



Climate Action

Progress Report 2022



Climate
Action

**Accelerating the transition to climate neutrality
for Europe's security and prosperity** _____

“In the last year the world has faced unprecedented difficulties. The global health crisis, the Russian invasion of Ukraine, and the surge in energy prices have highlighted our fragility, while the devastating impacts of the climate crisis continue to materialise before our eyes.

Against uncertainty and with huge challenges still ahead, the European Green Deal remains our vision and guide for a resilient and climate-neutral Europe. Work continues to deliver on its targets, so that we reduce greenhouse gas emissions, create jobs and boost innovation. We should not be under any illusion that this transition is going to be easy, but the human and economic costs of inaction will only increase the longer we wait. We simply cannot afford to slow down.”



Frans Timmermans

European Commission Executive Vice-President
for the European Green Deal

This report is dedicated to the memory of Mauro Petriccione, Director-General of Directorate General for Climate Action 2018-2022.

His great enthusiasm for climate policy, acute intellect, humour and strategic vision will continue to inspire us.

Rest in peace Mauro.



Foreword

We are living in times where uncertainty is rife and many profound transformations are happening in parallel. With the Covid-19 pandemic and its effects still present, Russia's invasion of Ukraine has sparked an energy crisis that brings increasing inflation and disproportionately impacts the most vulnerable, in Europe and far beyond. Europeans have over the last year faced unprecedented spikes in energy prices and weathering the winter ahead will require a concerted collective effort based on European solidarity.

Many this year have suffered the impacts of the climate crisis with extreme heatwaves across the world, destructive forest fires and droughts in Europe and beyond, devastating floods in Pakistan and Nigeria, and deadly storms in Asia and North America. The constant increase in the frequency and severity of extreme weather only confirms the calls for urgent climate action made by the scientific community in their latest reports such as the authoritative 6th Assessment Report by the UN's Intergovernmental Panel on Climate Change.

The EU is taking action. As we face these enormous challenges, the European Green Deal is more important than ever as our roadmap to a resilient and climate-neutral Europe, to cutting harmful greenhouse gas emissions, boosting innovation, creating sustainable and lasting jobs, and readying ourselves for those consequences of climate change that we can no longer avoid.

This report sets out how the EU has progressed over the past year in achieving our climate goals and meeting our international climate commitments.

Notably, EU emissions of greenhouse gases continue their long-term downward trend, despite rising in 2021 above the exceptionally low COVID-19 lockdown levels of 2020.

The EU Emissions Trading System (ETS) continues to cap greenhouse gas emissions and provide an important price incentive to innovate and cut emissions. It also generates revenues that allow EU Member States, as well as the Innovation and Modernisation Funds managed by the European Commission, to accelerate the transition and thus provide support to consumers faced with higher energy bills. These revenues nearly doubled in 2021 for all Member States and top up the significant funds from the EU's budget already earmarked for climate action.

Under the European Green Deal, the Commission has proposed a comprehensive set of measures to deliver a net cut of at least 55% in EU greenhouse gas emissions by 2030, reducing our dependence on fossil fuels, and especially those imported from Russia. The RePowerEU plan, published in May this year, builds on this.

As this year's report sets out, climate change will not wait, and neither should we. The Green Deal is our opportunity to deliver the fair, green transition that is essential for our energy security, economic resilience, health and overall wellbeing.

We look to the world's major emitters to follow suit with ambitious action now to make progress before 2030 and keep the Paris 1.5°C warming goal within reach. This is not only possible but essential for global stability and our future prosperity.



Clara de la Torre

Acting Director-General
Directorate General for
Climate Action

I.

Emissions trends, policies and achievements

Key highlights

- Scientists warn that stabilising the climate will require faster global action.
- The EU and its Member States have met their international climate commitment under the UNFCCC to reduce GHG emissions by 20% compared to 1990 levels by 2020.
- While EU GHG emissions rebounded in 2021 from the exceptionally low 2020 COVID-19 lockdown levels, they were still 4% below 2019 pre-pandemic level. The speed of greenhouse gas emissions reduction needs to increase; the European Commission proposed a new package of measures in 2021 to meet the more ambitious 2030 climate target.
- Power sector and industry emissions remain on a downward trend despite having risen compared to 2020 due to the rebound following the pandemic and gas-to-coal fuel switching due to the unprecedented surge in gas prices in 2021.
- Reducing dependence on fossil fuels will increase the resilience of the EU-wide energy system, save nearly EUR 100 billion annually, improve access to affordable energy for all and accelerate the green transition.
- EU funds and instruments are increasingly directed to support the green and just transition.
- Under the Climate Pact, almost 54 thousand Europeans have committed to taking more than 3 million CO₂ reducing steps.
- 100 cities across Europe have been selected to become climate neutral by 2030 in a socially inclusive way under the Mission on Climate Neutral and Smart cities.



©Getty Images | Andriy Onufriyenko

Greenhouse gas emissions and the EU's international commitments

The latest Intergovernmental Panel on Climate Change (IPCC) reports¹ confirm that transformative global action must be taken if we are to meet the goals of the Paris Agreement, including limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. Global greenhouse gas (GHG) emissions need to peak in the 2020-25 period and then fall by around 43% below 2019 levels by 2030 in order to keep the increase in average global temperature to 1.5°C by the end of this century. Under current policies², the world is not on a path to meet the temperature goal of the Paris Agreement. Meeting all new pledges made by countries before COP26 in Glasgow would improve our prospect, but still be insufficient³.

In 2021, global emissions rebounded to pre-pandemic levels. Preliminary JRC data⁴ show that global GHG emissions rose by 4.2% in 2021 to 52.9 billion tonnes of CO₂ equivalent (CO₂-eq), a level slightly above 2019 emissions, as the global economy rebounded from the pandemic. Power sector emissions and other industrial combustion emissions rose above pre-pandemic levels (+1.3% and +2.1% respectively, compared to 2019), also due to increased use of coal⁵, while emissions from transport and buildings remained lower

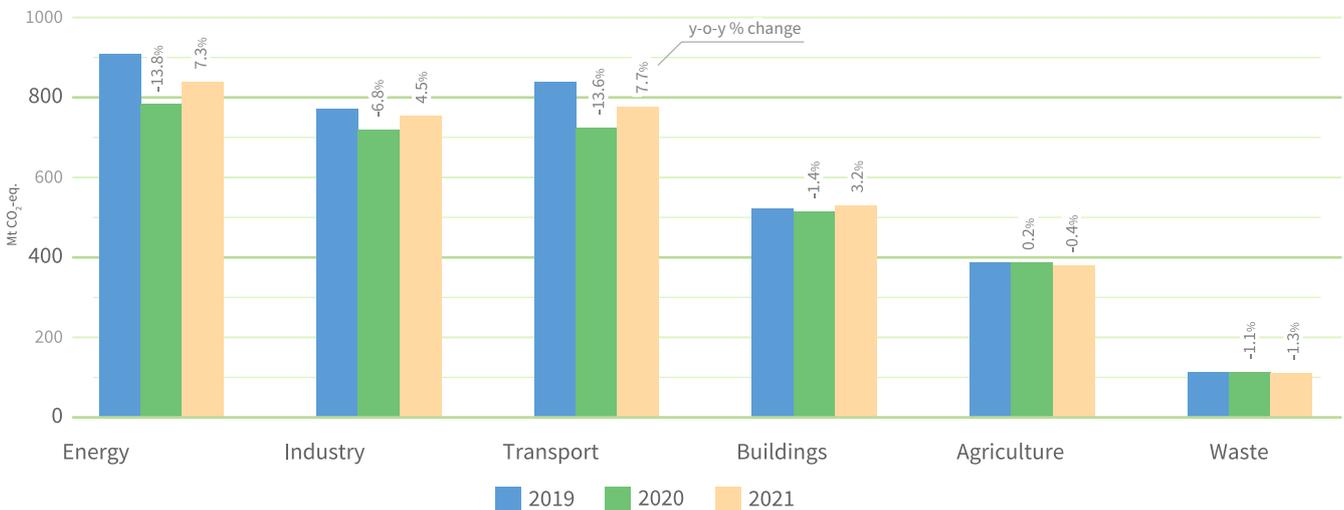
(-5.2% and -3.7%, respectively). The last year saw further devastating impacts associated with a warming climate, reinforcing the warning from scientists.

Limiting global warming requires unprecedented action by all countries and all sectors. To achieve net-zero emissions by 2050⁶, we must cut GHG emissions in a rapid, deep, and sustained way, while enhancing the planet’s capacity to absorb carbon through nature-based solutions and carbon removal technologies. The IPCC findings strengthen the EU’s determination to become climate neutral by 2050 and climate resilient, key objectives now set in the European Climate Law.

Under the UNFCCC, the EU and its Member States committed to a joint, economy-wide target to reduce GHGs by 20% compared to 1990 levels by 2020 (‘the Cancun pledge’). As set out in the EU’s 2022 GHG inventory submission⁷, the EU has substantially overachieved this target, so that its Member States and the United Kingdom have also fulfilled their emission reduction obligations under the Convention⁸. Total GHG emissions, excluding land use, land use change and forestry (LULUCF) and including international aviation, fell by 34% in the EU-27 + UK compared to 1990 (or 32% without UK)⁹. This is a reduction of 1.94 billion tonnes of CO₂-eq by 2020 (or 1.55 GtCO₂-eq without UK). The EU and its Member States jointly met their target by implementing the 2020 EU Climate and Energy Package.

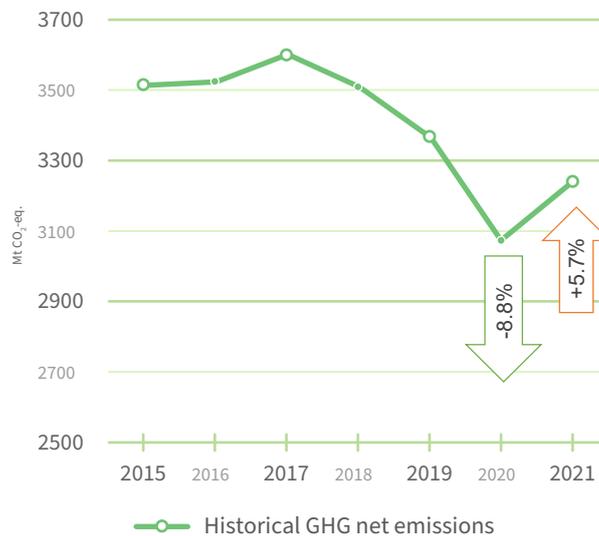
However, provisional data show that the EU’s domestic GHG emissions, excluding international aviation, rose by 4.8% in 2021 from their exceptionally low 2020 pandemic level, though they remained below 2019 level (i.e. -4.0%)¹⁰. Emissions from stationary installations covered by the EU Emissions Trading System (ETS) increased by 6.6% and non-ETS emissions by 3.5%, driven by the recovery from the pandemic. For all main sectors and gases, except buildings, emissions are expected to remain below pre-pandemic levels, continuing the overall downward trend of the past 30 years (Figure 1). Provisional 2021 data for the emission removals from LULUCF, however, do not show a reversal of its recent, concerning, declining trend. The unprecedented surge in gas prices from the second half of 2021 had a clear impact on emissions from electricity generation due to a temporary switch from gas to coal fuel (Box 1).

Figure 1 EU-27 domestic GHG emissions by sector (2019-2021)¹¹



The GHG emission intensity of the economy – the ratio between emissions and GDP – fell by 7 gCO₂-eq/EUR compared to 2019. Overall, EU net domestic emissions in 2021, including LULUCF, were 30% lower than 1990 levels, broadly consistent with the trajectory to achieve the EU 55% reduction target by 2030. However, the speed of reduction needs to increase significantly (Figure 2). In 2021 the European Commission put forward a package of proposals to adjust policies so they can meet the EU’s updated climate objectives.

Figure 2 EU-27 net domestic GHG emissions (including LULUCF)¹²



In the EU, verified emissions from aircraft operators generated 26.87 million tonnes of CO₂ in 2021, 8.7% higher than the 24.71 million tonnes reported in 2020, but still 61% lower than the 68.2 million tonnes of CO₂ in 2019, before the pandemic. Since 2021, the EU ETS no longer covers flights from the UK. Without these, ETS emissions from aviation increased by about 30% compared with 2020 and decreased by 50% compared with 2019¹³.

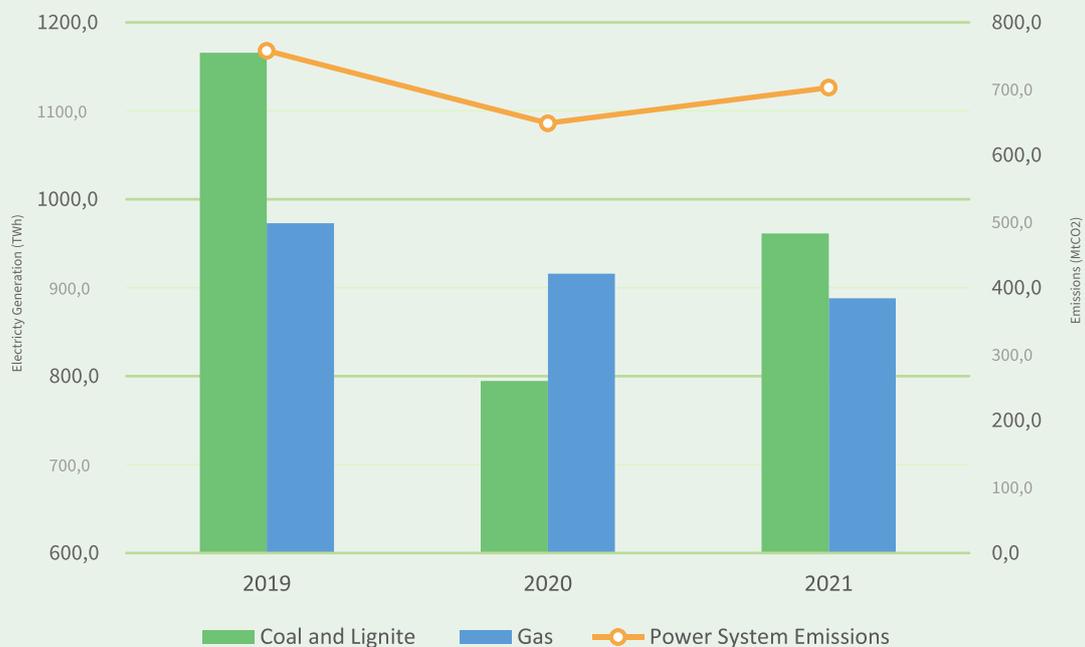
Maritime transport is a substantial CO₂ emitter, generating around 3-4% of total EU CO₂ emissions. In 2021, shipping companies reported a fall in emissions from transport activities related to the EU since pre-pandemic years due to the UK withdrawal from the EU.

Box 1: Impact of 2021 surge in gas prices on GHG emissions

In 2021, average wholesale gas prices reached a record EUR 49/MWh (Megawatt per hour), with daily peaks as high as EUR 183/MWh. By comparison, gas prices oscillated between EUR 15 and 25/MWh between 2010 and 2019, and quickly recovered to similar levels from a historic low of EUR 3-4/MWh in May 2020. Several concurrent events caused the price surge including cold weather in the beginning of the year, EU storage level below the seasonal average, low wind and solar availability during the summer and increasing geopolitical tensions on the borders of the EU. The high gas price resulted in a substantial gas-to-coal and gas-to-lignite switch in the EU power system, with coal and lignite power plants increasing running hours at the expense of gas-fired plants. Compared to 2020, coal and lignite generation increased by +68 TWh, more than half of the total production increase (+118 TWh)^(a), while gas generation fell (-16 TWh). The rest of the additional production rise was generated by renewables and nuclear (+65 TWh), despite lower onshore wind production.

The switch from gas to coal and gas to lignite resulted in CO₂ emissions from the power system rising above 2020 levels in 2021 (+8.3%). Nevertheless, CO₂ emissions in the sector in 2021 were still 7.3% lower than in 2019^(b) (Figure 3), following the long-term progressive decarbonisation of the EU power system^(c).

Figure 3 Electricity generated by coal, lignite and gas and CO₂ emissions of the power system, 2019-2021^(d).



In 2022, abnormally high gas prices persisted. The Russian invasion of Ukraine contributed to extremely high price uncertainty. At the time of writing, the market does not anticipate a return to past price levels in the short-term.

The 'Fit for 55' package along with the REPowerEU^(e) plan aim to reduce the EU's dependence on fossil fuel imports and to achieve the 2030 climate target by accelerating the rollout of renewable energy, diversifying supplies, and boosting energy efficiency significantly. Investment to diversify supplies should avoid future stranded assets.

Progress on climate action in the EU

The EU has made substantial progress under the **European Green Deal**, the blueprint for a green and inclusive transition.

The **European Climate Law**¹⁴, in force since July 2021, writes into law the EU's targets to become climate neutral by 2050 and to reduce GHG emissions by at least 55% by 2030 compared to 1990, the commitment the EU and its Member States made under the Paris Agreement.

In 2021, the Commission proposed a **package of climate and energy legislation** to ensure that the EU policy framework is fit to achieve the EU's higher climate target for 2030. The proposals are being negotiated by the European Parliament and the Council. This year has seen progress on other provisions of the European Climate Law. The **European Scientific Advisory Board on Climate Change** was appointed in 2022, to provide independent scientific advice on EU measures and climate targets. The Commission adopted **climate proofing guidance**¹⁵ and updated its **better regulation instruments**¹⁶ to ensure it takes the same approach when assessing whether draft measures are consistent with climate-neutrality and progress on adaptation, as set out in the Climate Law.

The transition to climate neutrality and climate resilience requires substantial investments.

In 2021, the Member States submitted their **recovery and resilience plans (RRPs)** to rebuild their economies after the pandemic. For the 26 RRP adopted by mid September 2022, 40% of total planned expenditure is earmarked for climate investments, above the 37% obligation set by the RRF Regulation (see Chapter 6)¹⁷.

In May 2022, the Commission proposed its **REPowerEU Plan**¹⁸ in response to the energy market disruption caused by Russia's invasion of Ukraine. The plan estimates that EUR 210 billion of additional investments in energy efficiency, energy infrastructure and renewable energy are required for the EU to reduce its fossil fuel use and cut Russian gas imports by two-thirds between now and 2027. It proposes measures to bring down emissions and energy costs for consumers and industry, including increasing the 2030 energy efficiency target to 13% and increasing the share of renewables in the EU's energy consumption from 22.1% in 2020 to 45% in 2030, above the 40% target in the 'Fit for 55' proposal¹⁹. The EU could save nearly EUR 100 billion per year on Russian fossil fuel imports.

EUR 225 billion remaining in the Recovery and Resilience Facility (RRF) will be available for action under REPowerEU. The plan proposes a further EUR 20 billion in grants from the sale of allowances from the Market Stability Reserve of the EU ETS to increase financing under the RRF. Member States could also redirect certain EU funds towards REPowerEU objectives. More money than ever is being pumped into climate projects. At least 30% of the EU budget for 2021-2027 – the biggest share ever – and of Next Generation EU is allocated to climate action (up from 20% in 2014-2020) (see Chapter 6).

In July, the Commission adopted the save energy for a safe winter Communication²⁰, including a gas demand reduction plan and a regulation proposal on coordinated demand reduction measures for gas²¹. Member States are taking measures to reduce their energy consumption.

Under the Sustainable and Smart Mobility Strategy, the Commission this year proposed **a new EU Urban Mobility framework** and an action plan to increase long-distance and cross-border rail traffic, making rail travel more attractive for passengers.



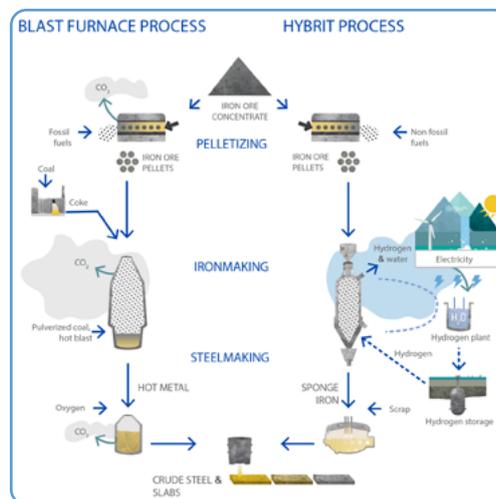
©Getty Images | Dave G Kelly

Investing in innovation

The **ETS Innovation Fund**, continues to provide support to EU industry, to develop cutting-edge technologies and to scale up innovation in renewable hydrogen and other clean-tech solutions. Since the first round, funds available have increased by more than 50%, a big boost for the decarbonisation of industry in the EU, complementing instruments such as Horizon Europe (see Chapter 6).

Example 1: Stimulating investment – Innovation Fund

The Swedish Hydrogen Breakthrough Ironmaking Technology (HYBRIT) financed by the Innovation Fund, aims to create a fossil-free value chain for iron and steel production using fossil-free electricity and hydrogen. The HYBRIT technology involves replacing the blast furnace process, which typically uses coal and coke to remove the oxygen from iron ore, with a direct reduction process using green hydrogen.



©Hybrit Media bank

Mobilising more private capital in green finance

The Commission is working to align capital market rules with climate objectives, including to implement the renewed sustainable finance strategy²². The Commission has proposed a Corporate Sustainability Reporting Directive²³ for comparable climate-related information, a Corporate Sustainability Due Diligence Directive²⁴, and targeted amendments to the EU banking²⁵ and insurance rules²⁶ to ensure that they integrate climate risks in their management and operations.

The Commission has proposed specific treatment of certain energy activities under the Taxonomy Regulation²⁷. It has collected evidence for possible legislative proposals on credit ratings and on environmental, social, and governance ratings²⁸, as well as on the review of the macroprudential framework²⁹.



©Getty Images | fhm

Strengthening social fairness and economic resilience

To be a success, the green transition must be fair and inclusive in line with the European Pillar of Social Rights, supporting those who face the greatest challenge. The geopolitical situation and developments in energy prices highlight the need to accelerate the transition while building social and economic resilience.

A Council recommendation on **ensuring a fair transition towards climate neutrality** was adopted in June 2022³⁰ to provide guidance for Member States designing and implementing policy packages on employment, skills, social and distributional aspects of the transition³¹. Given rising energy prices, Member States are putting in place measures to provide people on low incomes with access to energy and transport. A range of EU funding instruments offer support for a fair and social transition (Chapter 6)³².

Engaging people

Transition to a climate-neutral society is about people: how we produce, consume, move, heat and cool our homes, work and live together. Active public participation is paramount. The **European Climate Pact**³³ gives everyone a voice and a platform to design new climate actions, amplify activities, share information and knowledge, launch and connect grassroots activities and showcase solutions.

The pilot phase focused on translating climate science and policy into our daily lives. The Climate Pact Ambassadors are now almost 1 000 people from all walks of life, from scouts to Mayors, active in local communities, networking and exchanging knowledge across Europe. The Pact has created a system for individual and organisations' commitments. Individual pledges, collected in partnership with Count Us In³⁴, have so far led to almost 54 000 Europeans taking more than 3 million CO₂ reducing 'steps'. Over 300 organisations (including the European Commission) or groups have made pledges (1 800 in total) to get on a path to climate neutrality. By showcasing initiatives, the Pact inspires others to act.



©Getty Images | Johner Images

Mobilising cities

The Mission on Climate Neutral and Smart cities has selected 100 diverse cities across Europe to become climate neutral by 2030 in a socially inclusive way. The cities benefit from tailored support from the NetZeroCities³⁵ platform and are co-creating 'Climate City Contracts' with action plans and investment strategies.



©Getty Images | Westend61

Example 2: New European Bauhaus

The **New European Bauhaus** initiative connects the European Green Deal to our daily lives and living spaces. It calls on all Europeans to imagine and build together a sustainable and inclusive future that is beautiful for our eyes, minds, and souls.



©European Union

By creating **bridges** between different backgrounds, the New European Bauhaus inspires a movement to facilitate and steer the transformation of our societies along three inseparable values: **sustainability, aesthetics, and inclusion.**

From 9 to 12 June 2022, Brussels hosted the first **Festival of the New European Bauhaus**. The festival is spreading throughout Europe, with more than 200 co-created side events. On 11 October 2022, the **European Urban Initiative** officially launched its first **Innovative Actions call**, with a budget of EUR 50 million to support New European Bauhaus projects. The aim is to deliver tangible, real-life examples of how we can connect our living spaces with the European Green Deal.

II.

The EU Emissions Trading System

Key highlights

- In 2021, ETS emissions were 6.6% higher than in 2020 reflecting both the economic recovery from COVID-19 and the developing energy crisis. Emissions are still on the downward trend seen before the pandemic hit.
- Following a more than 60% drop in 2020, aviation emissions covered by the EU ETS rebounded by 30% in 2021, but remained 50% lower than in 2019.
- Since 2005, emissions under the EU ETS have declined by 34.6%. In 2021, the carbon price increased in particular due to market anticipation of a higher 2030 climate ambition and related policy reforms. Overall, the EU carbon market remained effective and continued to function in an orderly manner.
- In 2021, revenues from ETS auctions almost doubled compared to 2020 to EUR 31 billion, which Member States continued to largely spend for climate and energy purposes. Member States have benefitted from over EUR 100 billion in auction revenues since 2013.

The EU Emissions Trading System (ETS) is a cornerstone of the EU's policy to tackle climate change. It currently covers around 36% of the EU's total GHG emissions, including close to 9500 power stations and manufacturing plants (i.e. stationary installations) and flights within the European Economic Area (EEA)³⁶

By 2021, the EU ETS had driven emissions from stationary installations down by 34.6%³⁷ against 2005 levels. In parallel, Member States have raised over EUR 100 billion in auction revenues since 2013, available for further climate action and energy transformation.

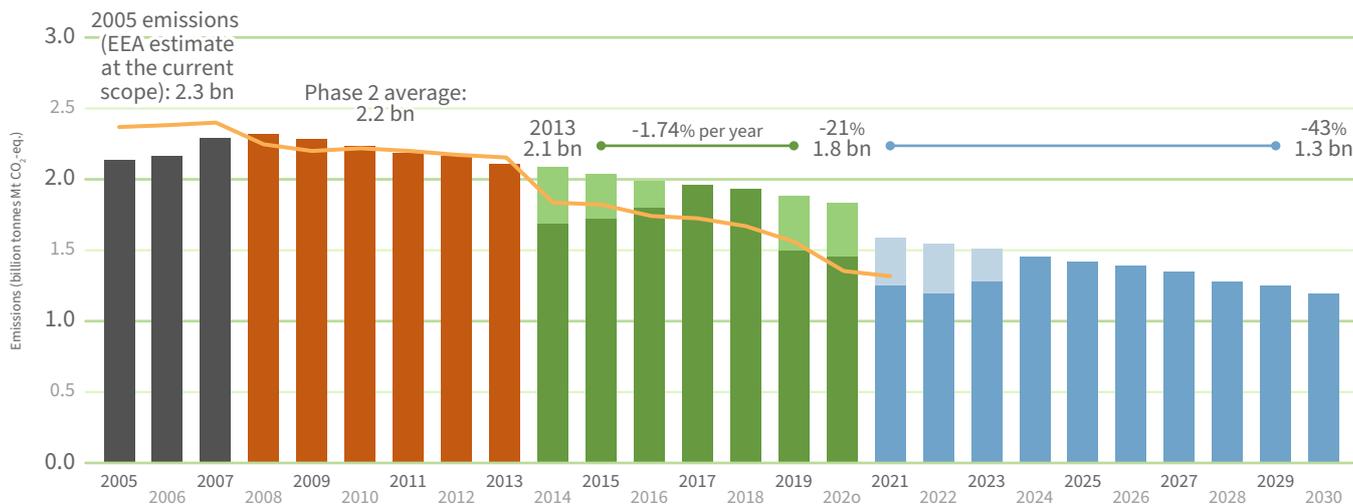
In 2021, EU ETS emissions increased slightly compared with 2020, reflecting both the economic recovery from COVID-19 and the developing energy crisis. While 2021 emissions remained on a downward trend compared with 2019 pre-pandemic emissions, more action is needed in ETS sectors to meet the 2030 climate target. This is the aim of the package proposed by the European Commission in 2021 to deliver the European Green Deal, currently being negotiated by the European Parliament and Council. This includes a reform of the ETS, strengthening the cap and extending the system to cover maritime emissions, and a parallel system to cover buildings and road transport.

Emissions trends

In 2021, stationary installations generated 1 335 million tonnes of CO₂-eq emissions. This is 6.6% higher than emissions in 2020, but still 5.6% lower than in 2019³⁸. The power sector saw an 8.4% increase in 2021, mainly driven by a switch back from use of natural gas to coal linked to the rise in gas prices and higher demand for electricity to fuel the economic recovery after the pandemic. However, overall power sector emissions in 2021 were still 8.1% below 2019 levels, with very similar demand for electricity in these two years.

Emissions from industry under the ETS were also higher in 2021 (by 4.6%) than in 2020, but 2.6% lower than in 2019. High increases were observed in most sectors, including iron and steel and chemicals. Following a more than 60% drop in 2020, EU ETS aviation emissions rebounded in 2021 by 30% but remained 50% lower than in 2019³⁹.

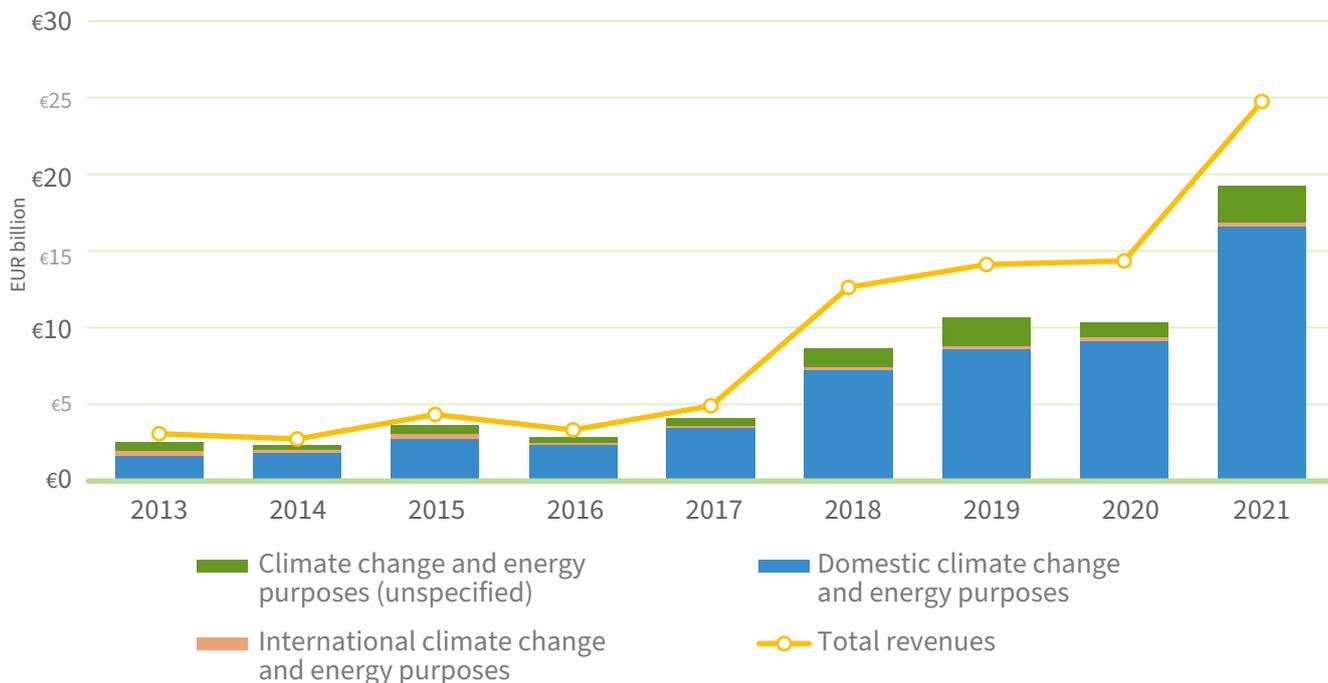
Figure 4 Verified ETS emissions 2005-2021, Member State projections with existing measures 2021-2030, ETS cap phases 2, 3 and 4, and accumulated surplus of ETS allowances 2008-2021 including UK (Northern Ireland), Norway and Iceland NB: adjust for cap phase 4



Resources generated by the ETS

The EU ETS implements the polluter pays principle but also generates substantial resources for climate action (see Chapter 6).

Figure 5 Auctioning revenues and reported usage, 2013-2021 (€ bn), EU-27



As the carbon price increased during 2021, so did ETS auction revenue, amounting to some EUR 31 billion in total⁴⁰. This means that revenue almost doubled from the EUR 16.5 billion raised in 2020. Of these EUR 31 billion, EUR 25 billion went directly to the 27 Member States. In 2021, they reported that an average of 76% of revenues was spent for climate and energy purposes⁴¹, in line with an average of 75% over the 2013-2020 period (Figure 5). About 24% of Member State revenues are earmarked for specific climate and energy actions, 25% went into dedicated environmental funds and 51% went to national budgets.

In 2021, several Member States also used their auction revenue to cushion the social impact of the energy price crisis.

Action in aviation and maritime transport

Emissions from extra-European aviation, from incoming flights to the European Economic Area and flights departing to countries outside the EEA, with the exception of flights departing to the UK and Switzerland, are currently not priced under the EU ETS under the ‘stop the clock’ provision in the EU ETS Directive.

The Commission’s proposal to extend the EU ETS to include emissions from maritime transport is now being negotiated by the European Parliament and the Council. The proposal builds on the Monitoring, Reporting and Verification Regulation⁴², which tracks CO₂ emissions from large ships calling at EU ports since 2018. The EU continues to support development of ambitious measures under the International Maritime Organisation strategy on GHG emission reductions, such as potential fuel GHG intensity standards and market-based measures.

EU carbon market

The EU carbon price has followed a consistent upward trend since 2018. In 2021, it continued to increase due to high gas prices and market anticipation of the increased 2030 climate ambition as well as related policy reforms. The higher carbon price contributed to higher electricity wholesale prices, but to a much smaller extent than the increase in gas prices. In the October 2021 Communication on energy prices, the Commission estimated the effect of the gas price increase on the electricity price to be nine times higher than the effect of the carbon price increase⁴³. Gas prices have since continued to increase sharply, whilst ETS prices have remained within a similar range. A report from the European Securities and Markets Authority, completed in March 2022, excluded a role for speculation in driving the carbon price increase⁴⁴ (see Carbon Market Report)⁴⁵.

Example 3: Alliance for Zero-Emission Aviation

To prepare for the advent of hydrogen-powered and electric aircraft the Commission on 24 June 2022 launched the **Alliance for Zero-Emission Aviation** and invited actors from across aviation to join. The European aeronautical industry is working on a new generation of aircraft in the commuter, regional and medium-haul segments that will fly on hydrogen or battery-electric power, and these aircraft are expected to enter into service in the coming decade. The Alliance for Zero-Emission Aviation will pin-point what action needs to be taken where and by when. It will also help attract the required investments.

III.

Effort Sharing Emissions

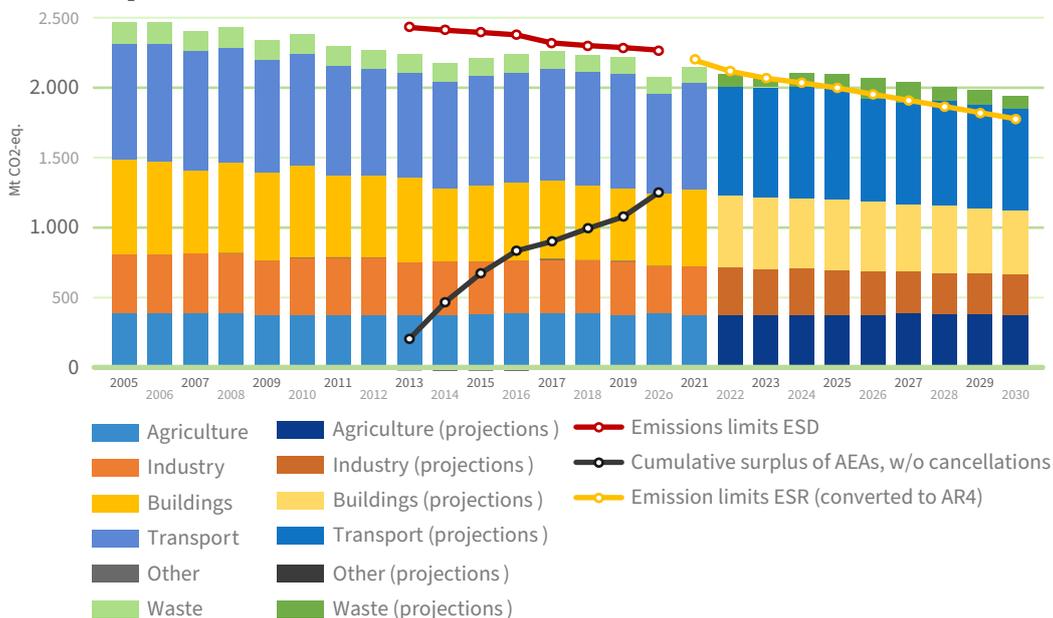
Key highlights

- GHG emissions in the sectors covered by the effort sharing legislation fell by 16.3% in 2020 compared to 2005 emission levels, overachieving the EU's 2020 target of a 10% reduction.
- All Member States met their effort sharing obligations for 2013-2019.
- Member States need to step up action to reach the EU's current target for 2030 of a 30% reduction in GHG emissions compared to 2005 and even more so to reach the higher ambition of a 40% reduction set under the 'Fit for 55' proposal.
- The update of the national energy and climate plans will be a key process to enable the EU to meet these higher ambitions in practice.

Emissions from sectors not included in the current EU ETS, such as emissions from buildings, road transport, agriculture, waste, domestic navigation and small industry, account for almost 60% of total domestic EU emissions. These emissions are covered by the EU effort sharing legislation that sets national targets. The Effort Sharing Decision⁴⁶ (ESD) sets national emissions targets for 2020 compared to 2005 levels and annual emissions allocations (AEAs), which are the emission limits that Member States must stay under for the period 2013-2020.

Since 2013, EU-wide emissions in the effort sharing sectors have been below the annual limit, as shown in Figure 6. EU-27 emissions covered by the Effort Sharing Decision⁴⁷ (ESD) were 16.3% lower in 2020 than in 2005; the EU overachieved its 2020 target by six percentage points. After the pronounced fall in 2020 emissions due to the pandemic, emissions in the ESR sectors rebounded in 2021. Based on approximated data, effort sharing emissions in 2021 were 3.5% higher than in 2020. The increase was most pronounced for transport (with an increase in emission of more than 7% compared to 2020), followed by emissions from buildings (3.1% rise). The agriculture sector saw a slight decrease in emissions in 2021 compared to 2020 of above 0.3%, but overall the decrease has been small compared to 2005 (around 2%).

Figure 6 Emissions in sectors covered by effort sharing legislation 2005-2030 and annual emission allocations (AEAs), EU-27 (Mt CO₂-eq) (see details in the SWD)⁴⁸.

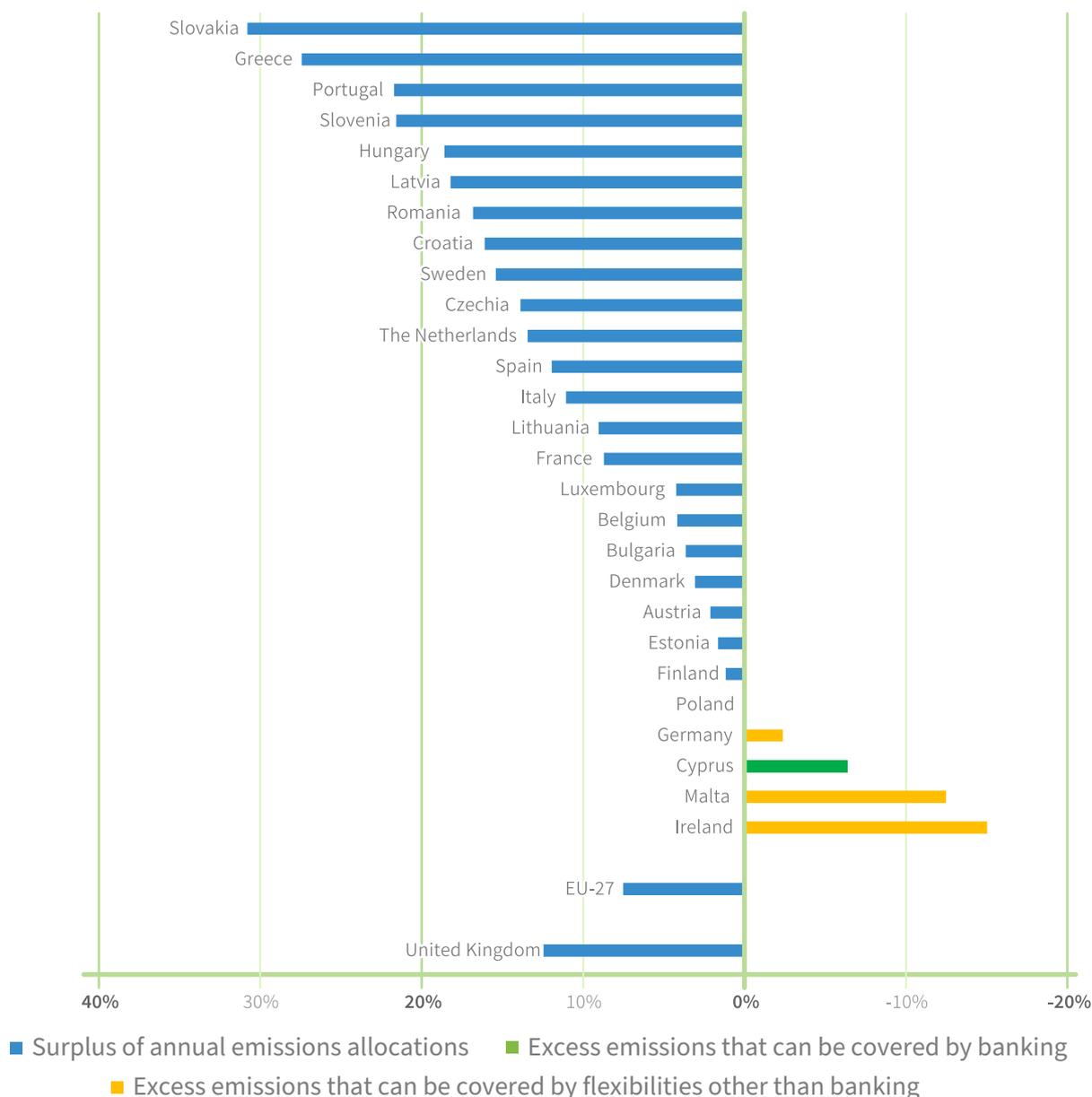


Results of the Effort Sharing decision 2013-2020

All Member States met their effort sharing obligations in all years between 2013 and 2019. Malta exceeded its annual emissions allocations (AEAs) every year, but covered the deficit by buying AEAs from Bulgaria. In 2019, Austria, Belgium, Cyprus, Estonia, Finland, and Luxembourg also exceeded their AEAs but used saved surpluses from previous years to cover the deficit. Germany and Ireland did not have enough saved surplus to cover their deficit. Germany carried forward AEAs from 2020 to meet its obligation for 2019, while Ireland used international credits from the Clean Development Mechanism to meet its obligations. All Member States except Hungary, Sweden and the UK banked surplus AEAs for possible use in 2020.

The compliance cycle for 2020, the final year under the Effort Sharing Decision, is ongoing. Based on the annual inventory review under the ESD, emissions in four Member States exceeded their AEAs (Figure 7). Cyprus' emissions exceeded its AEAs by 6%; it has sufficient surplus of AEAs from previous years to comply in 2020. As Germany carried forward part of its 2020 AEAs for compliance in 2019, its 2020 emissions exceed the remaining 2020 AEAs by 2%. Malta and Ireland's emissions exceeded their AEAs by 12% and 15% respectively and, with Germany, they will need to buy AEAs from other Member States and/or use international credits to comply in 2020 as they do not have enough banked AEA surplus.

Figure 7 Difference between Member States' 2020 target under the ESD and emissions in the effort sharing sectors in 2020 (in percentage of 2005 emissions)⁴⁹.



Progress on 2030 targets under the Effort Sharing regulation

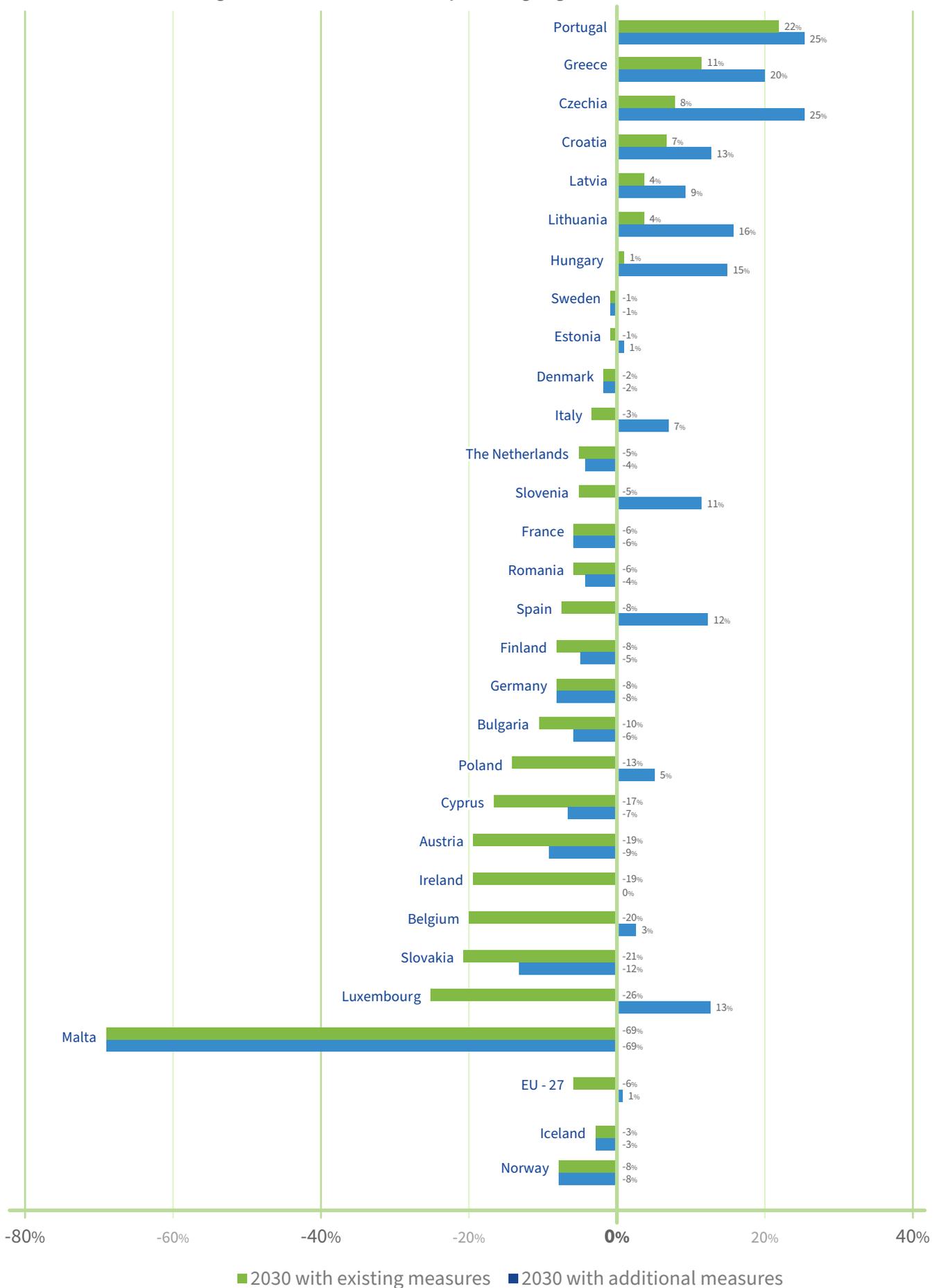
As of 2021, the Effort Sharing Regulation⁵⁰ (ESR) sets national emissions targets for 2030 and AEAs for each year between 2021-2030, including for Iceland and Norway⁵¹.

Member States are planning and implementing policies and measures to achieve their current 2030 effort sharing targets under the ESR. In aggregate for the EU-27, current national policies would reduce emissions by 22% by 2030 compared with 2005 (Figure 8), well below the current 29% overall effort sharing emissions reduction target. If Member States implement all additional policies they have reported, the EU would only just meet the 29% reduction target under the existing ESR. The Commission has proposed to amend the ESR to deliver the higher ambition for 2030 of at least 55% GHG domestic emission reduction, with a proposed increase of the 2030 target for effort sharing sectors to 40% emission reduction compared to 2005. This is in negotiation between the European Parliament and the Council.

This highlights the strong, imminent need for Member States to plan and implement additional climate action in effort sharing sectors in their updated integrated national energy and climate plans. As Member States must submit draft updated plans by 30 June 2023⁵², the Commission is preparing guidance to assist their preparations.

Approximated inventory data for 2021 shows that four Member States are expected to exceed their current AEAs for that year, by 1 percentage point for Czechia, by 2 percentage points for Italy, by 5 percentage points for Ireland and 14 for Cyprus. As 2021 is the first year under the ESR, any remaining surplus under the ESD is not carried over. However, Member States will be able to use other flexible options under the ESR.

Figure 8 Gap between 2030 ESR targets and projected emissions⁵³ with existing measures and additional measures, as a percentage of 2005 emissions for EU-27, Iceland and Norway. Positive values indicate targets forecast to be exceeded; negative values indicate that they are not going to be met.

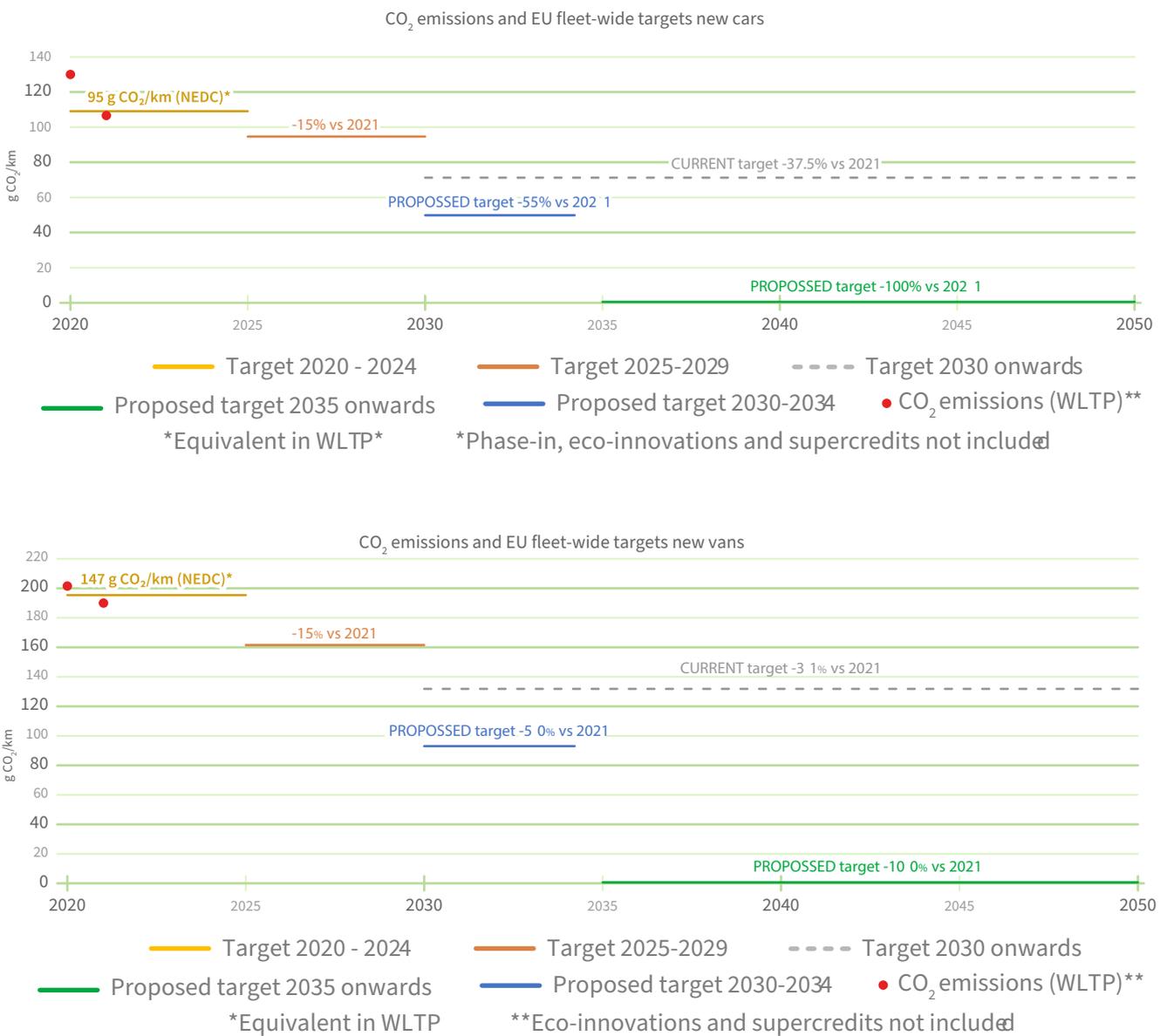


Policies in key sectors

Transport

CO₂ emission standards for new cars and vans and for heavy-duty vehicles are key drivers for road transport emissions reduction. Average emissions from new cars fell from 130.3 g CO₂/km WLTP⁵⁴ (i.e. 107.5 g CO₂/km NEDC⁵⁵) in 2020 to 114.7 g CO₂/km in 2021, according to provisional monitoring data for 2021⁵⁶. This continues the steep downward trend seen since 2019 in CO₂ emissions of new cars registered in the EU, thanks to stricter EU fleet-wide CO₂ targets that have applied since 2020. Moreover, the share of battery electric cars has increased spectacularly. In 2021, 10% of newly registered cars in the EU was battery electric (up from 2% in 2019 and 6% in 2020). Provisional data shows that, in 2021, the average emissions for vans also decreased to 193.8 g CO₂/km WLTP, from 200.3 g CO₂/km WLTP (i.e. 155.0 g CO₂/km NEDC) in 2020, also thanks to stricter targets applying since 2020 (Figure 9).

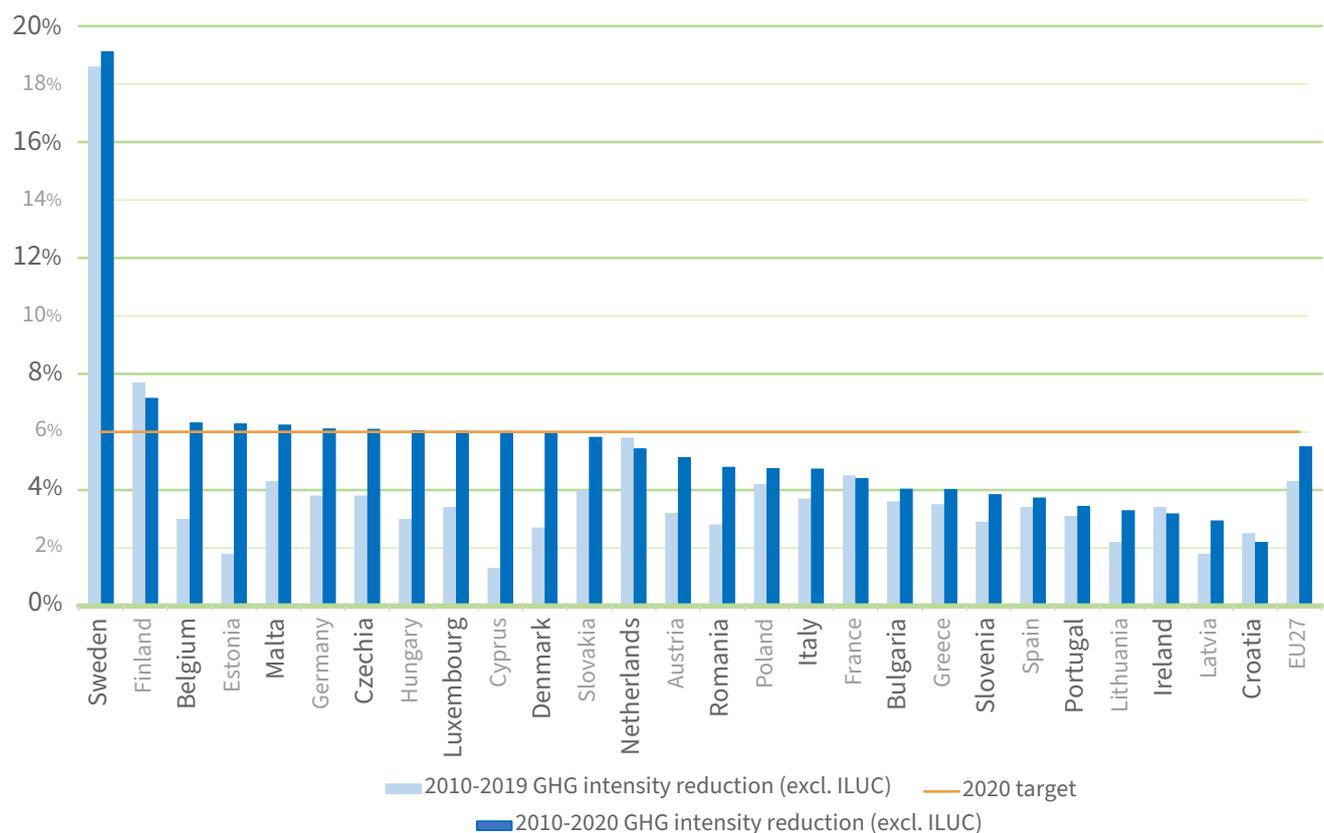
Figure 9 CO₂ emissions and EU fleet-wide targets, cars and vans



Heavy-duty vehicles (HDV), such as lorries, heavy vans and buses, generate about 30% of all CO₂ emissions from road transport. Existing legislation requires the average CO₂ emissions of a manufacturer's fleet of new heavy lorries to be reduced by 15% by 2025 and 30% by 2030 from 2019 levels. A legislative proposal by the Commission due at the end of 2022 is expected to tighten existing standards and extend the scope to most remaining HDV vehicle groups.

The **Fuel Quality Directive** also reduced transport emissions; it stipulates that the life-cycle GHG emission intensity of fuels must be reduced by 6% by 2020 compared to 2010 levels. The average GHG intensity of fuels supplied in 2020 was 5.5% lower than in 2010. The progress by EU fuel suppliers varies greatly across Member States (Figure 10).

Figure 10. Reductions in GHG intensity of fuels achieved by EU fuel suppliers in EU-27, 2010-2019 and 2010-2020 (Source: EEA)



F-gases

Fluorinated gases ('F-gases') have a global warming effect up to 25 000 times greater than CO₂. After 2014, a decade-long trend of rising emissions of F-gases was reversed due to the current F-gas Regulation (Regulation (EU) No 517/2014). EU-27 emissions fell by 20% from 2014 to 2020 and the supply of hydrofluorocarbon (HFC) gas to the market fell by 47% in CO₂-eq between 2015 and 2019, notably due to refrigeration shifting to more climate-friendly alternatives. In April 2022, the Commission proposed a new F-gas Regulation for additional emission savings by 2050.

ODS

Ozone-depleting substances (ODS) are also very strong greenhouse gases. Their use and production in the EU has fallen by 99% over past decades, as part of global action to protect the ozone layer under the Montreal Protocol. The largest remaining EU sources of ODS are legacy foams for insulation in buildings over 20 years old, emitted when buildings are renovated or demolished. A new proposal for ODS Regulation, adopted by the Commission in April 2022, aims to avoid emissions by requiring the collection and destruction or reuse of these pollutants.

Example 4: LIFE Retrtradeables - Recover, Recycle and Re-use of F-gases

LIFE Retrtradeables (2020-2023) aims to create an innovative circular economy ecosystem for F-gases to reduce industry emissions and increase F-gas compliance and safety. The project is developing a self-certification platform, with reliable F-gas declarations for composition/recovery/recycling and establishing a new market for recycled F-gases in Europe, where gas distributors offer transparent and reliable trades for recovered F-gases in real time onsite. By fostering the use of high-quality, cost-efficient recycled F-gases and providing an accurate database of information for regulation compliance, LIFE Retrtradeables offers an easy and secure solution to put recovered F-gases back on to the market. The project includes activities to support EU companies to identify reclamation opportunities, raise awareness and improve industry knowledge about the development of effective climate change mitigation.

IV.

Land Use, Land Use Change And Forestry

Key highlights

- Between 2013 and 2020, the EU's carbon sinks removed a net average of 320 Mt CO₂-eq per year, but the size of the carbon sink has been decreasing.
- The main cause of the decrease in the EU's carbon sinks is the decrease of removals by forest management for 2013-2020.
- In order to reverse this trend, the Commission has proposed a change in the regulatory framework, including a simplified monitoring system to enhance sustainable carbon removals.

Land use, land use change and forestry (LULUCF) will play a crucial role in achieving the EU's climate neutrality goal, as land can both release GHG emissions to the atmosphere and remove CO₂ from it, depending on the use made of the land. In the EU, LULUCF emits less GHG into the atmosphere than the CO₂ it removes through biogenic processes, but recent years have seen a decline of this natural carbon sink. For 2013 to 2020, Member States committed to accounting for additional action in LULUCF, in reported GHG emissions and CO₂ removals, to assess the target under the Kyoto Protocol⁵⁷.

Figure 11 Reported (R) and preliminary accounted (A) emissions and removals under the Kyoto Protocol, second commitment period, EU-27⁵⁸

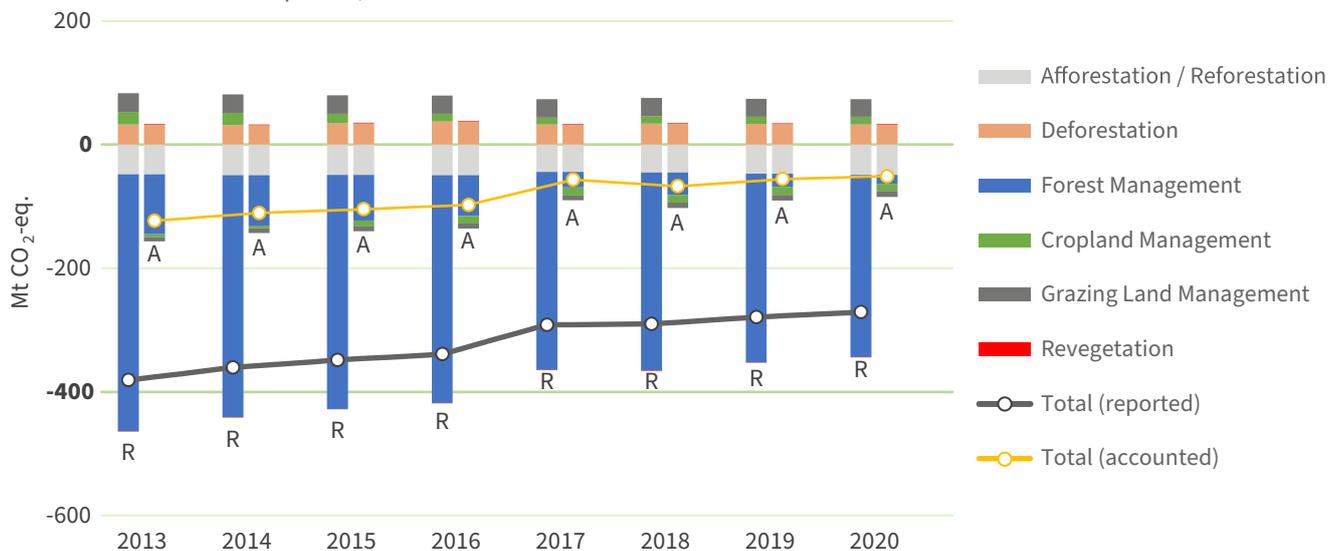


Figure 11 shows a decreasing sink of 'reported' emissions and removals by activity for the EU for the second commitment period of the Kyoto Protocol (2013-2020). Average net removals were 320.2 Mt CO₂-eq over the period. With Kyoto Protocol accounting rules, the 'accounted' balance produced an average carbon sink (or credit) of 83.4 Mt CO₂-eq, with net credits decreasing from -123.2 in 2013 to -51.3 Mt CO₂-eq in 2020⁵⁷. This includes both 'elected' and 'mandatory' activities (afforestation/reforestation, deforestation and forest management)⁶⁰.

The main cause of this sink decline is the decrease in reported net removals and accounted net credits from forest management for 2013-2020. The decline in carbon removals is due to a mix of factors, including higher demand for wood (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). According to preliminary estimates, using accounting rules for the Kyoto Protocol second commitment period, Belgium, Bulgaria,

Czechia, France, Croatia, Cyprus, Slovenia and Finland have average net LULUCF debits⁶¹.

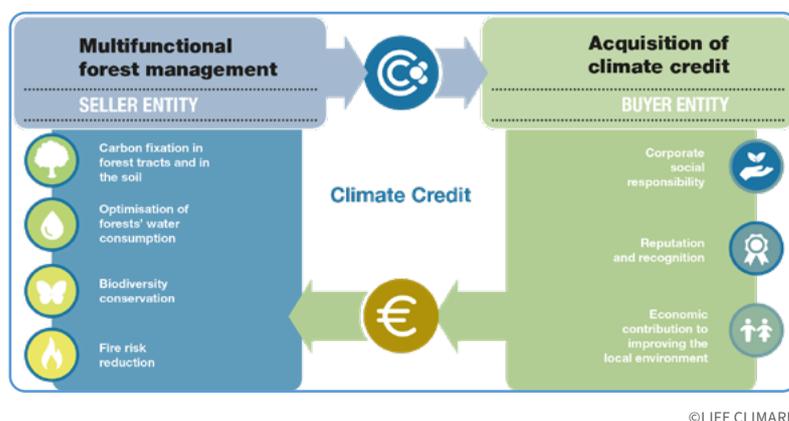
The current LULUCF Regulation⁶² and secondary legislation⁶³ require that, as of 2021, each Member State offset their GHG emissions from the sector by at least an equivalent amount of CO₂ removed from the atmosphere, under the ‘no-debit rule’.

For the first time under the ‘Fit for 55’ package, the Commission proposed – an EU net removals target of 310 million tonnes of CO₂-eq in 2030 for the LULUCF sector. This EU-wide target is to be implemented through binding national targets. Looking further ahead, the Commission has proposed a land sector focus, combining emissions from agriculture (mainly livestock and fertiliser) and net removals from LULUCF. The aim is to reach climate neutrality in the land sector by 2035 and net negative emissions thereafter.

The Commission Communication on Sustainable Carbon Cycles⁶⁴ of December 2021 sets goals and action plans to achieve carbon removals through nature-based solutions⁶⁵ and industrial technologies. The Commission is developing a regulatory framework for EU certification of carbon removals to reward land managers for carbon sequestration, in full respect of ecological principles (‘carbon farming’). It will also help create an EU internal market for the capture, use, storage and transport of CO₂, using innovative technologies, such as Earth Observation (Copernicus programme)⁶⁶.

Example 5: LIFE CLIMARK – Promoting sustainable forest management

Sustainable forest management is a key tool to maintain and enhance the mitigation capacity of forests. The LIFE CLIMARK project (2016-2022), located in Catalonia (Spain) and replicated in Veneto (Italy), designed a local market of ‘climatic credits’ to promote multifunctional forest management in a rural abandonment context. Climatic credits are defined by assessing the impact of locally identified forestry practices on climate mitigation, water flow regulation and biodiversity. CLIMARK applied climatic credits on almost 88 hectares of diverse Mediterranean forest typologies and developed tools to facilitate their replication in other European regions.



©LIFE CLIMARK

Example 6: LIFE-IP PAF Wild Atlantic Nature project - Protecting and restoring Ireland's blanket bog

The project (2020-2028) aims to address the identified obstacles, gaps and shortcomings that currently prevent the full implementation of the Prioritised Action Framework (PAF) for Natura 2000 on 24 sites with respect to Ireland’s blanket bogs in the Northern and Western Region covering an area of over 200,000 ha. The overall status of conservation of the blanket bog has been declining mainly due to inappropriate agricultural practices, peat cutting, forestry plantations and invasive species. To address this trend, the project has facilitated the development of a Results-Based Agri-environment Payment Scheme in the Northwest of Ireland, involving c.750 farmers and over 40 agricultural advisors, to reward high quality peatland habitats and incentivise the improvement of poorer quality habitats. This approach forms the basis of the new Cooperation Approach of Ireland’s CAP Strategic Plan, which will be rolled out to over 300,000 ha from 2023.



©Ronan Casey



Adapting to climate change

Key highlights

- The 2021 adaptation strategy has begun delivering results and achieving important milestones in a broad range of policy fields as, for example, the adoption of a new guidance on how to climate-proof future infrastructure projects.
- The research and innovation initiative 'Mission on Adaptation' is making good progress, with 118 regions and local authorities having signed its Charter to date and 12 calls for funding launched.

Implementing the EU's 2021 strategy on adaptation to climate change is a multi-year project, with important achievements this year.

The Commission published **technical guidance on climate proofing of infrastructure** for 2021-2027, as required under the European Climate Law⁶⁷. These enable investors to make informed decisions on projects compatible with the Paris Agreement and the EU's climate targets.

The European Climate and Health Observatory, launched in March 2021 by the Commission and the EEA, already plays a key role⁶⁸, closing an important knowledge gap, helping overcome barriers that prevent us from tackling fast-growing and negative health impacts of climate change. The observatory provides information and tools to assess climate change and health⁶⁹. It also provides effective solutions and interventions to integrate and improve climate adaptation strategies in national and sub-national health policies. The new **sustainable finance and forest strategies** bridge the climate protection gap and to boost forest resilience. The first ever EU Adaptation Communication was submitted to the UNFCCC in October 2021⁷⁰.

The **Mission on Adaptation to Climate Change** has made good progress in fostering a step-change in adaptation action at sub-national level. It supports at least 150 EU regions and communities in accelerating their transformation to achieve climate resilience by 2030. 118 regions and local authorities from 18 Member States have signed the Mission Charter to join a community of practice and it has issued 12 calls for funding amounting to EUR 240 million.

The EEA plans a full **report on the status of national adaptation action** in late 2022. The report will be based on reporting by national authorities from March 2021 under the Energy Union Governance Regulation⁷¹ and other sources.

Example 7: Horizon Europe Mission for Adaptation to Climate Change

The Horizon Europe Mission for Adaptation to Climate Change engages actively with communities to meet their unique needs in accelerating adaptation. A key cross-cutting element is working with nature and with ecosystems to make cities, regions, coastlines, river basins, or forests more resilient. The Mission also aims to deliver at least 75 large-scale demonstrators of systemic transformations on the ground.



©European Union

To identify interested parties, the Mission launched a Mission Charter for regional and local authorities. Signatories declare their willingness to cooperate, mobilise resources and develop activities in their respective region and communities to reach their adaptation goals, and will receive targeted support via the Mission Implementation Platform. The first 118 regions and local authorities that will sign the Charter were announced on 7 June 2022 during the Mission Forum.

Example 8: Horizon Europe FIREURISK

The Horizon Europe FIREURISK project (2021-2025) is working on improving our understanding of the vulnerability and resilience of European communities and countries against the increasing wildfire risk conditions. Such risks comprise human casualties, cultural and economic losses, social disruption, major infrastructure damage, and deterioration of natural capital and biodiversity. The main objective of FIREURISK is therefore to develop, test, and disseminate an integrated, science-based strategy for wildfire risk management in Europe.

Financing climate action

Key highlights

- At least 30% of the EU's total budget for 2021-2027 and 37% of the EU's Recovery and Resilience Facility will be spent on fighting climate change.
- The EU budget will fund action to secure a fair and just transition to climate neutrality at an unprecedented scale over the current decade.
- Between 2020 and 2030, it will be possible to invest EUR 89 billion, under current carbon price estimates, through the Innovation and the Modernisation Funds in EU climate action.

The transition to climate neutrality and climate resilience requires substantial investment. At EU level funding is available from various sources.

Funding from the EU Emissions Trading System

The **Innovation Fund** is one of the world's largest public funding programmes for rollout of innovative low-carbon technologies. It is financed by auctioning 450 million allowances from the EU ETS over this decade, representing some EUR 38 billion⁷². Since its start in 2020, about EUR 3 billion have been invested in 54 projects. In 2021, two calls for projects were completed: one for large-scale investments⁷³ of EUR 1.146 billion and one for small-scale investments⁷⁴ of EUR 109 million.

Under the first call for large-scale projects, seven grants were awarded, with successful bids in ETS sectors, including chemicals, steel, cement, refineries, and power and heat. For the first call for small-scale projects, 32 were awarded grants in a broader range of ETS sectors including green hydrogen, energy storage, glass, heat and carbon capture.

In July 2022, 17 projects were pre-selected under the second large-scale call for projects in cement, hydrogen, chemicals, and others for a total of EUR 1.8 billion in Bulgaria, Finland, France, Germany, Iceland, the Netherlands, Norway, Poland and Sweden. These projects aim to save up to 136 million tonnes of CO₂-eq in their first 10 years of operation.

The next large-scale call, to be launched in autumn 2022, has an unprecedented budget of EUR 3 billion, with sections for projects to implement the REPowerEU plan, on hydrogen and electrification, clean-tech manufacturing and pilots.

The **Modernisation Fund**, also from the EU ETS, supports lower-income Member States to modernise their energy systems and improve energy efficiency. Until 2030, over 640 million allowances (representing some EUR 51 billion)⁷⁵ will be auctioned to support these Member States. Since 2021, EUR 3.3 billion have been transferred to Croatia, Czechia, Estonia, Hungary, Lithuania, Poland, Romania and Slovakia funding 71 investments for transition in areas such as photovoltaics and power grids for electric car charging.

Example 9: Stimulating investment – Innovation Fund

In the chemical industry, the Kairos@C project has received funding from the ETS Innovation Fund. This project aims to create the first and largest cross-border Carbon Capture and Storage (CCS) value chain to capture, liquefy, ship and permanently store CO₂ underground that would otherwise be emitted. This new technology and infrastructure will be located in the port of Antwerp and is expected to become the cornerstone of Belgium's decarbonisation roadmap.



©BASF Antwerp

Example 10: TANGO project funded by the Innovation Fund

Located in Catania, the 3Sun factory is one of the largest solar panel production plants in Europe. It's the first of its kind in Europe to mass produce bifacial panels with heterojunction technology (HJT). Bifacial panels can capture sunlight from their back surface too, which means they are far more efficient than traditional ones because more clean energy is produced without major additional cost. They are also stronger and last longer, which lowers the consumption of raw materials.



©ENEL Green Power

The TANGO project will be carried out by ENEL Green Power, one of the largest operators in the renewable energy sector in the world. TANGO aims to expand the 3Sun factory and turn it into the GigaFactory, the first European industrial-scale manufacturing plant for highly innovative solar panels. The production capacity will reach **3 GW** per year. What does this mean in practice?

- **3 GW** of panels can generate around **5,5 GWh** of renewable electricity per year, roughly the annual consumption of two million Italian households.
- The panels produced during the project's first ten years of operation will avoid the equivalent of **25 million tonnes of CO₂**, amounting to more than 30% of all GHG emissions from public electricity and heat production in Italy in 2019.

Additionally, the future GigaFactory will create around **1000 jobs** by 2024

Mainstreaming climate policies in the EU budget

At EU level, investment for the transition will flow from two main sources: the EU's EUR 1.2 trillion 'multiannual financial framework' for 2021-2027 and the EUR 806.9 billion NextGenerationEU, supporting the EU's recovery. At least 30% of these two sources combined (potentially over EUR 670 billion in current prices) will be spent on fighting climate change⁷⁶.

Spending programmes under the EU's 2021-2027 budget also have climate spending targets of at least 30%. These include the European Regional Development Fund (ERDF) (30%), Horizon Europe (35%), the Cohesion Fund (37%), the Connecting Europe Facility (60%), and LIFE (61%).

Programmes and funds

The EU's **Recovery and Resilience Facility** – centrepiece of *NextGenerationEU* with a value of up to EUR 723.8 billion – enables Member States to significantly increase climate investments. To qualify for the Facility's grants (EUR 338 billion) and loans (EUR 385.8 billion), Member States must prepare recovery and resilience plans setting out investments and policy reforms that create added value for the EU from green transition. Each national plan must allocate a minimum of 37% of planned expenditure to climate action and every measure must comply with the 'do no significant harm' principle.

All 26 plans adopted by mid September exceed the 37% benchmark; 40% of their collective financial means is dedicated to climate objectives, though some Member States have used more than half of their allocation to fund climate policy. About 44% of the funding allocated to climate is expected to target renewable energy and energy efficiency, and 34% sustainable mobility⁷⁶. Subject to the adoption of the **REPowerEU** proposals of May 2022 to address the energy implications of Russia's invasion of Ukraine, Member States will have the option to update their plans and increase support for energy efficiency and renewable energy.

Example of climate measures with fulfilled milestones and targets

- France has put in place investments to support energy-efficiency renovation and major rehabilitation of private and social housing.
- Italy introduced new legislation to promote biomethane production and consumption.
- Spain introduced a reform to set up an enabling framework for the integration of renewables into the energy system: networks, storage and infrastructure.
- Portugal approved a reform supporting the implementation of the Innovation Agenda for Agriculture 2030, targeting R&I to the needs of the agricultural sector, food and agro-industry, and has opened a first call for tender on investments to support the decarbonisation of industry.
- Greece passed a reform to set up a framework for the installation and operation of charging infrastructure for electric vehicles.
- Croatia adopted programmes for energy efficiency of buildings and to reduce energy poverty, introduced an Energy Efficiency Programme for decarbonising the energy sector and adopted the Alternative Fuels for Transport Act.
- Romania demonstrated that a first target of 1695MW of coal/lignite-fired installed electricity production capacity have been decommissioned, as part of the replacement of coal in the national energy mix.

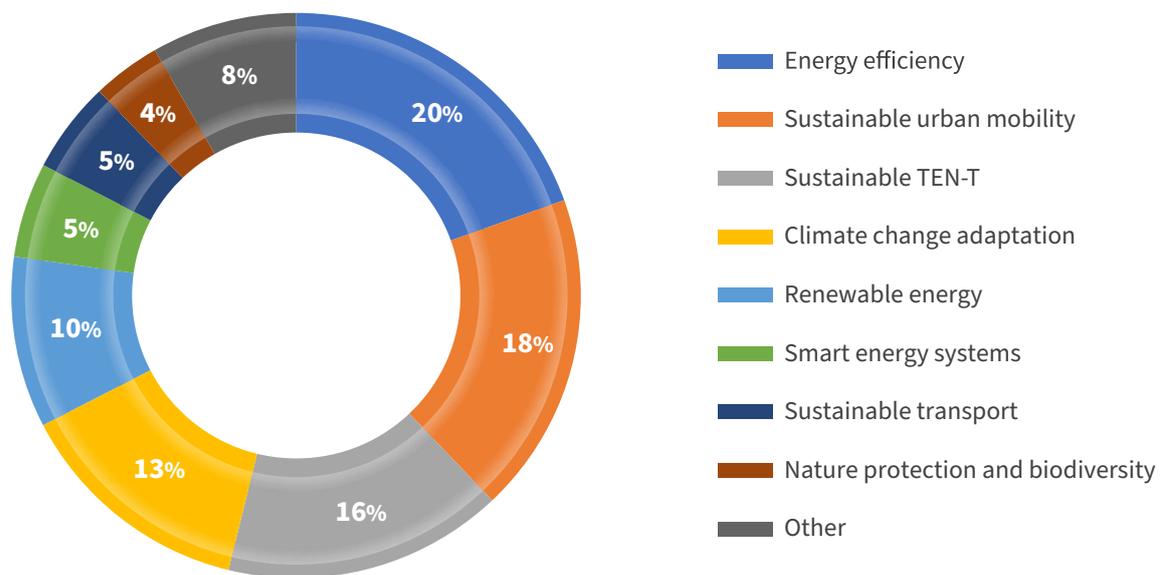
At least 30% of the **InvestEU** programme's target budget of EUR 372 billion in additional investment over the period 2021-27 will be allocated to climate objectives. Under the Sustainable Infrastructure Window, 60% of the funding must be spent on climate and environment⁷⁸. The EIB, the EIF and other implementing partner banks will use InvestEU guarantees for private-sector investments in line with climate and environmental tracking and the sustainability proofing guidance developed by the Commission.

Research and innovation enable the green transition by testing and demonstrating solutions, developing

breakthrough innovations and knowledge for policies based on latest scientific evidence. The **Horizon Europe programme** will devote at least 35% of its EUR 95.5 billion budget to research and innovation to support a just transition, empowering citizens to actively participate in the green transition. New partnerships are developing, scaling up technologies necessary for climate neutrality. Horizon Europe invested almost EUR 4.2 billion in climate action by end 2021⁷⁹.

The **European Regional Development Fund and Cohesion Fund**⁸⁰ support Member States in promoting economic, social and territorial cohesion, while advancing the transition to climate neutrality and other EU priorities. Each Member State has prepared a Partnership Agreement, outlining an investment strategy for their cohesion policy funding for 2021-2027. The funds will deliver at least EUR 78 billion in investment in climate action in 2021-2027 (30% of the total ERDF and 37% of the total Cohesion Fund budget allocation). Preliminary data from draft and adopted programmes suggest that funds allocated to climate will exceed their respective targets.

Figure 12. Distribution of cohesion policy Funds climate allocation by thematic area (preliminary data)



The **Just Transition Fund** has an EU contribution of EUR 19.2 billion for investment over 2021-2027 in regions across Europe that will be most affected by the transition to climate neutrality in terms of impact on their economic structure and social effects. Following the creation of the Fund, Member States are now preparing territorial just transition plans (TJTPs), to be adopted by the Commission as part of cohesion policy programmes. The Greek, Cypriot, Austrian, North Rhine Westphalia and Swedish plans have been approved.

Just transition Fund, from plans to territories

Thanks to the first Just Transition Fund (JTF) Programme adopted by the Commission on 16 June 2022, Greece will mobilise a total investment of EUR 1.63 billion to alleviate the impact of the energy and climate transition on the local economy and society. Greece has engaged in a complete de-lignitisation process by 2028 with a drastic reduction and complete removal of lignite from the electricity mix.

Half of the funds will support entrepreneurship and links between companies and research and innovation. Another large part will strengthen workforce skills in the affected areas (skilling-upskilling-reskilling) and promote employment. The JTF support will also target energy transition, adaptation and circular economy (e.g. energy communities, renewable energy sources, e-mobility, and energy storage systems).

The **European Social Fund, ESF+**, supports employment and investments in human capital. By mid-September roughly a third of ESF+ programmes were adopted for the period 2021-2027. Negotiations are still ongoing; all ESF+ programmes are expected to be adopted by the end of the year. To support the creation of green job and the adaptation of skills and qualifications to the transition to a climate-neutral economy, Member States plan to develop new types of training, curricula, apprenticeship and business model such as social entrepreneurship.

The **Technical Support Instrument** continued tailored technical support to Member States to design and implement reforms for European Green Deal priorities. 17 Member States⁸¹ received support via the additional dedicated REPowerEU call to identify suitable reforms and investments to phase out dependency on Russian fossil fuels.

The **LIFE Programme** is the EU's funding instrument for the environment and climate action. In 2021, more than EUR 290 million were awarded to 132 projects, including projects in areas like climate neutral farming, peatland restoration, heat recovery in iron and steel manufacturing and adaptation of forests and infrastructures to climate. There will be around EUR 755 million for climate and environment projects in 2022, including for clean energy transition. In June, Ukraine joined the LIFE programme and could benefit from LIFE support to help restore its environment after the destruction brought from the Russian invasion.

Example 11: LIFE HEATLAND – An innovative pavement to mitigate the urban heat island effect

LIFE HEATLAND (2017-2021) demonstrated the effectiveness of an innovative cool pavement technology that increases the resilience to climate change in urban areas by reducing the urban heat island (UHI) effect. The cool pavement was installed in an urban area of Murcia, reducing the ambient temperature by 1.5°C and the surface temperature of the pavement by 7-11°C. In addition, this technology helped reduce the noise level and energy consumption for street lighting thanks to its higher reflection properties. In November 2021, the Barcelona City Council decided to join this initiative, carrying out an additional test of the cool pavement.



©ENEL Green Power

VII.

International climate action

Key highlights

- EU climate diplomacy contributed to raising global commitments to tackle climate change through multilateral negotiations and bilateral policy dialogues with major emitters.
- The EU and its Member States continue to increase their technical and financial support for climate action in countries most in need and in the EU neighbourhood.
- Despite progress made, the world is not yet on track to avoid the worst effects of climate change. Implementation is key and more ambitious commitments, reforms and investment are urgently needed.
- International cooperation is more important than ever to multiply the effects of the European Green Deal.

As we completed the first five-year cycle of the Paris Agreement, the past year has seen intense, productive international exchanges, particularly at the Ministerial meetings on Climate Action co-convened by the EU, China and Canada, the Petersberg Climate Dialogue, the Rome G20 Summit, and the UN climate change conference in Glasgow (COP26).

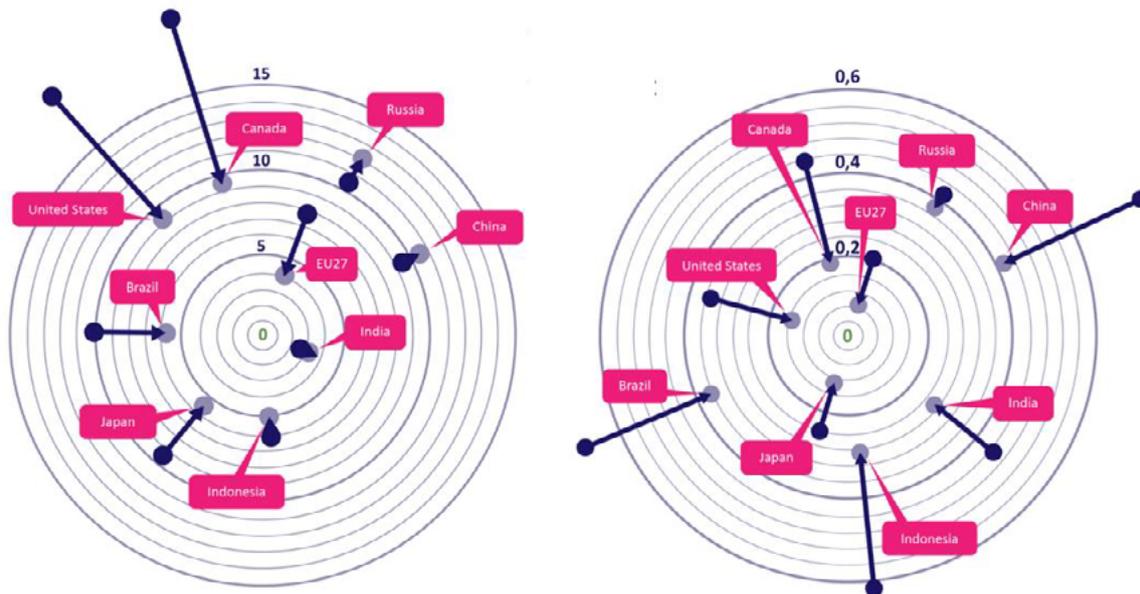
Following the EU's lead, almost all major economies have committed to achieve net-zero greenhouse emissions by or around mid-century. Many have increased their 2030 emission targets (nationally determined contributions) significantly, proving that the Paris Agreement works, and that the EU is inspiring others to accelerate action. Nonetheless, under current national policies and measures, the world is not on track to achieve the Paris Agreement temperature goal. If countries fulfil all their new pledges, the world may be avoiding some severe climate impacts, however the warming will still exceed 1.5°C by the end of the century.

The EU and its Member States keep raising awareness of the opportunities from green transition and the consequences from delayed action. The EU is encouraging and assisting international partners to deliver more robust and sustained responses to our common threat of climate change.

The EU and its Member States are the largest provider of public climate finance in the world, with EUR 23.4 billion committed in 2020 to reduce emissions and build resilience to the effects of climate change in developing countries, including EUR 5.2 billion committed at EU level (EU budget, European Development Fund and European Investment Bank). Public funding and regulatory reforms are contributing to mobilising capital and scaling up private investment needed to make the transition EU research and innovation framework programmes make an important contribution to global climate assessments and action, with the EU among the top funders of the evidence base underpinning reports of the Intergovernmental Panel on Climate Change⁸².

New initiatives spearheaded by the EU over the last year include the USD 8.5 billion Just Energy Transition Partnership between South Africa and a group of donors, the Global Methane Pledge launched by Presidents von der Leyen and Biden and joined by over 100 countries so far, a Green Alliance between the EU and Japan, and the G20 Leaders' decision to end international public finance for unabated coal power generation.

Figure 13 Net greenhouse gas emission trajectories: Progress towards net-zero emissions in selected economies, from 2015 to the 2030 target, assuming targets are reached⁸³.



The EU's revised nationally determined contribution of reducing GHG emissions by at least 55% by 2030 compared to 1990 is a significant step up from its previous commitment. It requires significantly greater emissions reductions, ensuring that the EU continues to be the most greenhouse gas efficient major economy, in line with the objective of achieving a climate-neutral EU by 2050. It is a fair contribution to the global temperature goal set by the Paris Agreement.

Example 12: Sustainable land use activities in the Republic of Congo, in the framework of the Central African Forest Initiative (CAFI)

The Central African rainforest is the second largest in the world, with an area the size of Western Europe. It represents 30% of the vegetation cover of the African continent. The conservation and sustainable use of the Congo basin forest represents a major component of global climate action, and thus provides a significant contribution to achieving the objectives of the European Green Deal. In the Republic of Congo, the forest covers about two thirds of the national territory and stores the equivalent of 10 billion tonnes of carbon dioxide.



©Baudouin Mouanda

This project, funded under the new Neighbourhood, Development and International Cooperation Instrument (NDICI-Global Europe), aims to operationalize multi-sector, inclusive, concerted, and integrated spatial planning for land management, with a view to ensure sustainable management of natural resources and preserve the exceptional natural heritage of the Republic of the Congo, in accordance with reforms initiated under national legislation. Starting this year, the project will specifically contribute to (1) develop the production of deforestation-free and sustainable agricultural commodities, (2) reduce deforestation and forest degradation resulting from uncontrolled wood-energy supply to large urban centres, and (3) mobilise finance to develop renewable energy sources, e-mobility, and energy storage systems).

Endnotes

¹ In 2021 and 2022, the IPCC released reports produced by three working groups for its Sixth Assessment Report-the Physical Science Basis report ([Working Group I](#)) in August 2021, the report on impacts, adaptation and vulnerability ([Working Group II](#)) in February 2022 and the report on climate change mitigation ([The Working Group 3](#)) in April 2022.

² IPCC Working Group 3: Mitigation of Climate Change (2022), for mitigation efforts consistent with national policies implemented by the end of 2020.

³ Latest scientific analyses suggest temperatures across European land areas will continue to increase throughout this century at a higher rate than the global average (EEA: [Global and European temperatures](#))

⁴ https://edgar.jrc.ec.europa.eu/dataset_ghg70

⁵ <https://www.iea.org/news/global-co2-emissions-rebounded-to-their-highest-level-in-history-in-2021>

⁶ Net zero emissions means achieving a balance between anthropogenic emissions by sources of greenhouse gases and removals by sinks, so all residual greenhouse gas emissions going into the atmosphere are offset by human-induced removals from the atmosphere, resulting in net zero emissions.

⁷ https://unfccc.int/sites/default/files/resource/European%20Union-BR4_C_2019_8832_and_SWD_2019_432_2.pdf

⁸ The UK was part of the joint EU 2020 target together with the 27 EU Member States.

⁹ GHG emissions and removals for 1990-2020 are based on CRF tables submitted by EU Member States to the UNFCCC by 27 May 2022 in their inventory submissions under Regulation (EU) No 525/2013. Figures may change following resubmissions resulting from later reviews.

¹⁰ GHG net emissions figures for 2021 are based on approximated GHG inventories submitted under Regulation (EU) 2018/1999.

¹¹ European Environment Agency (EEA): 2022 GHG inventory and approximated EU GHG inventory for 2021 based on Member States' submissions. Notes: (1) Energy sector refers to electricity and heat production and petroleum refining. (2) Industry includes fuel combustion in manufacturing and construction and emissions in industrial processes and product use. (3) Buildings include emissions from energy use in residential and tertiary buildings, and energy use in agriculture and fishery sectors.

¹² Based on the 2022 GHG inventory and approximated EU GHG inventory for 2021, based on Member States' submissions, excluding international bunkers. The net zero by 2050 linear trajectory is made consistent with the EU's target of -55% emission reduction by 2030.

¹³ Two thirds of the climate impact of aviation are non-CO₂ emissions., co-legislators started considering these in the 'Fit for 55' discussions, to monitor and mitigate these short-lived pollutants.

(a) European Commission, Quarterly report on electricity market, Volume 14 (covering fourth quarter of 2021). Figure 18.

(b) https://ec.europa.eu/clima/news-your-voice/news/emissions-trading-greenhouse-gas-emissions-73-2021-compared-2020-2022-04-25_en

(c) Emission trends in EU-27 for the IPCC sector 1.A.1.a – Public Electricity and Heat production at the EEA greenhouses gases – data viewer <https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer>.

(d) For 2019-2020, CO₂ emissions values corresponds to IPCC sector 1.A.1.a. The value for 2021 is extrapolated assuming the same trend as for the emissions of the European Union Transaction Log for the corresponding sectors.

^(e) COM/2022/230.

¹⁴ Regulation (EU) 2021/1119 ('European Climate Law'), OJ L 243, 9.7.2021, p. 1.

¹⁵ Commission Notice giving technical guidance on the climate proofing of infrastructure in the period 2021-2027 (2021/C 373/01, OJ C 373, 16.9.2021, p. 1), implementing Article 5(5) of the European Climate Law.

¹⁶ Communication from the Commission – Better Regulation: Joining forces to make better laws, better regulation guidelines, and better regulation toolbox of November 2021.

¹⁷ In line with conditions in the annexes to the Council implementing decisions approving national RRP.

¹⁸ COM/2022/230 final; COM/2022/240 final.

¹⁹ Directive 2009/28/EC.

²⁰ COM(2022) 360 final.

²¹ COM(2022) 361 final.

²² SWD (2021) 180 final.

²³ https://ec.europa.eu/info/publications/210421-sustainable-finance-communication_en#csrd

²⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0071>

²⁵ https://ec.europa.eu/info/publications/211027-banking-package_en

²⁶ https://ec.europa.eu/info/publications/210922-solvency-2-communication_en

²⁷ Regulation (EU) 2020/852 and Delegated Regulation (EU) 2022/1214.

²⁸ https://ec.europa.eu/info/consultations/finance-2022-esg-ratings_en

²⁹ https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13188-EU-banking-sector-review-of-macroprudential-rules-to-limit-systemic-risk_en

³⁰ Council Recommendation 2022/C 243/04

³¹ Implementation will be monitored through the NECPs.

³² COM(2021) 801 final.

³³ https://europa.eu/climate-pact/index_en

³⁴ https://europa.eu/climate-pact/pledges/individual-pledging_en

³⁵ <https://netzerocities.eu/>

³⁶ Including outgoing flights from the EEA to Switzerland and to the UK.

³⁷ Update reflecting the departure of the UK from the EU and the ETS.

³⁸ As of 2021, the UK is no longer part of the EU ETS. Comparison with 2020 is adjusted accordingly.

³⁹ Comparison with adjusted 2020 and 2019 verified emissions, including only outgoing flights to the UK and 0.3 million tonnes CO₂-eq under the Swiss ETS.

⁴⁰ EU-27 + EEA countries.

⁴¹ The remaining 24% is not necessarily spent on other purposes. Part will be spent in later years or go to a general budget used for multiple purposes, including climate change and energy.

⁴² Regulation (EU) 2015/757.

⁴³ COM(2021) 660 final.

⁴⁴ <https://www.esma.europa.eu/press-news/esma-news/esma-publishes-its-final-report-eu-carbon-market>

⁴⁵ COM(2022) 516.

⁴⁶ Decision No 406/2009/EC.

⁴⁷ Decision No 406/2009/EC.

⁴⁸ From projections reported by Member States under Regulation (EU) 2018/1999, compiled and checked by the EEA. Figures include EU-27 only.

⁴⁹ Pursuant to Commission Implementing Decision (EU) 2022/1953.

⁵⁰ Regulation (EU) 2018/842.

⁵¹ The ESR no longer allows Member States to use international credits to reach their targets, but they can offset part of their GHG emissions in effort sharing sectors with net removals in the LULUCF sector and, for some Member States, by cancelling allowances in the existing EU ETS.

⁵² Article 14 of Regulation (EU) 2018/1999.

⁵³ Member States submitted their emission projections by March 2021. Denmark, Ireland, Latvia, and Iceland submitted updated reports in 2022 due to substantial changes. The EEA 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 provided here for illustrative purposes only. See the annex for more details.

⁵⁴ Worldwide Harmonised Light Vehicles Test procedure.

⁵⁵ New European Driving Cycle Test procedure.

⁵⁶ Monitoring of CO₂ emissions from passenger cars and vans – Regulation (EU) 2019/631; published by the EEA.

⁵⁷ What matters to meet the Kyoto targets is not the absolute quantities of removals or emissions, but the changes in removals and emissions compared to a benchmark and a particular reference year, as set out in the accounting rules.

⁵⁸ Reported emissions and removals from LULUCF under the Kyoto Protocol are based on specific activities and are not the same as land-based emissions and removals from LULUCF under the UNFCCC Convention inventory

⁵⁹ The pattern in the time series of reported emissions and removals for the EU is similar between accounting and reporting, with the differences due to the application of accounting rules.

⁶⁰ DK, DE, IE, ES, IT and PT elected to include cropland management. DE, DK, IE, IT and PT also elected to include grazing land management and RO to include revegetation.

⁶¹ Grassi, G., et al., 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.

⁶² Regulation (EU) 2018/841.

⁶³ Delegated Regulation (EU) 2021/268 and SWD/2020/0236 final.

⁶⁴ COM(2021) 800 final.

⁶⁵ https://research-and-innovation.ec.europa.eu/research-area/environment/nature-based-solutions_en

⁶⁶ [Certification of carbon removals – EU rules \(europa.eu\)](#).

⁶⁷ <https://op.europa.eu/en/publication-detail/-/publication/23a24b21-16d0-11ec-b4fe-01aa75ed71a1/language-en>

⁶⁸ <https://climate-adapt.eea.europa.eu/observatory>

⁶⁹ Earth observation data and products provided within the European Climate and Health Observatory are supplied by the Copernicus Climate Change Service (C3S) and Copernicus Atmosphere Monitoring Service (CAMS) of the Copernicus Programme. CAMS is also developing a CO₂ monitoring and verification capacity.

⁷⁰ COM(2021) 572 final.

⁷¹ Article 19 of Regulation (EU) 2018/1999.

⁷² Estimate based on current ETS prices.

⁷³ Large-scale projects have a total capital expenditure higher than EUR 7.5 million.

⁷⁴ Small-scale projects have a total capital expenditure not exceeding EUR 7.5 million.

⁷⁵ Estimate based on current ETS prices.

⁷⁶ The draft budget 2023 estimates that EUR 557 billion or 31.5% of the EU budget NGEU will contribute to climate objectives. These reflect loans currently requested in the RRF and exclude the Innovation and Modernisation Funds.

⁷⁷ Source: Recovery and Resilience Scoreboard, [Green transition pillar](#).

⁷⁸ https://investeu.europa.eu/what-investeu-programme_en

⁷⁹ Preliminary figures.

⁸⁰ [Cohesion Policy 2021-2027 - Regional Policy - European Commission \(europa.eu\)](#)

⁸¹ BE, CZ, EE, IE, EL, ES, FI, HR, IT, CY, HU, PL, PT, SI and SK.

⁸² Informing global climate action: Contribution of the Framework Programmes (FP7 and H2020) to the knowledge base of recent IPCC reports based on openly available data.

⁸³ Trajectory from 2015 emission levels towards 2030 emission targets, assuming all targets are reached. left: net greenhouse gas emissions per inhabitant (tCO₂-eq/capita; right: net greenhouse gas emissions per unit of economic output (kgCO₂-eq/USD of GDP, purchasing power parity, constant USD 2015). Data: [JRC Global Energy and Climate Outlook 2021](#)

**Commission Staff Working Document (SWD),
technical information** _____

Contents

I. Overview of EU climate targets.....	A-1
II. Eu's greenhouse gas emissions: trends and projections.....	A-6
III. Greenhouse gas emissions covered by the kyoto protocol and the climate and energy package.....	A-8
IV. Summary of EU's responses to the surge of energy prices and the Russian aggression to ukraine...	A-10
V. Commission's assessment of national long-term strategies.....	A-11
VI. Eu greenhouse gas emissions by sector.....	A-13
VII. Total GHG emissions per Member State.....	A-15
VIII. Greenhouse gas intensity in the EU and its Member States.....	A-16
IX. Greenhouse gas emissions per capita in the EU and its Member States.....	A-17
X. EU ETS emissions.....	A-18
XI. Emissions covered by the Effort Sharing legislation.....	A-19
XII. Use of revenues from auctioning of ETS allowances.....	A-30
Technical notes	A-37

I

Overview of EU climate targets

Table 1 Overview of existing and Commission’s proposed new climate targets (in the “Delivering the European Green Deal” package - July 2021)

	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
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 CO ₂ -eq - For 2035 the EU target is a climate neutral land sector (combining LULUCF and emission from agriculture non-CO ₂).
			Overall target: -20% GHG emissions reduction vs 1990		<u>Overall target</u> : at least -55% net domestic reduction vs 1990		

	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
Further targets	-	<ul style="list-style-type: none"> limiting global warming to well below 2°C.; every 5 years to set more ambitious targets as required by science; <ul style="list-style-type: none"> 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. 					
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		

	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
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%. In order to ensure that sufficient mitigation efforts are deployed up to 2030, the Climate Law limits the contribution of net removals to the Union 2030 climate target to 225 million tonnes of CO ₂ equivalent, and provides that the Union shall aim to achieve a higher volume of its net carbon sink in 2030		
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

	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
Carry-over of units from preceding periods³	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 ₂ O, HFCs ⁴ , PFCs, SF ₆ , NF ₃	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , NF ₃	CO ₂ , N ₂ O, PFCs,	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆	CO ₂ , N ₂ O, PFCs,	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , NF ₃	CO ₂ , CH ₄ , N ₂ O
Sectors included	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	IPCC AR5	IPCC AR5

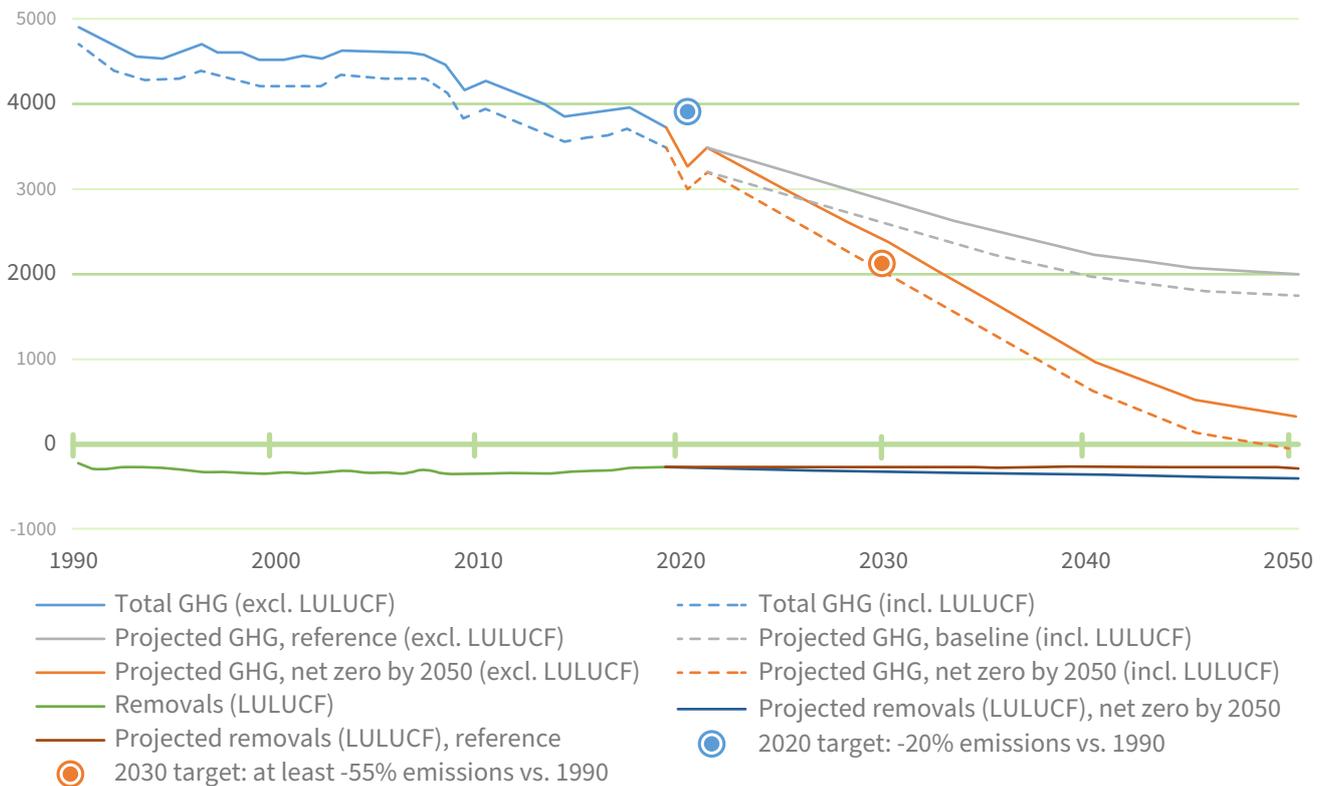
	International commitments		EU domestic legislation				
	The EU's commitment under the Kyoto Protocol (KP)		2020 Climate and Energy Package		2030 Climate and Energy Framework		
			EU ETS	Effort Sharing Decision (ESD)	EU ETS	Effort Sharing Regulation (ESR)	LULUCF
Applicable to number of MS	15 (additional KP targets for single MS)	EU-27, UK and Iceland	EU-27		EU-27 ⁵		EU-27 ⁶

II

EU's greenhouse gas emissions: trends and projections

In 2021, EU greenhouse gas emissions continued the 30-years descending trend. EU-27 domestic greenhouse gas (GHG) emissions, including international aviation⁷, amounted to 3525 MtCO₂-eq, below the 2019 level of 3735 MtCO₂-eq, despite the strong rebound in emissions following the unprecedented fall in 2020 due to the pandemic (see Figure 1). This translates into a reduction in GHG emissions of 28.1% compared to the 1990 base year (or 28.7% when international aviation is excluded). Hence, overall GHG emissions remain on a downward trend, although more effort is needed to reach the EU's long-term climate targets. The annual average reduction in domestic GHG emissions observed over the last decade (i.e. 2011-2021) has to more than double in order to achieve the 2030 target of -55% and keep up the pace beyond 2030 to reach climate neutrality by 2050⁸.

Figure 1 Total EU-27 GHG emissions (including international aviation) and removals 1990-2021, targets, model-based projected emissions and removals 2022-2050⁹



The main driver of emission reductions over the past three decades was a significant decline in energy intensity (i.e. the quantity of energy consumed to produce one unit of GDP) and to a lesser extent in emission intensity (i.e. the amount of GHG emissions per unit of energy production), with an annual average decline over 1990-2020 of 1.3% and 0.8%, respectively¹⁰. However, emission intensity of power generation has decreased drastically over the last three decades. In 2020, the EU electricity sector was 54% less GHG intensive than in 1990 (an annual average decline of 1.8%)¹¹.

Policies promoting a more efficient energy use in different sectors of the economy, a growing deployment of renewable energy supply and the use of less carbon intensive fossil fuels have been playing a key role in driving the decarbonisation process. This has allowed the continued decoupling between emissions and economic growth with the GHG emission intensity of the economy, defined as the ratio between emissions and GDP, falling to 268 gCO₂-eq/EUR in 2020, less than half the 1990 level.

Table 2 Change in EU's GHG emissions over 1990-2020: a sectoral perspective.

EU-27	% rate of change			annual average % rate of change		
	1990-2020	1990-2010	2010-2020	1990-2020	1990-2010	2010-2020
1 - Energy	-33,2	-11,5	-24,5	-1,1	-0,5	-2,2
1.A.1 - Energy Industries	-45,7	-12,7	-37,8	-1,5	-0,6	-3,4
of which:						
1.A.1.a - Public Electricity and Heat Production	-46,8	-12,1	-39,5	-1,5	-0,6	-3,6
1.A.2 - Manufacturing Industries and Construction	-44,2	-33,9	-15,6	-1,4	-1,6	-1,4
of which:						
1.A.2.a - Iron and Steel	-54,1	-38,6	-25,3	-1,7	-1,8	-2,3
1.A.3 - Transport	7,2	21,6	-11,8	0,2	1,0	-1,1
of which:						
1.A.3.b - Road Transportation	11,2	24,4	-10,6	0,4	1,2	-1,0
1.A.4 - Other Sectors	-28,1	-8,2	-21,7	-0,9	-0,4	-2,0
1.A.4.a - Commercial/Institutional	-31,9	-5,0	-28,3	-1,0	-0,2	-2,6
1.A.4.b - Residential	-29,2	-8,6	-22,5	-0,9	-0,4	-2,0
1.A.4.c - Agriculture/Forestry/Fishing	-15,6	-12,2	-3,8	-0,5	-0,6	-0,3
2 - Industrial Processes and Product Use	-32,1	-21,4	-13,6	-1,0	-1,0	-1,2
2.A - Mineral Industry	-26,3	-17,9	-10,2	-0,8	-0,9	-0,9
2.B - Chemical Industry	-67,2	-57,8	-22,4	-2,2	-2,8	-2,0
2.C - Metal Industry	-52,6	-42,7	-17,3	-1,7	-2,0	-1,6
2.D - Non-energy Products from Fuels and Solvent Use	-27,6	-18,1	-11,5	-0,9	-0,9	-1,0
2.E - Electronics Industry	-9,1	56,3	-41,9	-0,3	2,7	-3,8
2.F - Product Uses as Substitutes for ODS	-	-	-8,2	-	-	-0,7
2.G - Other Product Manufacture and Use	-29,5	-26,6	-4,0	-1,0	-1,3	-0,4
2.H - Other Industrial Process and Product Use	-34,0	7,5	-38,6	-1,1	0,4	-3,5
3 - Agriculture	-20,8	-22,0	1,5	-0,7	-1,0	0,1
of which:						
3.1 - Livestock	-22,2	-22,0	-0,3	-0,7	-1,0	0,0
4 - Land Use, Land-Use Change and Forestry	7,7	51,2	-28,8	0,2	2,4	-2,6
5 - Waste management	-34,9	-20,8	-17,8	-1,1	-1,0	-1,6
Total emissions (UNFCCC)	-31,9	-13,8	-21,0	-1,0	-0,7	-1,9
Total emissions with international aviation (EU 2020)	-31,6	-12,7	-21,6	-1,0	-0,6	-2,0
Total net emissions (UNFCCC)	-33,8	-16,8	-20,4	-1,1	-0,8	-1,9
Total net emissions with international aviation (EU NDC)	-33,3	-15,6	-21,0	-1,1	-0,7	-1,9

In terms of sectors (Table 2), emission reductions in the last three decades were significant in the energy industry (e.g. electricity and heat production, -47%), in the manufacturing industry and construction (e.g. iron and steel production, -54%) and in the industrial processes and product use industries (e.g. chemical industry, -67%; metal industry, -53%). Conversely, emissions in the transport sector have increased, especially in road transportation (+11%) although they have been decreasing in the last ten years¹². Emission reduction in the agriculture sector (excluding fuel combustion) has somewhat halted at the half-way, showing even a moderate increase since 2010¹³. Finally, the traditional role of natural sink of CO₂ of the land use, land use change, and forestry sector (LULUCF), declined at a worrying speed in the last decade.

III.

Greenhouse gas emissions covered by the Kyoto Protocol and the climate and energy package

Table 3 and 4 show 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, the geographical scope and the time period comparison.

In particular, 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 UK and certain regions not included in the Climate and Energy Package. The Climate and Energy package is based on a year-to-year comparison (2020 vs. 1990) whereas the Kyoto Protocol compares the average of emissions in the period 2013-2020 (second commitment period) with emissions in 1990, the base year¹⁴.

Under the **Climate and Energy package**, the EU, its Member States and the UK committed jointly to achieving a quantified economy-wide greenhouse gas emission reduction target of -20% below the 1990 level by 2020. At UNFCCC level, this translated into ‘the Cancun pledge’.

The 5th Biennial Report to be submitted by 31 December 2022 to the UNFCCC will be the basis for assessing the achievement of the Cancun pledge. The EU National Inventory Report (‘NIR’) submitted to the UNFCCC on 27 May 2022 suggests that the EU-27 overachieved its reduction target under the Convention by reducing emissions by -32% between 2020 and 1990. This means that the EU Member States and the UK have also met their emission reduction targets.

Table 3 Emissions covered by the EU Climate and Energy Package 1990, 2020 and 2020 targets (Mt CO₂-eq. and % change from base year emissions)

Climate and energy package:	Base year emissions (Mt CO ₂ -eq.)	1990 emissions (Mt CO ₂ -eq.)	2020 emissions (Mt CO ₂ -eq.)	2020 emissions (% change from base year)	2020 targets (Mt CO ₂ -eq.)	2020 target (% change from base year)
Total GHG Emissions, including international aviation (EU-27, convention scope)	4 901	4 901	3 354	-32%	3 920	-20%

Under the **Kyoto Protocol**, the EU, its Member States, the UK and Iceland committed jointly to reducing greenhouse gas emissions in the second commitment period (2013-2020) by 20% on average in comparison to 1990, the emissions’ base year. Under such framework, the EU, its Member States, the UK and Iceland were assigned Kyoto Protocol units (Assigned Amount Unit, or AAU) for the eight-year second commitment period, based on 80 per cent of its emissions in the base year. The AAUs reported in Table 4 correspond to million tonnes of CO₂ equivalent.

The EU NIR submitted to the UNFCCC on 27 May 2022, once reviewed, will be the basis for assessing whether the EU, its Member States, the UK and Iceland comply with their joint commitment. The EU NIR suggests that the EU, its Member States, the UK and Iceland overachieved their reduction target in the second commitment period of the Kyoto Protocol by reducing emissions by -28%.

Table 4 Emissions covered by the Kyoto Protocol, second commitment period (Mt CO₂-eq. and % change from base year emissions)

Kyoto Protocol:	Base year emissions (Mt CO ₂ -eq.)	2013 - 2020 emission reduction target (% change from base year)	Assigned Amount Units in Mt CO ₂ -eq. (2013-2020)	Emissions in Mt CO ₂ -eq. (2013 - 2020)	Over (+) / Under (-) achievement	2013 - 2020 emission reduction (% change from base year)
Total GHG emissions, excluding international aviation (EU-27+IS+UK, KP scope)	5 876	-20%	37 604	33 699	3 905	-28%

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 4 does not include emissions and removals from LULUCF. For the EU as a whole, the LULUCF sector has been a net accounted sink in 2013-2020, thereby also contributing to achieving the commitment.

The EU and its Member States have implemented mitigation policies and measures, which contributed successfully to the reduction of greenhouse gas emissions. These include the EU Emissions Trading System (EU ETS), the Effort Sharing Decision (ESD) and a wide range of policies and measures addressing all sectors of the economy. As more action is urgently needed, the EU is enhancing and extending its climate change policies and measures – to deliver on the European Green Deal, the Paris Agreement and to ensure that the EU and its Member States achieve their updated Nationally Determined Contribution (NDC) target of an economy-wide net domestic emission reduction of at least 55% by 2030 compared to 1990.

IV.

Summary of EU's responses to the surge of energy prices and the Russian aggression to Ukraine

As part of the response to the surge in energy price and the climate of uncertainty created by Russia's invasion of Ukraine, the European Commission outlined a number of measures to address undesirable negative impacts of higher energy prices on households and businesses.

In October 2021, the Commission adopted a first Communication on 'Tackling rising energy price'¹⁵, which included a toolbox that the EU and its Member State could use to address the immediate impact of price increases, and further strengthen resilience against future shocks. Short-term national measures included emergency income support to households, state aid for companies, and targeted tax reductions. Medium-term measures aimed at accelerating the transition toward a decarbonised and resilient energy system.

In March 2022, the Commission adopted a second Communication proposing collective European actions to address the root causes of the problem in the gas market with a view to ensuring security of supply at reasonable prices for next winter and beyond¹⁶. The Communication analysed possible options for Member States interventions in the gas and the electricity market and exceptional EU measures in case of full disruption of gas supplies. It also included the creation of a Task Force on common gas purchases at EU level, to facilitate and strengthen the EU's international outreach to suppliers and proposed a mandatory minimum level in EU underground gas storage¹⁷ to protect against potential interruptions to supply. This last measure already reached political agreement between the European Parliament and EU Member States and already this year, the Member States will need to reach a minimum 80% gas storage level by 1 November.

In July 2022, in light of the persisting uncertainty in the energy market and in preparation for possible further disruptions of gas supply, the Commission adopted the Communication 'Save gas for a safe winter', a plan for a voluntary gas demand reduction target of 15% from 1 August 2022 to 31 March 2023. To reach that target, the plan outlines various measures whereby Member States can encourage a decrease in gas demand and consumption by the public sector, by companies, but also by households, where possible. The Commission also adopted a proposal for a new Regulation on coordinated demand reduction measures for gas. The proposal also gives the Commission the possibility to declare a 'Union alert' on security of supply. In such a case, the Council can impose a mandatory gas demand reduction on all Member States, based on a proposal of the Commission.



Commission’s assessment of national Long-Term Strategies

Stable and reliable long-term strategies are essential to help **coordinate a cost-effective move towards the long-term goal set by the Paris Agreement**, as well as to promote awareness and ownership of the transformation needed.

Since October 2021, three additional Member States have submitted their long-term strategies to the Commission: Luxembourg, which set a legally binding climate neutrality target by 2050, Malta and Cyprus that outlined a feasible set of trajectories and measures aimed at achieving target reductions in GHG emissions. Overall, by October 2022, 23 Member States¹⁸ have submitted their long-term strategies required by the Governance Regulation¹⁹. Of these, 14 Member States²⁰ clearly expressed their aim to achieve climate neutrality or carbon neutrality²¹ by 2050 or before²². Others aim to be largely climate neutral²³ or to achieve reductions of 80-95% by 2050.

Table 5 Summary of the long-term strategies’ main features submitted by the EU Member States

Long-term strategies' main features	AT	BE	HR	CZ	DK	EE	FI	FR	DE	GR	HU	IT	CY	LV	LT	LU	MT	NL	PT	SK	SI	ES	SE
Climate neutrality by 2050 or earlier	x				x		x	x			x	x		x	x	x			x	x	x	x	x
Modelling projections and scenarios	x		x	x	x	x	x	x		x	x	x	x				x		x	x	x	x	
Emission projections by sectors	x	x	x		x	x	x	x			x	x	x	x	x		x		x	x	x	x	x
Emission removals in LULUCF	x				x	x	x	x				x	x						x	x	x	x	x
Estimated share of renewable	x		x		x		x			x	x	x	x		x	x		x	x		x	x	x
Estimated energy consumption	x		x		x		x			x	x	x	x	x					x		x	x	
Estimated investment needs			x	x		x	x	x		x	x			x			x		x	x	x	x	
Socio-economic impacts of transition						x	x	x		x	x	x	x	x					x	x		x	x
Adaptation Policies and Measures	x	x	x	x	x	x		x			x	x	x		x	x	x			x		x	x
Legally binding long-term goal			x		x	x		x			x					x	x	x				x	x

Notes: in the case of DK and SK, emission projections by sector, the estimated share of renewable and energy consumption, end in 2040

Two third of the strategies have been supported by quantitative projections based on different modelling scenarios. The national long-term strategies also provide useful information at sectoral level, which allow strengths and remaining challenges to be identified and recognised, although coverage varies significantly across Member States or lack details on the precise scope, notably the expected role of land use and removals (see Table 5). In this respect, it is worth mentioning that the current land use and forestry EU regulation provides that Member State may use the managed forest land flexibility only if their long-term strategy has included ongoing or planned specific measures to ensure the conservation or enhancement of forest sinks and reservoirs²⁴.

The inclusion of the recommended contents²⁵ also varies across Member States, with gaps in needs for research, development and innovation, estimated long-term investments, CO₂ intensity of GDP and, to a lesser extent, on the expected contributions of renewable energy, energy efficiency, and agriculture-specific emission reductions (see Table 5). Some of the submitted projections appear not to be in line with the stated ambitions. Finally, less than half of the long-term objectives have been enshrined into national law.

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. This underlines the importance to continue developing policies to increase and meet ambition over time. Member States are therefore encouraged to consider updating and, where possible, to increase the ambition of their national long-term strategies²⁶.

VI.

EU greenhouse gas emissions by sector

Figure 2 EU-27 GHG emissions by sector, historical data (1990-2021) and projections (2022-2030)²⁷.

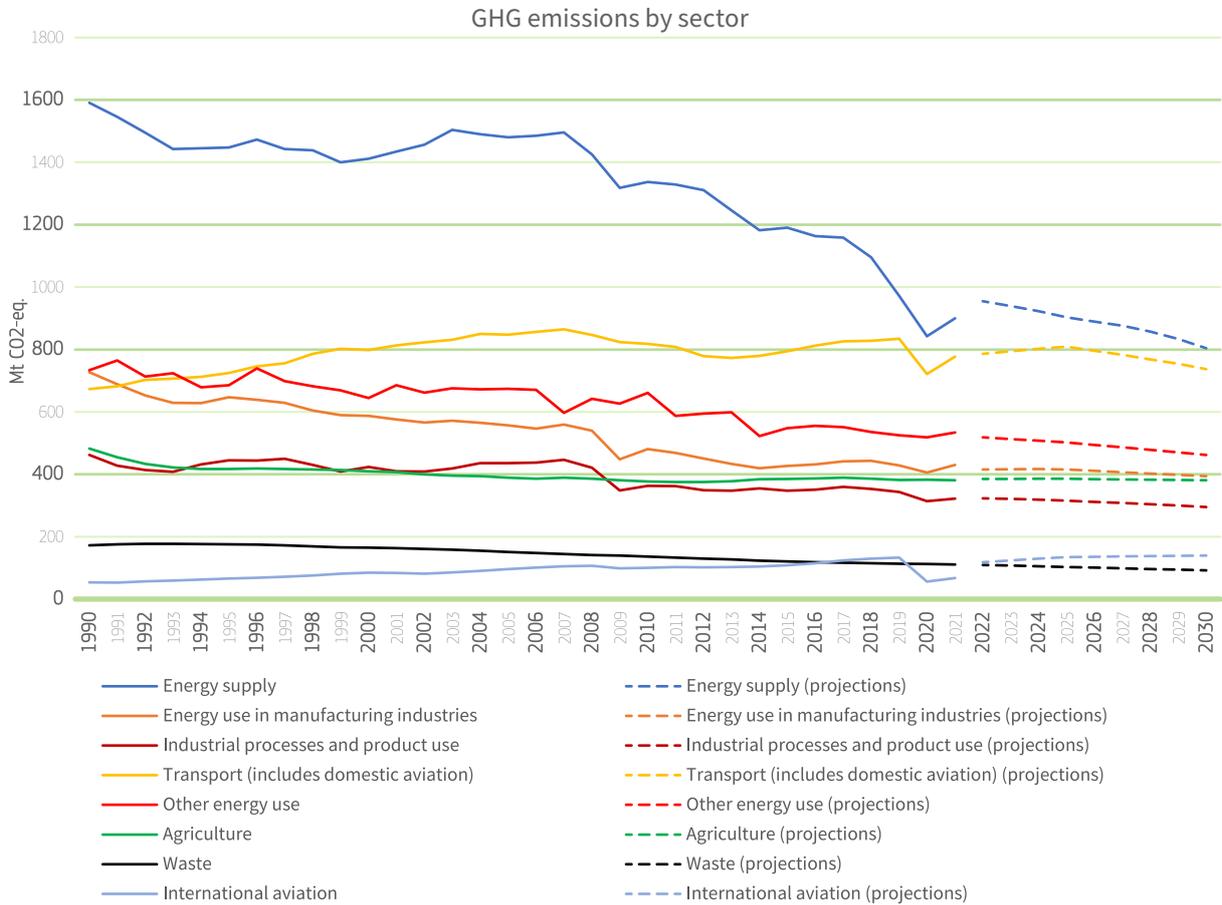
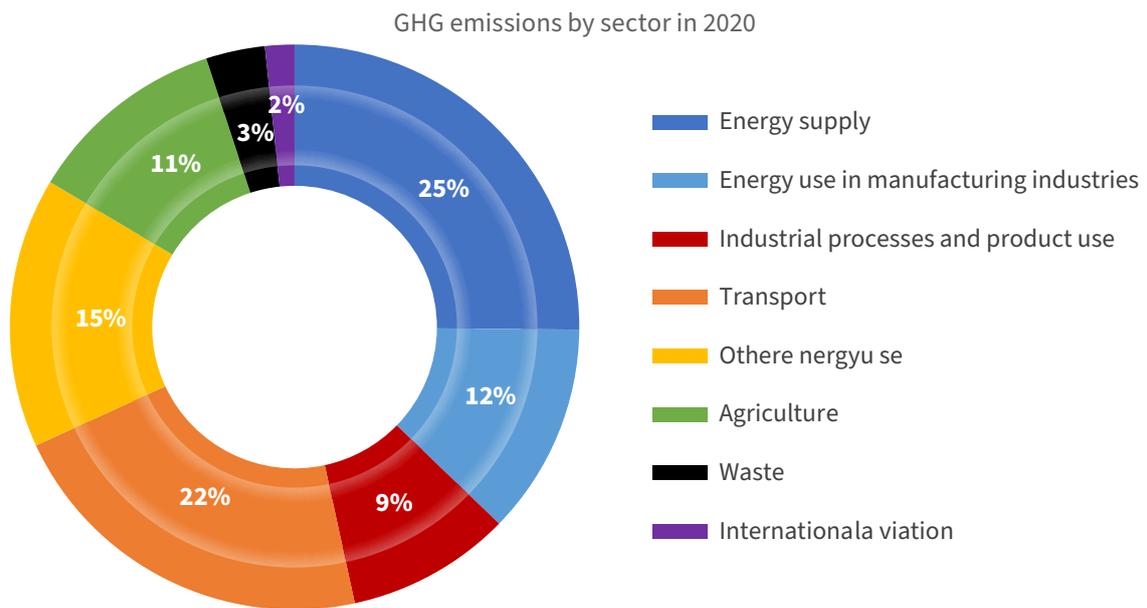


Figure 3 EU-27 greenhouse gas emissions by sector 2020 (in % of total emissions)²⁸.



The sectors used in Figure 2 and Figure 3 correspond to the following IPCC sectors²⁹:

- 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

VII.

Total GHG emissions per Member State

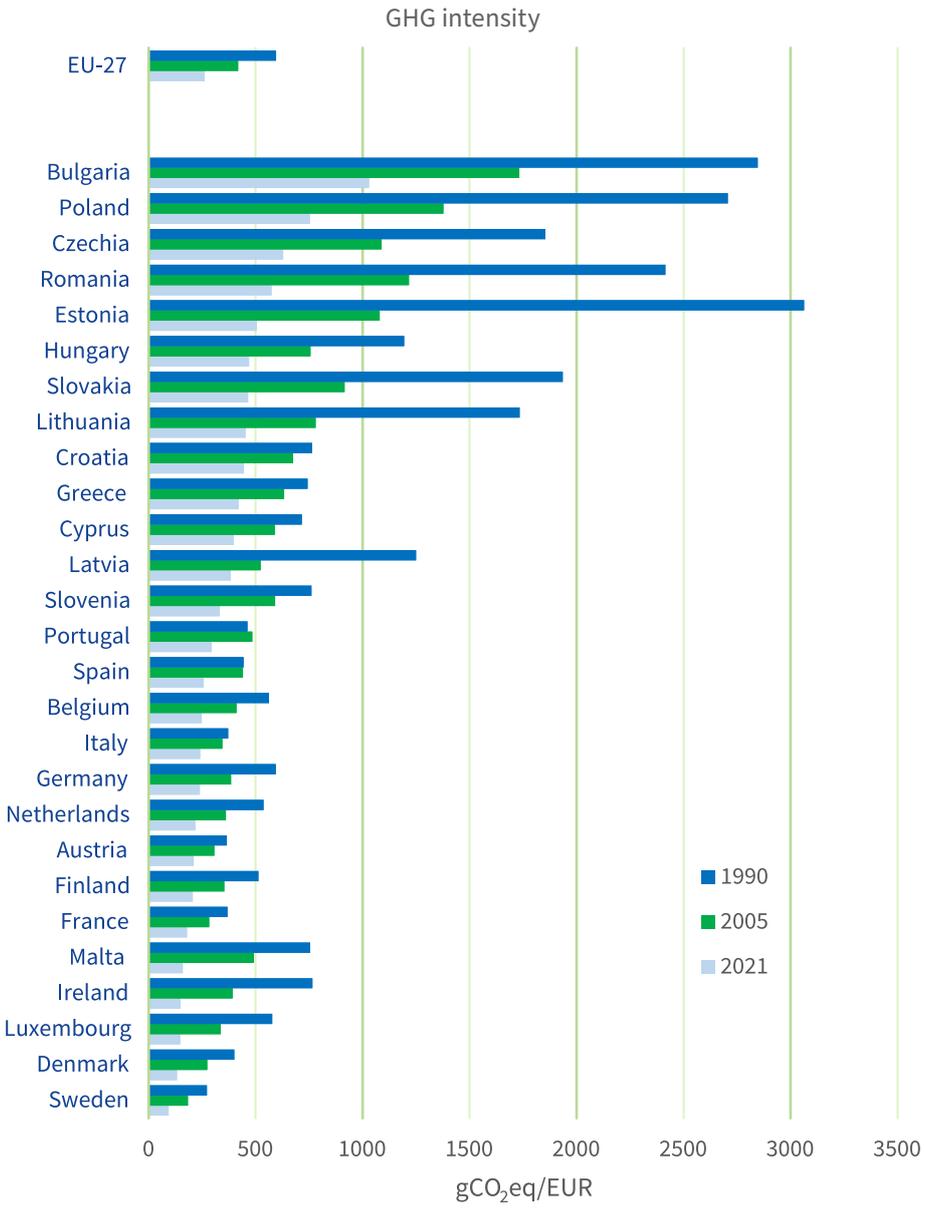
Table 6 Total GHG Emissions 2020, excl. LULUCF, including international aviation (Mt CO₂-eq. and % change from 1990 and 2005).

	1990	2005	2021	2021/1990	2021/2005
EU-27	4901	4633	3525	-28%	-24%
Austria	79	94	78	-1%	-17%
Belgium	149	149	115	-23%	-23%
Bulgaria	99	63	55	-45%	-12%
Croatia	32	30	23	-27%	-22%
Cyprus	6	10	9	47%	-8%
Czechia	200	150	120	-40%	-20%
Denmark	73	70	42	-42%	-39%
Estonia	40	19	13	-67%	-32%
Finland	72	71	49	-33%	-32%
France	553	567	427	-23%	-25%
Germany	1254	1010	780	-38%	-23%
Greece	106	139	78	-27%	-44%
Hungary	95	78	64	-33%	-17%
Ireland	55	73	62	11%	-15%
Italy	524	599	410	-22%	-32%
Latvia	26	11	11	-58%	-2%
Lithuania	48	23	21	-57%	-9%
Luxembourg	13	14	11	-14%	-21%
Malta	3	3	2	-16%	-28%
Netherlands	225	224	174	-23%	-22%
Poland	477	406	403	-16%	-1%
Portugal	60	88	59	-2%	-33%
Romania	250	147	115	-54%	-22%
Slovakia	74	51	41	-44%	-19%
Slovenia	19	21	16	-16%	-24%
Spain	295	454	298	1%	-34%
Sweden	73	69	49	-33%	-29%

VIII.

Greenhouse gas intensity in the EU and its Member States

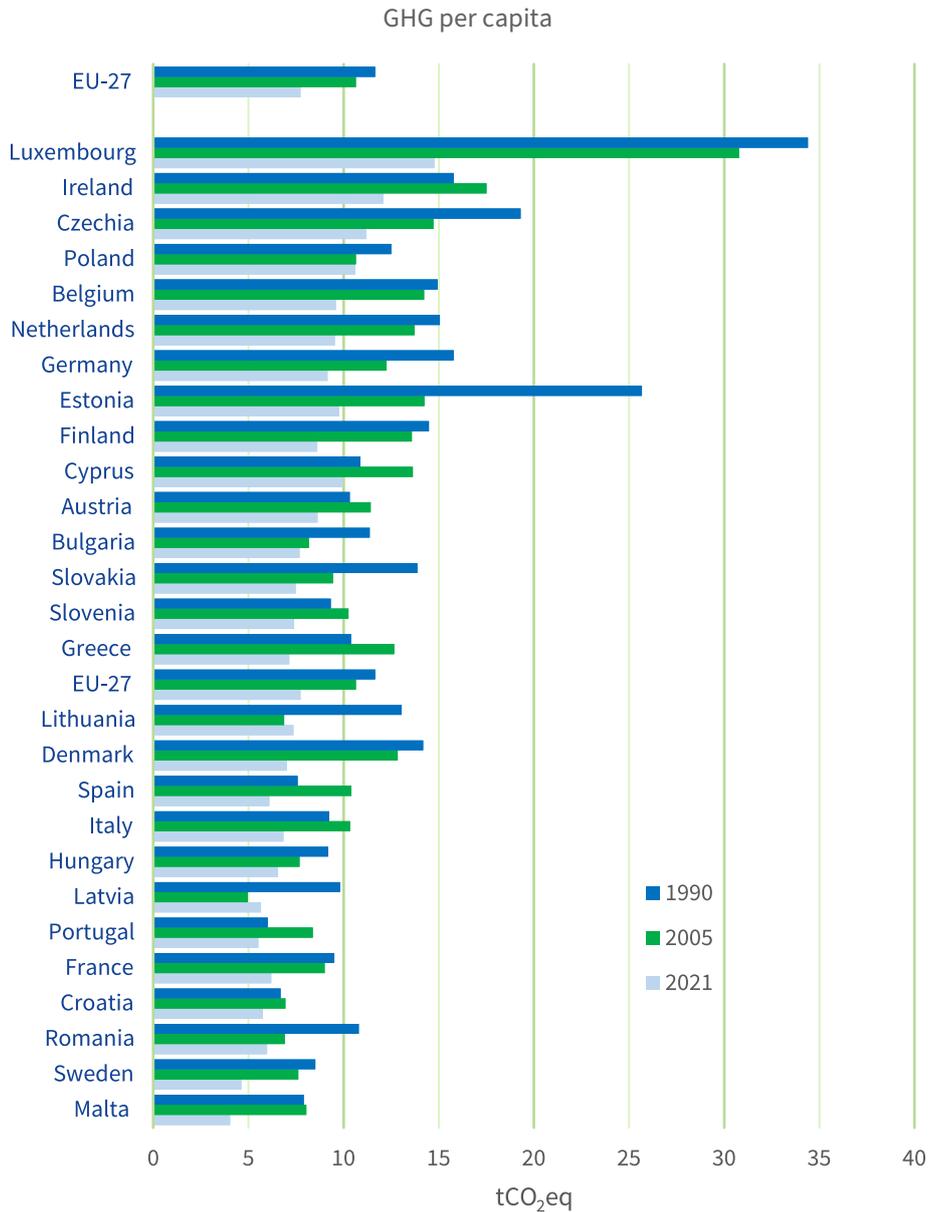
Figure 4 Greenhouse gas emissions intensity (i.e. the ratio between emissions and GDP) in the EU and its Member States 1990, 2005 and 2021 (g CO₂-eq./ EUR2015)³⁰.



IX.

Greenhouse gas emissions per capita in the EU and its Member States

Figure 5 Greenhouse gas emissions per capita in the EU and its Member States 1990, 2005 and 2021 (tonnes CO₂-eq. per capita)³¹.





EU ETS emissions

Table 7 Verified ETS emissions from stationary installations up to 2021 (Mt CO₂-eq. and percentage change from year X-1).

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021*
Verified total emissions from stationary installations	1 904	1 867	1 908	1 814	1 803	1 751	1 755	1 683	1 530	1 356	1 335
Change from year x-1		-2.0%	2.2%	-4.9%	-0.6%	-2.9%	0.2%	-4.1%	-9.1%	-11.4%	6.6%
Verified emissions from electricity and heat generation	1 261	1 254	1 191	1 100	1 091	1 046	1 036	964	822	696	707
Change from year x-1		-0.5%	-5.0%	-7.7%	-0.8%	-4.1%	-1.0%	-7.0%	-14.7%	-15.3%	8.4%
Verified emissions from industrial installations	643	613	717	714	712	705	719	719	708	659	631
Change from year x-1		-4.7%	17.0%	-0.4%	-0.3%	-1.0%	2.0%	0.1%	-1.6%	-6.9%	4.6%

*As of 2021, the UK is no longer part of the EU ETS. Verified emissions data for 2021 do not cover the UK, only power plants in Northern Ireland. To determine the year-on-year comparison, an adjusted value of 2020 verified emissions was used, with the scope reduced in the same way.

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021**
Verified total emissions from aviation	84	53.5	54.8	57.1	61.5	64.4	67.5	68.2	25.2	27.9
Change from year x-1		-	2.5%	4.1%	7.7%	4.8%	4.8%	1%	-63%	30%

**As of 2021, the UK is no longer part of the EU ETS. Verified emissions data for 2021 cover flights within the EEA as well as the outgoing flights to Switzerland and to the UK. To determine the year-on-year comparison, an adjusted value of 2020 verified emissions was used, with the scope reduced in the same way.

XI.

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. In 2022, three Member States (Denmark, Ireland, Latvia) and Iceland updated their projections.

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 8 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 indicate projected overachievement while negative values indicate projected underachievement. WEM = with existing measures, WAM = with additional measures.

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

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

Member State	ESD			ESR	
	2018	2019	2020	2030 (projections WEM)	2030 (projections WAM)
Ireland					
Target	-15%	-18%	-20%	-30%	-30%
Emissions	-4%	-3%	-5%	-11%	-30%
Distance to target (pp)	-12%	-15%	-15%	-19%	0%
Italy					
Target	-12%	-12%	-13%	-33%	-33%
Emissions	-17%	-18%	-24%	-29%	-40%
Distance to target (pp)	5%	6%	11%	-3%	7%
Latvia					
Target	15%	16%	17%	-6%	-6%
Emissions	7%	1%	-1%	-10%	-15%
Distance to target (pp)	8%	15%	18%	4%	9%
Lithuania					
Target	9%	12%	15%	-9%	-9%
Emissions	8%	8%	6%	-11%	-23%
Distance to target (pp)	2%	4%	9%	2%	14%
Luxembourg					
Target	-16%	-18%	-20%	-40%	-40%
Emissions	-11%	-9%	-24%	-14%	-53%
Distance to target (pp)	-5%	-9%	4%	-26%	13%
Malta					
Target	5%	5%	5%	-19%	-19%
Emissions	24%	28%	17%	50%	50%
Distance to target (pp)	-19%	-23%	-12%	-69%	-69%
Netherlands					
Target	-13%	-14%	-16%	-36%	-36%
Emissions	-22%	-24%	-29%	-31%	-31%
Distance to target (pp)	9%	10%	13%	-5%	-5%
Poland					
Target	12%	13%	14%	-7%	-7%
Emissions	18%	16%	14%	6%	-12%
Distance to target (pp)	-6%	-3%	0%	-13%	5%
Portugal					
Target	-1%	0%	1%	-17%	-17%
Emissions	-17%	-15%	-21%	-39%	-42%
Distance to target (pp)	16%	15%	22%	22%	25%
Romania					
Target	14%	16%	19%	-2%	-2%
Emissions	3%	0%	2%	5%	2%
Distance to target (pp)	11%	17%	17%	-6%	-4%

Member State	ESD			ESR	
	2018	2019	2020	2030 (projections WEM)	2030 (projections WAM)
Slovakia					
Target	10%	12%	13%	-12%	-12%
Emissions	-8%	-13%	-18%	9%	1%
Distance to target (pp)	19%	24%	31%	-21%	-13%
Slovenia					
Target	3%	4%	4%	-14%	-14%
Emissions	-7%	-9%	-18%	-9%	-25%
Distance to target (pp)	10%	12%	22%	-5%	11%
Spain					
Target	-8%	-9%	-10%	-26%	-26%
Emissions	-14%	-14%	-22%	-18%	-38%
Distance to target (pp)	6%	5%	12%	-8%	12%
Sweden					
Target	-14%	-16%	-17%	-40%	-40%
Emissions	-28%	-27%	-32%	-39%	-39%
Distance to target (pp)	13%	11%	15%	-1%	-1%
EU 27					
Target	-7%	-7%	-9%	-29%	-29%
Emissions	-10%	-11%	-16%	-22%	-29%
Distance to target (pp)	3%	4%	8%	-6%	0%
Iceland					
Target				-29%	-29%
Emissions				-26%	-26%
Distance to target (pp)				-3%	-3%
Norway					
Target				-40%	-40%
Emissions				-32%	-32%
Distance to target (pp)				-8%	-8%
EU-27 + IS + NO					
Target				-29%	-29%
Emissions				-22%	-30%
Distance to target (pp)				-7%	1%

Table 9 Member States approximated emissions for 2021 under the effort-sharing legislation. ESR annual emission allocations (AEAs) and base-year emissions have been approximately converted into GWP AR4 for comparability. In the case of Iceland and Norway, due to data availability, 2021 approximated emissions have been converted into GWP AR5 to make them directly comparable with the annual emission allocations (AEAs) under the ESR, as adapted by Protocol 31 to the EEA Agreement.

Member state	2021 Emissions (MtCO ₂ -eq)	2021 AEAs (MtCO ₂ -eq)	Difference (MtCO ₂ -eq)	As percent of the base-year
Austria	48.4	48.7	0.3	1%
Belgium	69.5	70.1	0.5	1%
Bulgaria	25.5	27.1	1.6	8%
Cyprus	4.6	4.0	-0.6	-14%
Czechia	61.8	60.9	-0.9	-1%
Germany	405.7	428.8	23.2	5%
Denmark	29.4	31.7	2.3	6%
Estonia	6.1	6.2	0.1	1%
Spain	194.8	197.5	2.7	1%
Finland	27.2	29.0	1.8	5%
France	327.5	334.4	6.9	2%
Greece	42.7	45.8	3.1	5%
Croatia	16.2	17.5	1.2	7%
Hungary	46.1	49.7	3.6	8%
Ireland	45.2	42.6	-2.5	-5%
Italy	271.7	266.6	-5.0	-2%
Lithuania	14.6	16.0	1.3	10%
Luxembourg	8.1	8.4	0.3	3%
Latvia	8.6	10.7	2.0	24%
Malta	1.3	2.1	0.8	76%
Netherlands	92.7	98.2	5.6	4%
Poland	209.7	210.4	0.7	0%
Portugal	40.5	42.3	1.8	4%
Romania	82.3	86.1	3.9	5%
Sweden	29.3	31.2	1.9	4%
Slovenia	9.9	11.1	1.1	10%
Slovakia	20.0	22.8	2.8	12%
Iceland	2.8	2.9	0.1	2%
Norway	26.6	25.2	-1.5	-5%
EU-27	2139.2	2199.9	60.6	2%

Table 10 Annual emissions allocations, historical emissions and distance to targets under the Effort Sharing Decision (Mt. CO₂-eq.) covering the period 2013 - 2020. Positive values indicate overachievement, negative values indicate underachievement. AEs 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 AEs’ 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 2022 annual ESD review. For compliance in 2019, Germany used the flexibility to carry forward part of the AEs allocated for 2020. As a result, Germany’s AEs available for compliance in 2020 are below the allocation set by the legislation.

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019	2020
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	46,5
Distance to target		2,5	3,9	2,2	0,4	-2,1	-1,4	-1,9	1,2
Cumulative surplus of AEs		2,5	6,4	8,7	9,0	6,9	5,5	3,6	4,8
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	64,9
Distance to target		4,1	6,8	2,6	-0,3	1,7	-3,2	-2,4	1,7
Cumulative surplus of AEs		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	25,7
Distance to target		4,7	4,3	2,1	2,1	-0,6	-0,2	0,5	0,8
Cumulative surplus of AEs		4,7	9,0	11,1	13,3	12,6	12,4	12,9	13,7
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	16,5
Distance to target		4,5	5,1	4,4	4,2	2,0	2,7	3,0	2,8
Cumulative surplus of AEs		4,5	9,6	14,1	18,2	20,3	22,9	26,0	28,8
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	4,2
Distance to target		2,0	2,0	1,9	1,8	-0,1	0,0	-0,3	-0,3
Cumulative surplus of AEs		2,0	4,0	5,8	7,7	7,6	7,5	7,2	7,0
Czechia									
AEA		62,5	63,2	64,0	64,7	65,2	65,9	66,5	67,2
Emissions	61,7	61,5	57,6	61,3	62,8	62,4	60,6	60,5	58,7
Distance to target		1,0	5,6	2,7	1,9	2,8	5,3	6,0	8,6
Cumulative surplus of AEs		1,0	6,6	9,3	11,2	14,0	19,2	25,2	33,8

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019	2020
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	30,8
Distance to target		3,1	3,3	2,5	1,0	2,1	0,7	0,9	1,2
Cumulative surplus of AEs		3,1	6,4	8,9	9,9	12,0	12,7	13,6	14,9
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	5,9
Distance to target		0,5	0,2	0,2	0,2	-0,3	-0,2	-0,2	0,1
Cumulative surplus of AEs		0,5	0,8	1,0	1,1	0,9	0,7	0,5	0,6
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	28,1
Distance to target		0,2	1,1	0,9	-1,0	0,1	-0,3	-0,6	0,4
Cumulative surplus of AEs		0,2	1,3	2,2	1,2	1,3	1,0	0,4	0,8
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	307,8
Distance to target		28,0	35,9	31,4	27,5	5,4	10,7	11,4	34,7
Cumulative surplus of AEs		28,0	63,9	95,3	122,8	128,2	138,9	150,3	185,0
Germany									
AEA		472,5	465,8	459,1	452,4	432,3	425,2	432,9	396,0
Emissions	477,8	460,2	436,8	444,1	454,2	466,9	434,0	444,3	407,4
Distance to target		12,3	29,0	15,1	-1,7	-34,5	-8,8	-11,3	-11,4
Cumulative surplus of AEs		12,3	41,4	56,4	54,7	20,2	11,3	0,0	-11,4
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	42,9
Distance to target		14,8	14,9	14,2	15,0	13,7	14,7	15,0	17,2
Cumulative surplus of AEs		14,8	29,6	43,8	58,8	72,5	87,3	102,3	119,4
Hungary									
AEA		50,4	51,5	52,6	53,8	50,1	51,0	51,9	52,8
Emissions	48	38,4	38,4	41,4	42,1	43,1	43,2	44,9	43,9
Distance to target		12,0	13,1	11,2	11,7	6,9	7,7	7,0	8,9
Cumulative surplus of AEs		12,0	25,1	36,3	47,9	54,9	62,6	69,6	78,5

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019	2020
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	44,7
Distance to target		4,7	4,1	1,6	-0,3	-2,9	-5,6	-6,9	-7,1
Cumulative surplus of AEs		4,7	8,8	10,4	10,1	7,1	1,6	-5,3	-12,4
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	254,0
Distance to target		34,8	40,9	31,0	31,6	28,1	17,1	18,5	37,0
Cumulative surplus of AEs		34,8	75,7	106,7	138,3	166,4	183,5	202,0	239,0
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	1,6
Cumulative surplus of AEs		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	14,0
Distance to target		0,5	0,4	0,4	0,1	0,0	0,2	0,6	1,2
Cumulative surplus of AEs		0,5	0,9	1,3	1,4	1,4	1,6	2,1	3,3
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	7,7
Distance to target		0,2	0,5	0,5	0,4	0,0	-0,5	-0,9	0,4
Cumulative surplus of AEs		0,2	0,7	1,2	1,6	1,6	1,1	0,1	0,6
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 AEs		-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
Emissions	127,8	108,3	97,9	101,1	101,3	102,3	99,7	97,1	90,2
Distance to target		14,7	22,8	17,3	14,8	11,7	12,1	12,5	17,2
Cumulative surplus of AEs		14,7	37,5	54,8	69,6	81,3	93,4	105,9	123,0

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019	2020
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	205,1
Distance to target		7,5	13,3	9,4	-1,3	-11,5	-11,3	-5,6	0,1
Cumulative surplus of AEs		7,5	20,9	30,2	29,0	17,4	6,1	0,5	0,5
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	38,5
Distance to target		10,7	10,8	9,2	8,6	7,7	7,7	7,2	10,5
Cumulative surplus of AEs		10,7	21,5	30,7	39,3	47,0	54,7	61,9	72,4
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	77,1
Distance to target		2,9	4,9	4,7	8,0	8,7	8,3	12,7	12,7
Cumulative surplus of AEs		2,9	7,8	12,5	20,5	29,2	37,5	50,2	62,9
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	18,9
Distance to target		2,9	4,6	4,7	5,3	3,8	4,3	5,6	7,1
Cumulative surplus of AEs		2,9	7,5	12,2	17,5	21,3	25,6	31,2	38,2
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	9,8
Distance to target		1,4	1,9	1,7	1,2	1,3	1,2	1,5	2,6
Cumulative surplus of AEs		1,4	3,3	4,9	6,1	7,4	8,6	10,1	12,7
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	184,2
Distance to target		27,3	25,9	27,6	23,3	17,2	13,3	12,5	28,2
Cumulative surplus of AEs		27,3	53,2	80,8	104,1	121,3	134,5	147,0	175,2
Sweden									
AEA		41,7	41,0	40,4	39,8	37,8	37,2	36,7	36,1
Emissions	43,5	35,3	34,5	33,9	32,6	32,5	31,4	31,7	29,4
Distance to target		6,4	6,5	6,5	7,2	5,3	5,8	5,0	6,7
Cumulative surplus of AEs		6,4	12,9	19,4	26,6	31,9	37,7	42,7	49,4

Member State	2005 base year emissions	2013	2014	2015	2016	2017	2018	2019	2020
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	298,9
Distance to target		19,3	29,8	23,7	11,3	28,4	27,4	25,0	52,0
Cumulative surplus of AEs		19,3	49,1	72,7	84,0	112,4	139,7	164,7	216,7

XII.

Use of revenues from auctioning of ETS allowances

The vast majority of revenue from auctioning ETS allowances accrue to Member States, who should spend at least 50% on climate and energy purposes.

Figure 6 Auctioning revenues and reported usage, 2013-2021 (€ bn), EU-27

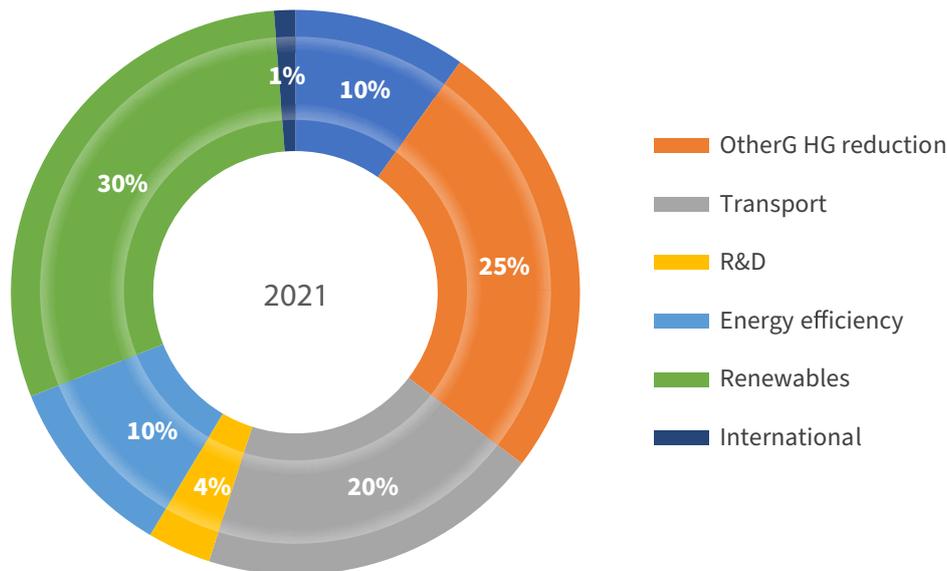


Figure 6 shows how the reported revenues have been spent in 2021 and indicates that renewables support, decarbonisation of transport and other GHG reduction, were the areas where most of the revenues were spent. Compared to previous years, the increasing share of “other” spending appears partly linked to new national measures using ETS revenues to compensate for rising energy prices and mitigate their social impacts³².

Auctions of EU ETS emission allowances for both stationary installations and aircraft operators have provided the EU-27 countries with revenues listed in the Table 11³³. 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. It should be noted that annual reporting does not necessarily cover 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” row³⁴. 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 funds³⁵.

Table 11 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 (%), 2013-2021³⁶.

Member State	2013	2014	2015	2016	2017	2018	2019	2020	2021
Austria									
Revenues from auctioning	55.8	53.6	78.6	59.5	79.4	210.4	183.8	184.2	311.0
Reported as spent on climate etc.	36.9	54.8	79.8	59.9	79.2	0	0	986.4	311.0
% spent on climate and energy	>100 %	>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	97.1	141.6	107.9	144.3	381.5	356.8	356.1	533.2
Reported as spent on climate etc.	0	0	0	37.5	133.1	213.7	357.8	162.6	76.1
% spent on climate and energy	N/A	N/A	N/A	35%	92%	56%	99%	46%	14%
The policy is that 100% of auctioning revenues are spent on energy and climate projects. The revenues for the years 2013-2020 have been divided over the regions and the federal government in shares determined by a cooperation agreement. Work on such an agreement for 2021-2030 is still ongoing. Until completed, revenues are carried over. The amount spent in 2021 came from both 2020 revenues and anticipated 2021 revenues.									
Bulgaria									
Revenues from auctioning	52.6	36.4	121.8	85.3	130.4	368.2	440.3	448.6	832.9
Reported as spent on climate etc.	51.3	36.2	103.5	94.1	138.2	368.2	440.3	448.6	832.9
% spent on climate and energy	97%	99%	85%	>100 %	>100 %	100%	100%	100%	100%
Unspent revenues are carried over to later years, therefore in some years spending is higher than the revenues.									
Croatia									
Revenues from auctioning	N/A	N/A	86.9	20.3	27.2	71.5	72.7	72.2	112.2
Reported as spent on climate etc.	N/A	N/A	77.5	46.1	18.9	29	13.4	44	12.3
% spent on climate and energy	N/A	N/A	100%	>100 %	100%	100%	100%	100%	100%
Cyprus (*)									
Revenues from auctioning	0.3	0.7	1.4	0.4	6.6	26	26.1	40.1	78.4
Reported as spent on climate etc.	1.9	0.7	2.8	0.3	0.8	6.4	57.5	57.6	75.3
% spent on climate and energy	>100 %	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.									

Member State	2013	2014	2015	2016	2017	2018	2019	2020	2021
Czechia *									
Revenues from auctioning	80.7	55.7	111.5	118	199.8	584.4	630.4	719.4	604.0
Reported as spent on climate etc.	73.2	26.9	111.5	118	199.8	367.3	408.4	309.7	296.5
% spent on climate and energy	91%	48%	100%	100%	100%	63%	65%	43%	49%
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	292.9
Reported as spent on climate etc.	56	48.1	71.3	53.7	71.7	189.8	166.1	166.5	292.9
% spent on climate and energy	100%	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	142.8	142.4	248.6
Reported as spent on climate etc.	9	3.6	9.5	12.2	15.9	53.3	64.5	30	43.6
% spent on climate and energy	50%	49%	44%	52%	40%	38%	45%	≥50%	≥50%
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).									
Finland *									
Revenues from auctioning	67	63.5	93.8	71.2	95.3	251.8	219.9	220.6	409.0
Reported as spent on climate etc.	2	31.1	93.8	71.2	9.5	251.8	219.9	220.6	409.0
% spent on climate and energy	3%	49%	100%	100%	10%	100%	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	1469.1
Reported as spent on climate etc.	219.2	215.3	312.1	234.7	313.4	550	420	728.1	1469.1
% spent on climate and energy	100%	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).									

Member State	2013	2014	2015	2016	2017	2018	2019	2020	2021
Germany									
Revenues from auctioning	791.3	750	1110.2	850.4	1146.8	2581.7	3164	2662.4	5306.2
Reported as spent on climate etc.	790.9	750	1110.2	845.6	1130.8	2563	3147.2	2662.4	5306.2
% spent on climate and energy	100%	100%	100%	98%	99%	99%	99%	100%	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	523.5	509.5	506.7	1014.6
Reported as spent on climate etc.	147.6	131.1	195.2	148.1	198	523.5	509.5	506.7	1014.6
% spent on climate and energy	100%	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	226.3	288.2
Reported as spent on climate etc.	17.3	13.1	32.8	18.5	68.7	65.9	74	71.8	232.9
% spent on climate and energy	50%	50%	39%	29%	81%	50%	50%	50%	81%
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.									
Ireland *									
Revenues from auctioning	41.7	36	53.5	40.1	53.6	142.1	124.3	124.5	149.2
Reported as spent on climate etc.	41.7	36	53.5	40.1	53.6	142.1	124.3	124.5	149.2
% spent on climate and energy	100%	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	366.5	542.4	411.2	549.7	1453.3	1289	1290.5	2520.9
Reported as spent on climate etc.	N/A	192.8	237.7	118.1	383.7	148.4	148.1	506.6	1260.5
% spent on climate and energy	50%	53%	44%	29%	70%	50%	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).									

Member State	2013	2014	2015	2016	2017	2018	2019	2020	2021
Latvia									
Revenues from auctioning	10.8	10.2	15.3	11.5	15.4	40.7	42.6	42.3	62.4
Reported as spent on climate etc.	0	0.1	0.1	7.4	3.8	12.3	11.4	5.8	62.4
% spent on climate and energy	100%	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	17.3	28.4	20.8	31.5	80.4	84	86.6	86.2
Reported as spent on climate etc.	20	17.3	28.4	20.8	31.5	80.4	83.7	86.6	86.2
% spent on climate and energy	100%	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	5.2	6.8	5.1	6.9	18.3	17.1	17	8.1
Reported as spent on climate etc.	2.5	2.9	3.5	2.6	3.5	9.2	17.1	17	8.1
% spent on climate and energy	50%	56%	52%	51%	50%	51%	100%	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	15.7	15.9	15.8	30.7
Reported as spent on climate etc.	2.9	5.7	12	9.7	6.9	4.9	9.1	47.2	30.7
% spent on climate and energy	100%	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	894.0
Reported as spent on climate etc.	134.2	131.1	187.3	142.6	190.7	504.2	440.1	441.4	0.0
% spent on climate and energy	>100%	>100%	>100%	>100%	>100%	>100%	>100%	>100%	>100%
Auctioning revenues go to the national general budget which is used to finance among others 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.									

Member State	2013	2014	2015	2016	2017	2018	2019	2020	2021
Poland*									
Revenues from auctioning	244	78	132.8	136.1	506	1211.6	2548.8	3157.6	5593.6
Reported as spent on climate etc.	128.7	39	68.5	68.1	290.4	609.9	1274.4	1564	2768.3
% spent on climate and energy	53%	50%	52%	50%	57%	50%	50%	50%	49%
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	513.9
Reported as spent on climate etc.	71.4	64.8	83.7	72.8	95.1	201.2	235.3	251.3	513.9
% spent on climate and energy	98%	97%	84%	97%	95%	76%	92%	98%	100%
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.									
Romania (*)									
Revenues from auctioning	122.7	97.9	195.2	194	260.8	719.1	749.8	803.1	483.9
Reported as spent on climate etc.	91.2	97.9	195.2	194	0	160	42.7	165.9	226.6
% spent on climate and energy	74%	100%	100%	100%	0%	22%	6%	17%	47%
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	87.1	229.9	244.7	242.1	276.2
Reported as spent on climate etc.	0.1	15.1	30	35.6	40.9	55.6	44.6	27.4	50.9
% spent on climate and energy	0%	26%	36%	55%	47%	24%	18%	11%	18%
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	130.1
Reported as spent on climate etc.	4.6	4.0	12.6	25.2	5.4	14.2	40.8	40.4	79.9
% spent on climate and energy	100%	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. About EUR 185 million in already received auction revenues will still be spent on climate and energy.									

Member State	2013	2014	2015	2016	2017	2018	2019	2020	2021
Spain (*)									
Revenues from auctioning	346.1	330.1	489.5	369.5	493.6	1306	1245.2	1240.3	2482.9
Reported as spent on climate etc.	346.1	370.2	387.8	390.8	445.5	788.6	1054.1	1081.5	2035.0
% spent on climate and energy	100%	>100%	79%	>100%	90%	60%	85%	87%	82%
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	222.2
Reported as spent on climate etc.	35.7	18.9	52.4	21.7	28.8	76.5	73.9	65	222.2
% spent on climate and energy	100%	55%	100%	56%	56%	56%	58%	51%	100%
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 All departures of flights from EU airports.

⁸ These figures assume a quite significant improvement of LULUCF in absorbing the remaining emissions, therefore clear actions are expected for the sector to revert recent trends.

⁹ Notes: (1) Historical GHG emissions and removals (1990-2021) are based on European Environment Agency's 2022 GHG Inventory. (2) Projected emissions and removals (2022-2050) 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-CO₂ emissions into CO₂-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.

¹⁰ This decomposition of total CO₂ emissions in different factors follows the well-known 'Kaya Identity'. In this case, we use the primary energy consumption as an indicator of the energy demand. <https://ourworldindata.org/emissions-drivers>

¹¹ <https://www.eea.europa.eu/ims/greenhouse-gas-emission-intensity-of-1>

¹² Emissions in the refrigeration and air conditioning sector has also increased, although declining in the last few years.

¹³ <https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-agriculture>

¹⁴ For certain countries and greenhouse gases, the base year may differ, e.g. for Bulgaria it is 1988 instead of 1990; for NF3 it is 1995 for most Member States.

¹⁵ COM(2021) 660 final

¹⁶ COM(2022) 138 final

¹⁷ COM/2022/135 final

¹⁸ BE, CZ, DK, DE, EE, EL, ES, FR, HR, IT, CY LV, LT, LU, HU, MT, NL, AT, PT, SI, SK, FI, SE. LT and HU submitted an update of their initial strategies in July and September 2021, respectively.

¹⁹ Article 15 of Regulation (EU) 2018/1999 stating that MS should submit their LTS by January 2020

²⁰ AT, DK, ES, FI, FR, HU, IT, LT, LV, LU, PT, SE, SI, SK.

²¹ 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.

²² FI by 2035 and SE by 2045.

²³ 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.

²⁴ Article 13.2.(a) and 8.1 of the Regulation (EU) 2018/841.

²⁵ See Annex IV of Regulation (EU) 2018/1999.

²⁶ For a more detailed assessment of the long-term strategies submitted by Member States, please refer to the DG CLIMA dedicated website: https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-long-term-strategies_en

²⁷ Sources: EU greenhouse gas inventory 1990-2020. EU approximated greenhouse gas inventory 2021 (EEA). Member States projections with ‘existing measures’ reviewed by EEA (2022).

²⁸ EU greenhouse gas inventory 1990-2020.

²⁹ Source: EEA greenhouse gases - data viewer, European Environment Agency.

³⁰ Sources: EU greenhouse gas inventory 1990-2020, EU approximated greenhouse gas inventory 2021 (EEA). GDP in 2015-prices, data from Ameco database (European Commission, DG ECFIN) gap-filled by EEA.

³¹ Sources: EU greenhouse gas inventory 1990-2019, EU approximated greenhouse gas inventory 2020 (EEA). Average population (total) (Eurostat).

³² For instance, between late-2021 and mid-2022 Spain, Italy, Greece, Germany and Estonia announced the direct or indirect use of ETS revenues for such purposes.

³³ The table lists annual total revenues of the auctioned allowances on the [EEX](#) platform.

³⁴ 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 5 of the Climate Action Progress Report as “Used for climate change and energy, (unspecified)”.

³⁵ For the purposes of Figure 5 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.

³⁶ 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 2020-2022 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. Notes: “N/A” = Not available, “*” = Member States that do not earmark auction revenues, “(*)” = Member States that partially earmark auction revenues.



**Accelerating the transition to climate neutrality for
Europe's security and prosperity**

2022