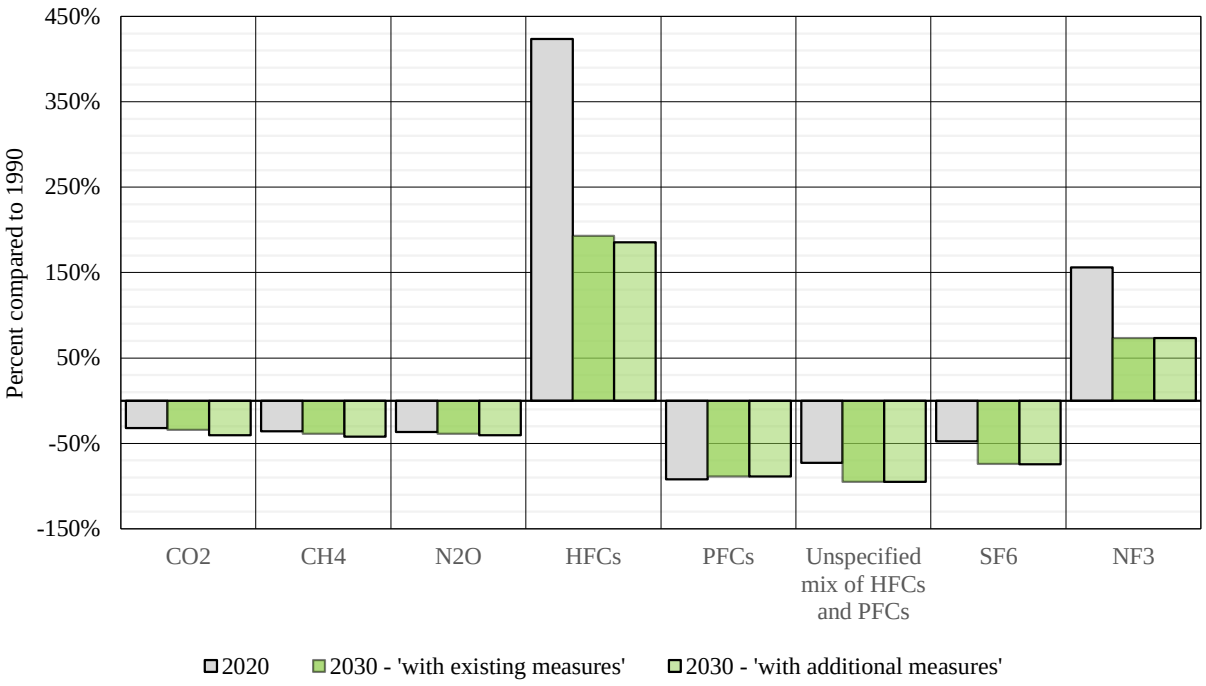
Total F-gas emissions (sum of HFCs, PFCs, SF_6, NF_3, unspecified mix of HFCs and PFCs) began decreasing after 2016. This is projected to continue up to 2030, achieving a level of 11 % below 1990 levels with existing measures in 2030 and 13 % below 1990 levels when also taking into account additional measures. The contributions of the various F-gases to these overall emissions differ (see Figure 77). The contribution of F-gases to total EU GHG emissions was relatively small and remains so. It is projected to amount to approximately 2 % in 2030 under both scenarios. The projected decrease in F-gas emissions thus has a relatively small effect on the projected decrease in total GHG emissions at EU level.

Figure 77: EU-27: Greenhouse gas emissions share by gas in 2020 and projected share by gas for 2030



Sources: Annual European Union greenhouse gas inventory 1990-2020, European Member States greenhouse gas emission projections submitted in 2021 and 2022 under the Governance Regulation.

Figure 78: EU-27: Historic and projected emission changes by gas in 2030 compared to 1990 in the 'with existing measures' and 'with additional measures' scenario



Sources: Annual European Union greenhouse gas inventory 1990-2020, European Member States greenhouse gas emission projections submitted in 2021 and 2022 under the Governance Regulation. Data for CO_2, CH_4 and N_2O excluding LULUCF.

Indirect CO_2 emissions (i.e. CO_2 which forms in the atmosphere from indirect GHGs such as non-methane volatile organic compounds) are included in the totals reported in the projection chapter. Separate projected indirect CO_2 emissions are available for four European Member States (Denmark, Finland, Latvia, the Netherlands) who reported data on indirect CO_2 emissions separately under the Governance Regulation. Thus projected indirect CO_2 emissions cannot be reported separately as an EU-27 aggregate.

For the emissions of the indirect GHGs nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOC), as well as sulphur oxides, projected 2030 estimates are available in a baseline scenario (see Table 28). This baseline scenario assumes implementation of current non-CO_2 GHG emission policies and the fulfilment of 2030 targets for renewable energy and energy efficiency.

Table 28: Emission projections for SO_2, NO_x and NMVOC for 2020 and 2030 measured in kilotons

Gas	2020	2030
SO_2	1,677	1,052
NO_x	5,151	2,929
NMVOC	4,752	3,899

Source: IIASA, EMRC, JRC (2021)[744].

[744] IIASA, EMRC, JRC (2021): Support to the development of the

Note: Projections are provided for sulphur dioxide (SO_2), rather than sulphur oxides (SO_x). The majority of emitted SO_x is SO_2 and only small fractions of sulphur trioxide can arise[745].

As can be seen in Table 28, the emissions of SO_2, NO_x and NMVOC are projected to decrease considerably by 2030. For carbon monoxide (CO) emissions, no projections are available. This can be justified by the fact that CO emissions in the EU-27+UK already decreased by approximately 75 % between 1990 and 2020[746].

[BR5] 5.5 Sensitivity analysis

Updated EU legislation (Annex XXV Table 6 and 7 of the 'EU Governance Implementing Regulation'[747]) provides structured reporting on European Member States' sensitivity analyses, which they report along with their greenhouse gas emission projections. This provides the opportunity to highlight and to take into account the effort European Member States make to explore how the variation of different parameters impacts their individual greenhouse gas projection.

21 European Member States submitted sensitivity scenarios along with their greenhouse gas emission projections reported under Article 18 of the Governance Regulation. The amount of sensitivity scenarios varied from one to ten. On average, results for four sensitivity scenarios were reported.

European Member States used different parameters and parameter combinations compared to their 'with existing measures' scenario submitted under the Governance Regulation. This is because there are no mandatory methodologies or parameter variations prescribed in EU legislation. Among the most varied parameters were fuel import prices, the EU ETS certificate price, population and GDP. An aggregation of sensitivity analyses to EU level would thus add uncertainties and is not undertaken for this present Biennial Report.

Figure 79 provides sensitivity insights for 2030 and on European Member State level. This figure considers the whole breadth of European Member States' sensitivity analyses and compares them to their individual 'with existing measures' scenario. The shown data refers to sensitivity analyses that were provided on the variable 'total greenhouse gas emissions without LULUCF'.

13 European Member States reported sensitivity scenarios on their total greenhouse gas emissions without LULUCF. The results vary compared to the 'with existing measures' scenario in the range from -29 % and +11 %.

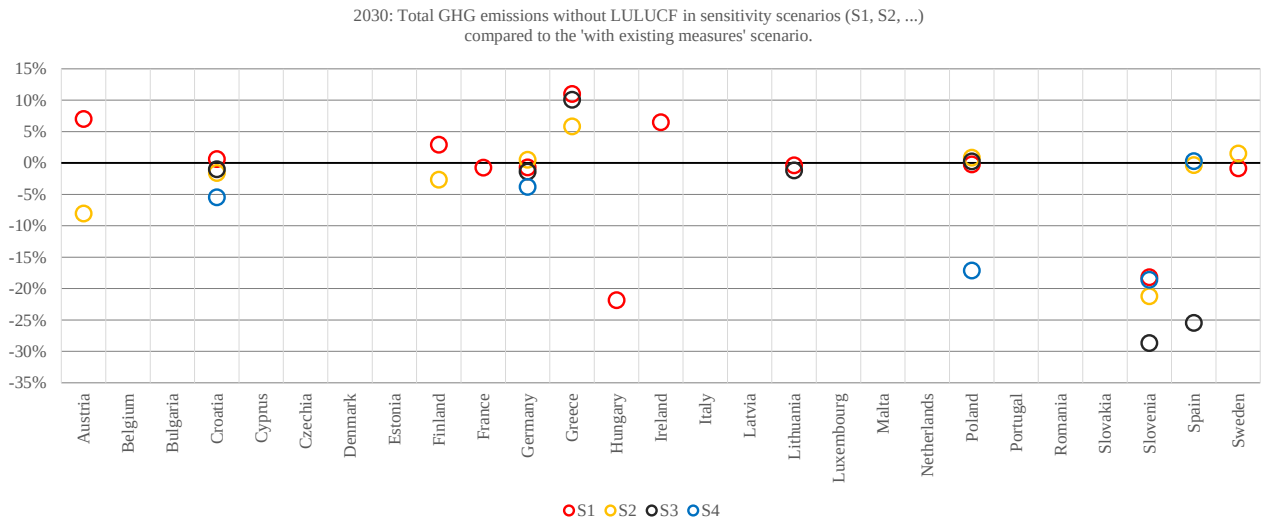
Figure 79: Differences in GHG emissions between 'with existing measures' and sensitivity scenarios

Second Clean Air Outlook, https://circabc.europa.eu/ui/group/cd69a4b9-1a68-4d6c-9c48-77c0399f225d/library/79bf53a9-b6d9-4a4a-a4b5-433101462e42/details.

[745] EEA (2019): EMEP/EEA air pollutant emission inventory guidebook 2019, https://www.eea.europa.eu/publications/emep-eea-guidebook-2019.

[746] Annual European Union greenhouse gas inventory 1990-2020 and inventory report 2022, https://unfccc.int/documents/461931.

[747] Commission Implementing Regulation (EU) 2020/1208, http://data.europa.eu/eli/reg_impl/2020/1208/oj.



Source: Sensitivity scenarios submitted by European Member States in 2021 and 2022 under the Governance Regulation.

The methodological background for this sensitivity analysis is documented in Section [BR5] 5.6.3 and changes to the prior methodology are documented in Section [BR5] 5.7.2.

[BR5] 5.6 Methodology

[BR5] 5.6.1 Compilation of aggregate EU projection data and breakdown by sector and gas

Historic data in this chapter for total greenhouse gas emissions is presented for the EU-27+UK and the EU-27 since the UK was still a Member State of the European Union until 2020 and is relevant in view of the EU's 2020 greenhouse gas emission reduction target.

Projected data (starting after 2020) presented in this chapter refers to the EU-27. It is an aggregation compiled from individual EU Member State greenhouse gas emission projections submitted to the European Commission via 'Reportnet 3'[748] under Article 18 of the Governance Regulation)[749] in 2021 and updated by three European Member States (Denmark, Ireland and Latvia) in 2022.

This compilation followed an analogous approach as documented in Chapter 5.3.1 of the EU's Fourth Biennial Report and takes into account the most recent data available.

- The sector breakdown is as follows:
    - Energy (CRF 1, without transport),
    - Transport (CRF 1.A.3),
    - Industry/industrial processes and product use (CRF 2),
    - Agriculture (CRF 3)
    - Land use, land us change and forestry (CRF 4)

[748] Reportnet 3: National projections of anthropogenic greenhouse gas emissions Pursuant to Governance Regulation Art.18 (1)(b) / Implementing Regulation Art.38, https://reportnet.europa.eu/public/dataflow/113.
[749] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, http://data.europa.eu/eli/reg/2018/1999/oj.

- Waste (CRF 5)
- Memo items: International aviation; international navigation

- The gases covered are:
  - CO_2 emissions
  - CH_4 emissions
  - N_2O emissions
  - HFCs,
  - PFCs,
  - SF_6.
  - unspecified mix of HFCs and PFCs,
  - NF_3 emissions.

Indirect CO_2 emissions are only included in the totals in this chapter. These emissions can be reported as a memo item under the Governance Regulation if available. Four European Member States reported projected data on indirect CO_2 emissions separately (Denmark, Finland, Latvia, the Netherlands).

[BR5] 5.6.1.1 Projection methodology

The projection data is compiled as the sum of European Member States individual projection data, which undergo a comprehensive quality assurance and control procedure (see Section [BR5] 5.6.2).

Detailed descriptions of the individual projection methodologies which European Member States used to project their greenhouse gas emissions and further information on their sensitivity analyses and their key parameters and assumptions are available in the reports provided by them alongside their submissions under Article 18 of the Governance Regulation to 'Reportnet 3'[748] and in the Biennial Reports of individual European Member States.

The strengths and weaknesses of aggregating the EU's greenhouse gas projection from individual European Member States' projections are as follows:

Strengths:

- European Member States have the best knowledge of their national circumstances, e.g. their national policies and measures, their exact specifications and their expected future development. They are thus in the best position to set up national projections that do their national circumstances justice. They are also in the best position to show possible overlaps and synergies between national policies and measures in their projection methodology.

- European Member States can apply tailor-made national tools and models that are suitable to best showing their individual contexts.

- The European Commission provides guidance to Member States with respect to key parameters and assumptions. This approach helps to harmonise elements that may be similar among Member States (such as fuel import prices). At the same time, for some Member States there may be reasons why these parameters should not have the recommended value. Member

States can thus choose to set different values for key parameters and assumptions to best show their national circumstances.

- Weaknesses: A potential weakness of the projection methodology is that the aggregation of the EU's projection becomes less robust if there are errors in the data of the individual Member States. This risk is mitigated by the comprehensive quality assurance and control procedure applied (see Section [BR5] 5.6.2 and documented in ETC-CM (2021) [750]).

[BR5] 5.6.1.2 Historic and projected data in the projection chapter

The figures in the projection chapter represent historic GHG emissions up to 2020. Projections are represented thereafter, starting in 2025.

[BR5] 5.6.1.3 Summary of key parameters and assumptions

The key parameter assumptions that underpin individual Member States projections are also submitted under Article 18 of the Governance Regulation. They undergo the quality assurance and control process documented in the ETC/CM Report X/2022[750]

The information has been aggregated to create information for the EU-27 reported either by aggregating to the EU-27 level (GDP, population) or by calculating the weighted average value (monetary data, except GDP). Based on this approach, the key parameters on EU-27 level and for the 'with existing measures' scenario are as follows:

Table 29: Derived EU-27 key projection parameters

Parameter	Unit	2025	2030	2035
GDP	million Euro (2016)	14,481,403	15,397,012	16,355,252
Population	Million	448	449	449
International oil import price	Euro (2016) / GJ	18.0	20.3	23.0
International gas import price	Euro (2016) / GJ	10.3	11.0	12.0
International coal import price	Euro (2016) / GJ	3.2	3.5	3.7
EU-ETS allowance price	Euro (2016) / t CO_2	28	32	40

Source: Compiled from European Member States greenhouse gas emission projections submitted in 2021 and 2022 under the Governance Regulation.
Notes: Monetary data, except GDP, calculated as population-weighted averages. For cases a European Member State did not report GDP assumptions, gap-filling was accomplished by using 2020 GDP data from Eurostat multiplied with real GDP growth rates from EC (2021)[751]

The European Commission issues guidance on key parameters for Member States orientation. For the recent projections, these were as follows:

[750] ETC-CM Report 2022/X, Quality assurance and quality control procedure for national and Union GHG projections 2022, https://www.eionet.europa.eu/reportnet/docs/govreg/projections/etccme_qa-procedure_update-2021_draft.pdf/view.

Table 30: EU-27 key projection parameters provided by European Commission as guidance for European Member States

Parameter	Unit	2025	2030	2035
GDP	million Euro (2016)	16,527,591	17,720,613	18,960,418
Population	Million	448	449	449
International oil import price	Euro (2016) / GJ	11.8	14.0	15.1
International gas import price	Euro (2016) / GJ	5.7	6.0	6.8
International coal import price	Euro (2016) / GJ	2.7	2.9	3.1
EU-ETS allowance price	Euro (2016) / t CO_2	28	30	40

Source: Compiled from EC(2021)[751].

Note: GDP values were provided as percent growth rates per year. These were converted into absolute values based on 2020 EU-27 GDP from Eurostat which was then multiplied by the population-weighted average of yearly growth rates provided as Guidance per European Member State.

Compared to aggregated data from European Member States' individual projections, the population and EU-ETS certificate price projections were in line with the provided guidance. European Member States took into account higher fuel import prices in general and less strong economic growth.

During the review of the Seventh National Communication of the EU, the expert review team 'recommended that an overview of key sector-specific information, such as primary energy consumption, electricity generation and transport volume, be included in the GHG projections in future NCs to the extent possible, or alternatively that an explanation be provided as to why such information is difficult to compile'. Due to the EU's greenhouse gas emission projection being an aggregation of individual European Member States' greenhouse gas emission projections (see documentation in Section [BR5] 5.6.1), it is not possible to include projected key sector-specific information such as primary energy consumption, electricity generation and transport volume. This data is not a mandatory reporting requirement according to Annex XXV, which specifies the structure for reporting under Commission Implementing Regulation (EU) 2020/1208[752]. Thus, a varying number of Member States reports on this information along with their parameters data, with the result that an EU aggregate cannot be compiled in a homogenous manner.

[BR5] 5.6.2 Quality assurance and control of Member States emission projections

The quality assurance and control process of Member States emission projections data – including key parameters and assumptions – is described in Chapter 5.3.4 of the EU's 4th Biennial Report.

The quality assurance and control procedure remain the same, while the legislative background was updated (brief insights into this are provided in Section [BR5] 5.7.1) and the relevant basis for quality

[751] EC (2021): Recommended parameters for reporting on GHG projections in 2021, available under https://reportnet.europa.eu/public/dataflow/113.
[752] Commission Implementing Regulation (EU) 2020/1208, http://data.europa.eu/eli/reg_impl/2020/1208/oj.https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32020R1208&from=EN

assurance and control is now anchored in Article 42 of the Governance Regulation[753]. The latest documentation of this procedure can be found in the ETC/CM Report 2022/2022[754].

[BR5] 5.6.3 Sensitivity analysis

The method for sensitivity analyses is documented in this section. Methodological changes compared to the EU's 4th Biennial Report are documented in Section [BR5] 5.7.2.

Data considered for the sensitivity analysis stems from reporting projections under Article 18 and specified under Annex V of the Governance Regulation[755]. Formats for reporting on sensitivities are provided under Annex XXV Table 6 and Table 7 of the Governance Implementing Regulation[756].

For presenting the results of European Member States' sensitivity analyses in the context of the EU, the data reported in Table 6 and 7 was considered as follows:

1. 'Total greenhouse gas emissions without LULUCF' were considered for all sensitivity scenarios that were projected by European Member States, i.e. for all Member States who provided sensitivity data on that variable.

2. 'Total greenhouse gas emissions without LULUCF' were considered from the 'with existing measures' scenario for those European Member States who provided data in Table 6 and Table 7. This data served as the reference for comparison (= 100).

3. The relative deviation of the data from 1. to the data from 2. (Table 6) was calculated.

The results from 3 were visualised for each European Member State for which data was available in Figure 79.

[BR5] 5.7 Methodological changes compared to the previous biennial report

[BR5] 5.7.1 Changes to the compilation of greenhouse gas emission projection including quality assurance and control

The methodology to report on the compilation of the EU's greenhouse gas projections remains unchanged vis-a-vis the methods in the 4th Biennial Report of the European Union under the UNFCCC.

Since then, the UK has left the EU. Projection data represented after 2020 is thus the aggregate of the remaining 27 EU Member States (labelled EU-27).

[753] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, http://data.europa.eu/eli/reg/2018/1999/oj.
[754] ETC-CM Report 2022/X, Quality assurance and quality control procedure for national and Union GHG projections 2022, https://www.eionet.europa.eu/reportnet/docs/govreg/projections/etccme_qa-procedure_update-2021_draft.pdf/view.
[755] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, http://data.europa.eu/eli/reg/2018/1999/oj.
[756] Commission Implementing Regulation (EU) 2020/1208, http://data.europa.eu/eli/reg_impl/2020/1208/oj.

The QA/QC procedure also remains unchanged; the latest documentation can be found in the ETC/CME Report 7/2021[754].

After submission of the EU's 4th Biennial Report, the reporting of greenhouse gas emission projections of European Member States and the QA/QC procedure were anchored in updated legislation, the Governance Regulation[757]. The relevant Articles are summarised here for reference:

- **Article 18: Integrated reporting on greenhouse gas policies and measures and on projections**

  From 2021 onwards, on 15 March every odd year (and if there are updates available also in even years), European Member States submit greenhouse gas emission projections (at least a 'with existing measures' scenario).

  This includes reporting on sensitivity analyses and on policies and measures and their projected effects.

- **Article 42: Role of the European Environment Agency**

  The European Environment Agency has the mandate to perform quality assurance and quality control procedures on the information reported by Member States on projections and policies and measures.

  This quality assured and quality controlled data is the data used to compile the presented EU-27 projection data.

[BR5] 5.7.2 Changes to the sensitivity analysis

The approach towards sensitivity analysis has changed compared to the EU's 3rd and 4th Biennial Report. In the EU's 3rd Biennial Report, a sensitivity analysis was approximated by comparing the EU-wide 'with existing measures' scenario with the EU Reference Scenario 2016, in the EU's 4th Biennial Report a comparison with the 'with existing measures' scenario from the EU's 3rd Biennial Report was conducted., This was because an update of the EU Reference Scenario 2016 was not available; it was concluded: "*On this basis, the WEM scenario reported in the 4BR can still be considered comparable to the results of the EU Reference Scenario 2016.*"[758]

In this present Biennial Report, EU Member States sensitivity analyses were taken into account instead. While these cannot be aggregated to EU level, they provide important insights into national sensitivity scenarios and the effort that is made by the European Member States to explore uncertainties of individual projections in view of various uncertainties. These efforts provide insights into the magnitude of the effect that individual sensitivities could have on the EU-wide level of greenhouse gas emissions, and at the same time stress the importance of national-level exploration of the data.

[757] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, http://data.europa.eu/eli/reg/2018/1999/oj.
[758] https://unfccc.int/sites/default/files/resource/European%20Union-BR4_C_2019_8832_and_SWD_2019_432_2.pdf?download.

This present Biennial Report is the first opportunity to make this specific methodological shift as the EU's updated legislative context provides the basis for such an analysis:

Annex XXV, Tables 6 and 7 of the Governance Implementing Regulation[759] provides tables for structured reporting on European Member States sensitivity analyses in view of their greenhouse gas emission projections reported under Article 18 of the Governance Regulation. Table 6 provides data on the results of the sensitivity analysis and Table 7 shows key parameters that were varied in the sensitivity analyses.

The data reported by EU Member States was taken into account as reported to provide an overview of how projected 2030 greenhouse gas emissions – without LULUCF, without international aviation – varied compared to those of Member States' 'with existing measures' scenarios. This was accomplished for each Member State that provided data in Table 6 and Table 7 of Annex XXV of the Governance Implementing Regulation; the results are documented in Section [BR5] 5.5.

[BR5] 5.7.3 Changes in overall projection results and assumptions compared to GHG projections reported under the previous Biennial Report (4BR)

This section provides a comparison of key data and assumptions with projection data from the EU's 4th Biennial Report and provides information on possible reasons for differences.

Table 31 provides information on total greenhouse gas emission reductions compared to 1990 and projected for 2030 in the latest two Biennial Reports. Compared to the EU's 4th Biennial Report, emission reductions in 2030 are larger in both scenarios.

The data are not perfectly comparable as the following circumstances have changed between the EU's Fourth and Fifth Biennial Report:

- the UK has exited the EU and its projections are no longer included; and
- the totals reported for the EU's Fifth Biennial Report in this chapter include indirect CO_2 emissions, which were reported separately for projections under the Governance Regulation for the first time. However, the effect of these on total greenhouse gas emissions is not significant.

Among the reasons for these stronger projected emission reductions in the EU's Fifth Biennial Report are the consideration of enhanced EU-wide and national legislation in individual European Member States' projections and higher fuel import price assumptions.

Table 31: Comparison of total GHG emissions excluding LULUCF, including international aviation in the two recent Biennial Reports in the 'with existing measures' scenario and in the 'with additional measures' scenario

Report	GHG emission reduction in 2030 compared to 1990 in percent	
	'with existing measures'	'with additional measures'

[759] Commission Implementing Regulation (EU) 2020/1208. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32020R1208&from=EN#d1e32-98-1.

EU's Fourth Biennial Report (scope: EU-27+UK)	30 %	36 %
EU's Fifth Biennial Report (scope: EU-27)	33 %	39 %

Table 32: Comparison of key assumptions in the EU's Fourth (BR4) and Fifth (BR5) Biennial Reports

Parameter	2025		2030		2035	
	BR4	BR5	BR4	BR5	BR4	BR5
GDP (million Euro (2016))	16,794,88	14,481,403	18,150,38	15,397,012	19,402,48	16,355,252
Population (million)	511.50	448	517.61	449	520.14	449
International oil price (Euro (2016) / GJ)	12.37	18.0	13.74	20.3	14.08	23.0
International gas price (Euro (2016) / GJ)	7.08	10.3	7.76	11.0	8.06	12.0
International coal price (Euro (2016) / GJ)	2.92	3.2	3.43	3.5	3.52	3.7
EU ETS price (Euro (2016) / t CO_2)	21.73	28	33.01	32	39.54	40

Note: The EU's Fifth Biennial Report included the UK. EU-wide projections in the EU's Fifth Biennial Report exclude the UK. Thus, GDP and population data are not perfectly comparable. Monetary assumptions from the Fifth Biennial Report were calculated as population-weighted averages (except for GDP) based on individual European Member States' assumptions.

[BR5] 6 PROVISION OF FINANCIAL, TECHNOLOGICAL AND CAPACITY-BUILDING SUPPORT TO DEVELOPING COUNTRIES

[BR5] 6.1 Introduction

This chapter includes information on the financial, technological and capacity-building support provided by the EU and its Member States. The EU support reported here is provided by EU institutions and the European Investment Bank (EIB) to developing country Parties that are part of the UNFCCC. The information covers the calendar years of 2019 and 2020. More specific information on climate finance provided by individual EU Member States can be found in the respective Member States' National Communications or Biennial Reports.

Detailed information and data on the EU's and EIB's support provided in 2019 and 2020 are included in the CTF tables 7, 8 and 9, and the CTF documentation box (Appendix I) and in the list of finance committed by the EIB (Appendix II).

The methodology used to track EU and EIB support is outlined in section [BR5] 6.2.3. This includes details on how support has been categorised as 'new and additional,' and how the purpose of the support has been defined as either mitigation, adaptation or cross-cutting.

[BR5] 6.2 The EU's approach to provision of support, including the provision of new and additional resources

The EU tracks the provision of its support through a project-based monitoring and reporting system. The system uses the Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) Rio Markers to categorise and track the extent to which a project is deemed to provide support, alongside more than 50 additional project markers that allow for further support tracking, for instance by geographical location, economic sector, financial instrument or funding source.

The financial resources reported in this Biennial Report are considered 'new and additional resources,' meaning that they were committed after and not included in the previous National Communication or Biennial Report (i.e. the new and additional resources were committed in either 2019 or 2020). As EU budgets are determined on an annual basis, each annual commitment cycle represents new and additional resources.

This methodology, along with the process of allocating Rio Markers to projects and apportioning the resulting support, is described in detail in Section [BR5] 6.2.3 'Methodology for tracking the provision of finance, technology and capacity building support,' below. Information is also provided in the same section on how the EIB categorises its provision of climate finance.

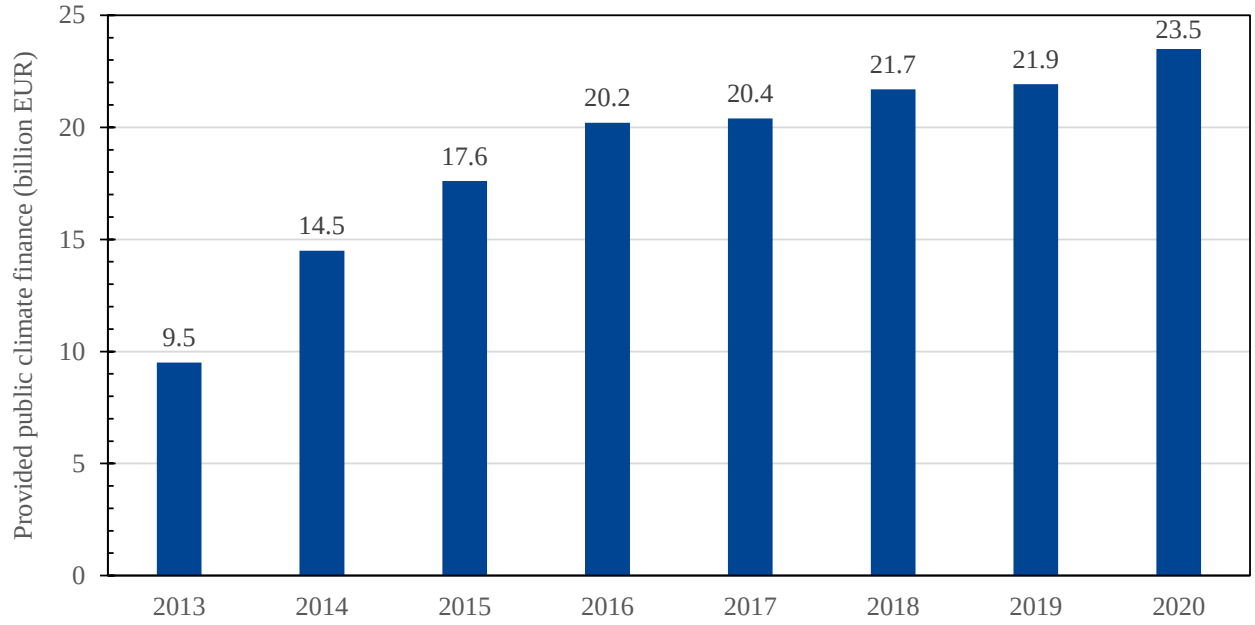
[BR5] 6.2.1 Addressing the needs of non-Annex I Parties

[BR5] 6.2.1.1 Overall approach

When taken as a collective, the EU, its Member States and the EIB are the largest providers of public climate finance to developing countries, contributing EUR 23.2 billion in 2019 including the UK/EUR 21.9 billion in 2019 excluding the UK and EUR 23.5 billion in 2020 (excluding the UK). The figure for 2019 includes EUR 2.5 billion from the European Commission (EC) and EUR 3.2 billion from the EIB, and the figure for 2020 includes EUR 2.6 billion from the EC and EUR 2.8 billion from the EIB.[760] The figures are discussed further in Section [BR5] 6.3.

This collective figure has continued to increase over the past 7 years, from EUR 9.5 billion in 2013 to EUR 23.5 billion in 2020; this is an increase by almost 150 %.

Figure 80: Provision of EU, Member State and EIB public climate finance to developing countries from 2013 to 2020



Sources: European Commission, EIB, submissions by EU Member States.[761]

Notes: Figures for 2019 and 2020 include support from 27 Member States, excluding the UK.

The EU considers climate change a key point of engagement with EU candidate and potential candidate countries, European Neighbourhood Policy partner countries, and all developing countries.

[760] In order to maintain consistency with the figures presented in earlier Biennial Reports, these figures include EUR 0.6 billion for 2019 and EUR 0.7 billion for 2020 of support to Belarus, Turkey and Ukraine, which are Annex I countries to the UNFCCC but belong to the list of ODA eligible countries.

[761] An analysis of the Climate Finance Reporting of the European Union, https://actalliance.eu/wp-content/uploads/2018/04/Analysis-of-the-climate-finance-reporting-of-the-EU.pdf; International climate finance, https://ec.europa.eu/clima/policies/international/finance_en; see also https://ec.europa.eu/eurostat/databrowser/view/sdg_13_50/default/table?lang=en.

This takes place through discussions and policy dialogues, and supporting action through financial support[762].

The EU recognises that climate action is most effective where support is designed and implemented in partnership with national governments. For this reason, the EU works closely with partner governments to strengthen their institutional capacity to develop climate policy, in line with their own national priorities. This approach allows for national stakeholders to be included in the design of the bilateral support programmes provided by the EU, providing the level of input necessary so that these support programmes consider the partner country's or region's own development plans. These include regional and sectoral plans such as national adaptation programmes of action (NAPAs) and national adaptation plans (NAPs)[763]. During 2019 and 2020, financial support of more than EUR 5 billion from the EU budget was provided to developing countries to mitigate and adapt to climate change, with a larger share of funds going towards the latter.

A new EU Climate Adaptation Strategy was adopted in February 2021. It aims to scale up international finance and to stronger engage and exchange globally on adaptation (see also chapter [NC8] 6.7.2 of the EU's Eighth National Communication).[764]

In addition, the EU establishes and maintains strategic partnerships such as the Africa-EU Strategic Partnership, the Joint Declaration on Sustainable Energy (signed between the EU, EIB and CARIFORUM)[765] and the Just Energy Transition Partnership with South Africa.[766] The EU also participates in regional processes (e.g. African Environment Ministries) and supports relevant regional institutions (e.g. Caribbean Community Climate Change Centre)[767].

[BR5] 6.2.1.2 Specific programmes, thematic instruments and focus areas

Since 2021, EU external cooperation is implemented through the Neighbourhood, Development and International Cooperation Instrument – 'Global Europe' (NDICI-GE). The NDICI-GE is the EU's main financing tool to contribute to eradicating poverty and promoting sustainable development, prosperity, peace and stability and has a budget of EUR 79.46 billion for the period 2021-2027.[768] It consolidates previous development cooperation funds into one instrument and consists of three pillars:

- the geographical pillar supports dialogue and cooperation with third countries with a budget of EUR 60.39 billion;

[762] International climate finance, https://ec.europa.eu/clima/policies/international/finance_en.
[763] National adaptation plans, https://www4.unfccc.int/sites/NAPC/Pages/national-adaptation-plans.aspx.
[764]Forging a climate-resilient Europe, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0082&from=EN.
[765] The Joint Declaration on Sustainable Energy signed between the EU, EIB and CARIFORUM aims to reinforce cooperation in the field of sustainable energy with and support Caribbean, African and Pacific group of states in meeting their obligations stipulated in the Paris Agreement on Climate Change and the UN Sustainable Development Goals.
[766] Just Energy Transition Partnership, https://ec.europa.eu/commission/presscorner/detail/en/IP_21_5768.
[767] Caribbean Community Climate Change Centre, https://www.caribbeanclimate.bz/.
[768] International Partnerships, https://ec.europa.eu/international-partnerships/system/files/factsheet-global-europe-ndici-june-2021_en.pdf.

- the thematic pillar with a budget of EUR 6.36 billion complements the geographic pillar by funding support to human rights and democracy, civil society, stability and peace as well as global challenges;

- the rapid response pillar with a budget of EUR 3.18 billion is dedicated for interventions targeted at conflict prevention and crisis response; and

- an additional EUR 9.53 billion of unallocated funds is available to react to emerging challenges and priorities.

The NDICI-GE further contains an investment framework for external action that will consist of the European Fund for Sustainable Development (EFSD+) and the External Action Guarantee. They provide an umbrella for blended finance and guarantee operations in EU external action.[769]

Under the NDICI-GE, a spending target of 30 % for climate change applies for the period 2021-2027.

With the Instrument for Pre-accession Assistance (IPA) the EU supports capacity building in EU candidate and possible candidate countries to align with the EU's values and progressively comply with the EU rules.[770] The IPA has an operational budget of EUR 13.8 billion for the period 2021-2027, of which about 42 % are allocated to the window 'Green agenda and sustainable connectivity'.[771]

Green Climate Fund and Adaptation Fund

A group of EU Member States are the largest block of contributors to the Green Climate Fund's (GCF) first replenishment (GCF-1).

As of 2019, some EU Member States provide about 95 % of the annual voluntary pledges to the Adaptation Fund[772]. In 2020, the EC committed EUR 10 million to the Adaptation Fund as a major instrument under the Kyoto Protocol and the Paris Agreement.

Link with the sustainable development goals

Support in the form of financial and technical assistance for meeting relevant Sustainable Development Goal (SDG) targets is a cross-cutting theme for the EU's external cooperation. This includes poverty eradication as well as the economic, social and environmental dimensions of the 2030 Agenda for Sustainable Development in an integrated manner. Contributing to achieving the international commitments and objectives that the EU has agreed to, in particular the 2030 Agenda and its Sustainable Development Goals and the Paris Agreement, is a specific objective of the NDICI-GE.

In addition to the SDGs, the EU emphasizes the integration of climate policy goals into Disaster Risk Reduction (DRR), supporting the adoption of the Sendai Framework for Disaster Risk Reduction

[769] New EFSD+ and the EIB's External Lending Mandate, https://www.europarl.europa.eu/RegData/etudes/ATAG/2022/729265/IPOL_ATA(2022)729265_EN.pdf.
[770] Instrument for Pre-accession Assistance,https://ec.europa.eu/neighbourhood-enlargement/enlargement-policy/overview-instrument-pre-accession-assistance_en.
[771] Ibid.
[772] International climate finance, https://ec.europa.eu/clima/policies/international/finance_en.

(2015-2030) as well as the Joint Communication on a Strategic Approach to Resilience in the EU's external action. The EU's five-year Sendai Action Plan[773] is the basis for a disaster-risk-informed approach to policy making and resilient sustainable development.

The EU supports countries in implementing Sendai Framework priorities through strengthening national and regional coordination, including the development of DRR strategies and data collection plans.[774] The European Forum for Disaster Risk Reduction serves as a platform for stakeholders from Europe and Central Asia to take a shared responsibility and make actionable commitments to reduce disaster risk.[775] It adopted a roadmap for a disaster-resilient European and Central Asian region by 2030, that includes modalities for cooperation based in commitments.[776]

Developing resilience

Resilience is a central objective for the EU in its development and humanitarian assistance. In 2015, the EU introduced a resilience marker in all its funded humanitarian projects. It is a tool for assessing the extent to which actions integrate resilience by accounting and addressing risk related to climate change, environmental degradation, natural and biological hazards, as well as conflicts and epidemics.[777] A group of EU Member States has supported the Pilot Programme for Climate Resilience, and the EU supports the Global Alliance for Resilience Initiative (AGIR)[778] in the Sahel and West Africa, which aims to foster the resilience of communities who are regularly affected by food insecurity and protracted conflicts. It also funds disaster risk reduction projects in Africa, the Caribbean and the Pacific.

Food security

Similarly, with regards to food security, the Pro-ACT 'Pro-Resilience Actions' is the specific European Commission tool[779] designed to respond – in complementarity with the European Civil Protection and Humanitarian Aid Operations of the European Commission – to major post-food crises, promoting the resilience of affected communities, and to build capacity of public institutions, private organisations and civil society organisations to respond to and prevent food crises (notable examples AGIR and SHARE initiatives) by making EUR 70 million available annually for Pro-ACT.

The European Commission supports the Global Fertilizer Challenge, which aims to raise USD 100 million to strengthen food security and advance fertilizer efficiency to reduce agricultural emissions.

[773] Action Plan on the Sendai Framework for Disaster Risk Reduction 2015-2030 ,https://climate-adapt.eea.europa.eu/metadata/publications/action-plan-on-the-sendai-framework-for-disaster-risk-reduction-2015-2030-a-disaster-risk-informed-approach-for-all-eu-policies.
[774] Strengthening disaster resilience and accelerating implementation of Sendai Framework for Disaster Risk Reduction in Central Asia ,https://www.eeas.europa.eu/eeas/strengthening-disaster-resilience-and-accelerating-implementation-sendai-framework-disaster_en.
[775] European Forum for Disaster Risk Reduction, https://efdrr.undrr.org/.
[776] EFDR Roadmap, https://efdrr.undrr.org/sites/default/files/2021-11/EFDRR%20Roadmap%202021-2030.pdf.
[777] Resilience marker, https://www.dgecho-partners-helpdesk.eu/mssa/action-proposal/fill-in-the-single-form/8-resilience-marker.
[778] AGIR (the Global Alliance for Resilience Initiative), https://civil-protection-humanitarian-aid.ec.europa.eu/agir-global-alliance-resilience-initiative_en.
[779] Pro Resilience Action, https://knowledge4policy.ec.europa.eu/projects-activities/pro-resilience-action-proact_en.

In 2019 and 2020, the European Commission implemented its "Landscape for the future" initiative to promote and support sustainable landscape management initiatives worldwide and highlight the benefits of such integrated approaches to achieve multiple objectives in the areas of climate adaptation, mitigation, sustainable agriculture and ecosystems conservation. Over these two years, 45 programmes proposed by the EU Delegations, EU Member States and partner countries started their activities, with a total funding of over 200 million EUR (including the co-financing from EU Member States). This integrated initiative built on the experience acquired and the resources of EU action under the Global Climate Change Alliance, the Developing Science, Innovation and Research for Agriculture (DESIRA) and Biodiversity for Life.

Forestry initiatives

In July 2019, the European Commission adopted the Communication on Stepping up EU Action to Protect and Restore the World's Forests[780]. The Communication proposes a partnership with producer and consumer countries as well as business, the research community, and civil society, in particular through the planned multi-stakeholder platform on deforestation and forest degradation. The Communication's actions are based on five priorities and address both the supply and demand side of the issue: i) to reduce the EU consumption footprint on land and encourage the consumption of products from deforestation-free supply chains in the EU; ii) to work in partnership with producing countries to reduce pressures on forests and to 'deforest-proof' EU development cooperation; iii) to strengthen international cooperation to halt deforestation and forest degradation, and encourage forest restoration; iv) to re-direct finance to support more sustainable land-use practices; and v) to support the availability of, quality of, and access to information on forests and commodity supply chains, and support research and innovation.

The EU supported several facilities that promote sustainable forest management.[781] One of them is the EU Forest Law Enforcement, Governance and Trade (FLEGT) Facility, which supports the implementation of the EU FLEGT Action Plan. Its objectives have been to reduce illegal logging by strengthening sustainable and legal forest management, improving governance and promoting trade in legally produced timber.[782]

The EU supported the EU Reducing Emissions from Deforestation and forest Degradation (REDD) Facility in order to improve land-use governance in partner countries as part of their efforts to slow, halt and reverse deforestation.[783] The Facility focuses on countries that are engaged in activities under the REDD+ programme under the UNFCCC. One of the strategic objectives of the EU REDD facility for the period 2018-22 was to support REDD+ countries in implementing their NDCs by supporting the clarification and implementation of legal frameworks, enabling sustainable land-use investment and management as well as informing deforestation-free production and trade.

[780] EU Communication (2019) on stepping up EU action to protect and restore the world's forests, https://ec.europa.eu/info/publications/eu-communication-2019-stepping-eu-action-protect-and-restore-worlds-forests_en.
[781] International partnerships - Forests, https://international-partnerships.ec.europa.eu/policies/climate-environment-and-energy/forests_en.
[782] FLEGT, https://www.euflegt.efi.int/what-is-flegt.
[783] EU REDD Facility, https://www.euredd.efi.int/about.

The Forest and Land Tenure Facility provided grants and technical assistance directly to Indigenous Peoples and local communities to support their efforts to secure tenure. The facility has a particular focus on mitigating climate change as well reducing conflict and promoting gender equality.[784]

Adaptation

As part of the European Green Deal the EU formulated a new Strategy on Adaptation to Climate Change which includes a component on international cooperation.[785] The EU acknowledges the importance of financial support for adaptation, mainstreaming adaptation into development cooperation, and aiming at balancing the support for adaptation and mitigation. At the climate change conference in Glasgow in 2021, the European Commission announced that around half of the climate change-related support for external cooperation in the period 2021-2027 will serve adaptation benefits.[786] In recognition of the Cancun Framework Agreement and the UNFCCC Nairobi Work Programme, support for adaptation is provided through a range of channels. These include bilateral agreements, as well as a range of multilateral institutions and funds such as the Adaptation Fund, the Green Climate Fund, and the Global Environment Facility with its Least Developed Countries Fund and Special Climate Change Fund. After contributing EUR 10 million in 2020 to the Adaptation Fund, the European Commission announced a new pledge of EUR 100 million to the Fund at COP26 in Glasgow.[787]

In parallel, the EU contributes to a number of other dedicated adaptation funds and programmes. EU support builds on the available vulnerability assessments and on the needs and priorities expressed by developing countries in their national development and adaptation strategies. These strategies include NAPAs, national strategies on DRR and national action plans on desertification, land degradation and drought as well as NAPs or equivalent strategic processes and documents. Supported actions include, inter alia, diversifying livelihoods, improving access to information, enhancing coastal zone management, reducing disaster risks and promoting improved agricultural techniques such as agroforestry as well as soil and water conservation.

In 2021, the EIB launched its first dedicated Adaptation Plan, which will support objectives of the EU Adaptation Strategy inside and outside the EU. The EIB is committed to increasing the share of adaptation support to 15 % of the bank's overall climate action by 2025. The EIB will further increase the share of financing it can provide for projects that are primarily motivated by adaptation to 75 % of the project cost globally and to 100 % in the least developed countries and small island developing states.[788] It further entered into a memorandum of understanding with the Global Center on Adaptation to strengthen cooperation on climate change adaptation with a focus on the most vulnerable regions.

[784] International partnerships - Forests, https://international-partnerships.ec.europa.eu/policies/climate-environment-and-energy/forests_en.
[785] Forging a climate-resilient Europe, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0082&from=EN.
[786] Compilation of 2021-2025 Climate Finance Commitments, https://ukcop26.org/wp-content/uploads/2021/11/Table-of-climate-finance-commitments-November-2021.pdf.
[787] Ibid.
[788] COP26: EIB will triple climate adaptation finance with new Adaptation Plan, https://www.eib.org/en/press/all/2021-387-cop26-eib-will-triple-climate-adaptation-finance-with-new-adaptation-plan.

Mobilisation of climate finance

Many developing countries stress that climate finance will be vital to enable their NDC delivery. The EU played a lead role in mobilising funding and technical assistance for developing countries to support the preparation of their Intended Nationally Determined Contributions and updated NDCs, e.g. through the EU Global Support Facility for NDCs. The EU NDCs Facility is part of the EU effort to develop an integrated offer of technical assistance and knowledge in support of the external dimension of the EU Green Deal, covering climate action, but also other key Green Deal priorities: sustainable energy, circular economy, water, biodiversity and forests, green cities, sustainable agriculture and food systems, environment and climate change mainstreaming. Through the Facility, the EU aims to support partner countries to accelerate the transition towards low-carbon, resource efficient and resilient economies. In this respect, the Facility delivers technical assistance, knowledge sharing and policy advice via ad hoc requests of EU Headquarters, EU Delegations and main partners at a country, regional and global level to support the design, update and implementation of partner countries NDCs, Long Term Strategies and NAPs, in the context of the Paris Agreement, the Sendai Framework and the 2030 Agenda. The Facility also provides specific inputs to the programming, identification, formulation and implementation of EU-funded interventions that are geared towards implementation of actions envisaged in NDCs.

In November 2019, the EIB Board of Directors decided to increase the level of climate and environment commitment for the EIB Group. This increased ambition has far-reaching implications for the Group, effectively transforming it from "an EU bank supporting the climate" into "the EU climate bank". The EIB Group has committed to supporting EUR 1 trillion of investments in climate action and environmental sustainability in the period from 2021 to 2030, and to increasing the share of EIB financing dedicated to climate action and environmental sustainability to over 50 % by 2025 and beyond.[789] These commitments apply to the Bank's activities outside and within the European Union. Specifically, the EIB aims to dedicate 50 % of annual financing to climate action and environmental sustainability outside and within the European Union. Chapter [BR5] 7 'Other reporting matters' of this report summarises the EU's actions to align finance flows as per Article 2.1c of the Paris Agreement.

The EU remains committed to contributing to the collective goal of developed countries of mobilising USD 100 billion per year by 2020 to support meaningful climate actions in developing countries. This goal was extended until 2025 in the context of meaningful mitigation actions and transparency on implementation, prior to which a new goal will be set. The funding will come from a variety source, i.e. public and private, bilateral and multilateral sources. The EU has set out its strategy for mobilising more climate finance and, to this end, has committed to spending at least 20 % of the EU budget on climate action by 2020. This target has been reached as during the period 2014-2020, 20.59 % of the total EU budget has been allocated to combating climate change.[790] The Commission is also on schedule to reach the target of providing at least EUR 14 billion (an average of EUR 2 billion per year) of public grants to support activities in developing countries between 2014 and

[789] Climate Bank Roadmap, https://www.eib.org/en/about/priorities/climate-action/cbr/index.htm.
[790] Supporting climate action through the EU budget, https://ec.europa.eu/clima/eu-action/funding-climate-action/supporting-climate-action-through-eu-budget_en.

2020,[791] and funding for international climate action has more than doubled since 2013 (see section [BR5] 1.2.1.1.). In line with the Paris Agreement, the commitment of the UN 2030 Agenda for Sustainable Development and its SDGs, 30 % of EU expenditure will be spent combating climate change for the period 2021 to 2027.[792]

Mainstreaming climate objectives

The EU understands that mainstreaming climate objectives into broader development goals will be fundamental to the transition to a low-carbon, climate-resilient world. The EU constantly mainstreams climate change into all its policies, including development assistance, which is distributed through multi-annual strategies and programmes, which are jointly prepared by the European External Action Service and the European Commission. The EU has established an ambitious Action Plan on Financing Sustainable Growth with a framework of measures through which it provides climate finance to non-Annex I countries. In addition, climate change is increasingly being integrated into the EU's broader strategy for development assistance through mainstreaming.

[BR5] 6.2.2 Innovating in delivering support: engaging the private sector in adaptation and mitigation in developing countries

The EU is using innovative ways to deliver support that engages the private sector in adaptation and mitigation activities in developing countries. Private investment, alongside and attracted by public investment, is seen as crucial to scaling-up climate finance and closing current finance gaps. Private investors are increasingly willing to fund low-carbon investment, yet this significant potential capital remains relatively untapped. Removing barriers and improving the enabling conditions for attracting private investment in recipient countries is essential.

In addition to its reporting, the EU is developing public initiatives to mobilise private climate finance directly, and to support the creation of appropriate enabling environments. EUR 3.7 billion was made available for sustainable energy cooperation in 2014-2020[793]. With a total EU contribution of more than EUR 300 million, the European Commission has been working with multiple development partners to further accelerate sustainable energy investments in partner countries. Through the Electrification Financing Initiative (ElectriFI),[794] Climate Investor One,[795] the Africa Renewable Energy Scale-Up Facility,[796] the Digital Energy Facility,[797] the Transferability & Convertibility Facility and the Facility for Energy Inclusion,[798] the European Commission has decisively increased the provision of risk capital for sustainable energy investments and has thus made a significant

[791] International climate finance, https://ec.europa.eu/clima/policies/international/finance_en.
[792] Supporting climate action through the EU budget, https://ec.europa.eu/clima/eu-action/funding-climate-action/supporting-climate-action-through-eu-budget_en.
[793] International climate finance, https://ec.europa.eu/clima/policies/international/finance_en.
[794] The Electrification Financing Initiative, https://www.electrifi.eu/.
[795] Climate Fund Managers, https://www.climateinvestorone.com/nl/.
[796] Africa Renewable Energy Scale-up Facility, https://www.get-invest.eu/fund/africa-renewable-energy-scale-up-facility-are-scale-up/.
[797] La Digital Energy Facility | AFD - Agence Française de Développement, https://www.proparco.fr/en/are-scale.
[798] Facility for Energy Inclusion, https://www.gogla.org/facility-for-energy-inclusion-fei.

contribution to leveraging additional funds and increasing the total volume of funds available for financing.

To scale up the mobilisation of private capital for environmentally sustainable investment, the EU, together with relevant authorities from Argentina, Canada, Chile, China, India, Kenya and Morocco launched the International Platform on Sustainable Finance in 2019. Since then, further countries have joined the platform whose current 18 members represent 50 % of the world's population. The platform provides a forum for dialogue between policymakers who can exchange and disseminate information to promote best practices, compare their different initiatives and identify barriers and opportunities of sustainable finance, while respecting national and regional contexts.[799]

The European Commission has recently set up a High Level Expert Group on scaling up sustainable finance in low and middle income countries mandated to recommend actions the EU can take to accelerate private finance for the implementation of the external dimension of the Green Deal and a green, just and resilient recovery in partner countries. It will inform the upcoming EU strategy on scaling up sustainable finance in low and middle-income countries.

The EU is also in the process of setting up the Global Green Bond Initiative that will support the expansion of the green bond markets in partner countries, thus helping them mobilise capital from institutional investors to finance – through green bonds – their climate and environmental projects. Through technical assistance, the EU supports partner countries to develop credible sustainable finance frameworks and taxonomies and to develop pipelines of green, bankable projects, and fostering linkages between local projects, entrepreneurs and global investors.

ElectriFI

Through ElectriFI, the EU continues to support small- and medium-sized private-sector-led investments in affordable, reliable, sustainable and modern energy. The initiative has already attracted significant interest from the private sector, development financiers and global development partners as an important platform in support of the sustainable energy agenda. The EU has contributed EUR 108 million complemented by USAID/Power Africa (USD 10 million) and the governments of Sweden and Italy (EUR 5 million each). At the end of 2020, the investment portfolio of ElectriFI included more than 25 investments, which are expected to allow at least 9 million beneficiaries to gain new/improved access to electricity. Moreover, eight African countries (Benin, Côte d'Ivoire, Nigeria, Zambia, Uganda, Kenya, Eswatini and Burundi) and the Pacific region channelled funding from their bilateral envelopes to establish specific ElectriFI country windows, amounting to a total allocation of EUR 150 million. The ElectriFI concept has also been replicated in other sectors, such as agriculture with the set-up of a dedicated financing initiative.

Demand side management, Social Infrastructures, Renewables and Energy Efficiency

In 2021, the EU and the EIB agreed on the programme entitled "Demand side management, Social Infrastructures, Renewables and Energy Efficiency". The Programme is a joint initiative of the EIB and the European Commission and will work on energy efficiency supporting the establishment and

[799] International Platform on Sustainable Finance, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/international-platform-sustainable-finance_en.

operationalisation of super energy service companies in three countries but also in demand side management commercial consumer energy efficiency measures, such as solar water heaters, efficient lighting and cooling.

Blending finance initiatives

Other thematic initiatives for blending finance include the Climate Finance Initiative.[800]

The leveraging of private finance is critical to achieving climate finance targets at the global level and the EU is prioritising actions to mobilise the private sector. Furthermore, it is important for developing countries to attract additional public and private financing, to transition to a low-carbon economy and drive sustainable economic growth. The EU recognises that international climate finance should be used as a lever to incentivise climate-resilient, low-carbon investments. The EU's approach is twofold: firstly, to provide grant funding directly to the poorest and most vulnerable countries and, secondly, to use grant funding to leverage private investment by combining grants with loans and equity from public and private sources including bilateral and multilateral development banks.

The EU has established a number of finance blending facilities that combine grant funding with loans, with each facility covering different regions. Through these facilities, the EU has provided grant finance to blended projects and helped unlock investments in partner countries, by combining EU grants with public and private financing.

Key Regional Investment Facilities (blending mechanisms) have been established over the years to leverage private finance (e.g. LACIF, APIF, AIP, NIP, WBIF). Besides traditional forms of support, the EU blending facilities mobilise additional financing from private and public sources for climate action and complement other aid modalities. Blending is the combination of EU grants with loans or equity from public and private financiers. EU grants can take different forms: investment grant and interest rate subsidy, technical assistance, risk capital and guarantees. EU regional blending facilities operate in all regions of EU external cooperation and help partner countries transition to low-carbon and climate resilient economies.

With the operationalisation of the new EFSD+ the European Commission's capacity to support, unlock, accelerate and leverage sustainable energy investments is considerably enhanced, while partnerships with countries in partner regions are being strengthened in view of achieving the Sustainable Development Goals and helping to address some root causes of migration. As a major financing instrument for activities like the Global Gateway, the EFSD+ focuses on objectives like climate investment. The EFSD+, a global instrument, is built on the experiences of its predecessor, the EFSD, whose activities were limited to Sub-Saharan Africa and the EU Neighbourhood. The EFSD Guarantee has an important energy component, as five (three focusing on Africa) of a total of fifteen approved guarantee tools[801] are under the Sustainable Energy and connectivity window. In addition, a large share of EU blending projects are in the energy and transport sectors; climate change and environmental considerations are mainstreamed in all the blending activities.

[800] International climate finance, https://ec.europa.eu/clima/policies/international/finance_en.
[801] EU External Investment Plan guarantees, https://ec.europa.eu/eu-external-investment-plan/eu-eip-guarantees_en.

Insurance coverage is another finance model, which can be harnessed to reduce the risks faced by low-income populations due to climate change. G7 leaders have agreed to increase, by up to 400 million, the number of people in the most vulnerable developing countries who have access to direct or indirect insurance coverage against the negative impact of climate- change-related hazards by 2020. This will build on existing risk insurance facilities such as the African Risk Capacity and the Caribbean Catastrophe Risk Insurance Facility. In addition, the EU is a member of the "InsuRelisience Global Partnership for Climate and Disaster Risk Finance and Insurance Solutions," which brings together countries, civil society, international organizations, the private sector, and academia. It particularly builds on a collaboration between the G20 and the V20 countries.[802]

[BR5] 6.2.3 Methodology for tracking the provision of finance, technology and capacity building support

The methodology used by the EU and the EIB for tracking the provision of finance, technology and capacity building support is described below, beginning with a list of definitions for important terms used in the EU's methodologies. Following this list of terms, Table 33 describes the EU's approach to applying the Rio Markers. The EIB's approach to tracking climate relevant financial flows are then described, followed by a brief description of how the EU completes the annual OECD survey regarding mobilised climate finance from the private sector.

- **Climate finance**: The UNFCCC defines climate finance as finance that aims at reducing emissions, and enhancing sinks of greenhouse gases and aims at reducing the vulnerability of, and maintaining and increasing the resilience of, human and ecological systems to negative climate change impacts (adapted from the UNFCCC Standing Committee on Finance's definition of climate finance).

- **Mitigation activities**: An activity should be considered as climate change mitigation related if it contributes to the objective of stabilisation of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system by promoting efforts to reduce or limit GHG emissions or to enhance GHG sequestration (adapted from the operational definition and criteria for eligibility used in the OECD-DAC (Policy Markers).[803]

- **Adaptation activities**: An activity should be regarded as adaptation-related if it intends to reduce the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by maintaining or increasing adaptive capacity and resilience. This encompasses a range of activities from information and knowledge generation, to capacity development, planning and the implementation of climate change adaptation actions (adapted from the operational definition and criteria for eligibility used in the OECD-DAC Policy Markers).

- **Climate-relevant technology development and transfer**: A broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change amongst different stakeholders such as governments, private sector entities, financial institutions, non-governmental organisations (NGOs) and research/education institutions. The broad and

[802] InsuResilience, https://www.insuresilience.org/members-partners/.
[803] Financing for sustainable development, https://www.oecd.org/dac/financing-sustainable-development/.

inclusive term 'transfer' comprises the process of learning to understand, utilise and replicate the technology, including the capacity to choose and adapt to local conditions and integrate it with indigenous technologies (adapted from the IPCC definition of climate-relevant technology transfer).

- **Climate-relevant capacity building**: Capacity-building is a process which seeks to build, develop, strengthen, enhance and improve existing scientific and technical skills, capabilities and institutions particularly in developing countries, to enable them to assess, adapt, manage and develop technologies. Capacity building must be country-driven, addressing specific needs and conditions of developing countries and reflecting their national sustainable development strategies, priorities and initiatives (adapted from the UNFCCC definition of capacity building activities).

The Rio markers are policy indicators and were not originally intended to accurately quantify climate finance. Therefore, an activity can have more than one principal or significant policy objective (i.e. it can be marked for several Rio markers; mitigation, adaptation and other Rio conventions such as Biodiversity and Desertification). The EU has adopted the following approach to 'translate' the Rio marked data into estimated flows of climate finance:

Table 33: Rio marker approach

Markers	Mitigation (%)	Adaptation (%)	Cross-cutting (%)	Total (%)
2 M & 0 A	100	0	0	100
1 M & 0 A	40	0	0	40
0 M & 2 A	0	100	0	100
0 M & 1 A	0	40	0	40
2 M & 1 A	100	0	0	100
1 M & 2 A	0	100	0	100
2 M & 2 A	0	0	100	100
1 M & 1 A	0	0	40	40

Source: Own compilation.

For example, if an EU commitment of EUR 1 million was made to a project going to a developing country Party that was marked as 'Principal' for mitigation ('2 M' in the above table) and 'Significant' for adaptation ('1 A' in the above table), then 100 % of that EUR 1 million would be categorised as mitigation and 0 % as adaptation.

Similarly, if the above project was not marked for mitigation but was marked as 'Significant' for adaptation, 40 % of that EUR 1 million would be categorised as adaptation, and 0% as mitigation.

This Biennial Report covers support that was committed by the EU and the EIB in 2019 and 2020. A commitment requires that a final decision has been taken on the allocation of the funds to a specific

project and programme. In general, disbursement will follow commitment unless exceptional circumstances arise. The EU also completes the annual OECD survey on data regarding mobilised climate finance from the private sector in the form of a supplementary Common Reporting Standard Excel file. This file provides information on the recipient country, project title, amounts mobilised from the private sector, amounts invested by the EU, as well as the type of financing mechanism used (Guarantees, syndicated loans, investments/shares in collective investment vehicles, direct investment in companies and project finance special purpose vehicles, credit lines, simple co-financing arrangements).

The EIB's climate-relevant financial flows are tracked using the joint approach developed by the Multilateral Development Banks (MDBs) which does not use the Rio markers. In 2015, Common Principles for tracking mitigation finance were developed with the International Development Finance Club (IDFC) and other multilateral development banks. The Common Principles for Climate Mitigation Finance tracking were updated in October 2021.[804] In 2020, the EIB Board approved the EIB Group Climate Bank Roadmap which sets out how the Group will deliver on its new climate and environment ambitions. This includes a commitment to gradually implement the EU Taxonomy criteria in relation to its tracking of climate action and environmental sustainability. The EIB started to apply the "substantial contribution" criteria of the first EU Taxonomy Delegated Act covering climate change mitigation and adaptation from the start of 2022, whilst remaining within the overall framework of the Joint MDB/IDFC Common Principles. For the reporting period of the Biennial Report (2019-20), the EU taxonomy criteria were not applied by the EIB. Further details on the EIB tracking methodology are available on the EIB website[805].

Also, the Joint Reports on MDB Climate Finance include climate co-financing flows that are invested alongside MDBs' climate finance activities, together with an explanation of how these are determined. Climate co-finance is defined as the amount of financial resources contributed by external public and private entities alongside climate finance invested by MDBs.

[BR5] 6.3 Financial resources

This section provides information on the total climate finance provided to developing countries through bilateral channels (by the EC) and multilateral channels (by the EC and the EIB) during 2019 and 2020.[806] Climate finance provided through bilateral channels is reported in section [BR5] 6.3.1, and climate finance provided through multilateral channels is reported in section [BR5] 6.3.2.

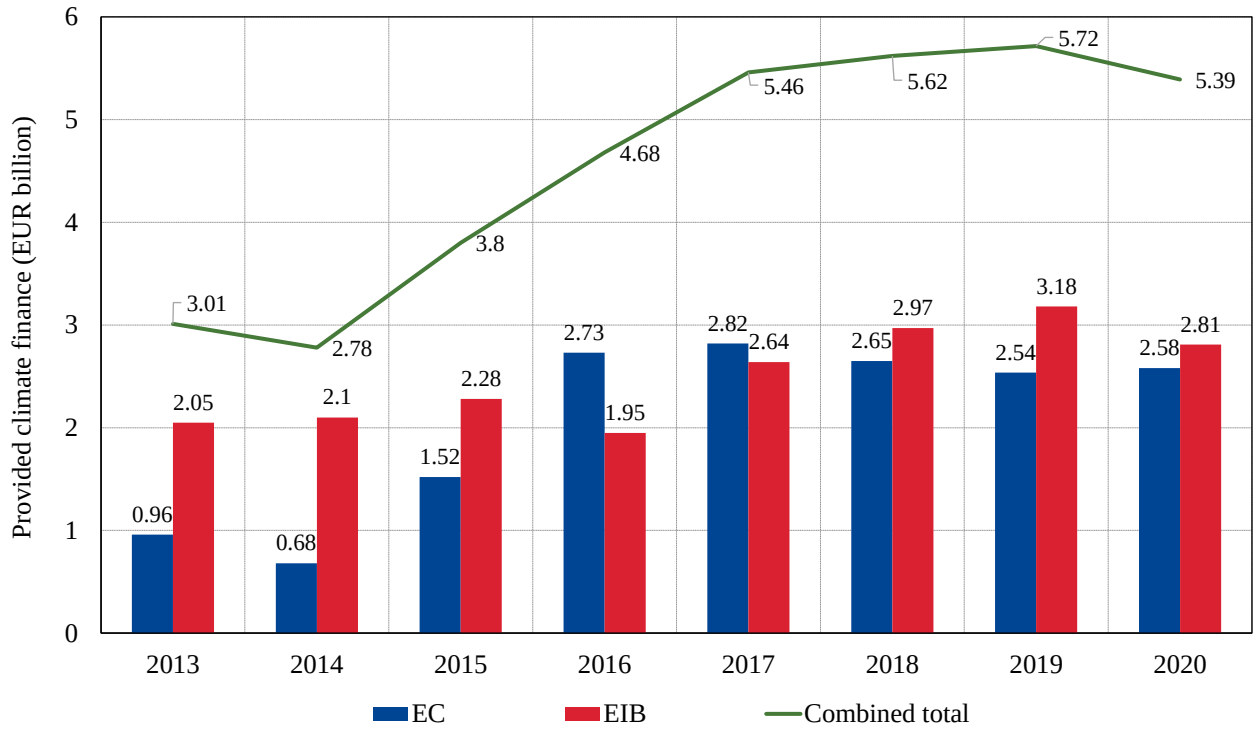
[804] Common principles for climate mitigation finance tracking, https://www.eib.org/attachments/documents/mdb_idfc_mitigation_common_principles_en.pdf. The MDB's methodologies for climate tracking are detailed in their latest 'Joint report on multilateral development banks' climate finance 2020', published in July 2021, see https://thedocs.worldbank.org/en/doc/9234bfc633439d0172f6a6eb8df1b881-0020012021/original/2020-Joint-MDB-report-on-climate-finance-Report-final-web.pdf.

[805] European Investment Bank Climate Action - Eligible sectors and eligibility criteria, https://www.eib.org/en/publications/climate-action-lending-eligibility-list.

[806] All the EU's finance climate finance provided to developing countries to the UNFCCC is classified as official development assistance (ODA). The figures include support for Annex I and non-Annex I developing countries.

Over the last 8 years, total climate finance provided by the EC and the EIB has increased by 79 %, from approximately EUR 3 billion in 2013 to approximately EUR 5.4 billion in 2020. This is displayed in Figure 81.

Figure 81: Provision of EU and EIB climate finance to developing countries, 2013-2020

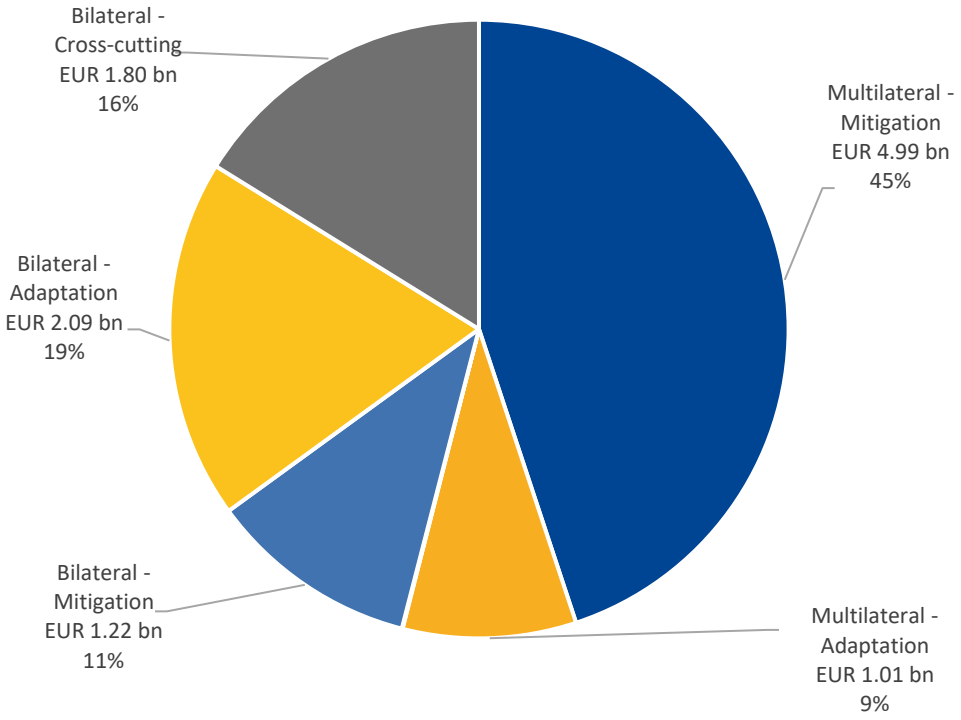


Source: European Commission and EIB.

During 2019 and 2020, 56 % of the climate finance by the EC and the EIB was committed to mitigation purposes and 28 % to adaptation purposes. For 16 %, the purpose is cross-cutting.[807] 54 % of the finance was committed through multilateral channels and 46 % through bilateral channels. The total bilateral and multilateral climate finance committed according to type of support is presented in Figure 82.

Figure 82: Total bilateral and multilateral finance in billion EUR in 2019 and 2020

[807] This includes bilateral contributions and one multilateral contribution (EUR 4.6 million) by the EC.



Source: European Commission and EIB.

[BR5] 6.3.1 Financial support through bilateral channels

All of the European Commission's climate finance committed to developing countries (financial support through bilateral and multilateral channels) in 2019 and 2020 was in the form of grants, and classified as official development assistance (ODA). This climate finance was marked by the Rio markers, as described in Section [BR5] 6.2.3, and is summarised below per year since publication of the last Biennial Report. It shows the amounts marked for mitigation, adaptation or cross-cutting activities, and how much of this finance went to LDCs. Only climate-specific finance committed by the EC is reported here.

In 2019 and 2020, the EC committed EUR 5.11 billion bilateral climate finance to developing countries. Of this total bilateral climate finance committed, EUR 1.2 billion was marked for mitigation, EUR 2.1 billion for adaptation, and EUR 1.8 billion as cross-cutting.

Of total climate finance provided by the EC in 2019 and 2020, almost EUR 1 billion (19.4 %) was provided to LDCs. The reason this reads 'at least' is because the EC marks its funding by country and by region, but in some cases climate finance goes to a collection of countries, and only a regional marker is used as a result, rendering it not possible to assign specific amounts to the individual countries in this regional group. Of the total climate finance provided in 2019 and 2020 to LDCs, at least EUR 426 million was marked for mitigation, EUR 477 million for adaptation and EUR 89 million for cross-cutting.

Further disaggregation of the climate finance provided by the EC in 2019 and 2020 is available in Table 34, Table 35 and Table 36, categorised by sector and by region.

Table 34: Committed EC bilateral climate finance for mitigation, adaptation and cross-cutting by sector for 2019 and 2020

Sector	Mitigation		Adaptation		Cross-cutting		Total		%
	EUR	USD	EUR	USD	EUR	USD	EUR	USD	
2019									
Energy	172,637	193,322	9,000	10,078	31,680	35,476	213,317	238,876	8%
Transport	78,552	87,964	25,230	28,253	77,400	86,674	181,182	202,892	7%
Industry	42,550	47,648	58,000	64,950	17,204	19,265	117,754	131,863	5%
Agriculture	-	-	124,168	139,046	191,829	214,814	315,996	353,859	13%
Forestry	-	-	-	-	2,000	2,240	-	-	0%
Water and sanitation	49,400	55,319	317,595	355,650	34,210	38,309	401,205	449,278	16%
Cross-cutting	110,805	124,082	223,264	250,016	163,343	182,915	497,412	557,012	19%
Other	35,800	40,090	557,173	623,934	209,540	234,648	802,514	898,671	32%
Total	**489,744**	**548,426**	**1,314,430**	**1,471,927**	**727,206**	**814,340**	**2,531,380**	**2,834,692**	
2020									
Energy	465,552	521,334	-	-	113,736	127,364	579,288	648,699	22%
Transport	40,688	45,563	137,702	154,202	104,636	117,174	283,026	316,939	11%
Industry	68,270	76,450	21,400	23,964	15,600	17,469	105,270	117,884	4%
Agriculture	8,000	8,959	143,508	160,703	208,954	233,991	360,462	403,652	14%
Forestry	8,000	8,959	-	-	-	-	-	-	0%
Water and sanitation	15,500	17,357	98,086	109,838	0	0	113,586	127,196	4%
Cross-cutting	119,800	134,155	229,716	257,240	517,163	579,130	866,678	970,524	34%
Other	4,400	4,927	147,986	165,718	108,887	121,934	261,274	292,580	10%
Total	**730,210**	**817,704**	**778,397**	**871,666**	**1,068,976**	**1,197,062**	**2,577,583**	**2,886,432**	**100%**

Source: European Commission.

Notes: Figures provided are to the factor of one thousand (‘000).
Please note that individual sectors presented in the table may not precisely add up to the total due to rounding. Percentages may not add up to 100 % due to rounding.

Table 35: Committed EC bilateral climate finance for mitigation, adaptation and cross-cutting by region for 2019

Region	Mitigation		Adaptation		Cross-cutting		Total		%
	EUR	USD	EUR	USD	EUR	USD	EUR	USD	
Europe	158,012	176,945	358,222	401,144	141,884	158,885	658,118	736,974	26%
Africa	169,310	189,597	308,238	345,172	100,891	112,980	578,439	647,748	23%
North of Sahara	-	-	32,938	36,885	1	1	32,939	36,886	1%
South of Sahara	169,310	189,597	270,500	302,912	75,090	84,087	514,900	576,596	20%
Regional	-	-	4,800	5,375	25,800	28,891	30,600	34,267	1%
America	-	-	114,950	128,723	15,609	17,479	130,559	146,202	5%
North & Central	-	-	84,950	95,129	9,400	10,526	94,350	105,655	4%
South	-	-	26,200	29,339	4,409	4,937	30,609	34,276	1%
Regional	-	-	3,800	4,255	1,800	2,016	5,600	6,271	0%
Asia	84,885	95,056	256,182	286,878	127,400	142,665	468,467	524,599	19%
Middle East	30,735	34,418	63,584	71,203	34,800	38,970	129,119	144,591	5%
South & Central	40,950	45,857	149,880	167,839	50,600	56,663	241,430	270,358	10%
Far East	-	-	42,718	47,836	12,000	13,438	54,718	61,274	2%
Regional	13,200	14,782	-	-	30,000	33,595	43,200	48,376	2%
Oceania	37,000	41,433	30,700	34,378	14,800	16,573	82,500	92,385	3%
Bilateral unallocated	40,537	45,394	246,139	264,433	326,622	365,758	613,297	686,783	24%
Total	**489,744**	**548,426**	**1,314,430**	**1,471,927**	**727,206**	**814,340**	**2,531,380**	**2,834,692**	**100%**

Source: European Commission.

Notes: Figures provided are to the factor of one thousand (‘000).
Please note that individual regions presented in the table may not precisely add up to the total due to rounding. Percentages may not add up to 100 % due to rounding.

Table 36: Committed EC bilateral climate finance for mitigation, adaptation and cross-cutting by region for 2020

Region	Mitigation		Adaptation		Cross-cutting		Total		%
	EUR	USD	EUR	USD	EUR	USD	EUR	USD	
Europe	146,910	167,706	21,653	24,718	307,322	350,824	475,885	543,247	18%
Africa	368,534	420,701	249,818	285,181	52,569	60,010	670,921	765,892	26%
North of Sahara	678	774	30,267	34,551	26,808	30,603	57,753	65,928	2%
South of Sahara	367,178	419,153	182,285	208,088	24,166	27,587	573,629	654,828	22%
Regional	678	774	37,267	42,542	1,595	1,820	39,539	45,136	2%
America	7,632	8,712	86,413	98,645	64,284	73,384	158,330	180,742	6%
North & Central	1,356	1,548	77,880	88,904	356	406	79,592	90,858	3%
South	5,598	6,390	8,267	9,437	14,714	16,797	28,579	32,624	1%
Regional	678	774	267	304	49,214	56,181	50,159	57,259	2%
Asia	203,371	232,159	202,642	231,326	117,348	133,959	523,361	597,444	20%
Middle East	678	774	40,891	46,679	10,178	11,619	51,747	59,072	2%
South & Central	18,537	21,161	42,655	48,693	26,814	30,610	88,006	100,464	3%
Far East	150,678	172,007	10,499	11,985	178	203	161,355	184,195	6%
Regional	33,478	38,217	108,597	123,969	80,178	91,527	222,253	253,713	9%
Oceania	678	774	26,932	30,745	178	203	27,788	31,722	1%
Bilateral unallocated	3,084	3,521	190,939	217,967	527,275	601,912	721,299	823,400	28%
Total	**730,210**	**833,573**	**778,397**	**888,582**	**1,068,976**	**1,220,293**	**2,577,583**	**2,942,447**	**100%**

Source: European Commission.

Notes: Figures provided are to the factor of one thousand (‘000).
Please note that individual regions presented in the table may not precisely add up to the total due to rounding. Percentages may not add up to 100 % due to rounding.

[BR5] 6.3.2 Financial support through multilateral channels

The EU and its Member States support a variety of global programmes and Trust Funds managed by multilateral organisations, including the United Nations Development Programme (UNDP), United Nations Environment Programme, Food and Agriculture Organization and the World Bank. For example, the European Commission has committed EUR 1 million to UNDP for enhancing knowledge and evidence to scale-up climate change adaptation in Africa via the Adaptation Initiative.[808] The EU also provides support to the operating entities of the financial mechanism of UNFCCC, the Global Environment Facility (GEF) and the GCF. The EC’s statistical system categorises the large majority of its climate finance support as bilateral with multiple recipients, even where the finance is delivered through a multilateral organisation. Multilateral contributions to multilateral institutions operating in the field of climate change that are not earmarked for specific purposes are reported as climate-specific multilateral support. All other finance earmarked for a specific climate-related purpose and provided through a multilateral organisation is reported in CTF 7(b) as bilateral support. All bilateral climate finance committed by the EC to recipient countries is reported under Section [BR5] 6.3.1.

The EIB channels significant volumes of climate finance to developing countries. All EIB funds that are reported here are provided in the form of loans alongside several equity investments, grants and guarantees.

The EIB is one of the largest multilateral providers of climate finance worldwide. In 2019 and 2020, the EIB invested over EUR 43 billion in climate change mitigation and adaptation projects worldwide. Most of this investment is in the EU; approximately EUR 6.0 billion went to developing countries. EIB funding acts as a catalyst for mobilising finance for climate action by encouraging others to co-finance with its long-term lending.

[808] Core contributions to these organisations are only provided by EU Member States, not by the EC.

The EIB contributes to the EU's climate and energy objectives by supporting a range of mitigation projects (e.g. in renewable energy, energy efficiency and low-carbon transport) and investing in adaptation measures. The EIB has a target of supporting EUR 1 trillion of investments in climate action and environmental sustainability in the period from 2021 to 2030 and of increasing the share of its financing dedicated to climate action and environmental sustainability to more than 50 % of its operations in 2025.[809] In 2015, the EIB committed to increase its climate lending to 35% of total investment in developing countries by 2020. Accordingly, the EIB was able to step up its climate action financing outside the European Union, exceeding this commitment in 2017, 2019 and 2021. In 2020, climate action lending outside the European Union remained elevated, at EUR 2.8 billion, despite the disruption caused by the pandemic, particularly to contract signatures in the renewable energy sector. The lower level of climate action lending in percentage terms chiefly reflects the extraordinary surge in total lending outside Europe to EUR 9.3 billion in response to the pandemic and its effects on economies around the world. All EIB-financed projects, regardless of sector, must comply with EIB environmental and social standards that reflect EU climate objectives.

As in the EU's 4th Biennial Report, the contribution of financial support by the EIB in this Biennial Report is categorised as multilateral, as the EIB is considered a multilateral development bank. All climate finance committed by the EIB to recipient countries as well as a few multilateral non-earmarked contributions by the EU are reported as multilateral. Only the EIB's climate-specific outflows are reported here. In order to keep the same level of transparency as in BR4, this report's Appendix II contains detailed data and information on individual contributions by the EIB.

The total climate finance committed by the EIB to developing country Parties to the UNFCCC in 2019 and 2020 was EUR 6.0 billion. In 2019, the total climate finance committed by the EIB was EUR 3.2 billion and in 2020, EUR 2.8 billion was committed. Total multilateral climate finance committed by the EIB and the EC is provided in Table 37, which is based on the EIB's established procedure for tracking its climate finance, using signed finance contracts in the given financial year.

Table 37: Multilateral financial support committed by the EIB and the EC in 2019-2020

Year	Mitigation		Adaptation		Cross-cutting		Total	
	EUR bn	USD bn	EUR bn	USD bn	EUR bn	USD bn	EUR bn	USD bn
EIB 2019	2.83	3.17	0.36	0.40	-	-	3.18	3.57
EC 2019	-	-	-	-	0.004	0.005	0.004	0.005
EIB 2020	2.16	2.42	0.65	0.73	-	-	2.81	3.15
EC 2020	-	-	-	-	-	-	-	-
Total	**4.99**	**5.59**	**1.01**	**1.13**	**0.004**	**0.005**	**6.00**	**6.72**

Source: European Commission and EIB.

Of total climate finance provided by the EIB in 2019 and 2020, EUR 1.5 billion was channelled to developing countries as ODA and EUR 195 million was delivered as Other Official Flows (OOF). For the remaining EUR 4.3 billion, this information is not available because at the time of signature,

[809] Climate Bank Roadmap, https://www.eib.org/en/about/priorities/climate-action/cbr/index.htm.

the interest rate of the loan is not known as it is set at first disbursement. It is therefore not possible to establish whether a given loan is concessional or not at the time of signature, and therefore whether it is classified as ODA or OOF; as a result they are classified as 'other' in the Technical Annex. Once loans are classified, the data is submitted to the European Commission, who then submits the consolidated EU ODA/DAC data to the OECD.

[BR5] 6.4 Technology development and transfer

The EU has mainstreamed technology transfer activities into many development cooperation activities. Since these activities form one component of a larger project, disaggregating the finance dedicated to these activities alone is not currently possible. This section will outline the platforms and measures which the EU employs to encourage the transfer of technology, and to provide case studies of relevant programmes.

The EU is already contributing significantly to the transfer of technology to developing countries by financing climate action and development projects with a technology dimension, and through research collaboration. The EU's joint research programmes contribute to a higher level of knowledge amongst local scientists and to the sharing of the benefits of research and development. The EU's research framework programme, Horizon 2020, promotes research collaboration and the mobility of researchers between the EU and third countries, including developing countries, in areas of common interest. Similarly, the Network for the Coordination and Advancement of Sub-Saharan Africa-EU Science and Technology Cooperation continues to provide local capacity building in scientific research, such as in its Intra-Africa Academic Mobility Scheme. Following the publication of the call for proposals in July 2017, seven projects have been selected for funding which will offer 450 scholarship opportunities during a five-year implementation period. This will include 273 Master students (61%), 108 PhD candidates (24%) and 69 academic and administrative staff members (15%), with overall funding of close to EUR 10 million.

In addition, the African, Caribbean and Pacific (ACP) EU Technical Centre for Agricultural and Rural Cooperation (CTA)[810] also supports the development and enhancement of endogenous capacities and technologies of developing country Parties, combining this with facilitating innovation in the private sector. The COLE-ACP programme also provided capacitation for food system stakeholders in partner countries to adopt more sustainable practices in order to meet the requirements of the EU market for exports. The actions supported by the DESIRA initiative in 2019 and 2020 allowed joint efforts by research organisations (locally and from the EU), development agencies, smallholder farmers and value chain stakeholders to adopt and implement the latest findings of science and research into agriculture and food systems, enhancing their resilience and lowering their carbon footprint.

The EU recognises that the private sector will be critical to the successful transfer of technologies to developing countries. The private sector is able to mobilise larger amounts of capital and is a key driver of technological innovation. The ElectriFI-family of innovative financing instruments, to which the EU has contributed over EUR 300 million, has increased the provision of risk capital to private-sector-led investments, targeting a wide range of segments in the sector, addressing the lack

[810] CTA, http://www.cta.int/en/.

of access to seed financing, mid- and long-term capital in difficult countries, the reluctance of commercial banks to provide suitable lending that meet investors' needs and existing capacity limitations in terms of structuring and bringing projects to financial close.

The EU also provides support to explore opportunities for public-private partnerships and supports innovative multi-stakeholder alliances between national or local authorities, enterprises and NGOs for skills development and the provision of basic services. These partnerships facilitate access to sustainable and affordable energy, water and agriculture. They develop synergies between public and private interests in technology transfer, and engage stakeholders in the development and diffusion of technology, particularly to and between developing countries.

Through the recently announced EU Global Gateway initiative, the EU aims to mobilise up to EUR 300 billion of investment by 2027. With the Global Gateway, the European Union redoubles its efforts and offers partnership based on mutual values and common objectives for green, smart and inclusive investments. Through the Global Gateway, inter alia, the EU will strengthen connections between Europe and the world and help partner countries address the digital divide and further integrate into the global digital ecosystem as well as promoting green technology exchanges and reinforce energy security. Started in 2015, the Covenant of Mayors in Sub-Saharan Africa (CoM SSA) is a major catalyst for local climate action in the region, with political commitments from over 315 local governments. CoM SSA is a regional chapter of the Global Covenant of Mayors for Climate & Energy (GCoM), the largest global network of 11,000+ cities taking ambitious climate and energy action. CoM SSA is supporting local governments in moving from planning to implementation, with an emphasis on unlocking climate finance at the local level. Since January 2019, the initiative is co-funded by the European Union, the German Ministry of Economic Cooperation and Development (BMZ), and the Agencia Española de Cooperación Internacional para el Desarrollo (AECID). It is jointly implemented by four European Member State Organizations namely GIZ, AECID, AFD and Expertise France who are providing deep-dive support to 22 signatory cities.[811]

By proposing a new Alliance for Sustainable Investment and Jobs between Europe and Africa,[812] the Commission has reiterated its commitment to working together with African partner countries based on reciprocal commitments and to continuing to champion true and fair partnerships. The alliance has the objective of creating 10 million jobs in five years, boosting investment and promoting sustainable development. Sustainable energy is one of the priorities under the Alliance and, to ensure rapid operationalisation, a High Level Platform on Sustainable Energy Investments was launched by the European Commission. This platform is geared to identifying and exploiting strategic opportunities for accelerating the pace and effectiveness of sustainable energy cooperation under the enhanced EU-Africa partnership, starting with improving the investments environment.

In January 2020, the European Commission signed four guarantee agreements worth EUR 216 million that will help unlock EUR 2 billion to invest in renewables, urban infrastructure and start-ups

[811] Bobo Dioulasso, Burkina Faso; Douala, Cameroon; Garoua, Cameroon; Doumé, Cameroon; Kasese, Uganda; Kampala, Uganda; Kisumu, Kenya; Nakuru, Kenya; Mombasa, Kenya; Gran Maputo (Maputo, Matola, Boane), Mozambique; Cape Town, South Africa; Abuja, Nigeria; Lagos, Nigeria; Kpalimé, Togo; Sokodé, Togo; Dakar, Sengal; Pikine, Senegal; Praia, Cabo Verde; Riberia Grande de Santiago, Cabo Verde
Nouakchott, Mauritania; Bamako, Mali; Ségou, Mali.

[812] Communication on a new Africa, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0643.

in Africa and the EU Neighbourhood. The guarantees were signed with the European Bank for Reconstruction and Development, the EIB, the German KfW Group and the Spanish development cooperation agency. EUR 96 million of the guarantees will help to expand the generation of renewable energy in Sub-Saharan Africa and cut the region's carbon emissions and increase energy efficiency; they will also help to scale up investment in renewable energy in Ukraine and in the EU Southern Neighbourhood, particularly in Jordan, Lebanon and Tunisia. Another EU 100 million are being used in Sub-Saharan Africa and the EU Neighbourhood to help cities develop public-private partnerships and to lower the risks for private investors involved in financing urban infrastructure. Here the focus is on energy efficiency, flood protection, public transport, water sanitation and solid waste treatment.

Other examples of EU-led partnerships include the SWITCH to Green Flagship initiative,[813] which provides technical assistance to a large number of EU actors aiming at improving coordination as well as building awareness and capacities on inclusive green economy.

A selection of activities related to technology transfer, including success stories, are presented in Table 38 (adapted from Table 9 of the National Communication guidelines). For more detailed information, please see CTF 8. CTF 8 includes a non-exhaustive list of initiatives selected to represent technology transfer support provided by the EU.

Table 38: Examples of activities related to technology transfer

Project/ programme title:	**Support to the UNFCCC Climate Technology Centre and Network (CTCN+ Part II)**
Recipient country/ region:	Global
Sector:	Multisector
Total funding:	EUR 7 000 000 (EU Contribution) EUR 6 689 391.06 (Paid amount at 06/10/2022)
Years in operation:	5 years and 8 months (Starting date of activities 01/12/2016 - End date of activities 31/07/2022)
Purpose and Description:	The CTCN promotes the accelerated transfer of environmentally sound technologies for low carbon and climate resilient development at the request of developing countries. CTCN provides technology solutions, capacity building and advice on policy, legal and regulatory frameworks tailored to the needs of individual countries.[814] The CTCN facilities the transfer of technologies through three core services: - Providing technical assistance to accelerate the transfer of climate technologies; - Creating access to information and knowledge on climate technologies; - Fostering collaboration among climate technology stakeholders via the Centre's network of regional and sectoral experts from academia, the private sector and public and research institutions. Through these services, CTCN aim to address barriers that hinder the development and transfer of climate technologies, and to thereby help create an enabling environment for:

[813] The Switch to Green Flagship Initiative, https://www.switchtogreen.eu/the-flagship-intiative/.
[814] https://www.ctc-n.org/

	- Reduced greenhouse gas emissions and climate vulnerability - Improved local innovation capacities - Increased investments in climate technology projects.
Factors which led to the project's success:	Tailoring to a country's needs: 1. Government, NGOs, the private sector, academia and research institutions representatives work with their National Designated Entity, the CTCN focal point selected by each country, to identify the type of technical assistance they need in order to implement their technology-related climate plans; The NDE conveys the request to CTCN; A team of climate technology experts from the CTCN, its Consortium and Network work with NDE to provide solutions tailored to the needs of the individual country.
Technology transferred:	The online Technology Portal serves as a gateway to the CTCN's technical assistance and capacity building services, where users can access technology webinars and practical information about climate technology solutions. The CTCN also provides tailored knowledge exchanges and training for one or multiple countries, upon request. 320 climate technology transfers implemented[815]. The CTCN delivers five main types of technical support on climate technologies: - Technical assessments, including technical expertise and recommendations related to specific technology needs, identification of technologies, technology barriers, technology efficiency, as well as piloting and deployment of technologies. - Technical support for policy and planning documents, include strategies and policies, roadmaps and action plans, regulations and legal measures - Trainings - Tools and methodologies - Implementation plans
Impact on greenhouse gas emissions/ sinks:	12.9 million expected tonnes of CO_2eq reductions per year[816]

[BR5] 6.5 Capacity-building

Access to knowledge and technologies are not enough on their own; the right set of specific local conditions needs to be in place to attract project developers and investors. This so-called 'enabling environment' involves the following set of interrelated conditions: legal, organisational, fiscal, informational, political, and cultural. A skilled workforce is also crucial for maintaining know-how in the community. Therefore, the successful transfer of climate technologies to developing countries requires support to increase local administrative capacities. The EU works closely with governments in developing countries to reinforce administrative capacities and to support the development of legal and regulatory frameworks that are conducive to mitigating and adapting to climate change.

[815] https://www.ctc-n.org/sites/www.ctc-n.org/files/resources/CTCN_Progress_Report_2021.pdf
[816] https://www.ctc-n.org/sites/www.ctc-n.org/files/resources/CTCN_Progress_Report_2021.pdf

The EU has mainstreamed capacity-building activities into all development assistance, in line with the provisions of the Paris Declaration on Aid Effectiveness and the Accra Agenda for Action. Since these activities form one component of a larger project, disaggregating the finance dedicated to these activities alone is not currently possible. This section will outline the platforms and measures which the EU employs to build capacity, and provide case studies of relevant programmes.

The EU's development activities in the field of climate change are based on, and emphasize the importance of, the principles of national ownership, stakeholder participation, country-driven demand, cooperation between donors and across programmes, and impact assessment and monitoring (when appropriate). Since EU support is partner-country-driven, only information from partner countries (e.g. through their National Communications) is the best way to get a picture of capacity building support and activities and their effectiveness.

Since 2010, the EUROCLIMA+ regional programme is supporting Latin American countries in order to contribute to the achievement of the objectives of the Paris Agreement. To this end, the Programme provides a platform for highly articulated cooperation between the EU and the 18 Latin American partner countries that is capable of accompanying diverse processes and generating numerous results. It aims to reduce the impact of climate change and its effects in Latin America by promoting climate change mitigation and adaptation, resilience and investment. With more than ten years of experience in the region, the Programme seeks to generate the enabling conditions and drive sustainable transformation processes through the implementation and/or updating of NDCs, and the configuration of a long-term vision that aims at carbon neutrality and resilience that is fair, leaves no one behind and contributes to the post-pandemic recovery processes.

EUROCLIMA+ offers support to partner countries to foster institutional strengthening processes. It does this in a variety of ways, from formal training on specific topics, to participation in specific events and workshops. In total, more than 200 capacity building processes have been carried out to date with the support of the Programme. Moreover, more than 250 Latin American public or private organisations have been involved in the development and implementation of plans, strategies and policies; and more than 60,000 individuals have been trained in the many areas linked to climate change.

A selection of activities related to capacity building, including success stories, are presented in Table 39 (adapted from Table 11 of the National Communication reporting guidelines). For more detailed information, please see CTF Table 9.

Table 39: Examples of activities related to capacity building

Project/ programme title:	GCCA+AO
Recipient country / region	West Africa
Description:	West African countries are considered the most vulnerable to the impacts of climate change due to the many pressures exerted on them, due to their low adaptive capacity as well as their intrinsic geographical and climatic condition, as evidenced in various vulnerability indexes such as NDGAIN and INFORM, and recognized at the Paris Conference of Parties (COP21) in December 2015. Contributing to increase the resilience of ECOWAS countries and populations to the challenges of climate change and more specifically, supporting regional institutions (ECOWAS, CILSS) and their Member States to provide better responses in terms of adaptation and mitigation in the face of the challenges of climate change at the operational, institutional and financial levels, is the leitmotif of the GCCA+ West Africa project (GCCA+WA), financed by the European Union, and implemented by Expertise France under ECOWAS political leadership and CILSS partnership. After 4 effective years of implementation from 2019 to 2022, the strategic dialogue on climate negotiations has been strengthened through improved scientific and technical capacity in the region. The challenges of climate change are integrated into the political agenda of the region, in particular through support for the updating of NDCs, as well as the development and validation of the ECOWAS regional climate strategy, which is the common denominator of the sustainability of all the achievements of the project and above all, a vehicle for scaling up and deployment at the national level, of the 15 Member States of ECOWAS, of the results of the project. However, climate capacity building requires long time. The success of the operationalization phase of the regional climate strategy would be guaranteed through partnerships and strategic support such as that of the European Union.

[BR5] 7 OTHER REPORTING MATTERS

[BR5] 7.1 Making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development

The Paris Agreement defines three goals in Article 2. Besides the temperature goal in Article 2.1(a) and the adaptation goal in Article 2.1(b), it defines the 'finance flows' goal in Article 2.1(c) as follows: 'Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.'

As a Party to the Paris Agreement, the EU is taking the following concrete steps to implement Article 2.1c:

- The European Commission is committed to mainstreaming climate change mitigation and adaptation into all major EU spending programmes. For the EU budget 2021-2027, 30 % of the EU budget is planned to be spent to fight climate change.[817]

- In addition to climate mainstreaming, the EU is also implementing a range of projects, programmes and initiatives aimed at making finance flows consistent with the climate commitments of the EU under the Paris Agreement. This includes:

  – The European green deal investment plan which aims to mobilise at least EUR 1 trillion of sustainable investments in the decades ahead and to create an enabling framework to facilitate and stimulate public and private investments needed for the transition to a climate-neutral, green, competitive and inclusive economy;[818]

  – Strategy for financing the transition to a sustainable economy building on the 2018 action plan on financing sustainable growth, including plan to develop a comprehensive strategy to scale up sustainable finance in low and middle-income countries;[819]

  – The upcoming EU strategy on scaling up sustainable finance in low and middle-income countries will be informed by the recently established High Level Expert Group on scaling up sustainable finance in low and middle income countries. This is mandated to recommend actions which the EU can take to accelerate private finance for the implementation of the external dimension of the Green Deal and a green, just and resilient recovery in partner countries.

  – International Platform on Sustainable Finance, aiming to scale up the mobilisation of private capital towards environmentally sustainable investments and providing a multilateral forum of

[817] Supporting climate action through the EU budget, https://ec.europa.eu/clima/eu-action/funding-climate-action/supporting-climate-action-through-eu-budget_en.
[818] The European Green Deal Investment Plan and Just Transition Mechanism, https://ec.europa.eu/info/publications/200114-european-green-deal-investment-plan_en.
[819] Strategy for financing the transition to a sustainable economy, https://ec.europa.eu/info/publications/210706-sustainable-finance-strategy_en.

dialogue between policymakers in charge of developing sustainable finance regulatory measures;[820]

- EU taxonomy, creating a common classification system for sustainable economic activities (cf. section [BR5] 4.2.3.4);[821]
- Reporting guidelines for companies regarding the disclosure of climate-related information;[822]
- Regulation on EU labels for climate-related benchmarks and sustainability-related disclosures for benchmarks;[823]
- Regulation on sustainability-related disclosure in the financial services sector;[824]
- Using at least 50 % of auctioning revenues from the EU Emissions Trading System for climate and energy-related purposes.[825]

- As part of its new ambitions on climate and environment, the EIB Group committed in 2019 to aligning all financing with the principles and goals of the Paris Agreement by the end of 2020. At the same time, the EIB Board approved as part of its revised energy lending policy the end of support for fossil fuel energy projects by the end of 2021.[826] In 2020, the EIB Group published a Climate Bank Roadmap,[827] which included details on specific approaches to ensure Paris alignment of projects, both from low carbon, and climate resilience angles. In 2021, the Group went a step further by publishing a framework to support the Paris Alignment of counterparties – or PATH framework[828]. EIB corporate clients now need to develop and disclose decarbonisation and resilience plans. In general, the EIB will no longer finance standard low-carbon projects of high-emitting corporates if the corporate continues to operate or invest in activities that are not aligned with the goals of the Paris Agreement. Large financial institutions are asked to increase climate-related disclosures. The EIB Group is offering technical support to clients to help them prepare credible and robust climate plans.

[820] International Platform on Sustainable Finance, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/international-platform-sustainable-finance_en.
[821] EU taxonomy for sustainable activities, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en.
[822] Corporate disclosure of climate-related information, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/corporate-disclosure-climate-related-information_en.
[823] EU labels for benchmarks (climate, ESG) and benchmarks' ESG disclosures, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-climate-benchmarks-and-benchmarks-esg-disclosures_en.
[824] Sustainability-related disclosure in the financial services sector, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/sustainability-related-disclosure-financial-services-sector_en.
[825]Auctioning revenues and their use, https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/auctioning_de#auctioning-revenues-and-their-use.
[826] EIB energy lending policy, https://www.eib.org/attachments/strategies/eib_energy_lending_policy_en.pdf.
[827] EIB Group Climate Bank Roadmap 2021-2025, https://www.eib.org/attachments/strategies/eib_group_climate_bank_roadmap_en.pdf.
[828] The EIB Group PATH Framework, https://www.eib.org/en/publications/the-eib-group-path-framework.

[BR5] 8 LIST OF ABBREVIATIONS

Abbreviation	Description
ACP	African, Caribbean and Pacific
AEAs	Annual Emission Allocations
AECID	Agencia Española de Cooperación Internacional para el Desarrollo
AECM	Agri-Environment-Climate Measure
AGIR	Global Alliance for Resilience Initiative
BAT	Best Available Techniques
BR4	Fourth Biennial Report
BR5	Fifth Biennial Report
BREF	Best Available Techniques Reference Document
CAP	Common Agricultural Policy
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2eq	Carbon dioxide equivalent
CoM SSA	Covenant of Mayors in Sub-Saharan Africa
COVID-19	Coronavirus Disease 2019
CRF	Common Reporting Format
CTF	Common Tabular Format
DAC	Development Assistance Committee
DESIRA	Developing Science, Innovation and Research for Agriculture
DRR	Disaster Risk Reduction
EAGF	European Agricultural Guarantee Fund
EAFRD	European Agricultural Fund for Rural Development
EC	European Commission

EEA	European Environment Agency
EED	Energy Efficiency Directive
EFSD	European Fund for Sustainable Development
EIB	European Investment Bank
ElectriFI	Electrification Financing Initiative
EPBD	Energy Performance of Buildings Directive
ERU	Emission Reduction Unit
ESD	Effort Sharing Decision
ESR	Effort Sharing Regulation
ETC/CM	European Topic Centre on Climate Change Mitigation
EU	European Union
EU-27	27 Member States of the EU
EU-27+UK	27 Member States of the EU and the United Kingdom
EU ETS	EU Emissions Trading System
EUR	Euro
F-gases	fluorinated greenhouse gases
FLEGT	Forest Law Enforcement, Governance and Trade
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GJ	gigajoule
GW	gigawatts
GWP	Global Warming Potential
HDV	Heavy-duty vehicle
HFCs	Hydrofluorocarbons
IDFC	International Development Finance Club
IED	Industrial Emissions Directive
IPA	Instrument for Pre-accession Assistance
IPCC	Intergovernmental Penal on Climate Change
JRC	Joint Research Centre

KP	Kyoto Protocol
LDCs	Least Developed Countries
LIFE	L'Instrument Financier pour l'Environnement – the financial instrument for the environment
LULUCF	Land Use, Land-Use Change and Forestry
MAC	Mobile Air Conditioning
MDB	Multilateral Development Banks
MFF	Multiannual Financial Framework
MMR	Monitoring Mechanism Regulation
MS	Member States
MW	megawatt
N_2O	Nitrous Oxide
NAPAs	National Adaptation Programmes of Action
NAPs	National Adaptation Plans
NC8	Eighth National Communication
NDC	Nationally Determined Contribution
NDICI-GE Europe"	Neighbourhood, Development and International Cooperation Instrument – "Global
NECP	National Energy and Climate Plan
NF_3	Nitrogen Trifluoride
NGO	Non-Governmental Organisation
NIR	National Inventory Report
NMVOC	Non-methane volatile organic compounds
NO_x	Nitrogen Oxides
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OOF	Other Official Flows
PCD	Policy Coherence for Development
PFCs	Perfluorinated Compounds
QA/QC	Quality Assurance/Quality Control
RED	Renewable Energy Directive

REDD	Reducing Emissions from Deforestation and forest Degradation
RFF	Recovery and Resilience Facility
SAF	Sustainable Aviation Fuel
SDG	Sustainable Development Goal
SF_6	Sulphur Hexafluoride
SMEs	Small and Medium-sized Enterprises
SO_x	Sulphur Oxides
TEN-T	Trans-European Transport Network
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar

APPENDIX I: CTF TABLES

CTF Table 1: Emission trends

CTF Table 2: Description of quantified economy-wide emission reduction target

CTF Table 3: Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

CTF Table 4: Reporting on progress

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

CTF Table 6(a)/(c): Information on updated greenhouse gas projections under a 'with measures' scenario and under a 'with additional measures' scenario

CTF Table 7: Provision of public financial support: summary information 2019, 2020

CTF Table 7(a): Provision of public financial support: contribution through multilateral channels in 2019, 2020

CTF Table 7(b): Provision of public financial support: contribution through bilateral, regional and other channels in 2019, 2020

CTF Table 8 Provision of technology development and transfer support

CTF Table 9 Provision of capacity-building support

Table 1
Emission trends: summary
(Sheet 1 of 3)

GREENHOUSE GAS EMISSIONS	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998
	kt CO_2 eq									
CO_2 emissions without net CO_2 from LULUCF	4,470,262.01	4,470,262.01	4,415,704.48	4,271,724.02	4,190,488.60	4,166,665.75	4,207,187.00	4,311,780.91	4,221,882.95	4,218,831.45
CO_2 emissions with net CO_2 from LULUCF	4,241,741.67	4,241,741.67	4,099,706.77	3,981,169.69	3,895,210.47	3,869,258.49	3,896,103.72	3,971,358.47	3,885,704.16	3,868,894.09
CH_4 emissions without CH_4 from LULUCF	710,545.65	710,545.65	691,379.15	677,472.15	669,399.64	653,747.60	653,492.59	649,829.85	644,239.08	629,050.33
CH_4 emissions with CH_4 from LULUCF	723,123.53	723,123.53	703,394.04	689,442.49	681,743.80	668,486.97	667,674.90	663,049.28	657,244.12	642,335.37
N_2O emissions without N_2O from LULUCF	383,119.38	383,119.38	365,479.32	350,706.37	340,907.72	344,804.76	346,139.21	352,477.96	349,077.09	327,031.28
N_2O emissions with N_2O from LULUCF	399,039.98	399,039.98	381,436.46	366,538.63	356,678.99	360,861.76	361,643.34	367,566.29	364,164.02	342,177.21
HFCs	29,135.98	29,135.98	29,183.45	31,647.37	34,445.88	38,870.09	43,345.78	50,666.92	58,127.81	59,406.26
PFCs	25,867.33	25,867.33	23,491.60	19,176.95	18,251.79	17,599.78	17,269.34	16,595.32	15,392.19	14,549.59
Unspecified mix of HFCs and PFCs	5,850.00	5,850.00	5,381.60	5,367.40	5,361.18	5,633.13	5,944.08	4,495.46	4,381.30	4,281.00
SF_6	10,913.67	10,913.67	11,374.01	12,208.97	12,889.99	14,056.97	15,047.71	14,904.14	13,403.18	12,648.46
NF_3	23.48	23.48	25.15	26.99	29.01	32.00	99.21	93.43	101.14	76.63
Total (without LULUCF)	5,635,717.50	5,635,717.50	5,542,018.75	5,368,330.21	5,271,773.81	5,241,410.08	5,288,524.93	5,400,843.98	5,306,604.75	5,265,875.00
Total (with LULUCF)	5,435,695.65	5,435,695.65	5,253,993.09	5,105,578.48	5,004,611.11	4,974,799.19	5,007,128.09	5,088,729.30	4,998,517.93	4,944,368.62
Total (without LULUCF, with indirect)	5,640,034.42	5,640,034.42	5,546,130.18	5,372,230.19	5,275,579.58	5,245,115.96	5,292,132.62	5,404,360.51	5,310,010.76	5,269,200.93
Total (with LULUCF, with indirect)	5,440,012.56	5,440,012.56	5,258,104.52	5,109,478.45	5,008,416.88	4,978,505.07	5,010,735.78	5,092,245.84	5,001,923.94	4,947,694.55

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998
	kt CO_2 eq									
1. Energy	4,319,452.18	4,319,452.18	4,286,843.98	4,153,244.79	4,077,125.37	4,024,369.37	4,057,153.70	4,165,798.29	4,070,754.08	4,061,444.55
2. Industrial processes and product use	547,474.54	547,474.54	511,238.67	491,448.54	482,194.76	509,027.73	522,885.80	524,846.28	530,845.08	505,487.58
3. Agriculture	531,333.43	531,333.43	503,045.81	480,828.41	469,032.35	465,193.39	465,038.95	467,543.88	465,364.35	463,352.16
4. Land Use, Land-Use Change and Forestry[b]	-200,021.86	-200,021.86	-288,025.66	-262,751.73	-267,162.71	-266,610.89	-281,396.84	-312,114.68	-308,086.82	-321,506.37
5. Waste	237,457.35	237,457.35	240,890.30	242,808.48	243,421.33	242,819.59	243,446.49	242,655.53	239,641.24	235,590.71
6. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
Total (including LULUCF)	5,435,695.65	5,435,695.65	5,253,993.09	5,105,578.48	5,004,611.11	4,974,799.19	5,007,128.09	5,088,729.30	4,998,517.93	4,944,368.62

Notes:
All footnotes for this table are given on sheet 3 of table 1.

Table 1
Emission trends: summary
(Sheet 2 of 3)

GREENHOUSE GAS EMISSIONS	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	kt CO_2 eq										
CO_2 emissions without net CO_2 from LULUCF	4,157,213.76	4,176,856.60	4,243,880.79	4,227,744.47	4,322,450.02	4,335,704.43	4,313,101.02	4,320,349.43	4,277,051.18	4,179,265.27	3,834,020.12
CO_2 emissions with net CO_2 from LULUCF	3,795,833.83	3,857,786.93	3,894,528.09	3,899,881.09	4,015,196.34	4,000,387.53	3,981,824.13	3,966,531.80	3,967,812.24	3,827,379.69	3,475,557.65
CH_4 emissions without CH_4 from LULUCF	617,247.28	594,303.68	584,023.72	572,647.47	564,854.89	546,533.91	535,150.33	523,141.95	514,321.32	502,446.95	490,067.07
CH_4 emissions with CH_4 from LULUCF	629,287.35	607,233.89	596,052.24	584,094.31	577,741.13	558,039.59	547,266.40	534,525.65	526,936.69	513,579.01	501,522.64
N_2O emissions without N_2O from LULUCF	305,815.03	302,548.60	300,868.46	289,172.53	286,178.42	290,747.24	283,836.64	272,521.72	274,226.09	262,369.82	247,655.51
N_2O emissions with N_2O from LULUCF	320,581.91	317,627.63	315,707.64	303,879.33	301,334.57	305,363.36	298,613.50	286,987.28	288,922.74	276,792.95	262,197.32
HFCs	51,588.14	52,688.48	51,826.36	55,286.49	62,062.11	66,259.83	73,150.01	79,549.99	86,845.67	92,830.13	94,049.02
PFCs	14,133.73	12,151.83	10,805.50	12,534.21	10,258.98	8,728.16	7,326.54	6,457.74	5,976.04	5,497.35	3,648.56
Unspecified mix of HFCs and PFCs	4,120.22	2,248.56	1,966.21	2,042.06	1,221.28	1,017.37	1,075.75	866.41	723.46	949.79	1,305.77
SF_6	10,319.88	10,349.43	9,571.76	8,524.75	8,011.61	8,030.33	7,774.54	7,365.97	6,913.34	6,586.86	6,231.52
NF_3	74.32	102.33	81.69	133.27	146.2	132.15	156.03	141.12	163.15	149.27	77.5
Total (without LULUCF)	5,160,512.37	5,151,249.51	5,203,024.49	5,168,085.25	5,255,183.52	5,257,153.41	5,221,570.84	5,210,394.33	5,166,220.25	5,050,095.45	4,677,055.06
Total (with LULUCF)	4,825,939.38	4,860,189.08	4,880,539.49	4,866,375.51	4,975,972.22	4,947,958.31	4,917,186.89	4,882,425.96	4,884,293.33	4,723,765.07	4,344,589.98
Total (without LULUCF, with indirect)	5,163,632.87	5,154,207.21	5,205,873.72	5,170,832.92	5,257,896.66	5,259,774.48	5,224,206.91	5,213,024.80	5,168,758.35	5,052,531.35	4,679,298.02
Total (with LULUCF, with indirect)	4,829,059.88	4,863,146.78	4,883,388.72	4,869,123.18	4,978,685.36	4,950,579.37	4,919,822.96	4,885,056.43	4,886,831.42	4,726,200.97	4,346,832.94

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	kt CO_2 eq										
1. Energy	4,000,929.04	3,990,298.40	4,068,137.67	4,050,173.88	4,132,536.70	4,126,075.62	4,103,455.33	4,100,062.23	4,047,873.51	3,972,320.26	3,693,196.67
2. Industrial processes and product use	467,974.91	478,769.83	461,100.15	455,574.79	469,527.92	486,983.27	486,416.27	488,775.04	499,810.96	471,686.53	389,017.08
3. Agriculture	461,667.71	455,493.55	451,280.23	443,585.79	439,800.07	438,980.02	433,280.33	428,927.23	432,048.11	427,542.74	422,132.10
4. Land Use, Land-Use Change and Forestry[b]	-334,572.99	-291,060.43	-322,485.00	-301,709.74	-279,211.29	-309,195.10	-304,383.95	-327,968.37	-281,926.93	-326,330.38	-332,465.08
5. Waste	229,940.70	226,687.74	222,506.44	218,750.78	213,318.82	205,114.51	198,418.91	192,629.83	186,487.67	178,545.91	172,709.21
6. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA
Total (including LULUCF)	4,825,939.38	4,860,189.08	4,880,539.49	4,866,375.51	4,975,972.22	4,947,958.31	4,917,186.89	4,882,425.96	4,884,293.33	4,723,765.07	4,344,589.98

Notes:
All footnotes for this table are given on sheet 3 of table 1.

Table 1
Emission trends: summary
(Sheet 3 of 3)

GREENHOUSE GAS EMISSIONS	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Change from base to latest reported year
	kt CO_2 eq											%
CO_2 emissions without net CO_2 from LULUCF	3,952,494.55	3,810,551.43	3,755,376.58	3,662,262.80	3,486,515.87	3,522,924.39	3,507,262.32	3,518,463.02	3,436,684.20	3,279,125.15	2,955,455.27	-33.89
CO_2 emissions with net CO_2 from LULUCF	3,607,492.92	3,466,652.75	3,404,009.64	3,312,380.12	3,154,141.94	3,197,043.99	3,187,219.92	3,247,910.23	3,163,469.18	3,019,628.34	2,703,186.51	-36.27
CH_4 emissions without CH_4 from LULUCF	479,262.32	469,192.87	465,115.01	455,064.60	447,362.21	447,064.38	440,451.65	439,264.99	433,058.62	424,208.51	418,340.58	-41.12
CH_4 emissions with CH_4 from LULUCF	490,967.36	480,880.57	477,492.11	466,080.46	458,281.95	458,223.38	451,782.96	453,273.35	444,317.98	435,521.09	429,794.31	-40.56
N_2O emissions without N_2O from LULUCF	237,725.28	231,995.36	229,822.91	230,131.73	233,408.50	232,919.99	232,415.91	236,703.11	233,302.34	229,859.19	226,933.99	-40.77
N_2O emissions with N_2O from LULUCF	252,205.75	246,423.45	244,457.99	244,200.51	247,499.46	247,966.67	247,372.54	252,223.14	248,219.98	244,852.72	241,880.45	-39.38
HFCs	98,731.94	102,596.53	105,629.58	109,029.75	111,552.06	105,893.78	107,543.25	107,166.27	103,171.36	99,821.94	88,845.98	204.94
PFCs	3,862.19	4,158.18	3,504.67	3,620.52	3,279.91	3,369.89	3,778.08	3,384.47	3,537.93	2,732.70	2,092.53	-91.91
Unspecified mix of HFCs and PFCs	523.23	418.09	807.14	983.81	772.15	765.24	779.9	1,117.53	1,832.92	1,669.99	1,604.46	-72.57
SF_6	6,275.50	6,010.24	6,123.91	6,030.42	5,706.79	6,048.05	6,319.35	6,553.19	6,733.86	6,709.94	5,520.39	-49.42
NF_3	119.68	127.87	92.25	66.08	70.06	64.57	61.49	60.24	68.11	57.49	60.17	156.28
Total (without LULUCF)	4,778,994.70	4,625,050.57	4,566,472.05	4,467,189.71	4,288,667.55	4,319,050.29	4,298,611.95	4,312,712.83	4,218,389.34	4,044,184.92	3,698,853.38	-34.37
Total (with LULUCF)	4,460,178.57	4,307,267.69	4,242,117.29	4,142,391.67	3,981,304.31	4,019,375.57	4,004,857.50	4,071,688.42	3,971,351.32	3,810,994.21	3,472,984.80	-36.11
Total (without LULUCF, with indirect)	4,781,275.25	4,627,215.14	4,568,543.33	4,469,113.80	4,290,539.41	4,320,913.12	4,300,411.04	4,314,499.12	4,220,065.64	4,045,813.46	3,700,323.16	-34.39
Total (with LULUCF, with indirect)	4,462,459.12	4,309,432.26	4,244,188.57	4,144,315.76	3,983,176.17	4,021,238.39	4,006,656.59	4,073,474.72	3,973,027.62	3,812,622.76	3,474,454.58	-36.13

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Change from base to latest reported year
	kt CO_2 eq											%
1. Energy	3,790,637.45	3,646,552.93	3,604,531.66	3,505,508.01	3,318,999.39	3,360,279.08	3,344,294.35	3,347,327.49	3,266,210.16	3,108,866.79	2,797,785.09	-35.23
2. Industrial processes and product use	404,859.73	401,833.24	390,496.85	393,447.78	400,119.25	391,147.66	388,845.84	397,941.54	390,005.62	379,275.94	348,239.89	-36.39
3. Agriculture	418,262.25	417,042.62	416,181.47	419,065.98	426,408.30	427,439.57	428,557.30	431,742.36	427,933.75	423,590.50	422,842.69	-20.42
4. Land Use, Land-Use Change and Forestry[b]	-318,816.12	-317,782.88	-324,354.76	-324,798.03	-307,363.24	-299,674.72	-293,754.45	-241,024.40	-247,038.02	-233,190.70	-225,868.58	12.92
5. Waste	165,235.26	159,621.79	155,262.07	149,167.94	143,140.61	140,183.99	136,914.46	135,701.44	134,239.81	132,451.68	129,985.71	-45.26
6. Other	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	0.00
Total (including LULUCF)	4,460,178.57	4,307,267.69	4,242,117.29	4,142,391.67	3,981,304.31	4,019,375.57	4,004,857.50	4,071,688.42	3,971,351.32	3,810,994.21	3,472,984.80	-36.11

Notes:
Further detailed information could be found in the common reporting format tables of the Party's greenhouse gas inventory, namely "Emission trends (CO_2)", "Emission trends (CH_4)", "Emission trends (N_2O)" and "Emission trends (HFCs, PFCs and SF_6)", which is included in an annex to this biennial report.
1 kt CO_2 eq equals 1 Gg CO_2 eq.

Abbreviation: LULUCF = land use, land-use change and forestry.

[a] The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

[b] Includes net CO_2, CH_4 and N_2O from LULUCF.

These data are based on the submission of 27 May 2022. The latest GHG inventory data are available on the UNFCCC website: https://unfccc.int/ghg-inventories-annex-i-parties/2022

Table 1(a)
Emission trends (CO_2)
(Sheet 1 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998
	kt									
1. Energy	4,093,765.50	4,093,765.50	4,071,434.08	3,944,781.43	3,870,945.93	3,830,174.41	3,861,674.63	3,972,416.24	3,877,390.55	3,877,780.46
A. Fuel combustion (sectoral approach)	4,063,796.36	4,063,796.36	4,043,698.36	3,916,762.10	3,842,992.56	3,802,099.91	3,832,097.32	3,942,947.01	3,848,108.31	3,849,054.75
1. Energy industries	1,667,239.25	1,667,239.25	1,631,964.83	1,574,380.69	1,507,701.89	1,509,948.19	1,510,580.96	1,540,149.93	1,494,998.40	1,503,441.19
2. Manufacturing industries and construction	798,155.83	798,155.83	763,666.24	725,615.05	699,298.67	697,355.03	713,069.41	705,011.59	694,337.06	670,273.95
3. Transport	779,358.18	779,358.18	787,872.20	809,270.84	814,304.94	820,965.45	831,846.02	856,129.48	866,769.94	896,285.05
4. Other sectors	792,229.30	792,229.30	837,889.97	789,012.01	805,448.01	759,040.56	762,889.37	828,990.75	778,724.44	765,815.63
5. Other	26,813.80	26,813.80	22,305.12	18,483.52	16,239.05	14,790.68	13,711.55	12,665.25	13,278.47	13,238.93
B. Fugitive emissions from fuels	29,969.14	29,969.14	27,735.71	28,019.33	27,953.37	28,074.50	29,577.31	29,469.23	29,282.25	28,725.71
1. Solid fuels	8,503.47	8,503.47	6,310.25	6,061.87	5,547.23	4,132.16	5,222.91	4,553.37	5,356.07	4,443.75
2. Oil and natural gas and other emissions from energy production	21,465.67	21,465.67	21,425.47	21,957.46	22,406.14	23,942.34	24,354.40	24,915.86	23,926.18	24,281.96
C. CO_2 transport and storage	NO, NA	NO, NA	NO, NA	NO, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA
2. Industrial processes	355,905.18	355,905.18	326,561.03	310,739.94	303,982.82	321,082.97	329,773.77	323,614.28	329,632.22	326,053.90
A. Mineral industry	144,338.20	144,338.20	132,033.24	128,146.56	122,805.92	130,806.40	135,419.61	131,253.24	134,145.33	136,756.58
B. Chemical industry	58,418.07	58,418.07	54,857.79	52,934.07	50,662.66	54,295.20	58,307.84	58,971.18	57,336.45	56,993.32
C. Metal industry	140,115.54	140,115.54	127,302.14	116,605.57	117,767.94	123,645.99	123,586.29	120,502.98	125,925.77	120,154.36
D. Non-energy products from fuels and solvent use	12,130.65	12,130.65	11,458.09	12,138.43	11,879.91	11,471.81	11,604.20	11,998.13	11,351.67	11,289.08
E. Electronic industry										
F. Product uses as ODS substitutes										
G. Other product manufacture and use	789.78	789.78	811.92	810.58	769.71	791.53	787.24	801.84	791.17	787.75
H. Other	112.95	112.95	97.85	104.73	96.67	72.02	68.58	86.91	81.82	72.81
3. Agriculture	15,407.47	15,407.47	12,580.77	11,025.52	10,495.99	10,599.50	11,100.44	11,230.34	10,944.90	11,231.62
A. Enteric fermentation										
B. Manure management										
C. Rice cultivation										
D. Agricultural soils										
E. Prescribed burning of savannas										
F. Field burning of agricultural residues										
G. Liming	10,371.10	10,371.10	8,168.40	6,749.05	6,377.49	6,470.79	7,161.84	7,177.23	6,904.26	6,887.37
H. Urea application	3,923.85	3,923.85	3,393.34	3,323.72	3,194.23	3,170.57	2,971.69	3,050.57	3,057.67	3,320.43
I. Other carbon-containing fertilizers	1,112.52	1,112.52	1,019.03	952.75	924.27	958.13	966.90	1,002.54	982.97	1,023.81
J. Other	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
4. Land Use, Land-Use Change and Forestry	-228,520.34	-228,520.34	-315,997.70	-290,554.33	-295,278.13	-297,407.27	-311,083.28	-340,422.44	-336,178.79	-349,937.35
A. Forest land	-350,105.09	-350,105.09	-443,322.81	-421,962.68	-422,551.92	-414,579.51	-420,500.04	-447,478.10	-439,496.35	-450,159.77
B. Cropland	75,113.88	75,113.88	71,760.61	72,911.39	70,690.56	70,068.53	70,487.66	71,609.90	70,746.06	70,359.75
C. Grassland	28,593.60	28,593.60	24,832.49	23,491.07	25,667.55	22,813.36	18,011.76	17,041.84	18,993.92	19,519.76
D. Wetlands	10,794.60	10,794.60	10,832.26	10,945.78	10,040.21	11,589.16	11,470.90	11,202.50	11,283.46	10,058.80
E. Settlements	34,651.54	34,651.54	36,311.28	35,351.45	37,427.64	36,101.81	37,008.72	34,702.16	35,913.39	35,698.51
F. Other land	2,515.10	2,515.10	1,873.17	1,642.31	1,295.45	1,123.76	-249.6	-304.12	-341.39	-382.21
G. Harvested wood products	-30,083.97	-30,083.97	-18,284.70	-12,933.65	-17,847.61	-25,558.38	-28,530.10	-28,258.40	-34,203.89	-35,839.81
H. Other	IE, NA, NO	IE, NA, NO	IE, NA, NO	IE, NA, NO	IE, NA, NO	1,034.00	1,217.43	1,061.77	926.02	807.62
5. Waste	5183.86	5183.86	5128.59	5177.14	5063.86	4808.88	4638.16	4520.05	3915.28	3765.46
A. Solid waste disposal	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
B. Biological treatment of solid waste										
C. Incineration and open burning of waste	5,162.08	5,162.08	5,106.25	5,153.37	5,042.04	4,787.06	4,613.89	4,495.52	3,892.20	3,744.10
D. Waste water treatment and discharge										
E. Other	21.78	21.78	22.34	23.78	21.82	21.82	24.27	24.53	23.08	21.37
6. Other (as specified in the summary table in CRF)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
Memo items:										
International bunkers	179,172.63	179,172.63	176,252.80	183,194.75	187,737.00	190,838.22	195,556.22	207,351.82	221,542.86	233,725.55
Aviation	68,842.04	68,842.04	67,715.61	73,202.87	77,184.64	80,587.76	85,184.95	89,186.36	93,295.99	99,825.18
Navigation	110,330.59	110,330.59	108,537.19	109,991.88	110,552.35	110,250.46	110,371.27	118,165.46	128,246.87	133,900.37
Multilateral operations	0.67	0.67	1.14	0.98	0.94	0.86	1.33	1.45	1.95	1.76
CO_2 emissions from biomass	213,013.85	213,013.85	225,687.87	223,909.08	242,893.52	243,887.05	249,478.89	265,106.87	276,886.67	280,826.18
CO_2 captured	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	0.86	20.07	54.15	73.54	106.08	127.95
Long-term storage of C in waste disposal sites	138,878.69	138,878.69	145,015.87	149,910.18	154,961.50	159,195.66	164,239.21	168,374.67	172,824.61	176,969.37
Indirect N_2O										
Indirect CO_2	4,316.92	4,316.92	4,111.43	3,899.97	3,805.77	3,705.88	3,607.69	3,516.53	3,406.01	3,325.93
Total CO_2 equivalent emissions without land use, land-use change and forestry	4,470,262.01	4,470,262.01	4,415,704.48	4,271,724.02	4,190,488.60	4,166,665.75	4,207,187.00	4,311,780.91	4,221,882.95	4,218,831.45
Total CO_2 equivalent emissions with land use, land-use change and forestry	4,241,741.67	4,241,741.67	4,099,706.77	3,981,169.69	3,895,210.47	3,869,258.49	3,896,103.72	3,971,358.47	3,885,704.16	3,868,894.09
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	4,474,578.93	4,474,578.93	4,419,815.91	4,275,624.00	4,194,294.37	4,170,371.63	4,210,794.68	4,315,297.44	4,225,288.96	4,222,157.38
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	4,246,058.59	4,246,058.59	4,103,818.20	3,985,069.67	3,899,016.24	3,872,964.36	3,899,711.41	3,974,875.00	3,889,110.17	3,872,220.02

Notes:
All footnotes for this table are given on sheet 3 of table 1(a).

Table 1(a)
Emission trends (CO_2)
(Sheet 2 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	kt										
1. Energy	3,823,346.60	3,832,078.81	3,913,071.70	3,899,352.84	3,982,185.48	3,982,684.22	3,963,486.47	3,964,881.16	3,916,489.08	3,841,440.24	3,569,255.21
A. Fuel combustion (sectoral approach)	3,795,935.37	3,804,822.73	3,886,899.73	3,872,836.84	3,955,282.86	3,956,981.54	3,936,562.73	3,936,745.13	3,888,807.20	3,814,945.13	3,544,455.09
1. Energy industries	1,457,311.93	1,494,393.29	1,531,200.47	1,550,357.43	1,605,016.54	1,595,833.84	1,587,341.40	1,599,633.03	1,609,830.98	1,534,964.55	1,412,175.17
2. Manufacturing industries and construction	656,534.28	656,018.80	643,131.57	626,843.32	632,090.04	624,193.70	616,333.40	603,677.26	614,651.30	591,486.39	492,749.77
3. Transport	915,269.19	912,635.66	926,849.48	940,112.12	948,389.12	968,182.94	968,379.74	976,397.34	986,450.48	962,946.50	936,049.58
4. Other sectors	754,662.11	730,454.89	774,858.40	744,173.16	757,594.09	755,586.83	751,098.68	744,075.75	664,681.35	713,199.56	692,651.32
5. Other	12,157.86	11,320.09	10,859.81	11,350.82	12,193.07	13,184.23	13,409.51	12,961.74	13,193.09	12,348.12	10,829.25
B. Fugitive emissions from fuels	27,411.23	27,256.07	26,171.97	26,516.00	26,902.61	25,702.68	26,923.74	28,136.03	27,681.88	26,495.11	24,800.12
1. Solid fuels	5,038.20	4,890.32	4,366.94	4,528.32	5,077.36	4,276.10	3,822.76	4,521.25	4,343.95	4,182.40	3,091.48
2. Oil and natural gas and other emissions from energy production	22,373.03	22,365.76	21,805.03	21,987.67	21,825.26	21,426.58	23,100.97	23,614.78	23,337.93	22,312.71	21,708.64
C. CO2 transport and storage	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA
2. Industrial processes	318,909.80	330,391.50	316,823.18	314,285.72	325,130.69	338,366.00	335,069.20	341,384.15	346,367.26	323,766.59	250,967.27
A. Mineral industry	137,387.30	139,680.92	136,930.65	136,388.44	138,111.33	144,115.07	144,005.63	147,999.45	153,284.64	143,023.48	115,053.73
B. Chemical industry	56,421.50	59,751.52	57,066.74	54,678.72	57,472.22	59,783.73	61,108.59	58,332.41	61,248.86	58,126.76	49,400.35
C. Metal industry	113,048.32	118,768.13	110,906.97	111,466.07	118,098.90	121,740.59	117,813.63	122,958.08	119,690.56	110,701.41	76,280.06
D. Non-energy products from fuels and solvent use	11,189.34	11,301.77	11,063.44	10,924.80	10,630.65	11,952.99	11,372.91	11,325.84	11,360.92	11,141.28	9,474.59
E. Electronic industry											
F. Product uses as ODS substitutes											
G. Other product manufacture and use	779.15	804.46	777.78	756.45	720.78	675.94	675.69	684.48	700.40	668.78	661.72
H. Other	84.19	84.69	77.6	71.23	96.81	97.67	92.75	83.89	81.88	104.88	96.81
3. Agriculture	11,482.55	10,938.14	10,558.23	10,407.44	11,132.54	10,923.16	10,720.96	10,324.10	10,423.09	10,359.00	10,218.27
A. Enteric fermentation											
B. Manure management											
C. Rice cultivation											
D. Agricultural soils											
E. Prescribed burning of savannas											
F. Field burning of agricultural residues											
G. Liming	6,881.51	6,204.66	5,961.43	5,903.45	6,582.82	6,261.46	6,215.86	5,760.10	5,635.31	5,726.30	5,523.01
H. Urea application	3,475.32	3,662.86	3,650.15	3,587.35	3,618.96	3,738.63	3,581.91	3,672.53	3,861.81	3,727.69	3,802.98
I. Other carbon-containing fertilizers	1,125.72	1,070.63	946.65	916.64	930.77	923.08	923.19	891.48	925.96	905.01	892.29
J. Other	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
4. Land Use, Land-Use Change and Forestry	-361,379.93	-319,069.67	-349,352.70	-327,863.38	-307,253.68	-335,316.90	-331,276.89	-353,817.63	-309,238.94	-351,885.58	-358,462.46
A. Forest land	-458,220.79	-404,693.87	-447,962.49	-420,204.13	-395,699.10	-415,545.40	-408,138.49	-419,697.66	-377,585.73	-436,567.56	-456,988.03
B. Cropland	70,077.91	68,288.54	65,486.65	65,726.03	65,229.56	63,500.99	61,931.86	59,957.23	62,569.47	63,260.97	62,016.12
C. Grassland	17,837.60	18,141.42	20,471.05	18,860.31	19,348.06	17,734.76	15,540.02	12,979.54	18,843.72	11,515.65	10,997.37
D. Wetlands	12,441.67	11,331.45	13,827.39	13,920.14	14,882.33	14,223.71	15,454.14	15,240.05	13,930.01	13,759.27	13,737.14
E. Settlements	36,470.74	35,545.83	39,827.81	39,920.54	40,690.08	41,871.76	41,822.11	41,054.02	41,484.31	42,431.95	42,207.08
F. Other land	-401.47	-455.36	-513.48	-687.41	-760.63	-844.56	-835.89	657.95	-1,234.89	-1,249.64	-989.32
G. Harvested wood products	-40,289.96	-47,841.98	-41,025.40	-45,866.13	-51,351.51	-56,613.57	-57,360.61	-64,279.10	-67,481.61	-45,241.86	-29,622.16
H. Other	704.36	614.31	535.77	467.27	407.52	355.42	309.98	270.34	235.78	205.63	179.34
5. Waste	3474.82	3448.16	3427.69	3698.47	4001.31	3731.04	3824.38	3760.01	3771.76	3699.45	3579.38
A. Solid waste disposal	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
B. Biological treatment of solid waste											
C. Incineration and open burning of waste	3,452.35	3,426.00	3,405.80	3,677.09	3,978.05	3,710.14	3,802.83	3,738.02	3,749.20	3,674.14	3,553.49
D. Waste water treatment and discharge											
E. Other	22.47	22.16	21.89	21.38	23.26	20.90	21.55	22.00	22.56	25.32	25.89
6. Other (as specified in the summary table in CRF)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
Memo items:											
International bunkers	236,841.31	249,413.19	253,132.87	255,156.12	261,768.20	278,820.66	290,909.56	307,963.89	319,688.65	322,035.98	292,614.73
Aviation	108,277.99	114,150.34	112,733.17	109,690.97	114,047.24	121,839.52	129,909.43	135,409.12	139,920.29	140,774.85	130,285.07
Navigation	128,563.32	135,262.85	140,399.69	145,465.15	147,720.95	156,981.14	161,000.13	172,554.77	179,768.36	181,261.13	162,329.66
Multilateral operations	1.76	2.45	1.88	2.46	1.44	1.26	1.51	1.51	1.72	1.73	1.91
CO_2 emissions from biomass	285,896.89	287,913.26	298,244.49	297,830.45	325,444.92	340,189.63	366,441.94	388,537.07	417,120.40	451,672.89	469,446.75
CO_2 captured	156.47	183.44	175.68	176.47	186.21	212.73	183.55	211.96	234.04	213.52	185.06
Long-term storage of C in waste disposal sites	181,400.63	185,824.36	189,498.09	192,841.29	197,283.16	201,063.03	205,114.63	208,014.41	211,926.80	215,704.91	218,536.22
Indirect N_2O											
Indirect CO_2	3,120.51	2,957.70	2,849.23	2,747.67	2,713.14	2,621.06	2,636.07	2,630.47	2,538.10	2,435.90	2,242.96
Total CO_2 equivalent emissions without land use, land-use change and forestry	4,157,213.76	4,176,856.60	4,243,880.79	4,227,744.47	4,322,450.02	4,335,704.43	4,313,101.02	4,320,349.43	4,277,051.18	4,179,265.27	3,834,020.12
Total CO_2 equivalent emissions with land use, land-use change and forestry	3,795,833.83	3,857,786.93	3,894,528.09	3,899,881.09	4,015,196.34	4,000,387.53	3,981,824.13	3,966,531.80	3,967,812.24	3,827,379.69	3,475,557.65
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	4,160,334.27	4,179,814.30	4,246,730.02	4,230,492.14	4,325,163.16	4,338,325.49	4,315,737.08	4,322,979.90	4,279,589.28	4,181,701.18	3,836,263.08
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	3,798,954.33	3,860,744.63	3,897,377.32	3,902,628.76	4,017,909.48	4,003,008.59	3,984,460.19	3,969,162.27	3,970,350.34	3,829,815.59	3,477,800.62

Notes:

All footnotes for this table are given on sheet 3 of table 1(a).

Table 1(a)
Emission trends (CO_2)
(Sheet 3 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Change from base to latest reported year
	kt											%
1. Energy	3,665,661.14	3,525,513.34	3,482,479.31	3,387,430.83	3,206,139.60	3,246,458.83	3,233,791.10	3,236,657.03	3,158,722.87	3,007,558.86	2,701,586.67	-34.01
A. Fuel combustion (sectoral approach)	3,640,340.26	3,499,571.74	3,457,187.03	3,359,923.77	3,179,352.04	3,219,558.87	3,207,438.34	3,210,028.25	3,132,247.55	2,982,095.50	2,679,121.28	-34.07
1. Energy industries	1,437,776.38	1,415,184.60	1,408,494.34	1,332,130.06	1,247,152.56	1,235,320.84	1,189,003.18	1,174,013.79	1,107,137.33	981,894.76	847,114.31	-49.19
2. Manufacturing industries and construction	526,635.64	511,080.09	491,457.14	471,717.25	457,938.05	464,658.50	469,463.66	480,155.68	481,565.67	464,521.49	439,129.12	-44.98
3. Transport	928,619.42	917,096.43	886,983.21	880,323.34	887,627.55	905,184.39	924,836.55	939,200.55	939,153.69	943,330.70	808,175.48	3.7
4. Other sectors	736,747.91	645,458.22	660,811.79	666,561.42	577,918.99	605,941.85	616,461.74	608,937.98	597,006.59	584,426.84	576,989.11	-27.17
5. Other	10,560.92	10,752.41	9,440.55	9,191.71	8,714.88	8,453.28	7,673.20	7,720.24	7,384.28	7,921.71	7,713.26	-71.23
B. Fugitive emissions from fuels	25,320.88	25,941.59	25,292.28	27,507.06	26,787.56	26,899.96	26,352.76	26,628.79	26,475.33	25,463.36	22,465.40	-25.04
1. Solid fuels	4,015.22	4,084.57	3,905.91	4,447.11	4,630.61	4,353.13	4,026.76	4,206.66	4,333.83	3,790.54	3,501.95	-58.82
2. Oil and natural gas and other emissions from energy production	21,305.65	21,857.02	21,386.38	23,059.95	22,156.95	22,546.83	22,326.00	22,422.13	22,141.50	21,672.82	18,963.45	-11.66
C. CO2 transport and storage	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	NO, IE, NA	0.00
2. Industrial processes	272,965.20	271,165.24	258,840.48	260,527.95	265,680.49	262,360.82	258,573.85	267,428.73	263,400.29	257,400.36	239,790.20	-32.63
A. Mineral industry	116,376.79	117,136.55	110,242.82	106,369.85	109,830.59	108,731.19	108,249.46	111,267.32	112,778.37	111,299.72	104,593.17	-27.54
B. Chemical industry	54,974.75	56,220.72	54,333.77	53,745.89	52,782.85	52,109.63	51,107.61	54,517.45	52,692.45	51,321.99	51,397.16	-12.02
C. Metal industry	90,195.90	87,085.26	83,695.40	90,115.03	92,496.13	91,716.16	89,202.85	91,445.64	88,001.41	85,185.03	74,359.07	-46.93
D. Non-energy products from fuels and solvent use	10,595.39	9,970.84	9,850.63	9,565.36	9,837.01	9,134.27	9,349.19	9,469.51	9,223.68	8,914.03	8,764.15	-27.75
E. Electronic industry												
F. Product uses as ODS substitutes												
G. Other product manufacture and use	711.51	645.19	609.22	622.8	640.7	580.22	577.33	626.45	587.73	563.55	570.19	-27.8
H. Other	110.87	106.67	108.64	109.03	93.21	89.35	87.41	102.37	116.66	116.05	106.47	-5.74
3. Agriculture	10,233.39	10,417.72	10,561.77	10,940.10	11,323.49	11,056.54	11,702.55	11,231.41	11,449.46	10,947.52	10,903.59	-29.23
A. Enteric fermentation												
B. Manure management												
C. Rice cultivation												
D. Agricultural soils												
E. Prescribed burning of savannas												
F. Field burning of agricultural residues												
G. Liming	5,443.25	5,539.11	5,432.19	5,895.57	6,093.79	5,592.66	5,938.82	5,544.19	6,019.74	6,081.69	6,042.51	-41.74
H. Urea application	3,902.83	3,917.02	4,204.22	4,103.71	4,313.69	4,560.95	4,886.05	4,793.55	4,514.55	4,122.53	4,069.63	3.72
I. Other carbon-containing fertilizers	887.31	961.59	925.36	940.81	916.01	902.93	877.68	893.67	915.17	743.3	791.45	-28.86
J. Other	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.00
4. Land Use, Land-Use Change and Forestry	-345,001.64	-343,898.68	-351,366.94	-349,882.67	-332,373.93	-325,880.40	-320,042.40	-270,552.79	-273,215.02	-259,496.81	-252,268.77	10.39
A. Forest land	-428,775.00	-424,599.38	-436,530.22	-443,039.65	-419,267.40	-406,938.10	-399,390.47	-348,578.79	-345,822.98	-335,943.17	-326,475.93	-6.75
B. Cropland	61,463.93	61,593.95	62,185.26	63,620.11	60,758.30	55,040.81	52,317.24	52,740.57	54,295.01	53,593.94	50,603.18	-32.63
C. Grassland	7,958.71	7,093.01	8,897.28	10,006.90	9,451.92	7,404.72	8,676.05	12,486.36	7,926.34	10,364.69	8,255.81	-71.13
D. Wetlands	14,919.82	14,710.44	13,605.83	15,952.99	14,883.30	17,640.39	14,860.76	16,152.37	16,383.21	16,164.12	16,177.18	49.86
E. Settlements	39,224.78	36,815.14	36,332.65	35,851.37	37,921.70	38,279.48	42,241.20	38,132.31	38,980.94	38,220.25	37,730.76	8.89
F. Other land	-865.05	-834.66	-591.24	-405.32	136.07	126.16	79.8	-90.61	-55.99	100.73	-194.76	-107.74
G. Harvested wood products	-39,085.25	-38,813.58	-35,385.47	-31,972.84	-36,348.32	-37,512.78	-38,895.81	-41,455.04	-44,973.91	-42,043.03	-38,404.83	27.66
H. Other	156.41	136.41	118.97	103.76	90.49	78.93	68.83	60.03	52.36	45.66	39.82	100.00
5. Waste	3634.82	3455.13	3495.01	3363.91	3372.3	3048.2	3194.83	3145.84	3111.57	3218.4	3174.81	-38.76
A. Solid waste disposal	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	0.00
B. Biological treatment of solid waste												
C. Incineration and open burning of waste	3,611.74	3,433.00	3,474.06	3,342.57	3,352.36	3,026.62	3,142.86	3,122.08	3,087.08	3,195.36	3,151.84	-38.94
D. Waste water treatment and discharge												
E. Other	23.07	22.12	20.95	21.34	19.94	21.58	51.97	23.76	24.49	23.04	22.96	5.42
6. Other (as specified in the summary table in CRF)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.00
Memo items:												
International bunkers	291,265.80	296,785.46	282,142.99	275,146.79	274,423.48	279,852.11	290,930.98	304,161.21	312,955.25	313,868.80	199,216.95	11.19
Aviation	131,005.23	135,137.60	132,971.22	134,093.21	136,431.10	140,834.04	147,457.77	158,859.38	165,361.72	168,217.07	69,713.51	1.27
Navigation	160,260.56	161,647.86	149,171.77	141,053.58	137,992.38	139,018.07	143,473.21	145,301.83	147,593.52	145,651.73	129,503.44	17.38
Multilateral operations	1.66	1.67	1.87	1.49	2.17	2.18	2.26	2.160	2.160	1.74	83.38	12,386.44
CO_2 emissions from biomass	515,097.07	500,373.56	539,537.38	550,592.17	535,608.52	556,803.57	562,774.53	574,490.66	581,816.92	593,764.35	595,768.92	179.69
CO_2 captured	197.80	180.14	147.21	145.59	149.72	139.09	138.45	133.42	134.99	124.28	101.51	100.00
Long-term storage of C in waste disposal sites	222,566.69	224,136.83	225,995.19	229,106.08	231,906.48	233,287.85	234,532.71	237,024.51	239,028.86	239,647.78	241,294.13	73.74
Indirect N_2O												
Indirect CO_2	2,280.55	2,164.57	2,071.28	1,924.09	1,871.85	1,862.82	1,799.09	1,786.30	1,676.30	1,628.54	1,469.78	-65.95
Total CO_2 equivalent emissions without land use, land-use change and forestry	3,952,494.55	3,810,551.43	3,755,376.58	3,662,262.80	3,486,515.87	3,522,924.39	3,507,262.32	3,518,463.02	3,436,684.20	3,279,125.15	2,955,455.27	-33.89
Total CO_2 equivalent emissions with land use, land-use change and forestry	3,607,492.92	3,466,652.75	3,404,009.64	3,312,380.12	3,154,141.94	3,197,043.99	3,187,219.92	3,247,910.23	3,163,469.18	3,019,628.34	2,703,186.51	-36.27
Total CO_2 equivalent emissions, including indirect CO_2, without land use, land-use change and forestry	3,954,775.10	3,812,716.00	3,757,447.85	3,664,186.89	3,488,387.72	3,524,787.22	3,509,061.41	3,520,249.31	3,438,360.50	3,280,753.70	2,956,925.05	-33.92
Total CO_2 equivalent emissions, including indirect CO_2, with land use, land-use change and forestry	3,609,773.47	3,468,817.32	3,406,080.91	3,314,304.22	3,156,013.79	3,198,906.81	3,189,019.01	3,249,696.53	3,165,145.48	3,021,256.89	2,704,656.28	-36.30

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

[a] The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

[b] Fill in net emissions/removals as reported in CRF table Summary 1.A of the latest reported inventory year. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

Table 1(b)
Emission trends (CH_4)
(Sheet 1 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998
	kt									
1. Energy	7,821.09	7,821.09	7,416.16	7,145.50	7,038.80	6,527.87	6,517.92	6,375.00	6,357.71	5,952.14
A. Fuel combustion (sectoral approach)	1,300.54	1,300.54	1,302.24	1,208.93	1,224.37	1,124.46	1,110.74	1,161.33	1,099.52	1,031.50
1. Energy industries	48.76	48.76	49.55	49.14	50.75	53.92	63.31	69.68	70.47	69.09
2. Manufacturing industries and construction	51.71	51.71	50.83	50.00	49.58	50.80	56.60	58.47	59.61	61.48
3. Transport	273.43	273.43	262.10	257.56	244.56	230.38	217.84	209.80	198.31	188.84
4. Other sectors	914.58	914.58	929.78	846.56	875.27	786.73	770.89	821.46	769.58	710.88
5. Other	12.05	12.05	9.98	5.68	4.21	2.63	2.11	1.92	1.54	1.22
B. Fugitive emissions from fuels	6,520.55	6,520.55	6,113.92	5,936.57	5,814.43	5,403.41	5,407.18	5,213.66	5,258.20	4,920.64
1. Solid fuels	3,900.15	3,900.15	3,653.28	3,557.20	3,417.72	3,048.23	3,115.44	2,974.75	3,171.68	2,887.89
2. Oil and natural gas and other emissions from energy production	2,620.40	2,620.40	2,460.64	2,379.36	2,396.71	2,355.18	2,291.74	2,238.91	2,086.52	2,032.75
C. CO_2 transport and storage										
2. Industrial processes	75.49	75.49	71.94	72.26	72.98	77.72	76.04	73.13	75.25	73.31
A. Mineral industry										
B. Chemical industry	54.59	54.59	52.89	54.48	55.51	58.82	57.18	55.73	56.85	55.51
C. Metal industry	16.99	16.99	15.31	14.1	13.94	15.19	15.06	13.55	14.5	14.03
D. Non-energy products from fuels and solvent use	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.07
E. Electronic industry										
F. Product uses as ODS substitutes										
G. Other product manufacture and use	2.33	2.33	2.38	2.43	2.42	2.51	2.6	2.74	2.8	2.72
H. Other	1.49	1.49	1.27	1.16	1.03	1.12	1.12	1.03	1.01	0.98
3. Agriculture	11,602.90	11,602.90	11,099.87	10,736.53	10,487.21	10,382.78	10,351.44	10,382.78	10,273.93	10,232.15
A. Enteric fermentation	9,432.27	9,432.27	9,034.26	8,690.83	8,488.72	8,392.80	8,363.58	8,390.22	8,288.93	8,225.73
B. Manure management	1,994.97	1,994.97	1,898.79	1,868.45	1,834.71	1,829.94	1,832.30	1,814.12	1,819.37	1,836.10
C. Rice cultivation	112.69	112.69	105.22	103.43	101.89	105.59	105.4	111.95	112.54	106.76
D. Agricultural soils	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field burning of agricultural residues	62.97	62.97	61.57	73.78	61.84	54.4	50.01	66.25	52.81	62.9
G. Liming										
H. Urea application										
I. Other carbon-containing fertilizers										
J. Other	0.01	0.01	0.03	0.04	0.05	0.06	0.14	0.23	0.29	0.66
4. Land use, land-use change and forestry	503.12	503.12	480.6	478.81	493.77	589.57	567.29	528.78	520.2	531.4
A. Forest land	155.52	155.52	143.07	148.12	150.49	154.15	134.17	123.64	135.04	145.89
B. Cropland	45.79	45.79	46.04	45.37	44.95	44.81	44.1	43.65	43.01	43.01
C. Grassland	190.35	190.35	179.08	178.48	190.49	183.35	166.67	168.76	173.7	182.08
D. Wetlands	101.43	101.43	100.59	100.16	101.52	102.06	103.23	103.92	102.48	101.56
E. Settlements	4.03	4.03	3.96	3.88	3.80	3.98	3.87	3.74	4.08	3.97
F. Other land	5.49	5.49	7.36	2.3	2.02	3.14	6.84	4.77	1.72	9.16
G. Harvested wood products										
H. Other	0.51	0.51	0.50	0.51	0.50	98.09	108.40	80.30	60.16	45.73
5. Waste	8,922.35	8,922.35	9,067.19	9,144.61	9,177.00	9,161.53	9,194.30	9,162.29	9,062.67	8,904.42
A. Solid waste disposal	7,407.15	7,407.15	7,608.63	7,722.11	7,795.42	7,833.56	7,868.93	7,847.00	7,761.77	7,645.78
B. Biological treatment of solid waste	24.14	24.14	26.77	28.63	31.94	38.01	42.75	48.26	53.16	56.91
C. Incineration and open burning of waste	17.8	17.8	17.68	17.64	16.02	14.2	12.19	16.54	15.86	13.54
D. Waste water treatment and discharge	1,471.39	1,471.39	1,412.32	1,374.53	1,332.05	1,274.41	1,269.22	1,249.39	1,230.90	1,187.33
E. Other	1.86	1.86	1.79	1.7	1.57	1.36	1.22	1.09	0.98	0.86
6. Other (as specified in the summary table in CRF)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
Total CH_4 emissions without CH_4 from LULUCF	28,421.83	28,421.83	27,655.17	27,098.89	26,775.99	26,149.90	26,139.70	25,993.19	25,769.56	25,162.01
Total CH_4 emissions with CH_4 from LULUCF	28,924.94	28,924.94	28,135.76	27,577.70	27,269.75	26,739.48	26,707.00	26,521.97	26,289.76	25,693.41
Memo items:										
International bunkers	8.28	8.28	8.08	8.24	7.99	7.92	7.98	8.41	9.06	9.45
Aviation	1.13	1.13	0.98	0.99	0.93	0.93	0.93	0.94	0.95	0.97
Navigation	7.16	7.16	7.11	7.25	7.06	6.99	7.05	7.47	8.11	8.47
Multilateral operations	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	0.00	0.00
CO_2 emissions from biomass										
CO_2 captured										
Long-term storage of C in waste disposal sites										
Indirect N_2O										
Indirect CO_2										

Notes:
All footnotes for this table are given on sheet 3 of table 1(b).

Table 1(b)
Emission trends (CH_4)
(Sheet 2 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	kt										
1. Energy	5,758.08	5,067.33	4,937.40	4,801.73	4,758.43	4,477.56	4,364.25	4,179.23	4,018.30	4,006.60	3,799.72
A. Fuel combustion (sectoral approach)	1,006.52	946.34	942.4	887.75	926.83	907.98	928.79	930.1	949.48	998.08	984.84
1. Energy industries	73.34	71.31	72.3	73.33	85.24	85.47	88.45	96.13	104.64	111.28	111.22
2. Manufacturing industries and construction	63.97	68.87	70.82	72.56	79.17	84.83	89.98	77.06	79.42	79.54	69.66
3. Transport	178.83	162.43	152.47	142.6	133.28	124.67	115.14	106.23	98.26	89.56	80.51
4. Other sectors	688.92	642.56	644.25	596.49	626.41	610.54	631.97	647.67	664.57	715.35	721.38
5. Other	1.46	1.17	2.56	2.78	2.72	2.46	3.25	3.00	2.59	2.36	2.07
B. Fugitive emissions from fuels	4,751.55	4,120.99	3,995.00	3,913.99	3,831.60	3,569.58	3,435.46	3,249.13	3,068.82	3,008.53	2,814.88
1. Solid fuels	2,790.27	2,606.88	2,516.19	2,448.06	2,366.99	2,158.50	2,034.35	1,900.61	1,762.48	1,736.69	1,591.79
2. Oil and natural gas and other emissions from energy production	1,961.28	1,514.11	1,478.81	1,465.93	1,464.61	1,411.08	1,401.10	1,348.52	1,306.35	1,271.84	1,223.09
C. CO_2 transport and storage											
2. Industrial processes	74.33	76.65	74.94	75.88	79.81	83.04	81.84	80.26	81.62	73.14	63.59
A. Mineral industry											
B. Chemical industry	56.99	58.84	57.89	58.50	62.77	63.97	63.18	61.98	61.46	56.72	53.18
C. Metal industry	13.61	14.00	13.33	13.60	13.08	15.18	14.82	14.13	15.89	12.74	6.66
D. Non-energy products from fuels and solvent use	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05
E. Electronic industry											
F. Product uses as ODS substitutes											
G. Other product manufacture and use	2.79	2.84	2.76	2.82	2.96	2.90	2.95	2.95	3.01	2.88	3.14
H. Other	0.86	0.90	0.89	0.89	0.94	0.92	0.83	1.15	1.20	0.74	0.56
3. Agriculture	10168.71	10075.29	9964.01	9810.48	9776.65	9633.79	9574.80	9505.91	9562.26	9425.90	9377.06
A. Enteric fermentation	8174.67	8073.92	7978.60	7829.80	7779.53	7671.37	7660.85	7601.18	7630.51	7568.98	7497.01
B. Manure management	1837.00	1843.23	1847.63	1835.88	1846.06	1818.60	1769.07	1758.56	1760.61	1708.36	1712.09
C. Rice cultivation	102.88	99.20	99.15	100.89	104.21	109.26	105.61	103.54	106.11	99.83	111.92
D. Agricultural soils	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field burning of agricultural residues	53.40	57.75	36.93	41.47	43.96	30.82	29.36	28.96	46.64	27.65	29.44
G. Liming											
H. Urea application											
I. Other carbon-containing fertilizers											
J. Other	0.75	1.20	1.70	2.44	2.88	3.73	9.91	13.67	18.38	21.08	26.59
4. Land use, land-use change and forestry	481.60	517.21	481.14	457.87	515.45	460.23	484.64	455.35	504.61	445.28	458.22
A. Forest land	127.60	155.61	124.72	120.59	156.50	116.13	136.59	115.17	135.12	102.64	107.81
B. Cropland	42.47	42.19	41.97	41.82	43.04	41.38	41.14	40.81	40.62	40.37	40.02
C. Grassland	166.82	177.04	171.23	164.25	174.55	170.07	168.27	168.20	199.92	174.22	177.72
D. Wetlands	101.65	103.46	110.49	103.57	111.03	108.65	110.92	110.62	110.77	110.94	112.68
E. Settlements	4.55	3.66	4.09	4.46	4.37	4.77	4.91	5.16	5.46	5.86	5.42
F. Other land	3.13	7.28	6.00	4.34	9.86	5.08	10.07	3.63	1.69	0.73	4.42
G. Harvested wood products											
H. Other	35.38	27.96	22.64	18.84	16.11	14.15	12.76	11.75	11.03	10.52	10.15
5. Waste	8688.77	8552.88	8384.60	8217.81	7979.30	7666.97	7385.13	7160.28	6910.67	6592.24	6362.31
A. Solid waste disposal	7466.61	7342.50	7257.77	7112.44	6864.93	6569.47	6319.13	6091.02	5843.32	5555.91	5346.61
B. Biological treatment of solid waste	64.17	71.29	75.54	83.85	92.69	98.20	105.97	112.09	119.73	123.71	132.70
C. Incineration and open burning of waste	12.85	14.36	16.44	13.78	17.81	14.96	13.11	15.29	15.47	14.68	16.18
D. Waste water treatment and discharge	1144.22	1123.77	1033.85	1006.65	1002.76	983.24	945.74	940.96	931.16	896.94	866.18
E. Other	0.92	0.97	1.00	1.08	1.11	1.09	1.19	0.92	0.98	1.00	0.65
6. Other (as specified in the summary table in CRF)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
Total CH_4 emissions without CH_4 from LULUCF	24689.89	23772.15	23360.95	22905.90	22594.20	21861.36	21406.01	20925.68	20572.85	20097.88	19602.68
Total CH_4 emissions with CH_4 from LULUCF	25171.49	24289.36	23842.09	23363.77	23109.65	22321.58	21890.66	21381.03	21077.47	20543.16	20060.91
Memo items:											
International bunkers	9.46	9.92	10.31	10.33	10.38	11.01	11.34	12.04	12.37	12.30	11.33
Aviation	0.98	0.91	0.85	0.82	0.85	0.89	0.89	0.92	0.95	0.96	0.88
Navigation	8.48	9.01	9.46	9.50	9.53	10.12	10.45	11.13	11.42	11.34	10.44
Multilateral operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 emissions from biomass											
CO_2 captured											
Long-term storage of C in waste disposal sites											
Indirect N_2O											
Indirect CO_2											

Notes:
All footnotes for this table are given on sheet 3 of table 1(b).

Table 1(b)
Emission trends (CH_4)
(Sheet 3 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Change from base to latest reported year
	kt											%
1. Energy	3,818.07	3,689.39	3,724.58	3,581.07	3,401.11	3,408.17	3,281.37	3,265.70	3,139.85	2,924.81	2,796.11	-64.25
A. Fuel combustion (sectoral approach)	1,043.47	956.46	1,012.41	1,010.02	917.96	940.40	938.97	957.46	941.23	924.13	900.16	-30.79
1. Energy industries	119.60	120.77	132.38	134.02	134.22	137.21	142.50	144.90	149.03	153.74	148.66	204.88
2. Manufacturing industries and construction	75.39	77.45	79.79	86.29	79.56	79.24	78.26	86.31	91.28	91.17	85.69	65.72
3. Transport	74.33	68.40	62.21	58.43	56.26	54.84	53.56	53.49	52.51	53.35	46.45	-83.01
4. Other sectors	772.01	688.44	736.69	730.09	646.81	667.27	662.64	670.98	647.95	625.39	618.85	-32.33
5. Other	2.14	1.40	1.33	1.19	1.12	1.83	2.01	1.78	0.46	0.49	0.50	-95.81
B. Fugitive emissions from fuels	2,774.60	2,732.94	2,712.17	2,571.04	2,483.15	2,467.77	2,342.39	2,308.25	2,198.62	2,000.67	1,895.95	-70.92
1. Solid fuels	1,534.74	1,519.47	1,528.82	1,411.90	1,364.45	1,388.03	1,277.94	1,255.20	1,170.54	1,016.13	950.08	-75.64
2. Oil and natural gas and other emissions from energy production	1,239.86	1,213.47	1,183.35	1,159.14	1,118.70	1,079.74	1,064.45	1,053.05	1,028.09	984.54	945.87	-63.90
C. CO_2 transport and storage												
2. Industrial processes	69.22	66.72	64.31	63.38	65.89	63.31	62.81	64.35	61.12	61.49	61.65	-18.33
A. Mineral industry												
B. Chemical industry	56.68	53.65	51.88	51.79	54.10	52.12	51.42	53.59	50.25	51.02	53.12	-2.69
C. Metal industry	8.71	9.24	8.58	7.70	7.97	7.30	7.69	6.97	6.91	6.61	5.18	-69.51
D. Non-energy products from fuels and solvent use	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	-46.52
E. Electronic industry												
F. Product uses as ODS substitutes												
G. Other product manufacture and use	3.20	3.22	3.32	3.35	3.25	3.32	3.10	3.19	3.37	3.26	2.85	22.15
H. Other	0.57	0.55	0.47	0.49	0.52	0.52	0.56	0.56	0.54	0.55	0.45	-69.47
3. Agriculture	9,231.51	9,176.73	9,151.86	9,143.73	9,249.75	9,341.17	9,344.42	9,357.64	9,297.51	9,230.77	9,225.88	-20.49
A. Enteric fermentation	7,430.93	7,345.24	7,342.46	7,364.53	7,433.87	7,501.79	7,526.88	7,537.06	7,486.61	7,423.75	7,398.26	-21.56
B. Manure management	1,630.13	1,653.00	1,619.25	1,599.74	1,638.01	1,653.51	1,631.50	1,644.73	1,640.63	1,635.50	1,649.43	-17.32
C. Rice cultivation	113.42	113.58	110.07	104.16	101.18	104.32	107.54	102.92	99.57	98.71	97.64	-13.35
D. Agricultural soils	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	0.00
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
F. Field burning of agricultural residues	24.14	24.60	37.73	24.56	23.95	26.92	24.21	19.47	18.08	20.29	28.03	-55.48
G. Liming												
H. Urea application												
I. Other carbon-containing fertilizers												
J. Other	32.89	40.31	42.35	50.74	52.74	54.64	54.29	53.46	52.62	52.52	52.52	475,758.24
4. Land use, land-use change and forestry	468.20	467.51	495.08	440.63	436.79	446.36	453.25	560.33	450.37	452.50	458.15	-8.94
A. Forest land	105.95	106.41	132.33	93.84	91.65	100.94	103.45	179.00	101.34	101.85	106.62	-31.45
B. Cropland	39.53	43.25	39.91	39.80	38.74	38.45	38.28	40.15	37.97	37.83	37.31	-18.51
C. Grassland	175.17	177.24	187.01	165.48	169.80	167.09	168.51	180.26	165.94	170.07	170.56	-10.39
D. Wetlands	122.65	117.99	115.79	119.36	120.88	121.44	120.38	128.14	124.30	125.82	125.93	24.15
E. Settlements	5.09	5.04	5.08	5.10	5.08	5.18	5.54	5.46	9.28	5.60	5.58	38.33
F. Other land	9.91	7.87	5.40	7.58	1.23	3.90	7.75	18.01	2.24	2.03	2.85	-47.99
G. Harvested wood products												
H. Other	9.89	9.70	9.57	9.48	9.41	9.36	9.34	9.32	9.31	9.30	9.30	1,739.11
5. Waste	6,051.69	5,834.87	5,663.86	5,414.41	5,177.74	5,069.93	4,929.47	4,882.90	4,823.86	4,751.27	4,649.99	-47.88
A. Solid waste disposal	5,031.58	4,818.03	4,679.14	4,438.07	4,207.81	4,105.40	3,966.71	3,919.77	3,865.21	3,803.16	3,716.66	-49.82
B. Biological treatment of solid waste	142.86	155.18	171.49	185.96	197.39	204.84	214.43	218.01	219.08	221.06	227.09	840.69
C. Incineration and open burning of waste	16.71	17.38	12.32	19.21	13.33	16.91	16.82	15.87	20.20	15.39	15.36	-13.69
D. Waste water treatment and discharge	860.29	844.01	800.66	770.94	758.98	742.54	731.01	729.01	719.13	711.43	690.65	-53.06
E. Other	0.25	0.26	0.25	0.23	0.23	0.23	0.49	0.24	0.24	0.23	0.23	-87.66
6. Other (as specified in the summary table in CRF)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.00
Total CH_4 emissions without CH_4 from LULUCF	19,170.49	18,767.71	18,604.60	18,202.58	17,894.49	17,882.58	17,618.07	17,570.60	17,322.34	16,968.34	16,733.62	-41.12
Total CH_4 emissions with CH_4 from LULUCF	19,638.69	19,235.22	19,099.68	18,643.22	18,331.28	18,328.94	18,071.32	18,130.93	17,772.72	17,420.84	17,191.77	-40.56
Memo items:												
International bunkers	11.06	11.47	10.73	10.02	9.88	9.91	9.93	10.13	10.81	12.20	12.12	46.34
Aviation	0.88	0.89	0.87	0.87	0.90	0.92	0.95	1.02	1.07	1.06	0.42	-62.87
Navigation	10.18	10.58	9.86	9.14	8.98	8.99	8.98	9.11	9.74	11.14	11.70	63.53
Multilateral operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	100.00
CO_2 emissions from biomass												
CO_2 captured												
Long-term storage of C in waste disposal sites												
Indirect N_2O												
Indirect CO_2												

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

[a] The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

Table 1(c)
Emission trends (N_2O)
(Sheet 1 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998
	kt									
1. Energy	101.21	101.21	100.69	100.09	101.37	104.02	109.16	114.12	115.51	116.98
A. Fuel combustion (sectoral approach)	100.71	100.71	100.02	99.40	100.73	103.34	108.55	113.47	114.75	116.33
1. Energy industries	28.77	28.77	28.23	27.58	26.56	26.32	26.11	26.38	25.65	25.68
2. Manufacturing industries and construction	17.44	17.44	16.80	15.98	15.08	14.64	15.25	15.04	15.03	15.47
3. Transport	27.14	27.14	27.49	28.74	31.02	35.63	40.22	44.26	46.20	48.14
4. Other sectors	26.51	26.51	26.71	26.41	27.38	26.11	26.40	27.25	27.30	26.52
5. Other	0.85	0.85	0.79	0.70	0.69	0.64	0.57	0.53	0.57	0.52
B. Fugitive emissions from fuels	0.50	0.50	0.67	0.69	0.64	0.68	0.61	0.65	0.75	0.65
1. Solid fuels	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Oil and natural gas and other emissions from energy production	0.50	0.50	0.67	0.69	0.64	0.68	0.61	0.65	0.75	0.65
C. CO_2 transport and storage										
2. Industrial processes	395.61	395.61	380.61	370.72	353.72	368.49	367.47	378.01	362.17	290.74
A. Mineral industry										
B. Chemical industry	376.38	376.38	361.58	351.64	334.71	349.72	348.72	359.04	343.52	272.08
C. Metal industry	0.16	0.16	0.15	0.15	0.14	0.15	0.13	0.12	0.13	0.12
D. Non-energy products from fuels and solvent use	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
E. Electronic industry										
F. Product uses as ODS substitutes										
G. Other product manufacture and use	18.85	18.85	18.64	18.70	18.62	18.37	18.37	18.61	18.25	18.28
H. Other	0.21	0.21	0.23	0.23	0.23	0.23	0.23	0.23	0.25	0.24
3. Agriculture	757.90	757.90	714.66	675.80	658.91	654.44	654.87	660.21	662.99	658.78
A. Enteric fermentation										
B. Manure management	102.23	102.23	97.87	93.87	91.06	89.15	88.39	88.19	87.58	87.18
C. Rice cultivation										
D. Agricultural soils	653.89	653.89	615.05	579.80	566.05	563.71	565.02	570.09	573.88	569.76
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field burning of agricultural residues	1.78	1.78	1.73	2.14	1.80	1.58	1.46	1.93	1.52	1.82
G. Liming										
H. Urea application										
I. Other carbon containing fertlizers										
J. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02
4. Land use, land-use change and forestry	53.42	53.42	53.55	53.13	52.92	53.88	52.03	50.63	50.63	50.83
A. Forest land	22.06	22.06	22.01	22.01	21.47	22.74	21.62	21.24	21.44	21.71
B. Cropland	10.92	10.92	10.93	10.91	10.91	10.85	10.70	10.56	10.39	10.23
C. Grassland	2.59	2.59	2.35	2.22	2.63	2.49	2.04	2.01	2.28	2.49
D. Wetlands	0.71	0.71	0.66	0.64	0.68	0.68	0.75	0.76	0.71	0.70
E. Settlements	12.24	12.24	12.68	12.54	12.42	12.25	12.05	11.27	11.10	10.88
F. Other land	0.26	0.26	0.29	0.23	0.23	0.28	0.32	0.30	0.27	0.39
G. Harvested wood products										
H. Other	1.08	1.08	1.08	1.08	1.08	1.07	1.07	1.07	1.07	1.07
5. Waste	30.92	30.92	30.48	30.26	29.98	30.11	30.04	30.46	30.74	30.92
A. Solid waste disposal										
B. Biological treatment of solid waste	1.13	1.13	1.29	1.44	1.67	2.08	2.34	2.60	3.04	3.25
C. Incineration and open burning of waste	1.67	1.67	1.59	1.66	1.57	1.49	1.34	1.71	1.79	1.71
D. Waste water treatment and discharge	28.12	28.12	27.59	27.16	26.74	26.54	26.32	26.07	25.79	25.80
E. Other	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	0.04	0.08	0.12	0.16
6. Other (as specified in the summary table in CRF)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
Total direct N_2O emissions without N_2O from LULUCF	1285.64	1285.64	1226.44	1176.87	1143.99	1157.06	1161.54	1182.81	1171.40	1097.42
Total direct N_2O emissions with N_2O from LULUCF	1339.06	1339.06	1279.99	1230.00	1196.91	1210.95	1213.57	1233.44	1222.03	1148.25
Memo items:										
International bunkers	6.04	6.04	5.81	6.18	6.43	6.65	6.95	7.08	7.52	7.86
Aviation	2.06	2.06	2.00	2.18	2.31	2.41	2.55	2.67	2.81	3.00
Navigation	3.98	3.98	3.81	4.00	4.12	4.24	4.40	4.41	4.71	4.86
Multilateral operations	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	C, IE, NA, NE, NO	0.00	0.00
CO_2 emissions from biomass										
CO_2 captured										
Long-term storage of C in waste disposal sites										
Indirect N_2O	53.48	53.48	49.30	46.10	44.60	42.73	40.96	39.60	37.72	35.98
Indirect CO_2										

Notes:
All footnotes for this table are given on sheet 3 of table 1(c).

Table 1(c)
Emission trends (N_2O)
(Sheet 2 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	kt										
1. Energy	112.85	105.83	106.14	103.28	105.34	105.54	103.57	103.02	103.78	103.07	97.14
A. Fuel combustion (sectoral approach)	111.91	105.09	105.37	102.59	104.67	104.82	102.91	102.39	103.09	102.51	96.65
1. Energy industries	25.06	25.86	26.95	27.58	28.75	29.40	29.32	29.55	29.72	29.29	27.98
2. Manufacturing industries and construction	15.09	14.85	15.03	15.35	15.72	16.00	15.85	15.76	15.87	15.50	13.13
3. Transport	44.94	37.62	36.75	34.29	33.41	33.23	30.46	30.21	30.50	29.50	27.65
4. Other sectors	26.35	26.30	26.28	25.02	26.33	25.58	26.64	26.28	26.41	27.69	27.34
5. Other	0.48	0.45	0.35	0.35	0.47	0.62	0.64	0.59	0.59	0.54	0.55
B. Fugitive emissions from fuels	0.94	0.74	0.77	0.69	0.67	0.72	0.66	0.64	0.69	0.56	0.49
1. Solid fuels	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Oil and natural gas and other emissions from energy production	0.94	0.74	0.77	0.69	0.67	0.72	0.66	0.64	0.69	0.56	0.49
C. CO_2 transport and storage											
2. Industrial processes	224.73	231.28	228.70	204.27	203.70	209.31	200.73	171.15	170.41	134.49	104.52
A. Mineral industry											
B. Chemical industry	206.60	213.57	211.53	187.96	188.50	194.58	185.92	155.99	155.57	119.96	90.89
C. Metal industry	0.12	0.13	0.11	0.10	0.12	0.13	0.12	0.12	0.11	0.11	0.08
D. Non-energy products from fuels and solvent use	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
E. Electronic industry											
F. Product uses as ODS substitutes											
G. Other product manufacture and use	17.76	17.30	16.77	15.92	14.78	14.30	14.40	14.75	14.43	14.14	13.28
H. Other	0.24	0.27	0.27	0.27	0.28	0.28	0.28	0.28	0.28	0.27	0.26
3. Agriculture	657.61	646.55	643.03	630.59	618.29	628.23	614.73	607.23	612.65	609.18	595.60
A. Enteric fermentation											
B. Manure management	85.54	83.63	83.19	82.06	81.52	80.93	80.99	80.27	80.61	79.15	77.97
C. Rice cultivation											
D. Agricultural soils	570.50	561.16	558.65	547.19	535.33	546.23	532.51	525.64	530.06	528.59	516.01
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field burning of agricultural residues	1.54	1.73	1.12	1.25	1.34	0.94	0.90	0.89	1.43	0.85	0.90
G. Liming											
H. Urea application											
I. Other carbon containing fertlizers											
J. Other	0.03	0.04	0.06	0.08	0.10	0.13	0.33	0.44	0.56	0.60	0.71
4. Land use, land-use change and forestry	49.55	50.60	49.80	49.35	50.86	49.05	49.59	48.54	49.32	48.40	48.80
A. Forest land	21.35	22.48	21.28	21.30	22.25	21.26	21.81	21.32	21.18	20.57	20.74
B. Cropland	10.04	9.84	9.65	9.55	9.47	9.36	9.35	9.35	9.38	9.59	9.67
C. Grassland	1.96	2.23	1.99	1.93	2.22	1.94	1.82	1.78	2.70	1.90	2.06
D. Wetlands	0.78	0.80	0.94	0.77	1.09	0.93	0.86	0.85	0.88	0.86	0.85
E. Settlements	10.76	10.58	11.16	11.06	10.98	10.85	10.90	10.57	10.53	10.72	10.64
F. Other land	0.32	0.39	0.38	0.36	0.43	0.37	0.44	0.39	0.35	0.39	0.43
G. Harvested wood products											
H. Other	1.06	1.06	1.06	1.05	1.05	1.04	1.03	1.03	1.02	1.02	1.02
5. Waste	31.03	31.60	31.76	32.24	33.00	32.58	33.44	33.10	33.39	33.69	33.80
A. Solid waste disposal											
B. Biological treatment of solid waste	3.67	4.13	4.48	5.03	5.53	5.77	6.32	6.64	7.02	7.09	7.40
C. Incineration and open burning of waste	1.62	1.81	1.94	1.72	2.10	1.80	1.68	1.85	1.81	1.72	1.80
D. Waste water treatment and discharge	25.53	25.38	25.02	25.11	24.96	24.54	24.58	24.49	24.45	24.76	24.47
E. Other	0.21	0.29	0.32	0.38	0.42	0.48	0.86	0.11	0.11	0.12	0.12
6. Other (as specified in the summary table in CRF)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
Total direct N_2O emissions without N_2O from LULUCF	1026.22	1015.26	1009.63	970.38	960.33	975.66	952.47	914.50	920.22	880.44	831.06
Total direct N_2O emissions with N_2O from LULUCF	1075.78	1065.86	1059.42	1019.73	1011.19	1024.71	1002.06	963.04	969.54	928.84	879.86
Memo items:											
International bunkers	7.87	8.25	8.30	8.24	8.37	8.86	9.13	9.60	9.90	9.98	9.18
Aviation	3.26	3.44	3.40	3.31	3.42	3.65	3.89	4.05	4.18	4.21	3.91
Navigation	4.61	4.81	4.91	4.93	4.95	5.21	5.24	5.56	5.72	5.77	5.27
Multilateral operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 emissions from biomass											
CO_2 captured											
Long-term storage of C in waste disposal sites											
Indirect N_2O	34.38	32.46	32.55	31.69	31.76	31.74	31.39	30.74	29.58	28.29	26.27
Indirect CO_2											

Notes:
All footnotes for this table are given on sheet 3 of table 1(c).

Table 1(c)
Emission trends (N_2O)
(Sheet 3 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Change from base to latest reported year
	kt											%
1. Energy	99.08	96.66	97.11	95.81	93.40	96.03	95.53	97.41	97.29	94.59	88.24	-12.81
A. Fuel combustion (sectoral approach)	98.56	96.24	96.75	95.44	93.03	95.65	95.15	97.03	96.91	94.25	87.51	-13.10
1. Energy industries	28.58	28.29	28.94	27.67	26.23	26.40	25.27	25.38	24.54	22.45	20.16	-29.93
2. Manufacturing industries and construction	13.73	13.68	13.09	12.42	12.43	13.03	12.74	12.92	13.38	12.87	12.36	-29.11
3. Transport	28.06	28.28	28.27	28.60	29.36	30.31	31.50	32.55	32.98	33.32	29.33	8.06
4. Other sectors	27.76	25.60	26.09	26.36	24.69	25.61	25.35	25.90	25.78	25.36	25.41	-4.15
5. Other	0.44	0.40	0.36	0.38	0.32	0.30	0.28	0.28	0.23	0.25	0.25	-70.74
B. Fugitive emissions from fuels	0.52	0.42	0.36	0.37	0.36	0.38	0.39	0.38	0.37	0.34	0.73	46.42
1. Solid fuels	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-78.06
2. Oil and natural gas and other emissions from energy production	0.52	0.42	0.36	0.37	0.36	0.37	0.39	0.38	0.37	0.34	0.73	46.50
C. CO_2 transport and storage												
2. Industrial processes	69.30	52.65	46.61	38.94	38.29	37.12	34.29	35.65	32.66	31.36	29.48	-92.55
A. Mineral industry												
B. Chemical industry	55.95	39.38	34.01	27.15	26.64	25.97	22.88	24.15	20.69	18.85	17.01	-95.48
C. Metal industry	0.09	0.09	0.08	0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.06	-59.63
D. Non-energy products from fuels and solvent use	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	8.90
E. Electronic industry												
F. Product uses as ODS substitutes												
G. Other product manufacture and use	12.98	12.91	12.24	11.41	11.27	10.77	11.03	11.11	11.59	12.13	12.09	-35.87
H. Other	0.27	0.26	0.27	0.27	0.28	0.28	0.28	0.28	0.29	0.30	0.30	42.34
3. Agriculture	594.77	594.65	593.37	602.46	616.92	613.60	614.91	626.07	617.61	610.31	608.36	-19.73
A. Enteric fermentation												
B. Manure management	76.91	75.70	74.95	74.54	74.70	75.38	75.17	75.29	75.37	74.17	74.18	-27.44
C. Rice cultivation												
D. Agricultural soils	516.30	517.27	516.47	526.28	540.60	536.50	538.10	549.30	540.82	534.67	532.47	-18.57
E. Prescribed burning of savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
F. Field burning of agricultural residues	0.74	0.75	1.15	0.75	0.73	0.82	0.74	0.59	0.56	0.62	0.86	-51.44
G. Liming												
H. Urea application												
I. Other carbon containing fertlizers												
J. Other	0.82	0.93	0.79	0.89	0.89	0.90	0.89	0.88	0.86	0.85	0.85	202928.83
4. Land use, land-use change and forestry	48.59	48.42	49.11	47.21	47.29	50.49	50.19	52.08	50.06	50.31	50.16	-6.12
A. Forest land	20.65	20.63	21.08	19.91	19.77	20.21	19.91	21.03	20.02	20.19	20.39	-7.58
B. Cropland	9.63	9.58	9.56	9.49	9.42	9.43	9.38	9.41	9.35	9.38	9.16	-16.09
C. Grassland	2.01	2.18	2.51	1.77	1.83	1.72	1.66	2.01	1.52	1.60	1.58	-39.23
D. Wetlands	1.11	0.94	0.87	0.96	0.95	0.98	0.89	1.09	0.90	0.90	0.86	20.00
E. Settlements	10.25	10.21	10.28	10.26	10.64	13.44	13.62	13.58	13.68	13.59	13.54	10.65
F. Other land	0.50	0.47	0.44	0.46	0.37	0.40	0.44	0.57	0.34	0.39	0.38	48.75
G. Harvested wood products												
H. Other	1.01	1.02	1.02	1.03	1.03	1.04	1.04	1.04	1.05	1.05	1.05	-2.93
5. Waste	34.59	34.55	34.13	35.05	34.65	34.86	35.18	35.18	35.34	35.07	35.44	14.61
A. Solid waste disposal												
B. Biological treatment of solid waste	7.99	8.21	8.49	8.67	9.03	9.15	9.49	9.42	9.33	9.35	9.44	732.64
C. Incineration and open burning of waste	1.91	1.93	1.56	2.07	1.61	1.87	1.81	1.83	2.06	1.70	1.71	2.43
D. Waste water treatment and discharge	24.57	24.28	23.95	24.17	23.88	23.72	23.75	23.81	23.83	23.91	24.18	-14.03
E. Other	0.13	0.14	0.13	0.13	0.13	0.12	0.12	0.12	0.11	0.11	0.11	100.00
6. Other (as specified in the summary table in CRF)	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	0.00
Total direct N_2O emissions without N_2O from LULUCF	797.74	778.51	771.22	772.25	783.25	781.61	779.92	794.31	782.89	771.34	761.52	-40.77
Total direct N_2O emissions with N_2O from LULUCF	846.33	826.92	820.33	819.46	830.54	832.10	830.11	846.39	832.95	821.65	811.68	-39.38
Memo items:												
International bunkers	9.15	9.25	8.79	8.60	8.58	8.85	9.23	9.59	9.59	9.94	6.57	8.86
Aviation	3.93	4.04	3.99	4.01	4.08	4.20	4.37	4.69	4.87	4.95	2.07	0.49
Navigation	5.22	5.21	4.81	4.58	4.50	4.65	4.86	4.89	4.72	4.99	4.51	13.18
Multilateral operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
CO_2 emissions from biomass												
CO_2 captured												
Long-term storage of C in waste disposal sites												
Indirect N_2O	25.88	25.01	24.28	24.43	24.15	23.86	23.44	23.44	23.49	22.86	21.20	-60.36
Indirect CO_2												

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

[a] The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

Table 1(d)
Emission trends (HFCs, PFCs and SF_6)
(Sheet 1 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[a]	1990	1991	1992	1993	1994	1995	1996	1997	1998
	kt									
Emissions of HFCs and PFCs - (kt CO_2 equivalent)	60,853.32	60,853.32	58,056.65	56,191.72	58,058.85	62,103.00	66,559.21	71,757.70	77,901.30	78,236.85
Emissions of HFCs - (kt CO_2 equivalent)	29,135.98	29,135.98	29,183.45	31,647.37	34,445.88	38,870.09	43,345.78	50,666.92	58,127.81	59,406.26
HFC-23	1.81	1.81	1.81	1.95	2.06	2.26	2.41	2.60	2.78	2.54
HFC-32	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.08
HFC-41	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-43-10mee	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA
HFC-125	0.01	0.01	0.01	0.01	0.03	0.08	0.18	0.32	0.55	0.83
HFC-134	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-134a	0.01	0.01	0.04	0.64	2.60	3.25	4.18	6.12	7.76	9.56
HFC-143	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-143a	0.51	0.51	0.53	0.41	0.03	0.07	0.14	0.33	0.51	0.80
HFC-152	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-152a	0.00	0.00	0.00	0.01	0.14	0.16	0.90	1.03	1.15	1.16
HFC-161	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-227ea	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	0.00	0.00	0.00	0.01	0.02	0.04	0.07
HFC-236cb	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-236ea	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-236fa	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, IE, NA	NO, NE, IE, NA	0.00	0.00
HFC-245ca	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-245fa	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	0.00	0.00	0.00	0.00
HFC-365mfc	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	0.00
Unspecified mix of HFCs - (kt CO_2 equivalent)	2.45	2.45	3.90	5.63	36.56	153.23	247.88	601.60	1,414.85	1,274.36
Emissions of PFCs - (kt CO_2 equivalent)	25,867.33	25,867.33	23,491.60	19,176.95	18,251.79	17,599.78	17,269.34	16,595.32	15,392.19	14,549.59
CF_4	2.44	2.44	2.19	1.71	1.58	1.47	1.50	1.43	1.37	1.33
C_2F_6	0.52	0.52	0.47	0.40	0.41	0.40	0.33	0.32	0.30	0.28
C_3F_8	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.03
C_4F_{10}	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.02	0.01
c-C_4F_8	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
C_5F_{12}	0.04	0.04	0.04	0.05	0.04	0.06	0.06	0.06	0.02	0.03
C_6F_{14}	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02
$C_{10}F_{18}$	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA
c-C_3F_6	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA
Unspecified mix of PFCs - (kt CO_2 equivalent)	314.15	314.15	328.33	343.13	405.79	397.82	556.15	480.99	440.04	405.25
Unspecified mix of HFCs and PFCs - (kt CO_2 equivalent)	5,850.00	5,850.00	5,381.60	5,367.40	5,361.18	5,633.13	5,944.08	4,495.46	4,381.30	4,281.00
Emissions of SF_6 - (kt CO_2 equivalent)	10,913.67	10,913.67	11,374.01	12,208.97	12,889.99	14,056.97	15,047.71	14,904.14	13,403.18	12,648.46
SF_6	0.48	0.48	0.50	0.54	0.57	0.62	0.66	0.65	0.59	0.55
Emissions of NF_3 - (kt CO_2 equivalent)	23.48	23.48	25.15	26.99	29.01	32.00	99.21	93.43	101.14	76.63
NF_3	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00

Notes:
All footnotes for this table are given on sheet 3 of table 1(d).

Table 1(d)
Emission trends (HFCs, PFCs and SF_6)
(Sheet 2 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	kt										
Emissions of HFCs and PFCs - (kt CO_2	69,842.09	67,088.86	64,598.07	69,862.75	73,542.37	76,005.36	81,552.29	86,874.14	93,545.17	99,277.27	99,003.36
Emissions of HFCs - (kt CO_2 equivalent)	51,588.14	52,688.48	51,826.36	55,286.49	62,062.11	66,259.83	73,150.01	79,549.99	86,845.67	92,830.13	94,049.02
HFC-23	1.69	1.34	0.83	0.63	0.62	0.41	0.41	0.24	0.22	0.21	0.16
HFC-32	0.14	0.22	0.34	0.45	0.63	0.87	1.10	1.41	1.70	2.02	2.18
HFC-41	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	0.00	0.00
HFC-43-10mee	NO, NE, IE, NA	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
HFC-125	1.17	1.58	2.04	2.57	3.16	3.80	4.47	5.46	6.32	7.06	7.32
HFC-134	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-134a	10.97	12.90	15.11	16.73	18.40	20.07	21.69	23.64	24.89	25.91	25.85
HFC-143	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-143a	1.13	1.58	1.96	2.38	2.85	3.28	3.76	4.24	4.73	5.14	5.36
HFC-152	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-152a	1.30	1.89	3.00	4.00	4.31	3.95	3.35	3.66	3.88	3.71	3.75
HFC-161	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-227ea	0.10	0.16	0.21	0.26	0.33	0.37	0.41	0.45	0.51	0.53	0.59
HFC-236cb	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-236ea	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-236fa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
HFC-245ca	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA
HFC-245fa	0.01	0.01	0.03	0.14	0.18	0.49	0.43	0.46	0.47	0.46	0.41
HFC-365mfc	0.01	0.03	0.05	0.10	0.17	0.51	0.51	0.53	0.61	0.53	0.49
Unspecified mix of HFCs - (kt CO_2 equivalent)	1,088.44	872.68	585.55	420.30	349.61	332.09	301.75	304.78	467.18	523.11	431.43
Emissions of PFCs - (kt CO_2 equivalent)	14,133.73	12,151.83	10,805.50	12,534.21	10,258.98	8,728.16	7,326.54	6,457.74	5,976.04	5,497.35	3,648.56
CF_4	1.30	1.06	0.95	1.15	0.93	0.78	0.64	0.56	0.51	0.44	0.25
C_2F_6	0.27	0.25	0.21	0.25	0.18	0.14	0.11	0.09	0.08	0.06	0.04
C_3F_8	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.03	0.02	0.02
C_4F_{10}	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.05	0.04
c-C_4F_8	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C_5F_{12}	0.02	0.03	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00
C_6F_{14}	0.02	0.02	0.02	0.00	0.02	0.02	0.01	0.01	0.01	0.01	0.02
$C_{10}F_{18}$	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA
c-C_3F_6	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA
Unspecified mix of PFCs - (kt CO_2 equivalent)	471.65	509.83	532.07	479.93	600.68	660.87	744.23	743.60	840.03	781.81	634.36
Unspecified mix of HFCs and PFCs - (kt CO_2 equivalent)	4,120.22	2,248.56	1,966.21	2,042.06	1,221.28	1,017.37	1,075.75	866.41	723.46	949.79	1,305.77
Emissions of SF_6 - (kt CO_2 equivalent)	10,319.88	10,349.43	9,571.76	8,524.75	8,011.61	8,030.33	7,774.54	7,365.97	6,913.34	6,586.86	6,231.52
SF_6	0.45	0.45	0.42	0.37	0.35	0.35	0.34	0.32	0.30	0.29	0.27
Emissions of NF_3 - (kt CO_2 equivalent)	74.32	102.33	81.69	133.27	146.20	132.15	156.03	141.12	163.15	149.27	77.50
NF_3	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00

Notes:
All footnotes for this table are given on sheet 3 of table 1(d).

Table 1(d)
Emission trends (HFCs, PFCs and SF_6)
(Sheet 3 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Change from base to latest reported
	kt											%
Emissions of HFCs and PFCs - (kt CO_2)	103,117.36	107,172.80	109,941.40	113,634.08	115,604.12	110,028.91	112,101.23	111,668.26	108,542.21	104,224.63	92,542.97	52.08
Emissions of HFCs - (kt CO_2 equivalent)	98,731.94	102,596.53	105,629.58	109,029.75	111,552.06	105,893.78	107,543.25	107,166.27	103,171.36	99,821.94	88,845.98	204.94
HFC-23	0.22	0.17	0.15	0.15	0.14	0.15	0.15	0.17	0.18	0.32	0.11	-94.08
HFC-32	2.44	2.71	3.02	3.35	3.59	3.64	4.06	4.49	4.96	5.35	5.66	779,898.79
HFC-41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
HFC-43-10mee	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	100.00
HFC-125	7.86	8.42	8.93	9.64	10.05	9.48	9.89	10.19	10.33	9.71	8.69	92,975.09
HFC-134	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	0.00	100.00
HFC-134a	26.20	26.94	27.31	27.58	27.98	27.25	27.48	26.95	25.37	23.97	22.60	253,965.96
HFC-143	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	0.00
HFC-143a	5.60	5.84	5.99	6.03	6.14	5.47	5.37	5.05	4.52	4.16	3.67	622.33
HFC-152	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	0.00
HFC-152a	3.77	3.61	3.54	3.30	3.32	3.20	3.10	3.26	3.18	3.04	2.85	3,311,156.84
HFC-161	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	0.00
HFC-227ea	0.64	0.69	0.73	0.76	0.79	0.83	0.85	0.88	0.85	0.85	0.83	100.00
HFC-236cb	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	0.00
HFC-236ea	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	0.00
HFC-236fa	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	100.00
HFC-245ca	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	NO, NE, NA	0.00
HFC-245fa	0.45	0.47	0.49	0.51	0.54	0.62	0.67	0.72	0.66	0.62	0.58	100.00
HFC-365mfc	0.47	0.47	0.44	0.42	0.47	0.58	0.60	0.61	0.51	0.57	0.43	100.00
Unspecified mix of HFCs - (kt CO_2 equivalent)	384.30	581.02	588.74	508.17	408.51	365.29	288.93	302.72	206.78	246.92	177.31	7,143.38
Emissions of PFCs - (kt CO_2 equivalent)	3,862.19	4,158.18	3,504.67	3,620.52	3,279.91	3,369.89	3,778.08	3,384.47	3,537.93	2,732.70	2,092.53	-91.91
CF_4	0.32	0.35	0.28	0.30	0.28	0.30	0.31	0.27	0.32	0.22	0.15	-93.88
C_2F_6	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	-95.52
C_3F_8	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.01	0.02	0.01	-42.24
C_4F_{10}	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.00	0.00	0.01	-70.61
c-C_4F_8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-79.01
C_5F_{12}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-99.98
C_6F_{14}	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-96.65
$C_{10}F_{18}$	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	0.00
c-C_3F_6	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	NO, NE, IE, NA	0.00
Unspecified mix of PFCs - (kt CO_2 equivalent)	707.55	733.72	755.45	679.90	597.93	553.15	649.94	667.04	706.38	599.89	478.25	52.24
Unspecified mix of HFCs and PFCs - (kt CO_2 equivalent)	523.23	418.09	807.14	983.81	772.15	765.24	779.90	1,117.53	1,832.92	1,669.99	1,604.46	-72.57
Emissions of SF_6 - (kt CO_2 equivalent)	6,275.50	6,010.24	6,123.91	6,030.42	5,706.79	6,048.05	6,319.35	6,553.19	6,733.86	6,709.94	5,520.39	-49.42
SF_6	0.28	0.26	0.27	0.26	0.25	0.27	0.28	0.29	0.30	0.29	0.24	-49.42
Emissions of NF_3 - (kt CO_2 equivalent)	119.68	127.87	92.25	66.08	70.06	64.57	61.49	60.24	68.11	57.49	60.17	156.28
NF_3	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	156.28

Abbreviations: CRF = common reporting format, LULUCF = land use, land-use change and forestry.

[a] The column "Base year" should be filled in only by those Parties with economies in transition that use a base year different from 1990 in accordance with the relevant decisions of the Conference of the Parties. For these Parties, this different base year is used to calculate the percentage change in the final column of this table.

[c] Enter actual emissions estimates. If only potential emissions estimates are available, these should be reported in this table and an indication for this be provided in the documentation box. Only in these rows are the emissions expressed as CO_2 equivalent emissions.

[d] In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories", HFC and PFC emissions should be reported for each relevant chemical. However, if it is not possible to report values for each chemical (i.e. mixtures, confidential data, lack of disaggregation), this row could be used for reporting aggregate figures for HFCs and PFCs, respectively. Note that the unit used for this row is kt of CO_2 equivalent and that appropriate notation keys should be entered in the cells for the individual chemicals.)

Table 2(a)

Description of quantified economy-wide emission reduction tar

Party	European Union (28)		Comment
Base year /base period	1990		The EU and its Member States committed to achieving a joint quantified economy wide greenhouse gas emission reduction target of 20 % below the 1990 level by 2020. It is a joint pledge with no separate individual targets for Member States under the Convention.
Emission reduction target	% of base year/base period	% of 1990 [b]	
	20.00%	20.00%	
Period for reaching	BY-2020		

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Optional.

Table 2(b)

Description of quantified economy-wide emission reduction target: gases and sectors covered[a]

Gases covered	Base year for each gas (year):
CO_2	1990
CH_4	1990
N_2O	1990
HFCs	1990
PFCs	1990
SF_6	1990
NF_3	
Other Gases (specify)	
Sectors covered[b]	
Energy	Yes
Transport[f]	Yes
Industrial processes[g]	Yes
Agriculture	Yes
LULUCF	No
Waste	Yes
Other Sectors (specify)	
International aviation(1)	Yes

Abbreviations: LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of

[b] More than one selection will be allowed. If Parties use sectors other than those indicated above, the explanation of how these sectors relate to the sectors defined by the IPCC should be provided.

[f] Transport is reported as a subsector of the energy sector.

[g] Industrial processes refer to the industrial processes and solvent and other product use sectors.

(1) Aviation in the scope of the EU Emissions Trading System at current

Table 2(c)

Description of quantified economy-wide emission reduction target: global warming potential values (GWP)[a]

Gases	GWP values [b]
CO_2	4th AR
CH_4	4th AR
N_2O	4th AR
HFCs	4th AR
PFCs	4th AR
SF_6	4th AR
NF_3	
Other Gases (specify)	

Abbreviations: GWP = global warming potential

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Please specify the reference for the GWP: Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) or the Fourth Assessment Report of the IPCC.

Table 2(d)

Description of quantified economy-wide emission reduction target: approach to counting emissions and removals from the LULUCF sector[a]

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

Abbreviation: LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

Table 2(f)

Description of quantified economy-wide emission reduction target: any other information[a,b]

In December 2009, the European Council reiterated the conditional offer of the EU to move to a 30 % reduction by 2020 compared to 1990 levels as part of a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and that developing countries contribute adequately according to their responsibilities and respective capabilities.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] This information could include information on the domestic legal status of the target or the total assigned amount of emission units for the period for reaching a target. Some of this information is presented in the narrative part of the biennial report.

Note: Tables 2(e)I and 2(e)II (market-based mechanisms) are not applicable for the EU's 2020 target. The target under the Convention, which applies to the EU as a whole, has been met domestically.

Table 3
Progress in achievement of the quantified economy-wide emission reduction target: information on mitigation actions and their effects

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]
EU Emissions Trading System, Directive 2003/87/EC as amended by Directive 2009/29/EC and Directive 2008/101/EC, 2003/87/EC and Directive (EU) 2018/410.*	Cross-cutting	CO_2, N_2O, PFCs	Cost-efficient reduction of emissions	Regulatory	Implemented	Putting a market price to carbon and giving a financial value to each tonne of emissions saved	2005	European Commission, Member States	NA	NA	NA	NE	888,000.00
Effort Sharing Regulation (EU) 2018/842 *	Cross-cutting	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6	Mitigating GHG emissions in sectors not included in the EU ETS.	Regulatory	Implemented	Binding GHG emissions targets for Member States for the years 2021-2030 for sectors not included in the EU ETS	2013	Member States	NA	NA	NA	NE	755,000.00
Regulation (2018/1999) on the Governance of the Energy Union and Climate Action*	Energy	CO_2, CH_4, N_2O	This Regulation sets out the necessary legislative foundation for reliable, inclusive, cost-efficient, transparent and predictable governance of the Energy Union and Climate Action (governance mechanism), which ensures the achievement of the 2030 and long-term objectives and targets of the Energy Union in line with the 2015 Paris Agreement	Regulatory	Implemented	The Energy Union covers five dimensions: energy security; the internal energy market; energy efficiency; decarbonisation; and research, innovation and competitiveness.	2018	European Commission, EU, Member States	NE	NE	NE	NE	NE
Methane strategy	Cross-cutting	CH_4	Reducing emissions of methane across all sectors.	Regulatory	Adopted	This communication sets out a strategy for reducing methane emissions. It outlines a comprehensive policy framework combining concrete cross-sectoral and sector-specific actions within the EU, as well as promoting similar action internationally.	2020	European Commission	NE	NE	NE	NE	NE
CCS Directive 2009/31/EC	Cross-cutting	CO_2	Geological storage of CO2	Regulatory	Implemented	Establishes a legal framework for the environmentally safe geological storage of CO_2	2009	European Commission, Member States	NE	NE	NE	NE	NE
Sustainable Carbon Cycles	Cross-cutting	CO_2	Establish sustainable and climate-resilient carbon cycles	Regulatory	Adopted	The European Commission provides methodological support and funding to support industrial capture, use and storage of CO_2 and will develop a regulatory framework for the certification of carbon removals. The communication on sustainable carbon cycles also addresses the concept of carbon farming, which aims at managing agricultural lands in a sustainable way in which they help to remove of CO_2 from the atmosphere and increase carbon stocks. Finally, so-called 'blue carbon' initiatives aim at increasing the removal of CO_2 in oceanic and coastal ecosystems by regenerating these ecosystems.	2021	European Commission	NE	NE	NE	NE	NE

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]
Taxonomy Regulation (EU) 2020/852	Cross-cutting	CO_2, CH_4, N_2O	Direct investments towards low greenhouse gas emissions and climate-resilient development	Regulatory	Implemented	The Taxonomy Regulation established the basis for a classification system which lists for considering certain economic activities as environmentally sustainable economic activities. The aim of this system is to provide companies, and investors and policymakers with information the criteria on under which certain economic activities can be considered environmentally sustainable.	2022	European Commission, Member States	NE	NE	NE	NE	NE
Directive (EU) 2018/2002 amending Directive 2012/27/EU on energy efficiency*	Energy	CO_2, CH_4, N_2O	Increase of energy efficiency	Regulatory	Implemented	The Energy Efficiency Directive (EED) is the main legal act addressing energy efficiency in the EU. The amendment entered into force in December 2018 and had to be transposed into national law by Member States by 2020. It introduced a new headline EU energy efficiency target for 2030 to be achieved collectively across the EU.	2018	Member States	NA	NA	NE	NE	NE
Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency*	Energy	CO_2, CH_4, N_2O	Accelerate the renovation of the existing building stock and improve the energy perfomance of new and existing buildings.	Regulatory	Implemented	The goal is to accelerate the renovation of the existing building stock through strengthened long-term renovation strategies and the mobilisation of related investments. All EU countries must establish a long-term renovation strategy to support the renovation of their national building stock into a highly energy efficient and decarbonised building stock by 2050. From 2021 onwards all new buildings must be nearly zero-energy buildings, while the remaining amount of energy required should be covered to a very significant extent by renewable sources.	2018	Member States	NA	NA	NE	NE	NE
Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU *	Energy	CO_2, CH_4, N_2O	Improving the energy efficiency of products on the EU market and help consumers to identify energy-saving products.	Regulatory	Implemented	The EU Energy Labelling Framework Regulation lays down specific labelling requirements for energy-related products placed on the EU market. It is a widely recognised feature on household products and helps consumers to choose products which are more energy efficient and encouraged manufacturers to drive innovation by using more energy efficient technologies.	2017	European Commission, Member States	NA	NA	NE	NE	NE
Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast)*	Energy	CO_2, CH_4, N_2O	Increase of renewable energy in electricity, heating and cooling and transport and including sustainability criteria for bioenergy	Regulatory	Implemented	The recast Renewable Energy Directive (RED) is the main legal act addressing the use of renewable energies in the EU. It includes a binding renewable energy target for the EU for 2030 of at least 32 % for the overall share of energy from renewable sources in the EU's gross final consumption of energy in 2030. It establishes a set of rules to facilitate the increase of renewable energy in electricity, heating and cooling and transport and includes sustainability criteria for bioenergy.	2018	Member States	NA	NA	NE	NE	NE

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]
A hydrogen strategy for a climate-neutral Europe*	Energy	CO_2, CH_4, N_2O	Scaling up the hydrogen production and infrastructure to an international dimension.	Information	Adopted	The hydrogen strategy puts forward a vision for the creation of a European hydrogen ecosystem from research and innovation in order to scale up production and infrastructure to an international dimension. The strategy explores how producing and using renewable hydrogen can help decarbonising the EU economy in a cost-effective way, in line with the European Green Deal.	2020	Member States	NA	NA	NA	NE	NE
Directive 2009/125/EC establishing a framework for the setting of eco-design requirements for energy- related products**	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	This is the framework Directive for eco-design requirements and one of the major cornerstones of the Community Strategy on Integrated Product Policy, together with the Energy Labelling Directive.	2009	European Commission, Member States	NA	NA	NE	NE	NE
Eco-design requirements for glandless standalone circulators and glandless circulators integrated in products (COM REG (EC) 641/2009)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for glandless standalone circulators and circulator integrated products, including the requirement for Energy labelling (see Reg. (EC) 622/2012)	2009	European Commission, Member States, Industry	NE	NE	11,000.00	NE	NE
Eco-design requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps (COM REG (EC) 245/2009 amended by COM REG (EU) 347/2010)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for fluorescent lamps, high discharge lamps, ballasts and luminaires able to operate such lamps, including the requirement for Energy labelling. (see Reg. (EU) 874/2012)	2009	European Commission, Member States, Industry	NE	15,300.00	NE	NE	100,000.00
Eco-design requirements for non-directional household lamps, amendment is replacing functionality requirements for lamps excluding compact fluorescent lamps and LED lamps (COM REG No 245/2009 amended by COM REG (EC) 2015/1428)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for non-directional household lamps, including the requirement for Energy labelling (see Reg. (EU) 874/2012).	2009	European Commission, Member States, Industry	NE	NE	15,400.00	NE	100,000.00
Eco-design requirements for household refrigerating appliances (COM REG (EC) 643/2009)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for household refrigerating appliances, including the requirement for Energy labelling (see Reg. (EU) 1060/2010).	2009	European Commission, Member States, Industry	NE	NE	2,000.00	6,000.00	17,000.00
Eco-design requirements for no-load condition electric power consumption and average active efficiency of external power supplies (COM REG (EC) 278/2009). Repealed by (EU) 2019/1782*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Adopted	The Regulation sets minimum standards for no-load condition electric power consumption and average active efficiency of external power supplies; Energy labelling has not been introduced.	2020	European Commission, Member States, Industry	NA	NA	NE	NE	1,500.00
Eco-design requirements for simple set-top boxes (COM REG (EC) 107/2009)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for simple set-top boxes; Energy labelling has not been introduced.	2009	European Commission, Member States, Industry	NE	NE	260	NE	NE

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]
Eco-design requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (COM REG (EC) 1275/2008), amended by (EU) No 801/2013*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for standby and off mode electric power consumption of electrical and electronic household and office equipment; Energy labelling has not been introduced.	2009	European Commission, Member States, Industry	NE	NE	12,400.00	NE	16,500.00
Eco-design requirements for household tumble driers (COM REG (EU) 932/2012)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for household tumble driers, including the requirement for Energy labelling (see Reg. (EU) 392/2012)	2012	European Commission, Member States, Industry	NA	400	1,500.00	2,900.00	3,800.00
Eco-design requirements for water pumps (COM REG (EU) 547/2012)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for water pumps; Energy labelling has not been introduced.	2012	European Commission, Member States, Industry	NA	NE	1,250.00	NE	NE
Eco-design requirements for air conditioners and comfort fans (COM REG (EU) 206/2012)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for air conditioners and comfort fans, including the requirement for Energy labelling (see Reg. (EU) 626/2011)	2012	European Commission, Member States, Industry	NA	1,000.00	3,000.00	5,000.00	5,000.00
Eco-design requirements for industrial fans (COM REG (EU) 327/2011)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for industrial fans; Energy labelling has not been introduced.	2011	European Commission, Member States, Industry	NA	9,600.00	24,800.00	41,600.00	NE
Eco-design requirements for household dishwashers (COM REG (EU) 1016/2010)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for household dishwashers, including the requirement for Energy labelling (see Reg. (EU) 1059/2010)	2010	European Commission, Member States, Industry	NE	NE	500	1,800.00	NE
Eco-design requirements for household washing machines (COM REG (EU) 1015/2010)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for household washing machines, including the requirement for Energy labelling (see Reg. (EU) 1061/2010)	2010	European Commission, Member States, Industry	NE	NE	800	NE	NE
Eco-design requirements for directional lamps, light emitting diode lamps and related equipment (COM REG No 1194/2012 amended by COM REG (EC) 2015/1428)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for directional lamps, light emitting diode lamps and related equipment, including the requirement for Energy labelling (see Reg. (EU) 874/2012)	2013	European Commission, Member States, Industry	NA	NE	9,500.00	10,300.00	100,000.00
Eco-design requirements for space heaters and combination heaters (COM REG (EU) 813/2013). Regulation (EU) 811/2013 for labelling.*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation aims to set minimum standards for space heaters and combination heaters, separate regulation for Energy labelling.	2013	European Commission, Member States, Industry	NA	57,000.00	114,000.00	161,000.00	199,000.00

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]
Eco-design requirements for computers and computer servers (COM REG (EU) 617/2013)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for computers and servers.	2013	European Commission, Member States, Industry	NA	NE	4,200.00	NE	NE
Eco-design requirements for vacuum cleaners (COM REG (EU) 666/2013)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for vacuum cleaners including the requirement for energy labelling.	2013	European Commission, Member States, Industry	NA	NE	6,000.00	NE	NE
Eco-design requirements for domestic ovens, hobs and range hoods (COM REG (EU) 66/2014)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for domestic ovens, hobs and range hoods including the requirement for energy labelling.	2014	European Commission, Member States, Industry	NA	NE	1,200.00	NE	2,600.00
Eco-design requirements for small, medium and large power transformers (COM REG (EU) 548/2014)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for power transformers.	2014	European Commission, Member States, Industry	NA	NE	NE	4,000.00	NE
Eco-design requirements for ventilator units (COM REG (EU) 1253/2014)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for ventilators including the requirement for energy labelling.	2014	European Commission, Member States, Industry	NA	NE	NE	NE	80,000.00
Eco-design requirements for television and networked standby losses (COM REG (EU) 801/2013)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for television, including the requirement for energy labelling.	2013	European Commission, Member States, Industry	NA	NE	36,000.00	NE	33,000.00
Eco-design requirements for water heaters and hot water storage tanks (COM REG (EU) 814/2013)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for water heaters and hot water storage tanks, including the requirement for energy labelling.	2013	European Commission, Member States, Industry	NA	13,000.00	29,000.00	42,000.00	45,000.00
Eco-design requirements for electric motors (COM REG (EU) 4/2014; amendment of COM REG (EC) 640/2009)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for electric motors, including the requirement for energy labelling	2013	European Commission, Member States, Industry	NA	NE	21,660.00	NE	38,000.00
Ecodesign requirements for air heating products, cooling products, high temperature process chillers and fan coil units (COM REG No 1194/2012 amended by COM REG (EC) 2015/1428)*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Implemented	The Regulation sets minimum standards for air heating products, cooling products and high temperature process chillers (see Reg. (EU) 2015/1428)	2016	European Commission, Member States, Industry	NA	NE	NE	NE	8,000.00
Eco-design requirements for welding equipment. Commission Regulation (EU) 2019/1784	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Regulatory	Adopted	The Regulation sets minimum standards for welding equipment (see Reg. (EU) 2019/1784)	2021	European Commission, Member States, Industry	NA	NA	NE	NE	270

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]
Voluntary eco-design scheme for complex set-top boxes*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Voluntary Agreement	Implemented	Voluntary agreement on energy consumption targets for set-top boxes without Energy labelling.	2010	European Commission, Member States, Industry	NE	NE	1,600.00	NE	NE
Voluntary eco- design scheme for imaging equipment*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption	Voluntary Agreement	Implemented	Voluntary agreement on energy consumption targets for imaging equipment without Energy labelling.	2011	European Commission, Member States, Industry	NA	NE	3,800.00	NE	3,400.00
EU Strategy on Heating and Cooling*	Energy	CO_2, CH_4, N_2O	Reduce energy consumption in buildings and industry	Information	Implemented	A strategy working to decarbonise buildings, and improve energy efficiency in industry. The strategy groups a series of existing policies and measures.	2016	European Commission, EU, Member States	NA	NA	NE	NE	NE
Energy Union Strategy (COM(2015) 80 final)*	Energy	CO_2, CH_4, N_2O	Ensure that Europe has secure, affordable and climate-friendly energy	Information	Adopted	It provides the framework for supply security, a fully-integrated internal energy market, energy efficiency and greenhouse gas emission reductions in the EU energy sector.	2015	European Commission, Member States	NA	NA	NE	NE	NE
Accelerating Clean Energy Innovation (COM (2016) 63)*	Energy	CO_2, CH_4, N_2O	Research and Innovation part of the Clean Energy for All European package. It recognizes the central role played by innovation in the energy transition and the importance of a regulatory framework that is conducive to it.	Information	Adopted	This Communication details a set of 20 different actions to boost research and innovation in clean energy solutions and to bring results to the market quickly and successfully.	2016	European Commission	NA	NA	NE	NE	NE
Regulation (EU) No 518/2014 of 5 March 2014 with regard to labelling of energy-related products on the internet*	Energy	CO_2, CH_4, N_2O	Help consumers to identify energy-saving products.	Regulatory	Implemented	The Regulation olbigates suppliers to provide dealers with sufficient labelling information so they can display it on their website	2014	European Commission, Member States	NA	NA	NE	NE	NE
Green Public Procurement*	Energy	CO_2, CH_4, N_2O	Increase the share of efficient and environmentally friendly technologies, products, services in	Voluntary Agreement	Implemented	Increase the share of efficient and environmentally friendly technologies, products, services in the public sector	2004	Member States	NA	NA	NE	NE	NE

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]
Commission Regulation (EU) 2017/1151 of 1 June 2017 supplementing Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information, amending Directive 2007/46/EC of the European Parliament and of the Council, Commission Regulation (EC) No 692/2008 and Commission Regulation (EU) No 1230/2012 and repealing Commission Regulation (EC) No 692/2008*	Transport	CO_2	Provide for a new regulatory test procedure by implementing the Worldwide harmonised Light-duty vehicles Test Procedures (WLTP) into Union legislation.	Regulatory	Implemented	The WLTP provides a full description of a vehicle test cycle for CO_2 and regulated pollutant emissions under standardised ambient conditions. In order to adapt it to the EU type-approval system, it is necessary to complement it by further improving the transparency requirements for technical parameters that will allow independent parties to reproduce the type approval test results and by reducing testing flexibilities.	2017	European Commission, industry	NA	NA	NE	NE	NE
Directive 1999/94/EC on Car Labelling*	Transport	CO_2	Raise consumer awareness on fuel use and CO2 emissions of new passenger cars	Regulatory	Implemented	The Directive requires that information relating to the fuel economy and CO_2 emissions of new passenger cars is consistently made available to consumers.	2000	Member States, industry	NE	NE	NE	NE	NE
Sustainable and Smart Mobility Strategy – putting European transport on track for the future, COM(2020) 789 final,	Transport	CO_2	Putting European transport on track for the future	Information	Adopted	The strategy sets out a roadmap for putting European transport firmly on the right track for a sustainable and smart future. It identifies 10 flagship areas with an action plan that will guide the work in future.	2020	European Commission, Member States	NA	NA	NA	NE	NE
Regulation (EU) 2019/631 setting CO2 emission performance standards for new passenger cars and for new light commercial vehicles*	Transport	CO_2	Setting more ambitious CO2 emission performance standards for new passenger cars and vans.	Regulatory	Implemented	The Regulation sets EU fleet-wide CO_2 emission targets applying from 2020, 2025 and 2030.	2020	European Commission, Member States, manufacturers	NA	NA	NA	NE	NE
Regulation (EU) 2019/1242 setting CO2 emission performance standards for new heavy-duty vehicles*	Transport	CO_2	Setting CO2 emission performance standards for new Heavy-duty vehicle.	Regulatory	Adopted	The Regulation sets targets for fleet-wide average CO_2 emissions from new lorries in a given calendar year. It further includes a specific mechanism to provide additional incentives to market zero- and low-emission vehicles and financial penalties in case of non-compliance with the CO_2 targets.	2020	European Commission, Member States, manufacturers	NA	NA	NA	NE	NE
Regulation (EU) 2020/740 on the labelling of tyres with respect to fuel efficiency and other parameters*	Transport	CO_2	New EU rules on the energy labelling of road tyres	Regulatory	Implemented	This Regulation establishes a framework for the provision of harmonised information on tyre parameters through labelling to allow end-users to make an informed choice when purchasing tyres, for the purpose of increasing safety, the protection of health, and the economic and environmental efficiency of road transport, by promoting fuel-efficient, long-lasting and safe tyres with low noise levels.	2020	Member States	NA	NA	NA	NE	NE

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]
Directive (EU) 2019/1161 on the promotion of clean and energy-efficient road transport vehicles*	Transport	CO_2	Promoting clean mobility solutions in public procurement tenders	Regulatory	Implemented	This Directive requires Member States to ensure that contracting authorities and contracting entities take into account lifetime energy and environmental impacts, including energy consumption and emissions of CO_2 and of certain pollutants, when procuring certain road transport vehicles with the objectives of promoting and stimulating the market for clean and energy-efficient vehicles and of improving the contribution of the transport sector to the environment, climate and energy policies of the Union.	2019	Member States	NA	NA	NA	NE	NE
Directive 2009/30/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions*	Transport	CO_2	Reduction of life-cycle GHG emissions intensity of fuels by at least 6 % by 2020 and beyond.	Regulatory	Implemented	This Directive sets, in respect of road vehicles, and non-road mobile machinery (including inland waterway vessels when not at sea), agricultural and forestry tractors, and recreational craft when not at sea: (a) technical specifications on health and environmental grounds for fuels to be used with positive ignition and compression-ignition engines, taking account of the technical requirements of those engines; and (b) a target for the reduction of life cycle greenhouse gas emissions.	2009	Member States	NE	NE	NE	NE	NE
Directive 2014/94/EU on Deployment of Alternative Fuels Infrastructure*	Transport	CO_2	Reduce CO2 emissions through shift of fuel type	Regulatory	Implemented	The Directive requires Member States to adopt national policy frameworks for the market development of alternative fuels and their infrastructure, and sets binding targets for the build-up of alternative fuel infrastructure.	2014	Member States	NA	NE	NE	NE	NE
Directive (EU) 2022/362 as regards the charging of vehicles for the use of certain infrastructures	Transport	CO_2	Moving away from a time-based charging model (vignettes) towards distance-based charges (tolls) for heavy-duty vehicles, buses, vans, minibuses and passenger cars.	Regulatory	Implemented	In 2022, the Eurovignette Directive (1999/62/EC) was amended aiming at moving away from a time-based model of charging (vignettes) to distance-based charges (tolls) – that better reflect the polluter-pays and user-pays principles - for heavy-duty vehicles. The rulesscope of the directive has have been extended to buses, vans, minibuses and passenger cars. To encourage the wider use of cleaner heavy-duty vehicles, Member States shall either charge reduced rates for zero- and low-emission vehicles as well as for vehicles more efficient than the average or introduce an external-cost charge related to the cost of CO_2 emissions, or both.	2022	Member States	NA	NA	NA	NE	NE

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]
European Strategy for Low-Emission Mobility*	Transport	CO_2	Reduce GHG emissions associated with transport	Information	Adopted	A strategy to deliver low emission mobility, based on an action plan for low emission mobility based around the following themes: Optimising the transport system and improving its efficiency; Scaling up the use of low-emission alternative energy sources; Moving towards zero-emission vehicles; Horizontal enablers to support low emissions mobility	2016	European Commission	NA	NA	NE	NE	NE
Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) (Recast)*	Industry/ industrial processes	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	Reduction of harmful industrial emissions across the EU	Regulatory	Implemented	The Directive is a recast of existing legislation aiming at achieving benefits to the environment and human health by reducing polluting emissions as well as waste from industrial and agricultural installations in particular through Best Available Techniques (BAT).	2011	European Commission, Member States	NA	NA	NE	NE	NE
F-Gas Regulation (EU) No 517/2014*	Industry/ industrial processes	HFCs, PFCs, SF_6	Reduce consumption and use of F-gases	Regulatory	Implemented	The Regulation prescribes a cap and subsequent reduction of HFCs that can be placed on the EU market ("phase-down"). It also includes a number of bans.	2015	European Commission, Member States	NE	NE	NE	NE	72,000.00
European Directive on mobile air-conditioning systems (MACs) (2006/40/EC)*	Industry/ industrial processes	HFCs	Reduce use and consumption of F-gases	Regulatory	Implemented	The Directive lays down the requirements for the EC type approval or national type-approval of vehicles as regards emissions from, and the safe functioning of, air-conditioning systems.	2006	European Commission, Member States, industry	NE	NE	NE	NE	NE
EU Regulation 2021/2116, repealing EU Regulation 1306/2013 on the financing, management and monitoring of the CAP	Agriculture	CO_2, CH_4, N_2O	It sets out the rules on the financing, management and monitoring of the CAP 2023-2030.	Regulatory	Adopted	This regulation lays down the financing of expenditure under the CAP, the management and control systems to be put in place by the Member States; the management and control systems to be put in place by the Member States for the CAP.	2023	European Commission, Member States	NA	NA	NA	NE	NE
EU Regulation 2021/2115 repealing EU Regulations 1305/2013 and 1307/2013 establishing rules on support for strategic plans to be drawn up by Member States	Agriculture	CO_2, CH_4, N_2O	It establishes rules on support for national CAP strategic plans.	Regulatory	Adopted	The Regulation provides general and specific objectives to be pursued through Union support financed by the EAGF and by the EAFRD under the CAP as well as the related indicators; types of intervention and common requirements for Member States to pursue those objectives as well as the related financial arrangements; CAP Strategic Plans, which are to be drawn up by Member States and which set targets, specify conditions for interventions and allocate financial resources, according to the specific objectives and identified needs; coordination and governance as well as monitoring, reporting and evaluation.	2023	European Commission, Member States	NA	NA	NA	NE	NE
EU Regulation 2020/2220 laying down certain transitional provisions for support from the European Agricultural Fund for Rural Development (EAFRD) and from the European Agricultural Guarantee Fund (EAGF) in the years 2021 and 2022.*	Agriculture	CO_2, CH_4, N_2O	The transitional provisions allow Member States and the Commission more time to prepare all elements necessary to apply the new legal framework of the new CAP period 2023-2030.	Regulatory	Implemented	Transitional Regulation which lays down the conditions for the provision of support from the EAGF and EAFRD. It remains in force until the new CAP begins.	2021	European Commission, Member States	NA	NA	NA	NE	NE

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010 [f]	2015 [f]	2020	2025 [f]	2030 [f]
Nitrates Directive (1991/676/EEC)**	Agriculture	N_2O	Prevent water pollution	Regulatory	Implemented	The Directive contains actions and measures to be elaborated by the Member States, such as monitoring of waters, identification of nitrates vulnerable zones (NZV), establishment of Codes of Good Agricultural Practices (CGAP) and implementation of actions plans.	1991	European Commission, Member States	NE	NE	NE	NE	NE
LULUCF Regulation (EU) 2018/841 on the inclusion of GHG emissions/removals in the 2030 climate and energy framework*	Forestry/ LULUCF	CO_2, CH_4, N_2O	Ensure that greenhouse gas emissions from land use, land use change or forestry are offset by at least an equivalent removal of CO_2 from the atmosphere in the period 2021 to 2030.	Regulatory	Implemented	The Regulation sets a binding commitment for each Member State to ensure that accounted emissions from land use are entirely compensated by an equivalent removal of CO_2 from the atmosphere through action in the sector. This is known as the "no debit" rule.	2021	Member States need to ensure that accounted emissions from land use are entirely compensated by an equivalent removal of CO_2 from the atmosphere through action in the sector	NA	NA	NA	NE	NE
Waste Framework Directive (2008/98/EC) as amended by Directive (EU) 2018/851 which was adopted in May 2018*	Waste management/ waste, Energy, Industry/ industrial Processes	CO_2, CH_4	Promote prevention and recycling of waste	Regulatory	Implemented	The Directive is a legal framework for the management of waste to cope with the challenge of decoupling economic growth from waste generation and promoting strict hierarchy of intervention for waste prevention and management. It has been amended in 2006, 2008 and 2018.	2008	European Commission, Member States	NE	NE	NE	NE	NE
Landfill Directive (1999/31/EC) as amended by Directive (EU) 2018/850 which was adopted in May 2018**	Waste management/ waste, Energy	CH_4	Prevent or reduce as far as possible negative effects on the environment resulting from landfilling	Regulatory	Implemented	The Landfill Directive defines the different categories of waste (municipal waste, hazardous waste, non-hazardous waste and inert waste) and applies to all landfills, defined as waste disposal sites for the deposit of waste onto or into land.	1999	European Commission, Member States	48,000.00	NE	44,000.00	NE	NE
EU policies targeting different waste streams*	Waste management/ waste, energy	CO_2, CH_4	Reduction of waste, increase of recycling rate	Regulatory	Implemented	These policy group targets different waste streams to promote recycling, re-use and waste recovery.	1994	European Commission, Member	NE	NE	NE	NE	NE
Management of biodegradable waste (COM/2008/0811 final) as amended by Directive (EU) 2018/850 which was adopted in May 2018 and Directive (EU) 2018/851 which was adopted in May 2018*	Waste management/ waste, Energy	CO_2, CH_4	Make us of bio-waste as energy or material source	Regulatory	Implemented	The Directive obliges Member States to reduce the amount of biodegradable municipal waste that they landfill to 35% of 1995 levels by 2016 (for some countries by 2020) which will significantly reduce this problem	2008	European Commission, Member States	NE	NE	NE	NE	NE
Urban Waste Water Treatment Directive (91/271/EEC)*	Waste management/ waste	N_2O, CH_4	Protect the environment from the adverse effects of urban & industrial waste water discharges	Regulatory	Implemented	The Directive concerns the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industrial sectors.	1991	European Commission, Member States	NE	NE	NE	NE	NE

Name of mitigation action[a]	Sector(s) affected[b]	GHG(s) affected	Objective and/or activity affected	Type of instrument[c]	Status of implementation[d]	Brief description[e]	Start year of implementation	Implementing entity or entities	Estimate of mitigation impact (not cumulative, in kt CO_2 eq)				
									2010[f]	2015[f]	2020	2025[f]	2030[f]
New Circular Economy Action Plan	Waste management/ waste	CO_2, CH_4, N_2O	Accelerate the transition to a circular economy and to reduce the EU's consumption footprint and to double the circular material use rate in the next decade	Regulatory	Adopted	The plan announces initiatives along the entire life cycle of products. It targets how products are designed, promotes circular economy processes, encourages sustainable consumption, and aims to ensure that waste is prevented and the resources used are kept in the EU economy for as long as possible.	2020	European Commission	NA	NA	NA	NE	NE

Note: The two final columns specify the year identified by the Party for estimating impacts (based on the status of the measure and whether an ex post or ex ante estimation is available).
Abbreviations: GHG = greenhouse gas; LULUCF = land use, land-use change and forestry.

[a] Parties should use an asterisk (*) to indicate that a mitigation action is included in the 'with measures' projection.

[b] To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors, cross-cutting, as appropriate.

[c] To the extent possible, the following types of instrument should be used: economic, fiscal, voluntary agreement, regulatory, information, education, research, other.

[d] To the extent possible, the following descriptive terms should be used to report on the status of implementation: implemented, adopted, planned.

[e] Additional information may be provided on the cost of the mitigation actions and the relevant timescale.

[f] Optional year or years deemed relevant by the Party.

Table 4
Reporting on progress[a, b]

	Total emissions excluding LULUCF	Contribution from LULUCF[d]	Quantity of units from market based mechanisms under the Convention		Quantity of units from other market based mechanisms	
Year[c]	(kt CO_2 eq)	(kt CO_2 eq)	(number of units)	(kt CO_2 eq)	(number of units)	(kt CO_2 eq)
Base year/period (1990)	5,709,517.20	NA	NA	NA	NA	NA
1990	5,709,517.20	NA	NA	NA	NA	NA
2010	4,913,472.45	NA	NA	NA	NA	NA
2011	4,763,579.09	NA	NA	NA	NA	NA
2012	4,702,723.99	NA	NA	NA	NA	NA
2013	4,604,425.18	NA	NA	NA	NA	NA
2014	4,428,209.59	NA	NA	NA	NA	NA
2015	4,463,021.94	NA	NA	NA	NA	NA
2016	4,449,195.28	NA	NA	NA	NA	NA
2017	4,474,782.75	NA	NA	NA	NA	NA
2018	4,386,906.69	NA	NA	NA	NA	NA
2019	4,215,532.13	NA	NA	NA	NA	NA
2020	3,770,662.70	NA	NA	NA	NA	NA

Abbreviation: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] For the base year, information reported on the emission reduction target shall include the following: (a) total GHG emissions, excluding emissions and removals from the LULUCF sector; (b) emissions and/or removals from the LULUCF sector based on the accounting approach applied taking into consideration any relevant decisions of the Conference of the Parties and the activities and/or land that will be accounted for; (c) total GHG emissions, including emissions and removals from the LULUCF sector. For each reported year, information reported on progress made towards the emission reduction targets shall include, in addition to the information noted in paragraphs 9(a–-c) of the UNFCCC biennial reporting guidelines for developed country Parties, information on the use of units from market-based

[c] Parties may add additional rows for years other than those specified below.

[d] Information in this column should be consistent with the information reported in table 4(a)I or 4(a)II, as appropriate. The Parties for which all relevant information on the LULUCF contribution is reported in table 1 of this common tabular format can refer to table 1.

Note: Tables 4(a) (LULUCF) and 4(b) (market-based mechanisms) are not applicable for the EU's 2020 target.

Table 5

Summary of key variables and assumptions used in the projections analysis [a]

Key underlying assumptions		Historical [b]											Projected		
Assumption	Unit	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2025	2030	2035
GDP [5]	million EUR (2016)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14,481,403.32	15,397,012.10	16,355,251.89
Population	thousands	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	447,964.96	448,653.71	448,897.10
Oil import price [1]	EUR(2016) / GJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	12.73	14.46	16.05
Natural gas import price [2]	EUR(2016) / GJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.39	7.96	8.72
Coal import price [3]	EUR(2016) / GJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.77	3.06	3.06
EU ETS emissions allowance price [4]	EUR(2016) / t CO_2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	26.81	31.04	39.44

[a] Parties should include key underlying assumptions as appropriate.

[b] Parties should include historical data used to develop the greenhouse gas projections reported.

Custom Footnotes

[1] Calculated as population-weighted average of the values used in EU Member States' projections

[2] Calculated as population-weighted average of the values used in EU Member States' projections

[3] Calculated as population-weighted average of the values used in EU Member States' projections

[4] Calculated as population-weighted average of the values used in EU Member States' projections

[5] The sum of the GDP of all Member States is presented. For cases a European Member State did not report GDP, gap-filling was accomplished by using 2020 GDP data from Eurostat multiplied by real GDP growth rates from EC (2021): Recommended parameters for reporting on GHG projections in 2021.

Table 6(a)
Information on updated greenhouse gas projections under a 'with measures' scenario[a]

	GHG emissions and removals[b] (kt CO_2 eq)								GHG emission projections (kt CO_2 eq)	
	Base year (1990)	1990	1995	2000	2005	2010	2015	2019	2020	2030
Sector[d,e]										
Energy	3,051,469.82	3,051,469.82	2,780,166.82	2,643,412.45	2,710,482.59	2,478,727.57	2,165,197.12	1,926,751.88	1,766,806.32	1,656,638.46
Transport	672,939.52	672,939.52	725,126.62	798,642.56	847,928.46	817,965.72	794,544.92	834,682.18	721,307.35	735,177.66
Industry/industrial processes	462,429.94	462,429.94	445,068.14	423,985.54	435,946.38	363,415.83	347,724.71	343,333.85	313,871.80	294,887.76
Agriculture	482,920.41	482,920.41	417,394.56	409,458.82	389,006.33	376,726.36	385,505.60	381,647.61	382,449.70	380,040.99
Forestry/LULUCF	-213,133.65	-213,133.65	-292,153.14	-299,278.22	-309,752.18	-322,325.16	-302,747.56	-237,211.03	-229,527.88	-190,257.16
Waste management/waste	172,540.01	172,540.01	175,820.52	165,427.40	150,899.45	136,736.71	120,832.40	113,539.82	112,330.82	93,045.33
Other (specify)										
Gas										
CO_2 emissions including net CO_2 from LULUCF [(2)]	3,636,057.33	3,636,057.33	3,328,637.73	3,290,041.24	3,415,333.56	3,101,043.25	2,780,446.31	2,659,946.11	2,381,879.75	2,337,225.44
CO_2 emissions excluding net CO_2 from LULUCF [(3)]	3,870,493.67	3,870,493.67	3,643,380.32	3,643,380.32	3,745,174.41	3,442,861.45	3,102,775.45	2,916,755.24	2,631,154.32	2,549,258.66
CH_4 emissions including CH_4 from LULUCF	589,054.46	589,054.46	539,637.75	589,054.46	457,563.66	424,154.37	402,773.18	382,164.48	378,530.75	363,397.32
CH_4 emissions excluding CH_4 from LULUCF	581,217.97	581,217.97	530,183.87	488,347.09	450,194.41	417,229.95	396,424.03	375,752.81	371,952.32	355,767.56
N_2O emissions including N_2O from LULUCF	349,513.84	349,513.84	321,841.36	287,644.99	272,614.95	229,266.23	225,967.03	222,840.98	220,959.20	220,172.69
N_2O emissions excluding N_2O from LULUCF	336,047.63	336,047.63	336,047.63	274,786.79	259,895.53	216,697.60	212,734.60	209,654.56	207,790.92	206,026.38
HFCs	14,735.31	14,735.31	24,781.39	44,922.58	64,076.11	86,938.01	92,295.14	87,308.18	77,157.96	43,166.34
PFCs	24,218.69	24,218.69	16,679.90	11,579.91	6,934.59	3,582.17	3,100.57	2,521.98	1,932.74	2,704.79
SF_6	9,713.07	9,713.07	13,802.38	8,548.98	6,756.74	5,620.44	5,645.51	6,235.45	5,113.45	2,529.09
NF_3	23.36	23.36	98.94	101.75	155.68	119.32	64.21	57.13	59.81	40.54
Other (specify) [(4)]	10,166.92	10,166.92	9,551.77	5,206.26	3,711.82	2,803.78	2,628.06	3,298.53	3,074.24	997.21
Unspecified mix of HFCs and PFCs	5,850.00	5,850.00	5,944.08	2,248.56	1,075.75	523.23	765.24	1,669.99	1,604.46	296.85
Indirect CO_2 emissions [(1)]	4,316.92	4,316.92	3,607.69	2,957.70	2,636.07	2,280.55	1,862.82	1,628.54	1,469.78	700.36
Total with LULUCF[f]	4,633,482.98	4,633,482.98	4,255,031.22	4,237,100.17	4,227,147.11	3,853,527.57	3,512,920.01	3,364,372.84	3,068,707.90	2,970,233.42
Total without LULUCF	4,846,616.62	4,846,616.62	4,574,526.20	4,476,873.68	4,536,899.29	4,175,852.72	3,815,667.57	3,601,583.88	3,298,235.76	3,160,490.57

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", at a minimum Parties shall report a 'with measures' scenario, and may report 'without measures' and 'with additional measures' scenarios. If a Party chooses to report 'without measures' and/or 'with additional measures' scenarios they are to use tables 6(b) and/or 6(c), respectively. If a Party does not choose to report 'without measures' or 'with additional measures' scenarios then it should not include tables 6(b) or 6(c) in the biennial report.

[b] Emissions and removals reported in these columns should be as reported in the latest GHG inventory and consistent with the emissions and removals reported in the table on GHG emissions and trends provided in this biennial report. Where the sectoral breakdown differs from that reported in the GHG inventory Parties should explain in their biennial report how the inventory sectors relate to the sectors reported in this table.

[c] 20XX is the reporting due-date year (i.e. 2014 for the first biennial report).

[d] In accordance with paragraph 34 of the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", projections shall be presented on a sectoral basis, to the extent possible, using the same sectoral categories used in the policies and measures section. This table should follow, to the extent possible, the same sectoral categories as those listed in paragraph 17 of those guidelines, namely, to the extent appropriate, the following sectors should be considered: energy, transport, industry, agriculture, forestry and waste management.

[e] To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors (i.e. cross-cutting), as appropriate.

[f] Parties may choose to report total emissions with or without LULUCF, as appropriate.

Custom Footnotes

Inventory data (1990-2020) and projected data are shown for the EU-27 to account for the UK having withdrawn from the European Union in 2020. The UK did thus not provide projected data under Article 18 of the Governance Regulation in submission years 2021 and 2022.

For 2020, GHG inventory data are provided.

Minor differences (0.1 % and 0.02 %) in the totals between gases and sectors occur due to the conversion of CH_4, N_2O, SF_6 and NF_3 from kt to kt CO_2e.

(1) Indirect CO_2 emissions for those European Member States who reported them separately.

(2) Excluding indirect emissions for all years

(3) Excluding indirect emissions for all years

(4) This row displays the sum of unspecified mix of HFCs and PFCs, and indirect CO2 emissions

Table 6(c)
Information on updated greenhouse gas projections under a 'with additional measures' scenarioa

	GHG emissions and removals[b] (kt CO_2 eq)								GHG emission projections (kt CO_2 eq)	
	Base year (1990)	1990	1995	2000	2005	2010	2015	2019	2020	2030
Sector[d,e]										
Energy	3,051,469.82	3,051,469.82	2,780,166.82	2,643,412.45	2,710,482.59	2,478,727.57	2,165,197.12	1,926,751.88	1,766,806.32	1,464,340.51
Transport	672,939.52	672,939.52	725,126.62	798,642.56	847,928.46	817,965.72	794,544.92	834,682.18	721,307.35	631,122.28
Industry/industrial processes	462,429.94	462,429.94	445,068.14	423,985.54	435,946.38	363,415.83	347,724.71	343,333.85	313,871.80	292,292.55
Agriculture	482,920.41	482,920.41	417,394.56	409,458.82	389,006.33	376,726.36	385,505.60	381,647.61	382,449.70	366,601.23
Forestry/LULUCF	-213,133.65	-213,133.65	-292,153.14	-299,278.22	-309,752.18	-322,325.16	-302,747.56	-237,211.03	-229,527.88	-208,810.72
Waste management/waste	172,540.01	172,540.01	175,820.52	165,427.40	150,899.45	136,736.71	120,832.40	113,539.82	112,330.82	90,267.29
Other (specify)										
Gas										
CO_2 emissions including net CO_2 from LULUCF [(2)]	3,636,057.33	3,636,057.33	3,328,637.73	3,290,041.24	3,415,333.56	3,101,043.25	2,780,446.31	2,659,946.11	2,381,879.75	2,031,103.14
CO_2 emissions excluding net CO_2 from LULUCF [(3)]	3,870,493.67	3,870,493.67	3,643,380.32	3,610,391.12	3,745,174.41	3,442,861.45	3,102,775.45	2,916,755.24	2,631,154.32	2,260,979.12
CH_4 emissions including CH_4 from LULUCF	589,054.46	589,054.46	539,637.75	496,560.54	457,563.66	424,154.37	402,773.18	382,164.48	378,530.75	343,485.96
CH_4 emissions excluding CH_4 from LULUCF	581,217.97	581,217.97	530,183.87	488,347.09	450,194.41	417,229.95	396,424.03	375,752.81	371,952.32	335,866.16
N_2O emissions including N_2O from LULUCF	349,513.84	349,513.84	321,841.36	287,644.99	272,614.95	229,266.23	225,967.03	222,840.98	220,959.20	213,624.04
N_2O emissions excluding N_2O from LULUCF	336,047.63	336,047.63	308,705.78	274,786.79	259,895.53	216,697.60	212,734.60	209,654.56	207,790.92	200,178.59
HFCs	14,735.31	14,735.31	24,781.39	44,922.58	64,076.11	86,938.01	92,295.14	87,308.18	77,157.96	42,089.00
PFCs	24,218.69	24,218.69	16,679.90	11,579.91	6,934.59	3,582.17	3,100.57	2,521.98	1,932.74	2,705.21
SF_6	9,713.07	9,713.07	13,802.38	8,548.98	6,756.74	5,620.44	5,645.51	6,235.45	5,113.45	2,468.40
NF_3	23.36	23.36	98.94	101.75	155.68	119.32	64.21	57.13	59.81	40.54
Other (specify) [(4)]	10,166.92	10,166.92	9,551.77	5,206.26	3,711.82	2,803.78	2,628.06	3,298.53	3,074.24	995.25
Unspecified mix of HFCs and PFCs	5,850.00	5,850.00	5,944.08	2,248.56	1,075.75	523.23	765.24	1,669.99	1,604.46	296.85
Indirect CO_2 emissions [(1)]	4,316.92	4,316.92	3,607.69	2,957.70	2,636.07	2,280.55	1,862.82	1,628.54	1,469.78	698.4
Total with LULUCF[f]	4,633,482.98	4,633,482.98	4,255,031.22	4,144,606.25	4,227,147.11	3,853,527.57	3,512,920.01	3,364,372.84	3,068,707.90	2,636,511.54
Total without LULUCF	4,846,616.62	4,846,616.62	4,547,184.35	4,443,884.48	4,536,899.29	4,175,852.72	3,815,667.57	3,601,583.88	3,298,235.76	2,845,322.27

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

[a] In accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", at a minimum Parties shall report a 'with measures' scenario, and may report 'without measures' and 'with additional measures' scenarios. If a Party chooses to report 'without measures' and/or 'with additional measures' scenarios they are to use tables 6(b) and/or 6(c), respectively. If a Party does not choose to report 'without measures' or 'with additional measures' scenarios then it should not include tables 6(b) or 6(c) in the biennial report.

[b] Emissions and removals reported in these columns should be as reported in the latest GHG inventory and consistent with the emissions and removals reported in the table on GHG emissions and trends provided in this biennial report. Where the sectoral breakdown differs from that reported in the GHG inventory Parties should explain in their biennial report how the inventory sectors relate to the sectors reported in this table.

[c] 20XX is the reporting due-date year (i.e. 2014 for the first biennial report).

[d] In accordance with paragraph 34 of the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications", projections shall be presented on a sectoral basis, to the extent possible, using the same sectoral categories used in the policies and measures section. This table should follow, to the extent possible, the same sectoral categories as those listed in paragraph 17 of those guidelines, namely, to the extent appropriate, the following sectors should be considered: energy, transport, industry, agriculture, forestry and waste management.

[e] To the extent possible, the following sectors should be used: energy, transport, industry/industrial processes, agriculture, forestry/LULUCF, waste management/waste, other sectors (i.e. cross-cutting), as appropriate.

[f] Parties may choose to report total emissions with or without LULUCF, as appropriate.

Custom Footnotes

Inventory data (1990-2020) and projected data are shown for the EU-27 to account for the UK having withdrawn from the European Union in 2020. The UK did thus not provide projected data under Article 18 of the Governance Regulation in submission years 2021 and 2022.

For 2020, GHG inventory data are provided.

Minor differences (0.1 % and 0.02 %) in the totals between gases and sectors occur due to the conversion of CH_4, N_2O, SF_6 and NF_3 from kt to kt CO_2e.

(1) Indirect CO_2 emissions for those European Member States who reported them separately.

(2) Excluding indirect emissions for all years

(3) Excluding indirect emissions for all years

(4) This row displays the sum of unspecified mix of HFCs and PFCs, and indirect CO2 emissions

Table 7

Provision of public financial support: summary information in 2019[a]

Allocation channels	Year									
	European euro - EUR					USD[b]				
	Core/ general[c, 1]	Climate-specific[d, 2]				Core/ general[c, 1]	Climate-specific[d, 2]			
		Mitigation	Adaptation	Cross-cutting[e]	Other[f]		Mitigation	Adaptation	Cross-cutting[e]	Other[f]
Total contributions through multilateral channels:	2,435,847.00			4,600,000.00	3,184,297,625.88	2,727,712.21			5,151,175.81	3,565,842,806.13
Multilateral climate change funds[g]	685,847.00			4,600,000.00		768,025.76			5,151,175.81	
Other multilateral climate change funds[h]	685,847.00			4,600,000.00		768,025.76			5,151,175.81	
Multilateral financial institutions, including regional development banks					3,184,297,625.88					3,565,842,806.13
Specialized United Nations bodies	1,750,000.00					1,959,686.45				
Total contributions through bilateral, regional and other channels		489,743,972.00	1,314,430,440.00	727,205,688.00			548,425,500.55	1,471,926,584.52	814,340,076.10	
Total	2,435,847.00	489,743,972.00	1,314,430,440.00	731,805,688.00	3,184,297,625.88	2,727,712.21	548,425,500.55	1,471,926,584.52	819,491,251.91	3,565,842,806.13

Note: Explanation of numerical footnotes is provided in the documentation box after tables 7, 7(a) and 7(b).
Abbreviation: USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should provide an explanation of the methodology used for currency exchange for the information provided in tables 7, 7(a) and 7(b) in the documentation box.

[c] This refers to support to multilateral institutions that Parties cannot specify as being climate-specific.

[d] Parties should explain in their biennial reports how they define funds as being climate-specific.

[e] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

[f] Please specify.

[g] Multilateral climate change funds listed in paragraph 17(a) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

[h] Other multilateral climate change funds as referred in paragraph 17(b) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

Documentation Box:

1: Core/general
The EC does not provide core contributions to multilateral organisations like UNDP, UNEP or the FAO. Contributions to the core budgets of the UNFCCC/ Paris Agreement/Kyoto Protocol and the IPCC are captured in the CTF table 7a.
2: Climate-specific
The EU categorises its climate finance as climate specific if it has been given a Rio Marker. CTF Table 7 combines the climate finance provided by the EC and EIB for the years 2019 and 2020, from CTF Tables 7(a) and 7(b). The EIB's climate relevant financial flows are tracked using the joint approach developed by the Multilateral Development Banks (MDBs) that does not use the Rio markers (see Section 6.2.3 of the EU's 5th Biennial report for recent developments in EIB's climate finance tracking methodology). The EU's statistical system categorises most climate finance support as bilateral with multiple recipients, even where the finance is delivered through a multilateral organisation. This support is reported in CTF 7(b). Additionally, the EU's support covers climate-specific contributions to multilateral institutions that are not earmarked for a specific purpose but support climate action in developing countries. These contributions are reported as multilateral support in CTF 7(a). As in the EU's 4th Biennial Report (BR4), the EIB's climate finance is aggregated and reported as multilateral, and therefore is reported in CTF Table 7(a). Categorising these financial flows in CTF Table 7(a) is a more accurate reflection of where the financial flows from a MDB should be reported. In order to provide the same high level of transparency as with the EU BR4, a Technical Annex has been added to this report, which contains all of the disaggregated information for the EIB's climate finance reported in CTF Table 7(a). The currency exchange rates used throughout the climate finance chapter and its CTF tables are average annual conversion rates and were sourced from the OECD website (https://data.oecd.org/conversion/exchange-rates.htm): 2019: 1 USD to 0.893 EUR 2020: 1 USD to 0.876 EUR
3: Status
The EU categorises the status of its climate finance as committed and disbursed but reports on committed funding for a given calendar year, in this case, 2019 and 2020. The status of the EIB's climate finance is committed.
4: Funding source
The EU categorises the funding source of its climate finance as ODA. EIB categorises its funding sources as ODA, OOF and Other. The funding source is specified for the EIB's multilateral contribution in the Technical Annex to the EU's 5th Biennial Report.
5: Financial instrument
The EU categorises the financial instrument used in its climate finance as grants. All EIB funds that are reported here are provided in the form of loans alongside several grant and equity investments as well as guarantees.
6: Type of support
The EU categorises the type of its climate finance support into "mitigation", "adaptation" or "cross-cutting", making use of the Rio markers. The method that it assigns is explained in detail in Section 6.2 of the EU's 5th Biennial Report. The EIB's climate finance support is also categorised into "mitigation", "adaptation" and "cross-cutting".
7: Sector
The EU categorises the provision of climate finance into the following eight sectors: Energy, Transport, Industry, Agriculture, Forestry, Water & sanitation, Cross-cutting, Other, and assigns one of these sectoral codes to each project visible in CTF Tables 7(a) and 7(b). In order to reduce the number of DAC CRS codes being allocated to the sector "Other", sector categories were integrated as follows: Code 313 "Fishing" was moved to Sector code 311 "Agriculture" for the EU BR5. Codes 322 "Mineral resources and mining" and 323 "Construction" were moved to sector Code 321 "Industry" for the EU BR5. Code 410 (General environmental protection) was added to the "Cross-cutting".
Each Party shall provide an indication of what new and additional financial resources they have provided, and clarify how they have determined that such resources are new and additional. Please provide this information in relation to table 7(a) and (b).
See section 6.2 of the EU's 5th Biennial Report.

Table 7

Provision of public financial support: summary information in 2020[a]

Allocation channels	Year									
	European euro - EUR					USD[b]				
	Core/ general[c, 1]	Climate-specific[d, 2]				Core/ general[c, 1]	Climate-specific[d, 2]			
		Mitigation	Adaptation	Cross-cutting[e]	Other[f]		Mitigation	Adaptation	Cross-cutting[e]	Other[f]
Total contributions through multilateral channels:	728,819.00				2,811,376,460.18	831,985.16				3,209,333,858.65
Multilateral climate change funds[g]	728,819.00					831,985.16				
Other multilateral climate change funds[h]	728,819.00					831,985.16				
Multilateral financial institutions, including regional development banks					2,811,376,460.18					3,209,333,858.65
Specialized United Nations bodies										
Total contributions through bilateral, regional and other channels		730,209,682.00	778,397,418.05	1,068,976,378.00			833,572,696.45	888,581,527.36	1,220,292,669.04	
Total	728,819.00	730,209,682.00	778,397,418.05	1,068,976,378.00	2,811,376,460.18	831,985.16	833,572,696.45	888,581,527.36	1,220,292,669.04	3,209,333,858.65

Note: Explanation of numerical footnotes is provided in the documentation box after tables 7, 7(a) and 7(b).

Abbreviation: USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should provide an explanation of the methodology used for currency exchange for the information provided in tables 7, 7(a) and 7(b) in the documentation box.

[c] This refers to support to multilateral institutions that Parties cannot specify as being climate-specific.

[d] Parties should explain in their biennial reports how they define funds as being climate-specific.

[e] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

[f] Please specify.

[g] Multilateral climate change funds listed in paragraph 17(a) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

[h] Other multilateral climate change funds as referred in paragraph 17(b) of the "UNFCCC biennial reporting guidelines for developed country Parties" in decision 2/CP.17.

Table 7(a)

Provision of public financial support: contribution through multilateral channels in 2019[a]

Donor funding	Total amount				Status[b, 3]	Funding source[f, 4]	Financial instrument[f, 5]	Type of support[f, g, 6]	Sector[c, f, 7]
	Core/general[d, 1]		Climate-specific[e, 2]						
	European euro - EUR	USD	European euro - EUR	USD					
Total contributions through multilateral channels	2,435,847.00	2,727,712.21	3,188,897,625.88	3,570,993,981.94					
Multilateral climate change funds	685,847.00	768,025.76	4,600,000.00	5,151,175.81					
1. Global Environment Facility									
2. Least Developed Countries Fund									
3. Special Climate Change Fund									
4. Adaptation Fund									
5. Green Climate Fund									
6. UNFCCC Trust Fund for Supplementary Activities									
7. Other multilateral climate change funds	685,847.00	768,025.76	4,600,000.00	5,151,175.81					
Other multilateral climate change funds (UNFCCC)			4,600,000.00	5,151,175.81	Committed	Oda	Grant	Cross-cutting	Cross-cutting
UNFCCC (core budget)	582,970.00	652,821.95			Committed		Grant	Cross-cutting	Other (Other)
Kyoto Protocol (core budget)	102,877.00	115,203.81			Committed		Grant	Cross-cutting	Other (Other)
Multilateral financial institutions, including regional development banks			3,184,297,625.88	3,565,842,806.13					
1. World Bank									
2. International Finance Corporation									
3. African Development Bank									
4. Asian Development Bank									
5. European Bank for Reconstruction and Development									
6. Inter-American Development Bank									
7. Other			3,184,297,625.88	3,565,842,806.13					
EIB			3,184,297,625.88	3,565,842,806.13	Committed				Other (Other)
Specialized United Nations bodies	1,750,000.00	1,959,686.45							
1. United Nations Development Programme									
2. United Nations Environment Programme									
3. Other	1,750,000.00	1,959,686.45							
IPCC	1,750,000.00	1,959,686.45			Committed		Grant	Cross-cutting	Other (Other)

Abbreviations: ODA = official development assistance, OOF = other official flows, USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[c] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[d] This refers to support to multilateral institutions that Parties cannot specify as being climate-specific.

[e] Parties should explain in their biennial reports how they define funds as being climate-specific.

[f] Please specify.

[g] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

Table 7(a)

Provision of public financial support: contribution through multilateral channels in 2020[a]

Donor funding	Total amount				Status[b, 3]	Funding source[f, 4]	Financial instrument[f, 5]	Type of support[f, g, 6]	Sector[c, f, 7]
	Core/general[d, 1]		Climate-specific[e, 2]						
	European euro - EUR	USD	European euro - EUR	USD					
Total contributions through multilateral channels	728,819.00	831,985.16	2,811,376,460.18	3,209,333,858.65					
Multilateral climate change funds	728,819.00	831,985.16							
1. Global Environment Facility									
2. Least Developed Countries Fund									
3. Special Climate Change Fund									
4. Adaptation Fund									
5. Green Climate Fund									
6. UNFCCC Trust Fund for Supplementary Activities									
7. Other multilateral climate change funds	728,819.00	831,985.16							
Other multilateral climate change funds (UNFCCC)									
UNFCCC (core budget)	655,937.00	748,786.53			Committed		Grant	Cross-cutting	Other (Other)
Kyoto Protocol (core budget)	72,882.00	83,198.63			Committed		Grant	Cross-cutting	Other (Other)
Multilateral financial institutions, including regional development banks			2,811,376,460.18	3,209,333,858.65					
1. World Bank									
2. International Finance Corporation									
3. African Development Bank									
4. Asian Development Bank									
5. European Bank for Reconstruction and Development									
6. Inter-American Development Bank									
7. Other			2,811,376,460.18	3,209,333,858.65					
EIB			2,811,376,460.18	3,209,333,858.65	Committed				Other (Other)
Specialized United Nations bodies									
1. United Nations Development Programme									
Other multilateral climate change funds (UNFCCC)									
2. United Nations Environment Programme									
3. Other									
IPCC									

Abbreviations: ODA = official development assistance, OOF = other official flows, USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[c] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[d] This refers to support to multilateral institutions that Parties cannot specify as being climate-specific.

[e] Parties should explain in their biennial reports how they define funds as being climate-specific.

[f] Please specify.

[g] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

Table 7(b)

Provision of public financial support: contribution through bilateral, regional and other channels in 2019[a]

Recipient country/ region/project/programme[b]	Total amount		Status[c, 3]	Funding source[g, 4]	Financial instrument[g, 5]	Type of support[g, h, 6]	Sector[d, g, 7]	Additional information[e]
	Climate-specific[f, 2]							
	European euro - EUR	USD						
Total contributions through bilateral, regional and other channels	2,531,380,100.00	2,834,692,161.17						
Cabo Verde/Africa (South of Sahara)/Contribution (phase 3) to the Africa Investment Facility in support of regional economic integration in West Africa	6,800,000.00	7,614,781.63	Committed	Oda	Grant	Cross-cutting	Transport	The overall objective is to contribute to poverty reduction and to sustainable and inclusive economic development through regional economic integration in West Africa, with an emphasis on the improvement of regional economic infrastructures
Africa/Africa-EU Investment Indaba (AE2I)	1,800,000.00	2,015,677.49	Committed	Oda	Grant	Cross-cutting	Cross-cutting	The Africa-EU Investment Indaba (AE2I) will establish a strategic dialogue between key stakeholders in Africa and Europe on investment climate reforms with the facilitation of the African Development Bank and other European financing institutions
America (North & Central America)/Support to the Caribbean Investment Facility 2019 allocation	35,000,000.00	39,193,729.00	Committed	Oda	Grant	Adaptation	Water And Sanitation	The CIF overall objective is to contribute to economic development and growth, integration at regional level and poverty reduction through the mobilization of resources for strategic economic infrastructure projects and support to the private sector
Sierra Leone/Africa (South of Sahara)/Jobs and Growth Programme	24,000,000.00	26,875,699.89	Committed	Oda	Grant	Adaptation	Other	The Action addresses the investment-education-employment problem nexus through support aiming to (1) improve the investment climate, (2) upgrade the human capital (general education and TVET) and (3) create jobs for a low qualified work force.
Comoros/Africa (South of Sahara)/"Msomo na Hazi" Formation et Insertion Professionnelle aux Comores	3,600,000.00	4,031,354.98	Committed	Oda	Grant	Adaptation	Other	Appui à la formation technique et professionnelle renforcer làccès au marché du travail et à des opportunités dàuto-emploi pour les jeunes Comoriens,hommes et femmes de 15-35 ans
Algeria/Africa (North of Sahara)/Programme d'Appui à la Politique d'Internationalisation de la Recherche et de l'Innovation	2,000,000.00	2,239,641.66	Committed	Oda	Grant	Adaptation	Other	Accompagner le MESRS dans les réformes engagées en y intégrant les problématiques de lInnovation et de lIngénierie de projets européens et en valorisant la recherche algérienne dans lèspace européen de Recherche et innovation
Lao People's Democratic Republic/Asia (Far East Asia)/Support to the Lao PDR National Nutrition Strategy and Plan of Action	20,000,000.00	22,396,416.57	Committed	Oda	Grant	Adaptation	Other	Nutrition Budget Support
Myanmar/Asia (South & Central Asia)/Enhancing Rural Nutrition in Myanmar: support to the National Agriculture Development Strategy and its contribution to the Multi-Sectoral National Pla	44,800,000.00	50,167,973.12	Committed	Oda	Grant	Adaptation	Other	The overall objective is the reduction of all forms of undernutrition in women of reproductive age, infant and under-five children through secured regular access and consumption of safe and diverse food and access to potable water in Myanmar.
Bolivia/America (South America)/Sanitation in small communities and water resilience in cities	14,000,000.00	15,677,491.60	Committed	Oda	Grant	Adaptation	Water And Sanitation	La acción consta de un apoyo presupuestario en saneamiento en zonas rurales y pequeñas comunidades y un proyecto de gran escala sobre resiliencia en ciudades a través de un acuerdo de contribución con AECID
Montenegro/Europe/EU for Infrastructure and Acquis related activities supporting Environment & Climate Change mitigation.	14,800,000.00	16,573,348.26	Committed	Oda	Grant	Mitigation	Water And Sanitation	Transport and Environment
West Bank and Gaza Strip/Asia (Middle East Asia)/Access to self-sufficient water and energy services	9,800,000.00	10,974,244.12	Committed	Oda	Grant	Cross-cutting	Water And Sanitation	This Action intends to operationalize - through a set of complementary interventions - its objective of supporting the PA to provide sufficient, equitable, affordable and sustainable access to energy and safe water services for al
Niger/Africa (South of Sahara)/Programme d'Appui à la Société Civile (PASOC IV)	3,200,000.00	3,583,426.65	Committed	Oda	Grant	Adaptation	Other	Consolidation du rôle et des capacités société civile
Senegal/Africa (South of Sahara)/Programme d'Appui à la société civile pour une meilleure gouvernance (PASC)	1,600,000.00	1,791,713.33	Committed	Oda	Grant	Cross-cutting	Other	le projet PASC va soutenir les réseaux d'OSC pour améliorer le gouvernance au niveau des secteurs de l'agiculture /sécurité alimentaiire, la gestion des ressources naturelles ainsi que pour promouvoir l'emploi des jeunes et lutter contre les causes de la migration.
Angola/Africa (South of Sahara)/Private sector development programme	4,800,000.00	5,375,139.98	Committed	Oda	Grant	Adaptation	Other	The overall objective of the Action is to contribute to diversified, sustainable and inclusive economic growth
Montenegro/Europe/Annual Action Programme for Montenegro 2019 Objective 2	5,400,000.00	6,047,032.47	Committed	Oda	Grant	Mitigation	Transport	Transport and Environment
Liberia/Africa (South of Sahara)/Rural Electrification prioritizing the S-E Liberia	16,800,000.00	18,812,989.92	Committed	Oda	Grant	Mitigation	Energy	Rural Electrification prioritizing the S-E of Liberia
Albania/Europe/Rural development programme	6,400,000.00	7,166,853.30	Committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
Montenegro/Europe/Rural development programme	3,200,000.00	3,583,426.65	Committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
Former Yugoslav Republic of Macedonia/Europe/Rural development programme	5,600,000.00	6,270,996.64	Committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
Serbia/Europe/Rural development programme	16,000,000.00	17,917,133.26	Committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.

Recipient country/ region/project/programme[b]	Total amount		Status[c, 3]	Funding source[g, 4]	Financial instrument[g, 5]	Type of support[g, h, 6]	Sector[d, g, 7]	Additional information[e]
	Climate-specific[f, 2]							
	European euro - EUR	USD						
Turkey/Europe/Rural development programme	16,000,000.00	17,917,133.26	Committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
Georgia/Asia (South & Central Asia)/European Neighbourhood Programme for Agriculture and Rural Development in Georgia, phase IV (ENPARD Georgia IV)	22,000,000.00	24,636,058.23	Committed	Oda	Grant	Cross-cutting	Agriculture	To support Georgia in eradicating poverty, promoting sustainable and inclusive growth, creating employment and livelihoods in the rural areas and improving food safety and enhanced export opportunities under the DCFTA.
Eswatini/Africa (South of Sahara)/Support to Agriculture Value Chains Via Sustainable and Inclusive Energy Investment in Eswatini	7,450,000.00	8,342,665.17	Committed	Oda	Grant	Cross-cutting	Agriculture	Alleviate rural poverty in Eswatini by capacitating vulnerable households and the youth to develop the renewable energy potential (sugarcane biomass, small hydro or solar, bioethanol), in synergy with AMSP grants and 11th EDF agriculture initiatives
Cambodia/Asia (Far East Asia)/ CAPFISH-Capture Cambodia Programme for Sustainable and Inclusive Growth in the Fisheries Sector: Capture component - MA part 2	717,692.00	803,686.45	Committed	Oda	Grant	Adaptation	Agriculture	The present action aims at supporting the implementation of the Strategic Planning Framework for Fisheries (SPF), with the objective of managing sustainably the fishery resource, in inland and marine domains, and generating increased added value
Georgia/Asia (South & Central Asia)/EU 4 Integrated Territorial Development	21,600,000.00	24,188,129.90	Committed	Oda	Grant	Mitigation	Industry	The Proposed Action is in line with the two overall objectives of the Sectors 1 and 2 of the new Single Support Framework (SSF) for Georgia 2017-2020. In regard to Sector 1 "Economic development and market opportunities" Specific Objective 5: "to reduce disparities, especially in terms of competitiveness, growth and jobs, between the levels of development of the various regions by means of a multi-sectoral approach, including investment related ..": and under the Sector 2 " to consolidate P
Albania/Europe/EU for circular economy and green growth	8,260,000.00	9,249,720.04	Committed	Oda	Grant	Mitigation	Cross-cutting	Annual Action Programme for Albania for the year 2019
Chad/Africa (South of Sahara)/AMCC+ Tchad	4,000,000.00	4,479,283.31	Committed	Oda	Grant	Adaptation	Cross-cutting	Renforcement de la Gouvernance et de la résilience climatiques au Tchad
Ethiopia/Africa (South of Sahara)/Climate Change Sector Reform Performance Contract in Ethiopia	36,000,000.00	40,313,549.83	Committed	Oda	Grant	Mitigation	Cross-cutting	The overall objective is to transform Ethiopia's economic structure towards a climate resilient and green economy. Improve climate change mitigation in Forestry and Industry sectors, climate actions monitoring and climate integration in public finance.
Timor-Leste/Asia (Far East Asia)/Support to Timor-Leste Environment Action	5,000,000.00	5,599,104.14	Committed	Oda	Grant	Cross-cutting	Cross-cutting	The core aim of this project is to address ~~-~~poverty, gender inequity, climate change impact and deforestation ~~-by~~ enabling subsistence farmers to restore forests and degraded landscapes. This will be achieved through carbon capture and trading systems which both provide reward for growing forests and has the potential to lift the economic status of women via the programme$ implementation.
Colombia/America (South America)/Sector Reform Contract for Local Sustainable Development in Colombia	3,600,000.00	4,031,354.98	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Fase II programa de Desarrollo Local
Peru/America (South America)/Support Measures for Peru	800,000.00	895,856.66	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Support Measures for Peru
Colombia/America (South America)/Contrato de Reforma Sectorial "Apoyo a la Política de Desarrollo Rural en Colombia" Fase II	7,200,000.00	8,062,709.97	Committed	Oda	Grant	Adaptation	Cross-cutting	Fase II del CRS Desarrollo Rural, orientado a apoyar los temas de titulación y formalización de la Tierra, facilitar el acceso a activos productivos a pequeños productores y aumentar la participación de las mujeres rurales
Developing countries, unspecified/Knowledge based management of natural ecosystems for sustaining green growth and ensuring stability	6,100,000.00	6,830,907.05	Committed	Oda	Grant	Cross-cutting	Cross-cutting	The objective of the action is to enhance the contribution of natural ecosystems to poverty alleviation and to stability.
Developing countries, unspecified/Local Authorities 2019 Programme	25,563,568.00	28,626,615.90	Committed	Oda	Grant	Adaptation	Other	CSO-LA Thematic Programme - Local Authorities component (Action Document nº 1 & Action Document nº 2)
Developing countries, unspecified/ Civil Society Organisations as actors of Governance and Development Work in the Field	62,080,472.00	69,519,005.60	Committed	Oda	Grant	Cross-cutting	Other	The amount indicated do not include Neighbourhood countries
Honduras/America (North & Central America)/Climate for Biodiversity : Reducing Supply Chain Deforestation	5,000,000.00	5,599,104.14	Committed	Oda	Grant	Cross-cutting	Agriculture	Part of the EU action for sustainable landscape management initiative, CRIS number: ENV/2019/041-788
South of Sahara/Africa (South of Sahara)/Programme de Sécurité Alimentaire	6,400,000.00	7,166,853.30	Committed	Oda	Grant	Adaptation	Cross-cutting	Programme de Sécurité Alimentaire pour la région de l'Océan Indien de l'Ouest
Developing countries, unspecified/Promoting the Energy Transition in the Southern Neighbourhood	4,800,000.00	5,375,139.98	Committed	Oda	Grant	Mitigation	Energy	The programme aims at promoting the energy transition in beneficiary countries while improving their energy security, thereby contributing to more stable, efficient, competitive and climate-resilient socioeconomic contexts
Developing countries, unspecified/EU action for sustainable landscape management	48,720,000.00	54,557,670.77	Committed	Oda	Grant	Cross-cutting	Agriculture	Promoting integrated landscape approaches and investments in sustainable land management, in order to conciliate and meet multiple objectives on a specific territory.

Recipient country/ region/project/programme[b]	Total amount		Status[c, 3]	Funding source[g, 4]	Financial instrument[g, 5]	Type of support[g, h, 6]	Sector[d, g, 7]	Additional information[e]
	Climate-specific[f, 2]							
	European euro - EUR	USD						
Brazil/America (South America)/Additional commitment for final payment as for audit report.	8,660.00	9,697.65	Committed	Oda	Grant	Cross-cutting	Agriculture	
Syrian Arab Republic/Asia (Middle East Asia)/PROACT 2018 Allocation for Syria	2,000,000.00	2,239,641.66	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Original decision DEVCO PROACT 041-109 -Near allocation for Syria
Developing countries, unspecified/Nuclear waste - INSC AAP 2019	5,280,000.00	5,912,653.98	Committed	Oda	Grant	Adaptation	Energy	MC.4.01/19 - Contribution to the Environmental Remediation Account for Central Asia and G.4.01/19 - Construction of radioactive storage and processing facilities in Georgia
Central Asia/Investment Facility for Central Asia (2019)	6,000,000.00	6,718,924.97	Committed	Oda	Grant	Mitigation	Water And Sanitation	IFCA promotes investments in key infrastructures in Central Asia. IFCA currently targets the sectors energy, environment, SME development and social services.
Developing countries, unspecified/Water for prosperity, regional stability and resilient ecosystems	17,620,000.00	19,731,243.00	Committed	Oda	Grant	Adaptation	Water And Sanitation	The present action aims at contributing to SDG 6. Three complementary objectives will be pursued through different components: - Reinforcement of the integrated and sustainable use of natural resources for water, energy and food security through the Nexus approach. - Enhancement of partnerships development between European and partner countries'public and private water utilities and operators. - Reinforcement of regional and national stability through support to the Water Convention.
Developing countries, unspecified/NIP AAP 2019 contribution to the NIP SOUTH without FAs	76,475,304.00	85,638,638.30	Committed	Oda	Grant	Adaptation	Water And Sanitation	Support investment operations related to blending in the Southern Neighbourhood.
Africa (North of Sahara)/AAP 2019 contribution to the NIP SOUTH with FAs	24,800,000.00	27,771,556.55	Committed	Oda	Grant	Adaptation	Water And Sanitation	Support investment operations related to blending in the Southern Neighbourhood. Financing Agreements to be concluded indicatively with Morocco, Tunisia and oPt
Europe/EU support to Regional Efficiency Energy Programme +	30,000,000.00	33,594,624.86	Committed	Oda	Grant	Mitigation	Energy	Multi-country Action Programme 2019
Africa (South of Sahara)/Contribution to the Africa Investment Platform (AIP) in support of the regional economic integration	10,400,000.00	11,646,136.62	Committed	Oda	Grant	Mitigation	Energy	Regional EA-SA-IO infrastructure programme EDF contribution to the African Investment Platform
Pakistan/Asia (South & Central Asia)/Revival of Balochistan Water Resources Programme	40,000,000.00	44,792,833.15	Committed	Oda	Grant	Adaptation	Water And Sanitation	The objective of the programme is to contribute to sustain the rural economy through reduced water use and improved land management in the arid regions of Balochistan.
Iraq/Asia (Middle East Asia)/2019 Special Measure in favour of Iraq - part 2	30,735,440.00	34,418,185.89	Committed	Oda	Grant	Mitigation	Other	Support to Governance and Job creation in agriculture and agribusiness in Iraq
Myanmar/Asia (South & Central Asia)/Promoting Integrated Land Use Planning and Management in Myanmar	5,000,000.00	5,599,104.14	Committed	Oda	Grant	Cross-cutting	Agriculture	Part of the EU action for sustainable landscape management initiative, CRIS number: ENV/2019/041-788
Developing countries, unspecified/FISH4ACP - Intra-ACP Blue Growth program for Sustainable Fisheries and Aquaculture Value Chains Productivity and Competitiveness	16,000,000.00	17,917,133.26	Committed	Oda	Grant	Adaptation	Agriculture	this action will contribute to economic growth, job creation, food and nutrition security by improving the economic, social and environmental sustainability of fisheries and aquaculture value chains in ACP countries.
Developing countries, unspecified/Enabling a future with forests	8,200,000.00	9,182,530.80	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Strengthening Forest governance and addressing deforestation and forest degradation
Tajikistan/Asia (South & Central Asia)/Indirect Management with World Bank	17,500,000.00	19,596,864.50	Committed	Oda	Grant	Adaptation	Water And Sanitation	Projects will support rural development and the implementing of Integrated Water Resources Management
Somalia/Africa (South of Sahara)/INCLUCITY - Support to inclusive and sustainable development of two strategic coastal cities in Somalia	9,200,000.00	10,302,351.62	Committed	Oda	Grant	Cross-cutting	Water And Sanitation	The overall objective of this Action is to contribute to the stabilization of Somalia through support to inclusive and sustainable urban development. The two cities targeted are Mogadishu and Berbera.
Turkey/Europe/EU Support to Sustainable Urban Mobility Planning	1,000,000.00	1,119,820.83	Committed	Oda	Grant	Cross-cutting	Transport	2019 Annual Action Programme for Turkey Objective 2
Turkey/Europe/EU Support to Energy	3,720,000.00	4,165,733.48	Committed	Oda	Grant	Adaptation	Energy	2019 Annual Action Programme for Turkey Objective 2
Developing countries, unspecified/AAP 2019 - GPGC - Sustainable Investment Climate and Value Chains Programme II	2,404,000.00	2,692,049.27	Committed	Oda	Grant	Cross-cutting	Industry	The action aims at enhancing EU$ participation in various partnerships and actions enhancing private sector$ role as a key developmental actor with emphasis on sustainable value chains, financial inclusion and the role of the financial sector.
West Bank and Gaza Strip/Asia (Middle East Asia)/Support to productive and social investments in Palestine	9,184,000.00	10,284,434.49	Committed	Oda	Grant	Adaptation	Cross-cutting	EJS P5: ENI/PS/1/8 Sustainable Economic Development.The AAP 2019 covers EU's programme in Area C, interventions in Gaza and the West Bank. Municipal development, local economic development, business environment, outsourcing activities and agriculture

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Developing countries, unspecified/Strengthening governance of Invasive Pests, Transboundary Animal Diseases, and Food Safety affecting hunger and malnutrition	8,000,000.00	8,958,566.63	Committed	Oda	Grant	Adaptation	Agriculture	The action will tackle Agricultural Risk Management (ARM) and enhance the effective control of global pests and diseases and the related quality of agricultural and livestock products, as well as the global capacity to deal with these and other risks to farming in developing countries. The action will primarily contribute to contain plant and animal pests, diseases and related threats, including through Food Safety, animal and plant health (SPS) measures. In addition to analysing and addressi
Developing countries, unspecified/Farmers Organisations for Asia and Latin America	6,000,000.00	6,718,924.97	Committed	Oda	Grant	Adaptation	Agriculture	Farmers'Organisations for Asia and Latin America (FO4A-LA) is a capacity building programme aiming to increase income and to improve livelihood, food and nutrition security and safety of family farming in the target areas of the project, through greater integration of family farms in key agricultural value chains.
/ Africa (South of Sahara)/EU Trade for Decent Work (component 5 of MAAP 2019-2020 part 2 for theme Human Development)	400,000.00	447,928.33	Committed	Oda	Grant	Cross-cutting	Other	"EU Trade for Decent Work"(component 5 of MAAP 2019-2020 part 2 for theme Human Development) - Annex 5 of C(2019)8049
Tunisia/Africa (North of Sahara)/Commune de Nabeul : Solutions renouvelables pour les services publics de base - Contrat suplémentaire pour le paiement des intérêts de retard.	872	976.48	Committed	Oda	Grant	Cross-cutting	Energy	
Developing countries, unspecified/Reducing illegal wildlife trafficking	6,100,000.00	6,830,907.05	Committed	Oda	Grant	Adaptation	Cross-cutting	Reducing illegal wildlife trafficking and the impact of displaced persons on high value ecosystems - Combatting emerging threats to biodiversity and security in high value ecosystem The objective is to reduce wildlife trafficking and unsustainable
Developing countries, unspecified/PRO-ACT 2019	70,000,000.00	78,387,458.01	Committed	Oda	Grant	Adaptation	Cross-cutting	Pro-Resilience Action for prevention and response to food crisis –PRO-ACT 2019
Algeria/Africa (North of Sahara)/JIL-SIYAHA "Programme d'appui à l'inclusion et à l'employabilité des jeunes dans le secteur du tourisme et ses chaines de valeurs"	4,000,000.00	4,479,283.31	Committed	Oda	Grant	Adaptation	Other	L'Action vise la participation des jeunes à la vie socioéconomique des territoires à travers le secteur du tourisme et ses chaines de valeurs et contribuer indirectement, à terme, à la diversification de l'économie algérienne
Togo/Africa (South of Sahara)/Facilité d'Appui au Partenariat entre le Togo et l'Union européenne (FAPTUE)	1,360,000.00	1,522,956.33	Committed	Oda	Grant	Cross-cutting	Other	La présente action couvre une Facilité d'appui transversal au Partenariat entre le Togo et l'Union européenne dans le cadre des objectifs de l'Alliance Afrique-Europe, du PND 2018-2022 du Togo, du PIN 2014-2020 du 11 FED pour Togo, du DPC 2014-2020
Albania/Europe/2014-2020 Greece - Albania Cross-border cooperation	2,351,030.00	2,632,732.36	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance
/ Europe/2014-2020 Croatia-Bosnia and Herzegovina - Montenegro Cross-border cooperation	2,793,700.00	3,128,443.45	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance
Europe/2014-2020 Italy - Albania - Montenegro Cross-border cooperation	3,851,740.00	4,313,258.68	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance
Europe/2014-2020 Adriacti-Ionian transnational cooperation programme	1,533,720.00	1,717,491.60	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Policy driver and governance innovator fostering European integration among Partner States, taking advantage of the rich natural, cultural and human resources surrounding the Adriatic and Ionian Seas and enhancing economic, social and territorial cohesion
Europe/2014-2020 Balkan-Mediterranean transnational cooperation programme	501,120.00	561,164.61	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Increasing territorial competitiveness and protecting the environment
Europe/2014-2020 Baltic sea transnational cooperation programme	789,410.00	883,997.76	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Strengthen integrated territorial development and cooperation for a more innovative, better accessible and sustainable Baltic Sea Region
Europe/2014-2020 Danube transnational cooperation programme	1,938,460.00	2,170,727.88	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Supporting policy integration in the area within a range of fields linked to the priorities of the EU Strategy for the Danube Region (EUSDR).
Europe/2014-2020 Danube transnational cooperation programme	193,120.00	216,259.80	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Supporting policy integration in the area within a range of fields linked to the priorities of the EU Strategy for the Danube Region (EUSDR).
Europe/2014-2020 Balkan-Mediterranean transnational cooperation programme	70,480.00	78,924.97	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Increasing territorial competitiveness and protecting the environment
Europe/2014-2020 Adriacti-Ionian transnational cooperation programme	215,720.00	241,567.75	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Policy driver and governance innovator fostering European integration among Partner States, taking advantage of the rich natural, cultural and human resources surrounding the Adriatic and Ionian Seas and enhancing economic, social and territorial cohesion
Europe/2014-2020 Baltic sea transnational cooperation programme	121,000.00	135,498.32	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Strengthen integrated territorial development and cooperation for a more innovative, better accessible and sustainable Baltic Sea Region
Former Yugoslav Republic of Macedonia/Europe/2014-2020 Bulgaria - former Yugoslav Republic of Macedonia Cross-border cooperation	808,580.00	905,464.73	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance
Former Yugoslav Republic of Macedonia/Europe/2014-2020 Greece - former Yugoslav Republic of Macedonia Cross-border cooperation	1,889,150.00	2,115,509.52	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance
Serbia/Europe/2014-2020 Hungary-Serbia Cross-border cooperation	3,183,200.00	3,564,613.66	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance
Serbia/Europe/2014-2020 Romania-Serbia Cross-border cooperation	3,661,350.00	4,100,055.99	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance
Serbia/Europe/2014-2020 Croatia-Serbia Cross-border cooperation	1,676,220.00	1,877,066.07	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance
Serbia/Europe/2014-2020 Bulgaria - Serbia Cross-border cooperation	1,416,850.00	1,586,618.14	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance
Turkey/Europe/2014-2020 Bulgaria - Turkey Cross-border cooperation	1,231,580.00	1,379,148.94	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance
Turkey/Europe/2014-2020 Bulgaria - Turkey Cross-border cooperation	18,500.00	20,716.69	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Infrastructure and environment, economy, education and culture, technical assistance

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Micronesia/Oceania/Sustainable Energy and Accompanying Measures (SEAM)	14,200,000.00	15,901,455.77	Committed	Oda	Grant	Mitigation	Other	To contribute to the improvement of energy security and the strengthening of capacity towards sustainable energy for all citizens of FSM
Asia (Far East Asia)/SMART Green ASEAN Cities	5,000,000.00	5,599,104.14	Committed	Oda	Grant	Cross-cutting	Other	SMART Green ASEAN Cities
Europe/Co-financing of Connectivity Projects in the Western Balkans -allocation 2019	14,030,292.00	15,711,413.21	Committed	Oda	Grant	Adaptation	Transport	Multi-country Programme for Connectivity 2018-2019 - allocation 2019
Asia/Asia Investment Facility (2019 part 2)	30,000,000.00	33,594,624.86	Committed	Oda	Grant	Cross-cutting	Transport	The objective of AIF is to promote additional investments and key infrastructure with the priority focus on climate-change related and green investments.
Africa/Strengthening pan-African interconnectivity through blending	24,000,000.00	26,875,699.89	Committed	Oda	Grant	Cross-cutting	Transport	The main purpose is to contribute to poverty reduction by promoting investments, job creation and income generation through MSMEs and microfinance institutions support and key infrastructures
Europe/EU Support to transport and energy connectivity projects 2019-2020	73,152,000.00	81,917,133.26	Committed	Oda	Grant	Mitigation	Transport	Multi-country Programme for Connectivity 2019-2020 - allocation 2019
Bosnia and Herzegovina/Europe/EU4 Energy	5,199,280.00	5,822,262.04	Committed	Oda	Grant	Cross-cutting	Energy	Annual Action Programme for Bosnia and Herzegovina 2019 - Objective 2: Support for economic, social and territorial development and related progressive alignment with the Union acquis
Philippines/Asia (Far East Asia)/Mindanao Peace and Development Programme (MINPAD)	22,000,000.00	24,636,058.23	Committed	Oda	Grant	Adaptation	Agriculture	To contribute to lasting peace, security and sustainable development in Mindanao
Asia (Far East Asia)/Regional-ASEAN forest governance support programme	2,000,000.00	2,239,641.66	Committed	Oda	Grant	Cross-cutting	Forestry	Support programme to enhance forest governance, monitoring and sustainable forest management in ASEAN, as well as the performance of legal and sustainable wood-based markets in the Asia region.
Developing countries, unspecified/Thematic component of the regional programme for OCTs under the 11th EDF	17,800,000.00	19,932,810.75	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Thematic component of the regional programme for OCTs under the 11th EDF
Europe/EU support to Western Balkans Investment Framework - WBIF (Infrastructure Project Facility and IFI Coordination Office)	12,000,000.00	13,437,849.94	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Multi-country Action Programme 2019
Europe/Multi-country Programme for Western Balkans Guarantee 2019-2020 - allocation 2019	20,000,000.00	22,396,416.57	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Multi-country Programme for Western Balkans Guarantee 2019-2020 - allocation 2019
Cameroon/Africa (South of Sahara)/Contribution à la Plateforme d'investissement pour l'Afrique (AIP) en faveur du secteur énergétique au Cameroun	16,150,000.00	18,085,106.38	Committed	Oda	Grant	Mitigation	Cross-cutting	Financement de projets visant l'augmentation de làccès à lénergie durable (notamment à l'électricité d'origine renouvelable), ainsi que làmélioration de l'environnement des affaires et làctivité économique dans le secteur Energie
Tunisia/Africa (North of Sahara)/Local Authorities 2018 Programme - Tunisie	2,138,256.00	2,394,463.61	Committed	Oda	Grant	Adaptation	Other	CSO-LA Thematic Programme - AAP 2018 Local Authorities (Action Document nº 1 & Action Document nº 2)
Developing countries, unspecified/Support services for the Covenant of Mayors for Climate and Energy	1,000,000.00	1,119,820.83	Committed	Oda	Grant	Cross-cutting	Energy	TECHNICAL ASSISTANCE AND MONITORING OF IMPLEMENTATION OF THE COVENANT OF MAYORS
Mozambique/Africa (South of Sahara)/Mozambique Biodiversity Actions	5,200,000.00	5,823,068.31	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Programme under 11th EDF Biofiversity Actions
Developing countries, unspecified/GLOBAL COMMITMENT - OECD CLIMATE CHANGE EXPERT GROUP (CCXG)	200,000.00	223,964.17	Committed	Oda	Grant	Mitigation	Cross-cutting	DIALOGUE BETWEEN DEVELOPED AND DEVELOPING COUNTRIES UNDER THE OECD CLIMATE CHANGE EXPERT GROUP - OECD CCXG - GPGC
Moldova/Europe/EU4MOLDOVA: Clean Water for Cahul	5,600,000.00	6,270,996.64	Committed	Oda	Grant	Mitigation	Water And Sanitation	The action is focusing on extension of Water Supply and Sanitation Services in the region of Cahul, in the South of the Republic of Moldova. This action will bring direct tangible results to the population of the region of Cahul, which is a focal region for EU support to Moldova.
Oceania/Investment Facility for the Pacific (2019)	22,800,000.00	25,531,914.89	Committed	Oda	Grant	Mitigation	Water And Sanitation	The IFP supports investment projects in the Pacific region in order to boost economic growth and reduce poverty, and to address climate change challenges.
Kiribati/Oceania/EU-Kiribati Partnership for a sustainable and inclusive socio-economic development	20,800,000.00	23,292,273.24	Committed	Oda	Grant	Adaptation	Water And Sanitation	The Action will contribute to the improvement of the social and economic development of Kiribati while strengthening resilience for the i-Kiribati population. Specifically, the Action aims at: a) Strengthening the economic dialogue and PFM reforms. The State and Resilience Building Contract (SRBC) is considered the best option to promote improvements in the Public Finance Management (PFM) at both the national level and in Kiritimati Island and improve service delivery in Kiritimati. b) Ensurin
Developing countries, unspecified/Contribution of the European Union to the budget of the Energy Community. This contribution stems from an international treaty	1,824,352.00	2,042,947.37	Committed	Oda	Grant	Mitigation	Energy	Develop a legislative framework based on EU Acquis in the areas of energy, environment and competition in the Balkans, allowing the creation of a regional energy market.
Europe/Promoting the Clean Energy Transition in the Eastern Partnership countries: EU4Energy Phase 2	3,600,000.00	4,031,354.98	Committed	Oda	Grant	Mitigation	Energy	Support to Energy Reforms in the 6 EaP countries / EUR 9 million funded from 2019 budget
Sri Lanka/Asia (South & Central Asia)/Support to Food Safety and Quality in Sri Lanka	4,000,000.00	4,479,283.31	Committed	Oda	Grant	Adaptation	Agriculture	The overall objective is to contribute to a more productive, sustainable, diversified, climate-resilient, market-oriented and inclusive agriculture in Sri Lanka.
Africa (South of Sahara)/Programme d'Appui pour la Préservation des écosystèmes Forestiers en Afrique de l'Ouest (PAPFor)	8,000,000.00	8,958,566.63	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Sous-secteur 3.2 RESSOURCES NATURELLES du DOMAINE PRIORITAIRE 3 du PIR 11e FED Afrique de l'Ouest 2014-2020, dont l'objectif est La protection de l'environnement, de la biodiversité et la lutte contre le changement climatique.
Turkey/Europe/Special Measure under the Facility for Refugees in Turkey - EU Budget	340,471,328.00	381,266,884.66	Committed	Oda	Grant	Adaptation	Other	Special Measure on health, protection, socio-economic support and municipal infrastructure under the Facility for Refugees in Turkey - EU Budget
Developing countries, unspecified/Cross Sub-delegation Agreement NEAR/DEVCO	15,209,700.00	17,032,138.86	Committed	Oda	Grant	Cross-cutting	Water And Sanitation	Decision C(2019)5866 on the Neighbourhood Investment Platform (NIP), part of the European Neighbourhood Wide Action Programme 2019

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Iraq/Asia (Middle East Asia)/Special measure for the 2019 DCI contribution to the EU Trust Fund Madad	9,000,000.00	10,078,387.46	Committed	Oda	Grant	Cross-cutting	Other	Contribution to the EU Trust Fund in response to the Syrian Crisis (MADAD Fund) - Iraq
Madagascar/Africa (South of Sahara)/Contribution à la plateforme d'investissement pour l'Afrique (AIP) en appui aux secteurs des transports, de l'eau et de l'énergie à Madagascar (Ph.3)	11,600,000.00	12,989,921.61	Committed	Oda	Grant	Cross-cutting	Transport	3ème engagement sur la programmation INFRA du 11ème FED à Madagascar
Zambia/Africa (South of Sahara)/Zambia Energy Efficiency and Sustainable Transformation programme (ZE2ST)	25,000,000.00	27,995,520.72	Committed	Oda	Grant	Mitigation	Energy	ZE2ST aims at mobilising end-use energy savings, energy services and demand side management and at promoting digitalisation to make energy efficiency count in Zambia.
Developing countries, unspecified/Provision of Scientific and Technical Support relevant to EU policies in the areas of Cooperation, Food and Nutrition Security and Sustainable Agricul	2,600,000.00	2,911,534.15	Committed	Oda	Grant	Adaptation	Agriculture	JRC
Madagascar/Africa (South of Sahara)/Programme d'Appui au Financement de l'Agriculture et aux Filières Inclusives Autour d'Antananarivo Madagascar (AFAFI-Centre)	4,800,000.00	5,375,139.98	Committed	Oda	Grant	Adaptation	Agriculture	Objectif global: amélioration durable des revenus des ménages ruraux et de leur sécurité alimentaire et nutritionnelle, en particulier celle des femmes et des enfants, et préservation de l'environnement naturel dans la zone périurbaine d'Antananarivo
Developing countries, unspecified/DeSIRA 2019	45,500,000.00	50,951,847.70	Committed	Oda	Grant	Cross-cutting	Agriculture	Generating and exchanging knowledge and fostering innovation- support to Development-Smart Innovation through Research in Agriculture
Africa/FISHGOV2	4,800,000.00	5,375,139.98	Committed	Oda	Grant	Adaptation	Agriculture	Enhancing fisheries management and aquaculture development in Africa: a programme for accelerated reform in the sectors
Developing countries, unspecified/SUPPORT ON CO2 EMISSIONS FROM CARS, VANS AND HEAVY DUTY VEHICLES 2018-2020-JRC	200,000.00	223,964.17	Committed	Oda	Grant	Mitigation	Cross-cutting	
Developing countries, unspecified/SUPPORT TO EMISSIONS MODELLING IN DEVELOPING COUNTRIES	2,100,000.00	2,351,623.74	Committed	Oda	Grant	Mitigation	Cross-cutting	SUPPORT TO EMISSIONS MODELLING IN DEVELOPING COUNTRIES
Europe/EU SUPPORT FOR CLIMATE ACTION IN THE WESTERN BALKANS AND TURKEY	2,000,000.00	2,239,641.66	Committed	Oda	Grant	Mitigation	Cross-cutting	EU SUPPORT FOR CLIMATE ACTION IN THE WESTERN BALKANS AND TURKEY -TRANSITION TOWARDS THE LOW EMISSIONS AND CLIMATE-
Europe/CBC 2018-2020 Action Programme the former Yugoslav Republic of Macedonia - Republic of Albania (Allocation 2019)	680,000.00	761,478.16	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Cross-border Cooperation Action Programme the former Yugoslav Republic of Macedonia - Republic of Albania for the years 2018-2020 (Allocation 2019)
Europe/CBC 2018-2020 Action Programme Kosovo-the former Yugoslav Republic of Macedonia (Allocation 2019)	480,000.00	537,514.00	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Cross border Cooperation Action Programme Kosovo-the former Yugoslav Republic of Macedonia for the years 2018-2020 (allocation 2019)
Armenia/Asia (South & Central Asia)/EU4Energy Efficiency and Environment	3,600,000.00	4,031,354.98	Committed	Oda	Grant	Cross-cutting	Cross-cutting	The main objective is to support initiatives aimed at energy efficiency and environmental protection. In particular, this programme aims to increase energy efficiency in existing buildings, in particular in multi-apartment residential buildings.
America/Regional Facility for International Cooperation and Partnership - ADELANTE - Phase II	3,800,000.00	4,255,319.15	Committed	Oda	Grant	Adaptation	Cross-cutting	The present proposal continues and deepens the new approach for engaging with Latin American and Caribbean (LAC) partner countries in the area of development cooperation through triangular cooperation. Following up on the successful implementation of the 2015 Regional Facility for International Cooperation and Partnership (ADELANTE), this second phase also aims at strengthening the flexible mechanism for joint activities between the EU and LAC countries to work together. ADELANTE 2 is launched
America (North & Central America)/Strengthening Climate Resilient Health Systems in the Caribbean	7,000,000.00	7,838,745.80	Committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
Developing countries, unspecified/Sustainable socio-economic development through clean and efficient energy solutions	94,500,000.00	105,823,068.31	Committed	Oda	Grant	Cross-cutting	Other	Energy efficiency in action Łeveraging an energy efficiency investments pipeline for EIP (including ElectriFI)
Kosovo/Europe/EU support to clean Air for Kosovo –Phase 2	15,200,000.00	17,021,276.60	Committed	Oda	Grant	Mitigation	Energy	Annual Programme for Kosovo 2019 - part 1 - objective 2
Tajikistan/Asia (South & Central Asia)/Rural Development programme II	500,000.00	559,910.41	Committed	Oda	Grant	Adaptation	Agriculture	Projects will support rural development and the implementing of Integrated Water Resources Management
Asia/ SWITCH-Asia and Central Asia II - Promoting Sustainable Consumption and Production- MA part 2	13,200,000.00	14,781,634.94	Committed	Oda	Grant	Mitigation	Industry	The overall objective of the programme SWITCH-Asia and Central Asia II is to promote sustainable growth, to contribute to the economic prosperity and poverty reduction in Asia and to mitigate climate change.
America/Support measures 2019-2020	800,000.00	895,856.66	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Support measures 2019-2020
America (North & Central America)/Evaluation and Audit	300,000.00	335,946.25	Committed	Oda	Grant	Adaptation	Cross-cutting	Overall objective(s): To deepen and strengthen cooperation and contribute to the sustainable social and economic development of CARIFORUM States and the Wider Caribbean Region. Specific objective(s): Wider
Europe/Support to the Implementation of the Eastern Partnership Multilateral Dimension and the Implementation of the Northern Dimension and the Black Sea Syn	3,920,000.00	4,389,697.65	Committed	Oda	Grant	Cross-cutting	Cross-cutting	The action supports the implementation of the Eastern Partnership Multilateral Dimension and the implementation of the Northern Dimension and the Black Sea Synergy, as guided by the European Neighbourhood Policy. It entails a flexible mechanism giving the European Commission the possibility to financially underpin policy processes and dialogue as well as small-scale actions in line with the objectives of these policy frameworks.
Tajikistan/Asia (South & Central Asia)/Evaluation and Audit	500,000.00	559,910.41	Committed	Oda	Grant	Adaptation	Cross-cutting	Projects will support rural development and the implementing of Integrated Water Resources Management
Kenya/Africa (South of Sahara)/Contribution to the Africa Investment Platform in support of the Energy Sector in Kenya	32,000,000.00	35,834,266.52	Committed	Oda	Grant	Mitigation	Energy	Component 1: ElectriFI country window for Kenya Component 2: Support to Control Centre and other reinforcements of the transmission system

Recipient country/ region/project/programme[b]	Total amount		Status[c, 3]	Funding source[g, 4]	Financial instrument[g, 5]	Type of support[g, h, 6]	Sector[d, g, 7]	Additional information[e]
	Climate-specific[f, 2]							
	European euro - EUR	USD						
Ukraine/Europe/Technical Cooperation Facility 2019	17,600,000.00	19,708,846.58	Committed	Oda	Grant	Cross-cutting	Other	Supporting Ukraine in implementing key reforms and the EU-Ukraine Association Agreement, including its DCFTA. The Action will provide policy advice, advice on legal approximation process with the EU, and capacity building in priority reform areas
Developing countries, unspecified/Support measures 2019 under GPGC Environment and Climate Change	230,464.00	258,078.39	Committed	Oda	Grant	Cross-cutting	Cross-cutting	The Support Measures will be used to finance, among others, activities such as i) risk-based audits and evaluations, ii) technical support for the identification and formulation of new actions, iii) studies and advisory services, trainings, seminars,
Bosnia and Herzegovina/Europe/EU4 Transport	4,000,000.00	4,479,283.31	Committed	Oda	Grant	Cross-cutting	Transport	Annual Action Programme for Bosnia and Herzegovina 2019 - Objective 2: Support for economic, social and territorial development and related progressive alignment with the Union acquis
Developing countries, unspecified/Sustainable energy support measures 2019	412,180.00	461,567.75	Committed	Oda	Grant	Mitigation	Energy	Sustainable support measures: AAP 2019/2020 for Sustainable Energy
Haiti/America (North & Central America)/Alliance Mondiale contre le Changement Climatique + (AMCC+) / Haïti	8,000,000.00	8,958,566.63	Committed	Oda	Grant	Adaptation	Cross-cutting	Programme d'Appui de l'Alliance Mondiale contre le Changement Climatique Plus (AMCC+) pour l'adaptation et le développement des énergies vertes en Haïti
Europe/CBC 2018-2020 Action Programme Serbia-Montenegro (allocation 2019)	480,000.00	537,514.00	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Cross-Border Cooperation Action Programme 2018-2020 Serbia-Montenegro (allocation 2019)
Europe/CBC 2018-2020 Action Programme Serbia-Bosnia and Herzegovina (allocation 2019)	800,000.00	895,856.66	Committed	Oda	Grant	Cross-cutting	Cross-cutting	IPA 2019 allocation for the Cross-Border Cooperation Programme Serbia-Bosnia and Herzegovina
Europe/CBC 2018-2020 Action Programme Serbia-the former Yugoslav Republic of Macedonia (allocation 2019)	280,000.00	313,549.83	Committed	Oda	Grant	Cross-cutting	Cross-cutting	2019 allocation for the CBC Serbia-the former Yugoslav Republic of Macedonia
Oceania/Pacific Regional Integration Support Programme (PRISE)	14,800,000.00	16,573,348.26	Committed	Oda	Grant	Cross-cutting	Industry	11th EDF Pacific regional trade and private sector development programme
Uganda/Africa (South of Sahara)/Promoting Inclusive Green Economy in Uganda (PIGE)	60,000,000.00	67,189,249.72	Committed	Oda	Grant	Adaptation	Water And Sanitation	The programme aims at advancing Inclusive Green Economy in Uganda
Angola/Africa (South of Sahara)/«Programa de Apoio à Sociedade Civil na Administração	2,400,000.00	2,687,569.99	Committed	Oda	Grant	Adaptation	Other	This action will aim at promoting an active, effective and meaningful participation of citizens in general and civil
Senegal/Africa (South of Sahara)/Programme d'appui au développement des énergies renouvelables pour l'accès universel à l'électricité	8,000,000.00	8,958,566.63	Committed	Oda	Grant	Mitigation	Energy	L'action consiste en une contribution du PIN 11ème FED du Sénégal à un programme d'appui au développement des énergies renouvelables pour l'accès universel à l'électricité permettant de réduire les émissions de CO2 au Sénégal conformément à ses engagements et créant les conditions d'égalité pour la création d'emplois dans une économie rurale plus résiliente. Une partie de l'action contribuera à la Plateforme d'Investissement pour l'Afrique (PIA) qui a été mise en place dans le cadre du Fonds Eur
Developing countries, unspecified/Projet d'appui au secteur de l'énergie en Côte d'Ivoire – Utilisation des reliquats ENERGOS 1 et 2	14,000,000.00	15,677,491.60	Committed	Oda	Grant	Mitigation	Energy	Les objetcifs portent sur l'accès à l'électricité et l'efficacité énergétique. IL fera l'objet de ocnventions de délégation à des Institutions financières via la Plateframe d'Investissement pour l'Afrique
Burundi/Africa (South of Sahara)/Appui au secteur privé dans le domaine de l'énergie renouvelable à travers une facilité d'investissement type ElectriFI	10,600,000.00	11,870,100.78	Committed	Oda	Grant	Mitigation	Energy	Action d'appui aux investissements du secteur privé qui intervient dans le domaine de l'énergie électrique et propre au Burundi
/ Africa (South of Sahara)/Contribution (phase 3) to the Africa Investment Facility in support of regional economic integration in West Africa.	5,480,000.00	6,136,618.14	Committed	Oda	Grant	Cross-cutting	Energy	The overall objective is to contribute to poverty reduction and to sustainable and inclusive economic development through regional economic integration in West Africa, with an emphasis on the improvement of regional economic infrastructures
Tajikistan/Asia (South & Central Asia)/Sebzor hydro power plant construction project	20,000,000.00	22,396,416.57	Committed	Oda	Grant	Cross-cutting	Energy	The aim is to increase the energy stability in the Pamir region, and in this way to stimulate economic development. The objective is to plug the rural energy gap and scale up the region's economic impact.
Uganda/Africa (South of Sahara)/Inclusive Green Economy Uptake Programme (GreenUP)	18,000,000.00	20,156,774.92	Committed	Oda	Grant	Cross-cutting	Cross-cutting	The programme aims at advancing Inclusive Green Economy in Uganda.
Africa (South of Sahara)/Projet d'Appui à la diffusion et à la mise en œvre de bonnes pratiques d'intensification agricoles durables en Afrique de l'Ouest	8,200,000.00	9,182,530.80	Committed	Oda	Grant	Adaptation	Agriculture	Ce projet fait partie intégrante des engagements de l'UE en soutien à l'intensification agricole et à l'agriculture durable dans le cadre du 11è FED PIR Afrique de l'Ouest.
Kenya/Africa (South of Sahara)/Agri-Biz: Decent jobs for Youth and Women in Agricultural Value Chains in Kenya	17,400,000.00	19,484,882.42	Committed	Oda	Grant	Adaptation	Agriculture	Integrated support to job creation for youth and women in selected counties in Kenya, including a financial blending component
Cameroon/Africa (South of Sahara)/Accompagnement des mutations du Bassin Cotonnier du Cameroun-ABC	9,500,000.00	10,638,297.87	Committed	Oda	Grant	Adaptation	Agriculture	En réponse à la stratégie pour le Relèvement et la Consolidation de la Paix au Cameroun, cette action vise l'amélioration de la situation socio-économique des population du bassin cotonnier (Extrême-Nord, Nord et Adamaoua)
Asia (Middle East Asia)/ASIA INVESTMENT FACILITY	48,000,000.00	53,751,399.78	Committed	Oda	Grant	Adaptation	Industry	Replenishment for 2019
Rwanda/Africa (South of Sahara)/GCCA+ Reducing Climate Impact of cooking in Rwanda through improved cooking systems	5,000,000.00	5,599,104.14	Committed	Oda	Grant	Mitigation	Cross-cutting	The main objectives of this programme will be to fight deforestation in Rwanda, and support adaptation to climate change. Universal modern and sustainable energy access will be to supported including shift towards more efficient
Africa (South of Sahara)/GCCA+ multi-country programme on sustainable cooling solutions &	5,360,000.00	6,002,239.64	Committed	Oda	Grant	Mitigation	Cross-cutting	The project objective is to initiate a sector wide transition towards the use of climate friendly and energy efficient
Namibia/Africa (South of Sahara)/GCCA+ support on coordination and implementation of	4,000,000.00	4,479,283.31	Committed	Oda	Grant	Mitigation	Cross-cutting	The main project actions will include improving technical capacity, development of appropriate responses and

Recipient country/ region/project/programme[b]	Total amount		Status[c, 3]	Funding source[g, 4]	Financial instrument[g, 5]	Type of support[g, h, 6]	Sector[d, g, 7]	Additional information[e]
	Climate-specific[f, 2]							
	European euro - EUR	USD						
Oceania/Pacific Initiative on Biodiversity, Climate Change and Resilience	9,900,000.00	11,086,226.20	Committed	Oda	Grant	Adaptation	Cross-cutting	The primary general objective of the initiative is to organize an international coalition in order to mobilize greater financial resources and to accelerate and simplify the funding of adaptation and biodiversity protection.
Developing countries, unspecified/2014-2020 Mediterranean transnational cooperation programme	914,600.00	1,024,188.13	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Promotion of growth in the Mediterranean area by fostering innovative concepts and practices (technologies, governance, innovative services) and encouraging sustainable use of (natural and cultural) resources and support social integration.
Developing countries, unspecified/2014-2020 Mediterranean transnational cooperation programme	122,710.00	137,413.21	Committed	Oda	Grant	Cross-cutting	Cross-cutting	Promotion of growth in the Mediterranean area by fostering innovative concepts and practices (technologies, governance, innovative services) and encouraging sustainable use of (natural and cultural) resources and support social integration.
Congo/Africa (South of Sahara)/Villes résilientes en République du Congo	12,800,000.00	14,333,706.61	Committed	Oda	Grant	Adaptation	Cross-cutting	L'objectif général du projet est d'améliorer les conditions de vie et l'attractivité des villes de Nkayi et d'Owando au travers du renforcement des autorités locales et de la société civile ainsi que la réalisation de travaux d'assainissement.
Tajikistan/Asia (South & Central Asia)/Rural Development programme II	20,500,000.00	22,956,326.99	Committed	Oda	Grant	Adaptation	Cross-cutting	Projects will support rural development and the implementing of Integrated Water Resources Management
Tajikistan/Asia (South & Central Asia)/Grants - Call for Proposals	20,000,000.00	22,396,416.57	Committed	Oda	Grant	Adaptation	Cross-cutting	Projects will support rural development and the implementing of Integrated Water Resources Management
Cuba/America (North & Central America)/ PROGRAMA DE APOYO ESTRATEGICO A LA SEGURIDAD ALIMENTARIA SOSTENIBLE	19,650,000.00	22,004,479.28	Committed	Oda	Grant	Adaptation	Agriculture	El objetivo general de la Acción es incrementar de forma sostenible la producción de alimentos de calidad para responder a la demanda local. El objetivo específico de la Acción es: se implementan enfoques innovadores, ambientales y resilientes al clima para incrementar la producción de alimentos
Developing countries, unspecified/European Unions contribution to the United Nations Trust Fund in support of the reinvigorated Resident Coordinator System for 2019	10,840,000.00	12,138,857.78	Committed	Oda	Grant	Cross-cutting	Cross-cutting	European Unionś contribution to the United Nations Trust Fund in support of the reinvigorated Resident Coordinator System for 2019
Kenya/Africa (South of Sahara)/Coastal Economic Development in Kenya (Partnership between the EU and the Government of Kenya to advance the Blue Economy agenda through coastal urban	10,000,000.00	11,198,208.29	Committed	Oda	Grant	Adaptation	Industry	Under the umbrella of the Blue Economy, the overall objective of the action is to contribute to unlock the potential of sea-land opportunities in coastal urban centres in an inclusive, integrated, participatory and sustainable manner.
Mozambique/Africa (South of Sahara)/Recovery and Resilience Programme in Mozambique	70,000,000.00	78,387,458.01	Committed	Oda	Grant	Adaptation	Other	Recovery and Resilience Programme in Mozambique
Suriname/America (South America)/GCCA+ support for Climate Change Adaptation in Suriname Phase 2	5,000,000.00	5,599,104.14	Committed	Oda	Grant	Adaptation	Water And Sanitation	GCCA+2 aims to support Suriname in dealing with the main effects of CC, by increasing resilience of coastal communities in Nickerie and Coronie against sea level rise improving national gov in the area of integrated water resource/ coastal zone mgmt
Iran/Asia (Middle East Asia)/2019 Special Measure in favour of Iran	6,400,000.00	7,166,853.30	Committed	Oda	Grant	Adaptation	Water And Sanitation	This is the second special measure in favour of Iran based on the 2018-2020 bilateral allocation approved as part of the Mid-Term Review of the DCI.
Armenia/Asia (South & Central Asia)/Local Empowerment of Actors for Development (LEAD)	5,600,000.00	6,270,996.64	Committed	Oda	Grant	Mitigation	Other	Through piloting innovative methods and processes, the Local Empowerment of Actors for Development (LEAD) aims to bolster the participation of wide range of local stakeholders in the socio-economic development of their communities.
Developing countries, unspecified/Climate Change and Security	2,500,000.00	2,799,552.07	Committed	Oda	Grant	Adaptation	Cross-cutting	The present action will enhance early warning and prevention measures to help promoting good neighbourly relations aiming at reducing tensions over limited natural resources
Yemen/Asia (Middle East Asia)/Supporting Resilient Livelihoods and Food and Nutrition Security in Yemen - Part 2	14,000,000.00	15,677,491.60	Committed	Oda	Grant	Cross-cutting	Agriculture	Linked to Decision 2018/40-734 - Split Commitment
Cuba/America (North & Central America)/GCCA+ Cuba, Municipality of Marti: Towards a low-carbon sustainable development model	4,400,000.00	4,927,211.65	Committed	Oda	Grant	Cross-cutting	Agriculture	The overall objective of the project is to contribute to boost the integrated development of Marti and to the implementation of Cuba's NDC and the specific objective is to support the municipality of Martí in adopting a climate-resilient, economic, social and environmentally sustainable, circular economic model for food and energy production. To achieve so, three outputs have been identified: O.1 Enhanced capacity and infrastructure for the production of economically and environmentally (low car
Developing countries, unspecified/ENHANCING KNOWLEDGE AND EVIDENCE TO SCALE-UP CLIMATE CHANGE ADAPTATION IN AFRICA	1,000,000.00	1,119,820.83	Committed	Oda	Grant	Mitigation	Cross-cutting	CLIMA.A3- UNDP - ENHANCING KNOWLEDGE AND EVIDENCE TO SCALE-UP CLIMATE CHANGE ADAPTATION IN AFRICA VIA THE AFRICA ADAPTATION INITIATIVE - GPGC 2019 - CA
Uzbekistan/Asia (South & Central Asia)/EU contribution to the Multi-Partner Human Security Trust Fund for the Aral Sea region in Uzbekistan	2,080,000.00	2,329,227.32	Committed	Oda	Grant	Adaptation	Cross-cutting	EU contribution to the UN Multi-Partner Human Security Trust Fund for the Aral Sea region in Uzbekistan (Karakalpakstan)
Developing countries, unspecified/EU contribution to the United Nations Joint Fund for the 2030 Agenda -Transforming the way the UN and governments work together to achieve the Sustai	8,000,000.00	8,958,566.63	Committed	Oda	Grant	Cross-cutting	Cross-cutting	The action will directly support partner countries in implementing the 2030 Agenda and the SDGs. It directly contributes to the 5 Ps (People, Planet, Prosperity, Peace, Partnership) of the 2030 Agenda and of the new European Consensus .

Recipient country/ region/project/programme[b]	Total amount		Status[c, 3]	Funding source[g, 4]	Financial instrument[g, 5]	Type of support[g, h, 6]	Sector[d, g, 7]	Additional information[e]
	Climate-specific[f, 2]							
	European euro - EUR	USD						
Developing countries, unspecified/SWITCH to Green Finance	16,000,000.00	17,917,133.26	Committed	Oda	Grant	Mitigation	Cross-cutting	Support to the transition to green and circular economies and the integration of environmental sustainability, climate change and disaster risk reduction.
Sri Lanka/Asia (South & Central Asia)/EU GCCA+ Support to the Implementation of Sri Lanka's NDCs in the Industry Sector	7,750,000.00	8,678,611.42	Committed	Oda	Grant	Mitigation	Industry	Reducing industrial GHG emissions and improving resource-efficient cleaner production in Sri Lanka
Africa (South of Sahara)/Support to Maritime Port Security and Safety in the EA-Sa-IO region	11,200,000.00	12,541,993.28	Committed	Oda	Grant	Adaptation	Transport	Support to Maritime Safety and Security in EA-SA-IO region
Developing countries, unspecified/Investing in data and indicators to end Hunger and Malnutrition .	2,800,000.00	3,135,498.32	Committed	Oda	Grant	Cross-cutting	Cross-cutting	This action supports evidence-based monitoring and policy making to improve food and nutrition security and to promote an inclusive sustainable agriculture transformation
Guatemala/America (North & Central America)/"Integral approach to build resilience in communities vulnerable to food insecurity and climatic shocks, especially droughts in Guatemala (PRO RESILI	15,000,000.00	16,797,312.43	Committed	Oda	Grant	Adaptation	Cross-cutting	Crop losses caused by droughts and irregular rainfall patterns are resulting in situations of food insecurity as well as crisis and negative emergency coping strategies, like selling land or productive assets. Since the beginning of Pro-Act in 2016, the scope of climate shocks has significantly increased and affected vulnerable families beyond the traditional Dry Corridor. WFP's recent Emergency Food Security Assessment (EFSA) conducted in Guatemala shows that 37% of the population is food insec
Africa (South of Sahara)/EU UHC Partnership	3,200,000.00	3,583,426.65	Committed	Oda	Grant	Adaptation	Other	EU-WHO Universal Health Coverage (UHC) Partnership: Supporting policy dialogue on national health policies, strategies and plans and universal coverage - Phase IV
Developing countries, unspecified/ Contribution to UNDP	1,000,000.00	1,119,820.83	Committed	Oda	Grant	Cross-cutting	Cross-cutting	SUPPORT TO DEVELOPING COUNTRIES' ALLIANCES ON CLIMATE CHANGE
Developing countries, unspecified/ Contribution to OECD CCXG	200,000.00	223,964.17	Committed	Oda	Grant	Cross-cutting	Cross-cutting	"Dialogue between developed and developing countries under the OECD Climate Change Expert Group"
Developing countries, unspecified/Adaptation Fund	10,000,000.00	11,198,208.29	Committed	Oda	Grant	Adaptation	Cross-cutting	The proposed Action aims to provide the first support from the European Union budget to the Adaptation Fund -a major international instrument under the Kyoto Protocol and the Paris Agreement on Climate Change.

Abbreviations: ODA = official development assistance, OOF = other official flows; USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should report, to the extent possible, on details contained in this table.

[c] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following

[d] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[e] Parties should report, as appropriate, on project details and the implementing agency.

[f] Parties should explain in their biennial reports how they define funds as being climate-specific.

[g] Please specify.

[h] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

Table 7(b)
Provision of public financial support: contribution through bilateral, regional and other channels in 2020 [a]

Recipient country/ region/project/programme [b]	Total amount		Status [c, 3]	Funding source [g, 4]	Financial instrument [g, 5]	Type of support [g, h, 6]	Sector [d, g, 7]	Additional information [e]
	Climate-specific [f, 2]							
	European euro - EUR	USD						
Total contributions through bilateral, regional and other channels	2,577,583,478.05	2,942,446,892.85						
Developing countries, unspecified/EU CONTRIBUTIONS TO MULTILATERAL ENVIRONMENTAL AGREEMENTS IN 2020	1,461,808.00	1,668,730.59	committed	Oda	Grant	Cross-cutting	Other	EU CONTRIBUTIONS TO MULTILATERAL ENVIRONMENTAL AGREEMENTS IN 2020
Developing countries, unspecified/AAP 2020 - Indigenous Peoples	400,000.00	456,621.00	committed	Oda	Grant	Cross-cutting	Other	Reaching the furthest behind support to indigenous peoples
Developing countries, unspecified/Civil Society Organisations as actors of Governance and Development Work in the Field	55,920,108.00	63,835,739.73	committed	Oda	Grant	Cross-cutting	Other	Country allocations
Developing countries, unspecified/2014-2020 Black Sea Bassin ENI Cross-border cooperation	6,414,270.00	7,322,226.03	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Developing countries, unspecified/2014-2020 Med Sea Bassin ENI Cross-border cooperation	27,578,050.00	31,481,792.24	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Developing countries, unspecified/2014-2020 Mediterranean transnational cooperation programme	1,865,790.00	2,129,897.26	committed	Oda	Grant	Cross-cutting	Other	Promotion of growth in the Mediterranean area by fostering innovative concepts and practices (technologies, governance, innovative services) and encouraging sustainable use of (natural and cultural) resources and support social integration.
Developing countries, unspecified/Water for prosperity, regional stability and resilient ecosystems	19,580,000.00	22,351,598.17	committed	Oda	Grant	Adaptation	Water And Sanitation	The present action aims at contributing to SDG 6. Three complementary objectives will be pursued through different components: - Reinforcement of the integrated and sustainable use of natural resources for water, energy and food security through the Nexus approach. - Enhancement of partnerships development between European and partner countries'public and private water utilities and operators. - Reinforcement of regional and national stability through support to the Water Convention.
Developing countries, unspecified/DeSIRA 2019	50,000,000.00	57,077,625.57	committed	Oda	Grant	Cross-cutting	Cross-cutting	Generating and exchanging knowledge and fostering innovation- support to Development-Smart Innovation through Research in Agriculture
Developing countries, unspecified/Provision of Scientific and Technical Support relevant to EU policies in the areas of Cooperation, Food and Nutrition Security and Sustainable Agricul	200,000.00	228,310.50	committed	Oda	Grant	Adaptation	Cross-cutting	JRC
Developing countries, unspecified/EU action for sustainable landscape management	46,700,000.00	53,310,502.28	committed	Oda	Grant	Cross-cutting	Cross-cutting	Promoting integrated landscape approaches and investments in sustainable land management, in order to conciliate and meet multiple objectives on a specific territory.
Developing countries, unspecified/Reducing illegal wildlife trafficking	3,100,000.00	3,538,812.79	committed	Oda	Grant	Adaptation	Cross-cutting	Reducing illegal wildlife trafficking and the impact of displaced persons on high value ecosystems - Combatting emerging threats to biodiversity and security in high value ecosystem The objective is to reduce wildlife trafficking and unsustainable
Developing countries, unspecified/Knowledge based management of natural ecosystems for sustaining green growth and ensuring stability	5,940,000.00	6,780,821.92	committed	Oda	Grant	Cross-cutting	Other	The objective of the action is to enhance the contribution of natural ecosystems to poverty alleviation and to stability.
Developing countries, unspecified/EU for Green MED III and sustainable transport	800,000.00	913,242.01	committed	Oda	Grant	Adaptation	Cross-cutting	By focusing on three complementary and interlinked lines of action (depollution of the Mediterranean, promotion of green and circular economy and sustainable transport), this action aims to support the depollution of the Mediterranean through the imp
Developing countries, unspecified/Sustainable socio-economic development through clean and efficient energy solutions	109,500,400.00	125,000,456.62	committed	Oda	Grant	Cross-cutting	Cross-cutting	Energy efficiency in action Łeveraging an energy efficiency investments pipeline for EIP (including ElectriFI)
Developing countries, unspecified/Climate for Cities in the Southern Neighbourhood	17,100,000.00	19,520,547.95	committed	Oda	Grant	Cross-cutting	Other	Climate for Cities in the Southern Neighbourhood region
Developing countries, unspecified/ACTIONS UNDER THE ANNUAL ACTION PROGRAMME 2020 FOR ENVIRONMENT AND CLIMATE ACTION UNDER THE GLOBAL PUBLIC GOODS AND CHALLENGES (GPGC) THEMATIC PROGRAM	6,501,000.00	7,421,232.88	committed	Oda	Grant	Cross-cutting	Other	ACTIONS UNDER THE ANNUAL ACTION PROGRAMME 2020 FOR ENVIRONMENT AND CLIMATE ACTION UNDER THE GLOBAL PUBLIC GOODS AND CHALLENGES (GPGC) THEMATIC PROGRAMME - C(2020)8016
Developing countries, unspecified/UNCCD - follow up CoP14	1,130,000.00	1,289,954.34	committed	Oda	Grant	Adaptation	Agriculture	UNCCD
Developing countries, unspecified/CSO Thematic Programme - NEAR - CSOs as actors of Governance and Development work in the Field	12,440,000.00	14,200,913.24	committed	Oda	Grant	Cross-cutting	Other	CSO Thematic Programme 2020 - MAAP 2018-2020 - Civil Society Organisations as actors of Governance and Development work in the Field (Action Document nº 2)
Developing countries, unspecified/NIP AAP 2020 contribution to the NIP SOUTH	54,400,000.00	62,100,456.62	committed	Oda	Grant	Cross-cutting	Cross-cutting	Support investment operations related to blending in the Southern Neighbourhood.
Developing countries, unspecified/Sustainable energy support measures 2019	284,000.00	324,200.91	committed	Oda	Grant	Mitigation	Other	Sustainable support measures: AAP 2019/2020 for Sustainable Energy
Developing countries, unspecified/Environment and climate change mainstreaming for sustainable development	300,000.00	342,465.75	committed	Oda	Grant	Cross-cutting	Other	This action will support Environment and Climate Change mainstreaming for sustainable development and the transformation to a Green Economy.
Developing countries, unspecified/Enabling a future with forests	8,600,000.00	9,817,351.60	committed	Oda	Grant	Cross-cutting	Other	Strengthening Forest governance and addressing deforestation and forest degradation
Developing countries, unspecified/Framework programme to support ACP agricultural value chains development	61,574,340.00	70,290,342.47	committed	Oda	Grant	Adaptation	Agriculture	The programme will be implemented through a combination of blended finance (mostly through Agri-FI) and Technical Assistance for preparation of bankable projects on prioritized agricultural value chains, and include COVID-19 mitigation measures.

Recipient country/ region/project/programme[b]	Total amount		Status[c, 3]	Funding source[g, 4]	Financial instrument[g, 5]	Type of support[g, h, 6]	Sector[d, g, 7]	Additional information[e]
	Climate-specific[f, 2]							
	European euro - EUR	USD						
Developing countries, unspecified/Support to business friendly and inclusive national and regional policies and strengthen productive capacities and value chains	2,800,000.00	3,196,347.03	committed	Oda	Grant	Mitigation	Other	through a coordinated a 3+1 tiered approach (macro, meso and micro-level + regional) improve investment climates by promoting business-friendly policies, support investment promotion and strengthen value chains.
Developing countries, unspecified/11th EDF ACP-EU Disaster Risk Reduction Programme	100,000,000.00	114,155,251.14	committed	Oda	Grant	Adaptation	Other	Contribute to reduce the impact of disasters, including those related to climate change and biological hazards, and increase resilience in ACP countries.
Developing countries, unspecified/SWITCH to Green Finance	10,160,000.00	11,598,173.52	committed	Oda	Grant	Cross-cutting	Cross-cutting	Support to the transition to green and circular economies and the integration of environmental sustainability, climate change and disaster risk reduction.
Developing countries, unspecified/ Energy security and Climate Action in the Southern Neighbourhood 2017-2018	1,036,000.00	1,182,648.40	committed	Oda	Grant	Cross-cutting	Other	The programme aims at enhancing energy security in beneficiary countries while fostering their transition to low carbon economy, thereby contributing to more stable, efficient, competitive and climate-resilient socioeconomic contexts.
Developing countries, unspecified/Support to the implementation of the Paris Agreement and Nationally Determined Contributions (NDCs)	16,000,000.00	18,264,840.18	committed	Oda	Grant	Cross-cutting	Cross-cutting	Component 1: Support to the implementation of the Paris Agreement with particular focus on NDCs -A directly managed technical assistance facility will be set up for the provision of high level technical assistance and policy advice to partners at country, regional and global level via EU Delegations. The main goal will be to support the update (in 2021 if needed and 2025) and operationalisation of the Nationally Determined Contributions and other relevant regional, national and local climate st
Developing countries, unspecified/2020 Support measures for GPGC Environment and Climate Change	397,360.00	453,607.31	committed	Oda	Grant	Cross-cutting	Other	2020 Support measures for GPGC Environment and Climate Change.
Developing countries, unspecified/AAP 2019 contribution to the NIP SOUTH with FAs	4,593,072.00	5,243,232.88	committed	Oda	Grant	Cross-cutting	Cross-cutting	Support investment operations related to blending in the Southern Neighbourhood. Financing Agreements to be concluded indicatively with Morocco, Tunisia and oPt
Developing countries, unspecified/Sustainable Food Systems	88,283,388.00	100,780,123.29	committed	Oda	Grant	Cross-cutting	Agriculture	4 components: i) sustainable food systems governance (also containing agrobiodiversity and SPS), ii) nutrition governance, iii) innovation and research, and iv) PROACT
Developing countries, unspecified/Local Authorities 2019 Programme	4,441,844.00	5,070,598.17	committed	Oda	Grant	Adaptation	Other	CSO-LA Thematic programme - Local Authorities component (Action document nº 1 & Action document nº 2)
Developing countries, unspecified/Union for the Mediterranean Operating Grant 2021	1,684,000.00	1,922,374.43	committed	Oda	Grant	Cross-cutting	Other	
Developing countries, unspecified/PRO-ACT 2019	84,620.00	96,598.17	committed	Oda	Grant	Adaptation	Other	Pro-Resilience Action for prevention and response to food crisis –PRO-ACT 2019
Developing countries, unspecified/Social and ecological resilience in the face of climate change in the Mediterranean Region	28,490.00	32,522.83	committed	Oda	Grant	Adaptation	Other	
Oceania/Pacific Initiative on Biodiversity, Climate Change and Resilience	4,000,000.00	4,566,210.05	committed	Oda	Grant	Adaptation	Cross-cutting	The primary general objective of the initiative is to organize an international coalition in order to mobilize greater financial resources and to accelerate and simplify the funding of adaptation and biodiversity protection.
Papua New Guinea/Oceania/Support to the Papua New Guinea National WaSH policy 2015-2030 - Part 2	10,000,000.00	11,415,525.11	committed	Oda	Grant	Adaptation	Water And Sanitation	This is the second action under Focal sector 2 of PNG EDF 11 NIP. This time concentrating on urban WaSH
Papua New Guinea/Oceania/Support to the Papua New Guinea National WaSH Policy 2015 - 2030 Part 1	265,540.00	303,127.85	committed	Oda	Grant	Adaptation	Water And Sanitation	Support under EDF 11 NIP focal sector 2 - WaSH
Vanuatu/Oceania/Vanuatu Value Chain Development	2,000,000.00	2,283,105.02	committed	Oda	Grant	Adaptation	Agriculture	As per NIP 2014-2020, intervention aims at rural development through support to the value chains of Coconut, Beef and Fruits&Vegetables.
Vanuatu/Oceania/Vanuatu CSO Support & Technical Cooperation Facility (CSOTCF) Project	2,400,000.00	2,739,726.03	committed	Oda	Grant	Adaptation	Cross-cutting	Vanuatu - Support for Civil Society Organisations and Technical Cooperation Facility (including support for the National Authorising Officer)
Fiji/Oceania/Support to Sustainable Rural Livelihoods - Fiji SRC	8,000,000.00	9,132,420.09	committed	Oda	Grant	Adaptation	Agriculture	The Support to Sustainable Rural Livelihoods programme responds to the need of Fiji which identified establishing a diversified and economically and environmentally sustainable agriculture economy in Fiji as a priority in its 2020 Agriculture Sector
Asia/Asian Investment Facility 2020	108,330,000.00	123,664,383.56	committed	Oda	Grant	Adaptation	Cross-cutting	The objective of AIF is to promote additional investments and key infrastructure with the priority focus on climate-change related and green investments
Asia/SWITCH-Asia - Promoting Sustainable Consumption and Production	32,800,000.00	37,442,922.37	committed	Oda	Grant	Mitigation	Cross-cutting	The overall objective of the SWITCH Asia programme is to promote sustainable growth, to contribute to poverty reduction and to climate change mitigation while decoupling economic growth from environmental degradation.
Asia/Asia Investment Facility (2020 part 1)	80,000,000.00	91,324,200.91	committed	Oda	Grant	Cross-cutting	Cross-cutting	The objective of AIF is to promote additional investments and key infrastructure with the priority focus on climate-change related and green investments
Viet Nam/Asia (Far East Asia)/EU-Viet Nam Sustainable Energy Transition Programme	142,000,000.00	162,100,456.62	committed	Oda	Grant	Mitigation	Cross-cutting	Sector Reform Performance Contract to support a more sustainable energy transition in Viet Nam
Philippines/Asia (Far East Asia)/Bangsamoro Agri-Entreprise Program	8,000,000.00	9,132,420.09	committed	Oda	Grant	Mitigation	Agriculture	Agri-business development in Bangsamoro Region
Philippines/Asia (Far East Asia)/National Capacity Programme on Copernicus satellite data analysis and applications development	10,232,200.00	11,680,593.61	committed	Oda	Grant	Adaptation	Other	The Philippines is a country highly exposed to natural disasters.The PHILs requires to advance in its current use of space technology for the monitoring and management of natural resources, land use and planning and disaster/emergency response
South Asia/Asia (South & Central Asia)/Accelerating Climate-Smart and Inclusive Infrastructure in South Asia	18,000,000.00	20,547,945.21	committed	Oda	Grant	Cross-cutting	Other	Mobilise Private Investments for new and improved infrastructure for climate resilient and low-carbon development in South Asia (Bhutan, India, Maldives, Nepal, and Sri Lanka)

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Bangladesh/Asia (South & Central Asia)/GCCA+ Support for enhancing communities' resilience to climate change and related disasters	6,877,700.00	7,851,255.71	committed	Oda	Grant	Adaptation	Other	planning/financing resilience related actions at community level mainstreaming climate change-disaster risk solutions into local governments planning/financing systems supporting policy developement in CCA-DRR.
India/Asia (South & Central Asia)/Technical Assistance for setting up the first off-shore wind-farm pilot in India	3,330.00	3,801.37	committed	Oda	Grant	Mitigation	Other	The purpose of this contract is the provision of technical assistance and advisory services to the joint-venture company formed by the Ministry of New and Renewable Energy (MNRE), Government of India, including National Institute of Wind Energy (NIWE), public sector undertakings and others, with the aim of bringing relevant EU experience and best practices in the off-shore wind sector to bridge the existing gaps and de-risk the first off-shore wind farm in India
Sri Lanka/Asia (South & Central Asia)/'Support to Integrated Rural Development in the Most Vulnerable Districts of the Central & Uva Provinces of Sri Lanka	1,720,000.00	1,963,470.32	committed	Oda	Grant	Adaptation	Other	The proposed action targets the poorest and most vulnerable communities in the districts of Monaragala, Badulla in Uva Province and Nuwara Eliya and Matale in the Central Province. The main objective "supporting the transition from early recovery or socio-economic backwardness to more sustainable development in lagging districts, or to further consolidate emerging sustainable development, in a limited number of selected districts.
Sri Lanka/Asia (South & Central Asia)/Support to the modernisation of the agricultural sector in Sri Lanka.	1,600,000.00	1,826,484.02	committed	Oda	Grant	Adaptation	Agriculture	The programme aims at supporting the Government of Sri Lanka in its efforts to modernise the agricultural sector, by promoting a more diversified, productive and resilient agriculture in selected districts.
Afghanistan/Asia (South & Central Asia)/Electrification of Badakhshan Province	16,500,000.00	18,835,616.44	committed	Oda	Grant	Mitigation	Cross-cutting	Providing access to reliable electricity in Badakhsan Province through (i) the construction of transmission lines from Tajikistan, (ii) supply and installation of substations, (iii) design and construction of distribution networks
Central Asia/Asia (South & Central Asia)/Investment Facility for Central Asia (2020)	15,000,000.00	17,123,287.67	committed	Oda	Grant	Adaptation	Cross-cutting	IFCA promotes investments in key infrastructures in Central Asia. IFCA currently targets the sectors energy, environment, SME development and social services.
Central Asia/Asia (South & Central Asia)/EU Support to Sustainable Energy Connectivity in Central Asia	3,200,000.00	3,652,968.04	committed	Oda	Grant	Cross-cutting	Cross-cutting	Promote a more sustainable energy mix in the Central Asia region in line with EU best practices. Specifically, the programme will work through components outputs and activities that strengthen public capacity (institutional, human and regulatory, financial), raise awareness, improve data and modelling, improve the identification of bankable projects, and boost regional cooperation, eventually setting the seed for connectivity.
Central Asia/Asia (South & Central Asia)/INVESTMENT FACILITY FOR CENTRAL ASIA (IFCA) 2020	15,000,000.00	17,123,287.67	committed	Oda	Grant	Adaptation	Cross-cutting	IFCA promotes investments in key infrastructures in Central Asia. IFCA currently targets the sectors energy, environment, SME development and social services.
Georgia/Asia (South & Central Asia)/EU Resilience Facility for Georgia: Economy, Environment, Health and Migration Management (The EU Resilience Facility)	5,080,000.00	5,799,086.76	committed	Oda	Grant	Cross-cutting	Cross-cutting	The overall objective of the action is to support Georgia to mitigate the impact of the COVID-19 outbreak and to ensure the continuous implementation of EU related commitments, notably the AA/DCFTA (focus on environment, healthcare and VLAP).
Armenia/Asia (South & Central Asia)/Local Authorities 2019 Programme - Armenia	1,657,124.00	1,891,694.06	committed	Oda	Grant	Adaptation	Cross-cutting	CSO-LA Thematic Programme - AAP 2019 Local Authorities
West Bank and Gaza Strip/Asia (Middle East Asia)/Rehabilitation of Brackish Desalination Plants in Gaza	104	118.72	committed	Oda	Grant	Cross-cutting	Water And Sanitation	Water quality monitoring from source to consumption is an integrated part of current Oxfam's water supply activities through vouchers implemented under previous and current Oxfam projects funded by ECHO in Gaza. This action builds on OXFAM's experience and capitalizes on previous/current projects both public and private through: The rehabilitation and upgrading of an estimated 16 public and 30 private desalination plant. Public hygiene promotion and awareness activities.
West Bank and Gaza Strip/Asia (Middle East Asia)/Access to self-sufficient water services	10,240,000.00	11,689,497.72	committed	Oda	Grant	Adaptation	Water And Sanitation	This Action intends to operationalize its objective of supporting the PA to provide sufficient, equitable, affordable and sustainable access to safe water services for all
West Bank and Gaza Strip/Asia (Middle East Asia)/Support productive investments in Palestine	9,120,000.00	10,410,958.90	committed	Oda	Grant	Adaptation	Cross-cutting	Pillar V/ EJS: Expected outcomes relate to enhancing the economic resilience, employment and income generation for its citizens. Further contributing to the Palestinian institutional contiguity and territorial interconnectivity.
Iraq/Asia (Middle East Asia)/2020 Special Measures for Iraq Part 1	21,264,560.00	24,274,611.87	committed	Oda	Grant	Adaptation	Cross-cutting	Support to Governance and job creation
Iraq/Asia (Middle East Asia)/Special Measure for the 2020 DCI contribution to the EU Trust Fund Madad	10,000,000.00	11,415,525.11	committed	Oda	Grant	Cross-cutting	Other	Contribution to the EU Trust Fund in Response to the Syrian Crisis (Madad Fund) - Iraq
America/Regional EnvironmentClimate Change programme in Latin America	24,000,000.00	27,397,260.27	committed	Oda	Grant	Cross-cutting	Other	The general objective of the programme is to contribute to environmentally sustainable and more climate-resilient development of Latin America, particularly where it affects living conditions of the most vulnerable populations. The programme does this through promoting policy dialogue as well as through technical and financial support to the development and implementation of climate change adaptation and mitigation policies in the Latin America region.
America/Support measures 2019-2020	400,000.00	456,621.00	committed	Oda	Grant	Cross-cutting	Other	Support measures 2019-2020
America/Latin American Investment Facility 2014 - LAIF	24,636,416.00	28,123,762.56	committed	Oda	Grant	Cross-cutting	Cross-cutting	LAIF aims at promoting additional investment and key infrastructure in transport, energy & environment. It supports social and private sector development in the LA region through different financial instruments integrated in an Investment Facility
America (South America)/EU- LA Alliance for Sustainable Growth and Jobs	13,200,000.00	15,068,493.15	committed	Oda	Grant	Cross-cutting	Cross-cutting	The overall objective of the programme is to promote Sustainable Growth and Jobs creation supporting the transition towards a low-carbon, resource-efficient and a more circular economy in Latin America.

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Paraguay/America (South America)/Agenda 2030 Facility	1,336,000.00	1,525,114.16	committed	Oda	Grant	Cross-cutting	Cross-cutting	Proyectos para facilitar la implementacion en Paraguay de los ODS
Ecuador/America (South America)/Apoyo a la Economia Circular en Ecuador	920,000.00	1,050,228.31	committed	Oda	Grant	Mitigation	Other	Apoyo al gobierno del Ecuador para desarrollar politicas publicas en favor de la economia circular y de la protección del medio-ambiente en el país.
Colombia/America (South America)/Sector Reform Performance Contract (SRPC) for an Inclusive, Green and Competitive Economy in Colombia (IGCE)	4,000,000.00	4,566,210.05	committed	Oda	Grant	Mitigation	Industry	The SRC's aim is to support the national policy to improve productivity, quality and formalization of MSMEs, while transitioning towards a more resource-efficient and low-carbon economy.
Bolivia/America (South America)/Apoyo a la Estrategia Nacional de Desarrollo Integral Sostenible con Coca 2020 - 2024	8,000,000.00	9,132,420.09	committed	Oda	Grant	Adaptation	Cross-cutting	Apoyo a la politica sectorial de la nueva ENDISC enmarcada por la nueva Ley 906 ley general de la Coca
Nicaragua/America (North & Central America)/Climate Resilience of Rural Households in the Dry Corridor	13,000,000.00	14,840,182.65	committed	Oda	Grant	Adaptation	Cross-cutting	This action aims to enhance the adaptive capacities of regional and local actors in response to droughts and other climate risks as well as their impact on food security. It proposes to do so by improving smallholder farmers' access to information required for climate adaptation and implementing climate-smart agriculture technologies.
Jamaica/America (North & Central America)/A Jamaican Path from Hills to Oceans	4,900,000.00	5,593,607.31	committed	Oda	Grant	Adaptation	Other	Part of the EU action for sustainable landscape management initiative, CRIS number: ENV/2019/041-788
Belize/America (North & Central America)/11th EDF Belize (CSP focal sector Health)	154,616.00	176,502.28	committed	Oda	Grant	Adaptation	Other	The Health Support Programme focus on refurbishing health facilities to become storm resilient and energy efficient, upgrading the Health Information System and restructuring the management structure and service delivery
Haiti/America (North & Central America)/URBAYITI Governance et résilience urbaines	16,000,000.00	18,264,840.18	committed	Oda	Grant	Adaptation	Other	Contribuer au développement économique et social dHaïti et à la résilience des populations à travers l'amélioration de la gestion et de la qualité de vie des villes
Haiti/America (North & Central America)/Programme Multisectoriel SAN en Haïti - 11ème FED	11,000,000.00	12,557,077.63	committed	Oda	Grant	Adaptation	Other	Programme multisectoriel de Sécurité Alimentaire et Nutritionnelle visant les populations les plus vulnérables.
Haiti/America (North & Central America)/ASIST (Appui au Secteur des Infrastructures et des Services de Transports)	17,272,000.00	19,716,894.98	committed	Oda	Grant	Adaptation	Transport	Réalisations des travaux de la RN3 de St-Raphael à Barrière-Battant.
Haiti/America (North & Central America)/PROGRAMME MULTISECTORIEL DE SECURITE ALIMENTAIRE ET NUTRITIONNELLE (Phase 2)	14,840,000.00	16,940,639.27	committed	Oda	Grant	Adaptation	Cross-cutting	Il s'agit de la seconde phase d'un appui au gouvernement haïtien pour la mise en oeuvre opérationnelle de la politique multisectorielle de sécurité alimentaire et nutritionnelle et d'activités spécifiques au bénéfice de la population
Africa/Strengthening pan-African interconnectivity through blending	12,000,000.00	13,698,630.14	committed	Oda	Grant	Adaptation	Cross-cutting	The main purpose is to contribute to poverty reduction by promoting investments, job creation and income generation through MSMEs and microfinance institutions support and key infrastructures.
Africa/Preserving threatened species, their habitats and the people depending on them – Building on the experience and success of SOS-Save Our Species	1,416,676.00	1,617,210.05	committed	Oda	Grant	Cross-cutting	Other	This action will develop field activities for protecting endangered species, their habitat and the people depending on them.
Africa/Global Monitoring for Environment and Security & Africa - 2 (GMES-2)	25,000,000.00	28,538,812.79	committed	Oda	Grant	Adaptation	Other	The action aims at supporting African organisations, policy-makers and practitioners to make more effective use of Earth Observation data to develop relevant operational information services to support sustainable management of natural resources
/ Africa (South of Sahara)/Programme d'Appui à l'Intégration Régionale et à l'Investissement en Afrique Centrale (PAIRIAC)	11,982,000.00	13,678,082.19	committed	Oda	Grant	Adaptation	Cross-cutting	LObjectif Global du projet PAIRIAC est de « Soutenir la croissance et lemploi durable en Afrique Centrale grâce à une intégration régionale renforcée, à des relations transfrontières apaisées et au développement du secteur privé »
Africa (South of Sahara)/Intra-ACP Global Climate Change Alliance Plus (GCCA+)	1,000,000.00	1,141,552.51	committed	Oda	Grant	Cross-cutting	Other	GCCA + / intra-ACP
Africa (South of Sahara)/EU UHC Partnership	6,680,000.00	7,625,570.78	committed	Oda	Grant	Adaptation	Other	EU-WHO Universal Health Coverage (UHC) Partnership: Supporting policy dialogue on national health policies, strategies and plans and universal coverage - Phase IV
Africa (South of Sahara)/Horn of Africa infrastructure connectivity and regional economic integration	16,000,000.00	18,264,840.18	committed	Oda	Grant	Mitigation	Cross-cutting	Support to Pillar 1 of the Horn of Africa Initiative (regional infrastructure). Concerns Djibouti, Eritrea, Ethiopia, Kenya and Somalia
Africa (South of Sahara)/Resilience building and Disaster Response Management in the Indian Ocean	6,650,000.00	7,591,324.20	committed	Oda	Grant	Adaptation	Other	The objective ofthe programme is to contribute to the sustainable development of the Island States of the Indian Ocean region, by strengthening their capacity for adaptation and building their resilience to diasaters.
Africa (South of Sahara)/Improved regional fisheries governance in Western Africa (PESCAO)	630,800.00	720,091.32	committed	Oda	Grant	Adaptation	Other	Support WA States in reinforcing the fishing sector (resilience), fighting Unregulated, Unreported and Illegal fishing, and implementing measures of protection of fish stocks
Africa (South of Sahara)/Programme relatif à la biodiversité et au changement climatique en Afrique de l'Ouest	800,000.00	913,242.01	committed	Oda	Grant	Cross-cutting	Other	Sous-secteur 3.2 RESSOURCES NATURELLES du DOMAINE PRIORITAIRE 3 du PIR 11e FED Afrique de l'Ouest 2014-2020, dont l'objectif est La protection de l'environnement, de la biodiversité et la lutte contre le changement climatique.
Africa (South of Sahara)/Reversing Land Degradation in Africa through Scaling-up EverGreen Agriculture	1,254,444.00	1,432,013.70	committed	Oda	Grant	Adaptation	Cross-cutting	To improve livelihoods, food security and resilience to climate change and restore ecosystem services through expanding the area under sustainable land management, particularly agriculture, and enhancing the ability to address land degradation.
Zambia/Africa (South of Sahara)/Kariba Dam Rehabilitation Project	4,400,000.00	5,022,831.05	committed	Oda	Grant	Mitigation	Other	Kariba Dam Rehabilitation - Plunge pool
Togo/Africa (South of Sahara)/Programme d'Extension de Réseaux Electriques dans les Centres Urbains du Togo (PERECUT)	6,000,000.00	6,849,315.07	committed	Oda	Grant	Mitigation	Other	Le projet permettra de restructurer, consolider et étendre le réseau de distribution publique afin de fiabiliser, et sécuriser la fourniture électrique et d'améliorer la couverture électrique dans les villes secondaires

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Tanzania/Africa (South of Sahara)/Integrated Approach to Sustainable Cooking Solutions	30,000,000.00	34,246,575.34	committed	Oda	Grant	Mitigation	Cross-cutting	Charcoal is a primary source of energy for cooking in Tanzania with 60.5% of urban households using it. Unsustainable production and utilization of charcoal result in wide-spread environmental damages and is a key driver of forest degradation and partly contributing to deforestation. Increased demand for charcoal is driven by rapid urbanisation and high relative prices, scarcity or unavailability of alternative fuels. Regardless of previous interventions to address cooking challenges, including
Tanzania/Africa (South of Sahara)/Tanzania Energy Sector Reform Programme	35,000,000.00	39,954,337.90	committed	Oda	Grant	Mitigation	Cross-cutting	To enhance the sustainable development of Tanzania's energy sector.
Tanzania/Africa (South of Sahara)/Beekeeping Value Chain Support	4,000,000.00	4,566,210.05	committed	Oda	Grant	Mitigation	Cross-cutting	The overall objective is to support the enhancement of the beekeeping industry's contribution to inclusive economic growth in Tanzania. The specific objective is to ensure that high quality honey produced in an environmentally sustainable manner leads to increased market penetration.
Tanzania/Africa (South of Sahara)/Support to Rural Electrification Programme	6,000,000.00	6,849,315.07	committed	Oda	Grant	Mitigation	Other	The specific objective of the action is to improve access to reliable electricity in rural areas through the extension of the national grid. The action will contribute to the implementation of rural electrification programme of the Government of Tanzania and REA with a focus on the Turnkey III program for rural electrification 2016-2020 targeting settlements which are within 10 km of the 33-kV MV network which exist at the end of 2015.
Eswatini/Africa (South of Sahara)/Water Harvesting, Small and Medium Earth Dams Project (WHDP)	118,324.00	135,073.06	committed	Oda	Grant	Adaptation	Agriculture	Rehabilitation and construction of water harvesting infrastructures, small and medium size dams and downstream development schemes roof water harvesting development of production and water user groups
Djibouti/Africa (South of Sahara)/Production Eau Potable par dessalement et Énergie Renouvelable (PEPER) - composante	5,000,000.00	5,707,762.56	committed	Oda	Grant	Adaptation	Water And Sanitation	L'objectif de l'intervention est d'augmenter la couverture et production dèau potable de la ville de Djibouti à un coût non rédhibitoire, par la réalisation d'une usine de dessalement en mobilisant des énergies à faible coût
Sierra Leone/Africa (South of Sahara)/Jobs and Growth Programme	2,080,000.00	2,374,429.22	committed	Oda	Grant	Adaptation	Cross-cutting	The Action addresses the investment-education-employment problem nexus through support aiming to (1) improve the investment climate, (2) upgrade the human capital (general education and TVET) and (3) create jobs for a low qualified work force.
Sao Tome and Principe/Africa (South of Sahara)/Appui aux filieres agricoles a Sao Tome et Principe	2,400,000.00	2,739,726.03	committed	Oda	Grant	Adaptation	Agriculture	Developpement des filieres agricoles pour ameliorer la balance des paiement en augmentant les revenus d'exportation et en reduisant les importations des denree agricoles
Rwanda/Africa (South of Sahara)/Sector Reform Contract to enhance the agriculture sector's sustainable use of land and water resources, value creation and contribution to nutrition s	12,400,000.00	14,155,251.14	committed	Oda	Grant	Adaptation	Agriculture	The overall objective of the SRC is to unlock the potential of Rwanda's agricultural and horticultural sector for sustainable and inclusive pro-poor growth, nutrition- and food security. The specific objective is to support inclusive agricultural and horticultural value chain development, from seed to retail, with an emphasis on non-traditional high-value value chains.
Rwanda/Africa (South of Sahara)/Technical Cooperation Facility VI	320,000.00	365,296.80	committed	Oda	Grant	Cross-cutting	Other	Technical Cooperation Facility for Zambia
Zimbabwe/Africa (South of Sahara)/Support to vulnerable people in Zimbabwe	5,000,000.00	5,707,762.56	committed	Oda	Grant	Adaptation	Cross-cutting	Through a multi sector approach, the Action will contribute to sustain the food assistance pipeline, livelihood recovery and wash sectors
Nigeria/Africa (South of Sahara)/EU Support to the Energy Sector in Nigeria - Phase 1	15,000,000.00	17,123,287.67	committed	Oda	Grant	Mitigation	Other	First phase of 11 EDF support to the energy sector in Nigeria
Mozambique/Africa (South of Sahara)/Sustainable Investments and Jobs for Mozambique	99,000,000.00	113,013,698.63	committed	Oda	Grant	Mitigation	Cross-cutting	Activities to be implemented in Mozambique under the new EIP instrument
Mozambique/Africa (South of Sahara)/Support to the consolidation of peace in Mozambique - Phase 1: local governance and early economic recovery	10,000,000.00	11,415,525.11	committed	Oda	Grant	Adaptation	Cross-cutting	Support to livelihoods in conflict-affected areas and to the implementation of the decentralisation process
Mozambique/Africa (South of Sahara)/PROMOVE Energia	83,500,000.00	95,319,634.70	committed	Oda	Grant	Mitigation	Cross-cutting	Programme aiming to support several investment projects in order to increase access to sustainable, modern, clean and affordable energy services in Mozambique, with a special focus in Nampula and Zambezia provinces
Mauritius/Africa (South of Sahara)/Mauritius from Ridge to Reef	4,000,000.00	4,566,210.05	committed	Oda	Grant	Mitigation	Cross-cutting	Part of the EU action for sustainable landscape management initiative, CRIS number: ENV/2019/041-788
Mauritius/Africa (South of Sahara)/Reinforcing Health Systems in Mauritius -REHSIMUS	3,160,000.00	3,607,305.94	committed	Oda	Grant	Adaptation	Other	Sector Reform Performance Contract in the Health sector in response to COVID crisi
Malawi/Africa (South of Sahara)/Increasing Resilience through Support to the Malawi National Social Support Programme	23,000,000.00	26,255,707.76	committed	Oda	Grant	Adaptation	Other	Reducing poverty by increasing the resilience of vulnerable households.
Malawi/Africa (South of Sahara)/Improving Secondary Education in Malawi (ISEM) II	22,000,000.00	25,114,155.25	committed	Oda	Grant	Adaptation	Cross-cutting	The programme will continue to support the secondary education Sub-sector, increasing equitable access and improving the quality and relevance of the education for improved learning outcomes.
Malawi/Africa (South of Sahara)/Afikepo (let them, the children, develop to their full potential) Nutrition programme in Malawi	6,400,000.00	7,305,936.07	committed	Oda	Grant	Adaptation	Other	EU support to promotion of nutrition in Malawi. Overall objective is to 'enhance nutrition security in Malawi' through increased and diversified dietary intake, nutrition education, good governance for optimal nutrition optimal nutrition for women of child bearing age, adolescent girls, infants and young children
Madagascar/Africa (South of Sahara)/Facilité de Coopération Technique	320,000.00	365,296.80	committed	Oda	Grant	Adaptation	Other	La TCF vise à doter la délégation des moyens nécessaires pour réaliser des études d'identification et formulation, ainsi que des actions d'appui et de suivi et évaluation des programmes en cours.
Lesotho/Africa (South of Sahara)/Lesotho Regional Economic Growth Job Creation EPA implementation Support Programme	2,400,000.00	2,739,726.03	committed	Oda	Grant	Cross-cutting	Cross-cutting	Lesotho's EUR 6 M share of Regional Indicative Programme

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Kenya/Africa (South of Sahara)/Tackling Desert Locust Crisis in East Africa - 2	6,000,000.00	6,849,315.07	committed	Oda	Grant	Adaptation	Other	The main objective of the intervention is to curb the spread of locusts, and reduce the potentially dramatic negative impact of the pest in Eastern African reagion.
Kenya/Africa (South of Sahara)/Contribution to the Africa Investment Platform in support of the Energy Sector in Kenya through Last Mile Electrification	23,000,000.00	26,255,707.76	committed	Oda	Grant	Mitigation	Other	Electricity grid extension to provide 200,000+ households with reliable and affordable energy.
Guinea/Africa (South of Sahara)/Programme dAssainissement Urbain en Guinée - phase II (SANITA II)	33,000,000.00	37,671,232.88	committed	Oda	Grant	Adaptation	Water And Sanitation	SANITA II vise à capitaliser sur les résultats de SANITA I. Il est composé de deux composantes : « Villes propres II », qui étendra Villes propres I à Coyah, Dubréka et Manéah et « CET » pour la construction dùn centre dènfouissement technique.
Ethiopia/Africa (South of Sahara)/Support to Early Recovery and Socio-Economic Stability of the drought affected population in Ethiopia	2,740.00	3,127.85	committed	Oda	Grant	Adaptation	Other	The project aims to to foster social and economic stability and recovery of drought affected communities in Afar and the Sitti Zone of Somali region, and specifically aims to reduce the vulnerability of pastoralist and agro-pastoralist communities to external shocks whilst increasing their productivity and income generating capacity
Ethiopia/Africa (South of Sahara)/Regional Connectivity and Competitiveness	40,000,000.00	45,662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	The action contributes to the country's reforms to foster regional economic integration and competitiveness
Benin/Africa (South of Sahara)/Projet d'appui à la mise en oeuvre de la coopération Bénin-Union européenne	1,840,000.00	2,100,456.62	committed	Oda	Grant	Adaptation	Other	L'objectif spécifique est de renforcer l'efficacité et la qualité de la conception, de la mise en œuvre et de la visibilité des actions en faveur du développement appuyées par l'UE au Bénin.
Democratic Republic of the Congo/Africa (South of Sahara)/Action de résilience pour la sécurité alimentaire et nutritionnelle en République démocratique du Congo	4,000,000.00	4,566,210.05	committed	Oda	Grant	Adaptation	Cross-cutting	ENV B - L'objectif général de l'Action est d'améliorer la sécurité alimentaire et nutritionnelle des populations en RDC, et en particulier des ménages les plus pauvres, des femmes et des enfants.
Democratic Republic of the Congo/Africa (South of Sahara)/Environnement et agriculture durable pour sauvegarder de sites biologiques prioritaires de la RDC	8,000,000.00	9,132,420.09	committed	Oda	Grant	Cross-cutting	Other	Le but de l'Action est de contribuer à la protection et à la valorisationdurable du capital environnemental unique des 5 aires protégées prioritaires de la RDC tout en augmentant les retombées économiques positives pour la population qui en depends.
Comoros/Africa (South of Sahara)/Programme d'Appui à la Production, à l'Industrialisation et au Libre-Echange aux Comores (APILE-Comores)	2,400,000.00	2,739,726.03	committed	Oda	Grant	Adaptation	Cross-cutting	Programme d'appui à la mise en oeuvre de l'Accord de Partenariat Economique (APE) aux Comores
Chad/Africa (South of Sahara)/Sécurité alimentaire et nutritionnelle (SAN)	400,000.00	456,621.00	committed	Oda	Grant	Adaptation	Other	L'objectif général de cette action est de contribuer à une réduction significative de la prévalence de la malnutrition chronique au Tchad tout en soutenant la transition des approches urgentistes vers une approche institutionnalisée, intersectorielle
Central African Republic/Africa (South of Sahara)/Résilience rurale et création d'emplois: transfert 2019 en faveur du Fonds Fiduciaire Bêkou de l'Union européenne pour la République centrafricaine	10,400,000.00	11,872,146.12	committed	Oda	Grant	Adaptation	Cross-cutting	Résilience rurale et création d'emplois: transfert 2019 en faveur du Fonds Fiduciaire Bêkou de l'Union européenne pour la République centrafricaine
Cameroon/Africa (South of Sahara)/Contrat de réforme sectorielle -Développement Rural	800,000.00	913,242.01	committed	Oda	Grant	Adaptation	Agriculture	L'objectif global de l'appui sectoriel est dàider le gouvernement du Cameroun à promouvoir une croissance durable et inclusive favorable aux populations vulnérables et à consolider la gouvernance démocratique, économique et administrative.
Cameroon/Africa (South of Sahara)/Contribution à la Plateforme d'investissement pour l'Afrique (AIP) en faveur du secteur industriel du septentrion camerounais	4,000,000.00	4,566,210.05	committed	Oda	Grant	Adaptation	Cross-cutting	Financement de projets visant l'augmentation de la production industrielle dans les 3 regions septentrionales du Cameroun
Burundi/Africa (South of Sahara)/Complétion des travaux de réhabilitation de l'axe transfrontalier RN 4 entre le Burundi et la RDC	100,000.00	114,155.25	committed	Oda	Grant	Adaptation	Transport	Finalisation des travaux de réhabilitation de la RN 4 Bujumbura-Frontière RDC
Burundi/Africa (South of Sahara)/Soutien à l'entrepreneuriat du secteur agricole (SESA)	7,068,000.00	8,068,493.15	committed	Oda	Grant	Cross-cutting	Cross-cutting	Développement de l'entreprenariat rural et des filière agricole
South Africa/Africa (South of Sahara)/EU-South Africa Dialogue Facility	800,000.00	913,242.01	committed	Oda	Grant	Cross-cutting	Other	The at strengthening relations between the European Union and the South African Government. It is designed to encourage and respond to requests, mainly from South African Departments of the Government, for policy dialogue on various areas included in the Trade, Development Cooperation Agreement (TDCA) and the South Africa-European Union Joint Action Plan adopted to implement the Strategic Partnership signed in 2007.
South Africa/Africa (South of Sahara)/Support Programme to the National System of Innovation	600,000.00	684,931.51	committed	Oda	Grant	Mitigation	Other	Support to the National System of Innovation lead by DST
South Africa/Africa (South of Sahara)/Technical Assistance Facility to support sustainable infrastructure development in South Africa	3,600,000.00	4,109,589.04	committed	Oda	Grant	Cross-cutting	Cross-cutting	The overall objective of this action is to support the Government of South Africa (GoSA) to promote inclusive and sustainable development and achieving the SDGs. The specific objective of the facility is to improve policy and regulatory environment and institutional framework for stimulation of innovative technical and financing models for sustainable infrastructure development within all three spheres of government -national, provincial and local.
Egypt/Africa (North of Sahara)/EU4 ENERGY & WATER (Top UP - AAP 2020)	4,000,000.00	4,566,210.05	committed	Oda	Grant	Adaptation	Other	The General objective of the action is to support the stabilization of Egypt through enhancing water and energy security. The specific objective is to improve the sustainable management of these resources through enhancing operational efficiencies.

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Egypt/Africa (North of Sahara)/EU joint support to Inclusive Urban Development in Egypt	9,200,000.00	10,502,283.11	committed	Oda	Grant	Adaptation	Cross-cutting	Improving living conditions of the residents of the less advantaged areas in Giza, Mansoura, and Port Said through integrated urban development approaches
Egypt/Africa (North of Sahara)/EU GREEN-EU Support for Growth through Egyptian Environmental Networks	14,000,000.00	15,981,735.16	committed	Oda	Grant	Cross-cutting	Cross-cutting	The Action will build the capacity of the Ministry of Environment to improve the strategic and legislative framework and its effective implementation. It will also support NGOs and Green entrepreneurs.
Egypt/Africa (North of Sahara)/EU ZIRA3A - Integrated Rural Development Programme for Egypt	9,600,000.00	10,958,904.11	committed	Oda	Grant	Cross-cutting	Cross-cutting	Improving the living conditions and revenues of the smallholder famers and their communities in the governorates of Sohag, Asyut and Damietta, through a sustainable and integrated approach to rural development.
Tunisia/Africa (North of Sahara)/2014-2020 Italy-Tunisia Cross-border cooperation	3,030,300.00	3,459,246.58	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Tunisia/Africa (North of Sahara)/Appui au Développement Rural en Tunisie	8,000,000.00	9,132,420.09	committed	Oda	Grant	Adaptation	Other	Soutenir la croissance économique, la compétitivité et l'emploi décent à travers le développement durable de l'agriculture
Algeria/Africa (North of Sahara)/Economie bleue - Pêche et aquaculture	8,800,000.00	10,045,662.10	committed	Oda	Grant	Adaptation	Cross-cutting	Contribution accrue de l'économie bleue -et notamment de la pêche/aquaculture -à la diversification de l'économie nationale.
Moldova/Europe/2014-2020 Romania-Moldova Cross-border cooperation	7,358,890.00	8,400,559.36	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Moldova/Europe/EU4Moldova: Local communities	6,400,000.00	7,305,936.07	committed	Oda	Grant	Adaptation	Other	The overall objective of the programme is to improve quality of life and economic performance of rural areas in the Republic of Moldova
Moldova/Europe/Local Authorities 2019 Programme - Moldova	2,986,076.00	3,408,762.56	committed	Oda	Grant	Adaptation	Other	CSO-LA Thematic Programme - AAP 2019 Local Authorities
Europe/2014-2020 Poland-Belarus-Ukraine Cross-border cooperation	15,971,450.00	18,232,248.86	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Europe/ EU Support to transport and energy connectivity projects 2019-2020	688,000.00	785,388.13	committed	Oda	Grant	Mitigation	Cross-cutting	Multi-country Programme for Connectivity 2019-2020 - allocation 2020
Europe/2014-2020 Balkan-Mediterranean transnational cooperation programme	1,022,290.00	1,166,997.72	committed	Oda	Grant	Cross-cutting	Other	Increasing territorial competitiveness and protecting the environment
Europe/2014-2020 Adriacti-Ionian transnational cooperation programme	3,128,780.00	3,571,666.67	committed	Oda	Grant	Cross-cutting	Other	Policy driver and governance innovator fostering European integration among Partner States, taking advantage of the rich natural, cultural and human resources surrounding the Adriatic and Ionian Seas and enhancing economic, social and territorial cohesion
Europe/2014-2020 Danube transnational cooperation programme	3,954,470.00	4,514,235.16	committed	Oda	Grant	Cross-cutting	Other	Supporting policy integration in the area within a range of fields linked to the priorities of the EU Strategy for the Danube Region (EUSDR).
Europe/CBC 2018-2020 Action Programme BiH-Montenegro (Allocation 2020)	432,000.00	493,150.68	committed	Oda	Grant	Cross-cutting	Other	Cross border Cooperation Action Programme Bosnia and Herzegovina -Montenegro for the years 2018-2020 (allocation 2020)
Europe/Contribution of the European Union to the budget of the Energy Community. This contribution stems from an international treaty	1,824,352.00	2,082,593.61	committed	Oda	Grant	Mitigation	Other	Develop a legislative framework based on EU Acquis in the areas of energy, environment and competition in the Balkans, allowing the creation of a regional energy market.
Europe/CBC Action Programme Montenegro-Albania 2018-2020 (Allocation 2020)	612,000.00	698,630.14	committed	Oda	Grant	Cross-cutting	Other	Cross-Border Cooperation Action Programme Montenegro-Albania 2018-2020 (Allocation 2020)
Europe/Neighbourhood Investment Platform (NIP) 2020 - East share	79,028,000.00	90,214,611.87	committed	Oda	Grant	Cross-cutting	Cross-cutting	The NIP's main purppose is to promote additional investments in key infrastructures sectors, such as transport, energy, water and environment, and to support social and private sector development in Partner countries
Europe/2018-2020 CBC Action Programme between the Republic of Albania and Kosovo (Allocation 2020)	432,000.00	493,150.68	committed	Oda	Grant	Cross-cutting	Other	2018-2020 CBC Action Programme between the Republic of Albania and Kosovo (Allocation 2020)
Europe/Special Measure on EU regional support to COVID-19 SME recovery in the Western Balkans in 2020 under IPA II	38,000,000.00	43,378,995.43	committed	Oda	Grant	Mitigation	Cross-cutting	Special Measure on EU regional support to COVID-19 SME recovery in the Western Balkans in 2020 under IPA II
Europe/EU4Connectivity: Support to Technical Assistance under the Western Balkans Investment Framework (IPF, EWBJF and IFICO) and JASPERS support to IPA II b	27,000,000.00	30,821,917.81	committed	Oda	Grant	Cross-cutting	Cross-cutting	Multi-country Annual Action Programme 2020 - part 1
Europe/CBC 2018-2020 Action Programme Serbia-the former Yugoslav Republic of Macedonia (allocation 2020)	252,000.00	287,671.23	committed	Oda	Grant	Cross-cutting	Other	CBC 2018-2020 Action Programme Serbia-the former Yugoslav Republic of Macedonia (allocation 2020)
Europe/EU4 Green Recovery	4,000,000.00	4,566,210.05	committed	Oda	Grant	Cross-cutting	Cross-cutting	Multi-country Action Programme for the year 2020 -part 2 under the Instrument for Pre-accession Assistance (IPA II)
Europe/EU support to transport and energy connectivity projects in the Western Balkans 2020	54,400,000.00	62,100,456.62	committed	Oda	Grant	Mitigation	Cross-cutting	Multi-country Action Programme for Connectivity for the year 2020
Europe/ EU4Youth Phase 3	6,480,000.00	7,397,260.27	committed	Oda	Grant	Mitigation	Cross-cutting	The proposed action comprises the following four components: 1.A next generation grants scheme on youth employment and entrepreneurship, with a focus on green and digital skills, 2.Developing and/or implementing active labour market policies through adopting suitable elements from the EU Youth Guarantee, 3.Scholarships for students from the EaP countries to study at the College of Europe, and 4. Support for EU4Youth horizontal coordination.
Europe/European Union for Environment: Water Resources and Environmental Data	12,000,000.00	13,698,630.14	committed	Oda	Grant	Adaptation	Cross-cutting	The programme will focus on: accounting of natural assets and their preservation through environmental assessments, as well as sound management of water assets as a critical element for economic and environmental resilience in the partner countries.

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Europe/Covenant of Mayors for Eastern Partnership Phase III	6,000,000.00	6,849,315.07	committed	Oda	Grant	Mitigation	Cross-cutting	This programme is the third phase of the successful Covenant of Mayors East Programmes (Covenant of Mayors -East programme (2010-2015) and (2016-2020). The EU has provided substantial support to local authorities in the Eastern Partnership (EaP) reg
States Ex-Yugoslavia unspecified/Europe/2014-2020 Italy - Albania - Montenegro Cross-border cooperation	7,857,550.00	8,969,805.94	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
States Ex-Yugoslavia unspecified/Europe/2014-2020 Croatia-Bosnia and Herzegovina - Montenegro Cross-border cooperation	5,699,150.00	6,505,879.00	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Belarus/Europe/2014-2020 Latvia-Lithuania-Belarus Cross-border cooperation	6,722,940.00	7,674,589.04	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Ukraine/Europe/2014-2020 Hungary-Slovakia-Romania-Ukraine Cross-border cooperation	6,718,580.00	7,669,611.87	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Ukraine/Europe/2014-2020 Romania-Ukraine Cross-border cooperation	5,451,030.00	6,222,636.99	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Ukraine/Europe/Climate package for a sustainable economy: (CASE) in Ukraine	10,000,000.00	11,415,525.11	committed	Oda	Grant	Mitigation	Cross-cutting	The Action will contribute to the development and implementation of policies supporting the transition to climate neutral, clean, resource efficient energy supply and consumption, circular economy and containment of GHG emissions
Albania/Europe/2014-2020 Lithuania-Russia Cross-border cooperation	1,727,540.00	1,972,077.63	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Albania/Europe/2014-2020 Kolartic Cross-border cooperation	2,245,650.00	2,563,527.40	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Albania/Europe/2014-2020 Latvia-Russia Cross-border cooperation	1,442,250.00	1,646,404.11	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Albania/Europe/2014-2020 Karelia Cross-border cooperation	1,953,380.00	2,229,885.84	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Albania/Europe/2014-2020 Finland-Russia Cross-border cooperation	3,283,950.00	3,748,801.37	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Albania/Europe/2014-2020 Poland-Russia Cross-border cooperation	4,413,890.00	5,038,687.21	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Albania/Europe/2014-2020 Estonia-Russia Cross-border cooperation	1,526,970.00	1,743,116.44	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Albania/Europe/2014-2020 Greece - Albania Cross-border cooperation	4,796,100.00	5,475,000.00	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Albania/Europe/Rural development programme	6,400,000.00	7,305,936.07	committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
North Macedonia/Europe/2014-2020 Greece - former Yugoslav Republic of Macedonia Cross-border cooperation	3,853,870.00	4,399,394.98	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
North Macedonia/Europe/2014-2020 Bulgaria - former Yugoslav Republic of Macedonia Cross-border cooperation	1,649,500.00	1,882,990.87	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
North Macedonia/Europe/Rural development programme	6,000,000.00	6,849,315.07	committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
Montenegro/Europe/Rural development programme	3,200,000.00	3,652,968.04	committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
Bosnia and Herzegovina/Europe/EU4 Environment	6,800,000.00	7,762,557.08	committed	Oda	Grant	Mitigation	Cross-cutting	Annual Action Programme for Bosnia and Herzegovina 2020 - Objective 2: Support for economic, social and territorial development and related progressive alignment with the Union acquis
Serbia/Europe/2014-2020 Bulgaria - Serbia Cross-border cooperation	2,890,380.00	3,299,520.55	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Serbia/Europe/2014-2020 Croatia-Serbia Cross-border cooperation	3,419,490.00	3,903,527.40	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Serbia/Europe/2014-2020 Hungary-Serbia Cross-border cooperation	6,493,730.00	7,412,933.79	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Serbia/Europe/2014-2020 Romania-Serbia Cross-border cooperation	7,469,150.00	8,526,426.94	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance
Serbia/Europe/Rural development programme	18,000,000.00	20,547,945.21	committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
Serbia/Europe/EU for Environment and Climate Action	18,222,000.00	20,801,369.86	committed	Oda	Grant	Cross-cutting	Other	Part II of Annual Action Programme for the Republic of Serbia for the year 2020 - objectiv
Serbia/Europe/Serbia window of the Regional Energy Efficiency Programme for the Western Balkans (REEP Serbia)	3,600,000.00	4,109,589.04	committed	Oda	Grant	Mitigation	Other	Part II of Annual Action Programme for the Republic of Serbia for the year 2020 - objectiv
Serbia/Europe/Civil Society Facility and Media Serbia	1,000,000.00	1,141,552.51	committed	Oda	Grant	Mitigation	Cross-cutting	Civil Society Facility and Media Programme 2020 in Western Balkans and Turkey
Kosovo/Europe/EU4 Environment, Climate Action and Energy	13,440,000.00	15,342,465.75	committed	Oda	Grant	Mitigation	Cross-cutting	Annual Programme for Kosovo 2020 - objective 2
Turkey/Europe/2014-2020 Bulgaria - Turkey Cross-border cooperation	2,512,420.00	2,868,059.36	committed	Oda	Grant	Cross-cutting	Other	Infrastructure and environment, economy, education and culture, technical assistance

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Turkey/Europe/Rural development programme	2,236.00	2,552.51	committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
Turkey/Europe/Rural development programme	28,495,652.00	32,529,283.11	committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
Turkey/Europe/Town Twinning between Turkey and the EU Phase -II (Twinning for Green Future)	4,000,000.00	4,566,210.05	committed	Oda	Grant	Mitigation	Other	Annual Action Programme for Turkey for the Year 2020 Objective 1
Turkey/Europe/Rural development programme	1,504,348.00	1,717,292.24	committed	Oda	Grant	Cross-cutting	Agriculture	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the CAP and related policies.
Europe/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
Europe/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
Europe/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
Europe/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
Africa (North of Sahara)/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
Africa (North of Sahara)/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
Africa (North of Sahara)/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
Africa (North of Sahara)/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
Africa (South of Sahara)/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
Africa (South of Sahara)/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
Africa (South of Sahara)/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
Africa (South of Sahara)/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
Africa/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.

Recipient country/ region/project/programme[b]	Total amount		Status[c, 3]	Funding source[g, 4]	Financial instrument[g, 5]	Type of support[g, h, 6]	Sector[d, g, 7]	Additional information[e]
	Climate-specific[f, 2]							
	European euro - EUR	USD						
Africa/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
Africa/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
Africa/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
West Indies/America (North & Central America)/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
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West Indies/America (North & Central America)/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
America (North & Central America)/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
America (North & Central America)/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
America (North & Central America)/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
America (North & Central America)/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
America (South America)/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
America (South America)/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
America (South America)/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
America (South America)/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
America/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
America/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
America/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
America/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
Asia (Middle East Asia)/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
Asia (Middle East Asia)/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
Asia (Middle East Asia)/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
Asia (Middle East Asia)/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
Central Asia/Asia (South & Central Asia)/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
Central Asia/Asia (South & Central Asia)/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
Central Asia/Asia (South & Central Asia)/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
Central Asia/Asia (South & Central Asia)/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
South Asia/Asia (South & Central Asia)/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
South Asia/Asia (South & Central Asia)/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
South Asia/Asia (South & Central Asia)/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
South Asia/Asia (South & Central Asia)/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
Asia (South & Central Asia)/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
/ Asia (South & Central Asia)/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
/ Asia (South & Central Asia)/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Asia (South & Central Asia)/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
Asia (Far East Asia)/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
Asia (Far East Asia)/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
Asia (Far East Asia)/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
Asia (Far East Asia)/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
Asia/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
Asia/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
Asia/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
Asia/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
Oceania/11th EDF Caribbean OCT Regional Programme - Caribbean OCTs Resilience, Sustainable Energy and Marine Biodiversity	178,000.00	203,196.35	committed	Oda	Grant	Cross-cutting	Cross-cutting	The twelve Caribbean Overseas Countries and Territories (OCTs) will under the 11th EDF regional programme focus on sustainable energy and marine biodiversity. Activities in both sub-sectors have the overall objective to contribute to the Caribbean OCTs'social, economic and environmental development. Building resilience to future changes in the Caribbean basin and striving towards a low carbon economy will contribute to sustainable economic development in the Caribbean OCTs.
Oceania/11th EDF Regional Private Sector Development Programme	98,000.00	111,872.15	committed	Oda	Grant	Mitigation	Industry	Enable greater market penetration utilising the EPA leading to increased employment creation, particularly for youth, women and indigenous groups, and overall poverty reduction in CARIFORUM.
Oceania/Support the effective and sustainable management of Solid Waste in the Caribbean	580,000.00	662,100.46	committed	Oda	Grant	Mitigation	Cross-cutting	This proposed action will support the development of an enabling environment that supports sustainable and practical strategies by the public, private sectors, and civil society for improvement in Integrated Solid Waste Management in the Caribbean region.
Oceania/Strengthening Climate Resilient Health Systems in the Caribbean	86,666.67	98,934.55	committed	Oda	Grant	Adaptation	Other	Climate Change oriented to Health Systems improvement and NDC related to the Health sector in CARIFORUM countries
America (North & Central America)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
Europe/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
Africa (North of Sahara)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
Africa (South of Sahara)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
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West Indies/America (North & Central America)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
America (North & Central America)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
America (South America)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
/ /America/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
/ Asia (Middle East Asia)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
Central Asia/Asia (South & Central Asia)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors

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	Climate-specific[f, 2]							
	European euro - EUR	USD						
South Asia/Asia (South & Central Asia)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
Asia (South & Central Asia)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
Asia (Far East Asia)/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
Asia/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors
Oceania/Support to the Comprehensive Development Plan for Central America in the framework of the Global EU response to COVID-19	180,000.00	205,479.45	committed	Oda	Grant	Adaptation	Cross-cutting	This European Union project is a contribution to the Integrated Development Plan -PDI- elaborated by the Economic Commission for Latin America -ECLAC and the Governments Mexico, El Salvador, Guatemala and Honduras. The PDI aims to support economic and social development in El Salvador, Guatemala and Honduras thus reducing migration fluxes originating from those countries. The objective of the project is to improve resilience amongst vulnerable people and their exposure to external factors

Abbreviations: ODA = official development assistance, OOF = other official flows; USD = United States dollars.

[a] Parties should fill in a separate table for each year, namely 2015 and 2016, where 2018 is the reporting year.

[b] Parties should report, to the extent possible, on details contained in this table.

[c] Parties should explain, in their biennial reports, the methodologies used to specify the funds as disbursed and committed. Parties will provide the information for as many status categories as appropriate in the following order of priority: disbursed and committed.

[d] Parties may select several applicable sectors. Parties may report sectoral distribution, as applicable, under "Other".

[e] Parties should report, as appropriate, on project details and the implementing agency.

[f] Parties should explain in their biennial reports how they define funds as being climate-specific.

[g] Please specify.

[h] This refers to funding for activities that are cross-cutting across mitigation and adaptation.

Table 8

Provision of technology development and transfer support[a,b]

Recipient country and/or region	Targeted area	Measures and activities related to technology transfer	Sector[c]	Source of the funding for technology transfer	Activities undertaken by	Status	Additional information[d]
Middle East and North Africa, Rwanda	Mitigation and Adaptation	Technical Cooperation Facility VI	Other (Government & Civil Society-	Private and Public	Private and Public	Implemented	Support to the cooperation between Government of Rwanda and EU, and to the implementation of the 11th European Development Fund (EDF) National Indicative Programme.
Albania	Mitigation and Adaptation	Rural development programme	Agriculture	Private and Public	Private and Public	Implemented	Programme designed to contribute to the sustainable adaptation of the agricultural sector and rural areas and to the country's preparation for the implementation of the acquis communautaire concerning the Common Agricultural Policy (CAP) and related policies.
Developing countries, unspecified	Adaptation	Support to ocean governance in African, Carribean and Pacific (ACP) countries	Other (General Environmental Protection)	Private and Public	Private and Public	Implemented	Support to a network of selected relevant higher education institutions to increase national capacities in biodiversity and forestry conservation with a specific window to reinforce people dependent on renewable natural resources.
Developing countries, unspecified	Adaptation	EU for Green Mediterannean (MED) III and sustainable transport	Transport	Private and Public	Private and Public	Implemented	Focussed on three complementary and interlinked lines of action: depollution of the Mediterranean and reduction of water stress, promotion of green and circular economy, and promotion of sustainable transport.
Nicaragua	Adaptation	Boosting Rural and Urban Economy in Times of Crisis and Beyond (BOOST)	Agriculture	Private and Public	Private and Public	Implemented	Mitigate the impacts of the 2018 crisis on food production and consumption in targeted areas of the country; specifically, promote sustainable agrifood systems in rural and urban areas, addressing the effects of crisis in targeted areas of Nicaragua.
Developing countries, unspecified	Mitigation and Adaptation	Development-Smart Innovation through Research in Agriculture (DeSIRA): Towards climate-relevant Agricultural and Knowledge	Agriculture	Private and Public	Private and Public	Implemented	This action is part of an initiative on Development Smart Innovation through Research in Agriculture (DeSIRA). It intends to link research and innovation with development initiatives, to boost food systems transformation in partner countries.

[a] To be reported to the extent possible.

[b] The tables should include measures and activities since the last national communication or biennial report.

[c] Parties may report sectoral disaggregation, as appropriate.

[d] Additional information may include, for example, funding for technology development and transfer provided, a short description of the measure or activity and co-financing arrangements.

Table 9

Provision of capacity-building support[a]

Recipient country/region	Targeted area	Programme or project title	Description of programme or project [b,c]
Asia, Central	Multiple Areas	Strengthening financial resilience and accelerating risk reduction in Central Asia	The main objective of this programme is to build disaster and climate resilience in Central Asia, and lay the foundations for a future disaster risk financing solution at regional level in line with the Sendai Framework. The programme will aim to embed an approach that shifts from managing disasters to managing risks and will allow investments to be risk-informed and livelihoods and growth to be sustainable.
Africa, regional	Mitigation	Capacity building for CO2 mitigation from international aviation (Phase II)	The objective is to mitigate greenhouse gas emissions from civil aviation. It will be achieved through: a) implementing State Action Plans to reduce emissions b) participating in the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).
Developing countries, unspecified	Mitigation	Policy advice, technical assistance and capacity building in support of regulatory reforms and investments in sustainable energy	Action aiming at the gradual improvement of the partner countries' capacities in the energy sector, fully integrated in pillar II of the External Investment Plan (EIP) and regional blending platforms, and also assist sector governance and improvement of the business environment.
Asia Pacific	Mitigation	11th European Development Fund (EDF) Support to Energy Efficiency in Palau	This programme will implement energy effciency in Palau, provide support to the National Authorising Officers (NAO) and build capacity of civil society.
Developing countries, unspecified	Mitigation	ACP-EU Programme to strengthen Research and Innovation capacity in ACP countries	The overall objective of the Action is to unlock the inclusive innovation potential of ACP countries and support their transition into knowledge-based economies for sustainable development and poverty reduction.
Lebanon	Mitigation	Towards a Decentralised Waste management Integrated Response (TaDWIR) - Lebanon / 2	This programme aims first and foremost at enhancing the capacity of the Beirut and the Governorate of Beirut and Mount Lebanon (BML) in waste management.
Yemen	Multiple Areas	Supporting Resilient Livelihoods and Food and Nutrition Security in Yemen	The objective of "Supporting Resilient Livelihoods and Food Security in Yemen" is to contribute to sustained improvements in food and nutrition security, reduce vulnerability and strengthened resilience capacity of crisis-affected communities in Yemen through creation of sustainable livelihoods and improve access to basic services.
Botswana	Multiple Areas	EDF 11 Botswana Dialogue Facility	Contributing to sustainable and inclusive growth, improving the quality of policy development and implementation of Botswana's key National Development Plan (NDP) priorities in the areas of economic development and diversification, and strengthening stakeholders‘ capacity.

[a] To be reported to the extent possible.

[b] Each Party included in Annex II to the Convention shall provide information, to the extent possible, on how it has provided capacity-building support that responds to the existing and emerging capacity-building needs identified by Parties not included in Annex I to the Convention in the areas of mitigation, adaptation and technology development and transfer.

[c] Additional information may be provided on, for example, the measure or activity and co-financing arrangements.

APPENDIX II: FINANCIAL SUPPORT BY THE EUROPEAN INVESTMENT BANK DURING 2019 AND 2020

This appendix provides a detailed breakdown of the climate finance by the EIB to developing countries reported in CTF Table 7(a) for 2019 and 2020.

Table 40: Climate finance committed by the EIB to developing countries (2019)

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
China	Loan	other	100,000,000	111,982,083	Mitigation	Energy	BAOTOU ENERGY EFFICIENCY	The proposed operation aims at improving energy efficiency and reducing air pollution through the replacement of inefficient coal-fired boilers by more efficient gas-fired appliances and the construction of enabling infrastructure. The location is Baotou, Inner Mongolia.
India	Loan	OOF	87,412,587	97,886,436	Mitigation	Energy	YES BANK (INDIA) CLIMATE ACTION FL	A framework loan of up to USD 200 m to part-finance renewable energy projects in India.
Egypt	Loan	other	350,000,000	391,937,290	Mitigation	Transport	CAIRO METRO LINE 1 UPGRADING AND RENOVATION	The project consists of the rehabilitation of metro line 1 of the Cairo metro network. The rehabilitation includes the upgrading of the signalling system, the telecommunications system, the electromechanical system, the centralized control system and the power supply system. Parts of the tracks will also be renewed.
Jordan	Loan	other	39,650,000	44,400,896	Cross-cutting	Water and sanitation	DEIR ALLA WATER SUPPLY AND SANITATION	Improvements to the existing water supply systems of the Deir Alla and Al Karameh districts in the Jordan Valley and provision of a first time centralized wastewater collection and treatment system for Deir Alla.
Gambia	Grant	ODA	6,543,300	7,327,324	Mitigation	Energy	GAMBIA RENEWABLE ENERGY	Implementation of an energy sector program in Gambia, including (1) up to 20 MW grid-connected PV plant, (2) grid reinforcement investments, (3) electricity sector institutional and technical support and (4) off-grid PV systems installed on up to 1100 public schools and health facilities.
Palestine	Loan	ODA	15,917,934	17,825,234	Mitigation	Energy	SCHOOL ROOFTOPS PHOTOVOLTAIC SYSTEMS	Construction of up to 450 rooftop photovoltaic systems on schools in the West Bank with a total capacity of up to 30 MWp.
Egypt	Equity	other	4,000,000	4,479,283	Mitigation	Energy	GREEN FOR GROWTH CAMENA	Participation in a debt fund targeting energy efficiency and renewable energy investments within the Southern Neighbourhood region. Operation to be realised under the Climate Action envelope of the Femip Trust Fund.

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Regional - Caribbean	Equity	ODA	3,022,562	3,384,728	Mitigation	Energy	MGM SUSTAINABLE ENERGY FUND II	Equity fund focused on energy efficiency and small size renewable energy projects in Latin America, the Caribbean and South East Asia.
Regional - Asia	Equity	ODA	1,007,521	1,128,243	Mitigation	Energy	MGM SUSTAINABLE ENERGY FUND II	Equity fund focused on energy efficiency and small size renewable energy projects in Latin America, the Caribbean and South East Asia.
Regional - Latin America	Equity	ODA	16,120,333	18,051,884	Mitigation	Enery	MGM SUSTAINABLE ENERGY FUND II	Equity fund focused on energy efficiency and small size renewable energy projects in Latin America, the Caribbean and South East Asia.
Regional - Southern Africa	Equity	ODA	6,568,676	7,355,740	Mitigation	Enery	EVOLUTION II	Equity investment into Evolution II Fund targeting renewable energy, energy efficiency and other resource efficiency projects and related corporate investments in sub-Saharan Africa.
Regional - West Africa	Equity	ODA	20,515,952	22,974,191	Mitigation	Energy	EVOLUTION II	Equity investment into Evolution II Fund targeting renewable energy, energy efficiency and other resource efficiency projects and related corporate investments in sub-Saharan Africa.
Regional - Africa	Equity	other	3,000,000	3,359,462	Mitigation	Cross-cutting	MERIDIAM INFRASTRUCTURE AFRICA FUND TOP UP	The Fund will finance primarily greenfield infrastructure projects in the energy and power, transportation, environmental infrastructure, social infrastructure and telecommunications sectors across Africa.
Lesotho	Loan	other	39,852,000	44,627,100	Adaptation	Water and sanitation	LLWDP II	The Lowlands Water Development Project (LWDP) is the second phase of the Lesotho Lowland Water Supply Scheme (LLWSS). It will include bulk water production infrastructure, distribution networks and actions on water efficiency, sanitation and capacity building. The overall LLWSS aims at improving the climate resilience and security of potable water access in the Lowlands of Lesotho. The first phase, the Metolong Dam and Water Supply Program (MDWSP), was already financed by the Bank.
Lao People's Democratic Rep.	Grant	ODA	1,550,000	1,735,722	Adaptation	Other	LAO RESILIENT RURAL ROADS	The project covers a 4-year rehabilitation programme of provincial and district roads in six provinces of Lao PDR and includes investments to increase climate resilience.

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Egypt	Loan	OOF	7,500,000	8,398,656	Mitigation	Other	NBE LOAN FOR SMES AND MIDCAPS	Loan for SMEs and MidCaps to support small and medium scale projects in Egypt
Regional - ACP	Loan	other	300,000	335,946	Mitigation	Cross-cutting	ACP SMALLHOLDER FINANCING FACILITY	The ACP Smallholder Financing Facility extends the scope of the regional ACP microfinance and SME facilities with a special focus on intermediated loans to support agricultural and commercial activities of smallholder farmers.
Cape Verde	Loan	ODA	482,900	540,761	Mitigation	Other	CAPE VERDE CONNECTIVITY PROGRAMME	The project concerns the promoter's investments in Cape Verde to increase the availability and quality of mobile and fixed high speed broadband services (based on 3G, 4G and FTTx) as well as the construction and installation of a submarine cable branch for linking Cape Verde with a Latin America to Europe submarine cable system.
Regional - ACP	Loan	other	100,000	111,982	Mitigation	Cross-cutting	ACP SMALLHOLDER FINANCING FACILITY	The ACP Smallholder Financing Facility extends the scope of the regional ACP microfinance and SME facilities with a special focus on intermediated loans to support agricultural and commercial activities of smallholder farmers.
Serbia	Loan	ODA	4,620,000	5,173,572	Mitigation	Other	PARTNERSHIP FOR LOCAL DEVELOPMENT	Revitalization of public infrastructure in the most deprived and poorest municipalities in the country.
Ukraine	Loan	ODA	28,148,930	31,521,758	Cross-cutting	Cross-cutting	AGRI-INFRASTRUCTURE AND BIOMASS POWER GENERATION	The project consists of the financing of (i) 2 inland grain silos, (ii) a grain handling and storage terminal located within the Port of Chernomorsk, (iii) 5 biomass-fired CHPs and (iv) one sunflower oil crushing plant, in different locations in Ukraine
Ukraine	Loan	OOF	2,478,805	2,775,817	Cross-cutting	Cross-cutting	AGRI-INFRASTRUCTURE AND BIOMASS POWER GENERATION	The project consists of the financing of (i) 2 inland grain silos, (ii) a grain handling and storage terminal located within the Port of Chernomorsk, (iii) 5 biomass-fired CHPs and (iv) one sunflower oil crushing plant, in different locations in Ukraine

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
India	Equity	ODA	13,357,079	14,957,536	Mitigation	Cross-cutting	GEF SOUTH ASIA GROWTH FUND II	Equity participation in GEF South Asia Growth Fund II, a USD 150m regional fund targeting SMEs that promote energy efficiency, environmental actions and circular economy in agricultural projects, renewable energy and efficient use of water in India and Bangladesh.
Turkey	Grant	other	33,457,568	37,466,482	Cross-cutting	Other	MUNICIPAL RESILIENCE FACILITY I-MADAD FUND	This 100 % grant management facility aims at supporting Turkey's efforts to increase the adequate resilience of host and refugee communities through supporting urgently needed municipal projects (water, waste-water and solid waste) in the municipalities located in the Southern and Eastern Turkey with the highest rate of Syrian refugees per local population.
Dominican Republic	Grant	other	7,150,000	8,006,719	Adaptation	Other	POST-DISASTER AND CLIMATE CHANGE RESILIENCE FL	Multi-sector framework loan to finance the reconstruction of infrastructure damaged by natural disasters and increase resilience to climate change in Dominican Republic
Tajikistan	Loan	other	30,000,000	33,594,625	Cross-cutting	Energy	QAIROKKUM HPP CLIMATE RESILIENCE UPGRADE	Rehabilitation of the Kairakkum Hydro Power Plant (HPP) in Tajikistan to increase its safety, efficiency and capacity.
South Africa	Loan	ODA	2,000,000	2,239,642	Mitigation	Cross-cutting	NEDBANK PRIVATE SECTOR FACILITY 2	Credit facility to Nedbank for on-lending to private sector limited scale investments in South Africa.
Kenya	Loan	OOF	500,000	559,910	Mitigation	Agriculture	KENYA AGRICULTURE VALUE CHAIN FACILITY	Multibeneficiary intermediated loan to be blended with EU grants to promote agricultural value chain development with a focus on integrating smallholder farmers into the value chain.
Cambodia	Loan	ODA	2,628,050	2,942,946	Cross-cutting	Water and sanitation	BAKHENG WATER SUPPLY PROJECT	Construction of Bakheng Water Treatment Plant (WTP), in the northern outskirts of Phnom Penh.The intake will be located on the west bank of the Mekong River.
Brazil	Loan	ODA	150,764,280	168,828,981	Mitigation	Energy	LATAM SUSTAINABLE POWER GENERATION FL	A Framework Loan to support the development of renewable energy projects in Brazil and Mexico, promoted by Energias De Portugal Renovaveis (EDPR)

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Lebanon	Loan	OOF	200,000	223,964	Mitigation	Other	LEBANON PRIVATE SECTOR RESILIENCE FACILITY	The operation proposed will provide funding to small and medium-sized enterprises and mid-caps through credit lines to local financial intermediaries, including second tier banks. The operation will support economic resilience of the Lebanese economy in the context of the refugee crisis, with a particular focus on employment creation.
Albania	Loan	other	960,000	1,075,028	Cross-cutting	Other	LANA RIVER FRONT - URBAN REDEVELOPMENT	Urban Redevelopment of Lana River front (approximately 2km) in the City of Tirana. Investments include the reorganization of streets and associated urban infrastructure on either riverbank as well as the improvement of the Lana River to prevent future flooding in the area.
Albania	Grant	other	288,000	322,508	Cross-cutting	Other	LANA RIVER FRONT - URBAN REDEVELOPMENT	Urban Redevelopment of Lana River front (approximately 2km) in the City of Tirana. Investments include the reorganization of streets and associated urban infrastructure on either riverbank as well as the improvement of the Lana River to prevent future flooding in the area.
Dominican Republic	Loan	other	28,966,132	32,436,878	Adaptation	Other	POST-DISASTER AND CLIMATE CHANGE RESILIENCE FL	Multi-sector framework loan to finance the reconstruction of infrastructure damaged by natural disasters and increase resilience to climate change in Dominican Republic
Senegal	Loan	ODA	6,840,000	7,659,574	Mitigation	Energy	SCALING SOLAR PV SENEGAL	The construction and operation of two independent solar PV plants totaling up to 79 MWp (60MWac) under the World Bank Group's Scaling Solar program, located in Kahone and Touba, Senegal.
Senegal	Loan	ODA	5,660,000	6,338,186	Mitigation	Energy	SCALING SOLAR PV SENEGAL	The construction and operation of two independent solar PV plants totaling up to 79 MWp (60MWac) under the World Bank Group's Scaling Solar program, located in Kahone and Touba, Senegal.
India	Loan	ODA	200,000,000	223,964,166	Mitigation	Transport	PUNE METRO RAIL PROJECT	Construction of two metro lines totalling of 31.25 km and 30 stations, as well as purchase of a related fleet of metro cars in Pune, Maharashtra State, West India

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
China	Loan	ODA	200,000,000	223,964,166	Mitigation	Other	JIANGXI WATER TRANSPORT I	The project consists of the construction of the Bazizui navigation hub on the Xinjiang river, one of the five major river systems in Jiangxi province. The proposed project is part of a larger and more comprehensive waterborne transport infrastructure programme, involving other internal waterways projects on Xinjiang and Ganjiang rivers. After project completion, the cargo expected to be transported in the waterway will be mainly solid bulk and general cargo.
New Caledonia	Loan	other	480,000	537,514	Mitigation	Cross-cutting	BCI SMALL ENTERPRISES AND REMOTE AREAS FACILITY	A line of credit to part-finance borrowings from enterprises located in remote areas, and very small enterprises in New Caledonia
Belarus	Loan	other	19,140,000	21,433,371	Mitigation	Water and sanitation	BELARUS UTILITY SERVICES MODERNIZATION	The project would support the critical needs of the water supply and sanitation sectors in Belarus.
Nigeria	Loan	OOF	1,200,000	1,343,785	Mitigation	Other	NIGERIA PRIVATE ENTERPRISE FINANCE FACILITY	The Nigeria Private Enterprise Finance Facility (NIGERIA PEFF) will be made available to eligible Nigerian financial intermediaries for 1) on lending to private enterprises in Nigeria, operating in productive and human capital sectors; 2) funding the banks' capital expenditures to further develop their capacities of intermediation.
Montenegro	Loan	ODA	1,000,000	1,119,821	Mitigation	Cross-cutting	IDF LOAN FOR SMES & PRIORITY PROJECTS IV	The project consists of a loan to finance small and medium-sized investments carried out by small and medium-sized enterprises (SMEs) and mid-caps as well as eligible projects promoted by local authorities or final beneficiaries of any size and ownership
Seychelles	Loan	OOF	200,000	223,964	Mitigation	Cross-cutting	SOUTHERN AFRICA AND INDIAN OCEAN SMERF	The SME Focused Regional Facility (SMERF) is a regional credit facility to financial intermediaries for on-lending to primarily SME projects in the Southern Africa and Indian Ocean region (excluding South Africa).
Regional - Southern Africa	Loan	OOF	70,000	78,387	Mitigation	Cross-cutting	SOUTHERN AFRICA AND INDIAN OCEAN SMERF	The SME Focused Regional Facility (SMERF) is a regional credit facility to financial intermediaries for on-lending to primarily SME projects in the Southern Africa and Indian Ocean region (excluding South Africa).

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Guinea	Loan	OOF	26,748,971	29,954,055	Mitigation	Energy	ENERGY EFFICIENCY TELECOM GUINEA	The project consists of financing a new energy efficient infrastructure (electrical supply, PV, batteries) for the existing and new cellular towers across Guinea, in order to improve the energy efficiency and reliability of power supply, as well as increasing renewable energy consumption.
Lebanon	Loan	OOF	23,374,486	26,175,236	Mitigation	Energy	ENERGY EFFICIENCY TELECOM LEBANON	The project consists of financing a new energy efficient infrastructure (cooling system, electrical supply, PV) for the existing and new cellular towers across Lebanon, in order to improve the energy efficiency and reliability of power supply, as well as increasing renewable energy consumption.
Lebanon	Loan	OOF	600,000	671,892	Mitigation	Cross-cutting	LEBANON PRIVATE SECTOR RESILIENCE FACILITY	The operation proposed will provide funding to small and medium-sized enterprises and mid-caps through credit lines to local financial intermediaries, including second tier banks. The operation will support economic resilience of the Lebanese economy in the context of the refugee crisis, with a particular focus on employment creation.
Lebanon	Loan	OOF	1,000,000	1,119,821	Mitigation	Cross-cutting	LEBANON PRIVATE SECTOR RESILIENCE FACILITY	The operation proposed will provide funding to small and medium-sized enterprises and mid-caps through credit lines to local financial intermediaries, including second tier banks. The operation will support economic resilience of the Lebanese economy in the context of the refugee crisis, with a particular focus on employment creation.
Serbia	Loan	other	5,110,000	5,722,284	Mitigation	Water and sanitation	BELGRADE PALILULA SEWERAGE SYSTEM	Development of the sewerage system in Palilula Municipality (Belgrade) located at the border of the Sava and Danube rivers with approximately 173,000 inhabitants. The project will be implemented in the area where there are no systematic sewer network nor wastewater treatment (Banat, a part of Palilula). Therefore not meeting environmental and social standards.
Jordan	Loan	other	45,000,000	50,391,937	Mitigation	Energy	CVDB - MUNICIPAL ENERGY EFFICIENCY PROGRAMME	Energy Efficiency investments targeting Jordanian municipal buildings and public lighting

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Tunisia	Loan	ODA	300,000	335,946	Cross-cutting	Cross-cutting	REHABILITATION URBAINE TUNISIE II	The project concerns the rehabilitation of 146 disadvantaged urban areas distributed across all 24 regions (Gouvernorats) of Tunisia through the provision of basic public infrastructure. In particular, the project's outputs will consist in the creation - or extension, as needed - of water and wastewater networks, roads pavement and drainage, extensions of power networks, installation of public lighting, constructions of playgrounds, sports and socio-cultural centers, and economic and manufacturing facilities. The project builds upon the success of the previous EIB operation Rehabilitation Urbaine Tunisie .
Moldova, Republic of	Loan	other	8,750,000	9,798,432	Mitigation	Other	MOLDOVA SOLID WASTE FRAMEWORK LOAN	The programme concerns the implementation of solid waste sector projects throughout Moldova, supporting the implementation of the Waste Management Strategy of the Republic of Moldova 2013-2027
Brazil	Loan	ODA	100,000,000	111,982,083	Mitigation	Cross-cutting	BDMG CLIMATE ACTION FL II	Framework Loan to part-finance a series of climate action projects in the state of Minas Gerais, Brazil, including solar PV, small-scale hydropower and other renewables.
Regional - West Africa	Loan	other	200,000	223,964	Mitigation	Cross-cutting	WEST AFRICA MICROFINANCE FACILITY	Framework credit line of up to EUR 50 m to provide medium to long term funding to micro and small enterprises through selected financial intermediaries in West Africa countries.
Regional - Africa	Loan	other	50,027,010	56,021,288	Mitigation	Energy	EGP AFRICAN RENEWABLE ENERGY FL (ZAMBIA)	A Framework Loan to support Enel Green Power's investments in Solar PV projects in Zambia and other African countries
Jordan	Grant	other	9,912,500	11,100,224	Cross-cutting	Water and sanitation	DEIR ALLA WATER SUPPLY AND SANITATION	Improvements to the existing water supply systems of the Deir Alla and Al Karameh districts in the Jordan Valley and provision of a first time centralized wastewater collection and treatment system for Deir Alla.
Montenegro	Loan	other	1,116,000	1,249,720	Mitigation	Other	MONTENEGRO EDUCATION PROGRAMME	Construction and/or renovation of public education infrastructure including kindergartens, elementary (primary) schools, gymnasium (secondary) schools and vocational education schools. The project also includes provision of new ICT equipment and furniture for schools and specific equipment for vocational schools.

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Lebanon	Loan	other	72,520,000	81,209,406	Mitigation	Water and sanitation	GREATER TRIPOLI BASIN WASTEWATER NETWORKS	The project consists of the construction of wastewater networks in the city of Tripoli and surrounding areas conveying sewerage to the existing wastewater treatment plant.
Regional - Central Africa	Loan	OOF	100,000	111,982	Mitigation	Cross-cutting	WEST & CENTRAL AFRICA PEFF	A Private Enterprise Finance Facility (PEFF); Regional credit facility for financial institutions to on-lend to private enterprises in West Africa (excluding Nigeria) and Central Africa aiming to contribute to the private sector development in the region.
Kingdom of Eswatini	Loan	OOF	200,000	223,964	Mitigation	Cross-cutting	SOUTHERN AFRICA AND INDIAN OCEAN SMERF	The SME Focused Regional Facility (SMERF) is a regional credit facility to financial intermediaries for on-lending to primarily SME projects in the Southern Africa and Indian Ocean region (excluding South Africa).
Ukraine	Loan	other	4,500,000	5,039,194	Adaptation	Transport	EUROPEAN ROADS UKRAINE III	The project will finance the construction of Lviv Northern bypass and the rehabilitation of sections of M-05 in Cherkasy, Kirovohrad, Mykolaiv and Odesa regions in Ukraine.
Belarus	Loan	other	90,000,000	100,783,875	Mitigation	Energy	BELARUS SUSTAINABLE ENERGY SCALE-UP	The project consists of investment in biomass-based heat generators, district heating grid modernisation and in thermal renovation of multi apartment buildings.
Belarus	Loan	ODA	400,000	447,928	Mitigation	Cross-cutting	BELAGROPROMBANK LOAN FOR SMES	Loan for SMEs
Belarus	Loan	ODA	1,700,000	1,903,695	Mitigation	Cross-cutting	BELARUSBANK LOAN FOR SMES	Loan for SMEs
Egypt	Loan	ODA	10,000,000	11,198,208	Mitigation	Cross-cutting	BANQUE MISR LOAN FOR SMES AND MIDCAPS II	Loan for SMEs and MidCaps to support private sector development through eligible sectors of Egyptian economy.
Liberia	Loan	other	460,000	515,118	Adaptation	Transport	MANO RIVER UNION ROAD	Upgrade of the 47 km long gravel road from Sanniquellie to Loguato, at the border with Ivory Cost

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Lebanon	Grant	other	17,934,000	20,082,867	Mitigation	Water and sanitation	GREATER TRIPOLI BASIN WASTEWATER NETWORKS	The project consists of the construction of wastewater networks in the city of Tripoli and surrounding areas conveying sewerage to the existing wastewater treatment plant.
Malawi	Loan	other	3,609,783	4,042,310	Mitigation	Energy	SOUTHERN SSA OFF-GRID SOLAR ENERGY ROLL-OUT	The project will finance the roll-out of off-grid solar energy systems in Mozambique and potentially other countries in Southern Sub-Saharan Africa.
Mozambique	Loan	other	5,414,674	6,063,464	Mitigation	Energy	SOUTHERN SSA OFF-GRID SOLAR ENERGY ROLL-OUT	The project will finance the roll-out of off-grid solar energy systems in Mozambique and potentially other countries in Southern Sub-Saharan Africa.
Brazil	Loan	ODA	250,000,000	279,955,207	Mitigation	Energy	NEOENERGIA CLIMATE ACTION FL	The project consists of a Framework Loan to finance renewable energy projects in Brazil, promoted by Neoenergia.
Regional - ACP	Loan	OOF	27,041,644	30,281,796	Mitigation	Cross-cutting	TDB SMES AND CLIMATE ACTION LOAN	Loan up to USD 120m for part-financing eligible projects, including at least 25% climate action projects, undertaken by private sector entities or commercially run public enterprises in the Member States of TDB, a regional African DFI. These eligible investments would be financed directly by TDB or, in the case of loans to small SMEs, through financial institutions with which the EIB does not maintain a significant relationship.
Sint Maarten	Loan	other	11,764,706	13,174,363	Adaptation	Other	ST MAARTEN AIRPORT POST-HURRICANE RECONSTRUCTION	The project consists of reconstructing the Princess Juliana International Airport terminal to pre-hurricane conditions and improve its resistance to extreme weather events. Works include exterior envelope, interior walls and finishes, ceilings, baggage handling and passenger processing equipment, mechanical, electrical, plumbing, life safety and IT installations. The critical component of replacing and reinforcing the roof is already underway. The existing foundation and steel building structure will be retained.
Madagascar	Loan	other	8,085,000	9,053,751	Adaptation	Water and sanitation	JIRAMA WATER III - PRIORITAIRE	Le projet consiste en la réalisation des investissements prioritaires pour le système d'adduction d'eau potable à Antananarivo, visant à renforcer et étendre l'approvisionnement en eau pour environ 2,2 millions de personnes.

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Regional - Africa	Equity	ODA	39,721,946	44,481,463	Mitigation	Energy	METIER SUSTAINABLE CAPITAL FUND II	Fund targeting renewable energy, energy efficiency and other resource efficiency projects and related corporate investments in sub-Saharan Africa.
Regional - Africa	Equity	ODA	3,413,093	3,822,052	Cross-cutting	Cross-cutting	CRAFT - CLIMATE RESILIENCE SOLUTIONS FUND	CRAFT is an investment fund targeting private companies providing climate resilience solutions in order to drive adaptation to Climate Change. Companies will operate in or develop climate solutions for developing countries. The Fund, domiciled in Luxembourg, has a target size of USD 250m and is managed by Lightsmith Resilience Partners.
Regional - Asia	Equity	ODA	6,826,185	7,644,104	Cross-cutting	Cross-cutting	CRAFT - CLIMATE RESILIENCE SOLUTIONS FUND	CRAFT is an investment fund targeting private companies providing climate resilience solutions in order to drive adaptation to Climate Change. Companies will operate in or develop climate solutions for developing countries. The Fund, domiciled in Luxembourg, has a target size of USD 250m and is managed by Lightsmith Resilience Partners.
Regional - Latin America	Equity	ODA	6,826,185	7,644,104	Cross-cutting	Cross-cutting	CRAFT - CLIMATE RESILIENCE SOLUTIONS FUND	CRAFT is an investment fund targeting private companies providing climate resilience solutions in order to drive adaptation to Climate Change. Companies will operate in or develop climate solutions for developing countries. The Fund, domiciled in Luxembourg, has a target size of USD 250m and is managed by Lightsmith Resilience Partners.
Regional - East Africa	Loan	OOF	300,000	335,946	Mitigation	Cross-cutting	EAST AFRICA SME-FOCUSED REGIONAL FACILITY	The East Africa SME-focused Regional Facility is a regional facility for financial intermediaries to on-lend primarily to SMEs in East Africa, with the aim to contribute to private sector development in the region.
Brazil	Loan	ODA	108,750,000	121,780,515	Cross-cutting	Water and sanitation	COPASA WATER AND SANITATION PROGRAMME	The COPASA Water and Sanitation Programme is structured around provision of sanitation services to unserved customers, provision of additional water connections and climate resilience investment components, in the area of operation of the Company in the state of Minas Gerais.
Morocco	Loan	other	129,000,000	144,456,887	Mitigation	Energy	ONEE - NOOR ATLAS	The "Noor Atlas" project has the objective to construct 7 solar photovoltaic (PV) power stations, in the East and the South of the Kingdom of Morocco, totalizing an installed capacity of 240MW

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Morocco	Loan	ODA	5,625,000	6,298,992	Adaptation	Water and sanitation	ONEE-AEP AMELIORATION ET ASSAINISSEMENT II	Prêt-cadre visant la modernisation et la réhabilitation des réseaux et infrastructures existants pour la production et la distribution d'eau potable à travers le Maroc.
Morocco	Loan	ODA	700,000	783,875	Mitigation	Cross-cutting	MBIL FINEA	L'opération proposée est un Prêt intermédié à FINEA (filiale du groupe CDG) visant à améliorer l'accès au financement bancaire des PME au Maroc. La ligne de crédit BEI sera utilisée directement par FINEA et au travers de lignes de financement octroyées par FINEA à des Intermédiaires financiers marocains avec lesquels FINEA signera une convention bancaire dans le cadre de cette opération; ces derniers ayant la charge de procéder à la distribution des financements BEI aux PME marocaines privées ou publiques à caractère industriel ou commercial intervenant dans l'ensemble des secteurs de l'économie marocaine.
Regional - North Africa	Equity	other	10,000,000	11,198,208	Mitigation	Cross-cutting	GREEN FOR GROWTH FUND IV	The proposed operation concerns an investment of up to EUR 25m in A Shares in the Green for Growth Fund, a layered debt fund targeting energy efficiency and renewable energy investments in Southeastern Europe, Eastern European Neighbourhood and Middle East and North Africa regions.
Georgia	Loan	OOF	1,000,000	1,119,821	Mitigation	Cross-cutting	BANK OF GEORGIA - LOAN FOR SMES AND MID-CAPS II	Loan dedicated to finance eligible SMEs and Mid-Caps in Georgia through Bank of Georgia.
Georgia	Loan	ODA	300,000	335,946	Mitigation	Cross-cutting	GEORGIA LOAN FOR SMES OUTREACH INITIATIVE	Loan for SMEs in Georgia via smaller intermediary banks
Regional - RU,E.Europe,S.Cauc.	Equity	other	15,000,000	16,797,312	Mitigation	Cross-cutting	GREEN FOR GROWTH FUND IV	The proposed operation concerns an investment of up to EUR 25m in A Shares in the Green for Growth Fund, a layered debt fund targeting energy efficiency and renewable energy investments in Southeastern Europe, Eastern European Neighbourhood and Middle East and North Africa regions.

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Bosnia and Herzegovina	Loan	ODA	600,000	671,892	Mitigation	Cross-cutting	ISP BIH LOAN FOR SMES AND PRIORITY PROJECTS IV	Loan to finance small and medium scale projects promoted by SMEs and Mid-Caps in industry, tourism, services and agriculture or by local authorities in the fields of environmental protection, energy efficiency, knowledge economy and infrastructure.
Sao Tome and Principe	Loan	other	5,750,000	6,438,970	Adaptation	Other	SAO TOME SUSTAINABLE ROADS	The project consists of the reconstruction, upgrading and coastal protection of the Sao Tome City's main avenue, The Marginal. The project aims to improve the climate resilience, road safety and connectivity of the Marginal, which is a key part of the primary national road network and a key element of the capital's urban regeneration and tourism development. The project will also include Technical Assistance for project preparation and implementation.
Regional - Africa	Equity	ODA	27,034,334	30,273,610	Mitigation	Cross-cutting	RESPONSABILITY ACCESS TO CLEAN POWER FUND	Investment fund providing debt and mezzanine financing to energy access companies that provide distributed generation solutions (primarily based on solar energy) to households and SMEs mainly Africa and Asia.
Regional - ACP	Loan	other	900,000	1,007,839	Mitigation	Cross-cutting	EDFI EUROPEAN FINANCING PARTNERS VI	Replenishment of EFP through a further contribution of up to EUR 50 million from the IF to co-finance on a pari passu basis with EDFIs operations in ACP countries.
Regional - Africa	Equity	ODA	12,390,736	13,875,405	Cross-cutting	Other	BLUE ORCHARD RESILIENCE FUND	The proposed operation consists of an equity participation of up to USD 25 m in Blue Orchard InsuResilience Investment Equity Sub-Fund ("IIF" or the "Fund"), targeting climate change adaptation and resilience high growth innovative companies operating in the insurance industry. To reach this objective, the Fund will invest in both insurers that invest in and make use of technology and digital technology companies developing solutions for the insurance industry (so-called Insuretech).The Fund will target investments in key countries in Africa, Asia and Latin America.
Regional - ACP	Guarantee	other	50,000	55,991	Mitigation	Cross-cutting	EDFI EUROPEAN FINANCING PARTNERS VI	Replenishment of EFP through a further contribution of up to EUR 50 million from the IF to co-finance on a pari passu basis with EDFIs operations in ACP countries.

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Regional - ACP	Equity	other	50,000	55,991	Mitigation	Cross-cutting	EDFI EUROPEAN FINANCING PARTNERS VI	Replenishment of EFP through a further contribution of up to EUR 50 million from the IF to co-finance on a pari passu basis with EDFIs operations in ACP countries.
China	Loan	other	200,000,000	223,964,166	Cross-cutting	Forestry	YANGTZE RIVER BASIN FOREST PROTECTION	The operation is to finance a programme of investments in Jiangxi and Anhui Provinces (China) for the period 2019-2023, covering about 107,000 ha and focusing on establishing new forests (about 32,000 ha) and improving quality of existing forests (about 75,000 ha) through sustainable forest management. The operation is part of a broader three-province investment programme including Sichuan province, which will be separately financed by the World Bank. The main purpose of the investments is to protect biodiversity and enhance resilience and adaptation to the negative impacts of climate change.
India	Loan	other	250,000,000	279,955,207	Mitigation	Transport	BHOPAL METRO RAIL PROJECT	The project concerns the construction of two lines of metro totaling 31 km with 30 stations and purchase of a related fleet of metro cars in Bhopal, Madhya Pradesh, central India.
Lao People's Democratic Rep.	Loan	ODA	15,000,000	16,797,312	Adaptation	Transport	LAO RESILIENT ROADS FRAMEWORK LOAN	The proposed framework loan is expected to finance road rehabilitation works in Laos to maintain and improve connectivity and accessibility and to improve their climate resilience. The project will include road sections that require urgent rehabilitation as their current condition hampers economic development and access to public services.
North Macedonia	Loan	other	26,860,000	30,078,387	Mitigation	Water and sanitation	SKOPJE WWTP	Construction of a waste water treatment plant (WWTP) in Skopje, serving approximately 500,000 inhabitants
North Macedonia	Grant	other	3,950,000	4,423,292	Mitigation	Water and sanitation	SKOPJE WWTP	Construction of a waste water treatment plant (WWTP) in Skopje, serving approximately 500,000 inhabitants
Colombia	Loan	other	2,703,433	3,027,361	Mitigation	Cross-cutting	BANCOLDEX PRIVATE SECTOR SUPPORT	The proposed operation is expected to support private investments, in a wide range of sectors. The EIB funds will be dedicated to finance projects exclusively in relevant areas for the successful implementation of the peace process in Colombia. These areas will be defined by the Government of Colombia.
Morocco	Loan	ODA	1,950,000	2,183,651	Adaptation	Agriculture	AGRO-FOOD PROGRAMME MOROCCO	Investment programme including grain storage facilities and chicken broiler farms located in the four main Moroccan consumption regions.

Recipient country/ region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Bosnia and Herzegovina	Loan	other	7,299,800	8,174,468	Adaptation	Other	FLOOD PROTECTION MEASURES RS	Construction of flood protection facilities along the Sava river and its tributaries
Cambodia	Loan	other	10,300,000	11,534,155	Adaptation	Transport	SAAMBAT SUSTAINABLE RURAL DEVELOPMENT CAMBODIA	The project consists of a framework loan to co-finance the rehabilitation of rural roads under Component 1: value chain infrastructure of the Sustainable Assets for Agricultural Markets, Business and Trade (SAAMBAT) programme in Cambodia. The programme covers the period 2020-2025.
Serbia	Loan	ODA	600,000	671,892	Mitigation	Cross-cutting	CREDIT AGRICOLE LOAN FOR SME&OTHERPRIORITIES III	Loan for SMEs, with a Mid-Cap tranche, to finance, for at least 70% of the facility amount, eligible investments promoted by SMEs and Mid-Caps operating in the agriculture, manufacturing, and services sectors in Serbia. Up to 30% of the loan amount could be dedicated to eligible projects promoted by public and/or private sector entities.
Kazakhstan	Loan	OOF	3,430,248	3,841,264	Cross-cutting	Cross-cutting	KAZAKHSTAN MICRO LENDING	Loan to KMF LLC for micro-lending operations in Kazakhstan
Kazakhstan	Loan	OOF	4,425,282	4,955,523	Cross-cutting	Cross-cutting	KAZAKHSTAN MICRO LENDING	Loan to KMF LLC for micro-lending operations in Kazakhstan
Georgia	Loan	OOF	520,000	582,307	Mitigation	Cross-cutting	TBC BANK JSC LOAN FOR SMES	Loan dedicated to finance through TBC Bank eligible SMEs in Georgia.
Ghana	Loan	ODA	12,500,000	13,997,760	Mitigation	Energy	KPONG DAM RETROFIT	Rehabilitation and upgrade of the electromechanical equipment and systems of the 160MW hydropower plant on the Volta river.
Egypt	Loan	other	51,000,000	57,110,862	Cross-cutting	Water and sanitation	ALEXANDRIA WEST WASTE WATER TREATMENT PLANT EXT	The project concerns the capacity increase and treatment level upgrade of the Alexandria West Wastewater Treatment Plant (WWTP).

Table 41: Climate finance committed by the EIB to developing countries (2020)

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Ecuador	Loan	other	26,884,459	30,690,021	Mitigation	Water and sanitation	ETAPA CUENCA WASTEWATER TREATMENT PLANT	Construction of a wastewater treatment plant in Guangarcucho, city of Cuenca, Azuay province (Republic of Ecuador).
Regional - West Africa	Loan	other	140,000	159,817	Mitigation	Cross-cutting	WEST AFRICA MICROFINANCE FACILITY	Framework credit line of up to EUR 50 m to provide medium to long term funding to micro and small enterprises through selected financial intermediaries in West Africa countries.
Nepal	Loan	other	11,000,000	12,557,078	Mitigation	Energy	NEPAL DISTRIBUTION SYSTEM UPGRADE AND EXPANSION	The project objective is to increase access to and improve quality and efficiency of electricity supply in selected areas of Western Nepal by 2024.
Regional - East Africa	Grant	other	9,100,000	10,388,128	Mitigation	Energy	RUZIZI III REGIONAL HYDROPOWER PPP &TRANSMISSION	The project consists of the construction of Ruzizi III, a 147 MW run-of-river hydropower plant on Ruzizi River bordering DR Congo and Rwanda. It will be developed as a Public Private Partnership (PPP) through a concession to a private investor to develop, finance, build, operate and maintain the plant. The plant will be the third hydropower development on the river, following Ruzizi I (29.8 MW) and Ruzizi II (43.8 MW). Also included in the project is a public sector component of 220 kV transmission lines and substations enabling evacuation of the power from the plant to the 3 beneficiary countries, Burundi, DR Congo and Rwanda.
Bosnia and Herzegovina	Loan	OOF	200,000	228,311	Mitigation	Cross-cutting	RLBH LOAN FOR SMES MIDCAPS &PRIORITY PROJECTS II	Loan for financing SMEs and Mid-Caps, as well as small and medium scale infrastructure projects promoted by local authorities and final beneficiaries of any size in the fields of environmental protection, industry, health, education and services, including investments promoted by youth and/or securing youth employment.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Belarus	Loan	ODA	400,000	456,621	Mitigation	Cross-cutting	RAIFFEISEN LEASING BELARUS LOAN FOR SMES	Dedicated loan to finance projects promoted by SMEs in Belarus.
Montenegro	Loan	ODA	600,000	684,932	Mitigation	Cross-cutting	EBM LOAN FOR SMES & OTHER PRIORITIES	Loan for SMEs with a Mid-Cap tranche to finance, for at least 70% of the facility amount, eligible investments promoted by SMEs and Mid-Caps operating in the manufacturing, tourism, and services sectors in Montenegro. Up to 30% of the loan amount could be dedicated to eligible projects promoted by public and/or private sector entities.
Egypt	Loan	ODA	1,827,819	2,086,552	Mitigation	Cross-cutting	BANQUE DU CAIRE LOAN FOR SMES	Loan for SMEs
South Africa	Loan	ODA	1,400,000	1,598,174	Mitigation	Cross-cutting	NEDBANK PRIVATE SECTOR FACILITY 3	Credit facility to Nedbank for on-lending to private sector limited scale investments in South Africa.
Barbados	Loan	other	4,243,557	4,844,244	Adaptation	Water and sanitation	BWA DRINKING WATER NETWORK REHABILITATION	Rehabilitation of drinking water distribution infrastructure in Barbados to improve efficiency, service quality and resilience to the adverse impacts of climate change.
Kosovo	Loan	other	9,097,000	10,384,703	Mitigation	Water and sanitation	WWTP GJILAN	Construction of waste water treatment facility and rehabilitation of existing sewerage in the municipality of Gjilan in Kosovo.
Maldives	Loan	ODA	400,000	456,621	Mitigation	Cross-cutting	COVID 19 RAPID RESPONSE TO THE MALDIVES	Dedicated credit line for re-establishing the economy through financing micro, small and medium-size private sector projects in industry, tourism and other service sectors affected, directly and indirectly, by the COVID 19 outbreak.
Serbia	Loan	other	300,000	342,466	Mitigation	Cross-cutting	UCBS IMPACT INCENTIVE LOAN FOR SMES & MID-CAPS	A loan facility with UniCredit Bank Srbija A.D. focused on supporting local businesses who commit to generate greater socio-economic impact and sustainable growth in Serbia.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Serbia	Grant	other	40,000	45,662	Mitigation	Cross-cutting	UCBS IMPACT INCENTIVE LOAN FOR SMES & MID-CAPS	A loan facility with UniCredit Bank Srbija A.D. focused on supporting local businesses who commit to generate greater socio-economic impact and sustainable growth in Serbia.
China	Loan	other	300,000,000	342,465,753	Cross-cutting	Forestry	IMAR TONGLIAO SAND DUNES SHELTERBELT FORESTS	This operation is to finance a comprehensive desertification control investment programme through afforestation and implementation of sustainable forest management practices in Horqin Sandy Lands, Tongliao City, Inner Mongolia Autonomous Region (IMAR), China. The total project area is about 138,000 ha. The implementation period is 2020-2024.
Ukraine	Loan	ODA	18,106,000	20,668,950	Mitigation	Other	INNOVATION CAMPUS FOR UKRAINE	The project is part of an urban development and comprises the design, renovation and construction of carefully selected sub-projects that are part of the innovation campus. The project includes the extension of a private non-profit IT training facility, multifunctional flexible floor space offering a variety of office accommodation, fablabs, communal and interaction spaces as well as seminar and meeting room spaces for events plus other supporting facilities and infrastructures. The variety of spaces and services aim to create and sustain an innovation eco-system that supports technology driven innovative companies and global market leaders to further strengthen and enhance the IT sector in Ukraine.
Ukraine	Loan	ODA	23,044,000	26,305,936	Mitigation	Other	INNOVATION CAMPUS FOR UKRAINE	The project is part of an urban development and comprises the design, renovation and construction of carefully selected sub-projects that are part of the innovation campus. The project includes the extension of a private non-profit IT training facility, multifunctional flexible floor space offering a variety of office accommodation, fablabs, communal and interaction spaces as well as seminar and meeting room spaces for events plus other supporting facilities and infrastructures. The variety of spaces and services aim to create and sustain an innovation eco-system that supports technology driven innovative companies and global market leaders to further strengthen and enhance the IT sector in Ukraine.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Morocco	Loan	other	60,000	68,493	Mitigation	Cross-cutting	AL AMANA MICROCREDIT	EUR 3m loan to finance the portfolio of Al Amana Microcredit, the largest microfinance institution in Morocco, which provides economic and social development solutions focusing on financial inclusion for micro entrepreneurs.
Jordan	Loan	ODA	1,400,000	1,598,174	Mitigation	Cross-cutting	JORDAN LOAN FOR SME RESILIENCE FACILITY	Long term financing for SMEs and Mid-Caps to improve access to finance and financial inclusion, which have been identified as key factors for reinforcing Jordan's economic resilience.
Ukraine	Grant	other	115,000	131,279	Mitigation	Cross-cutting	UKRAINE TRANSPORT CONNECTIVITY	The project consists of a framework loan for the financing of a series of small-scale transport projects addressing transport bottlenecks in Ukraine.
Regional - West Africa	Loan	other	80,000	91,324	Mitigation	Cross-cutting	WEST AFRICA MICROFINANCE FACILITY	Framework credit line of up to EUR 50 m to provide medium to long term funding to micro and small enterprises through selected financial intermediaries in West Africa countries.
Egypt	Grant	other	7,201,000	8,220,320	Mitigation	Water and sanitation	KITCHENER DRAIN	The project concerns the depollution of the Kitchener Drain in the Nile Delta Region in Egypt through investments in domestic wastewater collection and treatment, solid waste management and rehabilitation of the drain infrastructure.
Senegal	Loan	ODA	1,500,000	1,712,329	Mitigation	Cross-cutting	SENEGAL COVID-19 ECONOMIC RESILIENCE	Facility in support of SMEs and MidCaps affected by the Covid-19 in Senegal, contributing to the Mécanisme de Financement put in place by the government in the context of its economic and social resilience response to the pandemic.
Uganda	Loan	other	9,672,619	11,041,803	Mitigation	Energy	OFF-GRID SOLAR UGANDA ACCELERATION	The project will finance Fenix International's deployment of solar home systems in Uganda. The solar home systems are composed of a solar panel, a central unit (including battery storage, an energy management system/ charge controller and communication technology) and several appliances and will be sold on a payment plan basis to individual beneficiaries located in Uganda under pay as you go contracts.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Georgia	Loan	ODA	200,000	228,311	Mitigation	Cross-cutting	GEORGIA LOAN FOR SMES OUTREACH INITIATIVE	Loan for SMEs in Georgia via smaller intermediary banks
Congo	Loan	other	300,000	342,466	Mitigation	Cross-cutting	SG AFRIQUE CENTRALE FACILITE DE FINANCEMENT	Regional credit facility with three Central African subsidiaries of Group Société Générale dedicated to the financing of private enterprises in the region with an objective to develop the local private sector.
Chad	Loan	other	200,000	228,311	Mitigation	Cross-cutting	SG AFRIQUE CENTRALE FACILITE DE FINANCEMENT	Regional credit facility with three Central African subsidiaries of Group Société Générale dedicated to the financing of private enterprises in the region with an objective to develop the local private sector.
India	Loan	other	200,000,000	228,310,502	Mitigation	Transport	KANPUR METRO PROJECT	The project is the construction and operation of an urban metro rail transit system in Kanpur totaling to 32.4 km with 30 stations in the largest industrial city of Uttar Pradesh, India. The project includes the development of two metro rail corridors with elevated sections (altogether 19.4 km with 18 stations) and underground sections (altogether 13 km with 12 stations) as well as acquisition of rolling stock.
Egypt	Loan	ODA	16,000,000	18,264,840	Mitigation	Cross-cutting	NBE LOAN FOR SMES AND MIDCAPS COVID-19	Loan for SMEs and MidCaps in response to COVID-19 crisis affecting private businesses.
Cameroon	Loan	other	300,000	342,466	Mitigation	Cross-cutting	SG AFRIQUE CENTRALE FACILITE DE FINANCEMENT	Regional credit facility with three Central African subsidiaries of Group Société Générale dedicated to the financing of private enterprises in the region with an objective to develop the local private sector.
Montenegro	Loan	ODA	1,000,000	1,141,553	Mitigation	Cross-cutting	IDF COVID-19 RESPONSE FOR SMES AND MID-CAPS	Dedicated COVID-19 multi-beneficiary intermediated loan (MBIL) to support small and medium-sized enterprises (SMEs), midcaps and public sector entities and contribute to mitigating the COVID-19 induced economic impact in Montenegro.
Morocco	Loan	other	4,000,000	4,566,210	Mitigation	Cross-cutting	CAM-SMES & MID-CAPS AGRI AND RURAL DEVELOPMENT	Loan for SMEs & Mid-Caps to support investments in the bioeconomy, including agriculture, agro-industries and their upstream and downstream value chains

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Regional - Central Africa	Loan	other	1,000,000	1,141,553	Mitigation	Cross-cutting	BDEAC IMPULSION ECONOMIQUE & SECTEUR SOCIAL	Ligne de crédit (Facilité d'Investissement) pour le financement des secteurs privé et social dans les pays d'activité de la BDEAC.
Kenya	Loan	other	12,950,000	14,783,105	Mitigation	Water and sanitation	LV WATSAN - KISUMU	The Project involves the expansion of the water supply and rehabilitation and expansion of the wastewater system in the city of Kisumu, as well as certain satellite towns around the city including the construction of a new Wastewater Treatment Works.
Ukraine	Loan	other	300,000,000	342,465,753	Mitigation	Energy	UKRAINE PUBLIC BUILDINGS ENERGY EFFICIENCY	Framework loan aimed at thermal refurbishment of public buildings in Ukraine.
Madagascar	Grant	other	6,042,914	6,898,303	Adaptation	Water and sanitation	JIRAMA WATER III - PRIORITAIRE	Le projet consiste en la réalisation des investissements prioritaires pour le système d'adduction d'eau potable à Antananarivo, visant à renforcer et étendre l'approvisionnement en eau pour environ 2,2 millions de personnes.
South Africa	Loan	other	22,000,000	25,114,155	Mitigation	Cross-cutting	DBSA CLIMATE ACTION FACILITY	Credit facility to DBSA for on-lending to private sector climate action projects in South Africa.
Serbia	Loan	ODA	600,000	684,932	Mitigation	Cross-cutting	EBS COVID19 CRISIS RESPONSE FOR SMES&MIDCAPS	Financing to support Serbian SMEs and Mid-Caps affected by the COVID-19 crisis.
Tunisia	Loan	other	7,000,000	7,990,868	Adaptation	Water and sanitation	APPUI AU SECTEUR DE L EAU POTABLE	Le projet vise à sécuriser l'approvisionnement en eau potable dans le Grand Tunis via la construction d'une station de traitement d'eau à Béjaoua et les infrastructures connexes y inclus les conduites d'eau pour le port financier de Tunis.
Tunisia	Loan	other	12,000,000	13,698,630	Adaptation	Water and sanitation	APPUI AU SECTEUR DE L EAU POTABLE	Le projet vise à sécuriser l'approvisionnement en eau potable dans le Grand Tunis via la construction d'une station de traitement d'eau à Béjaoua et les infrastructures connexes y inclus les conduites d'eau pour le port financier de Tunis.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Ukraine	Grant	ODA	3,194,000	3,646,119	Mitigation	Other	UKRAINE MUNICIPAL INFRASTRUCTURE PROGRAMME	Framework loan for the rehabilitation and upgrading of municipal infrastructure in Ukraine.
Palestine	Loan	OOF	849,907	970,213	Mitigation	Other	PALESTINE PRIVATE SECTOR COVID-19 RESPONSE	The facility aims to finance eligible small and medium sized investments undertaken by SMEs and Mid-Caps in Palestine, thereby contributing to economic resilience, employment generating activities and alleviating the economic burden of the refugee crisis in the country.
Saint Lucia	Loan	other	100,000	114,155	Mitigation	Other	ST LUCIA DEVELOPMENT BANK MSMES COVID-19	A loan to Saint Lucia Development Bank for boosting access to finance for micro, small and medium enterprises, in particular those impacted by the Covid-19 breakout. The loan will be covered by the Saint Lucia sovereign guarantee.
Mozambique	Loan	other	83,000,000	94,748,858	Cross-cutting	Water and sanitation	MOZAMBIQUE CLIMATE RESILIENT FL	Framework loan to finance a climate-change resilience initiative, which will support the reconstruction and increased resilience of the water supply and wastewater infrastructure destroyed and damaged by the passage of cyclones Idai and Kenneth in Mozambique.
Jordan	Loan	other	128,994,958	147,254,518	Adaptation	Water and sanitation	JORDAN WATER SECTOR FRAMEWORK LOAN	The project will support water supply investments in Jordan.
Burkina Faso	Loan	other	7,500,000	8,561,644	Adaptation	Water and sanitation	ASSAINISSEMENT ET DRAINAGE DE OUAGADOUGOU	Construction d'infrastructures de drainage et d'évacuation des eaux pluviales dans le quartier de Tanghin, localité au Nord de la capitale Ouagadougou. Les travaux permettront également la réalisation d'aménagements durables ainsi que la valorisation des berges du canal de Tanghin en vue de favoriser l'activité économique locale.
Ecuador	Loan	other	21,494,616	24,537,233	Cross-cutting	Water and sanitation	PORTOVIEJO WATER AND SANITATION	Development of drinking water and sanitation networks in rural parishes located in the Portoviejo area in Ecuador

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Regional - ACP	Loan	other	50,000,000	57,077,626	Mitigation	Cross-cutting	INTERACT CLIMATE CHANGE FACILITY III	A replenishment of EUR 50 million from the IF to co-finance climate-friendly investments by the private sector in ACP countries on a pari passu basis with the European Development Finance Institutions and Agence Française de Développment, following the initial funding of EUR 50 million under project 2010-0525
Regional - ACP	Loan	other	10,000,000	11,415,525	Mitigation	Energy	SMALL-SCALE SOLAR PROGRAM IN SSA	The operation concerns the financing of the Sub-Saharan investment programme of the Promoter for small-scale solar electrification: (i) solar PV with battery storage to power a mini-grid in Comoros, and (ii) a small solar PV project with battery storage in Chad.
Regional - ACP	Loan	OOF	196,858	224,724	Mitigation	Cross-cutting	ACP MICROFINANCE FACILITY	The operation will provide of up to EUR 60 m of medium to long term funding in the form of senior debt to micro and small enterprises through selected financial intermediaries in ACP countries.
Regional - West Africa	Loan	other	60,000	68,493	Mitigation	Cross-cutting	WEST AFRICA MICROFINANCE FACILITY	Framework credit line of up to EUR 50 m to provide medium to long term funding to micro and small enterprises through selected financial intermediaries in West Africa countries.
Regional - ACP	Loan	OOF	137,622	157,103	Mitigation	Cross-cutting	ACP MICROFINANCE FACILITY	The operation will provide of up to EUR 60 m of medium to long term funding in the form of senior debt to micro and small enterprises through selected financial intermediaries in ACP countries.
Regional - East Africa	Loan	OOF	600,000	684,932	Mitigation	Cross-cutting	EAST AFRICA SME-FOCUSED REGIONAL FACILITY	The East Africa SME-focused Regional Facility is a regional facility for financial intermediaries to on-lend primarily to SMEs in East Africa, with the aim to contribute to private sector development in the region.
Cambodia	Loan	ODA	53,600,000	61,187,215	Cross-cutting	Agriculture	CAMBODIA IRRIGATED AGRICULTURE IMPROVEMENT	The project will modernize and upgrade five existing schemes in Battambang, Kampong Cham, Kampong Thom, Takeo and Kampot provinces, enhancing water supply reliability and reducing the adverse effects of weather-related disasters in schemes with a total command area of about 51,000 ha of existing agricultural land.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Ukraine	Loan	other	200,000,000	228,310,502	Mitigation	Transport	UKRAINE URBAN PUBLIC TRANSPORT FL II	Framework loan for financing of urban public transport investments in midsize and large municipalities in Ukraine. The project will support electric urban public transport schemes that aim at purchasing new rolling stock (trolleybuses, trams, metro coaches and electric buses) or rehabilitating the existing urban public transport infrastructure or extending it with new elements.
Ukraine	Loan	other	95,200,000	108,675,799	Mitigation	Other	UKRAINE RECOVERY PROGRAMME	Second framework loan to support priority investments in the recovery of areas affected by the conflict in eastern region of Ukraine and basic infrastructure needs of internally displaced population.
Regional - West Africa	Loan	other	100,000	114,155	Mitigation	Cross-cutting	WEST AFRICA MICROFINANCE FACILITY	Framework credit line of up to EUR 50 m to provide medium to long term funding to micro and small enterprises through selected financial intermediaries in West Africa countries.
Montenegro	Loan	other	400,000	456,621	Mitigation	Cross-cutting	PDB COVID19 RESPONSE FOR SMES&MIDCAPS	Dedicated EIB loan in support of SMEs and Mid-Caps in Montenegro. As part of the overall response to the Covid-19 crisis in the Western Balkans, this operation will support the provision of liquidity to SMEs and Mid-Caps and thereby contribute to mitigating the impact of the economic downturn in Montenegro.
Georgia	Loan	other	500,000	570,776	Mitigation	Cross-cutting	BANK OF GEORGIA - LOAN FOR SMES AND MID-CAPS II	Loan dedicated to finance eligible SMEs and Mid-Caps in Georgia through Bank of Georgia.
Kenya	Equity	ODA	36,000,000	41,095,890	Mitigation	Energy	IHS KENYA ENERGY EFFICIENT HOUSING	Equity fund developing energy efficient affordable housing in Kenya.
Mexico	Loan	ODA	2,466,700	2,815,867	Mitigation	Cross-cutting	NAFIN SMES SUPPORT COVID-19 RESPONSE	Credit line to NAFIN to boost access to finance for the MSMEs in Mexico affected by the Covid-19 breakout.
Palestine	Loan	OOF	54,267	61,949	Mitigation	Cross-cutting	VITAS PALESTINE	USD loan to finance a portfolio of microloans in Palestine

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Cambodia	Loan	other	2,750,000	3,139,269	Adaptation	Cross-cutting	SAAMBAT SUSTAINABLE RURAL DEVELOPMENT CAMBODIA	The project consists of a framework loan to co-finance the rehabilitation of rural roads under Component 1: value chain infrastructure of the Sustainable Assets for Agricultural Markets, Business and Trade (SAAMBAT) programme in Cambodia. The programme covers the period 2020-2025.
New Caledonia	Loan	other	400,000	456,621	Mitigation	Cross-cutting	PACIFIC OCTS COVID-19 FINANCIAL SECTOR FACILITY	The Pacific OCTs Financial Sector Facility is a credit facility dedicated to address the adverse consequences of the COVID-19 pandemic on the private sector, in particular SMEs. The main objective is to support on-lending by financial intermediaries to private sector projects in New Caledonia and French Polynesia.
Georgia	Loan	OOF	500,000	570,776	Mitigation	Cross-cutting	TBC BANK JSC LOAN FOR SMES	Loan dedicated to finance through TBC Bank eligible SMEs in Georgia.
Albania	Loan	other	300,000	342,466	Mitigation	Cross-cutting	PROCREDIT WB COVID19 RESPONSE FOR SMES & MIDCAPS	Dedicated EIB loan in support of SMEs and Mid-Caps in Serbia, Albania, North Macedonia and Bosnia & Herzegovina. As part of the overall response to Covid-19, the operation will support the financial intermediaries with temporary emergency measures to facilitate the provision of liquidity to SMEs and Mid-Caps and thereby contribute to mitigating the impact of the economic shock in the relevant countries.
North Macedonia	Loan	other	300,000	342,466	Mitigation	Cross-cutting	PROCREDIT WB COVID19 RESPONSE FOR SMES & MIDCAPS	Dedicated EIB loan in support of SMEs and Mid-Caps in Serbia, Albania, North Macedonia and Bosnia & Herzegovina. As part of the overall response to Covid-19, the operation will support the financial intermediaries with temporary emergency measures to facilitate the provision of liquidity to SMEs and Mid-Caps and thereby contribute to mitigating the impact of the economic shock in the relevant countries.
Bosnia and Herzegovina	Loan	other	300,000	342,466	Mitigation	Cross-cutting	PROCREDIT WB COVID19 RESPONSE FOR SMES & MIDCAPS	Dedicated EIB loan in support of SMEs and Mid-Caps in Serbia, Albania, North Macedonia and Bosnia & Herzegovina. As part of the overall response to Covid-19, the operation will support the financial intermediaries with temporary emergency measures to facilitate the provision of liquidity to SMEs and Mid-Caps and thereby contribute to mitigating the impact of the economic shock in the relevant countries.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Regional - East Africa	Loan	OOF	1,500,000	1,712,329	Mitigation	Cross-cutting	EAST AFRICA SME-FOCUSED REGIONAL FACILITY	The East Africa SME-focused Regional Facility is a regional facility for financial intermediaries to on-lend primarily to SMEs in East Africa, with the aim to contribute to private sector development in the region.
Kenya	Loan	OOF	500,000	570,776	Mitigation	Agriculture	KENYA AGRICULTURE VALUE CHAIN FACILITY	Multibeneficiary intermediated loan to be blended with EU grants to promote agricultural value chain development with a focus on integrating smallholder farmers into the value chain.
Serbia	Loan	other	400,000	456,621	Mitigation	Cross-cutting	PROCREDIT WB COVID19 RESPONSE FOR SMES & MIDCAPS	Dedicated EIB loan in support of SMEs and Mid-Caps in Serbia, Albania, North Macedonia and Bosnia & Herzegovina. As part of the overall response to Covid-19, the operation will support the financial intermediaries with temporary emergency measures to facilitate the provision of liquidity to SMEs and Mid-Caps and thereby contribute to mitigating the impact of the economic shock in the relevant countries.
Egypt	Loan	other	600,000,000	684,931,507	Mitigation	Transport	URBAN TRANSPORT INFRASTRUCTURE FRAMEWORK EGYPT	Framework loan to cover urban rail schemes in Egypt-s cities, in particular investments in the rehabilitation and expansion of metro and tram systems in Alexandria and Cairo.
Regional - Central Africa	Loan	other	400,000	456,621	Mitigation	Cross-cutting	W AND C AFRICA COVID19 RAPID RESPONSE FACILITY	The West and Central Africa COVID-19 Rapid Response Facility (RFF) is a credit facility dedicated to addressing the adverse consequences of the COVID-19 pandemic on the private sector, in particular on SMEs. The main objective is to support on-lending by financial intermediaries to private sector projects in the West and Central Africa region.
Peru	Loan	other	57,100,905	65,183,682	Mitigation	Cross-cutting	COFIDE CLIMATE ACTION FL	The operation consists of an intermediated framework loan through Peru's development bank to partly finance climate action investment projects, mainly in the sustainable energy sector, across the country.
Moldova, Republic of	Loan	other	400,000	456,621	Mitigation	Cross-cutting	PROCREDIT EP COVID19 RESPONSE FOR SMES & MIDCAPS	Dedicated EIB loan in support of SMEs and MidCaps in Ukraine, Moldova and Georgia. As part of the overall response to Covid-19, the operation will support the financial intermediaries with temporary emergency measures to facilitate the provision of liquidity to SMEs and MidCaps and thereby contribute to mitigating the impact of the economic shock.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Georgia	Loan	other	200,000	228,311	Mitigation	Cross-cutting	PROCREDIT EP COVID19 RESPONSE FOR SMES & MIDCAPS	Dedicated EIB loan in support of SMEs and MidCaps in Ukraine, Moldova and Georgia. As part of the overall response to Covid-19, the operation will support the financial intermediaries with temporary emergency measures to facilitate the provision of liquidity to SMEs and MidCaps and thereby contribute to mitigating the impact of the economic shock.
Ukraine	Loan	other	500,000	570,776	Mitigation	Cross-cutting	PROCREDIT EP COVID19 RESPONSE FOR SMES & MIDCAPS	Dedicated EIB loan in support of SMEs and MidCaps in Ukraine, Moldova and Georgia. As part of the overall response to Covid-19, the operation will support the financial intermediaries with temporary emergency measures to facilitate the provision of liquidity to SMEs and MidCaps and thereby contribute to mitigating the impact of the economic shock.
Mali	Loan	other	17,685,000	20,188,356	Mitigation	Energy	EDM - BOUCLE 225 KV NORD BAMAKO	Réalisation du tronçon nord de la boucle haute tension (225 kV) de Bamako, qui constituera à terme l'ossature principale d'alimentation et de distribution d'énergie électrique de la capitale malienne. Il comprend (i) une ligne THT double terne 225 kV de 103 km, (ii) l'extension de trois postes, et (iii) la construction de deux nouveaux postes électriques.
Malawi	Loan	other	250,000	285,388	Mitigation	Agriculture	KULIMA ACCESS TO FINANCE	The project comprises an intermediated facility for on-lending to eligible private agri-food sector investments in Malawi.
Malawi	Guarantee	other	50,000	57,078	Mitigation	Agriculture	KULIMA - RISK SHARING FACILITY ECOBANK	Risk-sharing facility supported by a grant from the European Commission to provide guarantees to Ecobank Malawi Ltd financing agri-food projects that engage smallholder producers in Malawi.
Malawi	Loan	ODA	960,000	1,095,890	Cross-cutting	Water and sanitation	LILONGWE WATER RESOURCE EFFICIENCY PROGRAMME	Medium term investment programme to optimise available water resources to bridge the gap in water demand in Malawi's fast growing capital city. The project's main components consist of extension of water treatment works, reduction of leakages and improving network management, improving water supply to low income areas and upgrading of a dam that is Lilongwe's primary water source.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
India	Equity	ODA	12,750,000	14,554,795	Mitigation	Cross-cutting	NEEV II	The proposed operation consists of an equity participation in an investment fund targeting SMEs that contribute to the achievement of SDGs and climate sustainability in India.
Serbia	Loan	ODA	800,000	913,242	Mitigation	Cross-cutting	INTESA LEASING BEOGRAD COVID19SME & MIDCAP LOAN	Dedicated EIB loan in support of SMEs and Mid-Caps in Serbia. As part of the overall response to COVID-19, the operation will support Intesa Leasing Beograd to facilitate the provision of liquidity to SMEs and Mid-Caps affected by the COVID-19 pandemic.
Jordan	Loan	ODA	2,000,000	2,283,105	Mitigation	Cross-cutting	JORDAN LOAN FOR SME RESILIENCE FACILITY	Long term financing for SMEs and Mid-Caps to improve access to finance and financial inclusion, which have been identified as key factors for reinforcing Jordan's economic resilience.
Morocco	Loan	other	200,000	228,311	Mitigation	Cross-cutting	JAIDA SA	EUR 10m loan to finance the portfolio of JAIDA, a company dedicated to support microfinance institutions in Morocco. The company aims to improve access to finance for micro-enterprises focusing on financial inclusion and social development.
Malawi	Loan	other	10,950,000	12,500,000	Adaptation	Water and sanitation	LILONGWE DROUGHT RESILIENCE PROGRAMME	Construction of a new water treatment plant for the city of Lilongwe Malawi
Cambodia	Grant	ODA	622,300	710,388	Cross-cutting	Water and sanitation	BAKHENG WATER SUPPLY PROJECT	Construction of Bakheng Water Treatment Plant (WTP), in the northern outskirts of Phnom Penh.The intake will be located on the west bank of the Mekong River.
Uzbekistan	Loan	other	1,643,926	1,876,628	Mitigation	Cross-cutting	UZBEKISTAN - COVID19 RAPID RESPONSE TO SME-MSMES	Sovereign loan to assist the government of Uzbekistan and support micro as well as small and medium-sized enterprises economically affected by the COVID-19 pandemic. The loan will be provided to the government for on-lending through acceptable financial intermediaries.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Egypt	Loan	ODA	8,500,000	9,703,196	Mitigation	Cross-cutting	BANQUE MISR COVID 19 LOAN FOR SMES AND MIDCAPS	Loan for SMEs and Mid-Caps in response to COVID-19 crisis impact affecting private businesses.
Palestine	Loan	OOF	526,056	600,521	Mitigation	Cross-cutting	PALESTINE PRIVATE SECTOR COVID-19 RESPONSE	The facility aims to finance eligible small and medium sized investments undertaken by SMEs and Mid-Caps in Palestine, thereby contributing to economic resilience, employment generating activities and alleviating the economic burden of the refugee crisis in the country.
Jordan	Loan	OOF	54,250	61,929	Mitigation	Cross-cutting	MICROFUND FOR WOMEN MICROFINANCE LOAN	USD loan to fund the microfinance activities of Microfund for Women ("MFW") which mainly supports female entrepreneurs, including Syrian refugees, in Jordan.
Morocco	Loan	other	3,000,000	3,424,658	Mitigation	Cross-cutting	MOROCCO SME PUBLIC SUPPORT COVID-19 RESPONSE	A loan to the Kingdom of Morocco, through the Moroccan Ministry of Economy and Finance (MEF), to support a guarantee scheme for new loans to Micro-, Small- and Medium-sized enterprises (MSME) as the Final Beneficiaries and Caisse Centrale de Garantie (CCG) as the Promoter. The MEF uses the loan to support CCG's liquidity buffer enabling provision of guarantees to Financial Intermediaries.
Ghana	Loan	other	3,400,000	3,881,279	Mitigation	Cross-cutting	DEVELOPMENT BANK GHANA	A loan to the Government of Ghana, through the Ministry of Finance, for on-lending to Ghanaian SMEs and Midcaps active in the agribusiness, manufacturing, ICT and tourism sectors by the newly created Development Bank Ghana.
Malawi	Loan	other	7,685,000	8,772,831	Adaptation	Water and sanitation	SRWB WATER SUPPLY AND SANITATION PROGRAMME	The SRWB project is an investment program for several towns in Southern Malawi to provide reliable drinking water via new water facilities including treatment, storage and distribution.
Nigeria	Loan	other	175,000,000	199,771,689	Adaptation	Cross-cutting	NIGERIA CLIMATE ADAPTATION - EROSION & WATERSHED	Financing investments in gully erosion control, slope stabilization, integrated watershed management, and improvement of livelihoods. Support Climate Adaptation process of Nigeria with capacity building on planning, management, monitoring of watershed and erosion-related activities and disaster risk management.

Recipient country/region	Funding instrument	ODA/OOF	EUR	USD	Type of support	Sector	Operation name	Operation description
Gambia	Loan	ODA	4,080,000	4,657,534	Mitigation	Energy	GAMBIA RENEWABLE ENERGY	Implementation of an energy sector program in Gambia, including (1) up to 20 MW grid-connected PV plant, (2) grid reinforcement investments, (3) electricity sector institutional and technical support and (4) off-grid PV systems installed on up to 1100 public schools and health facilities.
Regional - Africa	Loan	other	35,000,000	39,954,338	Mitigation	Energy	EDF OFF-GRID AFRICA	Framework Loan financing EDF's off-grid solar projects and ventures in Sub-Saharan Africa. The first allocations will be located in Kenya, Togo and Zambia.
India	Loan	other	150,000,000	171,232,877	Mitigation	Transport	KANPUR METRO PROJECT	The project is the construction and operation of an urban metro rail transit system in Kanpur totaling to 32.4 km with 30 stations in the largest industrial city of Uttar Pradesh, India. The project includes the development of two metro rail corridors with elevated sections (altogether 19.4 km with 18 stations) and underground sections (altogether 13 km with 12 stations) as well as acquisition of rolling stock.
Brazil	Loan	other	4,000,000	4,566,210	Mitigation	Cross-cutting	BRAZIL GENDER COVID-19 RESPONSE	Loan to the regional development institution "Banco do Nordeste do Brasil" for financing micro-enterprises, mainly targeted at women empowerment, in response to COVID-19 crisis affecting private businesses, impacting directly poverty alleviation.
Palestine	Loan	OOF	815,727	931,195	Mitigation	Cross-cutting	PALESTINE PRIVATE SECTOR COVID-19 RESPONSE	The facility aims to finance eligible small and medium sized investments undertaken by SMEs and Mid-Caps in Palestine, thereby contributing to economic resilience, employment generating activities and alleviating the economic burden of the refugee crisis in the country.
Ukraine	Loan	ODA	600,000	684,932	Mitigation	Cross-cutting	PRAVEX BANK COVID-19 LOAN FOR SMES AND MID-CAPS	The operation aims to finance eligible small- and medium-sized investments undertaken by SMEs and Mid-Caps in Ukraine.
Ukraine	Loan	OOF	400,000	456,621	Mitigation	Cross-cutting	UKRAINE DCFTA SUPPORT FACILITY	Loan dedicated to finance eligible trade transactions by SMEs and Mid-Caps acting as exporters or importers in Ukraine

APPENDIX III: OVERVIEW TABLE OF RECOMMENDATIONS

Table 17 lists the review recommendations from the technical review of the Fourth Biennial Report of the EU and explains how these recommendations were addressed in the Fifth Biennial Report.

Table 42: Review recommendations and how they were addressed

Recommendation	This recommendation was addressed as follows	Section of BR5
Table 4, issue 1 Impacts of policies and measures	Estimated impacts on greenhouse gas emissions were provided for additional policies and measures (sections [BR5] 4.2.1, [BR5] 4.2.2, [BR5] 4.3 and CTF table 3). In addition, an explanation was provided why it is not possible to estimate such impacts for many EU-wide policies and measures (section [BR5] 4.1).	4.1-4.3
Table 4, issue 3	In the biennial report, policies and measures with the target year 2020 are described, along with the corresponding policies and measures with the target year 2030. The distinction between the two periods in explained in the text for each relevant policy and measure. In CTF table 3, only the policies and measures currently in place and the most important planned policies and measures are described, i.e. those with target year 2030.	4.2, 4.3
Table 12, issue 1 Methodology for support provided	The descriptions and explanations requested by the expert review team were added in sections [BR5] 6.2, [BR5] 6.3 and in the documentation box accompanying CTF Tables 7a and 7b. Information on support provided to non-Annex I Parties is clearly explained. In addition to information on support provided to this group of Parties, the EU chose to provide sone information on support provided to other Parties.	6.2, 6.3
Table 12, issue 2 Enhancement of endogenous capacities and technologies	The African, Caribbean, and Pacific EU Technical Centre for Agricultural and Rural Cooperation, the Climate Technology Centre and Network (supported by the EU) and the project 'Boosting Rural and Urban Economy in Times of Crisis and Beyond (BOOST)' include measures taken to support the development and enhancement of the endogenous capacities and technologies.	6.4, CTF table 8

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from the European Union under the UNFCCC