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**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND
THE COUNCIL**

EU Climate Action Progress Report 2023

{SWD(2023) 338 final} - {SWD(2023) 339 final}

1 EMISSION TRENDS AND PROGRESS IN CLIMATE ACTION

GREENHOUSE GAS EMISSIONS AND THE EU'S INTERNATIONAL COMMITMENTS

In March 2023 the Intergovernmental Panel on Climate Change (IPCC) confirmed that global warming, induced by anthropogenic greenhouse gas (GHG) emissions is increasing the frequency and severity of climate and weather extremes, leading to widespread and adverse impacts on people and nature across the globe. Every increment of warming will intensify the impacts, and urgent global climate action is needed to limit global warming and to adapt to its impacts. Global GHG emissions need to fall by 43% by 2030 and by 84% by 2050 below 2019 levels, while global net zero CO₂ emissions must be reached in the early 2050s if we are to limit temperature increase to 1.5°C with no or limited overshoot. Reducing GHG emissions has many co-benefits, including for air quality, health, biodiversity and energy security.¹

Europe has been warming twice as much as the global average since the 1980s, with far-reaching impacts on the region's socio-economic fabric and ecosystems.² The year 2022 saw further devastating impacts associated with a warming climate, with extreme weather events becoming more and more common. The late spring and summer heatwaves, with record-breaking temperatures in many locations, resulted in a record number of days with very strong heat stress, leading to over 61 000 excess deaths across Europe.³ Hot and dry spring and summer conditions, which triggered drought across most of Europe, and fuelled numerous large wildfires, were followed by heavy precipitation and intense flooding in the autumn, causing dozens of fatalities.⁴ Overall, summer 2022 was Europe's warmest ever recorded.⁵ Temperature records continued to be broken in 2023, confirming the extra-ordinary pace of climate change. July was the hottest month on record with global temperatures 1.5°C warmer than the pre-industrial average. The rising temperatures and increasing frequency of extreme events contributed to numerous wildfires, and by the end of July 2023, they had affected more than 182 000 hectares across the EU, 40% above the 2003-2022 average,⁶ while unprecedented floods hit parts of Europe.⁷

In 2022, **global emissions** were back to their pre-pandemic increasing trend, reaching 53.8 billion tonnes of CO₂ equivalent (CO₂-eq), well above 2019 emissions. Preliminary JRC data⁸ show that global GHG emissions rose by 1.4% in 2022 compared to 2021 levels, against a 3.4% growth of global GDP over the same period, as the global economy continued rebounding from the pandemic. Transport was the main driver of increased GHG emissions (+4.7%, or 361 MtCO₂-eq), although still below the pre-pandemic level, followed by fuel

¹ IPCC, 2023. *Climate Change 2023: Synthesis Report. A Report of the Intergovernmental Panel on Climate Change. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 36 pages. (in press).

² WMO, *State of the climate in Europe 2022*. WMO-No. 1320.

³ Heat-related mortality in Europe during the summer of 2022 | Nature Medicine

⁴ European State of the Climate 2022 by Copernicus: [ESOTCsummary2022_final.pdf \(copernicus.eu\)](#)

⁵ For key facts on extreme weather events, see EEA [Extreme weather: floods, droughts and heatwaves \(europa.eu\)](#).

⁶ [OBSERVER: Global Wildfire Watch: Copernicus EMS and CAMS Monitor Wildfires in 2023 | Copernicus](#)

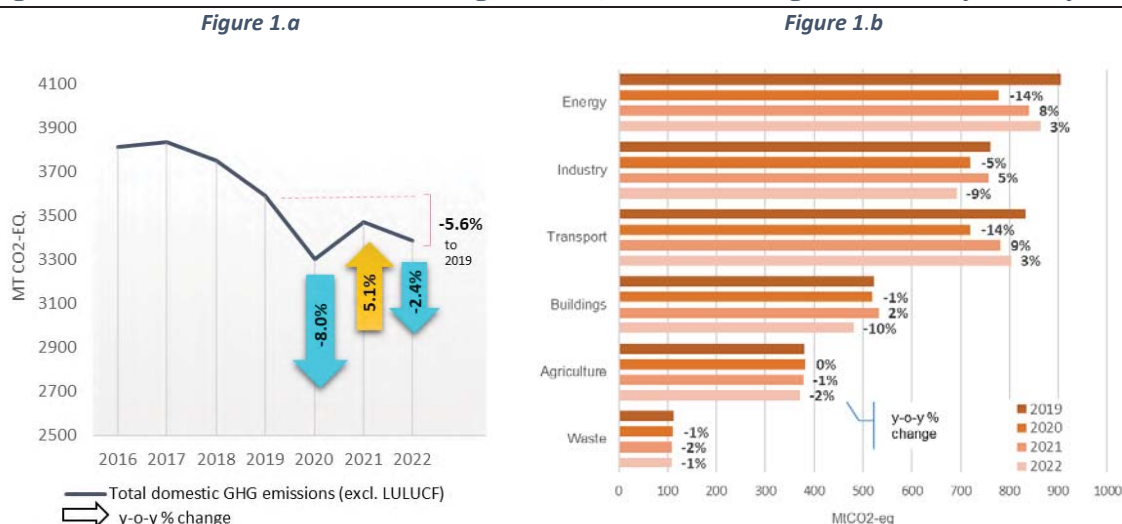
⁷ [Copernicus Emergency Management Service](#)

⁸ EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database comprising IEA-EDGAR CO₂, EDGAR CH₄, EDGAR N₂O, EDGAR F-GASES version 8.0, https://edgar.jrc.ec.europa.eu/report_2023.

production⁹ (+2.6%, or 157 MtCO₂-eq) and power (+0.9%, or 136 MtCO₂-eq). Among the larger emitters, the most significant increases were in Indonesia (+10%, or 113 MtCO₂-eq) and India (+5%, or 189 MtCO₂-eq), while China showed a limited increase (+0.3%, or 52 MtCO₂-eq).

In the EU, provisional data¹⁰ for 2022 show that total GHG emissions (excluding land use, land-use change, and forestry, and international aviation) decreased by 2.4% compared to 2021, continuing the 30-years descending trend, whilst EU GDP grew by 3.5% in the year 2022 (Figure 1.a). Emissions covered by the EU Emissions Trading System (EU ETS) fell by 0.2% and non-ETS emissions decreased by 2.9%.

Figure 1: EU GHG emissions (excluding land use, land-use change and forestry) and by sector¹¹



Exceptional events over the last 3 to 4 years have made the assessment of GHG emission trends more complex and continue to have an impact on 2022 emissions. For more clarity, this report therefore assesses the year-on-year change in emissions and compares to the pre-pandemic level. The COVID-19 lockdowns and restrictions led to an unprecedented but temporary drop in GHG emissions of 8% in 2020. In 2021, the economic recovery affected regions and sectors differently. Some sectors, such as the transport sector and travel-related emissions, recovered fully only in 2022. The energy crisis that started in 2021 continued in 2022, exacerbated by Russia's unprovoked and unjustified invasion of Ukraine, which drove energy prices to record highs, particularly gas prices. In addition, decreased level of nuclear¹²

⁹ Fuel production, processing and refining

¹⁰ The Governance Regulation ((EU) 2018/1999) requires Member States to report approximated GHG inventories annually by 31 July. Based on this reported data, the EEA compiles a Union approximated GHG inventory or, if a Member State has not communicated its approximated GHG emissions by that date, on the basis of EEA's own estimates. This provides an early estimate of GHG emissions ahead of the full GHG inventory.

¹¹ Based on 2023 GHG inventory and approximated EU GHG inventory for 2022, based on Member States' submissions, excluding international bunkers. 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 (1.A.4 GHG inventory code).

¹² Mainly due to temporary shutdown of several nuclear reactors in France for technical maintenance and/or additional inspections.

and low hydro power production¹³ have led to an increase in the use of coal and lignite for power generation, above the level recorded in 2021. The high energy prices also triggered action to reduce demand for both industrial and household energy.

EU emissions by sector show these changes (Figure 1.b). Emissions in energy and transport are expected to increase in 2022, although remaining below 2019 pre-pandemic levels, while significant cuts in emissions are expected in buildings and industry, mainly because of the continued increase of energy prices. Despite the slight decline in 2022, emissions in agriculture remain broadly at the same level as ten years ago.

Provisional 2022 data for GHG net removals from the Land Use, Land-use Change and Forestry (LULUCF) sector appear to suggest a break in their recent declining trend, with an expected increase in carbon sinks of 6% compared to 2021, although approximated emissions remain subject to large revisions. Consequently, in 2022 total net GHG emissions (including LULUCF) decreased by 3.0% on a yearly basis, a reduction of 32.5% compared to 1990 level.

In the EU, verified emissions from aircraft operators increased significantly, by 75% compared to 2021 as the industry recovers from the very low levels of activity during the COVID-19 pandemic.

TOWARDS THE CLIMATE-NEUTRALITY OBJECTIVE

In addition to assessing the progress made in climate policy under the Governance Regulation,¹⁴ for the first time this year this report assesses progress under the European Climate Law,¹⁵ including the collective progress made by Member States towards the EU's goal to achieve climate-neutrality by 2050.¹⁶ It looks at progress on several aspects and from several sources and takes account of the complexity inherent in the many possible paths to achieve a net-zero and resilient economy.

Overall, provisional 2022 data show that the EU's domestic GHG net emissions (i.e. including LULUCF and excluding international transport) are falling steadily, in line with the linear path to achieve the EU's 2030 GHG reduction target (i.e. -55%) and the EU's 2050 climate neutrality objective.¹⁷ However, the pace of emission reduction needs to pick up, to almost triple the average annual reduction achieved over the last decade (see Figure 2.a). Relative to past mitigation efforts, the most significant cuts in emissions are needed in buildings and transport, where the pace of decarbonisation is sluggish or even moving in the opposite direction. At the same time, action in the LULUCF sector is essential to achieve a significant boost in carbon removals. Although reaching the emissions cuts required from agriculture looks achievable when looking at progress over the past three decades, the lack of substantial progress in recent years is a concern, calling for a gear change (Figure 3.b).

¹³ Partly due to drought and high water temperatures in many parts of the EU.

¹⁴ Articles 29 and 35 of the Regulation on the Governance of the Energy Union and Climate Action (Reg. (EU) 2018/1999).

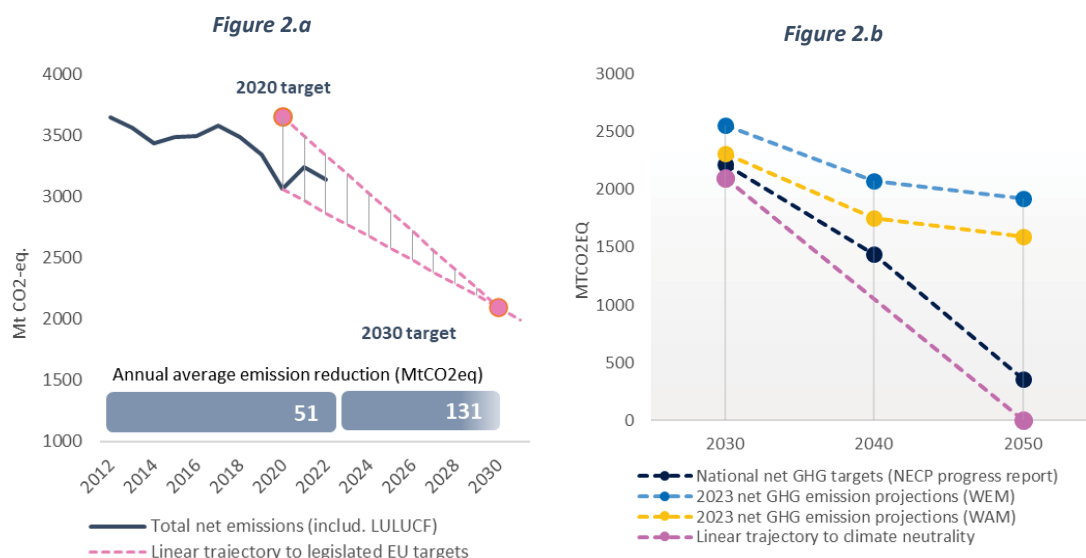
¹⁵ Articles 6 to 8 of the European Climate Law (EUR-Lex - 32021R1119 - EN - EUR-Lex (europa.eu)).

¹⁶ The EU climate-neutrality objective, set out in Article 2(1) of Regulation (EU) 2021/1119, is achieved when EU-wide GHG emissions and removals regulated in EU law are balanced within the EU at the latest by 2050, reducing emissions to net zero. The EU shall aim to achieve negative emissions thereafter.

¹⁷ The EU 2030 target as represented in the chart and the related progress assessments does not fully align with the exact legal scope of the 2030 target, which includes all emissions and removals regulated under EU law. While the EU ETS covers emissions from all flights within the European Economic Area (EEA) and departures to Switzerland and to the UK, these emissions (less than 2% of total GHG emissions) are not taken into account in this assessment. More information on ETS aviation emissions in chapter 2.

Although sizeable, such emission reductions are not unprecedented. In the two years before the pandemic, emissions were down by an annual average of 120 million tonnes of CO₂ equivalent, due to progress in energy efficiency and the fast deployment of renewables. In 2022, all actors in the EU, including energy intensive industry, decreased their demand for energy compared to pre-pandemic levels, with savings of more than 18% of gas compared to the five years before.¹⁸

Figure 2: EU GHG net emissions, targets and aggregated Member States' projections¹⁹



The energy crisis also sparked unprecedented momentum for renewable energy. In 2022, a record high of around 60 GW of wind and solar were installed in the EU²⁰ and heat pump market broke a new record, with around 3 million units (+37%) sold.²¹ Despite a continued contraction in car markets and higher manufacturing costs, the share of electric cars sold in Europe reached 21.6% in 2022, while the availability of publicly accessible chargers surged by more than 50% compared to 2021.²²

To hold this course, however, action by EU Member States is essential. On 15 March 2023, Member States updated their GHG projections and for the first time took stock of the progress achieved towards the objectives, targets and contributions set out in their initial integrated

¹⁸ 5-year average compared to gas consumption between August 2022 and June 2023 (State of Energy Union Report 2023).

¹⁹ Based on the 2023 GHG inventory and approximated EU GHG inventory for 2022, based on Member States' submissions, excluding international bunkers. Linear trajectories for GHG emissions and removals are based on legislated EU 2030 targets. The -55% 2030 target (European Climate Law) considers a contribution of removals limited to -225 MtCO₂eq. The national GHG targets are from Member States' submissions of NECP progress report (Annex I, Table 1). Any missing data are replaced by other targets or milestones that Member States submitted to the Commission under other reporting exercise (i.e. national long-term strategies, integrated national energy and climate plans, or the 2021 GHG projections). The annual average emission reduction after 2030 is based on a linear trajectory to EU climate neutrality. This is without prejudice to the pace required by the new 2040 target the Commission will propose in accordance with the Climate Law.

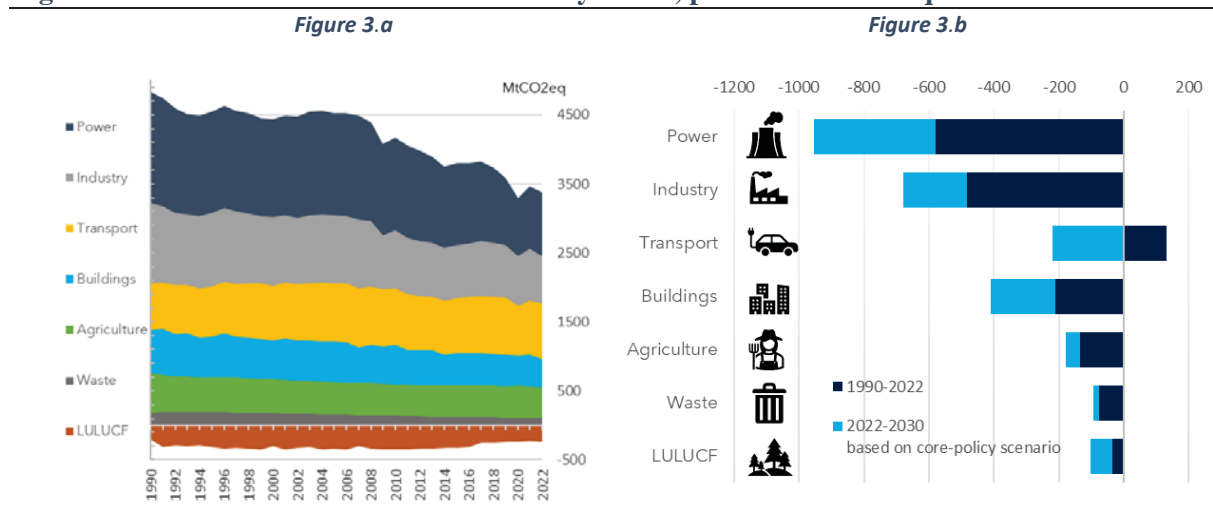
²⁰ Annual EU solar power growth increased by 47% from 28.1 GW in 2021. The new added capacity of 41.4 GW of solar power in 2022 is equivalent to the power needs of 12.4 million European homes. [New report reveals EU solar power soars by almost 50% in 2022 - SolarPower Europe](#). New wind energy capacity in 2022 amounted to around 16 GW, up 40% on 2021. [The EU built only 16 GW new wind in 2022: must restore investor confidence and ramp up supply chain | WindEurope](#).

²¹ European Heat Pump Association, based on 21 markets, the number of heat pumps sold in 2022 replaced roughly 4 bcm of natural gas, avoiding about 8 million tonnes of CO₂ emissions. [Market data – European Heat Pump Association \(ehpa.org\)](#)

²² Global EV Outlook 2023 (IEA).

National Energy and Climate Plans (NECP). The existing NECPs reflect past targets, before the EU raised its climate ambition under the European Green Deal. This assessment also feeds into the important process of updating the integrated NECPs by the Member States, which is now underway.

Figure 3: EU GHG emissions and removals by sector, past trends and required reductions²³



In the 2023 NECP progress reports, over half the Member States set the objective to achieve climate neutrality by 2050 or earlier, in line with their national long-term strategies. Most of the Member States have also indicated quantitative national GHG targets up to 2050.²⁴ Once aggregated for the EU-27, the national GHG targets reported by Member States at different reporting exercises²⁵ indicate some gaps to the EU legislated objectives (i.e. a gap of around 3% to the -55% net GHG reduction target by 2030 and of 8% to the net-zero GHG emissions by 2050), although they reflect the will to meet the objectives set at EU level (see Figure 2.b).²⁶

Member States' GHG emission projections provide additional indications of the expected evolution of EU GHG emissions. The latest projections submitted in March 2023 give a clearer measure of the risk of the EU missing its climate targets. Taking account of existing policy measures, aggregated projections at EU level indicate a gap of 15 percentage points to the EU 2030 GHG reduction target of 55%, and a narrower gap of 5 percentage points when factoring in additional policy measures (Figure 2.b). EU Member States still need to take

²³ Based on the 2023 GHG inventory and model-based outcomes of core policy scenario supporting the initiatives delivering the European Green Deal. Negative values for the LULUCF sector indicate an increase of GHG removals. 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. (4) Agriculture includes both non-CO₂ emissions and emissions from the energy use in agriculture and fishery sectors.

²⁴ As reported under Annex I, Table 1 of Commission Implementing Regulation (EU) 2022/2299 of 15 November 2022. See SWD on the Assessment of progress towards the objectives of the Energy Union and Climate Action accompanying the State of the Energy Union 2023.

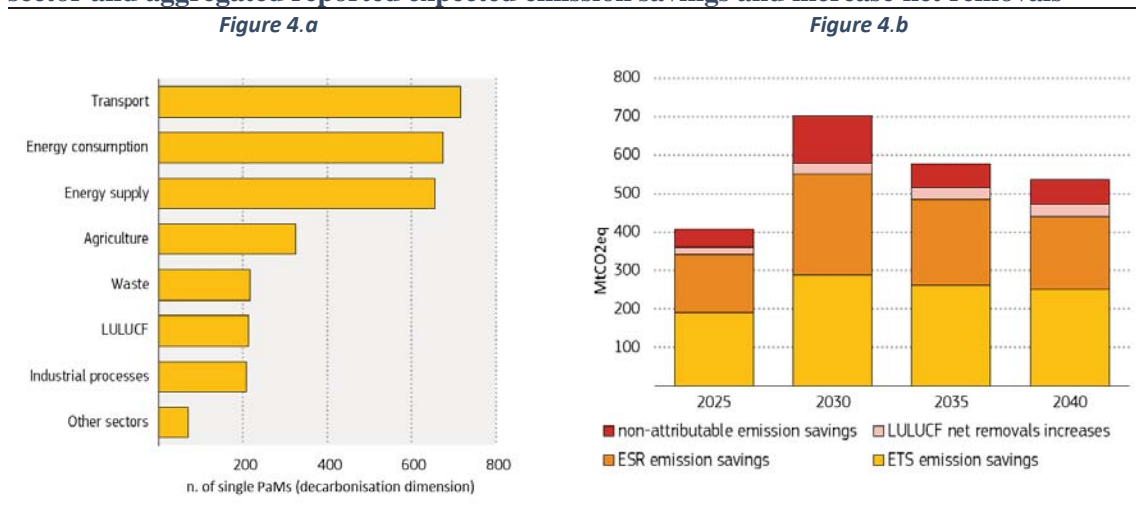
²⁵ Missing NECP values were replaced by national GHG targets submitted by Member States to the Commission in the past (e.g. for the 2021 NECP or long-term strategies), when available. As targets might be expressed in different global warming potential (i.e. AR4 or AR5), these values are indicative only.

²⁶ International maritime and aviation emissions could widen these gaps once included in the scope of EU climate targets.

additional mitigation measures to achieve climate neutrality by 2050 to cut around 1 600 million tonnes of CO₂ equivalent (or 34 percentage points).

EU Member States have also reported progress on more than 3000 individual policies and measures (PaMs), the large majority specifically aiming to reduce GHG emissions and increase carbon removals. Of the measures specifically addressing decarbonisation, around a third are *newly* implemented (i.e. from 2022 or later). The number of measures for climate mitigation reported in 2023 is 19% higher than in the previous reporting cycle. This is consistent with the EU's higher climate ambition and reflects the work to prepare the updated national energy and climate plans, with the final plans due by June 2024.²⁷

Figure 4: Number of single policies and measures (decarbonisation dimension) by affected sector and aggregated reported expected emission savings and increase net removals²⁸



The sectors with the most measures are transport (23%), energy consumption (22%), and energy supply (21%), partly reflecting the sectoral challenges and priorities (Figure 4.a). Information on the expected (ex-ante) emissions savings from these measures is important to assess expected progress from the planned and implemented measures. Unfortunately, in 2023, only 18 Member States reported quantitative ex ante savings for at least one year and one measure. This is lower than in 2021, making the aggregate assessment particularly difficult (Figure 4.b). It again highlights the need for Member States to step up action to assess the effects of implemented policies more systematically, both ex ante and ex post.

In conclusion, although GHG emissions continue to fall, as shown by the most recent data, and there are encouraging signs of action on the ground, progress towards the EU's climate objectives appears insufficient. Action is most needed in areas where:

- emission reductions still required are significant (buildings, transport),
- recent progress made is too slow (agriculture),

²⁷ Updated NECPs should reflect necessary increased ambition from the Fit for 55 package, the REPowerEU initiative and energy crisis measures adopted by the EU in the last year, given guidance issued by the European Commission in December 2022 on the update of NECPs, and pending in-depth review of the Governance Regulation.

²⁸ Values based on Annex IX to the NECP progress reports submitted by Member States, as of 31 August 2023. Member States could indicate more than one sector. This explains why the sum of measures across all affected sectors is higher than the current total number of individual measures.

- figures have not evolved in the right direction (land use, land-use change, and forestry).

The assessment shows that to get on a safer – more certain – path towards climate neutrality by 2050, the EU and its Member States need to significantly increase the pace of change. The Fit-for-55 legislative package must be adopted fully, and all parts rapidly implemented. More detailed monitoring is needed to assess progress on enabling factors that drive emissions in the different sectors to better highlight areas where progress is lacking or more action is needed.

PROGRESS ON CLIMATE ACTION IN THE EU

The “Fit for 55” package sets the EU on a path to reach its climate targets in a fair, cost-effective and competitive way. Most of the key proposals in the package have been adopted by co-legislators²⁹ and EU policies are now aligned with the updated 2030 target set in the European Climate Law. Implementing the new legislation under the Fit for 55 package³⁰ will enable the EU and its Member States to reduce net GHG emissions by at least 55% compared to 1990 levels by 2030³¹ (see Ch. 1 of the staff working document – ‘Technical information’).

The revised EU ETS Directive increases the level of ambition in the existing system from 43% to 62% emissions reductions by 2030, compared to 2005 levels and extend the system to also apply to international maritime transport. A separate carbon pricing system will apply to fuel combustion in road transport and buildings and small-emitting sectors³² (ETS2) with a 42% emission reduction target compared to 2005 across the sectors covered. The amended Effort Sharing Regulation (ESR) increased, for the sectors that it covers, the EU-level GHG emission reduction target from 29% to 40% by 2030, compared to 2005, which translates in updated 2030 targets for each Member State. The new LULUCF Regulation sets an overall EU-level objective of 310 Mt CO₂ equivalent of net removals in the LULUCF sector in 2030.

To ensure a just transition towards climate-neutrality, the EU created a new fund, the Social Climate Fund, to accompany the new ETS2, which will address the impacts of carbon pricing in new sectors and provide support for vulnerable households, micro-enterprises and transport users. Together with the Just Transition Fund supporting the territories most affected by the transition (see chapter 6), they will ensure that no-one is left behind. Empowerment of energy consumers is also enhanced by the latest legislative initiatives related to the electricity market. Under the Net Zero Industry Act (NZIA), the Commission will support the setting up of specialised academies for up-skilling and re-skilling.

In 2022 and 2023, the Commission made additional proposals to speed up the transition to climate neutrality. For example, the legislators reached a provisional agreement on the revised Fluorinated greenhouse gases (F-gases) Regulation which will further reduce the emissions from those highly potent GHGs. The Commission proposed more ambitious emissions reductions targets for heavy-duty vehicles. The Commission also put forward the

²⁹ This includes the revised EU ETS Directive, a new ETS for buildings, road transport and fuels, the Market Stability Reserve, the Effort Sharing Regulation, CO₂ standards for cars and vans, the Land Use, Land Use Change and Forestry Regulation, the Carbon Border Adjustment Mechanism, the establishment of the Social Climate Fund, FuelEU Maritime, the Alternative Fuel Infrastructure Regulation (AFIR), ReFuel EU Aviation, the Energy Efficiency Directive and the Renewable Energy Directive. Only the proposed revised energy taxation directive is still pending agreement.

³⁰ Cf. Chapter 2 of the staff working document – ‘Technical information’.

³¹ The legislation as adopted is estimated to result in a net domestic reduction of GHG emissions of 57% by 2030 compared to 1990. An overview of targets is presented in Chapter 1 of the staff working document – ‘Technical information’.

³² CO₂ emissions from fuel combustion in industry not covered by the existing EU ETS.

REPowerEU plan with specific measures to reduce the EU's energy dependence on Russian fossil fuels, and to speed up implementation of the European Green Deal with new actions, while building on the Fit for 55 package. To enhance the competitiveness of Europe's net-zero industry and to boost innovation, in particular in green technologies, the Commission put forward a Green Deal Industrial Plan. Chapter 2 of the staff working document – 'Technical information' presents an overview of recently adopted policy contributing to the alignment of EU level policies with climate objectives.

In November 2021, the Commission updated its Better Regulation instruments to ensure that new EU policies are consistent with climate goals. All proposed EU measures should now be assessed for their consistency with climate objectives- the climate neutrality objective and the objective to ensure progress on adaptation- as part of the impact assessment process, in line with the European Climate Law (the climate-consistency check). Good progress has been made in implementing this check. Since the beginning of 2022, out of the 27 impact assessments deemed relevant for this assessment (out of 57 impact assessments scrutinised by the Regulatory Scrutiny Board³³), 20 were found to have sufficiently assessed consistency of the initiative with climate objectives, while 7 impact assessments did not sufficiently assess climate aspects. This represents almost 75% of relevant cases and reflects the fact that it is a new requirement. With more experience in implementing the climate consistency check, compliance with this new impact assessment requirement could be further improved.

While good progress has been made to ensure that EU policies put the EU on a path towards a net zero economy, the recent emissions trends in the transport sector and the very slow pace of emissions reductions in agriculture, along with a decline of the carbon sink, raise concerns (see Chapters 3 and 4). Despite progress on green finance from private sources, significant additional investment is needed to finance the green transition. This needs action, in particular to redirect finance to enable the transition of 'brown' sectors (see Chapter 6).

As required by the European Climate Law, the Commission will publish a communication on the EU's climate target for 2040 in early 2024, setting a path from the already-agreed intermediate 2030 target to net-zero emissions by 2050. This will provide the information needed to ensure that measures and investments to implement the EU's 2030 targets are also well aligned with the pathways to climate neutrality by 2050. The 2040 target will provide predictability and keep progress on track to climate neutrality.

Climate change is already impacting nature and people more intensely, more frequently and over a wider geographical area than previously thought.³⁴ Progress is being made in the assessment of climate risks. In spring 2024, the Commission will respond to the evidence provided in a scientific European Climate Risk Assessment report on the evolution of climate risks and the need for further action in a communication on managing EU climate risks. In parallel, wide-ranging action is underway to implement the other aspects of the EU's 2021 adaptation strategy (see Chapter 5).

PROGRESS ON CLIMATE ACTION IN THE EU MEMBER STATES

The next chapters of the report will assess the progress made by the Member States in specific policy areas. This section gives a bird's eye view of GHG emissions trends towards climate mitigation objectives, including the EU's objective to achieve climate neutrality by 2050, and

³³ Impact assessment submitted for the first time to the Regulatory Scrutiny Board between January 2022 and April 2023 and for which an interservice consultation was launched by 23/05/2023.

³⁴ IPCC Sixth Assessment Report, Impacts, Adaptation and Vulnerability, February 2022.

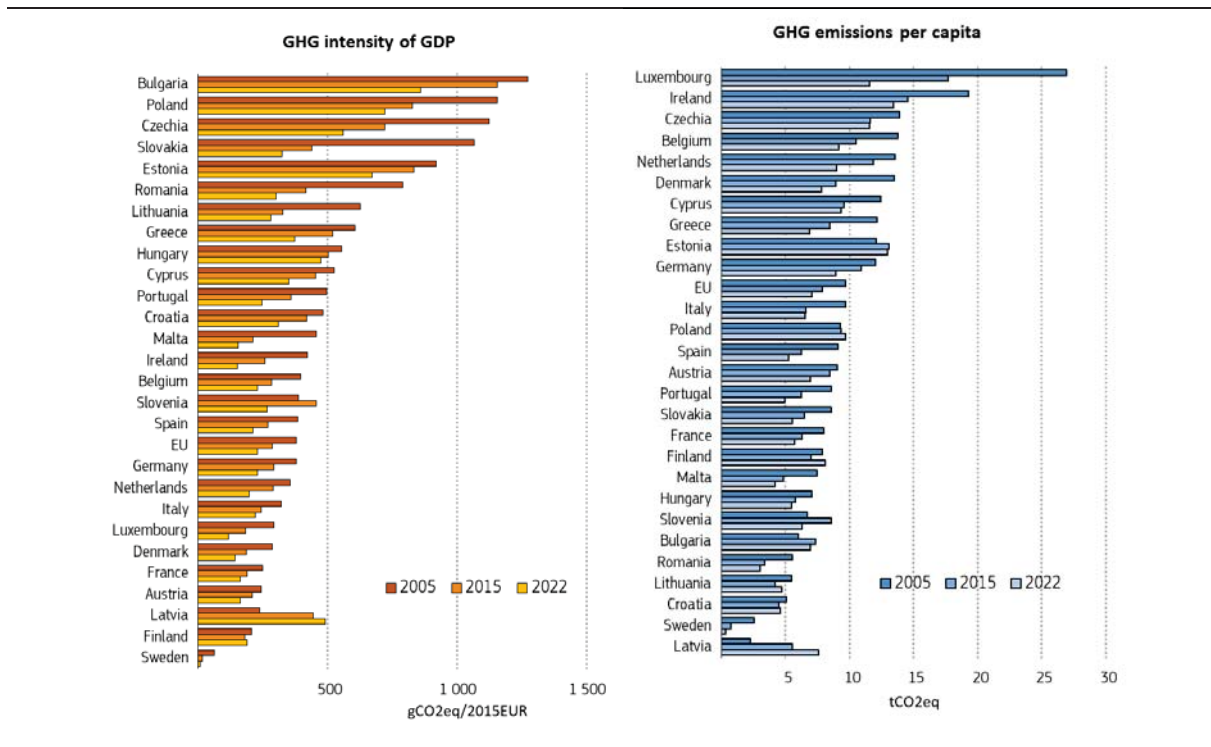
builds on the detailed analysis provided in Chapter 5 of the staff working document – ‘Technical information’.

Over the last three decades, the EU has substantially reduced its GHG emissions, overachieving its 2020 commitment under the UNFCCC³⁵ and its target under the Kyoto Protocol’s second commitment period in 2013-2020 (KP2).³⁶ Total GHG emissions under the UNFCCC (excluding LULUCF and including international aviation) fell by 34% in the EU-27 + UK compared to 1990. This is a reduction of 1.94 billion tonnes of CO₂-eq by 2020. (For more details see Chapter 4 of the staff working document – ‘Technical information’).

However, in the most recent years, progress across Member States has been mixed. Between 2015 and 2022, net GHG emissions have been rising in Latvia, Finland, and Lithuania, and, to a lesser extent, in Cyprus, Poland, Malta, Estonia, and Ireland. GHG emissions were reduced but only slowly in Czechia, Italy, Hungary, Croatia, France, and Denmark. The reasons vary by country. In Finland, Latvia and Estonia the upward emissions trend is mainly related to the sharp decline of the capacity of the land use, land-use change and forestry sector to act as a carbon sink, while for Lithuania, transport and building also contribute to the increase in emissions. Transport emissions increased in Hungary, Malta and Poland, while in Ireland emissions in agriculture continued to grow.

Since 2005, there has been a clear downward trend in GHG emissions per capita and in the GHG intensity of GDP in all EU Member States except Latvia (Figure 5). More rapid progress by countries with higher emitting ratios has led to significant convergence towards the EU average. However, between 2015 and 2022, the downward converging trend seems to have halted for most EU Member States.

Figure 5: GHG intensity of GDP and GHG emissions per capita by EU Member States



³⁵ Under the UNFCCC, the EU and its Member States (including the UK) committed to a joint, economy-wide target to reduce GHG emissions by 20% compared to 1990 levels by 2020 (‘the Cancun pledge’).

³⁶ Under the Kyoto Protocol’s second commitment period in 2013-2020, the EU, its Member States, the UK and Iceland committed jointly to reducing GHG emissions by 20% on average in comparison to 1990.

Information on the expected impact of current and additional policies on GHG emissions submitted by Member States can be used to gain insights into the progress they are making, or are expecting to make, towards the EU's climate objectives. By 2030, based on the GHG projections submitted by EU Member States in March 2023, six countries (Poland, Ireland, Estonia, Czechia, Luxembourg, and Latvia) expect emissions per capita to be significantly higher than 5 tonnes of CO₂-eq, which is the average EU GHG per capita broadly consistent with the EU -55% target.³⁷ On the climate-neutrality objective, all Member States except Finland, Portugal, Slovenia and Sweden still project sizeable net GHG emissions in 2050 even taking into account current and additional policies (see Table 6, in Chapter 5 of the staff working document – 'Technical information'), despite the fact that almost all have declared a climate-neutrality goal by 2050, or earlier.

Trajectories are also important. Figure 6 compares projected emissions³⁸ between 2022 and 2050 for each Member State with a benchmark trajectory, built as the median of the seven climate neutrality paths that form the basis of the advice of the European Scientific Advisory Board on Climate Change on the 2040 ambition.³⁹ The EU-level emissions of the median path were then distributed across Member States according to the country's share of EU emissions in the core policy scenario used for the European Green Deal initiatives.⁴⁰

Figure 6: Overshoot of projected GHG emissions against an indicative path to climate neutrality by 2050 (in % of benchmark emissions, total emissions excluding LULUCF)

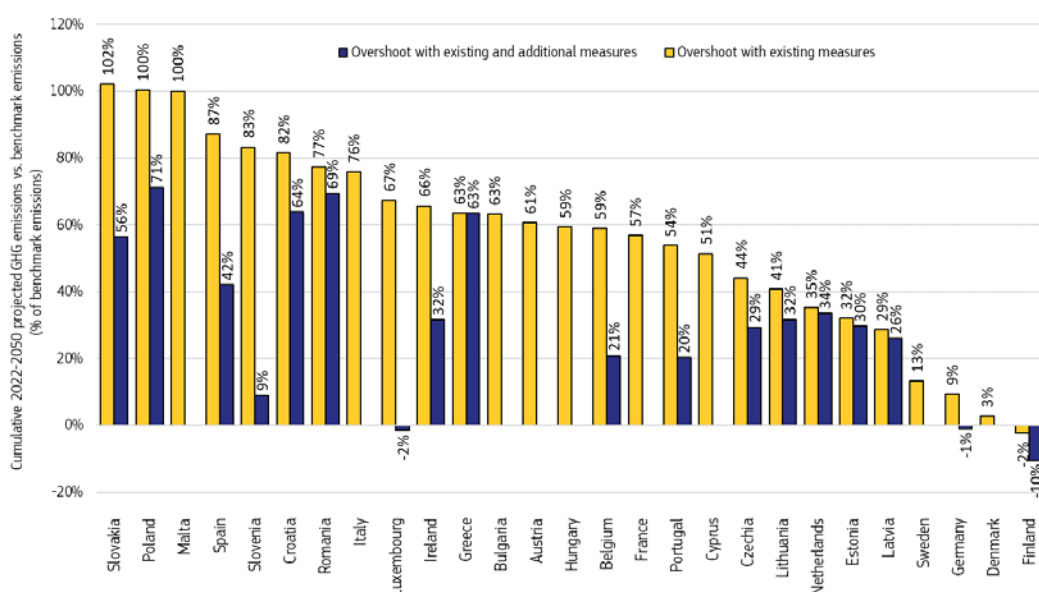


Figure 6 shows stark differences in progress towards climate neutrality across the EU's members. Factoring in existing measures⁴¹ (WEM, the yellow bars), between 2022 and 2050,

³⁷ Net GHG emissions consistent with EU 2030 target (around 2100 MtCO₂eq), divided by the latest Eurostat population projections for EU-27 by 2030 (around 550 million EU residents), is equal to 4.7 tonnes of CO₂eq per capita.

³⁸ Excluding LULUCF emissions and removals.

³⁹ [Scientific advice for the determination of an EU-wide 2040 climate target and a GHG budget for 2030–2050 \(europa.eu\)](https://europea.eu/scientific-advice-for-the-determination-of-an-eu-wide-2040-climate-target-and-a-ghg-budget-for-2030-2050)

⁴⁰ [Policy scenarios for delivering the European Green Deal \(europa.eu\)](https://europea.eu/policy-scenarios-for-delivering-the-european-green-deal). After 2030, the distribution key has been kept constant.

⁴¹ Projections 'with existing measures' (i.e. WEM) encompass the effects, in GHG emissions, of policies and measures adopted and implemented.

Slovakia, Poland and Malta expect to emit more than twice the emissions of the benchmark path to climate neutrality. A further 15 Member States project their cumulative emissions to overshoot the climate-neutrality benchmark by more than 50% without additional policies.⁴² When factoring in the impact of additional policy measures⁴³ (WAM, the blue bars) the overshoots decrease, although the gaps remain significant (above 50%) for Slovakia, Poland, Croatia, Romania and Bulgaria.⁴⁴

Similar results are produced when taking a linear trajectory as the indicative benchmark. Here, the largest overshoots are for Malta, Italy, Greece, Austria and Hungary under the WEM scenario, and for Poland, Romania, Bulgaria, and Croatia under both WEM and WAM scenarios (see Table 6, Chapter 5 of the staff working document – ‘Technical information’).⁴⁵

These analyses based on Member States’ GHG emission projections reflect different levels of ambition and implementation, but also the completeness and quality of data submitted. By the end of April 2023, more than a month after the official deadline, only 20 Member States had submitted their projections via the e-platform. Late submissions undermine the quality control and follow-up process of resubmissions. In addition, although not being mandatory, nine Member States⁴⁶ did not submit projections with additional measures, which were then gap-filled with projections using the ‘existing measures’ scenario, and for Belgium’s projections that lacked information beyond 2030, 2021 GHG projections were used. The Commission therefore urges Member States to improve their emissions projections and support analytical capacity and tools. Projections are an important guide for decarbonisation, to assess progress towards the climate-neutrality objective and to support sound policy design and decisions.

In 2023, all Member States reported progress on policies and measures. Although the number of measures has increased, there are still significant differences among Member States in the number of reported measures. Belgium, Spain, Luxembourg, and France reported the most measures and Bulgaria, Austria, Greece and Malta the least (Figure 7).⁴⁷

Compared to the previous reporting exercise (2021), the greatest increase in reported measures is in Cyprus and Luxembourg, followed by Spain, Portugal, Finland, Italy, and Estonia. Bulgaria, Austria and Malta reported a significant decrease. At the same time, more than a third of measures reported by Lithuania, Estonia, Croatia, Ireland, and Bulgaria appear to be new (in place as of 2022 or later). In terms of the affected sectors (Figure 7.b), the relative high share of policies and measures affecting agriculture and LULUCF sectors in Latvia and Finland should be noted, given recent trends in these sectors, although the reported expected emission savings are not significant.⁴⁸

⁴² ES, SL, HR, RO, IT, BG, LU, IE, EL, AT, HU, BE, FR, PT and CY.

⁴³ Projections ‘with additional measures’ (i.e. WAM) encompass the effects, in GHG emission reductions, of policies and measures adopted and implemented, as well as policies and measures that are planned (e.g. measures under discussion having a realistic chance of being adopted and implemented after the date of submission of the national plan).

⁴⁴ Only 18 Member States have submitted their GHG emission projections under the ‘with additional measure’ scenario.

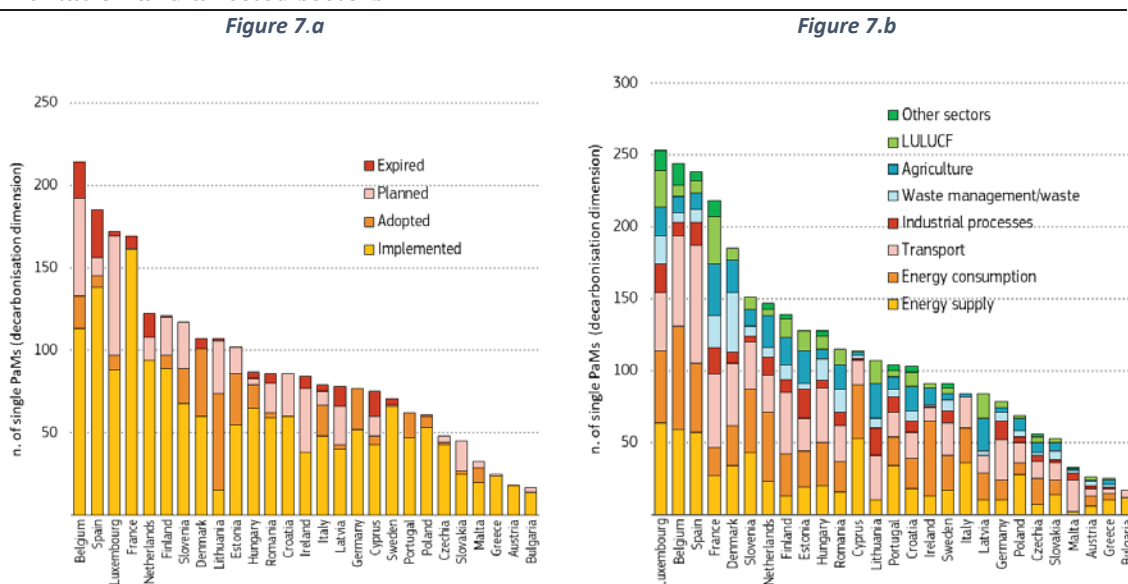
⁴⁵ The metric compares cumulative projected net GHG emissions (including LULUCF) with cumulative emissions underlying a linear trajectory from the 2021 net GHG emissions levels of each Member States to climate-neutrality by 2050.

⁴⁶ CY, DK, FR, EL, IT, MT, AT, HU, and SE.

⁴⁷ The number of reported PaMs could reflect the granularity of reported policies and measures. For example, both Belgium and France report their PaMs at a highly disaggregated level (e.g. many regional policies and measures are reported), while other Member States report their PaMs in a more aggregated level. Values are those available on 31/08/ 2023.

⁴⁸ Annex IX of Commission Implementing Regulation (EU) 2022/2299 of 15 November 2022). For more, see the SWD on the assessment of progress towards the objectives of the energy Union and climate action accompanying the State of the Energy Union 2023.

Figure 7: Number of single policies and measures reported by Member States: status of implementation and affected sectors⁴⁹



The EU 2030 climate target and the EU climate-neutrality objective by 2050 require ending subsidies for fossil fuels, creating favourable conditions for energy efficiency and renewable energy and focusing on the needs of the vulnerable for a just energy transition. Total fossil fuel subsidies had remained stable or slightly decreased for a number of years, reaching EUR 56 billion in 2021, but have surged recently due to measures to cushion the impact of the energy crisis. The Commission estimates that fossil fuel subsidies in 2022 more than doubled compared to 2021, reaching EUR 122 billion. Member States must accelerate action to end fossil fuel subsidies.⁵⁰

Overall, the level of progress by Member States in recent years falls significantly short of the effort required over the coming decades to meet both the medium and the long-term EU climate targets. Member States should rapidly accelerate action by making tangible progress on planned policies and by taking additional, urgent measures in line with the country-specific recommendations issued in the European Semester process of economic policy coordination. Several Member States also face sectoral challenges and weaknesses that need to be remedied without further delay.

In particular based on the available information, the level of progress towards the EU climate-neutrality objective appears insufficient for Poland, Ireland, Latvia, Malta, and Croatia, and, to a lesser extent, for Austria, Estonia, Czechia, Cyprus, Italy and Romania.

However, this current assessment does not reflect the more ambitious climate intentions that Member States should include in their revised national energy and climate plans (NECPs). By

⁴⁹ Values based on Annex IX of NECP progress reports submitted by Member States, by 15/08/2023. Member States could indicate more than one affected sector, so the sum of PaMs across all affected sectors can be higher than the total number of single PaMs with a decarbonisation dimension.

⁵⁰ 2023 Report on Energy Subsidies in the EU, annexed to the 2023 State of Energy Union Report.

30 June 2023, Member States had to submit their draft updated NECPs to the Commission.⁵¹ The draft NECPs should contain the policies and measures that each Member State envisages to meet their climate and energy targets. The Commission is in the process of assessing the draft NECPs and will issue recommendations to the Member States by the end of the year. Member States are encouraged to take these recommendations into account in their final updated NECPs due by 30 June 2024. The Commission urges Member States to seize the opportunity of updating their NECPs to plan additional measures, to align the expected emissions with the EU's higher level of ambition on climate policy.

Large-scale, long-term projects need to be supported by reliable strategies. Member States are therefore encouraged to consider updating and, where needed, to increase both the ambition and the quality of their national long-term strategies. Given the scale of the challenges ahead, the Commission will consider issuing recommendations under Article 7(2) of the Climate Law, together with recommendations on the draft NECP updates.

⁵¹ By 6 October 2023, 16 Member States had submitted draft updated NECPs. 6 Member States foresee a higher ambition in their draft NECPs compared to their reported projections in March 2023.

2 THE EU EMISSIONS TRADING SYSTEM

The EU Emissions Trading System (EU ETS) is a cornerstone of EU's climate action. It covers around 36% of EU's total GHG emissions, from the electricity and heat generation, manufacturing industry and aviation within Europe.⁵² By setting a cap on the total emissions, the system ensures that these emissions decrease over time. Within the cap, allowances are distributed primarily via auctioning, which raises revenues for Member States' budgets to support climate action and energy transformation. With the allowance price determined by the market, the ETS incentivises cost-effective emission reductions.

By 2022, the EU ETS had helped drive down emissions from power and industry installations by 37.3% compared to 2005 levels. These emission reductions have been largely driven by the energy sector - a switch from coal to gas and an increased deployment of renewable energy sources. Latest emission trends in the EU ETS, however, also reflect the impacts of the COVID-19 pandemic and the energy crisis (*see Emission Trends*).

In parallel, the EU ETS has raised over EUR 152 billion in auction revenues that Member States have largely used to support projects in renewable energy, energy efficiency and low-emission transport. In the wake of the energy crisis, Member States have also used their ETS revenues to address negative impacts on consumers and industries.

The revision of the EU ETS under the Fit for 55 package will help bring down emissions faster and across more sectors. The European Parliament and Member States in the Council agreed to tighten the cap on emissions whilst extending the system to emissions from maritime transport (*see Action in aviation and maritime transport*). A reduction in free allocation will help step up emission reductions across manufacturing industry and aviation. At the same time, more resources are leveraged to support decarbonisation in ETS sectors. The revision commits Member States to using all ETS revenues (or an equivalent thereof) for climate action, energy transformation and addressing social challenges of carbon pricing, and also increases the sizes of the Innovation and Modernisation Funds (see Ch. 2 of the staff working document – 'Technical information' for more details).

The revision of the EU ETS entered into force on 5 June 2023 with most changes taking effect from 1 January 2024. Work on the implementing legislation is ongoing. More on the functioning of the EU ETS in 2022 is available in the Carbon Market Report 2023.

EMISSION TRENDS

In 2022, overall EU ETS emissions decreased by 0.2% compared to the previous year.⁵³ This reflects a slight decrease in emissions from power and industry installations and a continued rebound in emissions from aviation after the COVID-19 pandemic. Looking to before COVID-19, however, emissions have remained on the decline. In 2022, emissions were around 8% lower than in 2019.

The EU's economic recovery continued in 2022, with GDP growing 3.5%. Even so, emissions from the energy sector and manufacturing decreased slightly by 1.8% compared to 2021. This is in part due to the energy crisis and its impacts. On the one hand, natural gas supply became restricted, and higher natural gas prices caused an increase in coal use for power generation.

⁵² Including departing flights to Switzerland and the United Kingdom.

⁵³ Based on data from the EU Registry as of 30 June 2023.

On the other hand, the energy crisis contributed to an increase in inflation and a reduction in industrial demand.

Electricity and heat generation – a slight increase in emissions

Emissions from electricity and heat generation in 2022 rose by 2.4% compared to 2021. Although electricity and heat demand decreased due to higher energy prices and milder weather, sectoral emissions increased due to a switch back from gas to coal for energy generation. The switch was prompted by both high prices of natural gas, and droughts in many parts of the EU which reduced output of nuclear and hydro power.

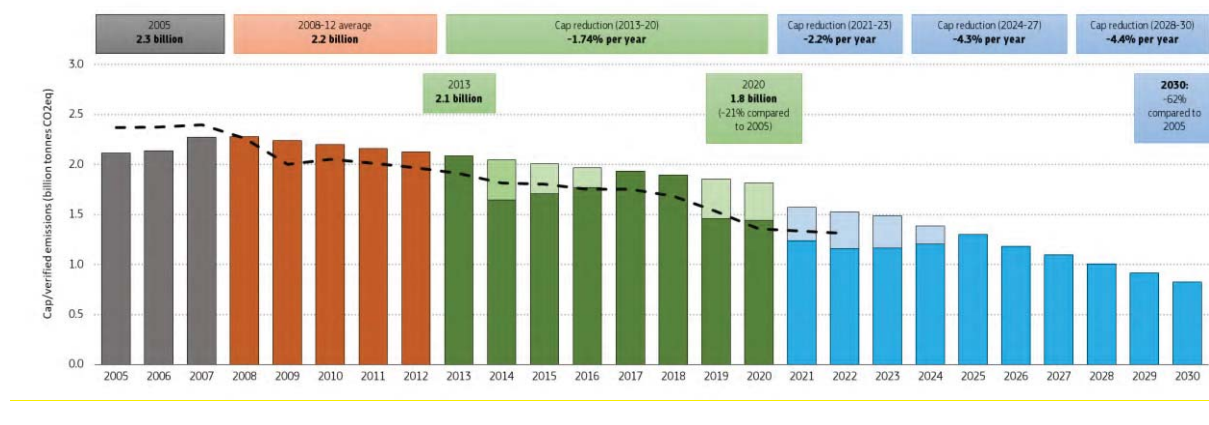
Industry – a net decline in emissions

Manufacturing industry saw a reduction of emissions of 6.5% in 2022 compared to 2021. With higher energy prices leading to reduced output, sectors such as cement, iron and steel and chemicals reported significant emissions reductions in 2022. At the same time, emissions in the oil and gas-producing sectors rose, as refineries increased output to profit from increased fossil fuel prices.

Aviation – emissions continue to rebound

In the EU, verified emissions from aircraft operators increased significantly, by 75% compared to 2021. This reflects a continued rebound of air traffic from the COVID-19 pandemic but is still almost 27% lower than in 2019.

Figure 8: Verified ETS emissions 2005-2022, Member States 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 4.⁵⁴



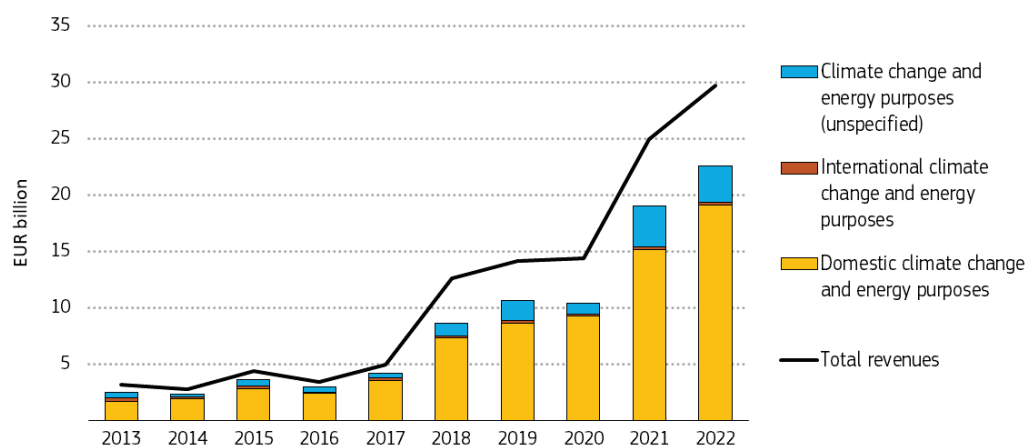
⁵⁴ Emissions cap in the EU ETS (considering the 2023 revision of the ETS Directive, i.e. rebasing in 2024 and 2026, inclusion of the maritime transport sector in 2024, and the linear reduction factor of 4.3% in 2024-27 and of 4.4% from 2028), compared with verified emissions. Aviation is not included. Due to scope changes, 2005-7 figures are not directly comparable to the latest. Legend: bars (cap), light shade bars in 2014-16 (allowances backloaded in phase 3), light shade bars since 2019 (feeds of allowances to the Market Stability Reserve), dash line (verified emissions).

REVENUES RAISED BY THE EU ETS

The EU ETS generates substantial revenues from the sale of allowances that can be used for climate action (see Chapter 6).

As the carbon price increased during 2022, so did ETS auction revenue, amounting to some EUR 38.8 billion in total, 7.7 billion more than in 2021 (Figure 9).⁵⁵ Of these EUR 38.8 billion, EUR 29.7 billion went directly to the 27 Member States. They reported that in 2022 an average of 76% of revenues was spent for climate and energy purposes,⁵⁶ the same as in 2021 and in line with an average of 75% over the 2013-2020 period. About 25% of Member State revenues are earmarked for specific climate and energy actions, 27% went into dedicated environmental funds and 48% went to national budgets. More information can be found in the staff working document – ‘Technical information’.

Figure 9: Auctioning revenues received by EU Member States and report usage (2013-2022)



Since 2021 several Member States use part of their auction revenue to cushion the social impact of the energy price crisis.

ACTION IN AVIATION AND MARITIME TRANSPORT

Maritime

Maritime transport is a substantial CO₂ emitter, generating around 3-4% of total EU CO₂ emissions. In 2022, emissions, as collected under the Monitoring, Reporting and Verification Regulation⁵⁷, increased by 7% compared to the previous year, as the sector recovered from the COVID-19 pandemic downturn. In May 2023, as part of the revised EU ETS Directive, the EU Maritime MRV Regulation was amended to extend its scope to cover non-CO₂ emissions (CH₄ and N₂O) as well as new ship types and sizes. The EU ETS will therefore cover CO₂ emissions from large ships calling at EU ports as of 2024 and non-CO₂ emissions as of 2026. At international level, the EU successfully supported the increase in ambition of

⁵⁵ EU-27 + EEA countries + Northern Ireland + Innovation Fund + Modernisation Fund.

⁵⁶ The remaining 24% is not necessarily spent on other purposes. Part will be spent in later years or go to general budget used for multiple purposes, including climate change and energy.

⁵⁷ Regulation (EU) 2015/757.

the 2018 International Maritime Organization greenhouse gas reduction strategy. The revised strategy, agreed in July 2023, sets a goal of net zero emissions from ships “by or around, i.e. close to, 2050” and indicative checkpoints set at reducing GHG emissions from ships by at least 20% - striving for 30% - in 2030 and at least 70% - striving for 80% - in 2040, both in comparison to 2008 levels.

Aviation

The overall climate impact of aviation is currently two to four times higher than the effect of its past CO₂ emissions alone, with non-CO₂ accounting for 66% of the aviation climate impact. There is no monitoring yet by Member States of aviation non-CO₂ emissions. From 1st January 2025, the revised ETS Directive tasks aircraft operators to monitor and report the non-CO₂ effects per flight on a yearly basis. By 31 December 2027, based on the results of the application of the MRV framework of non-CO₂ aviation effects, the Commission will submit a report and, where appropriate, a legislative proposal to mitigate the non-CO₂ effects by expanding the scope of the ETS to include them.

A BALANCED EU CARBON MARKET

Since 2019, the EU ETS functions with the Market Stability Reserve, which addresses the historical surplus of allowances built up in the system and improves resilience of EU carbon market to demand shocks. Based on the total number of allowances in circulation every year, the Reserve either withdraws or releases allowances, managing their supply to future auctions. This helps maintain a robust price signal in the ETS, to incentivise emission reductions and be factored into investment appraisal.

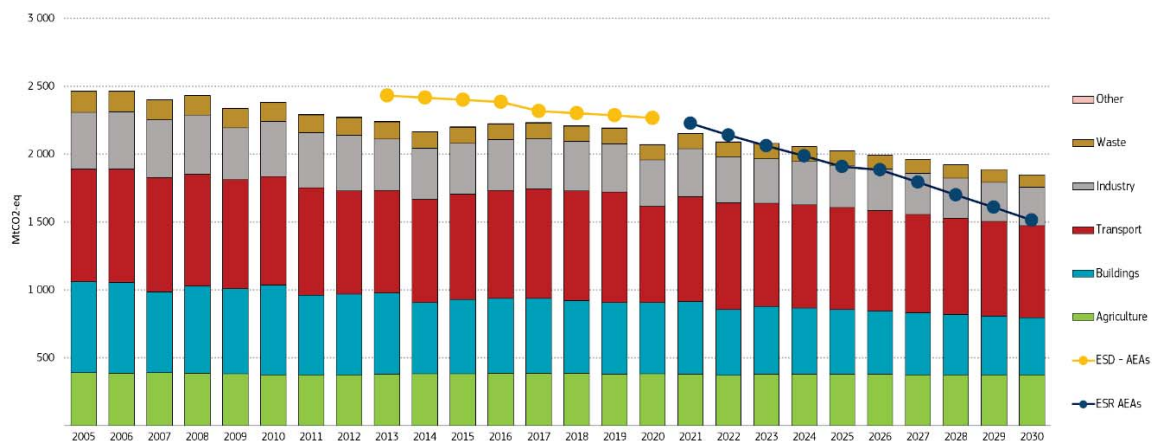
In 2022, the surplus of allowances in the EU ETS was just over 1.1 billion allowances. With this, the Reserve continues to withdraw allowances from the EU carbon market in 2023. From 2023 onward, allowances held in the Reserve above a certain threshold lose their validity. This means they can no longer be released to the market. On 1 January 2023, a little over 2.5 billion allowances became invalid. This is more than all the international credits used for compliance in the EU ETS to date. Thanks to the Market Stability Reserve and an ambitious long-term climate policy outlook of the European Green Deal, the price signal in the EU ETS remained robust in 2022 with only a short period of market volatility in March, triggered by Russia’s aggression against Ukraine.

3 EFFORT SHARING EMISSIONS

The Effort Sharing legislation covers GHG emissions from domestic transport (excluding CO₂ emissions from aviation), buildings, agriculture, small industry and waste. They account for around 60% of the EU's domestic emissions. The Effort Sharing legislation sets binding national targets to reduce emissions in these sectors compared to 2005 levels, under the Effort Sharing Decision⁵⁸ (ESD) for the period 2013-2020 and under the Effort Sharing Regulation⁵⁹ (ESR) for the period 2021-2030.

Based on approximated data, emissions from the effort sharing sectors in 2022 were 3% lower than in 2021. It followed the rebound of emissions in 2021, after the pandemic. The reduction in emissions resulted in particular from the buildings sector which showed an emission decrease of more than 9% compared to 2021. Small industry showed the second largest emission reduction with a decrease of almost 6% compared to 2021. The transport sector is the largest sector under the ESR, accounting for over one third of total effort sharing emissions, and the only one that saw its emissions increase, by over 2% from 2021 to 2022.

Figure 10: Emissions in sectors covered by effort sharing legislation 2005-2030 and annual emission allocations, EU-27⁶⁰



RESULTS OF THE EFFORT SHARING DECISION 2013-2020

In the period 2013 to 2020 all Member States met their effort sharing obligations under the ESD in every year. The EU overachieved its 2020 emission reductions target by more than six percentage points. EU-27 emissions covered by the ESD were 16.3% lower in 2020 than they were in 2005. Compared to 2013, the EU-27 emissions were 7.2% lower in 2020. 2020 was the last year covered by the ESD. Member States could not carry-over (bank) AEAs for use in future years under the ESR.

However, in 2020, emissions from four Member States exceeded their annual emissions allocations (AEAs).⁶¹ Cyprus used surplus AEAs from previous years (banking) to cover their

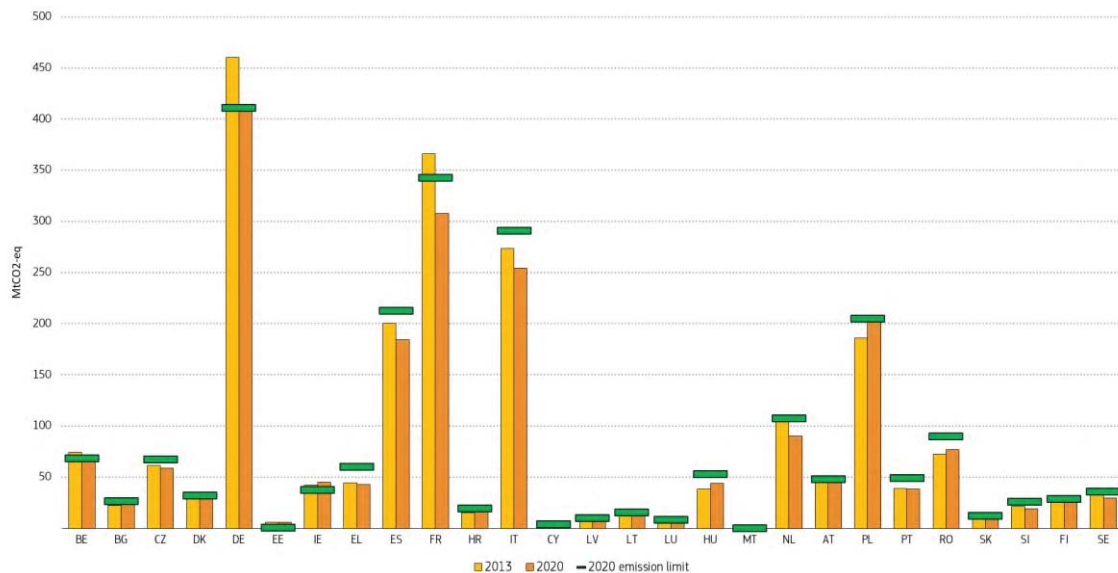
⁵⁸ Decision No 406/2009/EC of 23 April 2009.

⁵⁹ Regulation (EU) 2018/842 of 30 May 2018, as amended by Regulation (EU) 2023/857 of 19 April 2023.

⁶⁰ From inventory data for the years 2005-2022, and from projections for the years 2023-2030 as reported by Member States under Regulation (EU) 2018/1999, compiled and checked by the EEA. The ESD AEAs are expressed in GWP AR4, all other numbers are in GWP AR5. Figures include EU-27 only.

excess emissions. Malta and Germany covered their excess emissions by buying AEAs. Malta bought them from Bulgaria and Germany from three different countries (Bulgaria, Czechia and Hungary). Ireland used international credits from the Clean Development Mechanism⁶² and bought AEAs from Slovakia to meet its obligations under the ESD.

Figure 11: Change in ESD emissions between 2013 and 2020, against 2020 annual emission allocations⁶³



PROGRESS UNDER THE EFFORT SHARING REGULATION 2021-2030

In April 2023, the ESR was amended to deliver a higher ambition for 2030. This increased the ESR EU-wide target to reduce emissions from 29% (for EU-27) to 40% by 2030 compared to 2005 levels. The overall ESR target was translated into increased national GHG emission reduction targets by 2030 and more ambitious GHG emissions limits for 2023 - 2030. The amendment also changed some of the flexibilities that are available for Member States to comply with their annual GHG emission limits and targets and strengthened other provisions (for more details see Chapter 2 of the staff working document – ‘Technical information’). Iceland and Norway also implement the Effort Sharing Regulation, but the trend in (projected) emissions is only made for the EU Member States below.⁶⁴

⁶¹ Annual emission allocations are annual emission limits for GHG emissions in the effort sharing sectors for each Member State.

⁶² The Clean Development Mechanism (CDM), defined in Article 12 of the Kyoto Protocol, allows a country with an emission-reduction or emission-limitation commitment (Annex B Party) to implement an emission-reduction project in developing countries.

⁶³ The graph shows Member States ESD emissions in 2013 (yellow bar) and 2020 (orange bar), compared to its AEAs for 2020 (green line) before the use of any flexibilities under the ESD.

⁶⁴ The developments in Iceland and Norway are reflected in the annual Climate Progress Report prepared by the EFTA Surveillance Authority.

In 2021, EU-wide emissions in the ESR sectors remained 3.3% below the aggregated emissions limit, with emissions exceeding AEAs in five Member States.⁶⁵ Based on approximated data, EU-wide ESR emissions in 2022 are estimated to be 2% below the aggregated emissions limit. In 2022, nine Member States are expected to generate emissions that exceed their AEAs.⁶⁶ The final ESR emissions for 2021 and 2022 will only be determined after a comprehensive review in 2027, when the compliance cycle for each of the years 2021 to 2025 will take place. Member States can then use the flexibilities available under the ESR to comply with their annual emission limits. However, the emission projections that Member States submitted in March 2023 can be used at this stage to gain insights on progress towards ESR targets. Aggregated projections show that EU-wide ESR emissions are expected to fall by 32% in 2030 compared to 2005 levels including planned measures (see Figure 12). This is less than the EU-wide ESR target to reduce emissions in 2030 by 40% compared to 2005 levels.

Based on Member States' latest emission projections, the Commission also assessed Member States' progress towards their annual emission limits over the period 2021-2030, taking into account the flexibilities available under the ESR.⁶⁷ Based on the assumption that Member States would use saved AEAs from previous years (banking) and/or the existing ETS flexibility to cover excess ESR emissions, 19 Member States would still have excess emissions in at least one year over the 2021-2030 period.⁶⁸ Eight Member States already have excess emissions in the first compliance period (2021 to 2025), which poses a bigger challenge as there is less time to develop additional policies to drive down emissions.⁶⁹ In particular Cyprus, Italy, and Romania would already have excess emissions in the period 2021-2023, as well as Croatia but to a lesser extent.⁷⁰

Under Article 9(2) of the ESR, any debit (i.e., excess emissions) under the LULUCF Regulation in the period 2021 to 2025 is automatically deducted from Member States' AEAs under the ESR first compliance period. Based on available estimated LULUCF emission data for 2021 - 2025, trends in Czechia, Estonia, Finland, France, Portugal, and Slovenia are concerning (see Chapter 4). If these LULUCF trends are confirmed, it may be challenging for those countries to achieve their LULUCF targets and also lead to challenges in achieving their ESR targets each year in the first compliance period.⁷¹

⁶⁵ Austria, Cyprus, Denmark, Ireland and Italy. Denmark already indicated the intention to use the flexibility with the LULUCF Regulation to cover the excess emissions in 2021, if confirmed in 2027 after the comprehensive review of the ESR emissions.

⁶⁶ The 2021 ESR emissions are based on final inventory data and 2022 ESR emissions are based on approximated inventory data, both reported in 2023.

⁶⁷ Article 8 of the ESR provides that in case the Commission finds that there is not sufficient progress, Member States must prepare a corrective action plan.

⁶⁸ AT, BG, CY, CZ, DE, DK, EE, FR, HR, HU, IE, IT, LT, LV, MT, NL, PL, RO, SK.

⁶⁹ CY, HR, HU, IE, IT, LT, MT, RO.

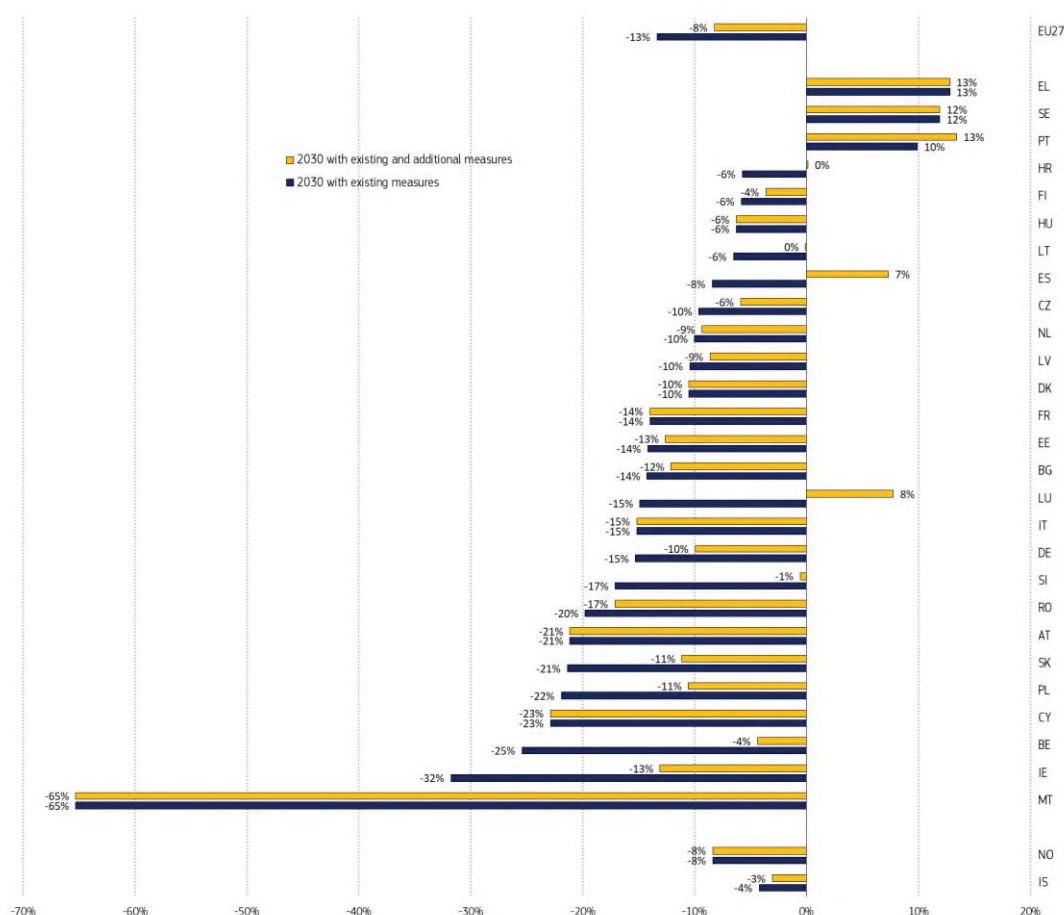
⁷⁰ Available historical and approximated data is used for Member States' ESR emissions in 2021 and 2022 and projections for other years; Final ESR emissions will only be established following a comprehensive review in 2027 (for 2021-2025) and 2032 (for 2026-2030). The AEAs for 2026-2030 are estimated as they will only be set after a comprehensive review in 2025. For more details, see Chapter 2 of the staff working document – 'Technical information'.

⁷¹ For the purposes of this assessment, the excess emissions under LULUCF in the period 2021 – 2025 are equally distributed over the years 2021 to 2025 for calculating the reduction in AEAs under the ESR. Flexibilities under the LULUCF Regulation are not taken into account.

To comply with their ESR emission limits, some Member States can increase their amounts of ETS flexibility.⁷² Member States that perform well under the LULUCF Regulation can use such overachievement, up to a limit, to cover any excess emissions in ESR. Member States can also transfer AEAs among each other to match emissions with AEAs.⁷³ However, based on current projections, there may only be a limited amount of AEAs available for purchase.

In conclusion, based on the information available at this stage and taken account of the substantial gap highlighted by the analysis above, Member States are encouraged to reflect on additional measures to reduce their emissions under the ESR, in particular as part of the ongoing NECP update process. Some Member States have planned higher ambition for emissions covered by the ESR in their draft NECPs. Therefore, a more complete overview will be available in the Commission's assessment of draft updated NECPs due by the end of this year. After the submission of the final updated NECPs by Member States, the Commission will come back to the assessment of whether Member States are making sufficient progress. Insufficient progress may trigger the need for a corrective action plan under Article 8 of the ESR.

Figure 12: Gap between ESR 2030 targets and projected GHG emissions



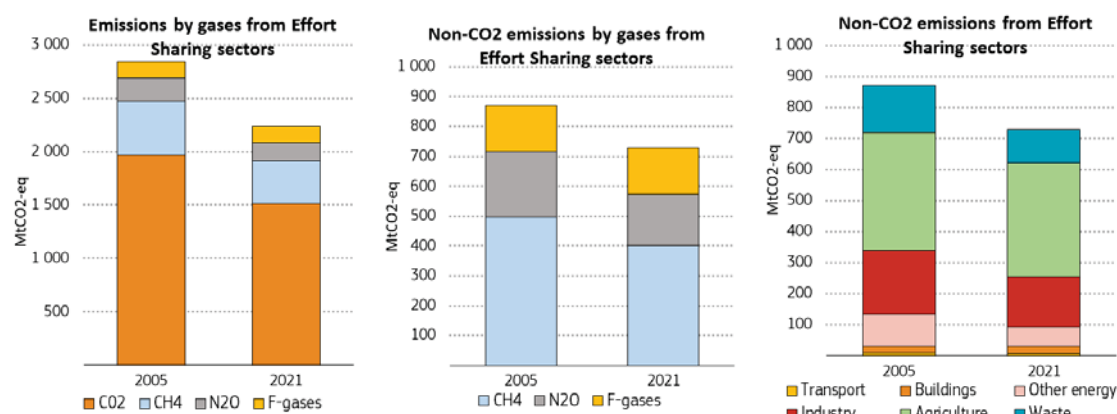
⁷² Belgium, the Netherlands, Sweden and Malta. ETS flexibility allows a Member State to notify to the Commission an amount of EU ETS allowances to be available for ESR compliance. The EU ETS allowances are deducted from the amounts that would normally be auctioned under the EU ETS.

⁷³ Iceland and Norway can also buy AEAs from and sell AEAs to Member States.

EMISSION TRENDS BY TYPE OF GAS UNDER THE EFFORT SHARING LEGISLATION

Around two thirds of total emissions from the effort sharing sectors are CO₂ emissions, the remaining third are non-CO₂ emissions. Non-CO₂ greenhouse gases include methane (CH₄), nitrous oxide (N₂O), and fluorinated gases (NF₃, HFCs, PFCs, SF₆, HFCs). While most of the emissions in the energy sector are covered by the EU ETS, methane emissions in this sector fall under the ESR. These non-CO₂ gases are emitted from a range of sectors and processes, and all have much higher global warming potentials than CO₂ by degrees of tens to tens of thousands depending on the gas. As a result, non-CO₂ emissions have an important impact on climate change and are key sources of potential emission reductions in several sectors. Mitigating non-CO₂ emissions can lessen global temperature increases rapidly. Reducing non-CO₂ emissions is also important to achieve our targets under the ESR. Around half of the non-CO₂ emissions come from the agriculture sector. All sectors have reduced non-CO₂ emissions from 2005 to 2021 but the most significant reductions were made in the non-ETS energy ('other energy') and the waste sector. Over the same period, non-CO₂ emissions from agriculture and buildings have remained relatively stable. Most emission reductions were nitrous oxide emissions from non-ETS industry and the waste sector, and methane in the waste sector, while the level of F-gas emissions has remained relatively stable. The EU methane strategy aims to reduce methane emissions in the energy, as well as in the agriculture and waste sectors, and thus also supports the achievement of the ESR targets.

Figure 13: Non-CO₂ emissions under the ESR in 2005 and 2021, by sector and by gas type.



F-gases

Fluorinated gases ('F-gases') have a global warming effect up to 25 000 times greater than CO₂. F-gas emissions in the EU amount to 2.5 % of the EU's total GHG emissions. Hydrofluorocarbons (HFCs) are the most important F-gases. Regulating F-gases at the EU level has been rather effective. 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 slightly over 20% from 2014 to 2021 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. The EU Regulation was also successful in terms of facilitating the global agreement reached in 2016 to phase down HFCs under the Montreal Protocol ("Kigali Amendment") which is estimated to prevent around 0.3-0.5 degrees Celsius of global warming by 2100. A political agreement has been reached on the Commission's proposal of April 2022 for a new F-gas Regulation for additional emission savings by 2050; formal adoption is expected by the end of 2023. The amount of HFCs must

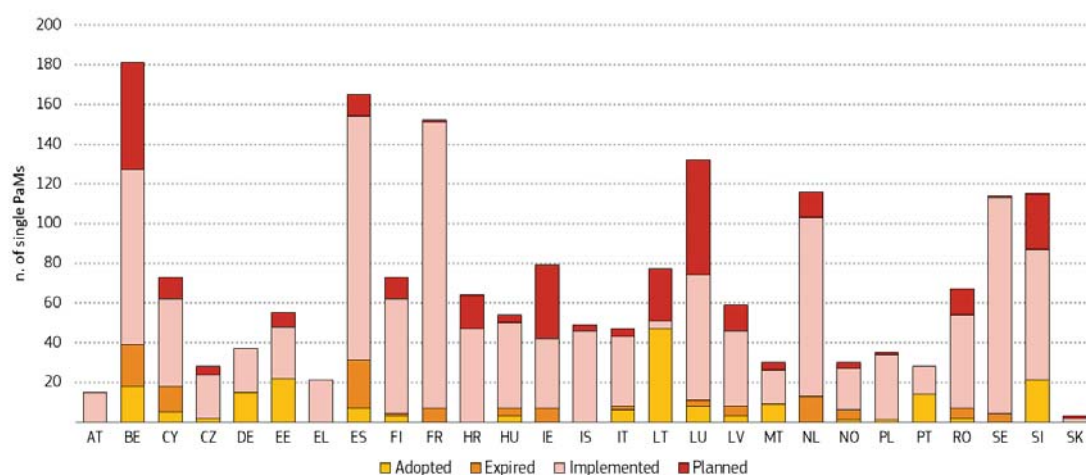
be reduced by around 95% in 2030 and 100% in 2050 compared to 2015.⁷⁴ These saved F-gas emissions will support Member States' efforts to reach their target under the Effort Sharing Regulation.

NATIONAL POLICIES AND MEASURES IN THE ESR SECTORS

EU legislation supports Member States to meet their targets under the ESR. Some policies in key sectors of the ESR are described in the next section.

In the 2023 integrated national energy and climate progress reports (NECPRs), Member States reported policies and measures (PaMs) that they have implemented or plan to implement to reduce GHG emissions and to achieve their current 2030 targets under the ESR. Member States have reported 1900 single measures related to the ESR, 10% more compared to the previous reporting round.⁷⁵

Figure 14: Number of single policies and measures reported by Member States for the ESR sector⁷⁶



EMISSION TRENDS AND POLICIES IN KEY SECTORS

Buildings

Buildings account for 40% of energy consumed and 36% of energy-related direct and indirect GHG emissions in the EU. Heating, cooling and hot water account for 80% of the energy that households consume. To achieve the 55% emission reduction target, by 2030 the EU should reduce buildings' GHG emissions by 60%, their final energy consumption by 14% and energy consumption for heating and cooling by 18%.⁷⁷ The Recovery and Resilience Facility⁷⁸ and

⁷⁴ For the quota system when measured in terms of the climate impact (CO₂eq).

⁷⁵ Compared to EEA database on greenhouse gas policies and measures in Europe. This includes all PaMs, expired, adopted, implemented, and planned.

⁷⁶ The number of PaMs has been established based on PaMs as reported by Member States with an explicit reference to the ESR as an objective. This is likely to underestimate the number of ESR PaMs, as not all PaMs with a sectoral policy objective that is closely linked to reducing emissions in the ESR (e.g., the Energy Performance of Buildings Directive) are qualified by Member States as ESR PaMs.

⁷⁷ Compared to 2015 levels, See *SWD(2020) 176 final*.

⁷⁸ [Recovery and Resilience Scoreboard \(europa.eu\)](https://recovery-and-resilience-scoreboard.europa.eu)

Cohesion Policy allocate a significant portion of funds to improve energy efficiency in buildings (see Chapter 6).

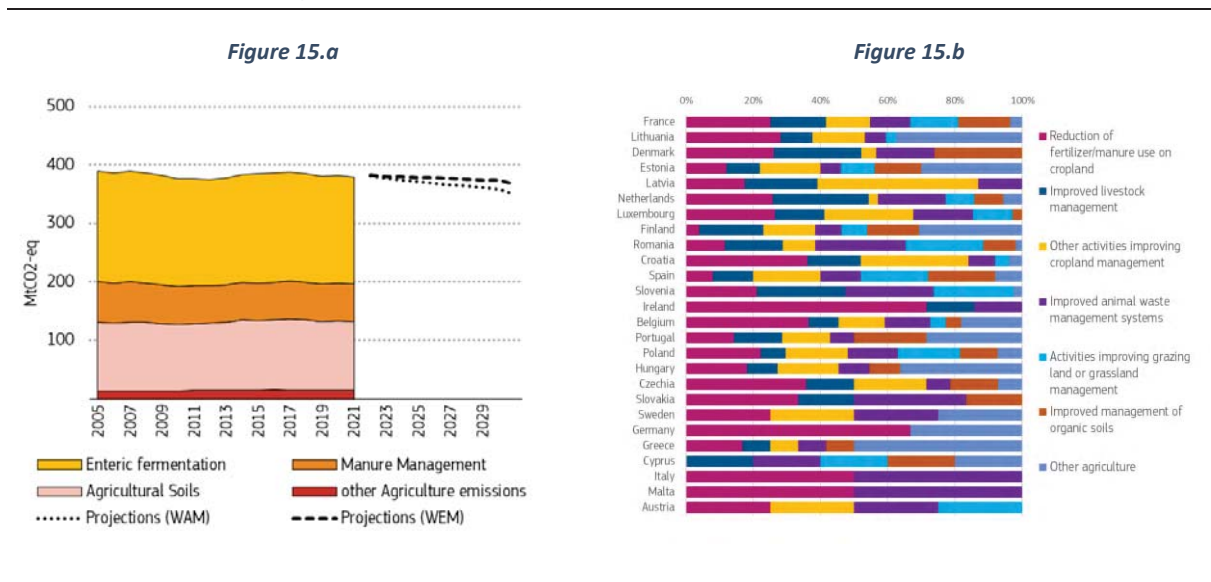
The Report on renovation of the national stock of residential and non-residential buildings and on nearly-zero energy buildings provides a first assessment of the implementation and progress of the 2020 national Long Term Renovation Strategies (LTRSs), based on the 2023 integrated NECP progress reports. It shows the level of ambition of LTRSs is not always in line with climate neutrality in 2050, with some progress observed in the NECPRs, e.g., towards GHG emission reduction targets in many countries, but without revisions of ambition. It also highlights the need to improve tracking of the evolution of the building stock in Member States and the streamlining and harmonisation of indicators and definitions.

The proposed revision of the Energy performance of buildings directive aims to enhance long-term renovation strategies (renamed national Building Renovation Plans) with a clear roadmap for a highly energy efficient and decarbonised building stock by 2050 (cf. Ch. 2 of staff working document – ‘Technical information’).

Agriculture

EU agricultural emissions represent around one-tenth of the overall GHG emissions, of which roughly two-thirds come from livestock. Since 2005, emissions have stagnated- inventory data show a slow annual decrease of 0.7 MtCO₂-eq between 2005 and 2021. The latest GHG projections from Member States indicate that under existing measures the pace of emission cuts will not change by 2030 (-1% compared to 2021, or an annual average reduction of 0.6 MtCO₂-eq). However, with additional measures, aggregated projected emissions from agriculture point to a visible decline by 2030 (5%, or 2.2 MtCO₂-eq annual average reduction). It is clear that more effort is needed to implement mitigation measures in the agricultural sector (Figure 15.a).

Figure 15: GHG emissions in the agriculture sector (EU, 2005-2021) and 2023 reported policies and measures for the agriculture sector (by objectives)



In 2023, Member States reported more than 300 measures aimed at reducing emissions in the agriculture sector, equal to 13% of total reported measures with decarbonisation dimension (see Figure 15.b), mainly to reduce fertilisers and manure use on cropland (22%) and to improve livestock management (16%). Many of these measures are supported through

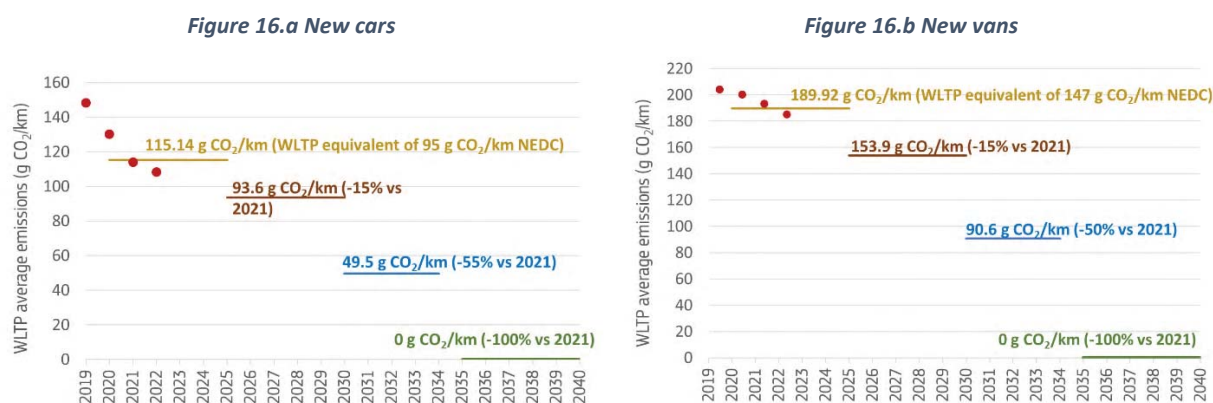
funding under the new Common Agriculture Policy (CAP), some others through national financing (State aid).

Transport

Transport emissions represent more than one-fifth of the overall EU domestic GHG emissions, of which the large majority from road transport (i.e. around 95%, or 75% when international bunkers are included). Since 2005, emissions have only slightly decreased. Inventory data show an annual decrease of 4 MtCO₂-eq between 2005 and 2021, a pace clearly insufficient to meet the EU 2030 target as outlined in the Commission's analysis.⁷⁹

Passenger cars and vans generate more than 70% of all road transport CO₂ emissions in the EU. CO₂ emission standards for new cars and vans and for heavy-duty vehicles are key drivers for reducing road transport GHG emissions. According to provisional monitoring data for vehicles registered in the EU, Iceland, and Norway in 2022,⁸⁰ the average Worldwide harmonised Light vehicles Test Procedure (WLTP)⁸¹ CO₂ emissions from **new cars and new vans** continued to decrease, to 108.2 CO₂/km from 114.1 g CO₂/km in 2021 for cars and to 185.3 g CO₂/km from 193.3 g CO₂/km in 2021 for vans. This continues the steep downward trend in CO₂ emissions triggered by the stricter targets that apply since 2020. By 2022, emissions from new cars and vans had decreased by 27% and 9%, respectively, compared to 2019 levels (Figure 16). The sharp decrease is due to the surge in the share of zero-emission vehicle registrations. In 2022, 13.4% of new cars and 5.9% of new vans had no tailpipe emissions (up from 2.2% and 1.4% in 2019, respectively). The recently adopted revised CO₂ standards require a further decrease in emissions. As of 2030, and compared to the 2021 baseline, emissions need to be reduced by 55% for new cars and 50% for new vans. By 2035, all new cars and vans should be zero-emission.

Figure 16: Average CO₂ emissions (dots) and EU fleet-wide targets (lines) for new cars (left) and vans (right)



Heavy-duty vehicles (HDV), such as lorries, buses, and coaches, generate almost 30% of all CO₂ emissions from road transport. Existing legislation requires manufacturers to reduce

⁷⁹ Based on modelling outcomes of the core policy scenario supporting the initiatives delivering the European Green Deal, between 2022 and 2030 the annual average emission reduction in the transport sector should be around 22 MtCO₂/eq. https://energy.ec.europa.eu/data-and-analysis/energy-modelling/policy-scenarios-delivering-european-green-deal_en.

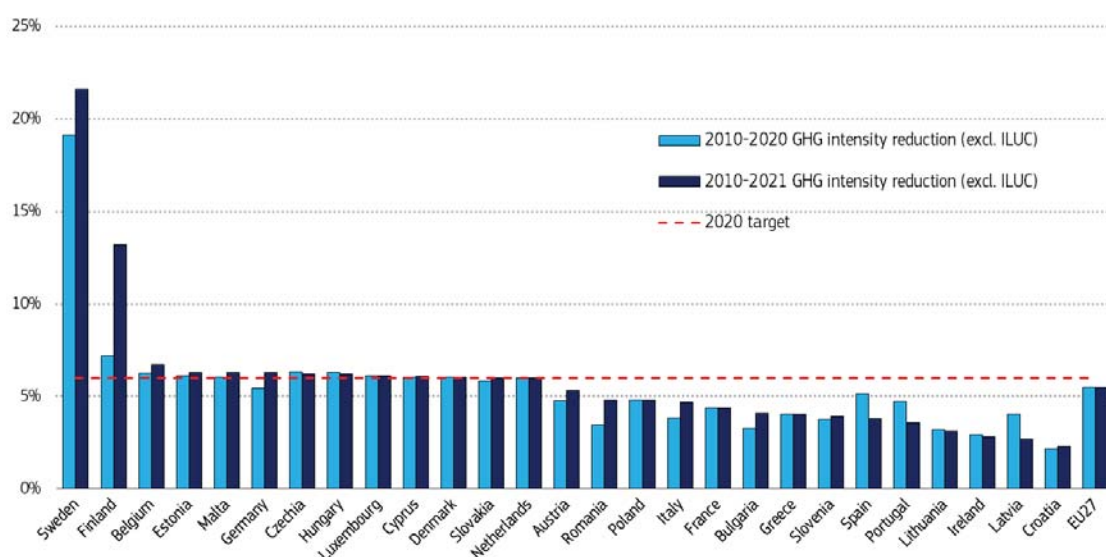
⁸⁰ Monitoring of CO₂ emissions from passenger cars and vans – Regulation (EU) 2019/631; published by the EEA.

⁸¹ Determined during type-approval using the Worldwide harmonised Light vehicles Test Procedure.

emissions of certain lorries by 15% by 2025 and 30% by 2030 compared to 2019 levels. In 2023, the Commission proposed revised CO₂ standards for HDV further tightening existing standards and extending the scope to smaller lorries, buses, coaches and trailers. The proposed Regulation requires CO₂ emissions reductions of 45% from 2030, 65% from 2035, and 90% from 2040 onwards compared to 2019 baseline. It also sets a 100% zero-emission target for new urban buses from 2030.

The **Fuel Quality Directive** also contributes to reducing transport emissions; it requires the life-cycle GHG emission intensity of fuels to be reduced by 6% by 2020 compared to 2010 levels. The average GHG intensity of fuels supplied in 2021 was 5.5% lower than in 2010. The progress by EU fuel suppliers varies greatly across Member States (Figure 17).

Figure 17: Reductions in GHG intensity of fuels achieved by EU fuel suppliers in EU-27, 2010-2020 and 2010-2021 (Source: EEA)



4 LAND USE, LAND USE CHANGE AND FORESTRY

The **land use, land-use change, and forestry (LULUCF)** sector plays a significant role in achieving the EU's climate neutrality goal. In the EU, the LULUCF sector absorbs more GHGs than it emits, removing significant volumes of carbon from the atmosphere. The sector also provides biomaterials that substitute fossil or carbon intensive materials, which is equally important in the transition to a climate-neutral economy. However, **carbon removals have declined at a worrying speed in recent years.**

This trend is mostly due to a **decrease in forest related removals, triggered mainly by an increase in harvesting.** To a lesser extent, it is also caused by reduced carbon sequestration in ageing forests in certain Member States, due to lower growth rates. Climate change itself is having an increasing impact too. The growing frequency and severity of disturbances such as wind throw, insect, and fungus outbreaks, forest fires, and droughts is undermining the role of forests as a carbon sink and has in some cases turned them temporarily into carbon sources. There are many indications that, because of climate change, the future robustness of Europe's forest sinks is far from guaranteed. The slowing of forest area expansion has also contributed to the fall in removals, but with a smaller impact. At EU level, cropland, grassland, wetlands, and settlements are mainly sources of LULUCF emissions, with managed organic soils generating particularly high emissions.

A GREATER ROLE FOR THE LULUCF SECTOR TO SUPPORT CLIMATE ACTION

The revised LULUCF Regulation⁸² sets out how the sources of emissions and removals in the land use sector contribute to EU climate goals, with a target to achieve land-based net carbon removals of -310 million tonnes of CO₂ equivalent by 2030.⁸³ To reach this, targets are allocated to Member States based on the total managed land area in their territory. The 2030 target of each Member State requires them to increase their climate ambition for their land-use policies.

The revised regulation sets two compliance periods:

- From 2021 to 2025: the assessment of Member States' progress is based on benchmarks for land use activities, such as Forest Reference Levels⁸⁴ for sustainable forest management. Across all land categories, a Member State has to fulfil the 'no-debit' rule, i.e. the credits or debits generated in individual land categories must to sum up to at least zero. If the 'no-debit' rule is not met and a Member State has a net debit, it will be able to use a number of flexibilities to compensate the net debit (e.g. by purchasing credits from other Member States). If a net debit remains from the first

⁸² Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of GHG emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU (OJ L 156, 19.6.2018, p. 1).

⁸³ Regulation (EU) 2023/839 of the European Parliament and of the Council of 19 April 2023 amending Regulation (EU) 2018/841 as regards the scope, simplifying the reporting and compliance rules, and setting out the targets of the Member States for 2030, and Regulation (EU) 2018/1999 as regards improvement in monitoring, reporting, tracking of progress and review (OJ L 107, 21.4.2023, p. 1).

⁸⁴ Commission Delegated Regulation (EU) 2021/268 of 28 October 2020 amending Annex IV to Regulation (EU) 2018/841 of the European Parliament and of the Council as regards the forest reference levels to be applied by the Member States for the period 2021-2025.

compliance period, even after using all flexibilities, this net-debit will be moved to the ESR account of the Member State.

- From 2026 to 2030: each Member State must meet a binding national target in 2030 based on the sum of reported emissions and removals in all land categories. Benchmarks no longer apply for individual land categories. A ‘net removal budget’ will be created for the period 2026-2029 to check the performance of each Member State. Any debit in this period will be carried forward to the final compliance assessment for the 2030 target.

ASSESSMENT OF PROGRESS IN THE LULUCF SECTOR

In 2021, the EU’s carbon sink achieved a net removal of -230 Mt CO₂-eq.⁸⁵ The trend seen in recent years persists, and the size of the carbon sink is continuing to decrease, even though, based on approximated data, the sink is estimated to have increased to -244 Mt CO₂-eq in 2022.

With current LULUCF accounting rules – with a limited scope – applicable to the period 2021 to 2025, the provisional ‘accounted’ balance for 2021 using the 2023 GHG inventory submission produced a slight accounted credit of -14 Mt CO₂-eq. As such, the EU as a whole meets the ‘no-debit’ rule of compliance for the first year of the compliance period 2021-2025. Based upon estimates using approximated data, 2022 would also produce a small accounted credit.

Even so, based upon a single year of the compliance period, and excluding the other flexibilities available to Member States at the end of the compliance period, nine Member States showed potential accounting debits,⁸⁶ with France, Finland and Czechia showing the biggest debit. 18 Member States had potential accounting credits⁸⁷ with Spain, Germany and Romania having the largest net credit in the EU.

Based on approximated data for 2022,⁸⁸ with accounting rules applied, 16 Member States had potential credits⁸⁹ and ten Member States showed potential debits.⁹⁰ Czechia and Finland show a decrease in debit while Latvia moves from having a credit to a debit. Italy and Romania show increase in credits. Five Member States submitted 2021 inventory data as approximated data for 2022.⁹¹ (for more details see Chapter 9 of the staff working document – ‘Technical information’).

⁸⁵ 2023 Submission GHGI reported data on LULUCF, as reported for the entire sector scope.

⁸⁶ In decreasing order of magnitude: France, Finland, Czechia, Portugal, Estonia, Poland, Slovenia, Belgium and Cyprus show net LULUCF debits.

⁸⁷ In increasing order of magnitude: Malta, Luxembourg, Latvia, Netherlands, Croatia, Slovakia, Bulgaria, Greece, Ireland, Austria, Lithuania, Denmark, Hungary, Italy, Sweden, Spain, Germany, and Romania show net LULUCF credits.

⁸⁸ Reported approximated data by Member States for 2022, on LULUCF carries uncertainties and it is therefore important to exercise caution drawing conclusions from this data. Seven Member States report 2021 data as approximated data for 2022.

⁸⁹ Austria, Bulgaria, Croatia, Denmark, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Romania, Slovakia, Spain, Sweden.

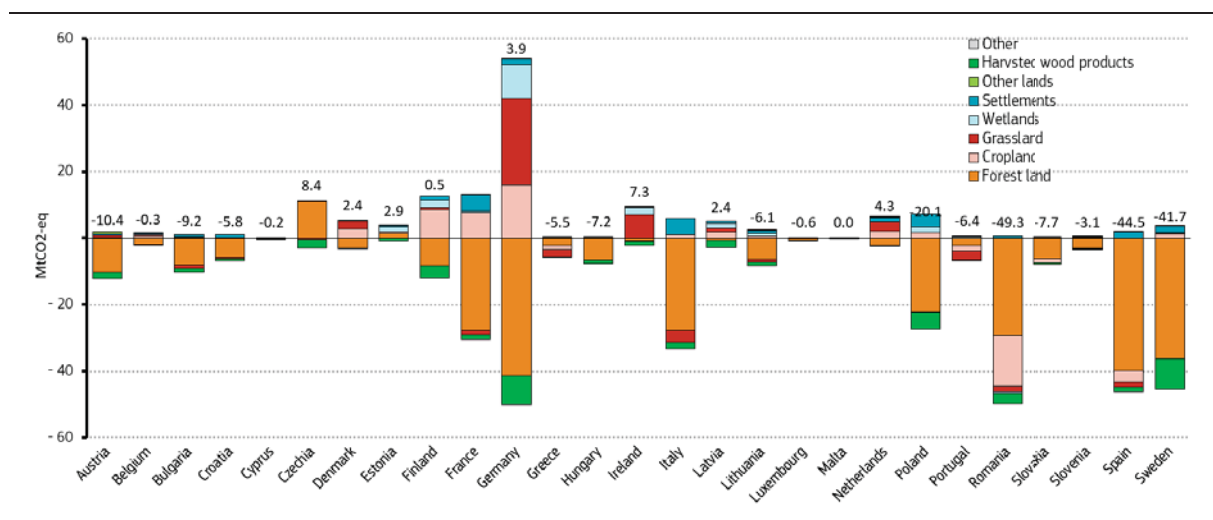
⁹⁰ Belgium, Cyprus, Czechia, Estonia, Finland, France, Latvia, Poland, Portugal, Slovenia.

⁹¹ Austria, Belgium, Croatia, Cyprus, Denmark, Estonia submitted same data as reported under 2023 GHGI submission as 2022 approximated data for LULUCF.

In line with the reporting obligations, Member States reported their projected total LULUCF accounted credit or debit for the period 2021 to 2025.⁹² From this, 16 Member States reported projections with existing measures⁹³ (WEM), and 10 Member States reported projections with additional measures⁹⁴ (WAM). After calculations⁹⁵, some Member States show debit accounted emissions per year for each year 2021-2025.⁹⁶ This raises reason for concern as there is limited time to develop policies and implement measures to reverse the trend.

Projections on reported emissions and removals, delivered by Member States in March 2023, have been assessed for LULUCF progress towards the 2030 targets. Projections with existing measures show EU total net removals of -239 Mt CO₂-eq for 2030 and -260 Mt CO₂-eq with additional measures, leaving a gap of around 50-70 Mt CO₂-eq to meet the 2030 target. This means that, according to projections, the EU is not on track to meet the 2030 net removal target of -310 Mt CO₂-eq.

Figure 18: Land sector emissions and removals in the EU, by main land use category⁹⁷



In conclusion, based on the limited data and information currently available, Member States are encouraged in the context of the ongoing NECP update process to reflect further on how to increase ambition and action on their territory. Following submission of the final updated NECPs in 2024, the Commission will return to the assessment of whether Member States are making sufficient progress. Insufficient progress may trigger the need for a corrective action plan under Article 13(d) of the LULUCF Regulation.

⁹² Total cumulative emissions/removals (kt CO₂-eq) for LULUCF by land category in the period 2021-2025, reported by Member States under Table 5b: Projections of accounted emissions and removals from the LULUCF sector in accordance with Regulation (EU) 2018/841

⁹³ Austria, Bulgaria, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Malta, Netherlands, Poland, Portugal, Romania and Sweden.

⁹⁴ Belgium, Croatia, Estonia, Ireland, Latvia, Lithuania, Luxembourg, Slovakia, Slovenia and Spain.

⁹⁵ Total cumulative emissions and removals (kt CO₂-eq) calculated average per year over the five-year period by using WAM per land category, if WAM not available, WEM is used. LULUCF managed forest land, including Harvested Wood Products assuming instantaneous oxidation where available

⁹⁶ Belgium, Cyprus, Czechia, Estonia, Finland, France, Malta, Portugal and Slovenia.

⁹⁷ The figure shows net reported removals by land use category for each Member State in 2021. Net removals are expressed as negative figures and net emissions as positive figures.

ACTION TO STEP UP LAND MONITORING

The **proposal for a directive on soil monitoring and resilience**⁹⁸ and the revised LULUCF Regulation⁹⁹ will be mutually reinforcing: healthy soils sequester more carbon and the LULUCF objectives promote the sustainable management of soils. The LULUCF regulation requires that all Member States set up systems to monitor, *inter alia*, soil carbon stocks¹⁰⁰.

Better land and soil monitoring will help target action on measures that unlock the highest climate benefits. Member States GHG inventories underpin climate action and are also continuously developing. Recalculations based on better data and methods are expected in response to new requirements on quality statistics in the revised LULUCF Regulation. Improved greenhouse gas inventories, based on harmonised and refined activity data and removal/emissions factors will be critical to facilitate action. Better, more timely and mapped data will help track national and collective EU progress towards climate objectives, and guide informed and accurate action and further measures. Over the past years, Member States made progress in their inventory reporting. For example, in their coverage of carbon pools and the quality of submitted data and methodological information. Advanced technologies, such as those available under EU programmes provide digital maps updated with high relevant satellite and ground observations. New steps are being undertaken to integrate data from the Copernicus satellite services and data sets such as those utilised for the Common Agricultural Policy (CAP).

RELATED INITIATIVES IN AGRICULTURE AND FORESTRY

Member States need to reflect on the role of the land use sector when updating their national energy and climate plans (NECPs) for the 2021-2030 period. This update is key to enable Member States to track progress against the targets and the EU to ensure increased ambition. Member States must also assess by 16 November 2023 whether their CAP strategic plans are in line with the new targets under the revised LULUCF Regulation and ESR and amend their plans as necessary.

Access to funding and incentives

Many funding mechanisms and incentives are available or being developed to encourage carbon removals, through public or private-sector sources. The EU provides funding under the CAP, other EU programmes such as LIFE, Horizon Europe (in particular the Soil Mission), and the Cohesion Policy funds. In 2023, the Commission adopted guidance on EU funding opportunities for healthy soils¹⁰¹. Member States can also support the uptake of sustainable management practices under State aid rules, which have been revised and allow for the provision of forest ecosystem services such as climate regulation and biodiversity restoration. The Commission guidance on payment schemes for forest ecosystem services¹⁰² provides further information for actors. The CAP and State aid cover funding for investments and measures such as training, advice or cooperation, that help maximise effects. Private initiatives linked to voluntary carbon markets or a combination of different funding options can supplement and further promote large-scale deployment of carbon farming.

⁹⁸ [Proposal for a Directive on Soil Monitoring and Resilience \(europa.eu\)](https://european-council.europa.eu/media/en/press-room/pages/press-room-detail.aspx?lang=en&id=12345)

⁹⁹ Regulation (EU) 2023/839

¹⁰⁰ Through an amendment to Annex V Part 3 (e) of Regulation (EU) 2018/1999,

¹⁰¹ SWD(2023) 423 final

¹⁰² [Guidance on the Development of Public and Private Payment Schemes for Forest Ecosystem Services](#) (SWD(2023)285 final).

To ensure high-quality EU-certified carbon removals, the Commission has proposed a regulatory **EU framework for the certification of carbon removals**¹⁰³ providing Member States with a toolbox to increase carbon removals. The certification framework will help ensure the transparent identification, through standardised methodologies, of carbon farming and industrial solutions that remove CO₂ from the atmosphere and store it long-term. Carbon removal certificates can also help organisations back credible carbon removal claims and meet stakeholders' expectations that carbon removals should not be used for greenwashing, in line with the Corporate Sustainability Reporting directive¹⁰⁴ and the proposed directive on green claims.¹⁰⁵ To facilitate future work under this initiative, the Commission has set up an Expert Group on carbon removals.¹⁰⁶

¹⁰³ [Proposal for a Regulation establishing a Union certification framework for carbon removals.pdf \(europa.eu\)](#)

¹⁰⁴ [Corporate Social Responsibility Directive and the related Sustainability Reporting Standards](#)

¹⁰⁵ [Proposal for a Directive on green claims \(europa.eu\)](#)

¹⁰⁶ [Expert group on carbon removals \(europa.eu\)](#)

5 RESILIENCE TO CLIMATE CHANGE

The losses from weather and climate related disasters are significant. The heatwaves of summer 2022 are estimated to have caused over 61000 excess deaths in Europe.¹⁰⁷ Extreme flash floods in summer 2021 caused EUR 46 billion of economic damage.¹⁰⁸ Climate risks will continue to intensify, with the IPCC assessing the window of opportunity to avert the worst consequences to be “brief and rapidly closing”.¹⁰⁹

The EU has an obligation under the European Climate Law to ensure continuous progress in building its capacity to adapt to the effects of climate change, boost its resilience and reduce vulnerability to climate change. The next section provides a high-level assessment of that progress at the level of EU policy. This is followed by an assessment of collective progress by all Member States. Further information is found in chapters 7 and 10 of the staff working document – ‘Report on the implementation of the EU strategy on adaptation to climate change’ accompanying this report. There is also a separate report on the implementation of the EU’s adaptation strategy.

IMPLEMENTATION OF THE EU ADAPTATION STRATEGY

The EU updated its adaptation strategy in 2021. The strategy contains 49 actions to which the Commission has committed, spread across four objectives: **smarter, more systemic, faster, and international** adaptation to climate change. The actions were designed to cover large ground in terms of policies and often require a careful sequencing of measures.

To improve knowledge and manage uncertainty, the Commission, together with the EEA, has expanded the content and partners of the **European Climate and Health Observatory**¹¹⁰ to help build resilience to climate change impacts on human health. It published new calls for projects under Horizon Europe to close knowledge gaps on climate impacts and resilience and is developing the **Risk Data Hub**.¹¹¹ The Commission is working to expand the content and impact of the Climate-ADAPT knowledge exchange platform.

The first ever **European Climate Risk Assessment** is due to be published in Spring 2024. The Climate Resilience Dialogues¹¹² have brought together policymakers, insurers, risk managers, consumers, city associations and other stakeholders to discuss and identify possible actions, on insurance and investment in adaptation to help narrow the climate protection gap.

The **European Drought Observatory** promotes the sustainable use of freshwater by providing knowledge. To address water scarcity, six times more water could be reused than current levels, facilitated by the **Water Re-use Regulation** that entered into force in 2023.¹¹³

The Commission has stepped up the systematic integration of adaptation action in sectoral strategies and plans, with updated guidelines on Member State adaptation strategies and plans and complementary support from the Commission's Technical Support Instrument, including under its 2023 flagship project on adaptation. In 2021, the Commission published **technical guidance on the climate proofing of infrastructure projects** and, in 2023, on **enhancing**

¹⁰⁷ Heat-related mortality in Europe during the summer of 2022 | Nature Medicine

¹⁰⁸ Economic losses from climate-related extremes in Europe (8th EAP) (europa.eu)

¹⁰⁹ Sixth Assessment Report — IPCC

¹¹⁰ European Climate and Health Observatory (europa.eu)

¹¹¹ DRMKC Risk Data Hub (europa.eu)¹¹² Climate Resilience Dialogue (europa.eu)

¹¹³ Water Reuse (europa.eu)

the climate resilience of buildings. Climate proofing applies to infrastructure and buildings funded by the EU budget. The **European Climate Pact**,¹¹⁴ a stakeholder platform launched by the Commission to empower citizen to act and advocate on climate matters, continues to run adaptation and mitigation activities. The **Policy Support Facility** under the **EU Covenant of Mayors** has involved over a thousand people over the past year and a half, including 350 municipalities, in national workshops, with eight cities developing peer-to-peer exchanges on climate action and 37 adaptation measures being implemented.

Good progress has been made in implementing the **EU Mission on Adaptation to Climate Change**,¹¹⁵ designed to speed up innovative adaptation action at local and regional levels. Over 300 regions and communities, covering some 40% of the EU, have signed up to the Mission Charter and committed to work together to accelerate their transformation to climate resilience; the Adaptation Community of Practice is live, and the Mission technical support facility is operational.

Climate resilience as an issue is now far more visible across EU policies than a few years ago. There have been efforts to support adaptation objectives in legislative proposals where resilience to climate change (or risks interacting with climate impacts) were not the primary objectives. For example, the proposal to amend the Budgetary Framework Directive, in the context of the economic governance review, includes reporting requirements for Member States on macro-fiscal risks from climate change and on disaster and climate related contingent liabilities.

Similarly, the proposed revision of the Urban Wastewater Treatment Directive included measures to tackle the overflow of sewage systems caused by flash floods, likely to become more intense and frequent across Europe due to the changing climate. Implementation will need to continue, building on measures initiated under the adaptation strategy. The Commission also now requires a consistency check with adaptation objectives in its own impact assessments (see Chapter 1 for an assessment of the consistency check), which should be done in a systematic way, covering both emission reduction and adaptation objectives.

ASSESSMENT OF COLLECTIVE PROGRESS OF MEMBER STATES ON ADAPTATION

Article 6.1b of the European Climate Law requires the Commission to assess the collective progress made by all Member States on climate adaptation. For the first time, this section assesses the progress they reported and have made in enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change.

Member States report that currently the most observed acute **climate hazards** in Europe are heatwaves, droughts, floods, heavy rainfall, and wildfires. They cite the changing temperature, changing rainfall patterns, sea level rise and hydrological variability as the most frequent chronic climate hazards. They anticipate that future hazards will be the same as those currently observed, except for water scarcity, which seven countries anticipate being an additional future key hazard.

Health, agriculture, forestry, biodiversity, energy, and water management are the areas reported as the most affected by climate threats in Europe.

Almost all Member States have carried out **climate risk assessments**, 14 of these assessments have been updated recently, with the rest scheduled for updates soon.

¹¹⁴ European Climate Pact (europa.eu)

¹¹⁵ EU Mission: Adaptation to Climate Change (europa.eu)

All Member States have **national adaptation strategies** and/or **national adaptation plans** in place. A considerable part of these strategies and plans have recently been renewed or are under revision and will be renewed over the coming years. More national sectoral adaptation plans have been adopted. The policy landscape is varied. On the one hand there is continuity in long-term priorities, increasing alignment with European frameworks, evolving legislative instruments, and incremental shifts in policy focus. On the other hand, there are challenges, gaps, and barriers to the governance of adaptation action.

National and subnational **governance** structures and mechanisms for horizontal policy integration and multi-level (vertical) coordination have been developed and are mainly now in place. The mandates and operational features of these structures vary greatly. Eight Member States report having embedded elements of their adaptation policy systems in binding legal frameworks. However, most Member States use soft and collaboration-based forms of vertical and horizontal governance.

Progress on **international and transnational cooperation** on adaptation has been made in two-thirds of the Member States. Factoring in social justice and equity into adaptation measures is still at an early stage in many countries, highlighting a key area for future focus, to tackle the disproportionate impacts of climate change on vulnerable groups. Two-thirds of Member States made progress in adaptation policy-related stakeholder engagement.

Member States are also making progress on implementing adaptation **measures**, including mainstreaming adaptation in sectoral policies and plans. They have made significant progress on integrating climate change impacts into national disaster risk management frameworks and sectoral planning. Assessing the **costs** of adaptation remains a challenge for many Member States and is often only done partially. National adaptation plans and strategies often lack dedicated budgets or financing streams for their implementation, and most countries lack the budget needed to finance adaptation action.

Half the Member States reported an increase in **monitoring, reporting and evaluation** activities since 2021, at national, regional and local level.

6 ALIGNING INVESTMENTS WITH CLIMATE NEUTRALITY

INVESTMENT NEEDS AND TRENDS IN THE EU

Bridging the investment gap for the transition to climate neutrality by 2050 will require substantial amounts of finance. Commission analyses¹¹⁶ estimate the *additional* private and public investment needs for the green transition at EUR 477 billion per year between 2021 and 2030¹¹⁷, and delivering the REPowerEU objectives requires an estimated additional investment of up to EUR 35 billion per annum between 2022 and 2027.¹¹⁸ Meanwhile, boosting EU manufacturing capacity for strategic net-zero technologies, as set out in the Net-Zero Industry Act (NZIA), will require investment amounting to around EUR 92 billion, cumulated over the period 2023-2030, compared to EUR 52 billion under a status quo scenario. Closing the investment gaps for other environmental objectives (circular economy, pollution, water, biodiversity) for the green transition will require an estimated EUR 110 billion per year between 2021-2030,¹⁰⁶ with climate action co-benefits (e.g. carbon removal, storage). While these figures should not be added up given their different scope, timeframe and estimation method, they convey the magnitude of the challenge.

Data show that in recent years, financial markets have begun to enable the transition too, an important development given the limits to public finance. This is driven by growing awareness of the financial impacts of climate change's physical and transition risks¹¹⁹ and a fast-evolving sustainable finance policy framework with increasing investor demand for genuinely sustainable investments.

MONITORING FINANCE'S ALIGNMENT WITH THE TRANSITION TO CLIMATE NEUTRALITY

Monitoring investment trends in climate and other green finance is still challenging, especially due to data gaps and limited standardisation of data categories. Disclosures mandated under the EU's sustainable finance regulatory framework are expected to facilitate monitoring once implemented. A series of indicators can already be used to measure stocks and flows of finance conducive to reaching the EU's climate objectives.

Sufficiently robust data is available on **green bond markets**, which have soared in recent years. Cumulative issuances of bonds aligned with the International Capital Market Association's (ICMA) Green Bond Principles¹²⁰ will very likely pass the EUR 1 trillion mark in 2023 (see Figure 19).

¹¹⁶ SWD(2023) 68 final. Values in EUR 2022.

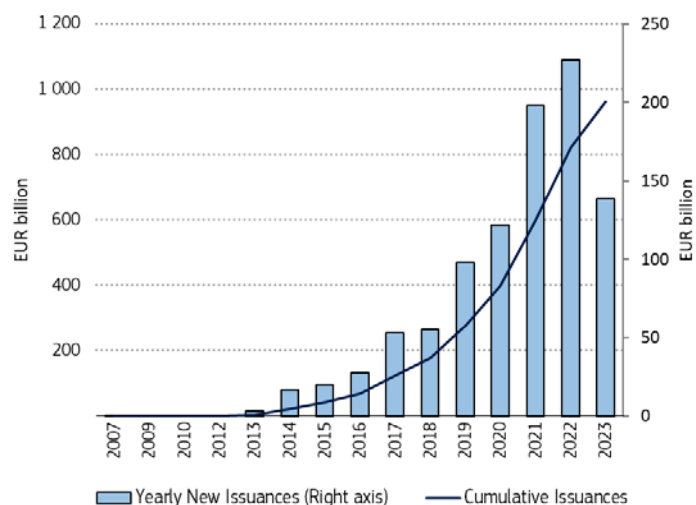
¹¹⁷ Investments in the transport sector are included in this figure, albeit not road or railway infrastructure investments.

¹¹⁸ COM(2022) 230 final, p. 12.

¹¹⁹ Transition risks are defined as financially-material risks related to changes in regulatory environment, technological development or consumer behaviour. Physical risks are financially-material risks related to impacts of climate change on an undertaking.

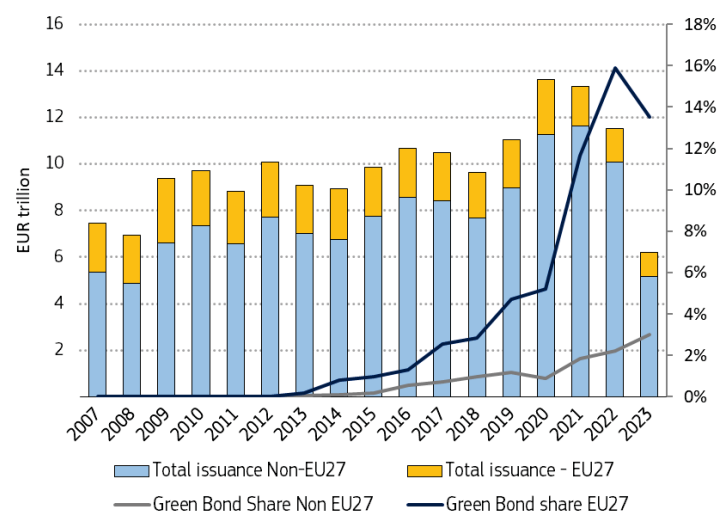
¹²⁰ <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/>

Figure 19: Issuance of Green Bonds in the EU aligned with ICMA's green principles (volumes)¹²¹



This increase in absolute green bond issuances is reflected in **green bonds' share of the corresponding bond market** (see Figure 20). For EU and non-EU issuers, the share in the EU27 remained lower than 1% until 2013, but has significantly increased since, even more markedly from 2016, on the back of strong growth of the green segment. In 2022, green bonds accounted for 16% of all newly issued bonds in the EU27, but only 2% of overall issuance in non-EU markets, confirming Europe's leading role in the sustainable debt capital market.

Figure 20: Green Bond Share in Total New Issuance for EU and Non-EU (until 30 June 2023)¹²²



¹²¹ Source: Dealogic DCM and JRC calculations. Data as of 30 June 2023.

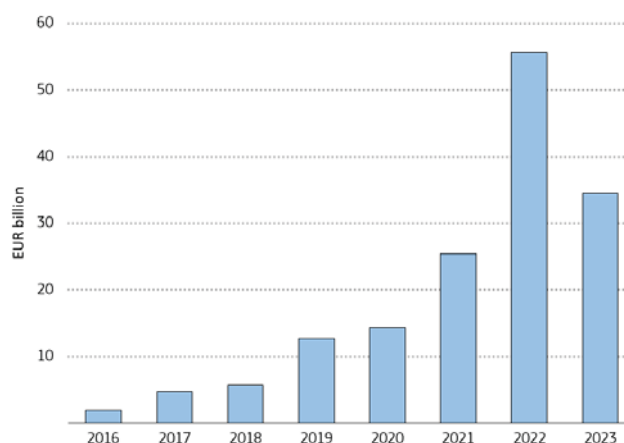
¹²² Sources: Dealogic DCM, JRC calculation.

Sustainability-linked bonds emerged in 2019 as a new financial instrument, incentivising the transition with contractual sustainability targets. Their uptake is still limited compared to green bonds, having peaked in 2021 at EUR 51.8 billion, given the more recent development of this new type of assets.

However, the “green-ness” of green bonds and sustainability-linked bonds remains a cause for concern due to the risk of greenwashing despite the emergence of standards and principles that require third-party certification and adequate reporting. Political agreement was reached in early 2023 on the voluntary **EU Green Bond Standard**, which will rely on the EU Taxonomy and independent reviewers to provide guarantees with a high degree of confidence that financing raised compliant with this standard is genuinely ‘green’.¹²³

While bonds are traded publicly, in the loan market, lending normally takes place based on private information. The loan market has only recently seen the introduction of codified principles to facilitate and support environmentally sustainable economic activity. All loans that follow ICMA’s Green loans principles are labelled as green.¹²⁴ Green loan volumes have been steadily increasing in the EU since 2016, reaching almost EUR 60 billion in 2022 (see Figure 21, below).

Figure 21: Yearly Issuance of Green Loans in the EU (until 30 June 2023)¹²⁵



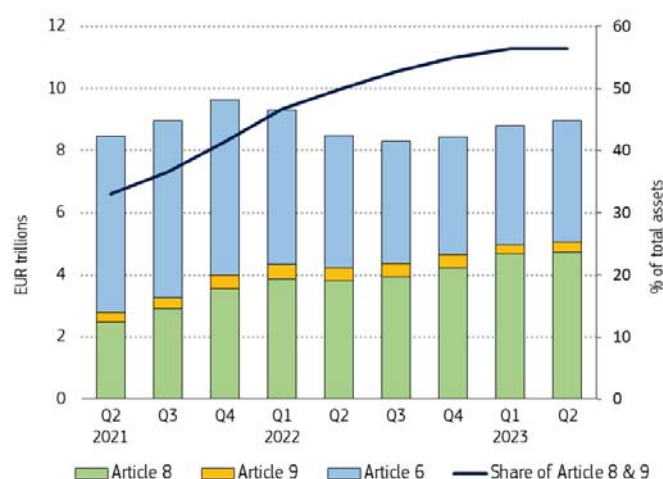
For **investment funds**, the entry into force of the Sustainable Finance Disclosures Regulation (SFDR) shed light on financiers’ sustainability claims. Since 2022, financial market participants are required to disclose information on their financial products with purported Environmental, Social, Governance (ESG) benefits. Figure 22 below shows that total assets under management for products with *ESG characteristics* and products with *a sustainability objective* has for a time represented over half the market before stabilising at around 50% of all assets under management.

¹²³ [European green bond standard \(europa.eu\)](https://european-green-bond-standard.europa.eu/)

¹²⁴ [https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/LMA Green Loan Principles Booklet-220318.pdf](https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/LMA_Green_Loan_Principles_Booklet-220318.pdf)

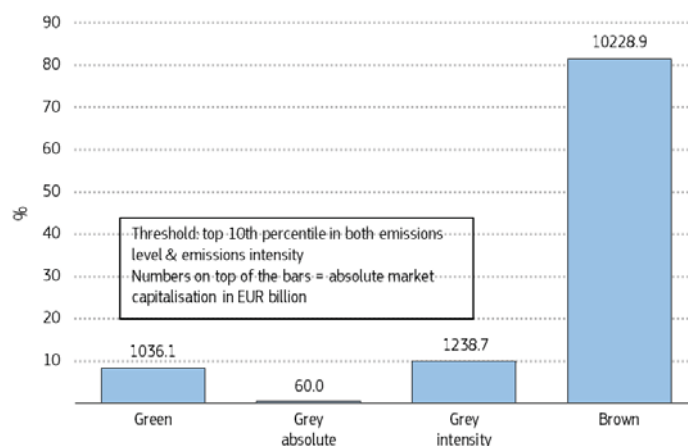
¹²⁵ The chart includes three types of loans: club deals, syndication transactions, bilateral transactions. Source: Refinitiv, JRC calculations.

Figure 22: Assets Under Management by SFDR Classification¹²⁶



However, SFDR-based classifications have not always been a reliable measure of the sustainability of funds, as the Regulation gives market participants considerable leeway to define sustainability. For example, while funds tracking the EU **Paris-Aligned or Climate Transition Benchmarks**,¹²⁷ can be considered sustainable, other products still have considerable exposures to the fossil fuel sector.¹²⁸

Figure 23: EU market capitalization by greenness, 2021¹²⁹



¹²⁶ Article 6 = funds without a sustainability scope; Article 8 = funds that promote environmental or social characteristics; Article 9 = funds that have sustainable investment as their objective. Source: MorningStar, JRC Calculation

¹²⁷ [EUR-Lex - 32019R2089 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/eli/reg/2019/2089/oj)

¹²⁸ Commission Staff Working Document on Enhancing the Usability of the EU Taxonomy and the overall EU Sustainable Finance Framework <https://impact-investor.com/article-9-funds-underreporting-exposure-to-fossil-fuels-research/>

¹²⁹ Green = top 10% of companies, i.e. below the 10th percentile threshold in both absolute emissions & emissions intensity rankings; Brown = companies ranking above the specified threshold for both absolute emissions & emissions intensity rankings; Grey intensity = companies like green ones regarding absolute emissions, but like brown ones for emissions intensity; Grey absolute = companies like green ones regarding emissions intensity, but like brown ones for absolute emissions. Source: JRC calculation based on MSCI emissions data (ranking based on global MSCI dataset; totalled figures by category referring to EU-domiciled companies sub-set)

Green finance can also be measured through **green market capitalisation** (equity investments) of EU-domiciled companies, defining green firms as those in the lowest 10th percentile for both total GHG emissions (scope 1 and scope 2) levels and intensities. Green companies represent a very small share of overall market capitalisations (see Figure 23, for 2021).

The gold standard for defining green economic activities is the **EU Taxonomy**, a cornerstone of the EU's Sustainable Finance framework. The mandatory Taxonomy-alignment disclosures on Capex, OpEx and revenue for companies under the scope of the Corporate Sustainability Reporting Directive (CSRD) will allow reliable quantification of finance aligned with a net zero trajectory by 2050 (and other environmental objectives). With first reporting on taxonomy-alignment mandated for 2023, it will be possible to start aggregating these data from 2024 onwards.

INTEGRATING CLIMATE IN FINANCIAL MARKET POLICY

Green finance is increasing and the sustainable finance regulatory framework that the EU has put in place since 2018 has been instrumental in driving the reorientation of private capital flows, but green finance remains far from the levels needed to finance the transition to a climate neutral and climate resilient economy. Policy needs to re-focus financing for the transition of “brown” sectors towards “green”, while avoiding lock-ins that undermine long-term goals. The 2023 Commission Recommendation on Transition Finance outlines how the EU's existing toolbox can already be used¹³⁰ and provides a starting point for the upcoming revisions of existing financial market policies, including identification of new policies to ensure a comprehensive framework to enable the EU to achieve its climate targets. The Commission's commitment in the Renewed Sustainable Finance Strategy of 2021 to report on its implementation by the end of 2023 will be an opportunity to assess needs to be addressed going forward.

FUNDING FROM THE EU EMISSION TRADING SYSTEM

The **Innovation Fund** is one of the key instruments at EU level to bring solutions to the market to decarbonise the European economy, supporting its transition to climate neutrality while fostering its competitiveness. It is Europe's key instrument to gear up the EU green industrial strategy while preserving cohesion objectives. Following the ETS Directive revision the Innovation Fund¹³¹ will:

- 1) grow from 450 million to approximately 530 million ETS allowances;
- 2) Have a bigger scope in terms of sectors (maritime, aviation, buildings, road transport), size of grant (introducing a category of medium-scale projects, with total investment costs of EUR 20 million to EUR 100 million) and in terms of level of innovation, allowing support for upscaling innovative technologies;
- 3) be able to introduce new financing mechanisms, with projects selected through auctions (competitive bidding) and supported through fixed premium contracts, contracts for difference or carbon contracts for difference.

¹³⁰ [EUR-Lex - 32023H1425 - EN - EUR-Lex \(europa.eu\)](#)

¹³¹ See delegated regulation on the Innovation Fund (Regulation (EU) 2019/856)

The Innovation Fund portfolio has continued to increase. A total of 23 large-scale projects (total investment costs above EUR 7.5 million) and 46 small-scale projects (total investments costs below EUR 7.5 million) are under implementation, with a total EU contribution amounting to EUR 3.1 billion. The investment mobilised by these grant contributions amounts to more than EUR 13 billion (estimated aggregate capital costs for the 69 projects). Following the publication of results from the third call for large-scale projects, another 41 projects with total grants amounting to EUR 3.6 bn are currently preparing their grant agreements with CINEA. In parallel, a total of 43 projects were awarded project development assistance by mid-2023. The third call for small scale projects closed in September 2023; 72 applications were received, asking for EUR 289 million, 2.9 times more than the call budget of EUR 100 million. The launch of a new call for proposals is planned by end 2023, with a total budget of EUR 4 billion, covering small, medium and large-scale projects.

In addition, following the introduction of the competitive bidding mechanism in the revised ETS Directive, the first auction organised at EU level under the Innovation Fund, on renewable hydrogen, is planned to be launched by the end of the year, with a budget of EUR 800 million, to respond to the priorities put forward in the Hydrogen Bank Communication,¹³² the Green Deal Industrial Plan¹³³ and the Net-Zero Industry Act.¹³⁴

The **Modernisation Fund** supports lower-income Member States with financial assistance, generated through the ETS, to modernise their energy systems and improve energy efficiency. Up to 2030, over 750 million allowances will be auctioned to support these Member States, an increase by 110 million allowances (representing around EUR 60 billion), thanks to the revision of the ETS Directive. In the latest disbursement cycle, the EU allocated EUR 2.4 billion to 31 projects across seven beneficiary countries. Additional investments were made in Romania (EUR 1.1 billion), Czechia (EUR 1 billion), Bulgaria (EUR 197 million), Poland (EUR 47 million), Croatia (EUR 88 million), Latvia (EUR 5 million), and Lithuania (EUR 1 million). The Modernisation Fund has now distributed a total of around EUR 7.5 billion since January 2021, benefiting ten eligible Member States. Under the revised EU ETS, Greece, Portugal and Slovenia will also become beneficiaries of the Modernisation Fund.

MAINSTREAMING CLIMATE POLICIES IN THE EU BUDGET

The EU budget 2021-2027 – both the ‘multiannual financial framework’ and the *NextGenerationEU* instrument – is an important enabler of the green transition. It is currently projected that in the period up to 2027 it will contribute EUR 578 billion to climate action. This represents 32.6% of the EU’s total budget¹³⁵ and exceeds its 30% climate spending target. This target is underpinned by programme-specific spending targets, for instance in the European Regional Development Fund (30%), the Neighbourhood, Development and International Cooperation Instrument (30%), Horizon Europe (35%), the Cohesion Fund (37%), the Common Agricultural Policy (40%), the Connecting Europe Facility (60%), and the LIFE programme (61%).

The EU’s **Recovery and Resilience Facility** – the centrepiece of *NextGenerationEU*, the EU’s recovery instrument – has a value of up to EUR 723.8 billion and enables Member States to significantly increase climate investments. To qualify for the Facility’s grants (EUR

¹³² COM/2023/156

¹³³ COM/2023/62

¹³⁴ COM/2023/161

¹³⁵ European Commission’s ‘statement of estimates’ published in preparation of the draft budget 2024. The projected amount reflects loans currently requested in the RRF and excludes the Innovation and Modernisation Funds.

338 billion) and loans (EUR 385.8 billion), Member States have prepared recovery and resilience plans setting out investments and policy reforms that contribute to the Facility's six policy objectives including the green transition. Each national plan must spend a minimum of 37% of its total allocation on measures contributing to climate objectives (such as initiatives promote energy efficiency, sustainable mobility and renewable energy). Every measure must also comply with the 'do-no-significant-harm' principle. All 27 Member State plans exceed the 37% benchmark, with some Member States spending well over half of their allocation to fund climate policy. Collectively Member States dedicate 40% of their allocations to climate objectives (EUR 203 billion)¹³⁶.

In addition, during 2023, Member States were (or still are) complementing their recovery and resilience plans with new chapters on *REPowerEU*, a joint response to the energy crisis caused by Russia's invasion of Ukraine. New or scaled-up reforms and investments in Member States to help phase out the EU's dependence on Russian fossil fuels and accelerate the clean energy transition will be supported by additional financial firepower (EUR 20 billion of new grants, transfers from other funds and use of remaining NGEU loans).

At the same time, the EU budget is enhancing its focus on the *results* of the measures that it finances. By way of example, by 2022:

- 459 362 households had improved their energy classification through the regional funds;
- Annual energy consumption had been reduced by nearly 14.2 terawatt thanks to the Recovery and Resilience Facility;
- 3 640 gigawatts of additional renewable energy had been financed by the regional funds.

InvestEU

At least 30% of the InvestEU programme's target of EUR 372 billion for mobilising additional investment over the period 2021-27 should contribute to meet the EU climate objectives. Under the Sustainable Infrastructure Window, 60% of the funding must be spent on climate and environment. Investments above EUR 10 million are subject to sustainability proofing (identify, assess and mitigate climate, environment or social risks). All InvestEU supported investment will be climate and environmentally tracked against the methodology issued by the Commission. Besides the EIB, 18 institutions have been selected to start negotiating Guarantee Agreements for them to become Implementing Partners, with Guarantee Agreements signed with the European Bank for Reconstruction and Development (EBRD), Council of Europe Development Bank (CEB), Nordic Investment Bank (NIB), CDP Equity (CDPE), Caisse des Dépôts (CDC) in 2022. Financial products foreseen will help address market failures in providing access to finance projects in a broad area of policy priorities from transport, smart mobility, clean energy, digital connectivity, as well as energy efficiency, decarbonisation of industry, renewable energy, circular economy and other fields.

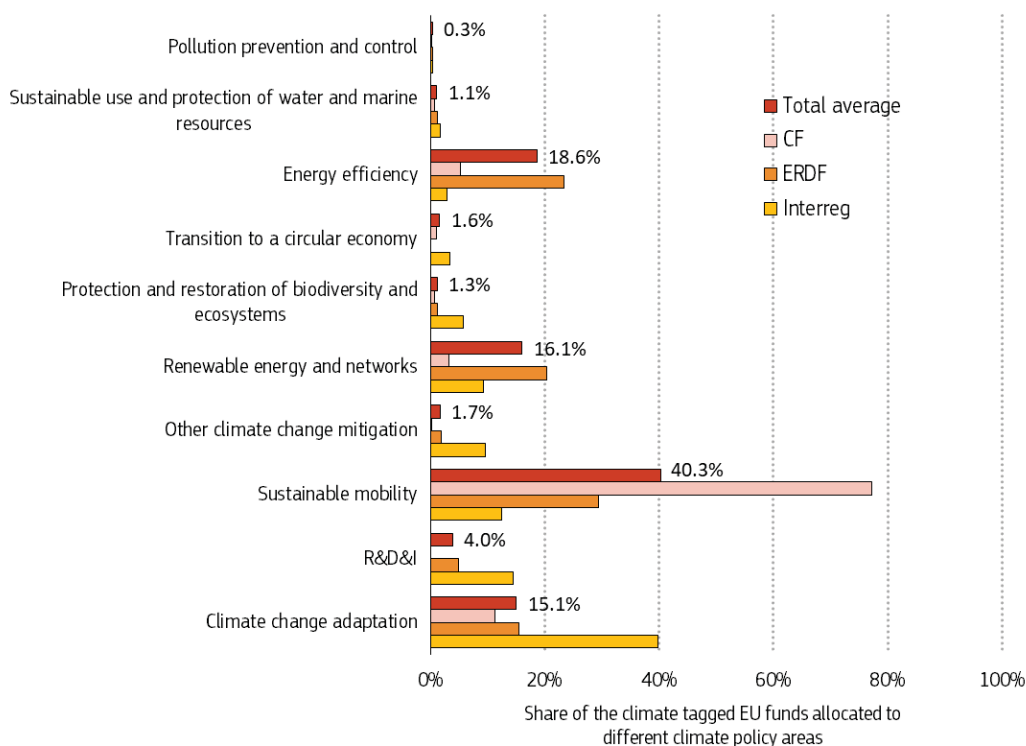
European Regional Development Fund and Cohesion Fund

Member States' planned allocations under Cohesion policy programmes for the period 2021-2027 exceed the climate expenditure targets of both the European Regional Development Fund (ERDF) (30.0%) and the Cohesion Fund (CF) (37.0%). EUR 92 billion (36.3%) of the EUR 253.3 billion of ERDF and CF funds financed by the EU under the current multiannual financial framework are expected to fund climate change mitigation and adaptation measures.

¹³⁶ [Recovery and Resilience Scoreboard \(europa.eu\)](https://recovery-and-resilience-scoreboard.europa.eu/)

In addition, about 24.9% of the EUR 10.2 billion of Interreg funds financed by the EU are expected to fund climate relevant measures. Figure 24 shows the funding allocated to climate relevant policy areas as a share of total ERDF, CF, and Interreg climate expenditure.

Figure 24: ERDF, CF and Interreg EU climate amounts by policy area¹³⁷



Research and Innovation Framework Programmes (Horizon Europe and Horizon 2020)

Investments in research and innovation are essential for generating knowledge and solutions for the transition towards climate neutrality and resilience. Overall, Horizon Europe will contribute at least 35% of its EUR 95.5 billion budget to climate objectives. By end of 2022, over EUR 8.5 billion have already been earmarked to R&I supporting climate action.¹³⁸ A broad portfolio of ambitious European private-public partnerships is mobilising resources and developing solutions necessary to deliver on the EU's climate agenda across key economic sectors such as steel, process industries, hydrogen, batteries, bioeconomy, aviation, road and waterborne transport, buildings, water and more.

¹³⁷ Totals may not add up due to rounding. The data shown were taken on 25/09/2023 from the [Open Data Portal for the European Structural Investment Funds - European Commission | Data | European Structural and Investment Funds \(europa.eu\)](https://open-data-portal.ec.europa.eu/data/european-structural-investment-funds), which contains more detailed information including climate spending by programme. Data shown are from the latest adopted versions of programmes. These figures are subject to change as Member States may amend their programmes during the programming period. The [methodology](#) for climate tracking under the Recovery and Resilience Facility (RRF) has been used as a basis for categorizing climate expenditure by policy category.

¹³⁸ Preliminary figures

Just Transition Fund

The Just Transition Fund (JTF) -related cohesion policy programmes adopted make EUR 18.5 billion of EU investments available to help the people and places that suffer the most from the transition to climate neutrality. In addition to JTF, the other 2 pillars of the Just Transition Mechanism will mobilise EUR 28 billion from public and private investments to address the social and economic effects of the transition. The Commission has approved 67 Territorial Just Transition Plans, covering a total of 93 territories, including coal regions and carbon intensive regions. Almost half of JTF investments will support diversification of the local economy, so that they don't depend on a single polluting sector, and help people acquire new skills. The first JTF projects are being selected in Estonia and Netherlands.

European Social Fund (ESF+)

For the period 2021-2027, Member States programmed almost 6 billion or 6% of total ESF+ allocations¹³⁹ for green skills and green jobs, considerably more than in the previous programming period. Finland, Italy, Belgium, Luxembourg, and Denmark allocated the highest shares to green jobs and skills (between 12% and 31%) while in several individual programmes from Belgium, Denmark, Italy, France, Germany, Portugal and Spanish programmes this share is 20% and above. In terms of actual investments, three individual programmes from Italy, Portugal and Greece alone contribute to some 30% of total EU climate expenditure for green jobs and skills. Overall, a third of climate expenditure has been allocated to access to employment and activation measures.

Technical Support Instrument

This year the Technical Support Instrument is financing several projects on adaptation, do-no-significant-harm, faster permitting, industrial eco-systems and skills, building renovation but also capacity building. A Flagship on preparation of the Social Climate Fund and the new ETS has been developed to help Member States implement the "Fit For 55" package.

LIFE programme

LIFE is the EU's funding instrument for the environment and climate action. In 2022, more than EUR 600 million were awarded to 200 projects supporting the Green Deal, including projects developing innovative solutions and sharing best practice to reduce GHG emissions, increase resilience to climate change and contribute to clean energy transition. In 2023, over EUR 600 million will be awarded to projects supporting environment, climate action and the clean energy transition, including contributing to the objectives of REPowerEU and the Green Industrial Plan. In the last year Moldova and North Macedonia joined Iceland and Ukraine in the list of third countries participating in LIFE.

¹³⁹ EU's main tool for investing in skills and for supporting labour market transitions with a total budget of almost EUR 99.3 billion for the period 2021-2027.

7 INTERNATIONAL CLIMATE ACTION

OVERVIEW AND DEVELOPMENTS

The past year has seen productive international exchanges including the Ministerial on Climate Action, the Major Economies Forum, the Petersberg Climate Dialogue, the Africa Climate Summit, the Cartagena Dialogue and the 27th Conference of the Parties in Sharm el Sheik, Egypt.

The EU is pushing for an ambitious Mitigation Work Programme, and focusing on delivering concrete solutions to close the ambition and implementation gap and to create incentives to set a high level of ambition.

The EU is seeking an ambitious outcome on the **first Global Stocktake** to set the course to achieve the Paris Agreement goals and to get on track to limit warming to 1.5 degrees Celsius, and concrete recommendations for enhanced, immediate and ambitious mitigation action pre- and post-2030. The EU is also wants action on climate adaptation and means of implementation and support, including aligning global finance flows with these goals.

On **Loss and Damage** discussed at COP27 in Sharm el-Sheikh, a fund to assist developing countries that are particularly vulnerable to the adverse effects of climate change will be set up, and the EU is engaging in the work of the Transitional Committee to develop recommendations for the operationalisation of the new funding arrangements.

The EU has been active in scaling up international finance for **adaptation**. The EU and its Member States are the largest donors of funding for adaptation, contributing more than EUR 12 billion per year to climate adaptation or actions that combine adaptation and mitigation. At COP27, and in the follow-up intersessional Conference 58 in Bonn, the Parties agreed on the possible structural aspects of a Global Goal on Adaptation Framework for consideration and adoption at COP28.

The EU has also joined and/or further developed initiatives such as Adaptation Without Borders, the Africa Adaptation and Innovation Initiative, the International Coral Reef Initiative, and the All-Atlantic Ocean Research Alliance.

The EU is helping to advance **plurilateral initiatives**, including the announcement of a global pledge for doubling energy efficiency and tripling renewable energy by 2030. The 2021 Global Methane Pledge, co-led with the United States of America, now has over 150 participants and a dedicated secretariat. The EU has provided EUR 10 million to support the work and is preparing development finance for implementation projects. The EU is also launching the MARS initiative (Methane Alert and Response System) to support ongoing work in this area.

MULTILATERAL AND BILATERAL ENGAGEMENT

Significant progress was made with multilateral and bilateral partners to convince and support other countries, in particular major emitters, to increase their climate ambition. The EU strengthened its green deal diplomacy efforts by increasing engagement with third countries and regions.

Following the adoption of the **Green Alliance** with **Japan** in 2021, the EU launched further green alliances and partnerships with **Morocco** (October 2022), **Norway** (April 2023) and **the Republic of Korea** (May 2023), bilateral frameworks for closer dialogue and cooperation on climate action, environmental protection and the clean energy transition.

Regular exchanges took place with the **United States**, including under the High-Level Climate Action Group set-up by the 2021 EU-US Summit. The EU also engaged in **high level dialogues** with **China** and **Canada** underlining that cooperation on climate for large emitters is central to building global consensus for increasing climate ambition aligned with the 1.5 °C degree temperature limit, and to ensuring that existing commitments are implemented.

The EU together with other members of the International Partners Group set up a **Just Energy Transition Investment Partnership** worth over USD 8.5 billion with South Africa in 2021 and signed three more since with Indonesia (2022), Vietnam (2022) and Senegal (2023) providing USD 20 billion, USD 15.5 billion and EUR 2.5 billion respectively in new public and private financing. The partnerships are a model of how the international community can work with partner countries to commit to sustainable development and jointly implement a clean and just energy transition.

The Political Declaration signed with **Indonesia** includes an accelerated path to reducing power sector emissions to net zero by 2050 and a strategy based on the expansion of renewables so that renewable energy comprises at least 34% of all power generation by 2030, the phase down of on- and off-grid coal-fired electricity generation, and further commitments to regulatory reforms and energy efficiency.

The Partnership with **Vietnam**, led by the EU and UK as co-leads of the International Partners Group, also sets ambitious new targets such as advancing the projected date for all GHG emissions to peak from 2035 to 2030, limiting Vietnam's peak coal capacity to 30.2 GWT (down from the current 37 GWT) and accelerating the adoption of renewables to reach at least 47% of electricity generation by 2030.

The Partnership with **Senegal** seeks to strengthen the development of renewable energy and infrastructure and technologies to accelerate deployment and use. Senegal aims to reach a share of 40% renewable energy in its installed generation capacity by 2030.

Through the **Global Gateway strategy**, the European Commission and the EU High Representative have set out to boost smart, clean and secure links in digital, energy and transport sectors and to strengthen health, education and research systems across the world. Between 2021 and 2027, the EU institutions and EU Member States jointly will mobilise up to EUR 300 billion of investment for sustainable, high-quality projects, considering the needs of partner countries and ensuring lasting benefits for local communities.

The EU also worked with the **Contracting Parties of the Energy Community**¹²³ to adopt the 2030 energy and climate targets to reduce primary and final energy consumption, accelerate the uptake of renewables and reduce GHG emissions to achieve climate neutrality by 2050. They also agreed to adopt monitoring and reporting of GHG emissions and associated legal acts.

CLIMATE FINANCE AND INTERNATIONAL COOPERATION

International public climate finance plays an important role in helping developing countries to implement the Paris Agreement, together with climate finance from private sources.

The Commission continues to support partner countries through its financing instruments. Under the Neighbourhood, Development and International Cooperation Instrument (NDICI) – Global Europe, with at least 30% to be dedicated to climate action.

The Instrument for Pre-Accession Assistance (IPA III) also sets a climate change spending target of 18%, rising to 20% by 2027. The principle of ‘do not harm’ is enshrined in both regulations. The Commission has committed an additional EUR 4 billion for climate finance by 2027 on top of these climate change spending targets, which equates to a 35% climate finance target. This is an unprecedented investment by the EU in reducing emissions and in helping developing countries build resilience to the effects of climate change.

The EU, its Member States and financial institutions, collectively known as Team Europe, are the leading contributor of development assistance and the world’s biggest climate finance contributor, accounting for about a third of the global public climate finance. In 2021, the European Union and its 27 Member States committed over EUR 23 billion in climate finance from public funds to support developing countries in reducing their GHG emissions and in adapting to the impacts of climate change.

Over 54% of overall Team Europe finance was allocated to either climate adaptation or to actions involving both mitigation and adaptation. Almost half of the total funding was committed in the form of grants.

Efforts are underway to **promote the involvement of the private sector** in climate action through the European Fund for Sustainable Development Plus (EFSD+) guarantees and blending.