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The European Union Second Biennial Transparency Report under the Paris Agreement and Ninth National Communication under the United Nations Framework Convention on Climate Change

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1 Introduction and executive summary

Climate change is already having profound and increasingly visible impacts across Europe. The European State of the Climate 2025 report confirms that Europe remains the world's fastest-warming continent, having warmed roughly twice as fast as the global average over the past three decades. In 2025, at least 95% of Europe experienced above-average annual temperatures.

2025 saw a series of climate-related records broken and extreme events across Europe, from the Arctic Circle to the Mediterranean. European sea-surface temperatures reached a record high for the fourth year running and wildfires burnt over one million hectares, the largest expanse ever. Drought affected many areas of the continent. About 70% of European rivers ran at below-average flows. 2025 was among the three driest years on record for soil moisture and yet many areas across Europe also experienced storms and floods. These conditions form part of the clear long-term trend. The record-breaking events demonstrate the growing effects of climate change on ecosystems, biodiversity, human health, water resources, the economy and infrastructure.

Public concern remains very high; the 2025 Eurobarometer survey found that 85% of Europeans consider climate change a serious problem and 81% support the EU-wide objective of climate neutrality by 2050[1].

The world is expected to cross 1.5 °C of global warming above pre-industrial levels in the next few years, pushing climate risks and impacts to increasingly dangerous levels. We can still limit temperature increase and return to below 1.5 °C of global warming by the end of the century, but it will be increasingly essential to take adaptation action alongside mitigation actions and to build resilience. The best remaining option is to pursue an 'overshoot, peak and decline' pathway, limiting the temperature increase and keeping the period of overshoot as short as possible. The European Union and its 27 Member States remain committed to ambitious climate action consistent with the Paris Agreement and are doubling down on rapid emissions reductions, climate neutrality and preparedness.

This report and its accompanying Staff Working Document (SWD) constitute the European Union's second Biennial Transparency Report (BTR2) and its ninth National Communication (NC9). The Commission has prepared this report based on the guidelines adopted by the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement, and Article 7 paragraph 2 of the Kyoto Protocol, conclusions of the UNFCCC lead reviewers' meetings and Article 29.5(a) of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.[2]

The report tracks the EU's progress towards its nationally determined contribution (NDC): the trajectory of the EU's greenhouse gas emissions and removals, policies and measures. It also covers climate change impact and adaptation actions, the support

[1] European Commission, Special Eurobarometer 565 on Climate Change, https://europa.eu/eurobarometer/surveys/detail/3472

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

provided and mobilised for developing countries in 2023 and 2024 and efforts to make finance flows consistent with low-greenhouse-gas and climate-resilient development by investing in climate action. As a joint BTR2/NC9, it additionally reports on research, systematic observation and on education, training and public awareness, showing how the EU's climate action is grounded in science and broad public engagement. The EU's 2026 national greenhouse gas inventory covering emissions from 1990 to 2024, is submitted as a stand-alone report.

2 Emissions and removals of greenhouse gases

EU emissions continue to fall. Total net GHG emissions, including emissions and removals from land use, land-use change and forestry (LULUCF), fell by 87 $MtCO_2$-eq (3%) between 2023 and 2024, to reach 2 786 $MtCO_2$-eq. In 2024, emissions were 39.5% below the 1990 level, deepening the strong reduction achieved in 2023, one of the largest year-to-year drops the EU has recorded since 1990. A decomposition analysis indicates that gains in energy efficiency and reductions in carbon intensity more than offset the upwards pressure associated with economic and population growth. Reflecting the decline of coal, the rapid expansion of renewables and more than three decades of EU mitigation policy.

The continued reduction reflects the combined effect of the declining use of coal, the rapid expansion of renewable energy, sustained progress on energy efficiency and the cumulative impact of the EU's mitigation policy framework over more than three decades.

Power is leading the way. Emissions from public electricity and heat generation fell by more than 9% (53 $MtCO_2$-eq) as coal use continued to decline along with use of natural gas, though to a lesser extent in 2024 as coal use continued to decline along with use of natural gas, though to a lesser extent. Hydro, wind and solar power provided 47% of net electricity generation and emissions from electricity production are now 58% below 1990. Emissions also fell from croplands by 15 $MtCO_2$-eq, from manufacturing industries excluding iron and steel by 7 Mt CO_2 eq and from residential heating by 5 $MtCO_2$-eq. Net removals from forest land increased slightly.

The energy sector nevertheless remains by far the largest source of emissions, emitting 2 283 $MtCO_2$-eq in 2024 or 76% of total emissions, 39% less than in 1990. It is followed by agriculture (359 $MtCO_2$-eq), industrial processes and product use (260 $MtCO_2$-eq) and waste (111 $MtCO_2$-eq). Carbon dioxide still accounts for most of the EU's emissions, with methane, nitrous oxide and fluorinated gases gradually grown as energy sector CO_2 emissions have fallen faster than emissions from agriculture and waste.

Two areas require more attention as emissions are still rising. Domestic road transport accounted for more than a quarter of EU emissions in 2024 and is the only sector still above its 1990 level: road transport emissions increased by 9 $MtCO_2$ -eq in 2024 and grassland emissions rose by 4 $MtCO_2$-eq. The LULUCF sector remains a net carbon sink, removing 231 $MtCO_2$-eq from the atmosphere, but its capacity has been declining and can no longer be assumed to increase automatically. Forest management, including

harvest rates, remains a major driver of the forests carbon sink, while forests through droughts, fires, storms and pests are putting forest under growing pressure.

3 Progress towards the EU's nationally determined contribution

Under its 2030 NDC, submitted to the UNFCCC in October 2023, the EU commits to reducing net GHG emissions economy-wide by at least 55% by 2030 compared to 1990, and to achieving this reduction without recourse to internation credits**.** The EU NDC's scope goes beyond that of the national GHG inventory by including specific emissions from international aviation and maritime transport that are subject to effective carbon pricing under the EU emissions trading system (ETS).

The indicator used to track progress is based on the annual EU GHG inventory complemented by estimates of those international aviation and maritime emissions in the scope of the NDC[3].

Progress is steady and accelerating. In 2024, emissions in the scope of the NDC reached 2 872 Mt $MtCO_2$-eq, this means that the latest indicator was 38.4% below 1990 levels while real GDP was around 71% higher. The trajectory has continued to improve so that EU net emissions covered by the NDC were 30.9% below 1990 levels in 2022 and 36.6% below 1990 levels in 2023. This confirms that the legal and institutional frameworks for the EU and its 27 Member States to reach their joint 2030 target are in place, though further reductions in the years up to 2030 will still be needed to close the remaining gap to the net 55% reduction.

The EU is already looking beyond 2030. The NDC submitted in November 2025 includes an indicative contribution for 2035 of a 66.25-72.5% net reduction in GHG emissions compared to 1990. In April 2026, the EU amended the European Climate Law to set a legally binding target of a 90% net greenhouse gas emissions reduction by 2040 compared to 1990, of which at least 85% must be achieved through domestic action, with a limited contribution from high-quality international credits possible from 2036. The EU's 2040 target provides the path between the 2030 target and the goal of climate neutrality by 2050, and the Commission is now translating it into a post-2030 legislative framework.

[3] The EU 2030 NDC scope includes international aviation: emissions from civil aviation activities as set out for 2030 in Annex I to the EU ETS Directive are included in the NDC only in respect of CO_2 emissions from flights subject to effective carbon pricing through the EU ETS. With respect to the geographical scope of the NDC these comprise emissions in 2024-26 from flights between the EU Member States, and departing flights to Norway, Iceland, Switzerland and the United Kingdom. And international navigation: waterborne navigation is included in respect of CO_2, methane (CH4) and nitrous oxide (N2O) emissions from maritime transport voyages between the EU Member States. These emissions are added to the emissions of the GHG emissions inventory.

4 Mitigation policies and measures

The EU's framework for mitigation is built around the European Climate Law, the European Green Deal[4] and climate and energy policies as reinforced in the Fit for 55 package. Together, these establish a legally anchored pathway to climate neutrality and a broad set of actions, including on carbon pricing, investment and sectoral measures. Since the first BTR in 2024, policy attention has increasingly shifted from adoption of the core legislation for 2030 to its implementation and the integration of decarbonisation with initiatives for a more sustainable, competitive and resilient European economy, industrial policy, energy security and affordability.

Carbon pricing remains the cornerstone. The revised EU Emissions Trading System legislation (ETS1) raises the level of ambition for 2030 for sectors covered by the current system to reduce emissions by 62% compared to 2005 levels and it extends carbon pricing to maritime transport. A separate emissions trading system for buildings, road transport and additional sectors is being introduced, ETS2, which will be fully operational in 2028. The Social Climate Fund was established alongside the ETS2 to ease the impact of the carbon price on fuels used in heating of buildings and road transport on vulnerable households and SMEs. The Effort Sharing Regulation requires a 40% reduction by 2030 compared to 2005 in the sectors not covered by ETS1. The LULUCF Regulation sets the EU-level objective for an additional 42 $MtCO_2$-eq of land-based net removals in 2030 compared with the 2016-2018 average.

Beyond the ETS, the Effort Sharing Regulation[5], sets binding national targets ranging from 10% to 50%, adding up to a 40% reduction by 2030 compared to 2005 levels in sectors not covered by the EU ETS.

Transforming the energy system is key for achieving the climate targets. The revised Renewable Energy Directive sets a target of at least 42.5% by 2030, aiming for 45%, while the Energy Efficiency Directive[6] aims to reduce final energy consumption by at least 11.7%. Energy policies combine accelerated roll-out of renewable. In 2024, renewable energy was the leading source of electricity generation, ahead of fossil fuel and nuclear power and electricity provided 23% of final energy consumption, up from 18% in 1990. Wind and solar capacity have expanded rapidly, while final energy consumption has fallen from its peak in the 2000s. Yet the EU still imported 57% of the energy needed to meet demand in 2024, underlining the continued need to reduce fossil-fuel dependence[7].

Transport remains one of the most difficult sectors to decarbonise. The EU framework to address emissions in the transport sector, is built around a set of core policies that

[4] State of the Energy Union 2021 – Contributing to the European Green Deal and the Union's recovery, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:950:FIN.

[5] The Effort Sharing Regulation scope covers emissions from domestic transport, buildings, agriculture, waste and small industry.

[6] Directive (EU) 2023/1791 on energy efficiency and amending Regulation (EU) 2023/955 (recast), http://data.europa.eu/eli/dir/2023/1791/oj.

[7] The EU action plan for affordable energy, https://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=CELEX%3A52025DC0079&qid=1741780110418

together target vehicle emissions standards, clean fuel, infrastructure deployment and modal shift. A central pillar is the CO_2 performance standards for cars, vans and heavy-duty vehicles which strengthen road fleet-wide emission limits and provide the regulatory basis to transition to zero-emissions vehicles. This is supplemented by the Alternative Fuels Infrastructure Regulation (AFIR), which requires Member States to extend charging and hydrogen refuelling infrastructure along the TEN-T network and its urban nodes, addressing a key barrier to uptake. Road transport accounts for most domestic transport emissions, and growth in this sector has offset much of the gains achieved from improved fuel efficiency and cleaner fleet. Battery electric and plug-in hybrid cars together accounted for 21% of new car registrations in 2024.

Industrial policy now combines competitiveness, decarbonisation and pollution reduction. In this context, the Clean Industrial Deal, presented in 2025, provides the strategic framework to support energy intensive industries, clean technology manufacturing and circular business models.

Targeted legislation addresses specific gases and installations. The F-Gas Regulation[8], cuts fluorinated greenhouse emissions through a combination of HFC quota reductions, restrictions on high Global-Warming-Potential gas and equipment, leakage prevention, recovery, reclamation requirements, certification obligations, and enhanced reporting and verification. The revised Industrial Emissions Directive strengthening the link between industrial pollution control and decarbonisation. The results are tangible: emissions from industry as a whole, including combustion and processes, almost halved between 1990 and 2024; emissions from Industrial Processes and Product Use sector have decreased by 42 % compared to 1990. Among the IPPU subsectors, nitrous oxide emissions from the chemical industry showed the largest emission decrease among these subsectors, fell by 76 %.

Sector-specific frameworks cover the other sectors. The energy performance of buildings Directive and the Energy Efficiency Directive reduce energy demand and promote cleaner heating. Agricultural and land policies aim to cut methane and nitrous oxide emissions while maintaining food security and improving the capacity of the land sector to remove carbon. While the waste policy shift waste management from landfill to recycling, reuse and a circular use of materials. Across these sectors, implementation at national and local level is essential to translate EU legislation into sustained emissions reductions.

Since the first BTR in 2024, new and proposed legislation has included targeted revisions to strengthen the 2030 framework, and a proposal for the review of the ETS, the first of a number of proposals to come as part of a new post-2030 framework to deliver the 2040 target. For example, the targeted adjustments to the Market Stability Reserve for the EU's emissions trading system for additional sectors including buildings and road transport (ETS2) proposed by the Commission in November 2025 was adopted in October 2026. It aims to prevent severe price volatility, protect consumers from high fuel and heating costs and support a smoother start to the ETS2 in 2028.

[8] Regulation (EU) 2024/573 on fluorinated greenhouse gases, amending Directive (EU) 2019/1937 and repealing Regulation (EU) No 517/2014, https://eur-lex.europa.eu/eli/reg/2024/573/oj.

Putting in place the framework to deliver the 2040 target

In July 2026, the European Commission adopted a proposal- one of several planned to establish the framework for implementation of the 2040 target- to update the EU Emissions Trading System (ETS) to align its ambition with the EU's 2040 and 2050 climate targets. The proposal adjusts the pace at which the ETS emissions cap declines after 2030, whilst maintaining a strong incentive to cut emissions. It provides for the purchase of a limited number of international credits for use towards the EU target in 2040. It also integrates high-quality permanent domestic carbon removals into the ETS, providing additional flexibility for sectors where emissions are particularly difficult to reduce. The proposal also significantly increases public support for industrial decarbonisation. A new Industrial Decarbonisation Bank will support the roll-out of clean technologies, Member States are also required to spend at least 50% of the revenues from ETS allowance auctions on investments in decarbonising the ETS sectors in the EU.

Proposals for the post-2030 national targets and flexibilities for the sectors outside the ETS are expected in the first quarter of 2027.

5 Aligning finance with climate goals

Article 2(1)(c) of the Paris Agreement calls for the flow of funds to be consistent with low greenhouse gas emissions and climate-resilient development. The EU pursues this objective through economy-wide policies that shape public and private investment, including carbon pricing, public expenditure, sustainable finance rules, climate-related disclosures and financial risk management.

Public funding remains a central pillar. The EU-level budgets of the 2021-2027 multiannual financial framework and the NextGenerationEU programme are projected to contribute around EUR 661 billion to climate objectives, while the EU Emissions Trading System has generated more than EUR 270 billion in auction revenues since auctioning began in 2013, most of which Member States are required to use for climate, energy and social purposes. These resources support renewable energy, energy efficiency, clean transport, industrial decarbonisation, adaptation, innovation and a just transition.

The EU has also strengthened the Framework to mobilise private finance. The EU Sustainable Finance Framework, which includes the EU Taxonomy, Corporate Sustainability Reporting Directive, helps mobilise and redirect private capital. Taxonomy aligned capital investment reached EUR 273 billion in 2024 and EUR 323.8 billion in 2025, bringing the cumulative reported value of sustainable investments since 2022 to EUR 1 224 trillion. Since the European Green Bond Regulation came into effect in December 2024 cumulative issuance has accelerated to around EUR 60 billion by 2026.

The EU also promotes greater consistency of flow of funds through international cooperation and investment partnerships and continues to strengthen its framework to scale up investment, reduce fossil fuel dependence, improve resilience and support competitiveness.

6 Projections

EU greenhouse gas (GHG) emissions are projected to continue falling in the run up to 2030 and beyond, with the additional measures planned expected to speed up progress along the trajectory significantly. By 2030, total domestic net GHG emissions, including LULUCF, are projected to fall to around 2 333 $MtCO_2$-eq under the scenario with existing measures (WEM) and to 2 032 $MtCO_2$-eq with additional measures (WAM), corresponding to a reduction of 49% and 56% respectively compared to 1990 levels.

Under the EU NDC scope – which include removals from the LULUCF sector and specific emissions from international aviation and maritime transport – aggregated GHG emissions are projected to decrease by 48% by 2030 under the existing measures scenario, and by 55% under the additional planned measures scenario. **This means the EU is on track to meet its Nationally Determined Contribution (NDC) target for 2030**.

The EU's expected progress on the transition to net-zero emissions varies considerably by sector. The energy sector is delivering the steepest reductions (projecting a fall by 2030 of 61% and 66% under WEM and WAM scenario, respectively, compared to 1990), driven mainly by the roll-out of renewable energy, fuel switching and efficiency improvements. By contrast, transport is a key challenge (with emissions projected to remain slightly above their 1990 level under WEM or to fall by 13% under WAM), with additional effort needed to deliver substantially stronger reductions. Emissions from industrial processes continue their long-term downward trend (48%-52%), but agricultural emissions are falling more gradually (30%-32%) and therefore their relative share is increasing as other sectors decarbonise. Removals by the LULUCF sector remain key to the EU's net emissions balance, while emissions from waste and other smaller sources are contributing further reductions. Overall, a sectoral analysis indicates that the energy system is progressively decarbonising but there is a growing need to make deeper reductions in transport and other persistent sources of emissions.

The projections underline the importance of implementing both existing and planned measures swiftly and in a sustained manner across all sectors. It is also crucial to continue investing in clean energy, energy efficiency, industrial transformation, low-emission mobility and resilient land-based carbon removals.

2026 was not a-mandatory reporting year, therefore only eight EU Member States updated their emissions projections due to significant changes. Consequently, 2026 aggregated data for the EU do not capture all recent policy developments consistently across all Member States.

The overall policy conclusion remains clear: the pace of reductions must continue to accelerate as the EU and its Member States progress from the substantial reductions made to the 2030 target and then follow the more ambitious 2040 trajectory. Continued progress will require swift implementation of adopted measures, faster investment in energy efficiency and clean energy, continued industrial transformation, deeper reductions in emissions from transport and buildings and more resilient land-based removals.

7 Adaptation - preparedness for and resilience to climate change

Climate risks are becoming increasingly significant across the EU. The first European Climate Risk Assessment identified 36 major climate risks affecting ecosystems, food, health, infrastructure and the economy and financial system. Several of these risks have already reached critical levels. Recent climate hazards, their increasing economic costs and their impact on vulnerable groups show why stronger and faster action to build resilience is urgently needed. The EU treats adaptation and mitigation as complementary: cutting emissions remains the most effective way to limit climate risks, as every fraction of a degree of warming increases the impacts on people, economy and nature. At the same time, Europe must prepare for a changing climate, including more severe scenarios.

On 27 October 2026, the Commission presented the EU Framework for Climate Resilience[9,10], including a proposal for a European climate resilience law to help the EU and its Member States anticipate, prepare and manage climate risk for effectively. Member States would have to assess their climate risks by June 2029 and adopt resilience plans by December 2030.

The framework aims to embed climate resilience across policy and investment decisions through a reference global warning trajectory, clearer risk ownership, better and more regular climate risks assessments, a single national strategic plan for climate resilience and stronger monitoring. It is supported by practical tools, such as the European climate viewer, the navigation of climate resilience tool, as well as tools to support local action, business resilience, finance and insurance. The European Water Resilience Strategy and the European Ocean Pact both adopted in 2025, further strengthen water and ocean resilience.

The EU also supports adaptation internationally, through finance, cooperations and initiatives, such as the Team Europe approach. This includes work in Africa, Central Asia, Latin America and other partner countries and regions. It also covers support for nature-based solutions, disaster risk reduction and recovery and climate-resilient investment, with particular attention to vulnerable groups and the principle of just resilience, recognising that climate risks and adaptation measures affect people unevenly and must be designed to avoid deepening inequalities. These actions contribute to the EU's commitment to implement the Global Goal on Adaptation and the UAE Framework for Global climate resilience.

8 Support provided and mobilised to developing countries

The EU, its Member States and the European Investment Bank (EIB) remain committed to supporting developing countries in implementing the Paris Agreement and responding to climate change. Support is provided through climate finance, technology-

[9] Communication on the EU Framework for Climate Resilience, COM(2026) 720.

[10] Commission proposal for establishing a framework to enhance climate resilience and amending Regulation, COM(2026) 730

development and transfer and capacity building with a particular focus on the needs of the most vulnerable.

The EU, its Member States and the EIB are the world's largest provider of climate finance. In 2024, they contributed 31.7 billion in public international climate finance to developing countries; an increase from EUR 9.5 billion in 2013. In 2023 and 2024, the European Commission and the EIB contributed a total of EUR 12.7 billion in climate finance: 59% for mitigation, 24% for adaptation and 17% for activities with cross-cutting objectives. The Commission managed 61% of this financing bilaterally and the EIB managed the remaining 39% multilaterally to finance both mitigation and adaptation actions. The mitigation and adaptation actions include projects to roll out renewable energy, sustainable infrastructure, climate resilience, disaster risk reduction and nature-based solutions. EU support was provided through bilateral, regional and multilateral channels, all contributing to collective action under the UNFCCC and the Paris Agreement.

Beyond finance, the EU continues to promote the development and transfer of climate-related technologies and strengthen institutional and technical capacities in partner countries. Through research cooperation, technical assistance, knowledge sharing and targeted capacity building, the EU supports partner countries in designing and implementing effective climate policies, enhancing MRV and transparency systems and strengthening resilience to climate impacts. The EU will continue to work with international partners to scale up support for climate action and resilience, recognising that increased international cooperation remains essential to be able to achieve the goal of the Paris Agreement.

9 Research and systematic observation

Research, innovation and systematic observation underpin the evidence base for the EU's climate action. Horizon Europe supports climate science and the development of mitigation and adaptation solutions, while Copernicus, as the Earth observation component of the EU Space Programme, provides free and open satellite- and ground-based data through six services covering atmosphere, marine, land, climate change, emergency management and security. The Copernicus and the European research infrastructures provide long-term observation and climate services needed for monitoring emissions, assessing risks and implementing policy. Continued development of these systems, including enhanced monitoring of atmospheric and greenhouse gases and expanded ocean and polar observation (for example under the OceanEye initiative and the new Copernicus polar missions), will increase the amount of information available for future climate action.

Internationally, the EU supports scientific cooperation and global climate governance through Horizon Europe, Copernicus and participation in bodies and initiatives such as the IPCC, GCOS, GOOS, GEO, Mission Innovation and the Belmont Forum[11]. Together, these policies and instruments provide the scientific evidence, monitoring capacity and

[11] The Belmont Forum is a transnational research partnership developed in collaboration with the EU's research and innovation framework programmes and EU countries' innovation projects.

innovation base needed to support EU climate policy, climate neutrality by 2050 and international climate action.

10 Education, training and public awareness

The EU supports education, training and public awareness on climate change in line with Article 6 of the United Nations Framework Convention on Climate Change, Article 12 of the Paris Agreement, and the Action for Climate Empowerment (ACE).

Although education and training are primarily the responsibility of Member States, the EU supports and complements national action through promoting transnational cooperation between education institutions, policy cooperation, funding and practical tools. The European Education Area provides the overall framework for the green transition and sustainability as one of its priorities. Key initiatives include the 2022 Council recommendation on learning for the green transition and sustainable development, its implementation through dedicated through working groups on school education and vocational education and training and through the European sustainability competence framework such as GreenComp and funding programmes such as Erasmus+, which support the development of sustainability competences and greener practices in education and training.

Public awareness, participation and access to information are also integral to EU climate action and form part of the EU's implementation of ACE. The European Climate Pact remains the EU's flagship initiative for citizen engagement on climate action, bringing together citizens, communities, civil society, educational institutions, businesses and local authorities. Public engagement and consultation help promote climate awareness and involvement of the public and stakeholders.

Internationally, the EU and its Member States contribute to implementing the Glasgow work programme on ACE partly through participation in the UNFCCC processes and through international partnerships and development cooperation programmes. This is particularly relevant for sectors undergoing structural transformation as part of the transition to climate neutrality, where reskilling and upskilling will be essential to support employment, competitiveness and social fairness.