European Commission

Speeding up European climate action towards a green, fair and prosperous future

EU Climate Action Progress Report

November 2021

Climate Action

"This is the make-or-break decade in the fight against the climate and biodiversity crises. Nine in ten Europeans agree that action should be taken to cut our emissions and make the European Union climate-neutral by 2050. The EU has set ambitious targets and the Commission's proposals show how we can get there. Securing a green and healthy future for all will require considerable effort in every sector and every Member State. Europe's transition will be fair, green and competitive."

Frans Timmermans
European Commission Executive Vice-President for the European Green Deal

1. MEETING THE EU'S INTERNATIONAL COMMITMENTS

The EU overachieved its 2020 reduction target for greenhouse gas emissions while a record drop was observed in 2020 due to the COVID-19 pandemic.

In 2020, EU-27 domestic greenhouse gas (GHG) emissions, including international aviation[1], were down by 31%[2] from 1990 levels and **reached their lowest level in 30 years.** If emissions and removals from the land use, land use change and forestry sector (LULUCF) are included, this results in a net emissions reduction of 34%[3]. **The EU has thus substantially overachieved its target under the UN Framework Convention on Climate Change** (UNFCCC) of reducing GHG emissions by 20% by 2020 compared with 1990[4]. Thanks to sustained decarbonisation efforts over the last decade this was already the case before the onset of the COVID-19 pandemic. Since the introduction of the EU Emission Trading System (EU ETS) in 2005, emissions in sectors covered (power generation, the bulk of industrial production and flights within the European Economic Area (EEA) have been cut by around 43%. This has contributed significantly to achieving the overall 2020 EU target. In sectors not covered by the ETS (such as non-ETS industry, transport, buildings, agriculture and waste) emissions were 16% lower than in 2005, i.e. the effort sharing target for 2020 (-10%) was also overachieved. According to preliminary simulated accounting under the Kyoto Protocol, annual accounted net credits from LULUCF decreased from 2013 to 2019.

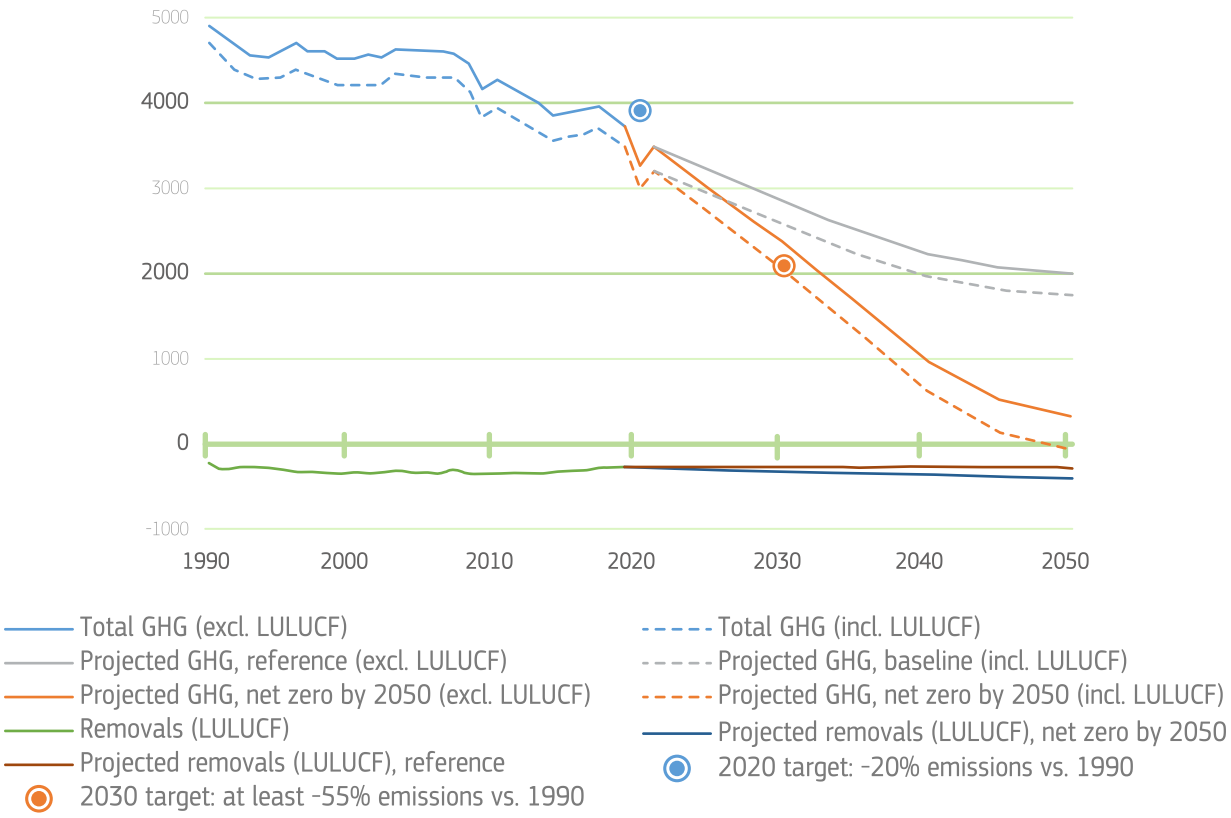
Since 1990 the **EU's combined GDP grew by more than 50%** while the GHG emission intensity of the economy, defined as the ratio between emissions and GDP[5], fell to 271g CO_2-eq/EUR2015 in 2020, less than half the 1990 level. This shows that decarbonisation and economic growth can go hand in hand as outlined in the EU's new growth strategy – the European Green Deal[6] (EGD).

Compared with 2019, GHG emissions fell by almost 10% in 2020, an **unprecedented temporary fall** in emissions due to the pandemic. Emissions from stationary installations covered by the EU ETS fell sharply by 11.4% and non-ETS emissions by 5.6%. The aviation sector experienced a record drop (-63.5%) in emissions from flights within the EEA and globally (-54%) from international aviation[7]. However, a recent study[8] shows that aviation's non-CO_2 emissions account for more than half (66%) of the aviation Effective Radiative Forcing (in 2018). This results in a need to consider how to best address non-CO_2 effects further to contribute to the EU's climate objectives and the Paris Agreement, complementary to climate action already being taken.

Despite being one of the most energy-efficient modes of transport, the maritime transport sector emitted around 3-4% of all EU CO_2 emissions in 2018-2019, with around 60% of the emissions reported from voyages to or from a port outside the EEA[9]. In 2020 the sector was also severely affected by the pandemic (-15% in CO_2 emissions year-on-year)[10]. Despite achievements so far, it is crucial to recall that a swift economic recovery may lead to a high and rapid increase in emissions, unless stimulus measures are geared toward the green transition. Lastly, given the unprecedented climate change impacts[11], **we must act faster than ever before to secure a green, just and prosperous future.**

Figure 1.

Total EU-27 GHG emissions (including international aviation) and removals 1990-2020, targets, model-based projected emissions and removals 2020–2050[12]



Major step up in European climate action

In line with the Paris Agreement, the EU set the **target of climate neutrality by 2050** in December 2019. The EU also adopted the European Green Deal (EGD), its multi-sectoral roadmap for a green and just transition, in which digital technologies are playing an increasingly critical role for climate mitigation and adaptation. In December 2020 the European Council endorsed a more ambitious 2030 target of at least -55% net emissions reduction (previously -40% GHG), following the publication of the Commission's 2030 **Climate Target Plan**[13] which proposes a more balanced path to climate neutrality. This led the EU and its Member States to submit updated **Nationally Determined Contributions (NDC)** to the UNFCCC in December 2020. By October 2021, 20 Member States[14] submitted their **long-term strategies**[15] to the EU but Member States are encouraged to consider to update and, where possible, to increase their ambition.

With the adoption and entry into force of the **European Climate Law**[16] in June 2021 both the 2030 and 2050 targets became legally binding in the EU. The law also limits the contribution that carbon removals can make towards emission reductions in 2030 to ensure that there is sufficient mitigation effort. It invites sectors to prepare roadmaps towards achieving the climate neutrality objective and establishes a **European Scientific Advisory Board on Climate Change.**

To ensure that that the EU policy framework is fit for its new 2030 climate target, the Commission proposed in July 2021 the most **comprehensive package of climate and energy legislation**[17] ever. The package seeks to introduce changes gradually and to put forward a number of tools to support a transition that is socially acceptable. In terms of GHG emissions, the package proposes to tighten the existing EU ETS and to extend the carbon pricing system to the maritime transport sector. It also proposes ways to boost the use of sustainable alternative fuels in the maritime and aviation sectors. Further, it proposes to phase out free emission allowances in the aviation sector and to implement, as appropriate, the global Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) for extra-EEA flights. In addition, the package proposes a separate emissions trading system for fuels used in road transport and buildings, a higher reduction target for CO_2 emissions of new cars and vans and a faster roll-out of the alternative fuels infrastructure. For sectors that are currently not subject to EU ETS (buildings, road and domestic maritime transport, agriculture, waste and small industries), the package strengthens the binding GHG emission reduction targets for each Member State. Specific targets are also set to preserve and grow natural carbon sinks. The package also includes higher targets for the use of renewables and measures to accelerate their deployment in all end-use sectors and to foster energy system integration. It also sets

higher energy efficiency targets and requires broader energy savings measures, including higher renovation rates of public buildings, proposes to tax energy sources in line with climate goals and puts forward measures to prevent carbon leakage. In July 2021, the Commission also adopted a new EU forest strategy for 2030[18]. This recognises the central role of forests and the entire forest-based value chain for achieving the EU's biodiversity objectives and the new GHG emissions reduction target and climate neutrality by 2050.

Given that Member States differ in their starting points and will be differently impacted by the green transition, it is **essential that this transition is just.** The strengthened emissions reduction targets for each Member State are based on their GDP per capita, with adjustments made to take into account cost-efficiency and specific national circumstances. To address distributional and social effects of the transition between and within Member States, the package also proposes to increase the size of the Modernisation Fund and to channel part of the revenues from the new ETS for road transport and buildings through the new Social Climate Fund to vulnerable households, micro-enterprises and transport users.

To adapt to the unavoidable impacts of climate change and become a climate-resilient society by 2050, the Commission adopted its **new strategy on adaptation to climate change[19]** in 2021. It urges smarter, faster and more systematic adaptation to reinforce adaptive capacity and minimise vulnerability to climate impacts of Member States and the EU as a whole and to step up cooperation with partner countries around the world. In October 2021, the EU submitted its **EU Adaptation Communication** to the UNFCCC, setting out the EU's ambitions as defined by the EU Adaptation Strategy, as well as through examples of Member States' good practices[20].

Adapting to climate change in urban areas

The HARMONIA project financed by Horizon 2020 (2021-2025) aims to help urban areas cope with climate change and extreme events using GEOSS and Advanced Modelling Tools. The project will deliver an Integrated Resilience Assessment Platform (IRAP), a system that allows stakeholders to model a range of planning options against a number of climate change scenarios, in order to mitigate climate change effects in urban areas.

Financing the green transition

The green transition will require unprecedented investments in innovation and new technologies in the years to come. The EU will need an estimated **€390 bn annually[21,22]** in additional investment, compared to the period 2011-2020, to meet its 2030 emissions-reduction target, alongside the **€130 bn per year[23]** for other environmental goals. To do this, alignment of all sources of finance – public and private, national and multilateral – is required. The new Multiannual Financial Framework (MFF), Next Generation EU (NGEU), regulatory and public-private initiatives, and the July 2021 package are all proposing substantial increases of climate funding.

To help unlock private investments[24] the **Renewed Sustainable Finance Strategy[25]** was adopted in 2021. To reorient private capital, the Commission adopted the **Sustainable Finance Taxonomy Regulation[26]** , which sets a framework for the EU taxonomy - a classification of environmentally sustainable economic activities for companies, investors and policymakers. Its first part focuses on climate change mitigation and adaptation in certain sectors[27]. Other environmental and social dimensions will be completed in 2022. By the end of 2021, the Commission will publish a report describing the provisions required to cover economic activities that do not have a significant impact on environmental sustainability and economic activities that significantly harm environmental sustainability[28]. The EU continues to work with its key partners in the **International Platform on Sustainable Finance[29]** on how to facilitate cross-border sustainable investments, notably, through a potential **Common Ground Taxonomy.** Furthermore, the Commission has proposed a **Corporate Sustainability Reporting Directive (CSRD)[30]** that would amend existing non-financial reporting requirements, extend the scope of reporting to all large companies and all companies listed on regulated markets, except listed micro-enterprises, and foresees the audit of reported information. This would greatly improve transparency.

In the EU, **industrial alliances** are part of the policy toolkit to mobilise investments in key sectors. Those include the European Batteries Alliance, the Clean Hydrogen Alliance and the European Raw Materials Alliance.

Towards a green and just recovery

Since the outbreak of the pandemic in 2020, the EGD has been at the centre of EU efforts when designing the recovery package and the EU's long-term budget (2021-2027). Following the European Council's agreement last year, **at least 30% of the €1.8 trillion of both the temporary recovery instrument NGEU and the 2021–2027 budget** will be used for climate-related policies and programmes, amounting to €540 bn. The Commission will finance 30% of NGEU through the issuance of green bonds, building on the climate expenditure under the **Recovery and Resilience Facility** (RRF). To receive support from the RRF[31], a centrepiece of the NGEU, in 2021 Member States had to prepare national recovery and resilience plans (RRPs) on how they intend to spend their national allocations. These plans must be in line with the National Climate and Energy Plans, meet a specific 37% climate expenditure target and comply with the principle of 'do no significant harm' (DNSH) to avoid any negative impact on climate and environmental objectives[32]. The Member States that have seen their RRPs assessed by the Commission have overachieved the above target by allocating around 40% to climate[33].

The **Just Transition Mechanism** was set up to ensure that the transition towards a climate-neutral economy happens in a fair way, leaving no one behind. This new tool is expected to mobilise around €55 bn to alleviate the socio-economic impact of climate transition in the most affected regions and sectors. Member States are preparing **Territorial Just Transition Plans** (TJTPs) identifying the most negatively affected territories and outlining their transition process and. To achieve the energy and climate targets it is crucial that investments support reskilling and upskilling of workers in sectors negatively affected by the transition and smoothen labour market transitions[34]. In addition, a Just Transition Platform[35] has been set up to assist regions relying on solid fossil fuels and carbon-intensive industries, and provide space for open dialogue and exchanges.

Just Transition Platform - offering technical assistance and space for open dialogue and exchanges for regions relying on coal and carbon-intensive industries

The Platform provides a single access point for stakeholders, comprehensive technical and advisory support, and offers dedicated project and expert databases. High-level events take place twice a year and there are dedicated stakeholders working groups (steel, cement, chemicals and horizontal stakeholders strategy).

Latest event with Member States, local and regional authorities, non-governmental organisations, social partners, and EU institutions covered both declining and transforming sectors by integrating the Coal Regions Virtual Week and the Carbon-intensive Regions Seminar. Stakeholders discussed challenges and opportunities and exchanged best practices regarding the development of territorial just transition plans (TJTP) and programmes, for instance, in Wielkopolska region (lignite) in Poland and in Norrbotten (iron and steel) in Sweden.

Cities and citizens increased climate action

The fight against climate change is a collective responsibility. People and cities across the EU are increasingly taking action. In December 2020, the Commission launched the **European Climate Pact**[36] to give citizens a greater role in designing both mitigation and adaptation actions, and an effective platform to do so. By July 2021 there were more than 1000 applications to join the Pact, and over 500 citizens are already fully active ambassadors[37].

By the end of 2020, some 9900 European cities had joined the **EU Covenant of Mayors**[38], with a collective commitment to reducing GHG emissions by 30% by 2020 and by 47% by 2030 compared with 2005. Under the Horizon Europe programme for research and innovation, the Commission is also launching the **mission 'climate-neutral and smart cities'** for at least 100 cities to become climate-neutral by 2030 and to foster experimentation and innovation while other missions – on adaptation to climate change, on oceans and inland waters and on soil health – will promote climate action through broad-based citizen engagement.

Co-Creating Positive and Sustainable Lifestyle Tool

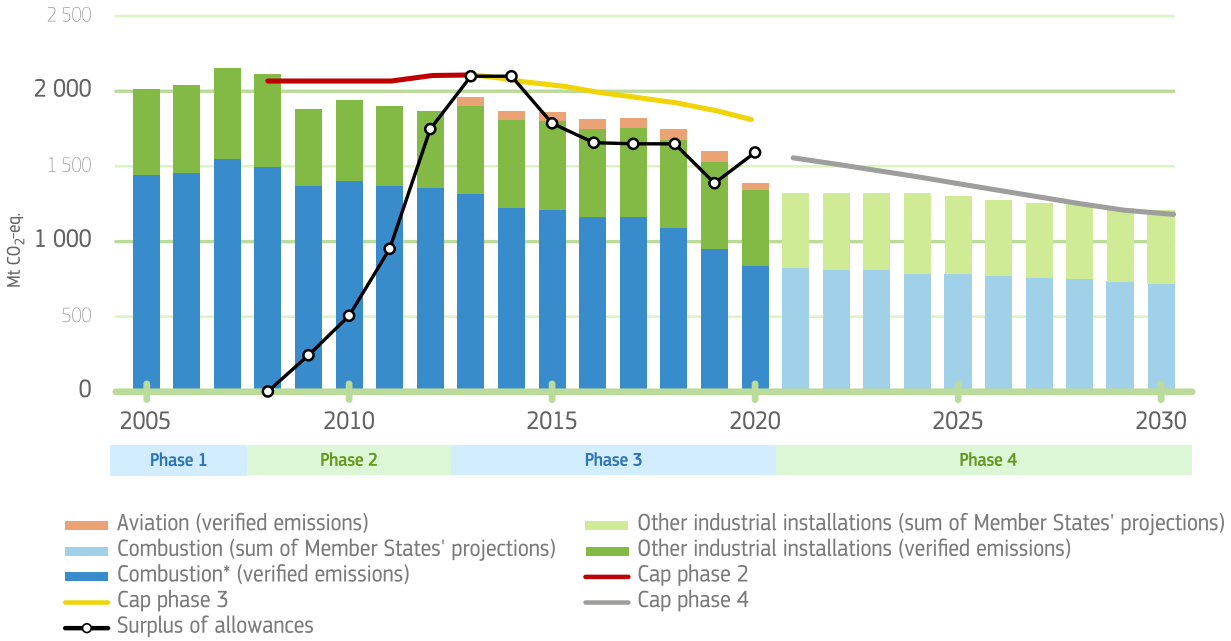
The PSLifestyle project (2021-2025) financed under the Horizon 2020 Green Deal call aims to help close the gap between climate awareness and individual action, and to increase citizen participation in sustainability topics. It aims to build a data-driven momentum for sustainable behaviour change across eight European countries. This by engaging citizens through a digital application to co-research, co-develop and to take up everyday life solutions for climate change by providing them with tools for collection, monitoring and analysis of their environmental and consumption data.

2. THE EU EMISSIONS TRADING SYSTEM

The EU Emissions Trading System (ETS)[39] presently covers around 36% of EU's total GHG emissions from close to 9500 power stations and manufacturing plants (i.e. stationary installations), and flights within the EEA[40]. In total, by 2020 EU ETS emissions from stationary installations had already fallen by 43% since 2005[41]. This decrease was mostly driven by the electricity and heat production sectors (-15%), reflecting both previously identified decarbonisation trends (such as switching from coal to natural gas-fired power generation and replacement of fossil fuels by renewable energy sources driven by EU and Member States renewable energy policies) and, in 2020, reduced electricity consumption due to the pandemic. In 2020, it is estimated that, due to the effects of the pandemic, emissions from stationary installations decreased by 11.4%, while emissions from industry saw the greatest decrease (-7%) since the start of EU ETS phase 3 in 2013 and aviation saw a record drop (-63.5%).

Figure 2.

Verified (historical) ETS emissions 2005-2020 in Mt CO_2-eq[42], Member State projections with existing measures 2021-2030, ETS cap phases 2, 3 and 4, and accumulated surplus of ETS allowances 2008-2020, including UK (Northern Ireland), Norway and Iceland



The last couple of years of phase 3 were marked by a reinforced carbon price signal. This was also the case in 2020 and 2021 when, despite the difficult economic situation in industry and aviation due to the pandemic, the carbon price remained strong due high gas prices and market anticipation of the increased 2030 climate ambition. Carbon prices have increased over 2021, which contributed to higher electricity wholesale prices but to a much smaller extent than the increased gas price.

Each year, the Commission publishes the surplus of allowances for the preceding year. In May 2021, the 2020 surplus was around 1.58 bn[43], somewhat higher than in 2019 (1.39 bn), as emissions kept decreasing due to the pandemic. Given the current surplus, auction volumes from September 2021 to August 2022 will be reduced by 378 m allowances. The first review of the **Market Stability Reserve[44],** operational since 2019, showed that it has fulfilled its objective to reduce the historical surplus and stabilise the market, even in the face of reduced emissions due to the COVID-19 outbreak. Namely, it led to an intake (reduced auction volumes) of nearly 1.1 bn allowances so far, and this is expected to continue in the coming years.

Regarding **international credits,** at the onset of phase 3, market analysts estimated that the quantity of international credit entitlements used over phases 2 and 3 (2008-2020) would amount to approximately 1.6 bn credits. As of May 2021[45] , the total number used or exchanged was around 1.565 bn, accounting for almost 98% of the estimated maximum. In phase 3 alone (2013-2020), 506.3 m international credits were exchanged. As per the provisions of the EU ETS Directive, international credits may no longer be used for EU ETS compliance in the system's fourth trading period (2021-2030).

Revenues from the auctioning of allowances on the European carbon market continued to grow in 2020 due to an increasing carbon price. Total revenues generated by Member States, the UK and EEA countries from the auctions between 2012 and 30 June 2021 were close to €83.5 bn. In 2020 alone, the generated total revenues were €16.5 bn (EU27 plus EEA) or €19 bn when including the UK. In the first six months of 2021 revenues (EU-27 plus EEA) were close to €14 bn[46].

Actions in aviation and maritime transport

Emissions from extra-European aviation, i.e. resulting from incoming flights to the EEA and flights departing to other countries, with the exemption of flights departing to the UK and Switzerland, are currently not priced under the EU ETS, in accordance with the "stop the clock" provision in the EU ETS Directive.

During 2021, the EU continued to support the implementation of the initial International Maritime Organisation GHG reduction Strategy with a focus on short-term measures. The Commission also signed a memorandum of understanding for a new Horizon Europe Partnership that will invest up to €3.8 bn in research and innovation to develop and demonstrate deployable zero-emissions solutions for all main ship types and services by 2030. In July 2021 the Commission proposed to extend the EU ETS to include emissions from the maritime transport and to boost the use of sustainable alternative fuels in the sector.

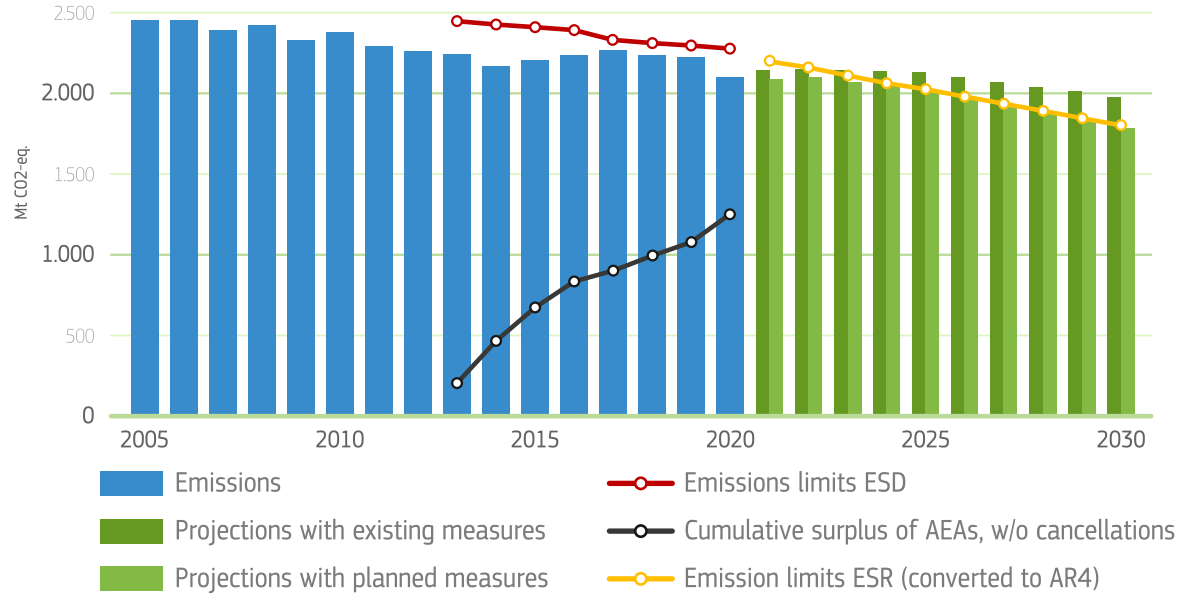
3. EFFORT SHARING EMISSIONS

Emissions from sectors not included in the ETS, such as transport, non-ETS industry, buildings, agriculture and waste, are covered by the EU effort sharing legislation. The Effort Sharing Decision (ESD) sets national emissions targets for 2020, expressed as percentage changes from 2005 levels. It also sets annual emissions allocations (AEAs) which Member States[47] must respect. Similarly, the successor Effort Sharing Regulation[48] (ESR) sets national emissions targets for 2030 and AEAs for the period 2021-2030, including for Iceland and Norway . Iceland and Norway took further steps to implement the ESR and by now both countries have submitted their national plans to the Commission[50, 51].

Since the effort sharing system was launched in 2013, EU-wide emissions have been below the overall limit each year. EU-27 emissions covered by the ESD were almost 11% lower in 2019 in comparison to 2005. Thus, the 2020 target (-10%) was over-achieved already before the COVID-19 crisis set in (Figure 3).

Figure 3.

Emissions in sectors covered by effort sharing legislation 2005-2030 and annual emission allocations (AEAs), EU-27 and Iceland and Norway (Mt CO_2-eq) (see details in the SWD)[52]



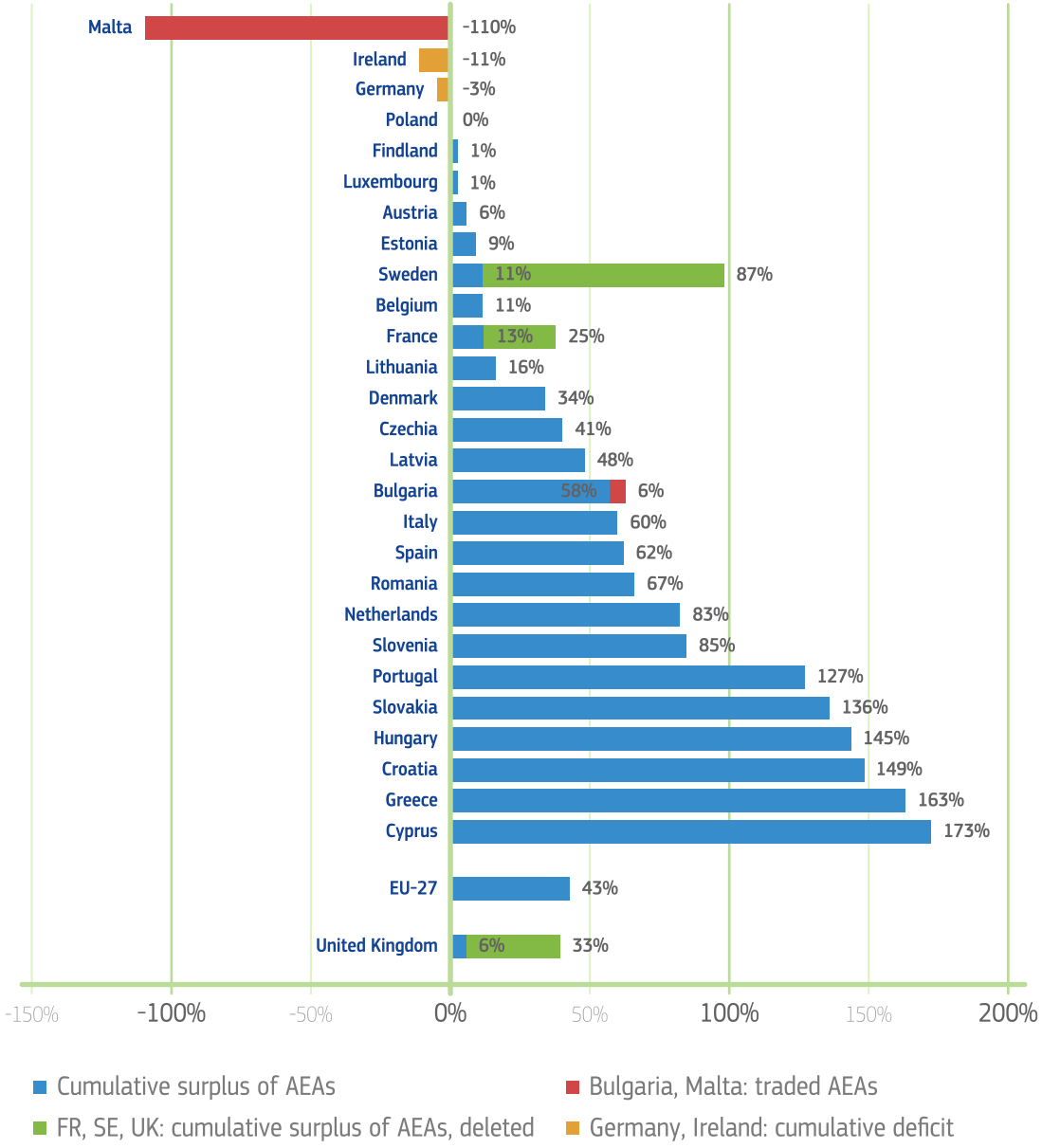
Member State compliance with effort sharing obligations 2013-2020

All Member States have complied with their effort sharing obligations in 2013-2018. Malta exceeded its AEAs in each of these years, but covered the deficit by purchasing AEAs from Bulgaria. In 2018, Austria, Belgium, Bulgaria, Cyprus, Estonia, Finland, Germany, Ireland, Luxembourg and Poland also exceeded their AEAs but could use saved surpluses from previous years. Sweden and UK cancelled AEA surpluses in 2018 to improve the environmental integrity of the system[53]. All other Member States banked surplus allocations for possible later use. No international project credits from the clean development mechanism or joint implementation were used to comply with the effort sharing obligations.

The compliance cycle for 2019 is ongoing. Based on the annual inventory review under the ESD, Malta's emissions exceeded its AEAs by 22% and therefore it will again need to purchase them. Emissions in nine other Member States[54] exceeded the 2019 AEAs by up to 18%. Except for Ireland and Germany, these countries have enough AEA surplus banked from previous years. Proxy inventory data for 2020 shows that Bulgaria, Cyprus, Finland, Germany, Ireland and Malta exceeded their AEAs, ranging from 0.4% (Finland) to 14% (Ireland). Member States which do not have banked surplus AEAs (Ireland, Germany and Malta) can use the ESD flexibility mechanisms (beyond banking and borrowing AEAs).

Figure 4.

Cumulative surplus of AEAs as percentage of 2005 base year emissions, 2013-2019 for EU-27 and the UK

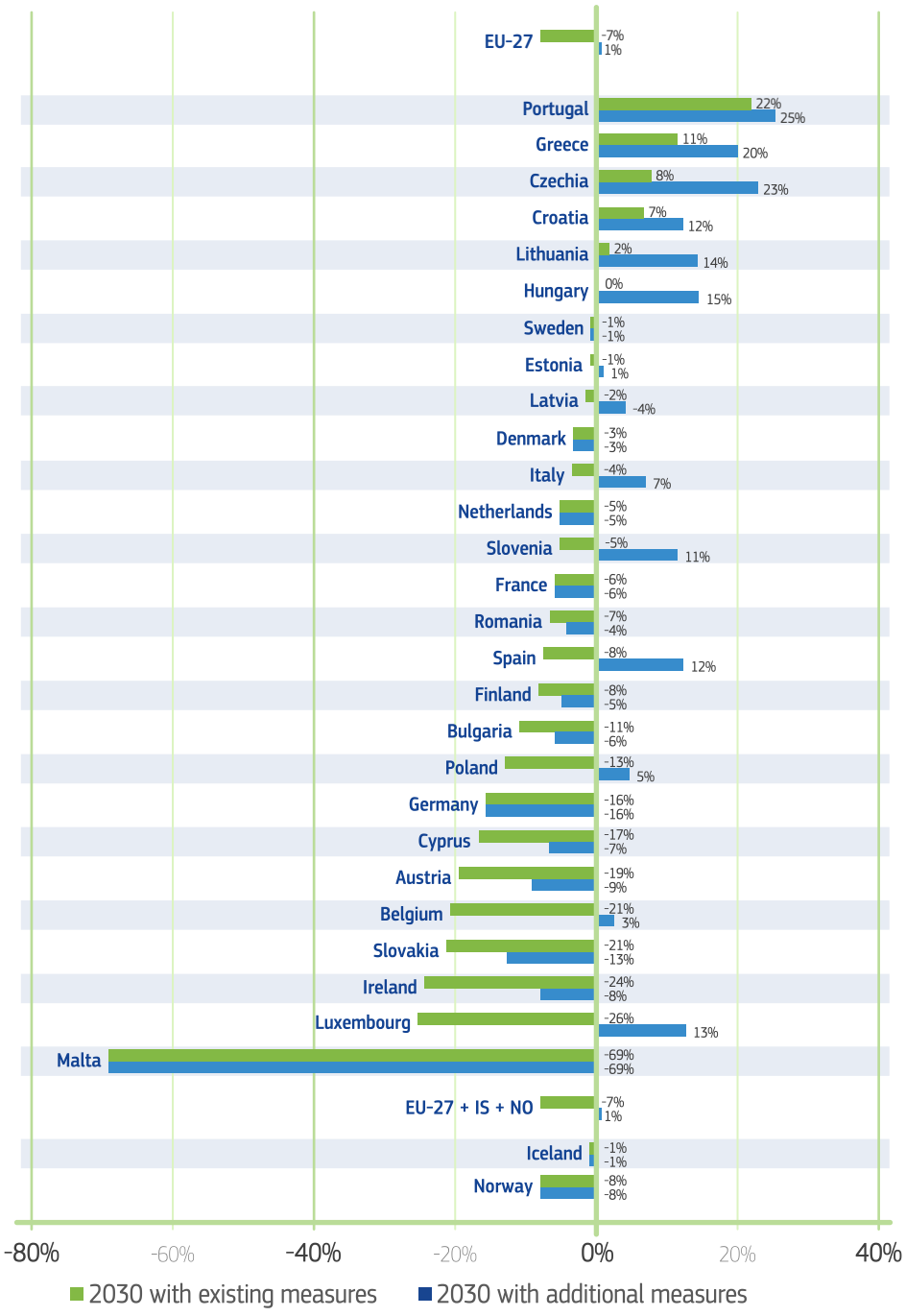


Progress towards the 2030 effort sharing targets

Member States are planning, adopting and implementing policies and measures to achieve their current 2030 effort sharing targets under the ESR. If currently implemented national policies are aggregated, the EU-27 would, compared with 2005, reduce effort sharing emissions by 22% by 2030. This is well below the current 30% overall emissions reduction target and the more ambitious target of 40% proposed in July 2021. Even if all additional policies reported by Member States were to be implemented, the 30% would be just met. This underpins the strong and imminent need for Member States to plan and implement additional climate action in the effort sharing sectors.

Figure 5[55].

Gaps between 2030 ESR targets and projected emissions[56] with existing measures and with additional measures as a percentage of 2005 base year emissions for EU-27, Iceland and Norway. Positive values indicate projected overachievement of targets; negative values indicate that projected targets are not going to be met.

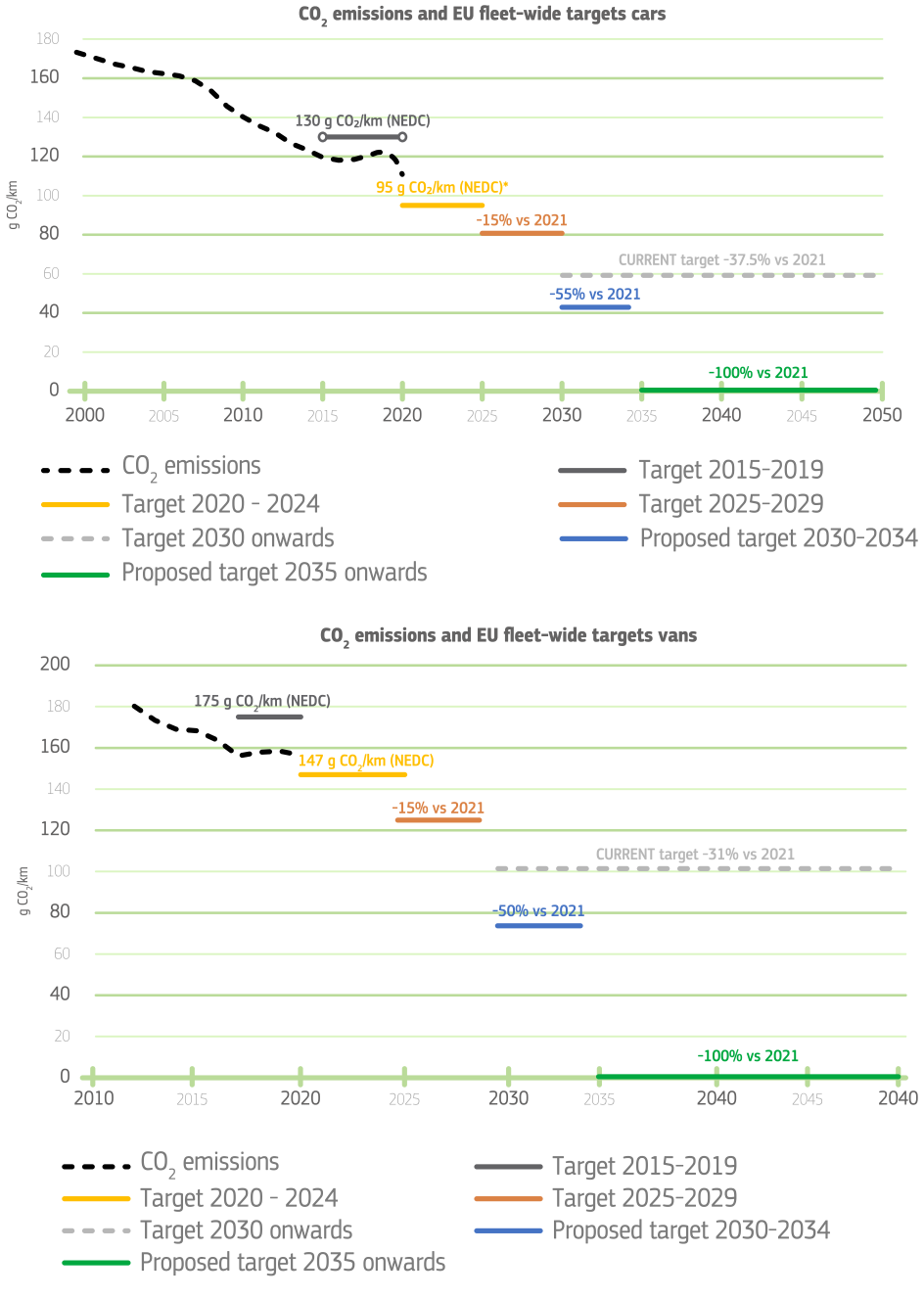


Policies in key sectors

In the **road transport sector,** the second largest source in the EU, emissions had – after a dip following the financial crisis – again reached their 2005 level in 2019. They are expected to rebound after the pandemic and are not likely to fall without additional measures. **CO_2 emissions standards for new cars and vans and for heavy-duty vehicles** are thus key drivers for reducing road transport emissions. Average emissions from new cars decreased from 122.3 g CO_2/km in 2019 to 107.8 g CO_2/km in 2020[57]. This is by far the greatest annual decrease since CO_2 standards were introduced in 2010, thanks to the phase-in of a stricter EU fleet-wide CO_2 target in 2020. In addition, it shows the effect of targeted recovery measures put in place by Member States which stimulated the uptake of zero- and low-emission vehicles and investments in recharging infrastructure. In 2020 electric car registrations tripled compared with 2019 (up from 3.5% to over 11%, of which 6% are full electric vehicles and 5% plug-in hybrids). In 2020 average emissions for new vans also decreased to 155.7 g CO_2/km, thanks to stricter standards (Figure 6). Heavy-duty vehicles, such as lorries, heavy vans, buses & coaches, contribute about 30% of road transport's total CO_2 emissions. Existing legislation requires average CO_2 emissions of a manufacturer's fleet of new heavy lorries to be reduced by 15% and 30%, as from 2025 and 2030, respectively, compared with the 2019 baseline.

Figure 6.

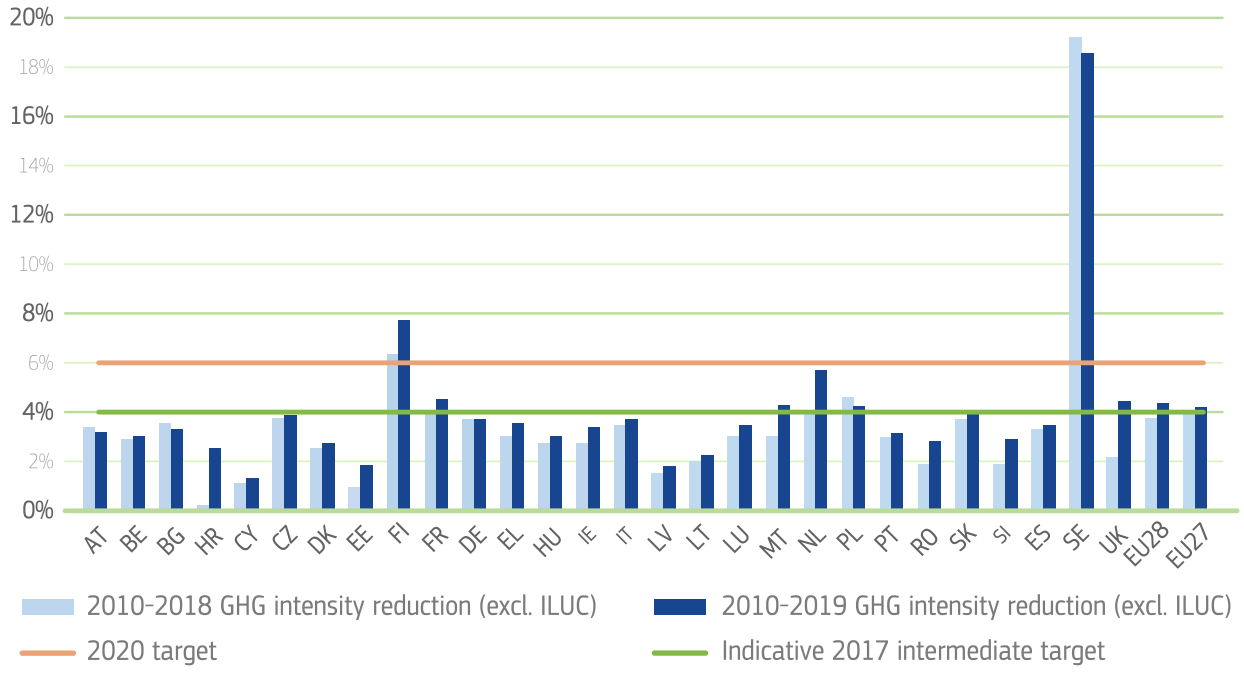
Average emissions (g CO_2/km) for newly sold cars and vans and fleet-wide targets[58]



Another tool used in the transport sector to decrease emissions is the Fuel Quality Directive, which requires life-cycle GHG emissions intensity of fuels to be reduced by 6% by 2020, compared with 2010. The average GHG intensity of fuels supplied in 2019 was 4.3% lower than in 2010 (Figure 7). The progress achieved varies greatly across reporting countries and almost all Member States need swiftly to take further action to meet the 2020 target. In July, the Renewable Energy Directive revision proposed a GHG intensity reduction target of 13% for all transport fuels by 2030. In addition, Member States need to meet sub-targets for renewable fuels of non-biological origin (2.6%) and advanced biofuels (2.2%).

Figure 7.

Reductions in GHG intensity of fuels achieved by EU fuel suppliers in 27 Member States and the UK, 2010-2019



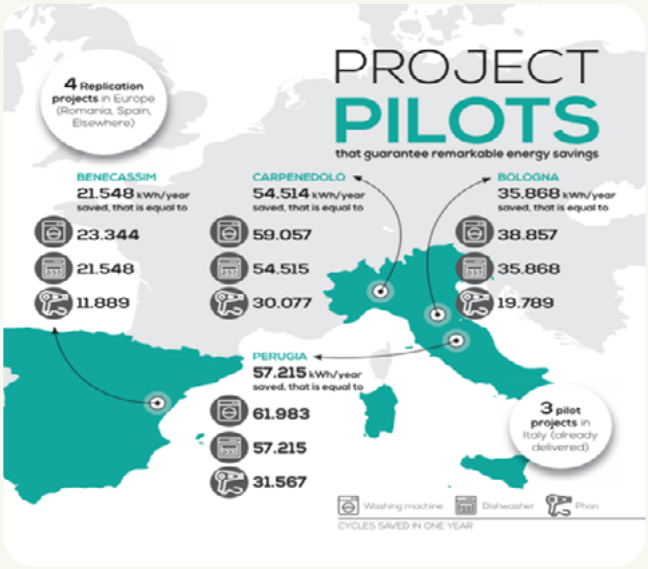
Fluorinated gases (F-gases) are very powerful GHG and their emissions are counted under the ESD. Since 2019 the EU must also comply with consumption limits for hydrofluorocarbons (HFCs) under the Montreal Protocol on substances that deplete the ozone layer. The current Regulation on F-gases[59] aims to cut emissions by promoting a shift from highly warming F-gases towards gases with a lower global warming potential. In 2020, the amount of F-gases supplied to the EU market had already been reduced by 40% compared with 2015, when measured in terms of its potential climate effect. Also, the EU was well below its 2020 HFC consumption limit under the Protocol. In 2021 the Commission continued to expand its real-time monitoring system - the EU Single Window Environment for Customs - so as to help Member State competent authorities prevent illegal imports of HFCs not covered by the quota system.

In many cases, F-gases replaced **ozone-depleting substances** (ODS), which are often also very potent GHG gases. By now the EU has phased out ODS and it successfully met its obligations under the Montreal Protocol. However, since ODS may still be used for certain exempted activities, it is essential to continue to enforce related policies

Reducing GHG emissions in commercial refrigeration sector

The LIFE C4R project (2018-2021) demonstrated the feasibility and efficiency of innovative technological solutions for reducing GHG emissions and particularly HFCs in the commercial refrigeration sector.

The project covered five pilots (three in Italy, one in Spain and one in Romania), all using the two innovative technologies developed to increase the efficiency of the refrigeration systems with CO_2. The monitoring results confirmed that the combination of high efficiency and use of low global warming potential (GWP) natural refrigerant (i.e. CO_2 has GWP=1) guarantees the lowest possible impact on climate change. The energy saving - compared to conventional CO_2 systems - is 13% for Full Transcritical Efficiency (active in all seasons) and 16% for Extreme Temperature Efficiency (active in summer above 30°C outdoor temperature). Without taking into account the direct benefits linked to the use of low GWP refrigerant (both in terms of gas leakage and end of life management), the energy savings were evident in all cases ranging from 34.2% to 11.8%.



4. LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF)

LULUCF can generate GHG emissions into the atmosphere but also remove CO_2 from it. Between 2013 and 2020, Member States committed to ensure that GHG emissions and CO_2 removals from additional action are accounted towards the reduction target under the Kyoto Protocol. As of 2021, the EU's 2030 Climate and Energy Framework integrates emissions and removals from the land sector using a set of accounting rules adapted from the Kyoto Protocol.

The LULUCF Regulation[60] requires each Member State to ensure that accounted GHG emissions from land use, land use change and forestry are balanced by at least an equivalent accounted removal of CO_2 from the atmosphere from 2021-2030 (the "no-debit" rule). Forest Reference Levels of the Member States for the period 2021-2025 have also been set[61]. The EFTA Surveillance Authority (ESA) adopted these levels for Iceland and Norway[62] following a similar process.

Figure 8.

Reported (R) and preliminary accounted (A) emissions and removals under the Kyoto Protocol, second commitment period, EU-27[63]

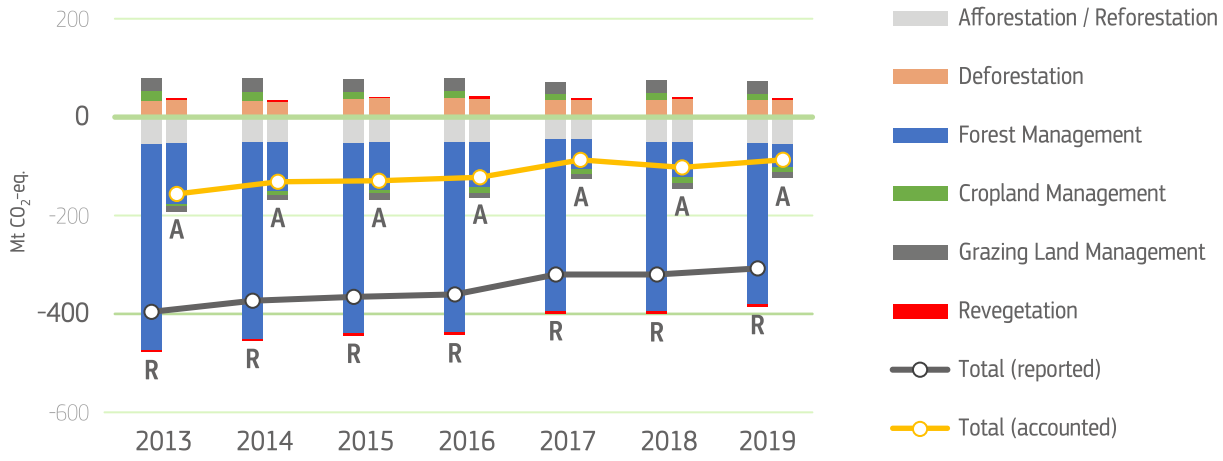


Figure 8 shows for the 2013-2019 period a decreasing sink of 'reported' emissions and removals per activity for the EU with average net removals of - 344.9 Mt CO_2-eq. Applying the specific Kyoto Protocol accounting rules, the 'accounted' balance produced an average sink (or credit) of -115.0 Mt CO_2-eq. The accounted net credits decreased from -153.3 to -85.3 Mt CO_2-eq[64]. These quantities include both 'mandatory', i.e. afforestation/reforestation, deforestation and forest management, and 'elected' activities under the KP[65].

The main driver for the EU LULUCF sink decline is the decrease in reported net removals and accounted net credits by Forest Management for 2013 -2019[66]. The decline in carbon removals is due to a mix of factors, including an increase in wood demand (e.g. 2018 in Finland), an increasing share of forests reaching harvest maturity (Estonia, Latvia) and an increase in natural disturbances such as insect infestations (Czechia since 2015), storms (2019 in Poland), droughts and forest fires (e.g. 2017 in Italy and Portugal)[67]. According to preliminary estimates, using the accounting rules for the Kyoto Protocol second commitment period, Cyprus, Finland and Netherlands have average net LULUCF debits smaller than 1 Mt CO_2-eq per year. Higher levels of debits are forecasted for Czechia, Latvia and Slovenia (2.6, 2.4 and 3.9 Mt CO_2-eq per year, respectively).

Forest management practices

The Haut Languedoc forest (France) is located at the intersection of different climatic regions and has suffered by high dieback of trees. The LIFE FORECCAST project (2016-2020) provided forest owners and managers with tools to help build their forest management strategy in view of climate change. A mobile phone application was developed to help evaluate and manage the risk of forest dieback, and was used to diagnose 4 300 ha of forests. New climate change management practices were carried out, including reforesting over 30 000 trees belonging to 32 species.

To reverse the decline in LULUCF net removals, the Commission proposed a new target of -310 Mt CO_2 eq. in 2030 for the carbon sink and a climate neutral land sector combining LULUCF net removals and emissions from livestock and fertilisers in 2035[68].

Emission reduction in the livestock sector with co-benefits in grasslands

The LIFE BEEF CARBON project develops innovative livestock farming systems and associated practices. Project partners are raising climate awareness, testing and promoting innovative practices for emission reduction and carbon sequestration at the farm level, providing advisory approaches and creating BEEF CARBON action plans in France, Ireland, Italy and Spain.

5. ADAPTING TO CLIMATE CHANGE

Climate adaptation is now mainstreamed into EU policies and the long-term EU budget. By 2020, all Member States had put in place a national adaptation strategy or plan. The Climate-ADAPT platform has become a reference for adaptation knowledge. In 2021, the Commission adopted its **new EU strategy on adaptation to climate change**[69], which sets out the path on how to prepare for the unavoidable impacts of climate change and to become climate resilient by 2050. This by improving and exchanging knowledge (e.g. via EU platforms and observatories), and collecting more and better data on climate-related risk and losses. The strategy highlights that policy developments at all levels and sectors should be supported, especially **local and just resilience.** It explores the macro-fiscal relevance of climate change and natural disaster risks and underlines the importance of integrating climate resilience into national fiscal frameworks. It also emphasises nature-based solutions.

Swifter adaptation solutions will be tested and scaled up through the Horizon Europe mission on adaptation to climate change. The aim is to support at least 150 regions and communities and to test at least 75 deep demonstrations. Horizon Europe missions on Soil health, Climate-neutral cities, and Oceans and inland waters are also directly relevant to action on adaptation.

Natural Water Retention Measures in the Altovicentino area (Italy)

The communities of Santorso and Marano Vicentino implemented several measures (e.g. bio retention, detention basins, porous paving, rain gardens) to cope with the increasing risk of floods, landslides and erosion due to increasing precipitation and land use as part of the LIFE BEWARE project. They deployed Natural Water Retention Measures (NWRMs) to increase the resilience of their territory to flooding in five locations in Santorso and two in Marano Vicentino (Italy). The interventions aim at solving existing hydraulic problems and preventing future ones. They are also used as best practice examples.

Detention basin after its construction in the agricultural area of Giavenale

First assessment of reporting on national adaptation policies

Starting in 2021 Member States are required to report on their national adaptation policies[70]. All Member States have completed this reporting. While it is still premature to assess actual progress in implementation, a snapshot of observed key hazards and future risks can be taken, against which progress can be measured in 2023[71].

The most frequently observed acute hazards in Member States are heatwaves and droughts (in all countries), heavy precipitation (leading to floods), storms, landslides and wildfires (a high number of countries in each climatic zone[72]). Most frequently observed chronic hazards are changing temperatures, changing precipitation patterns and types (as well as increased variability) and coastal erosion. There are also some hazards that stand out but are only reported in specific climatic zones: water scarcity, soil degradation and erosion appear to be almost absent in the north; the change in wind patterns is reported to affect mainly the north and the east; saline intrusion is especially problematic in the south. Overall, Finland, France and Spain reported the highest number of hazards and Ireland, Italy and Luxembourg the lowest. More than 60% of Member States mentioned health, agriculture and food, forestry, biodiversity, water management, tourism and energy as sectors that are mostly affected by future climate-induced risks. Portugal, Spain and Sweden reported the highest number of sectors subject to future risks.

6. FINANCING CLIMATE ACTION

Mainstreaming climate policies into the EU budget

As shown in Chapter 1, the transition to climate neutrality and climate resilience requires substantial investments. At least **30%** – the highest share ever – **of the next EU long-term budget** (2021-2027) is allocated for climate action (up from 20% in the 2014-2020). This means around €625 bn compared to around €210 bn in the previous period. Specific spending programmes have higher climate targets (Horizon Europe - 35%, Cohesion Fund - 37%, Common Agricultural Policy (CAP) - 40%, Connecting Europe Facility (CEF) - 60%, LIFE - 61%, the Just Transition Fund[73] - 100%), contributing even a larger share to the overall budget ambition.

To be able to benefit from **loans and grants for up to €723.8 bn under the RRF,** Member States were preparing Recovery and Resilience Plans (RRPs) in 2021. These Plans include investments and reform initiatives that have an added value for the EU as a whole, such as, the development and use of renewables including hydrogen, building renovation and energy efficiency, and roll-out of infrastructure for alternative fuels or railway transport. The specific target of 37% of expenditure on climate has been overachieved, as the combined climate investments of 22 assessed RRPs approved by the Commission[74] amounted to €177 bn, or around 40% of the total RRF funds allocated. About 43% of the amount allocated to climate measures will target renewable energy and networks and energy efficiency, and 35% sustainable mobility. Thus, RRPs can already help Member States achieve the more ambitious targets for 2030. The Commission has integrated the technical screening criteria from the EU Taxonomy where feasible to track climate spending under the RRF and structural funds. The NGEU green bond framework adopted in September 2021 provides the necessary guarantees that proceeds will finance green and climate investments under the RRF.

The Just Transition Mechanism (JTM) is expected to mobilise around €55 bn (2021-2027) of investments and consists of three pillars:

1. **Just Transition Fund** of at least €25 bn;
2. **InvestEU "Just Transition" scheme** -a budgetary guarantee under the InvestEU programme to mobilise private investments;
3. **Public Sector Loan Facility** which will combine €1.5 bn of grants from the EU budget with €10 bn of loans from the European Investment Bank (EIB) to mobilise around €18 bn of public investment.

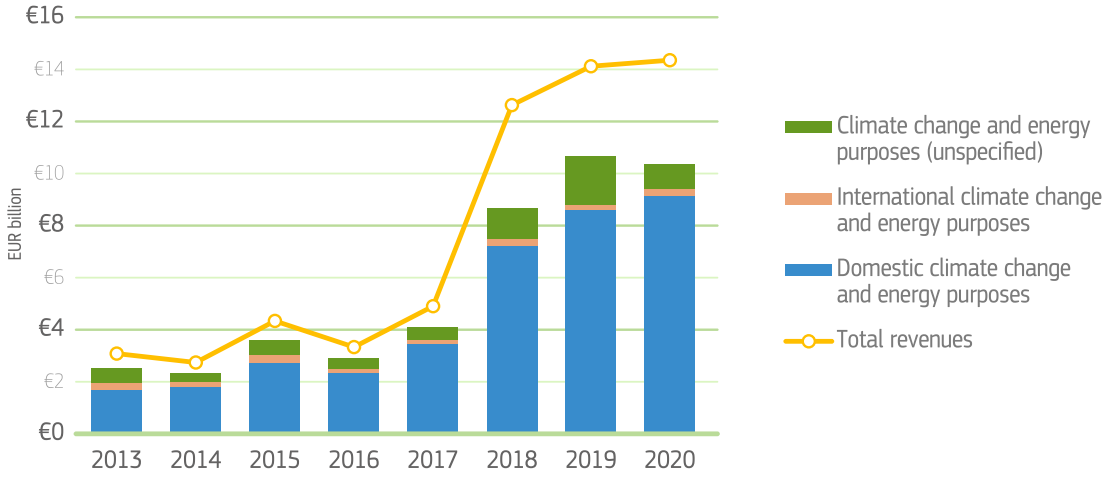
As of 2021, parts of different EU programmes that contribute to the EGD such as CEF, Horizon Europe programme, Innovation Fund, LIFE programme, Loan Facility under JTM etc. will be managed by a single entity - the European Climate, Infrastructure and Environment Executive Agency (CINEA).

Member State use of revenues from the auctioning of EU ETS allowances

With the significant carbon price increase in phase 3, auctioning revenues increased accordingly – up from €3.1 bn in 2013 to €14.4 bn in 2020 in the EU-27. Based on annual reporting, it is estimated that 75% of total revenues (€56.5 bn) was used for climate and energy purposes during phase 3 and 72% in 2020. In practice, Member States spend more on climate change and energy than their auctioning revenues[76] .

Figure 9.

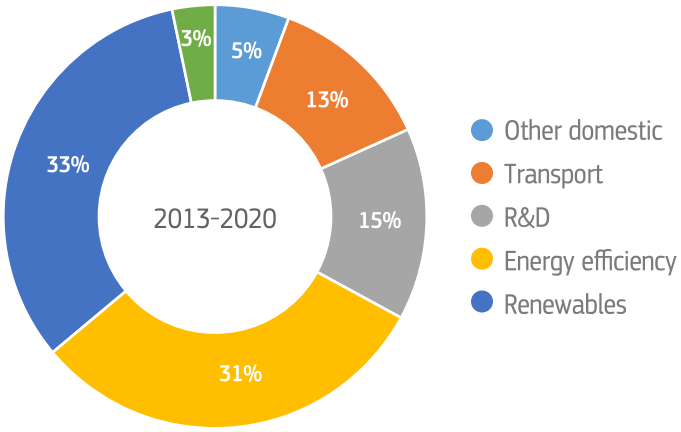
Auctioning revenues and reported usage, (€ bn), 2013-2020 EU-27



During phase 3 the additional annual revenues from rising carbon prices were mainly spent domestically while the reported annual international spending has been fairly stable (ca €100-200 million/year). The latter has been mostly channelled to developing countries via multilateral funds and institutions. Figure 10 shows how the reported revenues have been spent since 2013.

Figure 10.

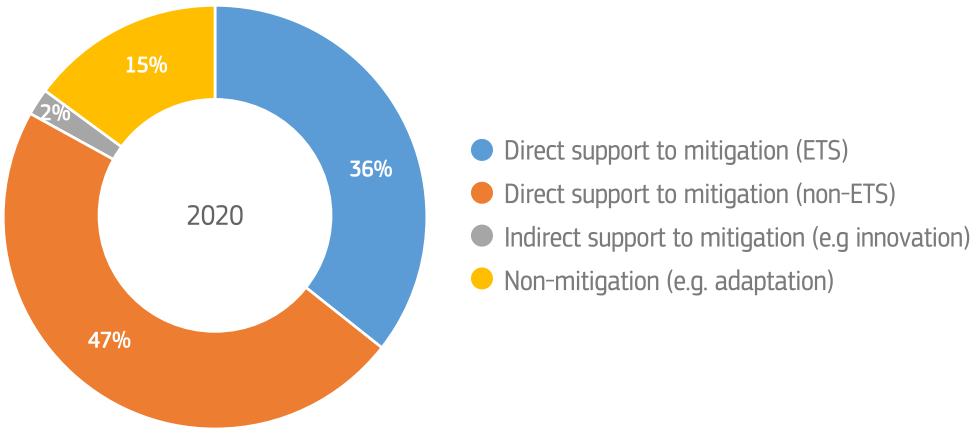
Reported domestic and international share of revenues spent on climate change and energy, 2013-2020, EU-27



Lastly, in 2020[77], Member States spent most of their reported revenues on direct support i.e. on the installation of technologies that reduce emissions (e.g. renewables).

Figure 11.

Reported share per type of support spent on climate change and energy domestically (incl. planned) in 2020 EU-27



NER 300 programme

The NER 300 is a large-scale funding programme for innovative low-carbon energy demonstration projects in the EU linked to renewable energy technologies and environmentally safe carbon capture and storage (CCS) on a commercial scale. The programme is funded from the monetisation of 300 m emission allowances from the New Entrants Reserve under ETS phase 3. In total, 39 projects have been awarded €2.1 bn of funding in 20 Member States. Projects are at different stages but 23 were withdrawn due to difficulties in raising sufficient equity and/or attracting additional financial support.

These withdrawals led to a release of almost €1.5 bn. The amended NER 300 Decision allowed to reinvest €708.7 m of unused funds through the existing financial instruments. Under the InnovFin Energy Demonstration Projects (InnovFin EDP) and the CEF Debt Instrument, both managed by the EIB, another three innovative projects on charging and energy storage, hydrogen production and distribution benefited from funding. The remaining unspent funds will be channelled to the Innovation Fund with €746.6 m already having been transferred. This shows that the blending mechanism put in place is working efficiently with the perspective of full allocation of undisbursed funds by the end of 2022.

NER 300 funds re-invested via the CEF DI

The EVERFUEL GREEN HYDROGEN project includes the deployment of a hydrogen distribution infrastructure and a hydrogen production plant to supply green hydrogen to a large-scale fleet of Fuel Cell electric buses (FC buses) in Denmark. The financing of EUR 20.7 million is supported by the CEF and the NER300 Programme.

Innovation Fund

The Fund is financed from the auctioning of 450 m allowances between 2020 to 2030 and any unspent funds from the NER300 programme. It pools together around €25 bn (at a carbon price of €50/tonne) until 2030 and is one of the world's largest programmes for commercial demonstration of innovative low-carbon technologies in energy intensive industries, innovative renewables, energy storage, and CCUS.

In 2020, first calls for proposals attracted significant interest from companies of all sizes and from various sectors in the EU-27, Iceland and Norway. For small-scale projects, 32 were selected and invited for grant preparation for a total volume of € 118 m. Under the large-scale call 66 best-ranked projects (out of 311 applications) submitted complete proposals worth €6 bn (against a call volume of €1 bn). Of these, 15 large-scale projects were selected for Project Development Assistance (€4 m).

Modernisation Fund

The Modernisation Fund, operational since 2021, is one of the key funding instruments supporting decarbonisation in 10 lower income Member States, including just transition. It is financed from the auctioning of more than 640 m ETS (2020-2030) allowances, which includes voluntary transfers from beneficiary Member States, and pools together around €31 bn (at a carbon price of €50/tonne) until 2030.

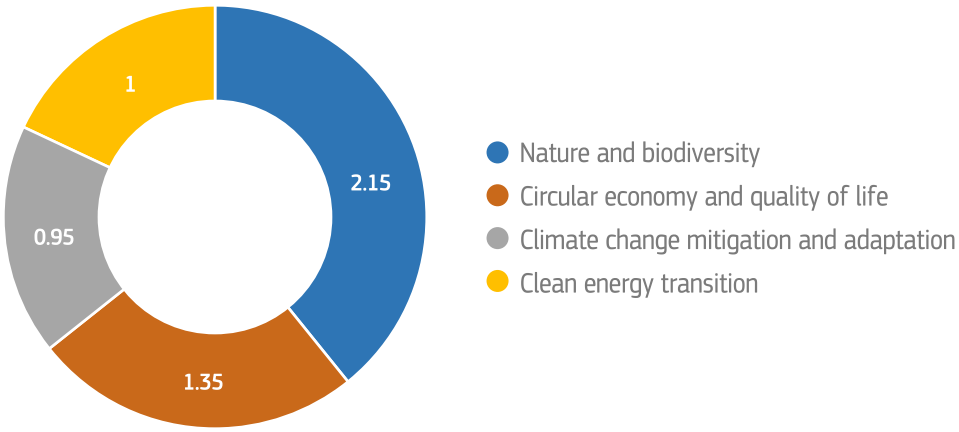
In the first biannual disbursement cycle, six multiannual schemes worth €304 m are being funded in Czechia, Hungary and Poland targeting renewables, energy efficiency, smart grids, and development of the power grid and energy communities.

LIFE programme

The LIFE programme is the EU's funding instrument for the environment and climate action and co-finances projects with European added value. For 2021-2027 period the budget has been substantially increased to €5.43 bn and allocated to four sub-programmes:

Figure 12.

Budget allocation for LIFE 2021-2027 (€ bn)



The number of proposals submitted under the 2020 LIFE Climate Action calls was considerably higher than in previous years. In addition, the new sub-programme Clean Energy Transition contributes directly to climate change mitigation and most of the Environment projects also bring related climate benefits.

Technical Support Instrument (TSI)

Tailored technical support for design and implementation of climate reforms continued to expand with almost one in three TSI 2021 projects supporting the EGD. Some Member States received technical support when preparing their RRPs while more than 60% of TSI 2021 projects support their implementation, including the DNSH principle, and/or the green components of their Plans. In 2021 a training on green budgeting took place and 17 Member States received support to prepare their TJTPs.

7. INTERNATIONAL CLIMATE ACTION

The EU continued to lead by example on how to achieve climate neutrality and climate resilience by 2050. In line with the Paris Agreement, the EU raised its 2030 target and submitted updated NDCs to the UNFCCC. In implementing the Paris Agreement, the EU cooperates with international partners, encourages and assists delivery of highest possible ambitions, and has shown solidarity in addressing the impacts of climate change. After the EU, over 50 other countries representing over half of the world economy have committed to net-zero emissions around mid-century, including the China, the United States and Japan. In recent months, the EU initiated new climate dialogues with India and the US, and a green alliance with Japan.

Western Balkans and the European Neighbourhood

The EU continued to support the development of long-term strategies and monitoring reporting and verification systems to help improve governance and to mobilise resources, both in the Pre-Accession and the Neighbourhood countries.

At the end of 2020, the Western Balkans' leaders committed to climate neutrality by 2050 and to reduce fossil fuel subsidies and endorsed an Economic and Investment Plan of €9 bn. This funding can be used to leverage €20 bn through the new Western Balkans Guarantee Facility. The Energy Community[78] intensified its work to adopt the 2030 Energy and Climate Framework, a Decarbonisation Roadmap and the Governance Regulation[79], and Renewable Energy and Energy Efficiency Directives.

Good progress in dialogue on climate issues has been made in the framework of the Union for the Mediterranean, especially with Morocco and Jordan. Eastern Partnership countries have confirmed their commitment to step up cooperation and adopted an Economic and Investment Plan in 2021. To align its policies and legislation with the EGD, Ukraine started a dedicated dialogue with the EU. The EU also supported the update of NDCs for Moldova, Georgia and Armenia through the regional project EU4Climate.

Supporting developing countries

The EU and its 27 Member States are the world's largest provider of international public climate finance and make a substantial contribution to the developed countries' collective goal to provide USD100 bn per year to support climate action in developing countries. This contribution has more than doubled since 2013 reaching almost €22 bn in 2019[80]. As an example, the Global Climate Change Alliance Plus (GCCA+) initiative helped fund 80 climate resilience and NDCs preparation projects in Africa, Asia, the Caribbean and the Pacific.

The 2021 EU strategy on adaptation aims to scale up international finance to build climate resilience and promote sharing of best-practices and expertise while promoting sub-national, national and regional approaches in partner countries. The global Technical Assistance Facility was launched in 2020 to help enhance NDCs, formulate and implement national adaptation plans, land policies and practices, disaster risk reduction strategies and low-carbon/climate-neutral development strategies. In 2021, the EU outlined actions to further mainstream climate change impacts and environmental factors into humanitarian aid policy and practice[81].

Finally, between 2021 and 2027 Global Europe is expected to dedicate some €28 bn to climate action by combining all EU external action programmes into one financing tool. Programming work at country, regional and thematic levels is currently underway and prioritises climate change in for example peace-building and crisis response.

Capacity building in African Regional Climate Centres

Funded by the 11th European Development Fund (EUR 85 million), the ongoing Climate Services and Related Applications (ClimSA) Programme is strengthening the capacity of African Regional Climate Centres to convert data into user-friendly information for decision-makers at all levels, eventually informing the design and implementation of NDCs and National Adaptation Plans (NAPs) and other cross-cutting and sectoral planning, including poverty reduction, nature conservation and disaster risk reduction (DRR) strategies.

Technical notes

[1]All departures of flights from EU airports.

[2]Approximated EU GHG inventory based on Member States' submissions. Gap-filling was done for BG using data from the EUTL, Eurostat, Eurocontrol, 2021 projections and previous years' data.

[3]Data from Member States' 2021 projections was used to gap-fill LULUCF for DK, EE, HR, HU, LV and SI.

[4]In addition to the target under the UNFCCC, the EU-27, together with IS and the UK, also committed to a binding emissions reduction for the second commitment period of the Kyoto Protocol (2013-2020). The target is to reduce emissions by 20%. See SWD for details.

[5]Ratio given for illustration, statistically imprecise as GDP (national accounting) and emissions (territory) have different scopes.

[6]COM(2019) 640 final.

[7]ICAO, C-WP/15209, May 2021.

[8]SWD(2020) 277 final.

[9]Regulation (EU) 2015/757.

[10]Preliminary estimations based on THETIS-MRV data.

[11]IPCC, first part of the Sixth Assessment Report, 2021.

[12](1) Historical GHG emissions and removals (1990-2020) are based on European Environment Agency's 2021 GHG Inventory. (2) Projected emissions and removals (2021-2050) are based on the EU Reference Scenario 2020 ("reference"; grey lines) and the MIX Policy Scenario (orange lines) supporting the "Delivering the European Green Deal" policy initiatives. (3) GHG emissions and projections use global warming potentials of the 4th Assessment Report of the IPCC to convert non-CO_2 emissions into CO_2-equivalent emissions. (4) The 2030 target (EU Climate Law) is defined as: 'the net GHG emissions, i.e. emissions after the deduction of removals, are reduced economy-wide and domestically by at least 55 % compared to 1990 levels'. For comparability, the '2030 target' dot is represented at -55% of the net GHG emissions level in 1990.

[13]COM(2020) 562 and SWD(2020) 176 final.

[14]AT, BE, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IT, LV, LT, NL, PT, SE, SI, SK. A summary assessment table is provided in the SWD. In July 2021, LT presented an update of its initial LTS. In September 2021, Hungary adopted its final national long-term strategy confirming the goal to achieve climate neutrality by 2050. The strategy has not yet been formally submitted to the Commission. In July 2021, the government of Luxembourg adopted a draft national long-term strategy. A public consultation will be carried-out before its final adoption.

[15]In accordance with Article 15 of Regulation (EU) 2018/1999 stating that MS should submit their LTS by January 2020.

[16]Regulation (EU) 2021/1119.

[17]COM(2021) 550 final. See SWD for more details.

[18]COM(2021) 572 final.

[19]COM(2021) 82 final.

[20]https://unfccc.int/documents/307266

[21]SWD(2021) 621 final.

[22]These estimates do not include investments such as reskilling and upskilling of the workforce; support for labour market transitions and restructuring; and direct income support to vulnerable households.

[23]COM(2020) 456 final.

[24]'Sustainable finance' refers to the process of taking due account of climate, environmental and social considerations in investment decision-making, leading to increased investments in longer-term and sustainable activities.

[25]SWD(2021) 180 final.

[26]Regulation (EU) 2020/852.

[27]Commission Delegated Regulation supplementing Regulation (EU) 2020/852 by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives (C/2021/2800 final).

[28]Report required under Article 26(2) of the Taxonomy Regulation.

[29]This brings together 17 countries representing over 55% of world GHG emissions.

[30]COM(2021) 189 final.

[31]Regulation (EU) 2021/241.

[32]For instance investments in fossil fuels and infrastructure, investments in new roads or waste incineration are not allowed.

[33]The expenditures reported for the RRF are estimates processed by the Commission based on the information on climate tracking published as part of the Commission's analyses of the recovery and resilience plans. The data reported covers the 22 national recovery and resilience plans assessed and approved by the Commission by 5 October and the amount will evolve as more plans are assessed.

[34]2020 Employment and Social Developments in Europe review.

[35]https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism/just-transition-platform_en

[36]https://europa.eu/climate-pact/index_en

[37]https://europa.eu/climate-pact/ambassadors/meet-our-ambassadors_en

[38]https://www.covenantofmayors.eu/about/covenant-initiative/covenant-in-figures.html

[39]Covers EU-27, Iceland, Liechtenstein, Norway and Northern Ireland. Until 2021 it covered the UK.

[40]Covers only CO_2 emissions from flights within the EEA, departing flights to Switzerland and the UK.

[41]Verified emissions from Union Registry.

[42]Due to ETS scope changes, time-series are not consistent before 2013. The figure includes all countries participating in the EU ETS in the respective years. Cap phase 4 with existing 40% target. The cap for 2021-2030 reflects the UK withdrawal.

[43]C(2021) 3266 final.

[44]Annex 7 of SWD (2021) 601 final.

[45]The exchange of international credits was possible until end of April 2021 i.e. the end of the 2020 compliance cycle.

[46]All amounts include allowances auctioned for the Innovation and Modernisation Funds.

[47]Under the Withdrawal Agreement, the UK continues to apply key ESD provisions.

[48]Regulation (EU) 2018/842.

[49]ESA decision No. 204/21/COL of 21 July 2021.

[50]December 2019: Norway's National Plan related to the Decision of the EEA Joint Committee No. 269/2019 of 25 October 2019.

[51]November 2020: Iceland's National Plan – Issued in accordance with Declaration related to the Decision of EEA Joint committee No 269/2019 of 25 October 2019.

[52]Figure based on reported projections by Member States under the Regulation (EU) 2021/1119, compiled and quality checked by the European Environment Agency. Until 2020 figures include EU-27 only and as of 2021 also Iceland and Norway.

[53]Sweden deleted 5.8 Mt and the UK 27.4 Mt.

[54]AT, BE CY, DE, EE, FI, IE, LU, PL.

[55]The aggregated AEAs for the 27 Member States do not exactly match the current EU-level effort sharing reduction targets expressed in percent. See SWD for more details.

[56]European Environment Agency gap-filled missing "projections with additional measures" with "projections with existing measures". The original data have different metrics, which a conversion approximately corrects. The gaps are thus provided here for illustrative purposes only. See SWD for more details.

[57]Provisional data published by the European Environment Agency.

[58]Targets for 2020-2024 to be calculated in the Worldwide Harmonised Light Vehicle Test (WLTP).

[59]Regulation (EU) 517/2014.

[60]Regulation (EU) 2018/841.

[61]Delegated Regulation (EU) 2021/268, accompanying SWD/2020/0236 final and scientific analysis (Vizzarri, M., Pilli, R., Korosuo, A. et al. Setting the forest reference levels in the European Union: overview and challenges. Carbon Balance Manage 16, 23 (2021)).

[62]ESA Decision No 157/20/COL of 16 December 2020.

[63]Reported emissions and removals from LULUCF under the Kyoto Protocol shown here are based on specific activities and are not the same as land-based reported emissions and removals from LULUCF under the UNFCCC Convention inventory in Figure 1.

[64]The pattern in the time series of reported emissions and removals for the EU differs from accounting due to the application of accounting rules, notably by applying a cap to credits by Forest Management equal to 3.5% of total GHG emissions in the base year.

[65]DK, DE, IE, ES, IT and PT elected to include in their accounts Cropland Management; DE, DK, IE, IT and PT also elected Grazing Land Management; RO elected Revegetation.

[66]Other noteworthy trends or dynamics: net removals or credits by Afforestation/Reforestation decreased by 7 Mt CO_2-eq in 2017; net emissions (credits) by Cropland Management decreased (increased) by 5 Mt CO_2-eq over the 7-year period.

[67]Grassi, G., Fiorese, G., Pilli, R., Jonsson, K., Blujdea, V., Korosuo, A. and Vizzarri, M., Brief on the role of the forest-based bioeconomy in mitigating climate change through carbon storage and material substitution, Sanchez Lopez, J., Jasinevičius, G. and Avraamides, M. editor(s), European Commission, 2021, JRC124374.

[68]This is based on land-based LULUCF emissions and removals reported to the UNFCCC. The average EU net removals in the LULUCF sector were -268 Mt CO_2-eq between 2016-2018.

[69]COM(2021) 82.

[70]Article 29 of Regulation (EU) 2018/1999.

[71]See details in the SWD.

[72]Country grouping into climatic zones according to a frequently used nomenclature in climate-related assessments of the European Environment Agency and of the Commission: northern (DK, EE, FI, IE, LT, LV, SE), eastern (BG, CZ, HU, PL, RO, SK), southern (CY, EL, ES, HR, IT, MT, PT, SI) and western (AT, BE, FR, DE, LU, NL).

[73]Regulation (EU) 2021/1056.

[74]See footnote 33 for explanations on methodology used.

[75]SWD(2021)242.

[76]See SWD for overview of revenues and reported spending per year.

[77]In 2020 Member States reported for the first time on the type of support used domestically as per Article 5 of the Implementing Regulation (EU) 2020/1208.

[78]Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Georgia, Moldova, Montenegro, Serbia and Ukraine.

[79]Regulation (EU) 2018/1999.

[80]2020 data forthcoming.

[81]COM(2021) 110 final.

Commission Staff Working Document (SWD), technical information

CONTENTS

1. OVERVIEW OF EU CLIMATE TARGETS

Table 1:

Overview of existing and proposed new climate targets (in the "Delivering the European Green Deal" package - July 2021)

	International commitments		EU domestic legislation				
			2020 Climate and Energy Package		2030 Climate and Energy Framework		
	The EU's commitment under the Kyoto Protocol (KP)	The EU's commitment under the Paris Agreement	EU ETS	Effort Sharing Decision (ESD)	EU ETS	Effort Sharing Regulation (ESR)	LULUCF
Target year of period	Second commitment period (2013-2020)	Already in force – covers the period post 2020	2013-2020	2013-2020	2021-2030	2021-2030	2021-2030
Emission reduction target	-20%	At least -55% net emissions in 2030	-21% in 2020 compared to 2005 for ETS emissions	-10% in 2020 compared to 2005 for non-ETS emissions Annual targets by MS.	-43% in 2030 compared to 2005 for ETS emissions <u>Proposed new target</u>: -61%	Annual targets by MS. In 2030 -30% compared to 2005 for non-ETS emissions <u>Proposed new target:</u> -40%	No-debit target based on accounting rules <u>Proposed new targets</u>: • For 2030 the EU target is -310 MT CO2-eq • For 2035 the EU target is a climate neutral land sector (combining LULUCF and emission from agriculture non-CO2).
			Overall target: -20% GHG emissions reduction vs 1990		<u>Overall target</u>: at least -55% net domestic reduction vs 1990		
Further targets	-	• Limiting global warming to well below 2°C • Every 5 years to set more ambitious targets 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.					

	International commitments			EU domestic legislation				
	The EU's commitment under the Kyoto Protocol (KP)		The EU's commitment under the Paris Agreement	2020 Climate and Energy Package		2030 Climate and Energy Framework		
				EU ETS	Effort Sharing Decision (ESD)	EU ETS	Effort Sharing Regulation (ESR)	LULUCF
Base year	1990, but subject to flexibility rules. 1995 or 2000 may be used as its base year for Nitrogen trifluoride (NF3)		1990	2005	2005	2005	2005	Subject to accounting rules
				1990 for overall emission reduction target		1990 for overall emission reduction target		
LULUCF	Included: afforestation, reforestation and deforestation and forest management, other activities if elected (new accounting rules)		Included: Contributes to the commitment of decreasing emissions by at least -55%.	Excluded from target, but reported in inventories.		Included: Contributes to the commitment of decreasing emissions by at least -55%. The Climate Law limits contribution of removals to the net target at the minimum level of 225 million tonnes (Mt) of CO2 equivalents.		
Aviation[1]	Domestic aviation included. International aviation not attributed.		Civil aviation included: outgoing flights that start in the EU (emissions calculated on the basis of fuels sold in the EU).	EU ETS: Domestic (national) and intra-EEA international aviation included.	ESD: CO_2 from domestic aviation excluded	EU ETS: Domestic and intra-EEA international aviation and departing flights to UK and CH included.	ESR: CO_2 from domestic aviation excluded. Aviation generally excluded.	
Use of international credits	Use of KP flexible mechanisms subject to KP rules		The EU will not use international credits (according to its NDC)	Upper limit for credit use for period 2008-2020 at a maximum of 50% of the reduction effort below 2005 levels.	Annual use of carbon credits is limited to up to 3% of each Member State's ESD emissions in 2005	No[2]	No	No
Carry-over of units from preceeding periods[3]	Subject to KP rules including those agreed in the Doha Amendment		No	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[4], PFCs, SF_6, NF_3		CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	CO_2, N_2O, PFCs,	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6	CO_2, N_2O, PFCs,	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	CO_2, CH_4, N_2O
Sectors included	Energy, IPPU, agriculture, waste, LULUCF	Energy, IPPU, agriculture, waste, LULUCF	Energy, IPPU, agriculture, waste, LULUCF	Power & heat generation, energy-intensive industry sectors, aviation	Transport (except aviation), buildings, non-ETS industry, agriculture (non-CO_2) and waste	Power & heat generation, energy-intensive industry sectors, aviation	Transport (except aviation), buildings, non-ETS industry, agriculture (non-CO_2) and waste	Land use, land use change and forestry
Global Warming Potentials used	IPCC SAR	IPCC AR4	IPCC AR5	IPCC AR4		IPCC AR5		
Applicable to number of MS	15 (additional KP targets for single MS)	EU-27, UK and Iceland	EU-27	EU-27[5]		EU-27[6]		

2. GREENHOUSE GAS EMISSIONS COVERED BY THE KYOTO PROTOCOL AND THE CLIMATE AND ENERGY PACKAGE

Table 2.

Emissions covered by the EU Climate and Energy Package and by the Kyoto Protocol, second commitment period 1990, 2019 and 2020 targets (Mt CO_2-eq. and % change from base year emissions)

	Base year emissions (Mt CO2-eq.)	1990 emissions (Mt CO2-eq.)	2019 emissions (Mt CO2-eq.)	2019 emissions (% change from base year)	2020 targets (Mt CO2-eq.)	2020 target (% change from base year)
Climate and energy package:						
Total GHG emissions, including international aviation (EU-27, Convention scope)	4925	4925	3743	-24%	3940	-20%
Kyoto Protocol:						
Total GHG emissions, excluding international aviation (EU-27+IS+UK, KP scope)	5876	5669	4067	-31%	4701	-20%

Table shows progress towards the EU's 2020 targets as defined under the EU Climate and Energy Package and under the Kyoto Protocol. The main differences between the two approaches are the sectoral coverage and the geographical scope. Notably, emissions from international aviation are included in the Climate and Energy Package, but excluded under the Kyoto Protocol. The geographical scope of the commitment under the Kyoto protocol includes Iceland, the United Kingdom and certain regions not included in the Climate and Energy Package.

Under the Kyoto Protocol, base year emissions differs from 1990 because some Member States have used a different base year. Moreover, for NF_3 emissions, 1995 or 2000 may have been used as base year.

Under the Kyoto Protocol, Member States also need to account for emissions and removals from certain activities of land use, land use change and forestry (LULUCF) by applying the accounting rules of the Kyoto Protocol. Table does not include emissions and removals from LULUCF. For the EU as a whole, the LULUCF sector has been a net accounted sink in 2013-2019, thereby contributing to achieving the commitment.

3. MAIN ELEMENTS OF THE COMMISION'S PROPOSALS FOR REVISED AND NEW LEGISLATION UNDER THE "DELIVERING THE GREEN DEAL" PACKAGE, JULY 2021

Carbon pricing

- Stronger carbon pricing system with additional revenues generated feeding into the **revamped Innovation Fund and Modernisation Fund.** For the Innovation Fund an additional 50 million allowances from the existing ETS, 150 allowances from the new emission trading sectors, and the allowances that will be freed from the introduction of the Carbon Border Adjustment Mechanism. The Commission proposes to increase the Modernisation Fund by an additional 2.5% of allowances from the current ETS.
- **A new Social Climate Fund** to support EU citizens most affected or at risk of energy or mobility poverty to ensure a fair transition leving noone behind. The Fund will provide EUR 72.2 billion between 2025-2032 in funding for renovation of buildings, access to zero and low emission mobility as well as income support.
- A new **Carbon Border Adjustment Mechanism** which puts carbon price on imports of targeted products to avoid 'carbon leakage'.

Effort-sharing

- New target of -40% at EU27 level by 2030 compared to 2005 (from current -29%), in line with cost-efficient projections for 2030, for sectors currently not subject to EU ETS (buildings, road and domestic maritime transport, agriculture, waste and small industries), with national targets ranging from -10% to -50%.
- Current scope stable, flexibilities and compliance regime maintained, and a new safety reserve proposed.

Energy

- Higher binding target for renewables in the EU's final energy consumption (40% by 2030), with Member States setting national contributions in the Governance process.
- Higher and binding energy efficiency targets at EU level to achieve an overall reduction of at least 9% by 2030 compared to 2020 Reference Scenario projections for 2030 (equivalent to a reduction of 36% for final and 39% for primary energy consumption compared to the 2007 Reference Scenario projections for 2030), with Member States setting their national contributions based on a new formula.
- Revision of minimum tax rates for heating and transport fuels/energy carriers.
- Phase out of exemptions and reduced tax rates that encourage fossil fuels use.
- Binding increase in the use of renewable energy in heating and cooling (+1.1 percentage points annually until 2030) in the Member States.
- Indicative target of 2.1 percentage points renewable energy and waste heat and cold in district heating and cooling.

Industry

- New indicative target of a 1.1 percentage point annual increase in renewable energy use in industry.
- 50% of renewable share in hydrogen consumption.

Buildings

- From 2026 a separate new emissions trading system to be set up for fuel distribution for buildings that would also cover fuels in road transport.
- Higher annual renovation rate of at least 3% of total floor area of all public buildings in the Member States.
- A benchmark of 49% of renewables in buildings by 2030.

Transport

All transport modes:

- A GHG intensity reduction target of 13% for all transport fuels by 2030 (Renewable Energy Directive revision). In addition, the Member States would need to ensure that sub-targets of 2.6% renewable fuels of non-biological origin and 2.2% advanced biofuels are achieved.

Road

- More ambitious targets for reducing CO_2 emissions of new cars and vans:
  - New car registrations: 55% in 2030 and 100% in 2035 compared to 2021.
  - New vans: 50% by 2030 and 100% by 2035 compared to 2021.
- From 2026 fuels in road transport to be covered by a separate emissions trading system which will also cover fuels in buildings.
- Targets for alternative fuels infrastructure on major highways (every 60 km for electric charging and every 150km for hydrogen refuelling).

Aviation

- Phase out of free emission allowances and alignment with ICAO's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) as appropriate.
- Promotion of sustainable aviation fuels with an obligation for fuel suppliers to blend increasing levels of sustainable fuels in jet fuels for all departures from EU airports.
- Taxation of fuel used for intra-EU passenger flights with reduced rates applicable to sustainable aviation fuels. Major airports would be required to provide an electricity supply to planes at all gates.

Maritime

- Carbon pricing with the extension of the EU's Emissions Trading System to large ships (above 5000 gross tonnage) covering all CO_2 emissions from intra-EU voyages and 50% of the emissions from extra-EU voyages.
- Promotion of sustainable alternative fuels in shipping and at European ports by limiting the greenhouse gas intensity of the energy used on-board large ships and by mandating the use of onshore power supply for certain ship types.
- Taxation of fuel used for intra-EU waterborne regular service navigation, fishing and freight transport (same EU minimum rates as applicable to agriculture).

Restoring nature and biodiversity

- A new target of -310 Mt CO_2 eq. for the EU carbon sink by 2030 and national targets to increase absorption of CO_2.
- Aiming for climate neutrality in the land sector combining LULUCF and emissions from agriculture non-CO_2 by 2035.
- A roadmap to plant 3 billion trees by 2030.
- New strict criteria to avoid unsustainable forest harvesting and to ensure high-biodiversity.

4. COMMISSION'S ASSESSMENT OF NATIONAL LONG-TERM STRATEGIES

By October 2021, 20 Member States[7] had submitted their long-term strategies, as required by the Governance Regulation[8]. Of these, 13 Member States[9] clearly expressed their aim to achieve climate neutrality or carbon neutrality[10] by 2050 or before[11]. Others aim to be largely climate neutral[12] or to achieve reductions of 80-95% by 2050. Whereas most of the national strategies received to date reflect the ambition to be climate neutral by 2050, they do not yet allow to conclude that the long-term strategies are adequate for the collective achievement of the objectives and targets of the Energy Union. Providing information on any remaining collective gap would have required a more complete and detailed set of strategies, including on the role of land use and removals. This underlines the importance to continue developing policies to increase and meet ambition over time. Overall, the recommended content[13] on needs for research, development and innovation, estimated long-term investments and CO_2 intensity of GDP is not covered comprehensively while information linked to energy consumption and certain sector specific emission reductions is often missing[14]. Member States are therefore encouraged to consider to update and, where possible, to increase the ambition of their national long-term strategies.

Table 3:

Summary table

Country (date of submission)	Overall LTS goal by 2050	Projected GHG emission reductions by 2050 (% change compared to 1990)	all gases emissions	including LULUCF	incl. International maritime and aviation	Share of renewable energy in gross final energy consumption by 2050	Projected final energy consumption by 2050 (% change compared to 2005)	Highlights from investment needs, enabling policies and socio-economic impact	Key reporting gaps
Austria (27/12/2019)	Climate neutrality	(-74% , -84%)	yes	no	yes	(76% , 93%)	(-52% , -38%)	positive impact on GDP and jobs natural and technical sinks needed to reach carbon neutrality	CO2 intensity of GDP investment needs socio-economic impact
Belgium (02/03/2020)	Different regional goals	(-85% , -87%) (excluding ETS sector)	?	no	no	n.a.	n.a.	investment needs significant in buildings exposure of agricultural system to climate change address energy poverty	information at national level GHG and CO2 intensity of GDP emission reductions for ETS and LULUCF
Croatia (24/06/2021)	Unspecified	(-57% , -73%)	yes	no	?	(53.2% , 65.6%)	(-25% , -37%)	overall impact on GDP uncertain, around 40'000 new green jobs additional investment above 1.5% of GDP	reductions and removals in LULUCF socio-economic impact emission reductions industrial sectors
Czechia (20/12/2019)	Unspecified	-80%	?	no	?	n.a.	n.a.	investment peak with expansion of CCS strengthen energy taxation increase share of nuclear in energy mix	GHG and CO2 intensity of GDP emission reductions by sector socio-economic impact
Denmark (20/12/2019)	Climate neutrality	n.a.	?	no	?	n.a.	n.a.	targets enshrined in law doubling organic farming increase spending in green research	public consultation emission reductions power & buildings socio-economic impact
Estonia (30/12/2019)	Quantitative GHG emission reduction target	-80%	yes	no	no	n.a.	n.a.	targets enshrined in law large investment needed in RES minor impact on GDP and jobs	CO2 intensity of GDP emission reductions in buildings RES, FEC/PEC targets
Finland (22/04/2020)	Carbon neutrality by 2035	(-87.5%, -90%)	yes	no	?	(64% , 80%)	(-16% , -5%)	slightly positive impact on GDP and jobs employment sensitive to arable lands annual investment ~3% of GDP	CO2 intensity of GDP emission reductions in buildings strategies for related R&D&I

Country (date of submission)	Overall LTS goal by 2050	Projected GHG emission reductions by 2050 (% change compared to 1990)	all gases emissions	including LULUCF	incl. International maritime and aviation	Share of renewable energy in gross final energy consumption by 2050	Projected final energy consumption by 2050 (% change compared to 2005)	Highlights from investment needs, enabling policies and socio-economic impact	Key reporting gaps
France (12/05/2020)	Carbon neutrality	-83%	yes	no	no	n.a.	n.a.	targets enshrined in law positive impact on GDP annual investment ~3.5% of GDP	GHG and CO2 intensity of GDP reductions and removals in LULUCF share of renewable energy in 2050
Germany (02/01/2020)	Largely climate neutral	(-80% , -95%)	yes	no	no	n.a.	n.a.	document outdated compared to recent review of the country's target aimed at reaching climate neutrality by 2045	GHG and CO2 intensity of GDP emission reductions by sector investment & socio-economic impact
Greece (08/01/2020)	Unspecified	(-83% , -95%)	?	?	?	(82% , 114%)	n.a.	increase use of heat pumps (buildings) and biofuel (transport) investment needs €0.1 to €1.1 bn per year	GHG and CO2 intensity of GDP emission reductions in agriculture and waste socio-economic impact
Hungary (21/09/2021)	Climate neutrality	-100%	yes	yes	no	close to 90%	(-30% , -37.4%) (compared to 2017)	positive impact on GDP and jobs annual investment ~4.8% of GDP avoided damage and benefits exceed costs	reductions and removals in LULUCF emission reductions in buildings
Italy (11/02/2021)	Climate neutrality	(84% , 87%)	yes	no	no	(85% , 90%)	40%	slightly negative impact on GDP boost sustainable finance focus on adaptation strategies	emission reductions in waste Investment needs socio-economic impact
Latvia (27/12/2019)	Climate neutrality	-85% (by 2040)	?	yes	?	n.a.	-37% (primary energy consumption)	positive impact on GDP annual investment ~1.4% of GDP creation of new (green) jobs	CO2 intensity of GDP emission reductions in buildings adaptation policies and measures
Lithuania (23/07/2021)	Climate neutrality	-100% (20% reduction from LULUCF & CCS)	yes	yes	yes	90%	final & primary energy intensity 2.4 times lower than 2017	positive impact on GDP and jobs 4% of GDP invested in R&D&I by 2040 focus on adaptation strategies	public consultation GHG and CO2 intensity of GDP emission reductions by sector

Country (date of submission)	Overall LTS goal by 2050	Projected GHG emission reductions by 2050 (% change compared to 1990)	all gases emissions	including LULUCF	incl. International maritime and aviation	Share of renewable energy in gross final energy consumption by 2050	Projected final energy consumption by 2050 (% change compared to 2005)	Highlights from investment needs, enabling policies and socio-economic impact	Key reporting gaps
Netherlands (18/12/2019)	Quantitative GHG emission reduction target	-95%	yes	yes	no	n.a.	n.a.	net-zero requires large scale CO2 capture by 2030, limited impact on GDP and jobs increase income disparities	reductions and removals in LULUCF emission reductions in all sectors by 2050 investment needs
Portugal (15/01/2020)	Carbon neutrality	(-85% , -90%)	?	no	?	(86% , 88%)	(-36% , -35%)	positive impact on GDP and jobs annual investment ~1.2% of GDP better air quality	GHG and CO2 intensity of GDP strategies related to R&D&I adaptation policies and measures
Slovakia (11/03/2020)	Climate neutrality	-80%	?	no	?	n.a.	n.a.	positive impact on GDP negative impact on jobs & wages annual investment ~4.2% of GDP	GHG and CO2 intensity of GDP emission reductions in buildings LULUCF, RES, FEC/PEC targets
Slovenia (19/07/2021)	Climate neutrality	(-80% , -90%)	?	no	no	at least 60%	at least -33%	positive impact on GDP and jobs additional investment from €66 to €72 bn focus on a climate resilient society	GHG and CO2 intensity of GDP emission reductions industrial sectors
Spain (11/12/2020)	Climate neutrality	-90%	yes	no	yes	97%	-44%	positive impact on GDP and jobs negative impact on jobs & wages annual investment ~1% of GDP	CO2 intensity of GDP emission reductions in agriculture & waste emission reductions for industrial sectors
Sweden (19/12/2019)	Climate neutrality by 2045 and negative emissions thereafter	-85% (by 2045)	yes	no	no	n.a.	final energy intensity 50% lower than 2005	limited impact on GDP and jobs better air quality focus on adaptation strategies	GHG and CO2 intensity of GDP share of renewable energy investment & socio-economic impact

Notes: (1) An "unspecified" goal refers to cases where the goal was not expressed in clear terms (e.g. “to approach”, “to move towards”, etc.). (2) In the case of DE the long-term strategy, as submitted to the Commission in January 2020, reflects the goal of the Climate Action Plan 2050 adopted in November 2016. According to the Climate Change Act, as amended in July 2021, Germany now aims at achieving climate neutrality by 2045. (3) Projected GHG emission reductions are all expressed as percentage change compared to 1990 level (except for BE, PT and SI where reduction rates refer to 2005 GHG emission levels, and FR to 2015 level), as a target or as the extreme values of the projected range. In the case of DK, projections in the LTS refer to a scenario with existing measures, not in line with the goal, therefore they have not been reported in the table. (4) "?" means that the LTS does not provide enough or clear information on the exact scope of projected GHG emission reductions. In the case of ES, only international maritime emissions were included in the projections. (5) Where feasible, final energy consumption has been expressed as percentage change compared to 2005 consumption level. (6) Annual investment needs are generally considered additional to a business as usual (BAU) or with existing measures (WEM) scenarios for the period 2020-2050. (7) Key reporting gaps are meant to provide only a general view of the completeness of the LTS and do not distinguish between mandatory and non-mandatory elements.

5. EU GREENHOUSE GAS EMISSIONS BY SECTOR

Figure 1:

EU-27 greenhouse gas emissions by sector, historical data (1990-2020) and projections (2021-2030)[15].

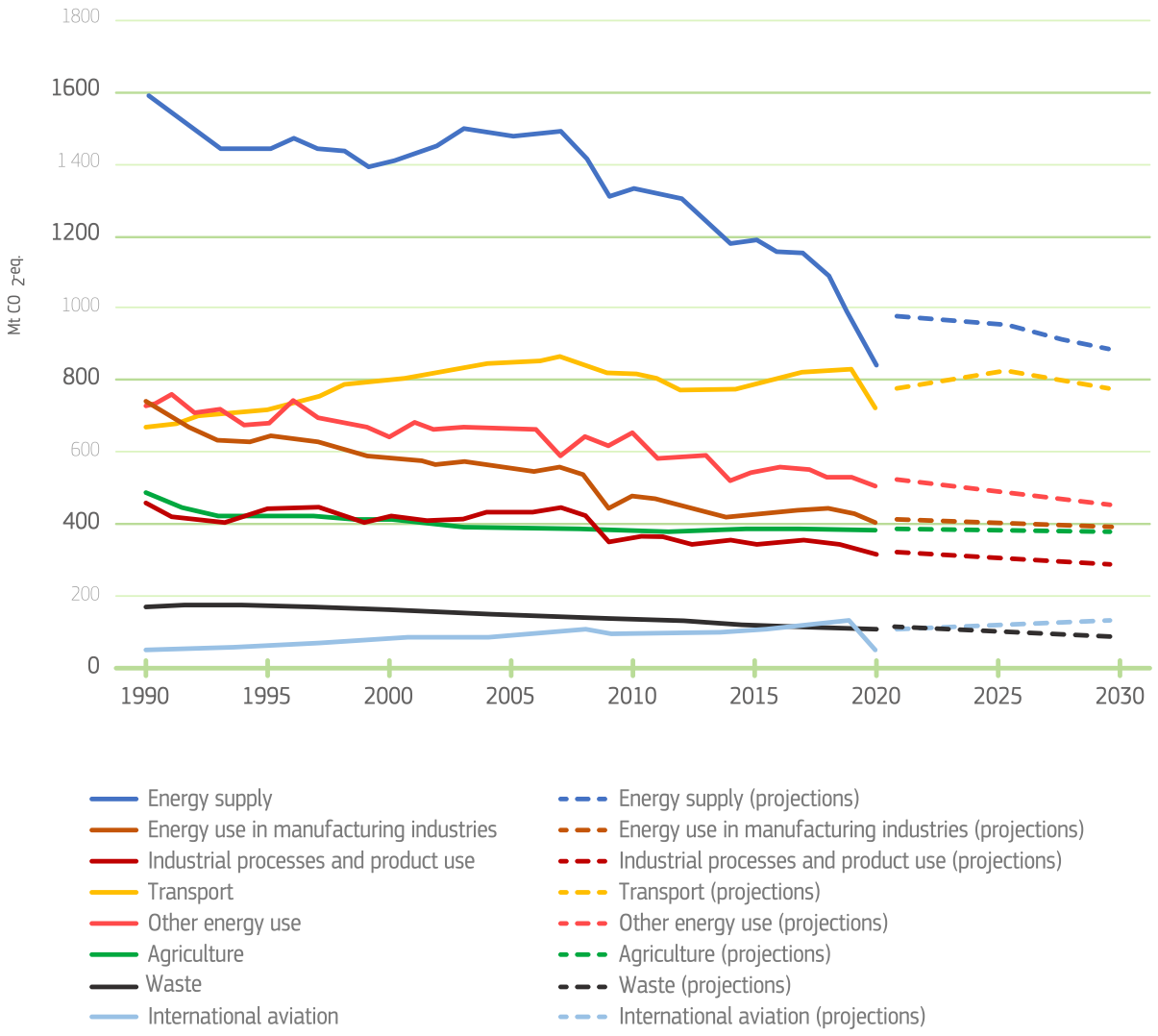
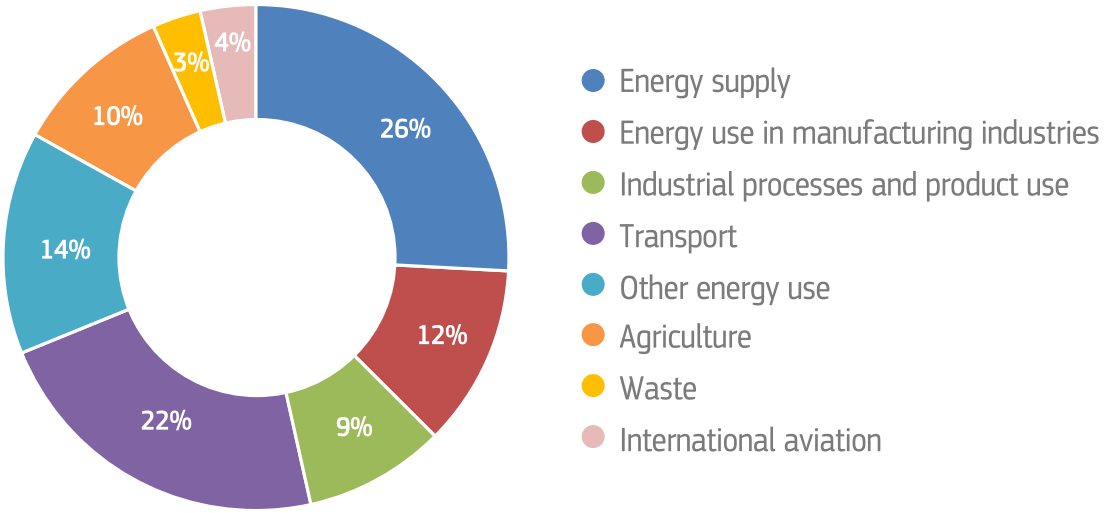


Figure 2:

EU-27 greenhouse gas emissions by sector 2019 (in % of total emissions)[16].



The sectors used in Figure 1 and 2 correspond to the following IPCC sectors[17]:

- Energy supply: 1A1, 1B and 1C,
- Energy use in manufacturing industries: 1A2,
- Industrial processes and product use: 2,
- Transport (includes domestic aviation) : 1A3,
- Other energy use: 1A4, 1A5 and 6,
- Agriculture: 3,
- Waste: 5,
- International aviation: 1.D.1.A

6. TOTAL GHG EMISSIONS PER MEMBER STATE

Table 4:

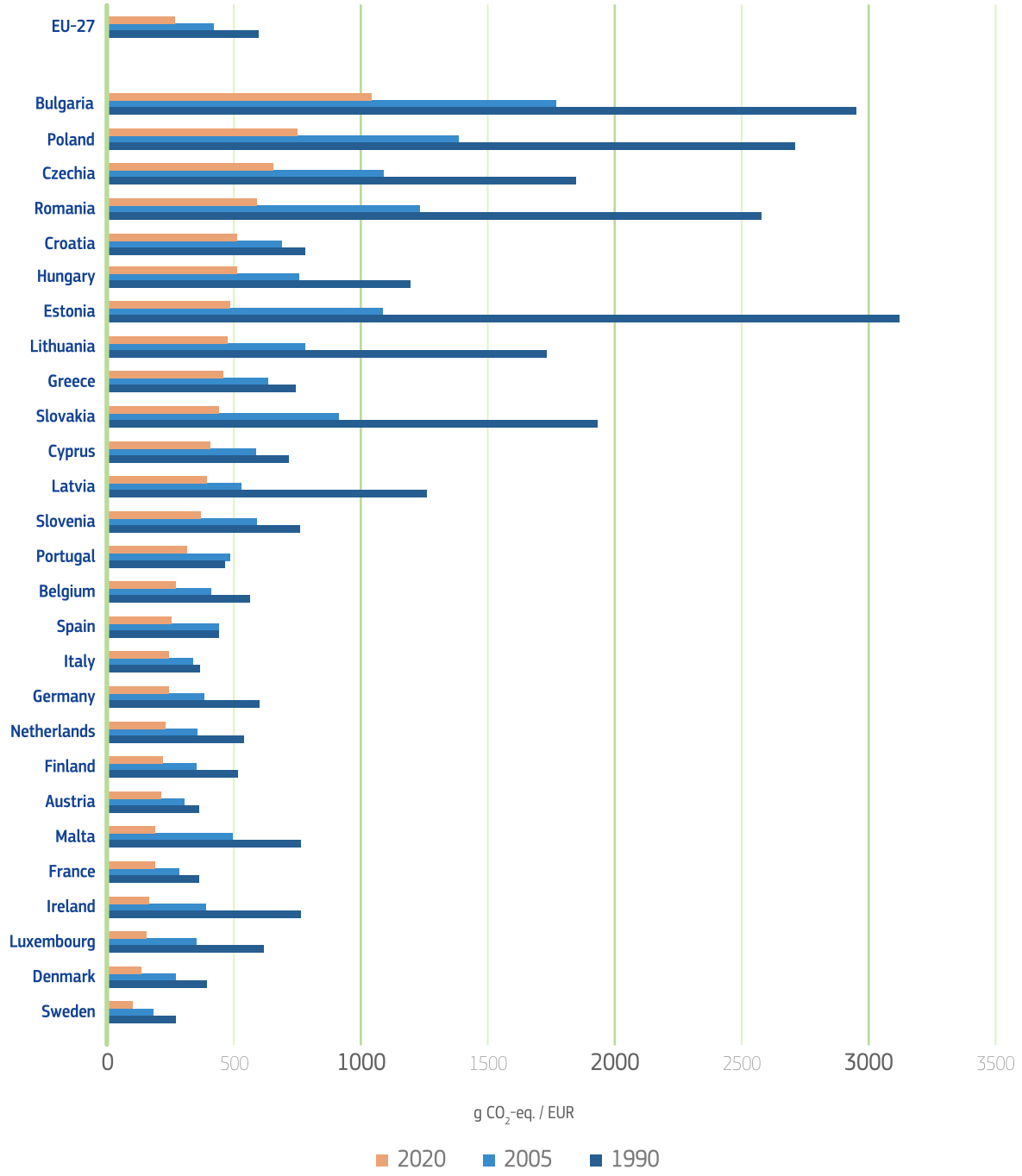
Total GHG Emissions 2020, excl. LULUCF, including international aviation (Mt CO_2-eq. and % change from 1990 and 2005).

	1990	2005	2020	2020/1990	2020/2005
EU-27	4925	4639	3377	-31%	-27%
Austria	79	94	75	-6%	-21%
Belgium	149	149	113	-24%	-24%
Bulgaria	101	63	53	-48%	-17%
Croatia	32	30	24	-25%	-21%
Cyprus	6	10	9	35%	-15%
Czechia	199	150	119	-40%	-20%
Denmark	73	69	42	-42%	-40%
Estonia	41	19	12	-72%	-40%
Finland	72	71	49	-32%	-31%
France	553	567	404	-27%	-29%
Germany	1261	1016	753	-40%	-26%
Greece	106	139	76	-28%	-45%
Hungary	95	78	64	-33%	-18%
Ireland	55	73	59	6%	-19%
Italy	523	598	387	-26%	-35%
Latvia	26	11	11	-59%	-4%
Lithuania	48	23	20	-58%	-12%
Luxembourg	13	14	11	-17%	-24%
Malta	3	3	2	-19%	-30%
Netherlands	225	224	171	-24%	-24%
Poland	477	406	375	-21%	-8%
Portugal	60	88	60	-1%	-32%
Romania	267	150	109	-59%	-27%
Slovakia	74	51	38	-49%	-25%
Slovenia	19	20	16	-14%	-22%
Spain	295	454	278	-6%	-39%
Sweden	73	69	48	-33%	-30%

7. GREENHOUSE GAS INTENSITY IN THE EU AND ITS MEMBER STATES

Figure 3:

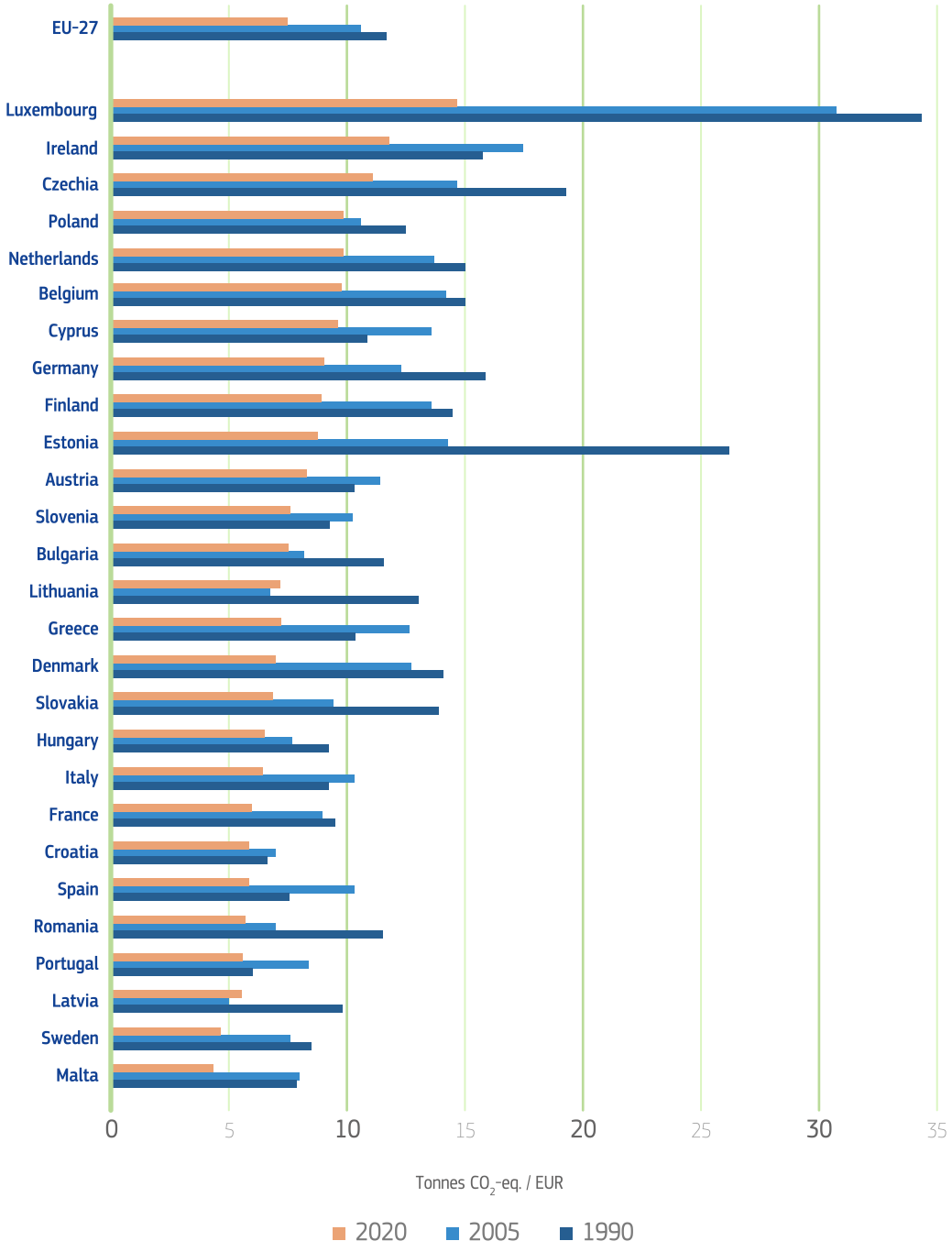
Greenhouse gas emissions intensity (i.e. the ratio between emissions and GDP) in the EU and its Member States 1990, 2005 and 2020 (g CO_2-eq./ EUR2015)[18].



8. GREENHOUSE GAS EMISSIONS PER CAPITA IN THE EU AND ITS MEMBER STATES

Figure 4:

Greenhouse gas emissions per capita in the EU and its Member States 1990, 2005 and 2020 (tonnes CO_2-eq. per capita)[19].



9. EU ETS EMISSIONS

Table 5:

Verified ETS emissions from stationary installations up to 2020 (Mt CO_2-eq. and percentage change from year X-1)[20].

Verified Emissions	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Stationary, total	1.904	1.867	1.908	1.814	1.803	1.751	1.755	1.683	1.530	1.355
Change to year x-1		*-2,0%*	*2,2%*	*-4,9%*	*-0,6%*	*-2,9%*	*0,2%*	*-4,1%*	*-9,1%*	*-11,4%*
Electricity and Heat Production	1.261	1.254	1.191	1.100	1.091	1.046	1.036	964	822	696
Change to year x-1		*-0,5%*	*-5,0%*	*-7,7%*	*-0,8%*	*-4,1%*	*-1,0%*	*-7,0%*	*-14,7%*	*-15,3%*
Industry	643	613	717	714	712	704	719	719	708	659
Change to year x-1		*-4,7%*	*17,0%*	*-0,4%*	*-0,3%*	*-1,1%*	*2,0%*	*0,1%*	*-1,6%*	*-7,0%*

10. EMISSIONS COVERED BY THE EFFORT SHARING LEGISLATION

In 2021, Member States submitted projections in the context of the Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action.

The original data have different metrics: Historical and projected emissions, ESD targets and 2005 base year emissions are expressed in the Global Warming Potential (GWP) of IPCC's 4th Assessment Report (AR4), whereas the ESR targets and 2005 base year emissions are in GWP of the 5th Assessment Report. For comparability, the latter have been approximately converted into GWP AR4, preserving the level of ambition as expressed in Commission Implementing Decision (EU) 2020/2126 which sets the annual emission allocations (AEAs) of each Member State for each year in 2012-2030 under the ESR. For these reasons, the distances to targets for 2030 are provided here for illustrative purposes only.

Due to UK's withdrawal from the EU, and the opt-out from the ETS of certain small installations in some Member States the aggregated targets (AEAs) for the 27 Member States, as in Commission Implementing Decision (EU) 2020/2126 (which result in -28.7% for the EU), do not exactly match the current EU-level effort sharing reduction targets expressed in percent (-30%).

Table 6:

Member States targets, historical and projected emissions under the effort-sharing legislation and distance to targets in percentage change from 2005 base year emissions. ESR base year emissions and targets have been approximately converted into GWP AR4 for comparability. Positive values (highlighted in green) indicate projected overachievement while negative values indicate projected underachievement. WEM = with existing measures, WAM = with additional measures.

Member State	2017	2018	2019	2020 (proxy)	2030 (projections WEM)	2030 (projections WAM
Austria						
Target	-13%	-14%	-15%	-16%	-36%	-36%
Emissions	-9%	-11%	-12%	-18%	-17%	-27%
Distance to target (pp)	-4%	-2%	-3%	2%	-19%	-9%
Belgium						
Target	-10%	-11%	-13%	-15%	-35%	-35%
Emissions	-12%	-8%	-10%	-17%	-14%	-38%
Distance to target (pp)	2%	-4%	-3%	2%	-21%	3%
Bulgaria						
Target	17%	18%	19%	20%	0%	0%
Emissions	20%	19%	17%	26%	11%	6%
Distance to target (pp)	-3%	-1%	2%	-6%	-11%	-6%
Croatia						
Target	7%	9%	10%	11%	-7%	-7%
Emissions	-4%	-7%	-8%	-9%	-14%	-19%
Distance to target (pp)	12%	15%	18%	20%	7%	12%
Cyprus						
Target	0%	-1%	-3%	-5%	-24%	-24%
Emissions	2%	-1%	5%	-3%	-7%	-17%
Distance to target (pp)	-2%	-1%	-8%	-2%	-17%	-7%

Member State	2017	2018	2019	2020 (proxy)	2030 (projections WEM)	2030 (projections WAM
Czechia						
Target	6%	7%	8%	9%	-14%	-14%
Emissions	1%	-2%	-2%	4%	-22%	-37%
Distance to target (pp)	5%	9%	10%	5%	8%	23%
Denmark						
Target	-13%	-15%	-18%	-20%	-39%	-39%
Emissions	-18%	-17%	-20%	-25%	-36%	-36%
Distance to target (pp)	5%	2%	2%	5%	-3%	-3%
Estonia						
Target	9%	10%	10%	11%	-13%	-13%
Emissions	14%	13%	14%	10%	-12%	-14%
Distance to target (pp)	-5%	-3%	-4%	1%	-1%	1%
Finland						
Target	-11%	-13%	-14%	-16%	-39%	-39%
Emissions	-11%	-12%	-13%	-16%	-31%	-34%
Distance to target (pp)	0%	-1%	-2%	0%	-8%	-5%
France						
Target	-10%	-11%	-13%	-14%	-37%	-37%
Emissions	-11%	-14%	-16%	-22%	-31%	-31%
Distance to target (pp)	1%	3%	3%	8%	-6%	-6%
Germany						
Target	-10%	-11%	-13%	-14%	-38%	-38%
Emissions	-2%	-9%	-7%	-12%	-29%	-29%
Distance to target (pp)	-7%	-2%	-5%	-2%	-9%	-9%
Greece						
Target	-5%	-5%	-4%	-4%	-16%	-16%
Emissions	-27%	-29%	-28%	-33%	-27%	-36%
Distance to target (pp)	22%	24%	24%	29%	11%	20%
Hungary						
Target	4%	6%	8%	10%	-7%	-7%
Emissions	-10%	-10%	-7%	-7%	-7%	-22%
Distance to target (pp)	14%	16%	15%	17%	0%	15%
Ireland						
Target	-13%	-15%	-18%	-20%	-30%	-30%
Emissions	-7%	-4%	-3%	-6%	-6%	-22%
Distance to target (pp)	-6%	-12%	-15%	-14%	-24%	-8%
Italy						
Target	-11%	-12%	-12%	-13%	-33%	-33%
Emissions	-19%	-17%	-18%	-24%	-29%	-40%
Distance to target (pp)	8%	5%	6%	11%	-4%	7%

Member State	2017	2018	2019	2020 (proxy)	2030 (projections WEM)	2030 (projections WAM
Latvia						
Target	14%	15%	16%	17%	-6%	-6%
Emissions	8%	7%	1%	-1%	-4%	-10%
Distance to target (pp)	6%	8%	15%	18%	-2%	4%
Lithuania						
Target	7%	9%	12%	15%	-9%	-9%
Emissions	7%	8%	8%	5%	-11%	-23%
Distance to target (pp)	0%	2%	4%	10%	2%	14%
Luxembourg						
Target	-14%	-16%	-18%	-20%	-40%	-40%
Emissions	-14%	-11%	-9%	-22%	-14%	-53%
Distance to target (pp)	0%	-5%	-9%	2%	-26%	13%
Malta						
Target	5%	5%	5%	5%	-19%	-19%
Emissions	28%	24%	28%	17%	50%	50%
Distance to target (pp)	-23%	-19%	-23%	-12%	-69%	-69%
Netherlands						
Target	-11%	-13%	-14%	-16%	-36%	-36%
Emissions	-20%	-22%	-24%	-29%	-31%	-31%
Distance to target (pp)	9%	9%	10%	13%	-5%	-5%
Poland						
Target	11%	12%	13%	14%	-7%	-7%
Emissions	18%	18%	16%	12%	6%	-12%
Distance to target (pp)	-6%	-6%	-3%	2%	-13%	5%
Portugal						
Target	-1%	-1%	0%	1%	-17%	-17%
Emissions	-17%	-17%	-15%	-19%	-39%	-42%
Distance to target (pp)	16%	16%	15%	20%	22%	25%
Romania						
Target	11%	14%	16%	19%	-2%	-2%
Emissions	0%	3%	0%	0%	5%	2%
Distance to target (pp)	12%	11%	17%	19%	-7%	-4%
Slovakia						
Target	9%	10%	12%	13%	-12%	-12%
Emissions	-7%	-8%	-13%	-15%	9%	1%
Distance to target (pp)	17%	19%	24%	28%	-21%	-13%
Slovenia						
Target	3%	3%	4%	4%	-14%	-14%
Emissions	-8%	-7%	-9%	-16%	-9%	-25%
Distance to target (pp)	11%	10%	12%	20%	-5%	11%

Member State	2017	2018	2019	2020 (proxy)	2030 (projections WEM)	2030 (projections WAM
Spain						
Target	-8%	-8%	-9%	-10%	-26%	-26%
Emissions	-15%	-14%	-14%	-23%	-18%	-38%
Distance to target (pp)	7%	6%	5%	13%	-8%	12%
Sweden						
Target	-13%	-14%	-16%	-17%	-40%	-40%
Emissions	-25%	-28%	-27%	-29%	**-39%**	**-39%**
Distance to target (pp)	12%	13%	11%	12%	**-1%**	**-1%**
EU 27						
Target	**-6%**	**-7%**	**-7%**	**-8%**	**-29%**	**-29%**
Emissions	**-9%**	**-10%**	**-11%**	**-16%**	**-22%**	**-30%**
Distance to target (pp)	**3%**	**3%**	**3%**	**7%**	**-7%**	**1%**
Iceland						
Target					-29%	-29%
Emissions					-28%	-28%
Distance to target (pp)					-1%	-1%
Norway						
Target					-40%	-40%
Emissions					-32%	-32%
Distance to target (pp)					-8%	-8%
EU 27 + IS + NO						
Target					**-29%**	**-31%**
Emissions					**-22%**	**-30%**
Distance to target (pp)					**-7%**	**-1%**

Table 7:

Annual emissions allocations (AEAs), historical and proxy emissions and distance to targets under the Effort Sharing Decision (Mt. CO_2-eq.). Positive values indicate overachievement, negative values (highlighted in red) indicate underachievement.

AEAs for the years 2017-2020 were revised in 2017 for all Member States to reflect updates in methodologies for reporting of GHG inventories. This recalculation ensures maintaining the originally intended effort of each Member State (in % of 2005 emissions). The values of 'cumulative surplus of AEAs' are the cumulative annual distances to target and do not take into account cancellations and transfers. 2019 ESD emissions are based on the 'Final Review Reports' from the 2021 annual ESD review. 2020 emissions are based on the 'proxy inventories' submitted by Member States (not available for the UK).

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019 (preliminary)	2020 (proxy inventory)
Austria									
AEA		52,6	52,1	51,5	51,0	49,5	48,9	48,3	47,8
Emissions	56,8	50,1	48,2	49,3	50,6	51,7	50,3	50,2	46,6
Distance to target		2,5	3,9	2,2	0,4	-2,1	-1,4	-1,9	1,2
Cumulative surplus of AEAs		2,5	6,4	8,7	9,0	6,9	5,5	3,6	4,7
Belgium									
AEA		78,4	76,9	75,3	73,8	72,5	71,1	69,7	68,2
Emissions	80,3	74,3	70,1	72,7	74,1	70,8	74,3	72,0	66,6
Distance to target		4,1	6,8	2,6	-0,3	1,7	-3,2	-2,4	1,7
Cumulative surplus of AEAs		4,1	10,9	13,5	13,2	14,9	11,7	9,4	11,1
Bulgaria									
AEA		26,9	27,2	27,5	27,7	25,9	26,1	26,3	26,5
Emissions	22,1	22,2	22,9	25,4	25,6	26,5	26,3	25,8	27,9
Distance to target		4,7	4,3	2,1	2,1	-0,6	-0,2	0,5	-1,4
Cumulative surplus of AEAs		4,7	9,0	11,1	13,3	12,6	12,4	12,9	11,5
Croatia									
AEA		19,6	19,8	20,0	20,2	18,7	18,9	19,1	19,3
Emissions	17,4	15,1	14,7	15,6	16,0	16,7	16,2	16,1	15,9
Distance to target		4,5	5,1	4,4	4,2	2,0	2,7	3,0	3,5
Cumulative surplus of AEAs		4,5	9,6	14,1	18,2	20,3	22,9	26,0	29,4
Cyprus									
AEA		5,9	5,9	5,9	5,9	4,2	4,1	4,0	4,0
Emissions	4,2	3,9	3,9	4,1	4,1	4,3	4,2	4,4	4,1
Distance to target		2,0	2,0	1,9	1,8	-0,1	0,0	-0,3	-0,1
Cumulative surplus of AEAs		2,0	4,0	5,8	7,7	7,6	7,5	7,2	7,1
Czechia									
AEA		62,5	63,2	64,0	64,7	65,2	65,9	66,5	67,2

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019 (preliminary)	2020 (proxy inventory)
Emissions	61,7	61,5	57,6	61,3	62,8	62,4	60,6	60,5	64,3
Distance to target		1,0	5,6	2,7	1,9	2,8	5,3	6,0	2,9
Cumulative surplus of AEAs		1,0	6,6	9,3	11,2	14,0	19,2	25,2	28,1
Denmark									
AEA		36,8	35,9	35,0	34,1	34,8	33,9	33,0	32,1
Emissions	40,1	33,7	32,6	32,5	33,1	32,7	33,1	32,1	29,9
Distance to target		3,1	3,3	2,5	1,0	2,1	0,7	0,9	2,2
Cumulative surplus of AEAs		3,1	6,4	8,9	9,9	12,0	12,7	13,6	15,8
Estonia									
AEA		6,3	6,3	6,3	6,4	5,9	6,0	6,0	6,0
Emissions	5,4	5,8	6,1	6,1	6,2	6,2	6,1	6,2	6,0
Distance to target		0,5	0,2	0,2	0,2	-0,3	-0,2	-0,2	0,1
Cumulative surplus of AEAs		0,5	0,8	1,0	1,1	0,9	0,7	0,5	0,5
Finland									
AEA		31,8	31,3	30,8	30,3	30,2	29,6	29,1	28,5
Emissions	33,9	31,6	30,1	29,9	31,4	30,1	29,9	29,6	28,6
Distance to target		0,2	1,1	0,9	-1,0	0,1	-0,3	-0,6	-0,1
Cumulative surplus of AEAs		0,2	1,3	2,2	1,2	1,3	1,0	0,4	0,3
France									
AEA		394,1	389,5	384,4	379,4	358,2	352,9	347,7	342,5
Emissions	398,2	366,1	353,5	353,0	351,9	352,8	342,2	336,4	310,5
Distance to target		28,0	35,9	31,4	27,5	5,4	10,7	11,4	31,9
Cumulative surplus of AEAs		28,0	63,9	95,3	122,8	128,2	138,9	150,3	182,2
Germany									
AEA		472,5	465,8	459,1	452,4	432,3	425,2	418,1	410,9
Emissions	477,8	460,2	436,8	444,1	454,2	466,9	434,0	444,3	418,5
Distance to target		12,3	29,0	15,1	-1,7	-34,5	-8,8	-26,2	-7,6
Cumulative surplus of AEAs		12,3	41,4	56,4	54,7	20,2	11,3	-14,9	-22,4
Greece									
AEA		59,0	59,3	59,6	59,9	59,1	59,4	59,7	60,0
Emissions	62,6	44,2	44,4	45,4	44,9	45,4	44,7	44,7	42,0
Distance to target		14,8	14,9	14,2	15,0	13,7	14,7	15,0	18,1
Cumulative surplus of AEAs		14,8	29,6	43,8	58,8	72,5	87,3	102,3	120,3
Hungary									
AEA		50,4	51,5	52,6	53,8	50,1	51,0	51,9	52,8

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019 (preliminary)	2020 (proxy inventory)
Emissions	48	38,4	38,4	41,4	42,1	43,1	43,2	44,9	44,6
Distance to target		12,0	13,1	11,2	11,7	6,9	7,7	7,0	8,2
Cumulative surplus of AEAs		12,0	25,1	36,3	47,9	54,9	62,6	69,6	77,8
Ireland									
AEA		46,9	45,8	44,6	43,5	40,9	39,8	38,7	37,7
Emissions	47,1	42,2	41,7	43,0	43,8	43,8	45,4	45,6	44,3
Distance to target		4,7	4,1	1,6	-0,3	-2,9	-5,6	-6,9	-6,6
Cumulative surplus of AEAs		4,7	8,8	10,4	10,1	7,1	1,6	-5,3	-11,9
Italy									
AEA		308,2	306,2	304,2	302,3	298,3	295,8	293,4	291,0
Emissions	334,5	273,3	265,3	273,3	270,7	270,1	278,7	274,9	255,1
Distance to target		34,8	40,9	31,0	31,6	28,1	17,1	18,5	35,9
Cumulative surplus of AEAs		34,8	75,7	106,7	138,3	166,4	183,5	202,0	237,9
Latvia									
AEA		9,3	9,4	9,4	9,5	9,7	9,8	9,9	10,0
Emissions	8,5	8,8	9,0	9,0	9,1	9,2	9,1	8,7	8,4
Distance to target		0,5	0,3	0,4	0,4	0,5	0,7	1,3	1,5
Cumulative surplus of AEAs		0,5	0,8	1,3	1,7	2,2	2,9	4,1	5,7
Lithuania									
AEA		12,9	13,3	13,7	14,0	14,1	14,5	14,9	15,2
Emissions	13,3	12,4	12,9	13,3	13,9	14,1	14,3	14,3	13,9
Distance to target		0,5	0,4	0,4	0,1	0,0	0,2	0,6	1,3
Cumulative surplus of AEAs		0,5	0,9	1,3	1,4	1,4	1,6	2,1	3,5
Luxembourg									
AEA		9,5	9,3	9,1	8,9	8,7	8,5	8,3	8,1
Emissions	10,1	9,4	8,9	8,6	8,5	8,7	9,1	9,2	7,9
Distance to target		0,2	0,5	0,5	0,4	0,0	-0,5	-0,9	0,3
Cumulative surplus of AEAs		0,2	0,7	1,2	1,6	1,6	1,1	0,1	0,4
Malta									
AEA		1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Emissions	1,1	1,3	1,3	1,3	1,3	1,4	1,4	1,4	1,3
Distance to target		-0,1	-0,1	-0,1	-0,2	-0,3	-0,2	-0,3	-0,1
Cumulative surplus of AEAs		-0,1	-0,2	-0,3	-0,5	-0,8	-1,0	-1,2	-1,4
Netherlands									
AEA		122,9	120,7	118,4	116,1	114,1	111,8	109,6	107,4

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019 (preliminary)	2020 (proxy inventory)
Emissions	127,8	108,3	97,9	101,1	101,3	102,3	99,7	97,1	90,4
Distance to target		14,7	22,8	17,3	14,8	11,7	12,1	12,5	17,0
Cumulative surplus of AEAs		14,7	37,5	54,8	69,6	81,3	93,4	105,9	122,9
Poland									
AEA		193,6	194,9	196,1	197,4	200,0	201,7	203,4	205,2
Emissions	180	186,1	181,5	186,8	198,7	211,5	213,0	209,1	201,9
Distance to target		7,5	13,3	9,4	-1,3	-11,5	-11,3	-5,6	3,3
Cumulative surplus of AEAs		7,5	20,9	30,2	29,0	17,4	6,1	0,5	3,8
Portugal									
AEA		49,3	49,6	49,9	50,1	47,9	48,3	48,7	49,1
Emissions	48,6	38,6	38,8	40,6	41,6	40,2	40,6	41,5	39,3
Distance to target		10,7	10,8	9,2	8,6	7,7	7,7	7,2	9,8
Cumulative surplus of AEAs		10,7	21,5	30,7	39,3	47,0	54,7	61,9	71,7
Romania									
AEA		75,6	77,5	79,3	81,1	84,1	86,0	87,9	89,8
Emissions	75,5	72,7	72,5	74,6	73,1	75,4	77,6	75,2	75,8
Distance to target		2,9	4,9	4,7	8,0	8,7	8,3	12,7	14,0
Cumulative surplus of AEAs		2,9	7,8	12,5	20,5	29,2	37,5	50,2	64,3
Slovakia									
AEA		24,0	24,4	24,7	25,1	25,0	25,3	25,6	25,9
Emissions	23	21,1	19,8	20,1	19,8	21,2	21,1	20,1	19,5
Distance to target		2,9	4,6	4,7	5,3	3,8	4,3	5,6	6,4
Cumulative surplus of AEAs		2,9	7,5	12,2	17,5	21,3	25,6	31,2	37,6
Slovenia									
AEA		12,3	12,4	12,4	12,4	12,2	12,2	12,3	12,3
Emissions	11,8	10,9	10,5	10,7	11,2	10,9	11,0	10,8	9,9
Distance to target		1,4	1,9	1,7	1,2	1,3	1,2	1,5	2,4
Cumulative surplus of AEAs		1,4	3,3	4,9	6,1	7,4	8,6	10,1	12,5
Spain									
AEA		227,6	225,6	223,7	221,8	218,3	216,3	214,3	212,4
Emissions	236	200,3	199,8	196,2	198,5	201,1	203,0	201,9	181,0
Distance to target		27,3	25,9	27,6	23,3	17,2	13,3	12,5	31,4
Cumulative surplus of AEAs		27,3	53,2	80,8	104,1	121,3	134,5	147,0	178,4
Sweden									
AEA		41,7	41,0	40,4	39,8	37,8	37,2	36,7	36,1

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019 (preliminary)	2020 (proxy inventory)
Emissions	43,5	35,3	34,5	33,9	32,6	32,5	31,4	31,7	30,8
Distance to target		6,4	6,5	6,5	7,2	5,3	5,8	5,0	5,3
Cumulative surplus of AEAs		6,4	12,9	19,4	26,6	31,9	37,7	42,7	47,9
United Kingdom									
AEA		358,7	354,2	349,7	345,2	360,4	357,2	354,1	350,9
Emissions	417,8	339,5	324,4	326,0	333,9	332,1	329,9	329,1	305,5
Distance to target		19,3	29,8	23,7	11,3	28,4	27,4	25,0	45,4
Cumulative surplus of AEAs		19,3	49,1	72,7	84,0	112,4	139,7	164,7	210,2

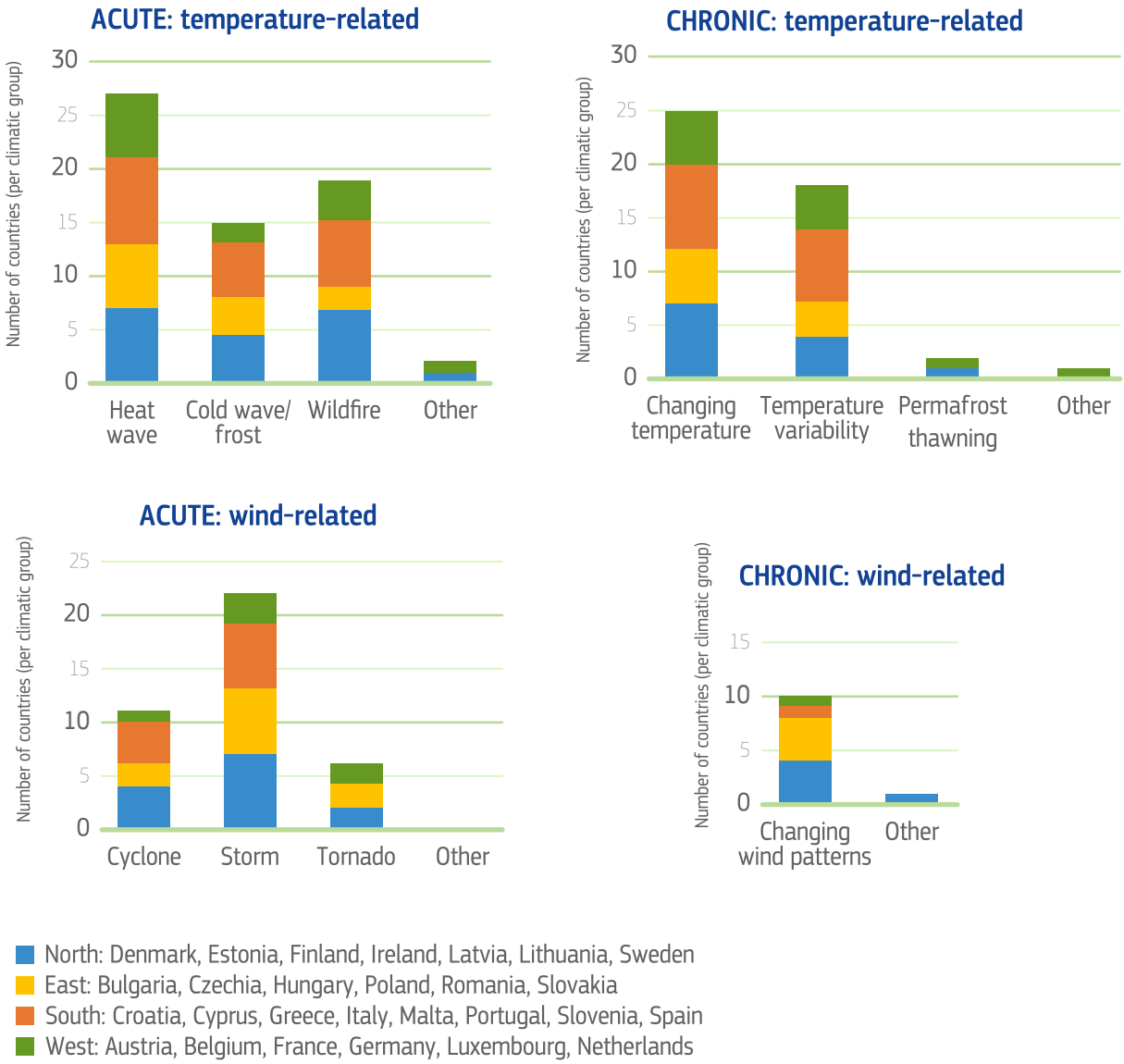
11. FIRST ASSESSMENT OF ADAPTATION STRATEGIES

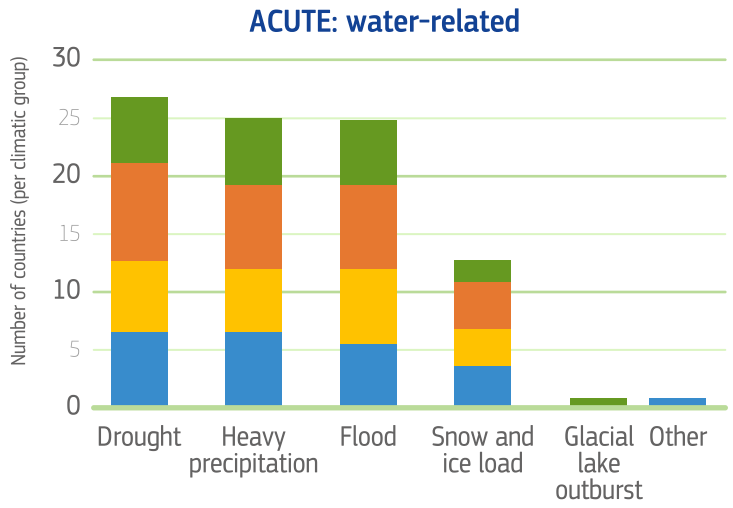
Member States reported on their national adaptation policies by 15 March 2021 on the basis of Article 19 of the Governance Regulation. The content of the reporting is set out in Annex VIII of the Regulation and further detailed in an implementing act of the Commission. By the end of September 2021, all Member States submitted the required reporting through the EEA's Reportnet interface.

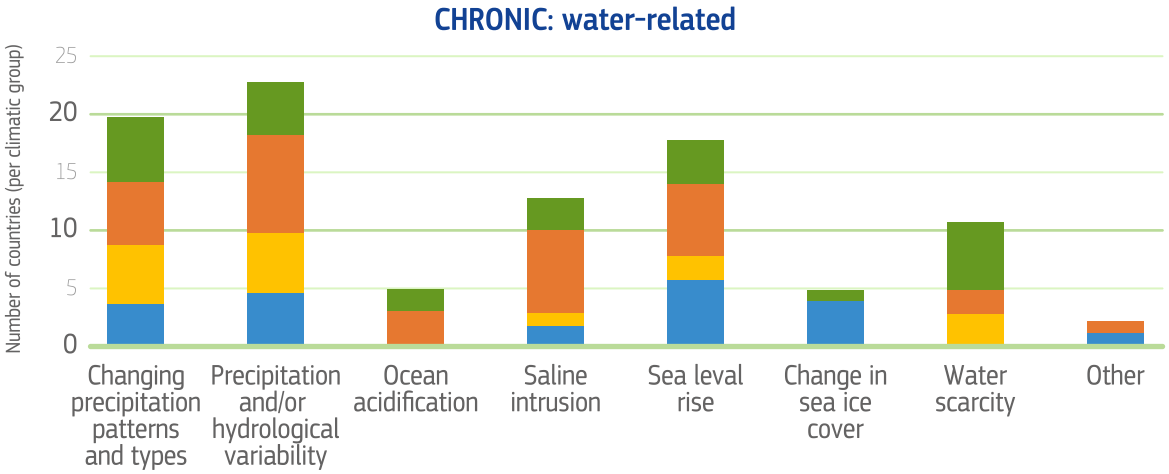
Countries were grouped into climatic zones according to a frequently used nomenclature in climate-related assessments of the European Environment Agency and of the Commission: northern (DK, EE, FI, IE, LT, LV, SE), eastern (BG, CZ, HU, PL, RO, SK), southern (CY, EL, ES, HR, IT, MT, PT, SI) and western (AT, BE, FR, DE, LU, NL).

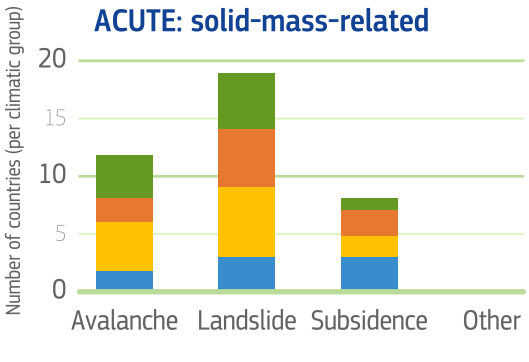
Figure 5:

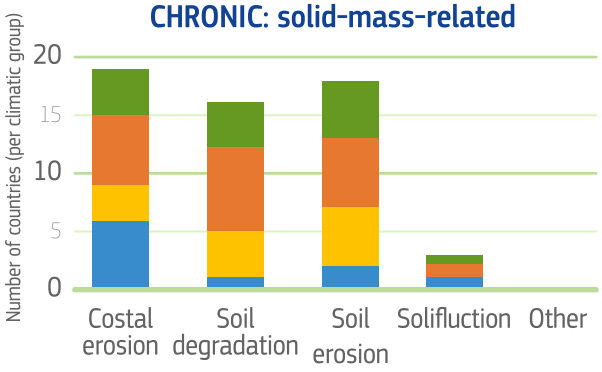
Key observed climate hazards in the different climatic zones







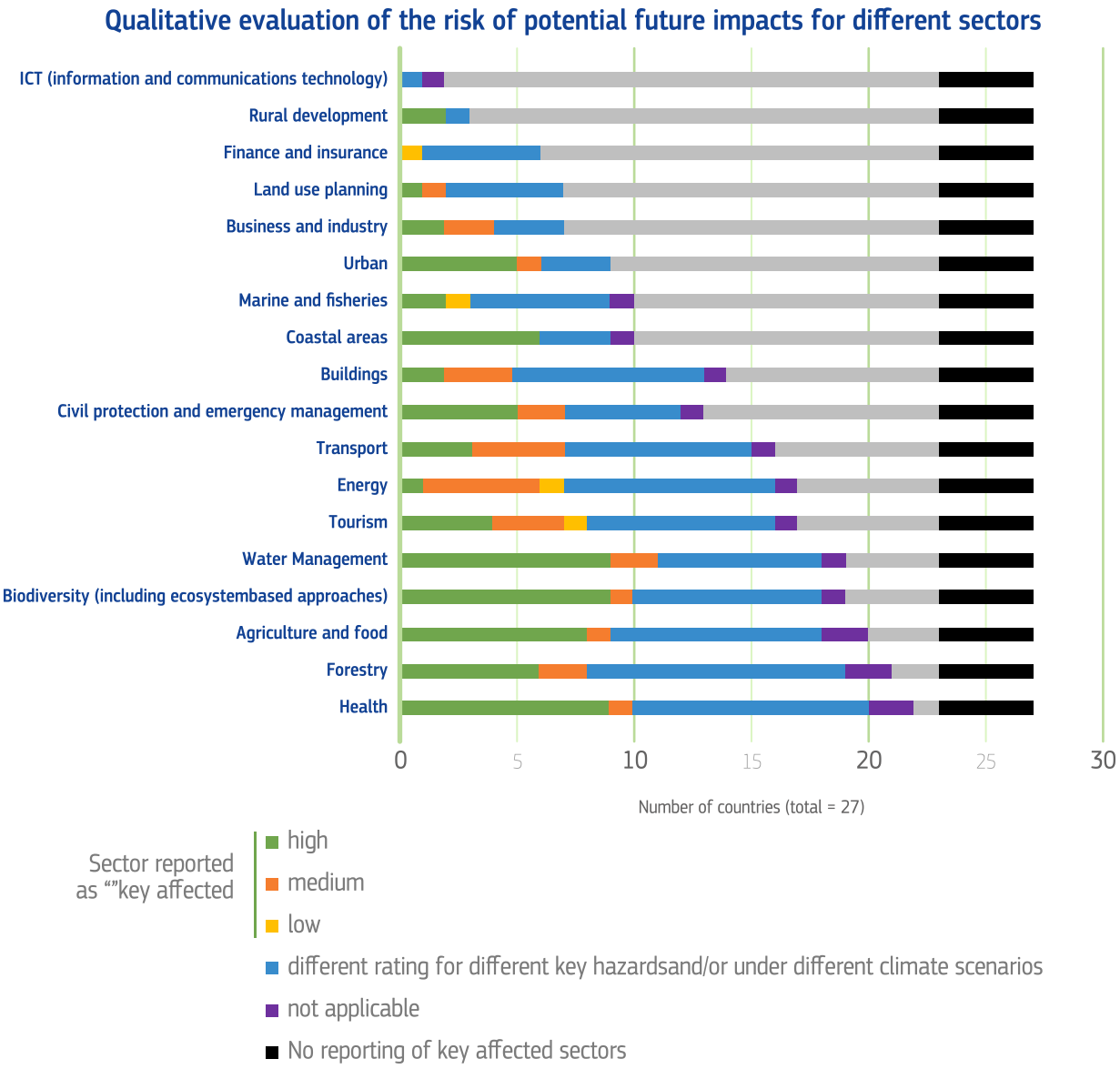




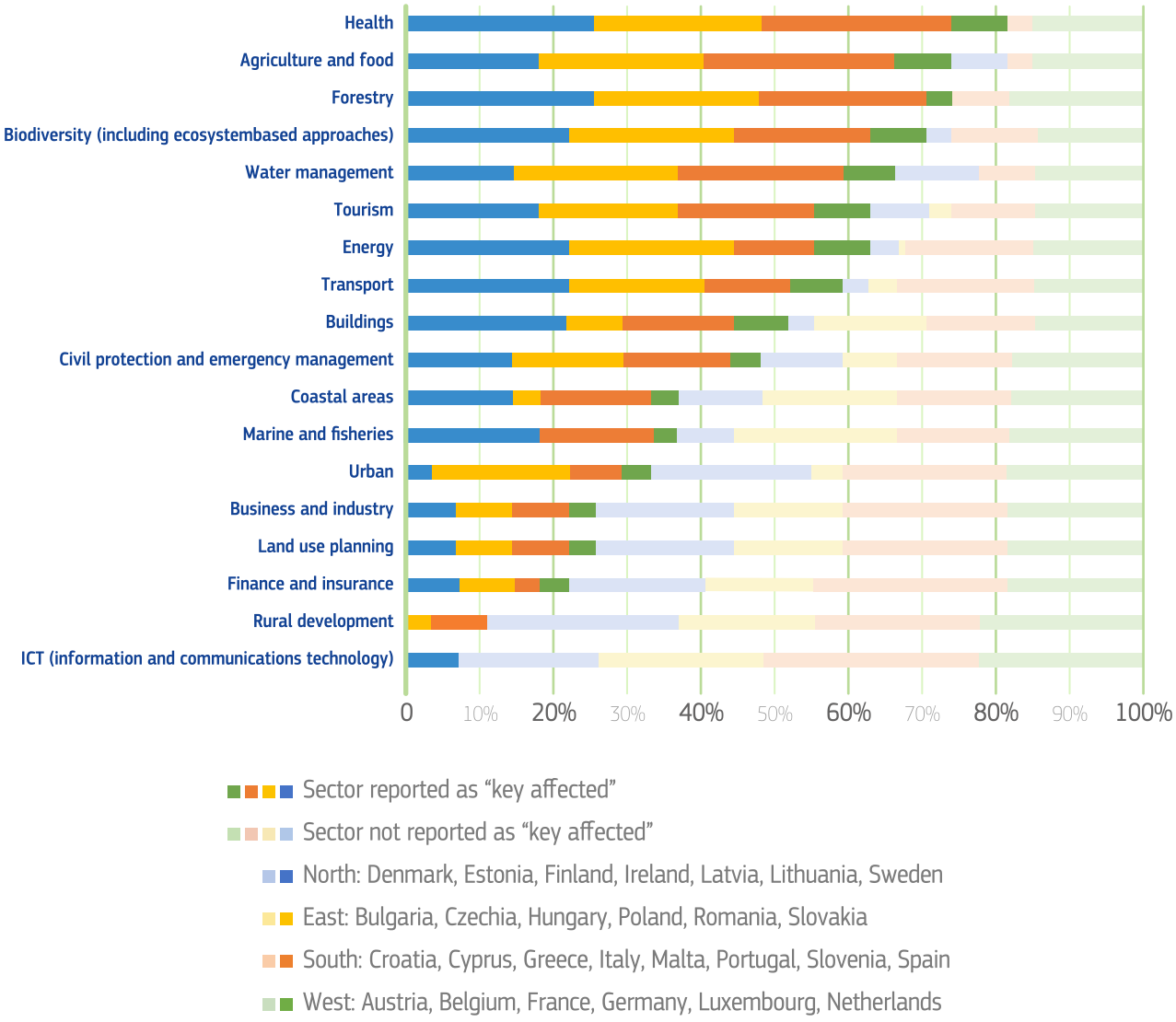
North: Denmark, Estonia, Finland, Ireland, Latvia, Lithuania, Sweden
East: Bulgaria, Czechia, Hungary, Poland, Romania, Slovakia
South: Croatia, Cyprus, Greece, Italy, Malta, Portugal, Slovenia, Spain
West: Austria, Belgium, France, Germany, Luxembourg, Netherlands

Figures 6 and 7:

Key sectors at risk of future climate impacts



Risk of potential future impacts percentage of countries that report a sector (total = 27)



Notes:
1. Only 2 out of 6 countries in the group Western Europe reported information on the affected sector
2. 23 sectores reported as "other" (by 7 different countries) are assigned by analogy to one of the sectors in the graph. In addition, there are 13 sectors reported as "other" (by 8 different countries) that could not be assigned to any of the sectors in the graph and excluded from the analyses.

12. USE OF REVENUES FROM AUCTIONING OF ETS ALLOWANCES

Auctions of phase 3 emission allowances for both stationary installations and aircraft operators have provided the EU-27 countries with revenues listed in the Table[21]. Member States report annually on the use of auctioning revenues for climate change and energy purposes, under Article 17 of Regulation (EU) No 525/2013. These are used in the Chapter 6 in the Climate Action Progress Report to estimate the share of revenues used for climate change and energy purposes. It should be noted that annual reporting does not necessarily cover on how the revenues of that year are spent, but the spending of revenues during that year, i.e. it can include revenues from earlier years. Member States only report on spending for the purposes of addressing climate change and energy, but this does not mean that the amount not covered in the report is necessarily spent for other purposes: it is also possible that revenues are spent later, or used to fund many projects/ activities, only part of which are linked to climate change and energy, or that a certain amount has been set aside for climate and energy but not all of it has yet been formally attributed to specific projects.

In the latter case, and when Member States have reported having a national minimum set aside for climate and energy, this has been reflected in the "% spent on climate and energy" row[22]. Additionally, multiple Member States do not earmark their auction revenues for a specific purpose, but instead attribute part or all of their revenues to a broad budget such as the general budget, that is funded by more than just auctioning revenues, and can be spent on both climate change and energy and other purposes. Often, in such cases example projects funded by the broad budget are reported, but a direct link to auctioning revenues cannot be made. Such country specific contexts are described below. Reported spending can also be higher than the revenues of that year, if either it includes spending of previous years' revenues or if the reported projects were co-funded with other funds[23].

Table 8:

Member States' revenues from auctioning of ETS allowances (EUR million), amounts spent on climate and energy purposes (EUR million) and share of the revenues spent on climate and energy purposes (%), 2013-2020[24].

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Austria								
Revenues from auctioning	55.8	53.6	78.6	59.5	79.4	210.4	183.8	184.2
Reported as spent on climate etc.	36.9	54.8	79.8	59.9	79.2	0	0	986.4
% spent on climate	>100%	>100%	>100%	>100%	>100%	>100%	>100%	>100%
Revenues are not earmarked. National spending on climate and energy is >100% of auctioning revenues. In several years, climate and energy projects financed from the national budget were reported, even though their funding cannot be directly linked to the auctioning revenues.								
Belgium								
Revenues from auctioning	115.0	97.1	141.6	107.9	144.3	381.5	356.8	356.1
Reported as spent on climate etc.	0.0	0.0	0.0	37.5	133.1	213.7	357.8	162.6
% spent on climate and energy	N/A	N/A	N/A	35%	92%	56%	99%	46%
Between 2013-2015 auctioning revenues were not spent pending a legal decision. The auctioning revenues from 2013 to 2015 have been earmarked and were partly committed and disbursed over the following years. In addition, the general budget is used to finance many climate and energy projects (data not included here).								
Bulgaria								
Revenues from auctioning	52.6	36.4	121.8	85.3	130.4	368.2	440.3	448.6
Reported as spent on climate etc.	51.3	36.2	103.5	94.1	138.2	368.2	440.3	448.6
% spent on climate and energy	97%	99%	85%	>100%	>100%	100%	100%	100%
Unspent revenues are carried over to later years, therefore in some years spending is higher than the revenues.								

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Croatia								
Revenues from auctioning	N/A	N/A	86.9	20.3	27.2	71.5	72.7	72.2
Reported as spent on climate etc.	N/A	N/A	77.5	46.1	18.9	29.0	13.4	44.0
% spent on climate and energy	N/A	N/A	100%	>100%	100%	100%	100%	100%
According to the law, 100% of the auctioning revenues are spent on climate and energy. This table lists the amount spent during the same year as the revenue earnt. The remainder is carried over to the next years.								
Cyprus(*)								
Revenues from auctioning	0.3	0.7	1.4	0.4	6.6	26.0	26.1	40.1
Reported as spent on climate etc.	1.9	0.7	2.8	0.3	0.8	6.4	57.5	57.6
% spent on climate and energy	>100%	100%	>100%	100%	100%	100%	>100%	>100%
The auctioning revenues go to a fund, which different ministries can use for climate and energy projects. This fund also receives money from the general budget, so in practice a higher amount than 100% of revenues is spent on climate and energy overall.								
Czechia *								
Revenues from auctioning	80.7	55.7	111.5	118.0	199.8	584.4	630.4	719.4
Reported as spent on climate etc.	73.2	26.9	111.5	118.0	199.8	367.3	408.4	309.7
% spent on climate and energy	91%	48%	100%	100%	100%	63%	65%	43%
Revenues are not earmarked. Reported spending represents the amounts allocated for climate change and energy projects in the national budget of each year (if this allocation is higher than 100%, it is reported as 100% of revenues).								
Denmark *								
Revenues from auctioning	56.1	48.1	71.3	53.7	71.7	189.8	166.1	166.5
Reported as spent on climate etc.	56.0	48.1	71.3	53.7	71.7	189.8	166.1	166.5
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
Revenues are not earmarked, example projects have been reported up to 100% of revenues each year.								
Estonia (*)								
Revenues from auctioning	18.1	7.4	21.3	23.6	39.4	140.0	142.8	142.4
Reported as spent on climate etc.	9.0	3.6	9.5	12.2	15.9	53.3	64.5	142.4
% spent on climate and energy	50%	49%	44%	52%	40%	38%	45%	100%
50% of the auctioning revenues are earmarked and directed through the four-year State Budget Strategy and spent on climate and energy projects and measures, which may take multiple years. Unspent revenues are carried over to later years and always used for climate and energy projects. The remaining 50% goes to the general budget, which, among others, covers climate and energy investment (not included here).								

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Finland *								
Revenues from auctioning	67.0	63.5	93.8	71.2	95.3	251.8	219.9	220.6
Reported as spent on climate etc.	2.0	31.1	93.8	71.2	9.5	251.8	219.9	220.6
% spent on climate and energy	3%	49%	100%	100%	10%	100%	100%	100%
Revenues are not earmarked. National spending on climate and energy is >100% of auctioning revenues. Only a part of actual spending has been reported, in some years covering specific projects, in other years up to 100% of revenues, even though this funding cannot be directly linked to the auctioning revenues.								
France (*)								
Revenues from auctioning	219.2	215.3	312.1	234.7	313.4	829.6	726.5	728.1
Reported as spent on climate etc.	219.2	215.3	312.1	234.7	313.4	550.0	420.0	728.1
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
The auctioning revenues co-fund energy efficiency improvements of low-income housing, up to a ceiling of EUR 420 million per year. The remainder is not earmarked but goes to the general budget, which, among others, covers climate and energy investments (not included here).								
Germany								
Revenues from auctioning	791.3	750.0	1110.2	850.4	1146.8	2581.7	3164.0	2662.4
Reported as spent on climate etc.	790.9	750.0	1110.2	845.6	1130.8	2563.0	3147.2	2662.4
% spent on climate and energy	100%	100%	100%	98%	99%	99%	99%	100%
100% of revenues is spent on energy and climate projects. All revenues go to a fund for climate and energy projects, which is additionally co-funded from the general budget.								
Greece								
Revenues from auctioning	147.6	131.1	195.2	148.1	198.0	523.5	509.5	506.7
Reported as spent on climate etc.	147.6	131.1	195.2	148.1	198.0	523.5	509.5	506.7
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
Revenues are earmarked and fully spent on domestic climate change and energy projects.								
Hungary (*)								
Revenues from auctioning	34.6	56.5	83.3	63.7	85.2	225.4	228.0	226.3
Reported as spent on climate etc.	17.3	13.1	32.8	18.5	68.7	65.9	74.0	71.8
% spent on climate and energy	50%	50%	39%	29%	81%	50%	50%	50%
50% of the revenues are spent on climate and energy (any revenues not spent are carried over to future years) and the remainder goes to the national general budget. Amounts included in the latter can be spent on climate change and energy are not covered here.								

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Ireland *								
Revenues from auctioning	41.7	36.0	53.5	40.1	53.6	142.1	124.3	124.5
Reported as spent on climate etc.	41.7	36.0	53.5	40.1	53.6	142.1	124.3	124.5
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
While ETS auction revenues are not earmarked for specific purposes, amounts spent are equivalent to 100% of these revenue (less ETS administration costs for the Environmental Protection Agency) and are attributed to emission reduction activities in line with the purposes specified in the ETS Directive.								
Italy (*)								
Revenues from auctioning	386.0	366.5	542.4	411.2	549.7	1453.3	1289.0	1290.5
Reported as spent on climate etc.	N/A	192.8	237.7	118.1	383.7	148.4	148.1	506.6
% spent on climate and energy	50%	53%	44%	29%	70%	50%	50%	50%
Italian law guarantees that, 50% of the revenues are used for climate and energy but only after the year has ended, which can cause underreported spending. . The remaining 50% was initially used to compensate for the depleted phase 2 of the New Entrants Reserve, and later it was allocated to the general budget, which funds, among others, climate and energy projects (not included here).								
Latvia								
Revenues from auctioning	10.8	10.2	15.3	11.5	15.4	40.7	42.6	42.3
Reported as spent on climate etc.	0.0	0.1	0.1	7.4	3.8	12.3	11.4	5.8
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
100% of revenues go to the EAAI, a national green investment scheme aimed at tackling global climate change. Reported spending shows actually disbursed amounts per year, all leftovers are carried over to future years.								
Lithuania								
Revenues from auctioning	20.0	17.3	28.4	20.8	31.5	80.4	84.0	86.6
Reported as spent on climate etc.	20.0	17.3	28.4	20.8	31.5	80.4	83.7	86.6
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	100%
Revenues are put in a Climate Change fund that is only for climate action and only funded by auctioning revenues, and spent on climate and energy projects								

Luxembourg *								
Revenues from auctioning	5.0	5.2	6.8	5.1	6.9	18.3	17.1	17.0
Reported as spent on climate etc.	2.5	2.9	3.5	2.6	3.5	9.2	17.1	17.0
% spent on climate and energy	50%	56%	52%	51%	50%	51%	100%	100%
Revenues are not earmarked, example projects have been reported up to 100% of revenues each year.								
Malta *								
Revenues from auctioning	4.5	3.9	6.2	4.5	6.0	15.7	15.9	15.8
Reported as spent on climate etc.	2.9	5.7	12.0	9.7	6.9	4.9	9.1	47.2
% spent on climate and energy	100%	100%	>100%	>100%	>100%	100%	100%	>100%
All revenues go to a fund for climate and energy projects, which is additionally co-funded from the general budget.								
Netherlands *								
Revenues from auctioning	134.2	131.1	187.3	142.6	190.7	504.2	440.1	441.4
Reported as spent on climate etc.	134.2	131.1	187.3	142.6	190.7	504.2	440.1	441.4
% spent on climate and energy	>100%	>100%	>100%	>100%	>100%	>100%	>100%	>100%
Auctioning revenues go to the national general budget which is used to finance climate and energy projects. Amounts spent are higher than 100% of revenues, but it is not possible to link auctioning revenues to specific projects funded.								
Poland*								
Revenues from auctioning	244.0	78.0	132.8	136.1	506.0	1211.6	2548.8	3157.6
Reported as spent on climate etc.	128.7	39.0	68.5	68.1	290.4	609.9	1274.4	1564.0
% spent on climate and energy	53%	50%	52%	50%	57%	50%	50%	50%
Revenues are not earmarked, example projects have been reported for around 50% of revenues each year.								
Portugal								
Revenues from auctioning	72.8	67.1	99.2	75.1	100.3	265.6	257.1	255.8
Reported as spent on climate etc.	71.4	64.8	83.7	72.8	95.1	201.2	235.3	251.3
% spent on climate and energy	98%	97%	84%	97%	95%	76%	92%	98%
All revenues from auctioning are channelled to the Environment Fund (alongside other revenues) which is financing environmental projects that may or may not be directly related to climate objectives. The amounts reported as spent represent climate change and energy projects paid by the Environmental Fund.								

Member State	2013	2014	2015	2016	2017	2018	2019	2020
Romania (*)								
Revenues from auctioning	122.7	97.9	195.2	194.0	260.8	719.1	749.8	803.1
Reported as spent on climate etc.	91.2	97.9	195.2	194.0	0.0	160.0	42.7	165.9
% spent on climate and energy	74%	100%	100%	100%	0%	22%	6%	17%
50% of revenues is earmarked for climate change and energy purposes and an additional 6% is earmarked for GHG reduction projects (and 15% goes to indirect carbon cost compensation and 29% to the general budget). Part of unspent revenues are carried over to later years.								
Slovakia								
Revenues from auctioning	61.7	57.6	84.5	65.0	87.1	229.9	244.7	242.1
Reported as spent on climate etc.	0.1	15.1	30.0	35.6	40.9	55.6	44.6	27.4
% spent on climate and energy	0%	26%	36%	55%	47%	24%	18%	11%
All auctioning revenues are earmarked and go to the Environmental Fund, which also receives money from other sources. The values reported as spent represent the funding of climate change and energy projects known at the time of reporting. Part of unspent revenues are carried over to later years.								
Slovenia								
Revenues from auctioning	17.7	16.6	24.4	18.7	25.1	66.3	65.3	65.0
Reported as spent on climate etc.	8.9	8.3	24.4	18.7	25.1	66.3	65.3	90.2
% spent on climate and energy	100%	100%	100%	100%	100%	100%	100%	>100%
100% of the auctioning revenues are used for climate and energy projects. Some projects receive funding later than in the year in which the auctioning revenues were generated.								
Spain (*)								
Revenues from auctioning	346.1	330.1	489.5	369.5	493.6	1306.0	1245.2	1240.3
Reported as spent on climate etc.	346.1	370.2	387.8	390.8	445.5	788.6	1054.1	1081.5
% spent on climate and energy	100%	>100%	79%	>100%	90%	60%	85%	87%
Estimated revenues are earmarked for energy and climate project ahead of each year (up to a cap, which was EUR 500 million up to 2018 and EUR 1100 million after). The remainder goes to the general budget, part of which also funds climate projects, but are not included here (2013 spending includes phase 3 allowances auctioned in 2012).								
Sweden *								
Revenues from auctioning	35.7	34.4	52.4	38.6	51.5	136.3	128.5	127.9
Reported as spent on climate etc.	35.7	18.9	52.4	21.7	28.8	76.5	73.9	65.0
% spent on climate and energy	100%	55%	100%	56%	56%	56%	58%	51%
Revenues are not earmarked, example projects have been reported for at least the minimum required spending on energy and climate.								

Technical notes

[1]May be reviewed in the light of the implementation of ICAO's global measure and the EU's enhanced target.

[2]A link with the permit system in Switzerland has been ratified.

[3]For the CP2 it refers to carry over from CP1. For the ETS it refers to carry-over from previous trading period under the scheme itself.

[4]HFCs are also covered by the Kigali Amendment to the Montreal Protocol, which entered into force on the 1st of January 2019.

[5]In addition to the 27 Member States, Northern Ireland, Iceland, Liechtenstein and Norway are also covered under the EU-ETS.

[6]Within the Agreement on the European Economic Area, Iceland and Norway cooperate with the EU-27 towards achieving the 2030 targets in the LULUCF and Effort Sharing sectors.

[7]AT, BE, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IT, LV, LT, NL, PT, SE, SI, SK. LT and HU submitted an update of their initial strategies in July and September 2021, respectively. In July 2021, the Luxembourgish government adopted a draft national long-term strategy. A public consultation will be carried-out before its final adoption.

[8]Article 15 of Regulation (EU) 2018/1999 stating that MS should submit their LTS by January 2020.

[9]AT, DK, ES, FI, FR, HU, IT, LT, LV, PT, SE, SI, SK.

[10]While neutrality means by definition that residual emissions are compensated by removals, not all Member States provided the respective share of emission reductions and removals and the level of ambition for actual reductions varies.

[11]FI by 2035 and SE by 2045.

[12]DE - it should be noted, however, that the German long-term strategy, as submitted to the Commission in January 2020, was prepared in 2016. According to the Climate Change Act, as amended in July 2021, Germany now aims at achieving climate neutrality by 2045.

[13]See Annex IV of Regulation (EU) 2018/1999.

[14]See SWD for detailed assessment per Member State.

[15]Sources: EU greenhouse gas inventory 1990-2019. EU approximated greenhouse gas inventory 2020 (EEA). Member States projections with 'existing measures' reviewed by EEA (2021).

[16]EU greenhouse gas inventory 1990-2019.

[17]Source: EEA greenhouse gases - data viewer, European Environment Agency.

[18]Sources: EU greenhouse gas inventory 1990-2019, EU approximated greenhouse gas inventory 2020 (EEA). GDP in 2015-prices, data from Ameco database (European Commission, DG ECFIN) gap-filled by EEA.

[19]Sources: EU greenhouse gas inventory 1990-2019, EU approximated greenhouse gas inventory 2020 (EEA). Average population (total) (Eurostat).

[20]Source: EUTL (data extracted 30/06/2021). Figures for EU27, UK and EEA. The categorization into electricity and heat production and industry is based on the NACE classification from the 2020 submission by Member States of their National Implementation Measures pursuant to Article 11 of Directive 2003/87/EC.

[21]The table lists annual total revenues of the auctioned phase 3 allowances on the EEX platform. Some phase 3 allowances were auctioned in 2012 and some phase 2 allowances were auctioned in 2013, these are not included here.

[22]Where relevant, the amount resulting from the "% spent on climate and energy" row that is not covered in the row "Reported as spent on climate etc." has been included in Figure 9 of the Climate Action Progress Report as "Used for climate change and energy, (unspecified)".

[23]For the purposes of Figure 9 of the Climate Action Progress Report and the estimated shares spent on climate and energy, the annual shares have been capped at 100% in order to avoid distortion of the figures.

[24]Data in this table is based on the annual reporting by the Member States with some modifications made to ensure consistency across all Member States and over the reporting period. In 2020/2021 the harmonisation, methodology and analysis were conducted by SQ Consult in a study for the European Commission. Proposed modifications have been discussed with the Member States as part of the quality checks.
N/A = Not available, * = Member States that do not earmark auction revenues, (*) = Member States that partially earmarks auction revenues.

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