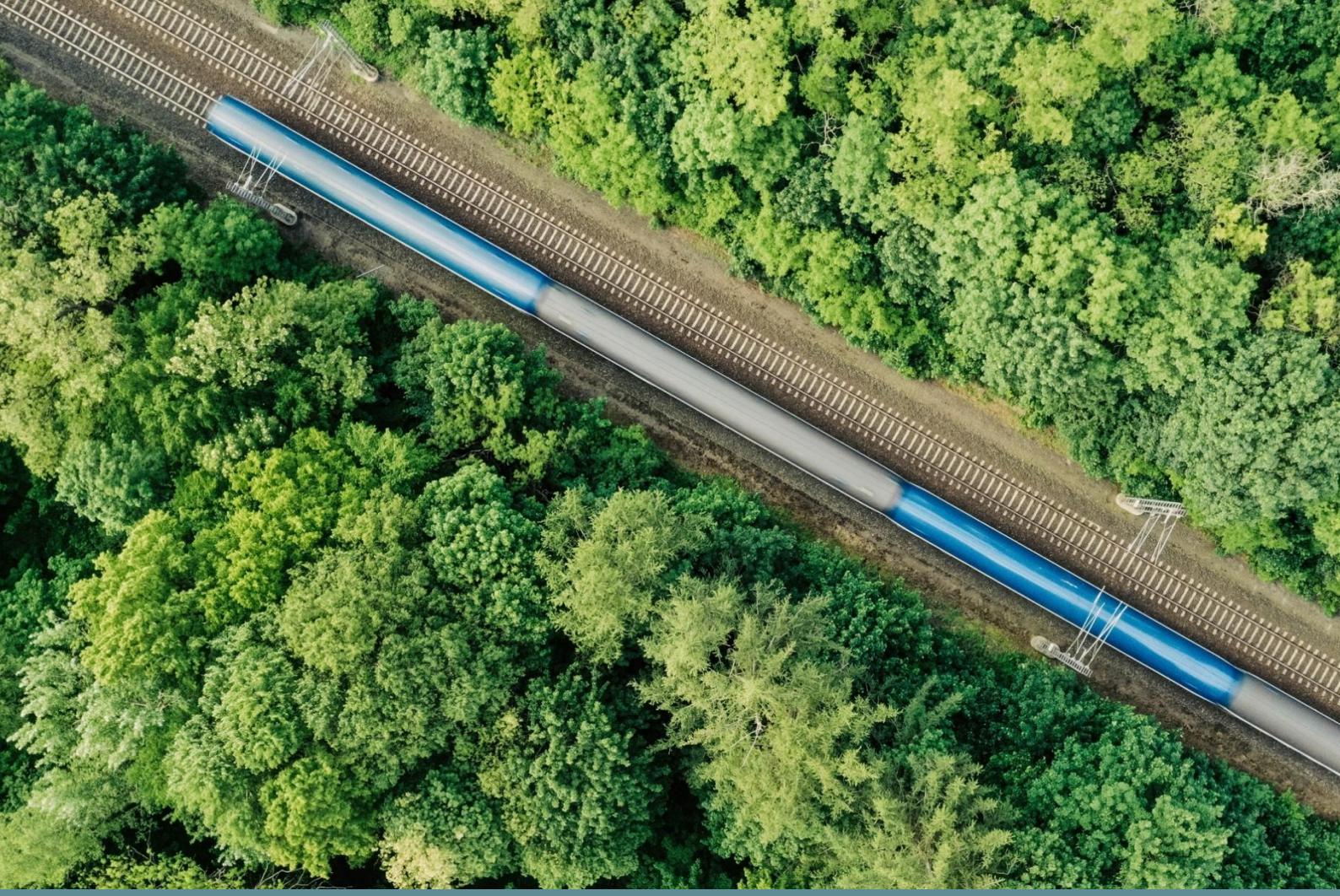

Towards EU climate neutrality

Progress, policy gaps and opportunities

Chapter 3: Overall progress

Assessment Report 2024

European Scientific Advisory Board on Climate Change

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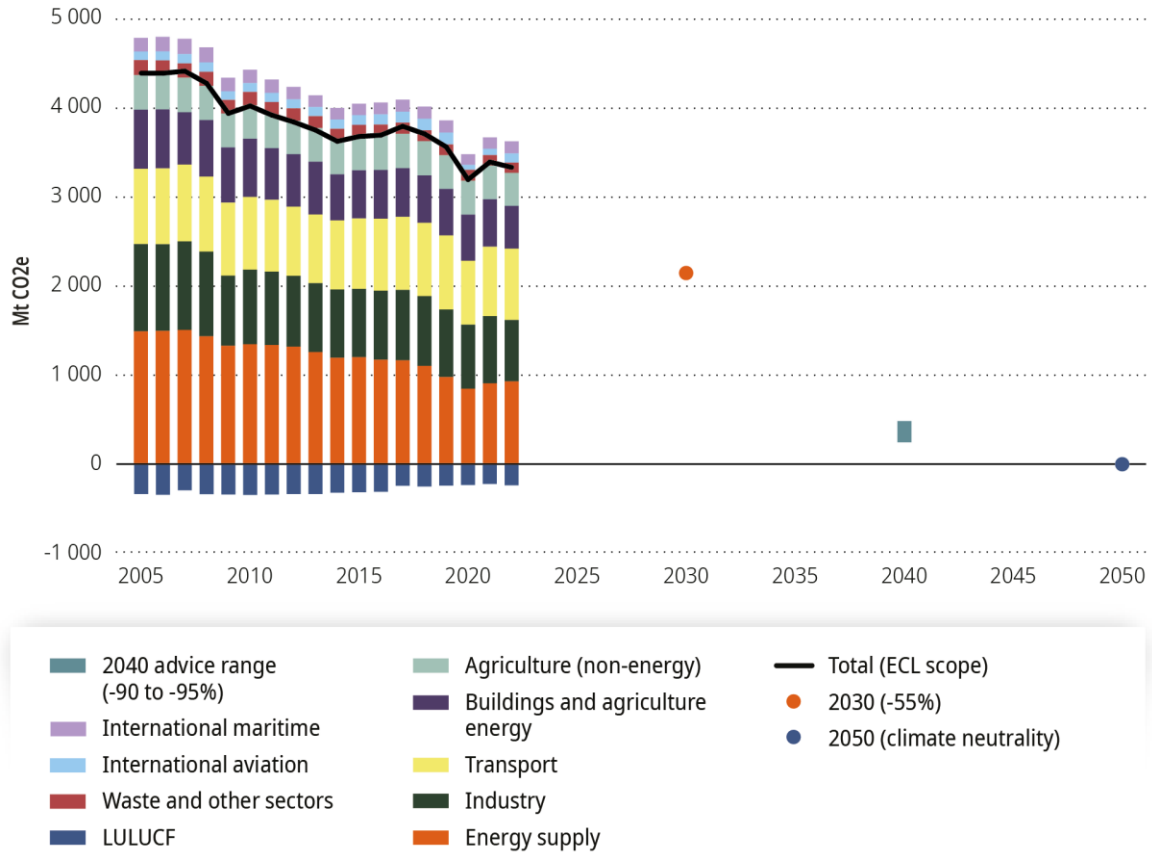
3 Overall progress

3.1 Progress on reducing greenhouse gas emissions

In 2022, total net greenhouse gas emissions in the EU (including emissions from international aviation) had decreased by 31% compared to 1990 (EEA, 2023p). Overall, the EU has managed to structurally reduce its GHG emissions by more than 1 Gt CO_2e, or 24 %, between 2005 and 2022 (based on proxy data), as shown in Figure 7. GHG emissions reduced by on average 62 Mt CO_2e per year in 2005–2022.

Figure 7 Indicator O1 – overall progress towards the EU's 2030 and 2050 GHG emission reduction objectives



Notes: Historic emissions up to 2021 from the EU GHG inventory, with 2022 data based on proxy data received from the EEA. The 2030 -55% objective and 2040 90-95% range were calculated based on a reduction from 1990 historic emission levels, the 2050 objective is set at zero in line with the EU's climate neutrality objective. Indicators are labelled based on the title of their respective capters (e.g. O1 to O3 for indicators discussed under Chapter 3 'Overall progress', T1 to T6 for indicators discussed under Chapter 6 'Transport', etc.)

Sources: GHG inventories (EEA, 2023f)

While this is substantial progress, the pace of reductions must accelerate even further for the EU to remain on track towards its current 2030 and 2050 climate objectives (see Box 1 on the assumed scope of the GHG reduction objectives under the European Climate Law). Between 2022 and 2030, emissions would need to reduce by on average 141 Mt CO_2e per year, more than a doubling of the reduction trend observed since 2005. After 2030, the pace of reductions would need to remain high, at an average of 106 Mt CO_2e per year, towards the 2050 climate neutrality objective. To achieve the recommended 90–

95 % objective for 2040, GHG emission reductions would even need to accelerate to on average 171–198 Mt CO_2e per year in 2031–2040. A promising development is that GHG reductions have been accelerating in recent years (– 94 Mt CO_2e per year in 2018–2022), a trend that had already started in 2018–2019, before COVID-19 and the energy crisis. Furthermore, the deployment of key decarbonisation technologies such as solar energy, battery electric vehicles (BEVs) and heat pumps is picking up pace.

Box 1 Scope of the reduction objectives under the European Climate Law

The European Climate Law covers all emissions and emission removals regulated by Union law. The scope of the objectives under the European Climate Law is therefore considered to include all domestic emissions and emission removals (including LULUCF), and parts of international maritime and aviation transport.

For maritime transport, the 2021 emissions that are expected to be covered by the EU ETS ('at berth', intra-EU and 50 % of extra-EU maritime transport) correspond to 64 % of the international maritime emissions reported in the GHG inventory (EC, 2023k; EEA, 2023f). Therefore, 64 % of all international maritime emissions as reported in the GHG inventories (from 1990 to 2022) are assumed to be covered by the European Climate Law.

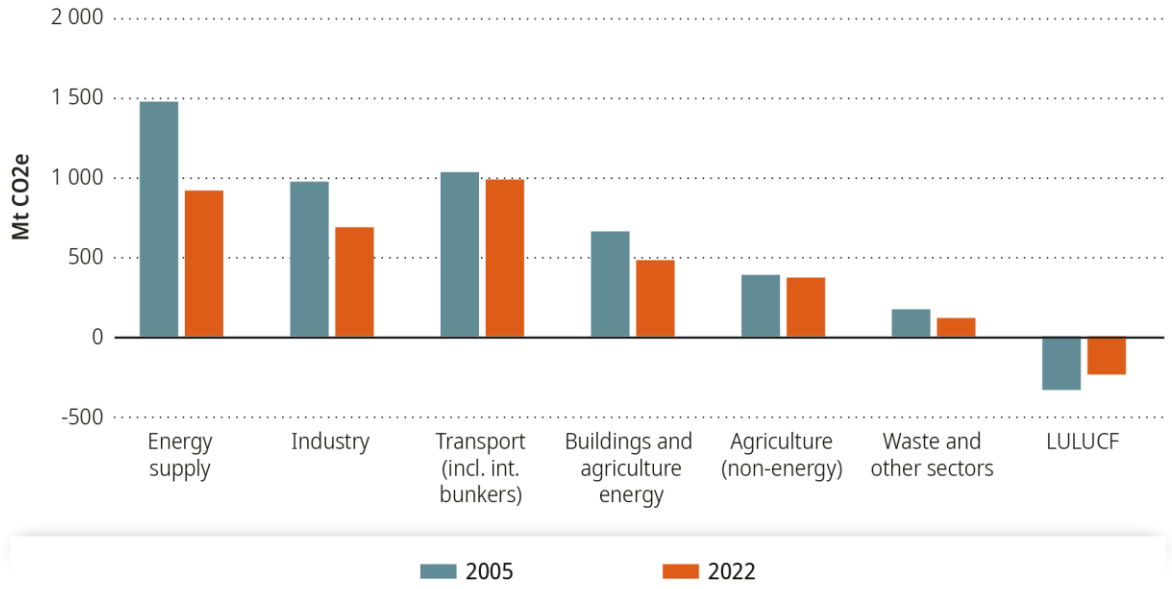
For aviation, the current EU ETS Directive covers in principle all flights arriving at and departing from airports located in the European Economic Area. However, it also provides a temporary derogation for extra-EU flights until 2026, thereby de facto limiting the EU ETS to intra-EU flights. Without further changes to the legislation, the EU ETS will again apply to both intra- and extra-EU flights as of 1 January 2027. However, Article 28b(3) of the directive requires the European Commission to – where appropriate – submit a proposal to apply the EU ETS to all flights departing from airports located in states in the European Economic Area. This would closely correspond with the GHG emissions for international aviation currently reported in the EU GHG inventories. The Advisory Board has therefore – by approximation – considered that international aviation emissions as reported in the EU GHG inventories correspond with the scope of the European Climate Law.

Whereas this report focuses on territorial (or production-based) emissions, in line with the objectives of the European Climate Law, Eurostat data on the EU's carbon footprint indicates that, in 2010–2020, consumption-based CO_2 emissions decreased on a par with production-based (or territorial) CO_2 emissions (Eurostat, 2023l). For the period before 2010, other studies have found that the technology-adjusted carbon footprint ([1]) of the EU and some of its Member States was below its territorial emissions (Jakob, 2022; Kander et al., 2015; Jiborn et al., 2018).

From a sectoral perspective (shown in Figure 8), GHG emission reductions between 2005 and 2022 were achieved primarily in energy supply (– 565 Mt CO_2e, – 38 %), followed by industry (– 290 Mt CO_2e, – 30 %) and buildings (– 183 Mt CO_2e, – 28 %). Progress in emission reductions has been considerably slower in the transport (– 47 Mt CO_2e, – 5 %) and agricultural sectors (– 19 Mt CO_2e, – 5 %). The LULUCF sector has been a net sink of GHG emissions; however, the size of the sink reduced by almost 30 % (– 98 Mt CO_2e).

([1]) This considers both embedded emissions of products imported into the EU and emissions avoided by exporting relatively GHG-efficient products from the EU.

Figure 8 Sectoral GHG emissions in 2005 and 2022



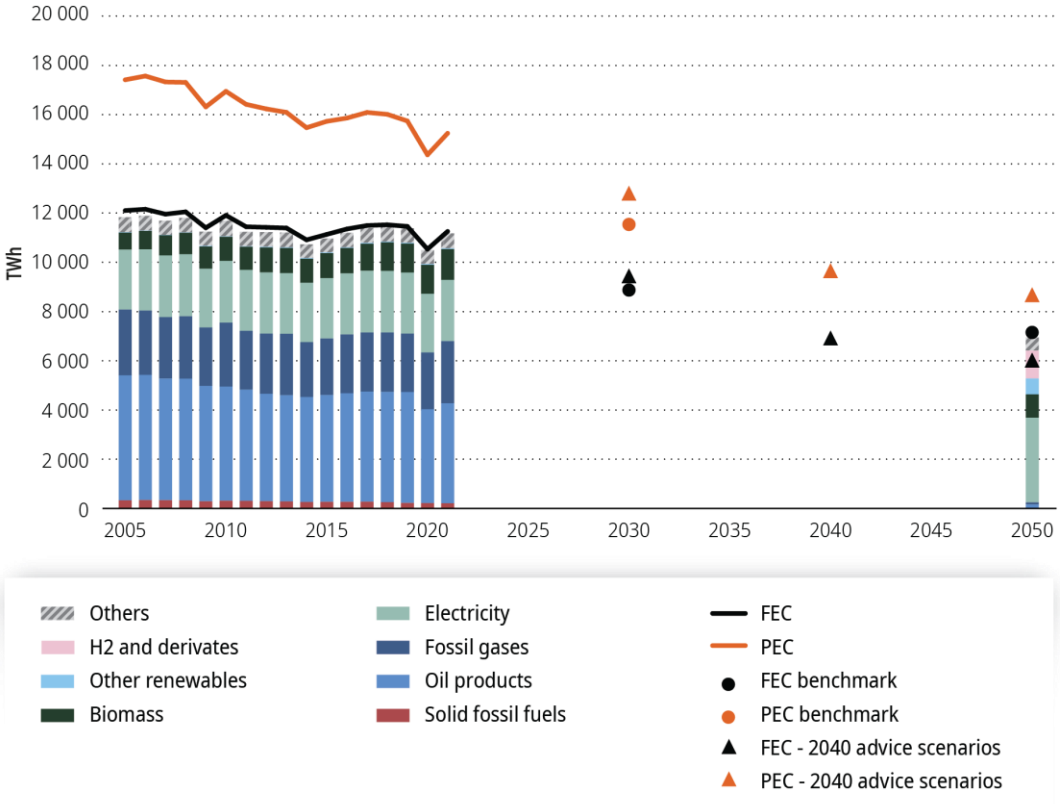
Notes: 2005 emissions based on the EU GHG inventory, 2022 emission data based on proxy data received from the EEA. Energy supply includes common reporting format (CRF) categories 1.A.1 and 1.B. Industry includes CRF categories 1.A.2 and 2. Transport includes CRF categories 1.A.3, emissions from international aviation (CRF memo item) and 64% of emissions from international shipping (CRF memo item). Buildings and agriculture energy include CRF category 1.A.4. Agriculture (non-energy) includes CRF category 3. LULUCF includes CRF category 4. Waste and other sectors includes CRF categories 1.A.5 and 5.

Sources: GHG inventories (EEA, 2023f)

3.2 Progress on energy efficiency and phasing out fossil fuels

As shown in Figure 9, in 2005–2021 the EU reduced its use of primary energy (– 12 %) and final energy (– 7 %), thereby achieving the 2020 energy efficiency target of 20 % set out under the EED (EU, 2012). However, the achievement of the 2020 target was in large part due to the COVID-19 pandemic. Without this external shock, the EU would not have reduced its energy demand sufficiently to achieve its 2020 objective, making it the only area where the EU had underdelivered its 2020 climate targets (EEA, 2022i). The average pace of reduction in final energy use in 2005–2021 (– 53 terawatt-hours (TWh) per year) would need to increase fivefold (– 265 TWh per year) in 2022–2030 to achieve the legally binding objective of 763 million tonnes of oil equivalent (Mtoe) (which corresponds to 8 874 TWh) under the revised EED (EU, 2023e). The latest EEA Trends and Projections report states that the Member States' latest projections – which date from 2019 – would only reduce final energy use to 885 Mtoe (10 293 Twh) by 2030, which is well above the newly agreed legal objective (EEA, 2023p). Such acceleration depends on energy efficiency policies; the complexities and challenges of this are addressed in more detail in Section 4.3.

Figure 9 Indicator O2 - progress in reducing primary and final energy consumption



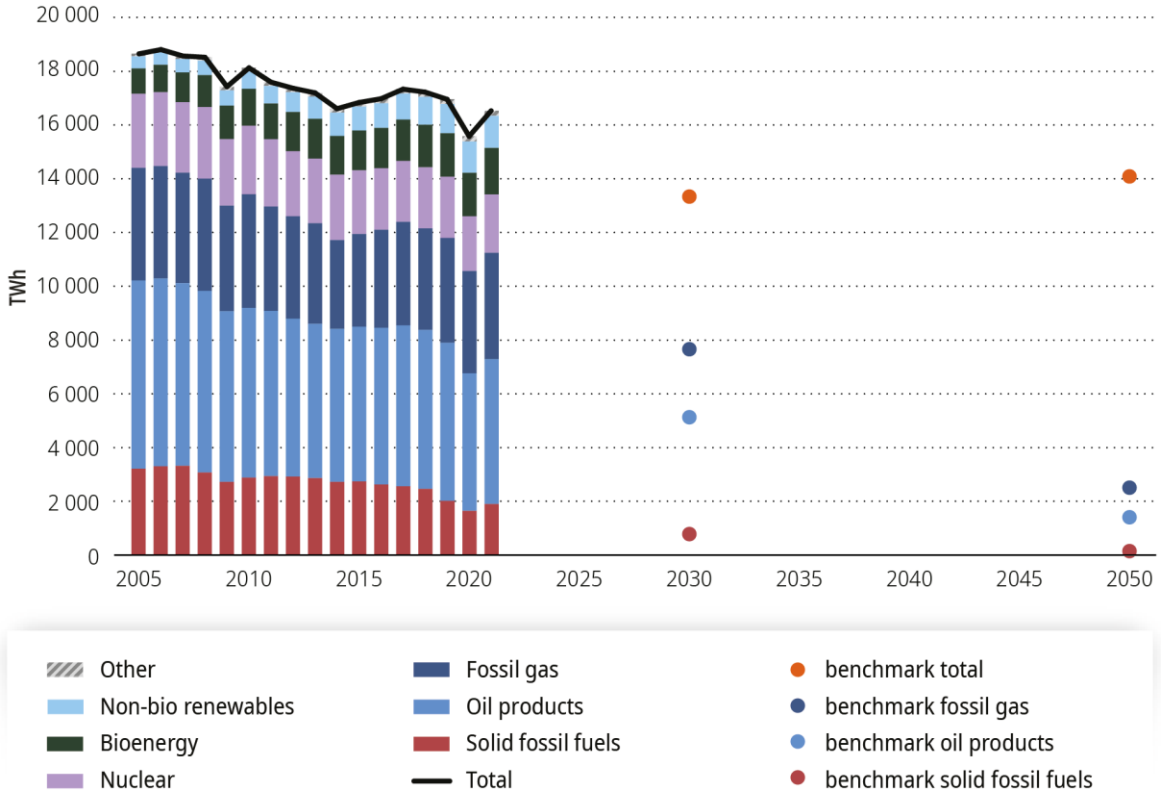
Notes: Historic energy use based on Eurostat energy balances. 2030 benchmarks based on the targets in the revised EED, while 2050 benchmarks based on the MIX Scenario from the Climate Target Plan impact assessment (Figure 17 & 37). Triangles represent the values of the scenarios underpinning the Advisory Board's advice on a 2040 reduction objective. Values converted to TWh.

Sources: Eurostat energy balances (2023b), revised EED (EU, 2023e), Climate Target Plan impact assessment (EC, 2020s), Advisory Board advice on a 2040 reduction objective (ESABCC, 2023b).

The share of fossil fuels in gross inland consumption ([2]) fell from 77 % in 2005 to 68 % in 2021, mainly achieved by a decrease in the use of solid fuels (– 5 percentage points (pp)) and oil products (– 5 pp), whereas the share of fossil gas increased (+ 2 pp). In 2021, the majority of the EU's gross inland energy use was still largely based on fossil fuels, notably oil products (33 %), fossil gas (24 %) and solid fossil fuels (12 %). To be consistent with the European Commission's scenarios that underpin the EU climate objectives, the phase-out rate for fossil fuels (on average – 0.6 pp per year in 2005–2021) would need to double up to 2030 (on average – 1.2 pp per year) and even more than triple thereafter (– 2 pp per year). By 2050, coal use would need to be phased out completely, whereas the use of oil (10 %) and fossil gas (7 %) would need to be reduced to less than 25 % of today's levels.

([2]) This includes non-energy use, but excludes energy use in international aviation and maritime transport.

Figure 10 indicator O3 - EU gross inland energy consumption



Notes: Historic energy use up to 2021 based on Eurostat energy balances. 2030 and 2050 benchmarks based on the MIX scenario of the Climate Target Plan impact assessment (figure 36). Peat and peat products included under solid fossil fuels, oil shale and oil sands included under oil products. The 'others' category includes waste and imports/exports of electricity and heat. All values have been converted to TWh.

Sources: Eurostat energy balances (2023b), Climate Target Plan impact assessment (EC, 2020s).

3.3 Progress on policy development

In 2019, the European Commission launched the European Green Deal as a strategic agenda to make the EU the first climate-neutral continent in the world (EC, 2019c). It initiated an extensive revision of the EU's policy and legal framework, with new legislation, revisions to existing legislation and additional funding all required to ensure consistency with the EU's climate ambitions. A key part of this was the Fit for 55 package, which was published in July 2021 and included a range of legislative proposals to put the EU on track towards the 2030 – 55 % objective (EC, 2021m).

While not an exhaustive list of all legislation and policy proposals stemming from the European Green Deal, Table 3 illustrates that the EU has already made substantial progress on several major pieces of legislation to align its policy and legal framework with its climate objectives. Many of the measures in the table have already been adopted at the time of writing, with those related to transport, effort sharing, carbon pricing, and finance and investments generally being the most advanced of all policy areas. Most of these adopted measures are already in force, while others, such as the EU ETS 2 and the Social Climate Fund, will come into effect in the coming years. Other policy areas are significantly less advanced and are still under negotiation between the institutions, notably many of the policies contained in the European Commission's recent Green Deal Industrial Plan and the CEAP 2. Although it is clear from this

table that climate policy and legislative development have greatly accelerated since 2019, it remains to be seen whether this pace will be maintained in the coming years.

This overview illustrates the substantial progress that has been made over the last few years in developing policies to set the EU on track towards its climate objectives. However, achieving the targets set by the European Climate Law not only depends on having certain legislation or policies in place, but requires them to be sufficiently ambitious, strong and comprehensive to deliver on the change required in the coming decades. Nor does this broad overview give insights into potential challenges or gaps in the implementation of different policies, which ultimately depends on the collective efforts and resources committed by the EU and Member States. This report therefore aims to provide a more comprehensive overview of the EU's progress towards climate neutrality by assessing current and future policies, identifying potential gaps or inconsistencies in their design and implementation, and providing recommendations on how to build on the progress that has been achieved to date on the path to climate neutrality.

Table 3 Summary overview of progress on the adoption of climate-relevant policies

Topic	Initiative	Legislative status
Carbon pricing and effort sharing	EU ETS for stationary installations (revision)	Adopted
	EU ETS 2 for buildings, road transport and additional sectors	Adopted
	Carbon Border Adjustment Mechanism	Adopted
	Effort Sharing Regulation (revision)	Adopted
Energy	Renewable Energy Directive (revision)	Adopted
	Energy Efficiency Directive (recast)	Adopted
	TEN-E Regulation (revision)	Adopted
	REPowerEU plan	Adopted
	EU electricity market design (revision)	Tabled
	Hydrogen and decarbonised gas market package	Close to adoption
	Methane Regulation	Close to adoption
	Energy Taxation Directive (revision)	Tabled
Buildings	Energy Performance of Buildings Directive (recast)	Close to adoption
	Construction Products Regulation (revision)	Close to adoption
Industry	Batteries Regulation	Adopted
	F-Gas Regulation (revision)	Close to adoption
	Net-Zero Industry Act	Tabled
	Critical Raw Materials Act	Close to adoption
	Industrial Emissions Directive (revision)	Close to adoption
	Ecodesign for Sustainable Products Regulation	Close to adoption
	Packaging and Packaging Waste Regulation (revision)	Tabled
	Waste Framework Directive (revision)	Tabled
	Right to Repair Directive	Tabled
	Green Claims Directive	Tabled
Transport	CO_2 emission standards for cars and vans (revision)	Adopted
	Alternative Fuels Infrastructure Regulation	Adopted
	ReFuelEU Aviation Regulation	Adopted

Topic	Initiative	Legislative status
	Carbon Offsetting and Reduction Scheme for International Aviation	Adopted
	EU ETS for aviation (revision)	Adopted
	FuelEU Maritime Regulation	Adopted
	CO_2 emission standards for heavy-duty vehicles (revision)	Tabled
	End-of-life vehicles Regulation (revision)	Tabled
	Trans-European Transport Network Regulation (revision)	Close to adoption
	Regulation on the use of railway infrastructure capacity in the single European railway area	Tabled
	Combined Transport Directive (revision)	Tabled
Carbon removal	Certification framework for carbon removals	Tabled
Agriculture	Sustainable food systems legislative framework	Announced
Land use	LULUCF Regulation (revision)	Adopted
	Nature Restoration Law	Close to adoption
	Soil Health Law	Tabled
Finance and investment	Taxonomy Regulation (for sustainable investment)	Adopted
	Social Climate Fund	Adopted
	Just Transition Fund	Adopted
	European Green Bond Regulation	Adopted

Notes: Measures are classed as 'adopted' if the legislative process has been fully completed, 'close to adoption' if interinstitutional/trilogue agreement has been reached, 'tabled' if at a different stage of the legislative process and 'announced' when they have been announced (e.g. in one of the sectoral strategies under the European Green Deal or in the European Commission's annual work programme) but a formal proposal has not yet been tabled by the European Commission.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