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TRANSITION, 2019-2024

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Abstract

Climate transition in the European Union has been a central sphere of action of the European Commission during the 2019-2024 legislature. This paper details how EU climate policies have evolved in that period through various instruments, starting with the European Green Deal which led to the inclusion in EU Law of the ambition to be climate-neutral by 2050. This aim is also an integral part of the recovery and resilience plans adopted under NextGenerationEU, the REPowerEU plan and the Green Deal Industrial Plan.

Keywords: climate transition in the EU, energy transition in the EU, European Green Deal (EGD), NextGenerationEU, REPowerEU, Green Deal Industrial Plan (GDIP).

JEL classification: E61, F53, Q42, Q43.

Resumen

La transición climática en la Unión Europea (UE) ha sido un eje central de actuación de la Comisión Europea durante la legislatura 2019-2024. Este documento detalla la evolución de las políticas climáticas de la UE en ese período, a través de las distintas iniciativas adoptadas, empezando por el Pacto Verde Europeo, por el que la UE ha incorporado en su legislación la ambición de ser climáticamente sostenible en 2050. Este objetivo ha sido también parte integrante de los planes de recuperación y resiliencia, adoptados bajo *NextGenerationEU*, del plan *REPowerEU* y del Plan Industrial del Pacto Verde.

Palabras clave: transición climática en la UE, transición energética en la UE, Pacto Verde Europeo (EGD), *NextGenerationEU*, *REPowerEU*, Plan Industrial del Pacto Verde (GDIP).

Códigos JEL: E61, F53, Q42, Q43.

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1 Introduction

Promoting the climate transition in the European Union (EU) featured prominently among the six priorities outlined by Ursula von der Leyen when she took office as President of the European Commission for the period 2019-2024 in December 2019. In fact, one of the first proposals of the von der Leyen Commission, published that same month, was the European Green Deal.

The European Green Deal is a broad strategy for the green transition that called for incorporating more stringent climate targets into EU legislation than those set so far and implementing the necessary measures to achieve them and make the EU a climate-neutral economy by 2050. In this vein, as part of the policies adopted to address the economic impact of the COVID-19 pandemic in the first months of 2020, the climate transition was included as a core axis of the NextGenerationEU (NGEU) recovery fund and Member States' Recovery and Resilience Plans (RRPs).

Just as the Green Deal was being developed, following the adoption of the Climate Law – with binding climate targets – and the publication of the first major package of measures proposed to meet the 2030 climate targets (the Fit for 55 package), the invasion of Ukraine in February 2022 and the war it triggered had a major impact on the climate transition projected by the EU. Europe's heavy dependence on fossil fuels imported from Russia (gas, oil and coal) forced it to adapt its climate change policy, and especially the energy transition policy, to the new situation, making energy decoupling from Russia a priority. Indeed, the EU had to quickly deal with the crisis triggered by the sharp rise in gas and electricity prices, largely driven by the cut-off of Russian gas supplies to the EU in the context of the conflict.

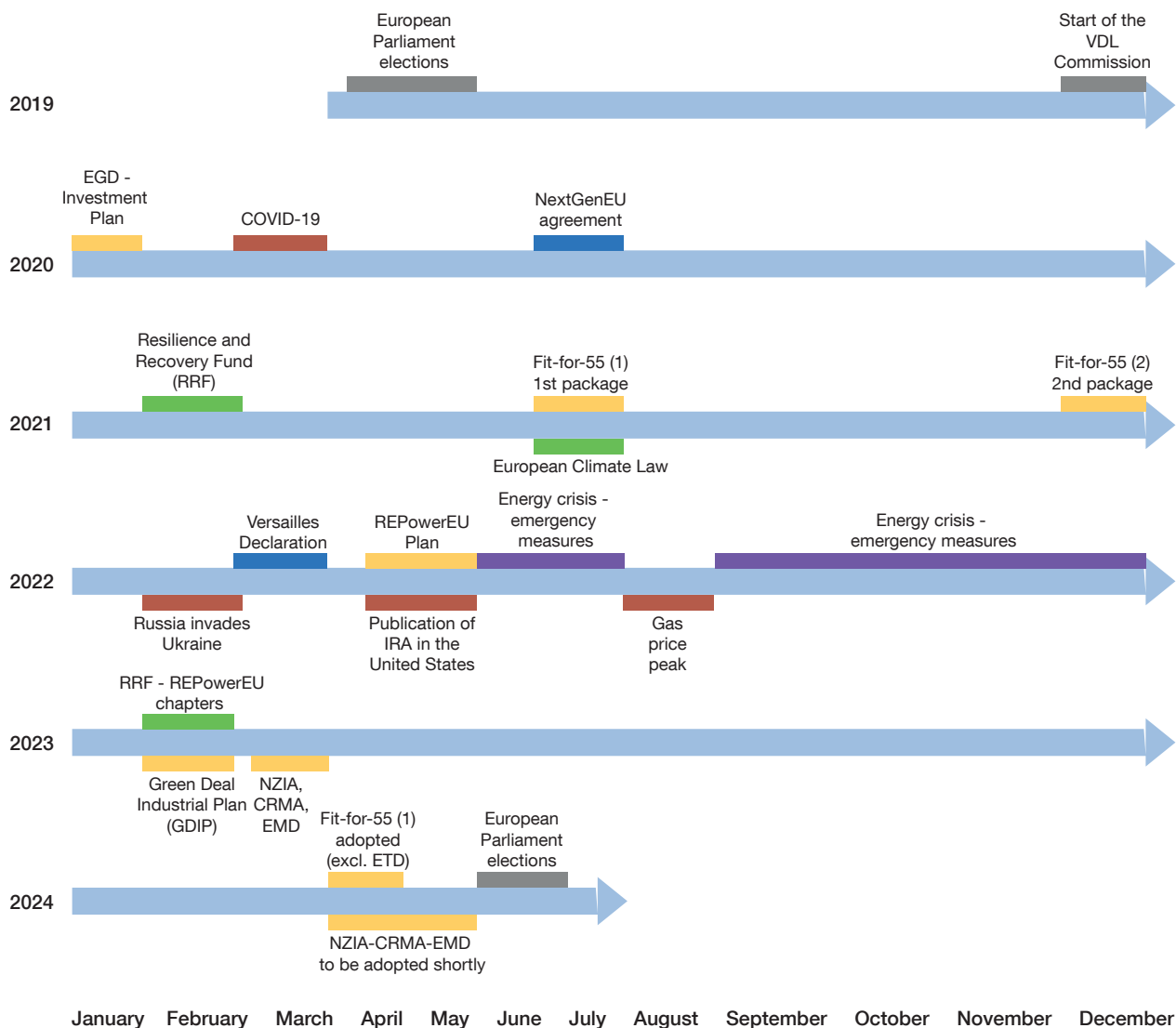
To manage the economic consequences of the Russian aggression, the EU swiftly launched the REPowerEU plan, reaffirming and recalibrating some of the objectives of its energy transition strategy and making it more ambitious, and took a number of additional measures to address the energy crisis.

The effects of the pandemic and the war in Ukraine were felt amid a change in economic relations on a global scale, which were increasingly affected by geopolitical issues. These events highlighted the existence of significant vulnerabilities in the EU stemming from external dependencies in key aspects relating to security and the economy, with inevitable consequences for the Union's economic openness model.

Although the EU was slow to take into account this shift in the global context in its policy-making, economic sovereignty and security-related considerations eventually gained importance in European policies, including those related to climate change. The clearest trigger for the EU's response to its external dependencies and vulnerabilities was the adoption of the so-called Inflation Reduction Act (IRA) in the United States, which establishes a programme of public support to key sectors of the green transition in that country.

Figure 1

Main milestones in the design and implementation of green policies during the Von der Leyen (VDL) Commission (2019-2024)



SOURCES: European Commission and devised by authors.

Following the publication of the IRA, the Commission launched a new package of measures, the Green Deal Industrial Plan, with a strong focus on economic security and strategic autonomy. In particular, the proposals aim to strengthen European sovereignty in the net-zero technology sectors and secure the supply of raw materials essential to producing

those technologies. One particularly important aspect, given the subsidy component of the IRA and the support that Chinese companies receive through different channels, is to ensure that EU companies compete on a global level playing field.

This paper details how EU policies in the field of climate and energy transition have changed during the institutional cycle covered by the von der Leyen Commission (see Figure 1). To this end, the different milestones that have marked this period are taken as reference points: the pandemic, the Russian invasion of Ukraine and the publication of the IRA. Section 2 starts with the European Green Deal, conceived as an EU growth strategy geared towards climate sustainability, which is reflected in the design of the NGEU recovery fund. Section 3 describes the shift in the energy strategy following the war in Ukraine and the energy price crisis, with the REPowerEU plan. Section 4 takes stock of the leap taken by the Green Deal Industrial Plan in adding the economic security aspect. Section 5 details the financing instruments that have accompanied the deployment of climate policies between 2019 and 2024. Lastly, Section 6 presents the main conclusions. A glossary and an Annex with references to the main legislative and non-legislative initiatives published by the EU relating to the green transition are included at the end of this paper.

2 Climate transition as an EU growth strategy: the European Green Deal and the post-COVID climate change policy in Europe¹

European climate change policy-making is a cross-cutting process that takes place in a setting of cooperation at global level. The 2016 **Paris Agreement** was a key milestone in the multilateral negotiation process on climate change and the first legally binding international treaty, whereby the 196 parties – forming the United Nations Climate Change Conference (COP) – undertook to keep the global temperature increase below 2°C, and preferably 1.5°C, compared with pre-industrial levels.

The climate commitment of the EU and its Member States is the foundation for the **European Green Deal** (EGD), the strategy agreed by the EU in 2019 to reduce its net greenhouse gas (GHG) emissions by at least 55% compared to 1990 levels by 2030, with the ultimate goal of achieving climate neutrality (net zero emissions) by 2050. The 55% reduction target in 2030 is more ambitious than the 40% previously agreed and underlines the EU's global leadership in terms of meeting its Paris Agreement commitments.²

The EGD is designed as an EU growth strategy, with broad sectoral coverage, aimed at “decoupling” economic growth from GHG emissions, thus making growth compatible with the decarbonisation objective. It uses regulation as a lever for the green transition. Thus, in application of the EGD, the European Commission has proposed to the European co-legislators over the course of 2020-2023 the adoption of several concrete packages of measures, with the purpose of guaranteeing an efficient use of resources, transforming the economy to curb climate change, reversing the loss of biodiversity and reducing pollution. These initiatives cover a wide range of economic sectors, but have a particular impact on transport, energy, agriculture, property development and industry (steel, cement, ICT, textiles and chemicals). The initial roadmap has been expanded – with legislative and non-legislative measures – as new needs have emerged and new responses to them have been formulated.

The two main initiatives that have been launched under the EGD umbrella (the Climate Law and the Fit for 55 package)³ are presented below.

The European Climate Law

A first objective of the EGD was to incorporate the climate neutrality commitment into the EU legal framework. In this regard, the European Climate Law, which has been in force since July 2021, provides the framework to ensure that all legislation and financial flows are designed in a way that is consistent with the transition to a low-carbon economy. Thanks

¹ This section summarises and updates Dormido, Garrido, L'Hotellerie-Fallois and Santillán (2022).

² The EU had previously introduced policies to reduce GHG emissions. Between 1990 and 2018, EU GHG emissions decreased by 23%, while GDP grew by 61%.

³ Other EGD initiatives include the EU Biodiversity Strategy, the Farm to Fork Strategy, the European Industrial Strategy, the Circular Economy Action Plan, a new Regulation on batteries and waste batteries, the Just Transition Mechanism, the Chemicals Strategy for Sustainability and the Forest Strategy.

to this initiative, Europe has become the first of the three largest GHG emitters in the world – China, the US and the EU, in this order – which has a climate law and, therefore, a legally binding objective for 2050.

The Climate Law sets the intermediate target of reducing net GHG emissions by at least 55% by 2030 (compared with 1990). It also provides for a new intermediate target to be set for 2040. In this regard, the Commission **recommended a 90% reduction in net GHG emissions by 2040**. If this target is adopted by the next Commission (2024-2029), it will be binding for both the EU institutions and its Member States and will form the basis of the new revised EU contribution to the Paris Agreement.⁴

One of the most notable aspects of the law is the **creation of a system for regularly monitoring progress towards the climate neutrality objective**, with the power to take additional measures if necessary. A European **Scientific Advisory Board on Climate Change**⁵ has been established, composed of 15 scientific experts who ensure laws are designed using proven data and provide the necessary scientific advice to policy makers on the alignment of policies with EU commitments. This Board, which should work in an independent manner, complements the work of the European Environment Agency (EEA).⁶ Member States must also set up national climate advisory bodies, which will provide expert scientific advice on climate policy to the national competent authorities. Moreover, each country shall draw up and communicate to the Commission its long-term strategy, in line with the climate-neutrality objective, to be updated by 1 January 2029 and every 10 years thereafter, or every 5 years as deemed necessary.

The Fit for 55 package

In order to make progress towards the EGD targets, a set of measures comprising the Fit for 55 package was **presented in July and December 2021**, aiming to enable a reduction in GHG emissions of at least 55% by 2030. The package consists of a set of legislative initiatives⁷ revising and updating EU climate, energy and transport legislation, with provisions on prices, environmental objectives, rules and mechanisms to support the transition. The measures can be grouped into thematic blocks.

A first set of legislative measures concerns the **reduction of carbon emissions and their pricing**. Of note among them is the **modification and extension of the EU Emissions Trading System (ETS)**,⁸ the main tool to reduce GHG emissions. The ETS was created on the basis of the “polluter pays” principle: industries covered by this system must

⁴ The EU should communicate the new contribution to the United Nations Framework Convention on Climate Change (UNFCCC) by 2025.

⁵ The Board published a report on the 2050 target in January 2024.

⁶ The EEA is an EU body set up in 1990 and based in Copenhagen, tasked with: (i) helping the EU and its members to make informed decisions on improving the environment by integrating environmental considerations into economic policies, and (ii) coordinating the European Environment Information and Observation Network (EIONET).

⁷ Thirteen interrelated proposals reviewing existing EU climate and energy legislation and six new legislative proposals.

⁸ The ETS was launched in 2005. The 2018 revision of the Directive established the total allowances for phase 4 (2021-2030), covering 43% of EU GHG emissions.

purchase one emission allowance⁹ for every tonne of CO₂ they release into the atmosphere. A carbon market is thus established, based on a capping system, where energy-intensive sectors,¹⁰ the power generation sector and the aviation sector trade their allowances. The new rules have increased the GHG emission reduction target for 2030, compared with 2005 levels, from 43% to 62% for the sectors covered by the ETS. To this end, the cap on GHG emissions is reduced with a more ambitious linear reduction factor (4.3% per year), its scope is extended (to include for the first time emissions from maritime transport), free allowances for the aviation sector are gradually phased out until 2026 and the market stability reserve is amended.¹¹ The creation of new rules on the use of ETS revenues is also envisaged, as well as an increase in the amount allocated to the **Modernisation and Innovation Funds**¹² (see Section 5).

In the same vein, a new independent **emissions trading system for buildings, road transport and other sectors** (called ETS2) was created, under which distributors supplying fuels to those sectors will have to surrender allowances based on the volume and carbon intensity of the fuels released from 2026 onwards. All allowances shall be purchased at auctions and no free allowances shall be provided. Part of the revenue will go to the **Social Climate Fund**, a new instrument created to protect the people and firms most affected by the increase in road transport and heating fuel prices resulting from the introduction of the new regime. Another part will be channelled into the Modernisation and Innovation Funds.

In parallel with the reform and extension of the ETS, a new regulation, the **Carbon Border Adjustment Mechanism (CBAM)**, which is the equivalent of the ETS for producers outside the EU, has been approved to ensure that the lower GHG emissions incentivised by the ETS are not offset by emissions incorporated in products imported from abroad that do not pay for their carbon emissions at source. The mechanism requires importers of carbon-intensive products to purchase CBAM certificates to compensate for the price difference with the domestic market. This also prevents carbon-intensive production from relocating to countries with less stringent climate policies than the EU. The first phase of the CBAM will cover imports of iron and steel, cement, fertilisers, aluminium and electricity, which should start contributing from 2026.¹³ The Commission reserves the right to extend the system to other sectors, without specifying a timetable.

In the field of emissions, mention should also be made of the revision of two important environmental regulations. The first, the so-called **Effort Sharing Regulation**

⁹ Allowances are purchased through auctions and prices are determined by supply and demand.

¹⁰ Including refineries and steel, cement, glass and paper production.

¹¹ The market stability reserve manages the surplus allowances accumulated since 2009 and increases the resilience of the system to major shocks by adjusting the supply of allowances for auctioning.

¹² The Modernisation Fund and the Innovation Fund aim to improve the energy systems of lower-income Member States and to finance low-carbon, carbon capture and storage, and renewable energy projects.

¹³ Importing firms shall provide CBAM emission certificates according to the carbon intensity of imported products. The price of certificates will be aligned with that of ETS allowances. Imports shall be declared to the national competent authority.

(ESR), sets binding annual GHG emission targets for Member States in sectors not covered by the ETS. The revised regulation sets an EU-wide GHG emissions reduction target for 2030 of 40% relative to 2005 (up from 29%), implying stricter targets in sectors such as national maritime and road transport, buildings, agriculture, waste and small industries.¹⁴ The second is the **Land Use, Land Use Change and Forestry (LULUCF) Regulation**, concerning how land, trees, plants, biomass and wood contribute to both the emission of CO₂ into the atmosphere and its absorption. The revision strengthens the contribution of the forestry sector to the overall climate ambition. It sets an EU-wide target for the sector of net removals of 310 million tonnes of CO₂ equivalent from the atmosphere by 2030 and assigns each Member State a binding national target to increase net GHG removals, to be met also by 2030.

A second set of measures in the Fit for 55 package are those adopted in the area of **investment in clean transport**, such as the revision of the regulation setting more stringent CO₂ emission standards for **new cars and vans**. The new rules¹⁵ aim to reduce emissions from road transport, ensure innovation continues in the automotive sector and give the sector the boost it needs to make the transition to zero-emission mobility. In the same vein, measures have been introduced to mitigate **aviation** and **maritime transport** emissions and promote the uptake of sustainable fuels in both sectors, with the ReFuelEU Aviation and FuelEU Maritime regulations. Meanwhile, the **Alternative Fuels Infrastructure Regulation** aims to ensure that there is a sufficient network of facilities for the recharging of vehicles on the road and the refuelling of ships with alternative fuels.

A third block of proposals concerns the **energy sector** and aims to accelerate the clean energy transition and increase energy savings. The revision of the **Renewable Energy Directive** has raised the binding target for the increase in the share of renewables (solar, wind, hydro and biomass) in total EU energy consumption to at least 42.5% by 2030, from 32% previously, which in practice means almost doubling the current share.¹⁶ The **Energy Efficiency Directive** has been revised, with the aim of reducing final energy consumption in the EU in 2030 by an additional 11.7% with respect to the projections made in 2020. These proposals include several concrete provisions for Member States to step up their efforts, such as a higher annual energy saving requirement and new rules to reduce energy consumption in public sector buildings. The **Energy Performance of Buildings Directive** has also been revised with measures to accelerate the pace of building renovation and the transition to more efficient and smarter energy management systems. Buildings are responsible for 40% of the energy consumed and 36% of direct and indirect GHG emissions. Finally, mention should be made of the proposal to revise the regulation of the European gas

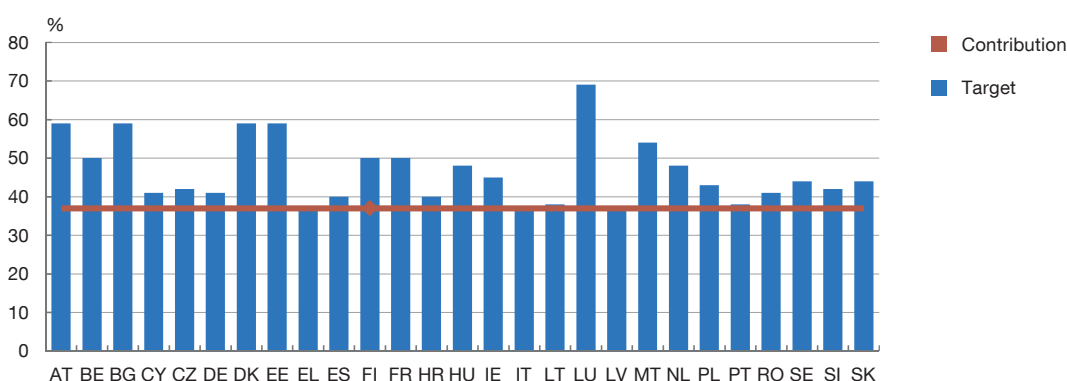
¹⁴ Although the new ETS Directive provides for its application to international maritime transport, as well as to buildings, road transport and other industrial sectors, the scope of the ESR, including national maritime and road transport, buildings, agriculture, waste and small industries, remains unchanged.

¹⁵ The new rules stipulate that, by 2035, new vehicles registered in Europe should be zero-emission and, as an intermediate step, by 2030 average emissions of new passenger cars should be reduced by 55% and those of new vans by 50%.

¹⁶ In 2020, 22.1% of the energy consumed in the EU came from renewable sources.

Chart 1

Percentage of RRP allocation that contributes to climate objectives



SOURCE: Recovery and Resilience Scoreboard (https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/index.html).

market, to accommodate **hydrogen and decarbonised gases**,¹⁷ which should gradually replace natural gas.

On the fiscal front, the **Energy Taxation Directive** is being revised,¹⁸ to incentivise producers, users and consumers to adopt sustainable practices. The proposal to revise the directive broadens the tax base by making more products subject to taxation and affects the structure of tax rates, with the aim of increasing taxation on the most polluting fuels and rationalising the use of tax exemptions and reductions by the Member States.

References and the approval status of the different legislative instruments underpinning these initiatives are included in the Annex. At present, most of the initiatives in the Fit for 55 package have been adopted following the completion of their respective legislative processes. It should be noted that during the negotiation processes between the co-legislators – which lasted more than two years – the Commission’s initial proposals have undergone changes, some of which are significant.¹⁹

The Recovery and Resilience Facility

As mentioned above, the **NGEU** recovery fund, which was launched to boost the recovery of the EU economies after the COVID-19 pandemic, incorporated **climate and environmental objectives as one of its main pillars**. The Recovery and Resilience Facility (RRF) is the

¹⁷ <https://www.consilium.europa.eu/en/press/press-releases/2023/12/08/gas-package-council-and-parliament-reach-deal-on-future-hydrogen-and-gas-market/>

¹⁸ Energy and electricity taxation plays an important role in energy policy. The Energy Taxation Directive (2003/96/EC) established harmonised rules for the taxation of these products, with the aim of ensuring the proper functioning of the internal market.

¹⁹ During these negotiations, diverging national positions emerge. For example, the position of France and other Member States in favour of considering nuclear energy as green energy, or Germany’s difficulties in accepting the phasing out of combustion engines in land transport. Detailed information on the negotiation processes and changes introduced due to these different positions can be found on the European Parliament’s website.

most important component of NGEU and calls for Member States' Recovery and Resilience Plans (RRPs), which are financed through the Facility, to allocate at least 37% of the budget to investments and reforms geared towards the green transition. Available information on the implementation of the RRP budgets indicates that this target has been comfortably exceeded and that on average around 40% of the RRP budgets has been allocated to climate objectives (see Chart 1). In particular, investments and reforms aimed at supporting sustainable mobility, increasing energy efficiency and promoting the development of renewable energy, are noteworthy.²⁰

²⁰ See https://commission.europa.eu/publications/recovery-and-resilience-facility-annual-report-2023_en, 25 September 2023, pp. 38-42.

3 The Russian aggression against Ukraine and its impact on the EU energy strategy. The REPowerEU Plan

Following the COVID crisis and the persistence of the bottlenecks that emerged as the economy recovered from the recession, energy prices in the EU started to rise significantly, albeit with an uneven impact across countries. In autumn 2021 **the Commission proposed to the Member States a catalogue of possible measures²¹ to address the impact of those increases on the most vulnerable consumers and firms** at national level.

Against this background, **Russia's invasion of Ukraine** in February 2022 was a major shock, for two reasons. First, it **highlighted the huge vulnerability of the EU due to its energy dependence on Russia's²² fossil fuels** (gas, oil and coal), which was actively used by Russia to weaken European economies in the context of the war. Second, it **worsened the situation in European energy markets**, especially in the natural gas market, fuelling electricity price increases and generating a major energy crisis.

The EU's response was swift and had two objectives: to **reduce energy dependence on Russia** as quickly as possible, accelerating the transition to an energy-sustainable economy, and to **manage the energy crisis** caused by high gas and electricity prices in the EU, by introducing a series of short and medium-term measures. Both strategies ran in parallel, with important interconnections between them, with the **REPowerEU Plan** as their main axis.

3.1 The REPowerEU Plan: energy decoupling from Russia

On 8 March 2022, within weeks of Russia's invasion of Ukraine, **the Commission published the REPowerEU Communication²³**, outlining the main avenues for action to end energy dependence on Russia – by 2027 at the latest – and increase energy security, as well as to address the consequences of the invasion on energy prices. The Commission proposed three lines of action: diversifying energy supply sources, increasing the production of renewables, and reducing energy demand and increasing energy efficiency. The promotion of clean energy – implemented through the Fit for 55 package measures, the projects and reforms of the RRP and the national climate plans – was thus the main lever to reduce dependence on Russian fossil fuels. Reference was also made to the need to mobilise the financial resources necessary to achieve these objectives. The proposal was supported by European leaders at their informal summit in Versailles (10-11 March 2022).

The **REPowerEU Plan**, published on 18 May 2022, **revisited and fleshed out the general actions outlined in the Communication of 8 March** to end energy dependence on Russia and manage the gas price crisis, elaborating on the three lines of action mentioned in the previous paragraph:

²¹ Tackling rising energy prices: a toolbox for action and support, 13 October 2021.

²² Balteanu and Viani (2023).

²³ REPowerEU: Joint European action for more affordable, secure and sustainable energy, 8 March 2022.

- **Energy saving:** establishment of a more ambitious energy efficiency target compared with the Fit for 55 plan (13%, up from 9%),²⁴ promotion of changes in consumption habits to reduce energy demand (by up to 5%) and introduction of fiscal measures to stimulate energy savings, among other actions.
- **Diversification of the EU energy supply:** agreements with international liquefied natural gas (LNG) suppliers, start-up of the **EU Energy Platform** to channel joint gas purchases and negotiate contracts on behalf of participating states and companies and launch of the **EU External Energy Strategy** to support a global green and just transition.
- **Accelerating the deployment of renewables and reducing fossil fuel consumption in industry and transport:** increase of the overall renewables production target (from 40% to 45%²⁵ in 2030) and adoption of the necessary measures to make this possible (Solar Strategy, simplification of administrative permits, production of renewable hydrogen, biomethane), and measures in the field of industry and transportation.

The Commission proposed **financing the additional investments** needed to achieve these targets – estimated at around €210 billion up to 2027 – through the funds for as yet unused RRF loans (€225 billion at that time), an additional €20 billion for subsidies from the ETS,²⁶ and voluntary transfers from the Cohesion Funds to REPowerEU. These funds were channelled to the Member States through the RRF. In particular, the Member States incorporated **new chapters – the so-called REPowerEU chapters – into their national plans (RRPs)**, which required an amendment to the RRF regulation.²⁷ By the end of 2023 most Member States had submitted their respective chapters and the Council had approved each of them. These REPowerEU chapters provide for new reforms and investments by the Member States (and/or revisions of those already included) to implement the REPowerEU lines of action or strengthen clean technology-related industrial sectors.²⁸

Complementing the measures taken in the context of the crisis initiated by Russia's invasion of Ukraine, **in March 2022 the Commission established a State aid Temporary Crisis Framework**,²⁹ which allowed Member States to: (i) grant limited amounts of aid to firms affected by the crisis or by the related sanctions; (ii) ensure that sufficient liquidity remained available to firms; and (iii) compensate firms for the additional costs incurred owing

²⁴ In 2021, the Commission carried out a study on the energy saving potential of energy efficiency measures, which found that it could reach 13% of final energy consumption by 2030 if the EU stepped up funding and efforts in this regard.

²⁵ The increase finally approved was 42.5%, with the ambition of reaching 45%.

²⁶ Finally, the Council decided that they should be funded from the Innovation Fund and the ETS.

²⁷ Regulation (EU) 2023/241. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023R0435>

²⁸ The investments and reforms included in these chapters also reflect the objectives of the Green Deal Industrial Plan (see Section 4). See the mid-term RRF evaluation report *Strengthening the EU through ambitious reforms and investments* of 21 February 2024, pp. 6-7.

²⁹ See Communication “[Temporary Crisis Framework for State Aid measures to support the economy following the aggression against Ukraine by Russia](#)” of 24 March 2022.

to exceptionally high gas and electricity prices. This temporary framework was revised in July 2022, to accommodate the REPowerEU targets (development of renewable energy and rapid decarbonisation of industry), and in October 2022, to further support crisis emergency measures.³⁰

Within the State aid framework, and after lengthy negotiations with the Spanish and Portuguese authorities, **the Commission approved the measure known as the “Iberian exception”**, aimed at reducing wholesale electricity prices on the Iberian market (MIBEL) by reducing the cost of fossil fuel power plant inputs (particularly gas).³¹ The measure was in force from June 2022 until December 2023, although it ceased to be effective in February of that year due to gas prices falling below the established ceiling. The Iberian Exception was justified by the relative isolation of the Iberian electricity market from the rest of the European market.³²

3.2 Managing the high energy price crisis

The REPowerEU communication of 8 March already pointed to the need for **emergency measures to limit the contagion of high gas prices to electricity prices**. A few days later, the Commission published a second communication,³³ with a more concrete assessment of the different measures that could be taken in the short term to control the sharp rise in gas and electricity prices in the EU.

Throughout 2022 discussions and decision-making in the Council on these measures were marked by the tension between two different positions: on the one hand, the reluctance of the Commission and a group of Member States to interfere with the functioning of the European electricity market – and, in particular, to modify the marginalist pricing mechanism based on the cost of the marginal production technology (usually gas) – and, on the other hand, the desire of another group of Member States to intervene in this mechanism in order to curb the impact of price increases on the most vulnerable firms and households.

The Commission initially chose to recommend actions aimed at moderating gas price increases, the source of the electricity price increases, while avoiding direct action on the latter. It thus proposed **pooling gas purchases** and ensuring **storage facilities were sufficiently filled**. Thus, on a proposal from the Commission, in June the Council adopted a regulation setting gas storage targets for autumn 2022 and beyond. The storage targets were met well ahead of schedule in both 2022 and 2023.³⁴

³⁰ See press releases https://ec.europa.eu/commission/presscorner/detail/en/ip_22_4622 and https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6468, extending the temporary framework until June/December 2023. This framework was subsequently revised and transformed under the GDIP.

³¹ See press release https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3550.

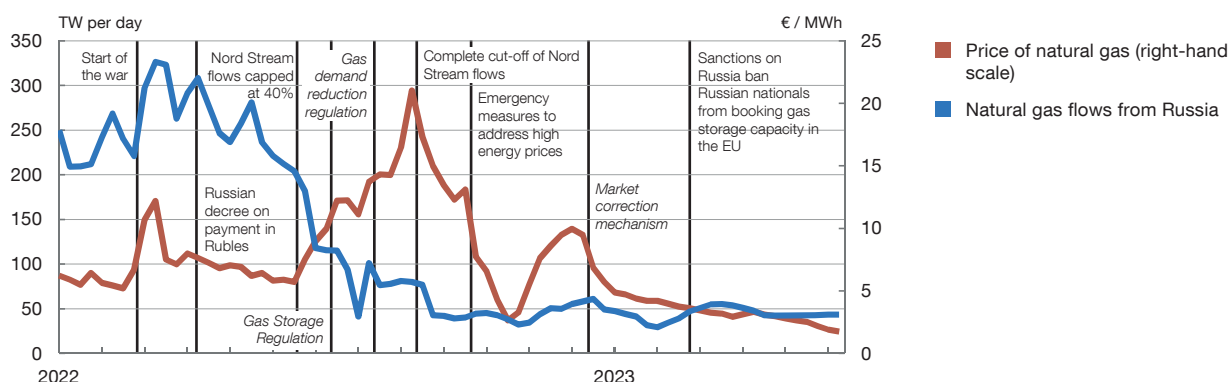
³² Arnedillo, Sanz and Rabinovich (2023). “Análisis de los efectos de la ‘excepción ibérica’”, El Periódico de la Energía.

³³ This second communication underpinned the discussions at the European summit of 24-25 March 2022. See <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022DC0138>, 23 March 2023.

³⁴ The Gas Storage Regulation <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022R1032>, approved in June 2022, required Member States to fill their gas tanks to at least 80% in November 2022 and 90% in subsequent years.

Chart 2

Emergency measures and gas prices



SOURCE: Refinitiv. Weekly averages.

Throughout the summer and autumn of 2022, as the gas and electricity price rises intensified and the risk to the EU's security of energy supply increased, the Commission proposed a number of **emergency measures**.³⁵ The measures, detailed in Box 1, were approved by EU energy ministers after intensive negotiations, reflecting the wide range of situations in which Member States found themselves during the crisis. Chart 2 shows the changes in gas prices and in the volume of Russian supplies over time, and illustrates how the adoption of these measures helped to tackle the crisis.

The information available suggests that **the implementation of REPowerEU and the emergency measures adopted in 2022 led to significant progress in reducing energy dependency and accelerating the green transition**. In particular:³⁶ (i) Russian fossil fuel imports have fallen sharply; (ii) the percentage of gas imported from Russia via pipeline has dropped from 50% at the start of 2021 to around 10% at end-2023; (iii) energy saving in energy-intensive industries has been considerable and the gas storage targets have been met much earlier than expected, guaranteeing gas supplies in the winters of 2023 and 2024; (iv) the percentage of electricity generated from renewable sources has increased from 37% to 45% between 2021 and 2023; and (v) gas and electricity prices have moderated significantly. Table 1 shows the substantial reduction in energy product transactions between Russia and the EU between 2021 and 2023,³⁷ except for some very specific categories, and the rapid energy decoupling between the two areas.

In spite of all this, **the medium and long-term challenges remain very significant**. In particular, persistently higher energy prices in Europe than in the US seriously hamper the

³⁵ Article 122 of the TFEU provides that the Council may approve measures deemed necessary to deal with emergency situations, without having to go through Parliament. The Commission considered that this article was applicable in view of the surge in gas and electricity prices, which reached all-time highs in the summer of 2022 due to the sharp drop in Russian gas supply, and the risk that it would be completely cut off.

³⁶ European Commission. (2023b). *2023 report on the state of the energy union*.

³⁷ McWilliams, Sgaravatti, Tagliapietra and Zachmann (2024). *The European Union-Russia energy divorce: state of play*.

Table 1

EU net imports of Russian energy products (2021-2023)

	Units	2021	2023	Percentage change
Crude oil	mb/d	2.26	0.22	-90%
Petroleum products	mb/d	1.05	0.09	-91%
Natural gas	bcm	155	27	-83%
LNG	bcm	13	18	38%
Uranium products	€m	572	1,064	86%
Coal	Mt	52	0	-100%
Electricity	TWh	13	0	-100%
Total (excluding uranium products)	TJ	14,251,000	2,221,000	-84%

SOURCE: <https://www.bruegel.org/analysis/european-union-russia-energy-divorce-state-play>

NOTE: Units: mb/d = million barrels per day; bcm = billion cubic metres; Mt = metric tonnes; TWh = terawatt hour; TJ = terajoules.

competitiveness of European industry. Moreover, the infrastructure network and the design of energy markets have to adapt to a scenario where renewables account for a greater share of the energy mix.

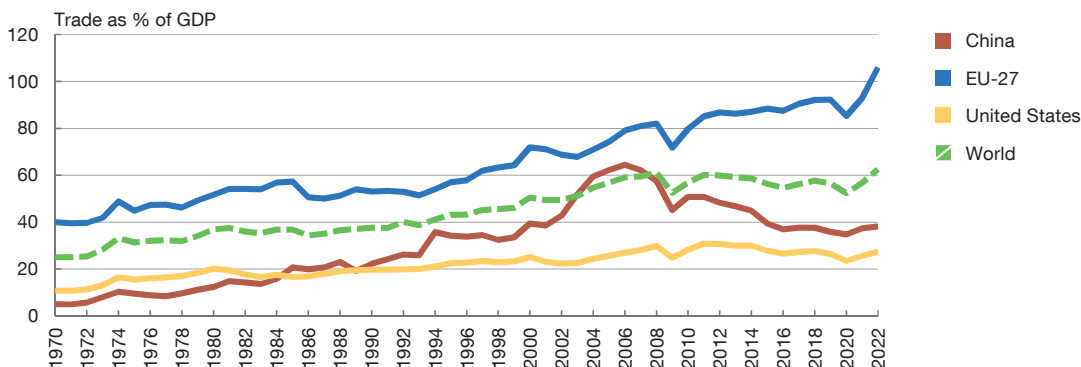
4 Energy transition policies in the era of global fragmentation: the Green Deal Industrial Plan

Until the 2008 global financial crisis, the world economy was immersed in a process of rapid globalisation. This process was interrupted by the crisis, when Chinese and, to a lesser extent, US trade began to contract. However, the EU's trade openness continued to increase (see Chart 3). Subsequently, when Trump became president of the United States, he started a “trade war” with China, prompting a major change in world economic relations. The worsening of relations between the two economies led to the return to protectionist policies, which prioritise domestic production over imports, and a politicisation of economic relations at the global level.

In this new geopolitical context, the strong economic dependencies of some economies on China, developed during the globalisation phase through global supply chains, became vulnerabilities for those economies, as demonstrated during the pandemic. Beyond the political confrontation, these dependencies and the risks of deindustrialisation explain the strategy followed by the US (and other Western countries) to strengthen economic security and the shift towards an industrial policy aimed at preserving key sectors for the digital transformation and the climate transition (semiconductors, batteries, key commodities). As Chart 4 illustrates, around 90% of global clean technology manufacturing capacity is concentrated in China and the Asia-Pacific region.

In the case of Europe, the tradition of trade openness and the lack of its own supply of key commodities have led to the delayed incorporation of these geopolitical constraints in the design of its policies.³⁸ Nonetheless, following the publication of the **Inflation Reduction Act (IRA)** in the United States in August 2022, the shift towards policies aimed at defending the European industrial base became clearly explicit. The IRA is part of the legislation

Chart 3
Global trade 1970-2022 (% of GDP)

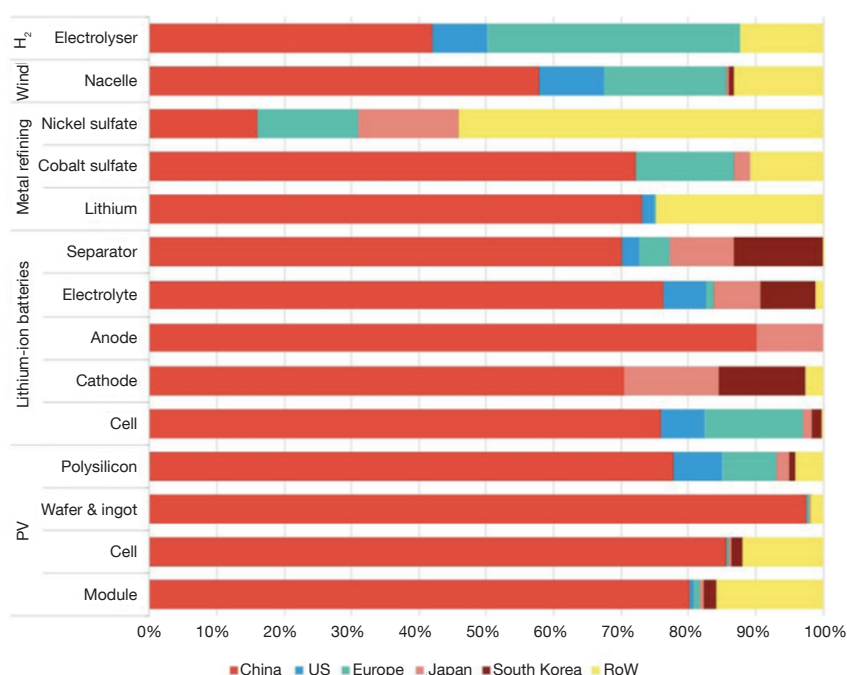


SOURCE: World Bank - Trade (% of GDP).

38 ECB. (2023). *The EU's Open Strategic Autonomy from a central banking perspective*.

Chart 4

Clean energy manufacturing capacity by geographical area



Source: BloombergNEF. Note: By factory location. PV, Hydrogen and battery component expressed in MW, MWh, m² or tonnes. Nickel is class 1 variety, and lithium is in lithium carbonate equivalent. H₂ is hydrogen. Data as of October 2022, except Electrolyser data which refer to 2021 and nacelle data which are for 2020.

SOURCE: https://www.eeas.europa.eu/eeas/geopolitics-climate-change_en

put in place by the Biden Administration under its strategy to improve competitiveness, innovation and industrial productivity in the US economy. It envisages a sharp increase in federal spending in the fields of energy security and climate change, with actions aimed at reducing US GHG emissions by 40%, compared with 2005, by 2030³⁹ and strengthening domestic production of clean technologies. The law, of which more details are given in Box 2, provides for the extension of a significant volume of tax credits to encourage green investments (see Table 2).

One of the effects of the IRA that has raised the most concern in the EU is the possible impact on the production of batteries and electric vehicles (EVs). Many EVs manufactured abroad will cease to be eligible for tax credits in the United States. This is because under the IRA the tax credits apply only if the materials used to manufacture the vehicles are sourced from the United States or from a country with a free trade agreement signed with the US, which excludes the EU. Indeed, these “local content requirements” may infringe on the international trade rules of the World Trade Organization (WTO).

39 Environmental Protection Agency (2023). *Inflation Reduction Act Overview*. An analysis published in *Science magazine* estimates that the measures introduced by the IRA could double the pace of carbon emissions reduction in the United States by between 43% and 48% by 2035, compared with 2005 levels.

Table 2

Summary of IRA energy and climate investments

	Amounts (million USD)
TOTAL ENERGY AND CLIMATE INVESTMENTS	391,000
Clean energy tax credits	161,000
Air pollution, transportation and infrastructure	40,000
Individual clean energy incentives	37,000
Clean manufacturing tax credits	37,000
Clean fuel and vehicle tax credits	36,000
Conservation, rural development and forestry	35,000
Building efficiency, electrification, transmission, industry, Department of Energy (DoE) grants and loans	27,000
Other energy and climate spending	18,000

SOURCE: Elcano and Committee for a Responsible Federal Budget (2022).

However, the risk that the IRA measures will trigger an exodus of human and business capital in the clean technologies sector from Europe to the United States should be qualified, as suggested by certain analyses,⁴⁰ and it should be remembered that the EU also has instruments at its disposal. In tune with this, the EU's initial reaction was measured and it proposed opening a dialogue with the United States. In particular, an EU-United States Task Force on the IRA has been established to address specific concerns related to the Act in a consensual manner. For its part, the European Parliament has welcomed the opening of negotiations with the United States to reach an agreement to strengthen international supply chains for critical minerals.

In a more structured manner, and in response not only to the possible consequences of the IRA but also to the global geostrategic shift, the European Commission has proposed the development of a **Green Deal Industrial Plan** (GDIP), which it presented in February 2023. The GDIP aims to enhance the competitiveness of Europe's net-zero (i.e. carbon neutral) industry and support the rapid transition to climate neutrality. To this end, it is underpinned by four pillars: (i) a predictable and simplified regulatory environment; (ii) access to funding; (iii) enhancing workers' skills; and (iv) strengthening global cooperation by seeking strong links with reliable trade partners to access the supply of raw materials and clean technologies and by diversifying the EU's import sources. The GDIP ties in with the EGD, NextGenerationEU and REPowerEU to create a broader and more up-to-date proposal for the green transition project in the EU.

To improve and simplify the EU's regulatory framework in the field of clean technologies (the first pillar of the GDIP), three legislative pieces have been approved: the Net-Zero Industry Act (NZIA), the Critical Raw Materials Act (CRMA) and the Electricity Market Design (EMD). Their main features are described below.

⁴⁰ [The Inflation Reduction Act: How Should the EU React?](#)

The NZIA aims to boost the industrial roll-out of net-zero technologies (or clean technologies) needed to achieve the EU's climate goals and reduce its strategic dependencies.⁴¹ As the EU is a net importer of some key technologies and components for the green transition, NZIA sets a target for domestic production capacity of net-zero technologies to reach 40% of EU needs by 2030, boosting the competitiveness of European industry and creating quality jobs. Thus, the regulatory framework for manufacturing these technologies is simplified, investment is incentivised by **simplifying administrative processes and accelerating permitting procedures, and support is provided for strategic projects**. In the hydrogen sector, which is especially significant, the creation of the European Hydrogen Bank is expected to unlock private investments in value chains and contribute to the creation of a European hydrogen market.

The CRMA aims to ensure a secure and sustainable supply of critical raw materials for European industry and to reduce the risks arising from the concentration of imports in a small number of suppliers, given that the EU relies heavily on third countries for the supply of these products.⁴² The law establishes a list of critical raw materials and a list of strategic raw materials, which are crucial for technologies in the field of the green and digital transition, as well as for defence and space, and sets as a priority the development of European production capacity at different stages of the strategic raw materials value chains. Specifically, by 2030 10% of the EU's annual consumption must be extracted domestically, 40% of its annual consumption must be processed domestically and 15% of its annual consumption must be recycled in the EU. Also, no more than 65% of the EU's annual consumption of each strategic raw material may come from a single third country. It also includes measures to boost investment in research and innovation, and to promote a more sustainable and circular raw materials economy. The European Critical Raw Materials Board will advise the Commission and facilitate EU-wide coordination and implementation of actions in this sector.

Lastly, **the Electricity Market Design (EMD) reform seeks to make this market more resilient and to protect European consumers and businesses from short-term market price volatility**. In the future, electricity produced from renewable sources (such as solar and wind) is expected to increase from 37% in 2020 to more than 60% in 2030, which may lead to increased price volatility. At the same time, it is necessary to ensure a sufficient supply in the absence of wind or sun. In short, the market needs to adapt to a scenario in which renewable energies will gain weight and attract the investments this will require.⁴³ To this end, further development of the long-term market is proposed, through the use of long-term power purchase agreements and supporting investment with two-way contracts

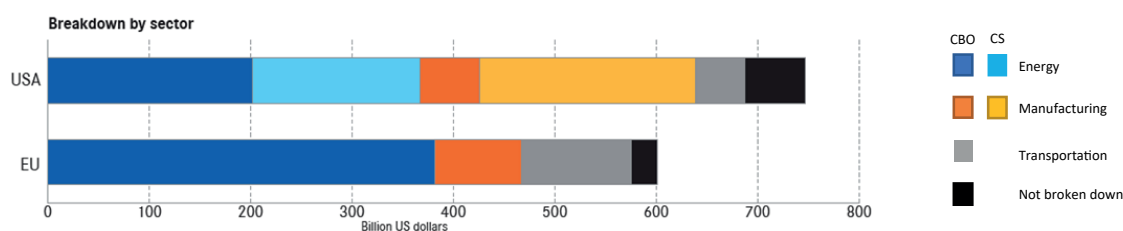
⁴¹ The Commission proposed singling out some net-zero technologies as strategic (solar photovoltaic and solar thermal, electrolysers and fuel cells, onshore and off-shore renewable technologies, sustainable biogas/ biomethane, batteries and storage, carbon capture and storage, heat pumps and geothermal energy, and grid technologies). However, the law that was finally passed only includes a single list of net-zero sectors and criteria for selecting strategic projects.

⁴² For example, 97% of Europe's magnesium supply comes from China, 100% of the rare earths needed for permanent magnets are refined in China, and 98% of Europe's borate supply comes from Turkey.

⁴³ See the *Revision of EU electricity market design* in the Annex.

Chart 5

A comparison of environmental and production subsidy amounts in the United States and the European Union



SOURCE: https://www.sachverstaendigenrat-wirtschaft.de/fileadmin/dateiablage/Publikationen/FGCEE/CAE-SVG_Joint_statement_IRA_2309.pdf
 NOTE: Data from the Congressional Budget Office (CBO) + additional estimate by Credit Suisse (CS).

for difference,⁴⁴ as well as improving the liquidity of the futures market. Although the reform is already approved, discussions on the design of the European electricity market can be expected to continue, as some critics consider that the reform has not been sufficiently far-reaching to solve the long-term challenges facing the European electricity system.⁴⁵

The GDIP initiatives require additional new investments, which will need to be funded. However, the EU's capacity to implement new sources of funding at EU level is limited for the time being. To address this shortfall in the short term, **the Commission further relaxed State aid rules** so that Member States are better able to channel funding at national level for these purposes. The renewed Temporary Crisis and Transition Framework⁴⁶ (TCTF) and the revised General Block Exemption Regulation⁴⁷ (GBER) give greater flexibility to Member States in providing public support for investments in net-zero technologies, including schemes to accelerate the introduction of renewables and energy storage, decarbonise industrial production processes and encourage investments in key sectors for the transition to a sustainable economy. In some cases, Member States are allowed to match the aids available under the IRA (see Box 3).

As regards funding at EU level, the Commission proposed the creation of the **STEP Platform** to encourage investments in net-zero technologies in Member States with less fiscal muscle. However, the STEP version adopted after the legislative negotiation process has low funding power and is only used in the defence sector. The fact that the additional funding for the GDIP comes mostly from State aid provided at national level poses risks for access to the single market on an equal footing by firms from all Member States.

44 These are long-term contracts entered into with public entities to support investments; the authorities supplement the market price when it is low and ask the producer to reimburse an amount when the market price exceeds a certain limit, in order to avoid excess windfall profits. These contracts will apply to new power-generating facilities based on wind energy, solar energy, geothermal energy, hydropower without reservoir and nuclear energy.

45 Fabra (2023). [Reforming European electricity markets: Lessons from the energy crisis](#)

46 Press release https://ec.europa.eu/commission/presscorner/detail/en/IP_23_1563

47 Press release https://ec.europa.eu/commission/presscorner/detail/en/IP_23_1523

Table 3

Projected environmental subsidies in the United States and the EU (2022-2031)

	IRA	EU
Electric car purchases	\$7,500 / car	€6,000 / car
Clean technology manufacturing	\$37 billion	€35 billion
Renewable energy	\$208 billion	€800 billion

SOURCE: <https://www.bruegel.org/policy-brief/how-europe-should-answer-us-inflation-reduction-act>

The main goal of both the IRA and the GDIP is to promote climate transition by supporting domestic industries that produce the technologies necessary for the transition (net-zero technologies). To this end, both programmes establish instruments to support investments in these sectors. However, direct comparisons of the amounts involved in the two plans (see Chart 5) should be interpreted with caution. The EU and the United States seek to achieve the same goal in different ways. Thus, while the United States has launched a single flagship programme, a variety of initiatives at EU and national level have been implemented in Europe, with funding coming mainly from NextGenerationEU and RePowerEU.⁴⁸ These funds are channelled in different ways by the Member States. In Spain, for example, most are awarded through public tenders. An important difference between the United States and the EU is precisely that the United States implements the measures at federal level, while in the EU many measures are implemented by the Member States. Moreover, some IRA subsidies discriminate against foreign producers, while EU subsidies do not. However, according to a comparative analysis conducted by Bruegel,⁴⁹ IRA subsidies for electric vehicles in the United States reach \$7,500 per car, while on average the EU Member States subsidise around €6,000 per vehicle (see Table 3). In addition, the European subsidies for renewable energies are nearly four times greater than the US subsidies.

⁴⁸ https://www.sachverstaendigenrat-wirtschaft.de/fileadmin/dateiablage/Publikationen/FGCEE/CAE-SVG_Joint_statement_IRA_2309.pdf

⁴⁹ <https://www.bruegel.org/policy-brief/how-europe-should-answer-us-inflation-reduction-act>

5 Investment needs and financing the climate transition

The transition to climate neutrality will require a **broad investment agenda** over the coming decades to ensure substantial improvements in quality of life, as well as to ensure Europe's future economic competitiveness. The EU will need to mobilise an appropriate mix of public and private sector investments to make our economy sustainable and competitive and ensure that the EU remains an attractive destination for investment in research, innovation, deployment of new technologies, circular solutions and infrastructure.

The additional investment needs to meet the 2030 climate, energy and transport targets are estimated at more than €477 billion per year during the current decade. Achieving the REPowerEU targets will require an estimated additional investment of up to €35 billion per year between 2022 and 2027.⁵⁰ In parallel, boosting the EU's manufacturing capacity in strategic zero-emission technologies, as set out in the NZIA, will require a cumulative investment over the current decade of €92 billion (compared to €52 billion projected under a status quo scenario), while closing investment gaps for other environmental objectives, such as circular economy, pollution, water or biodiversity, will require approximately €110 billion per year. Although these figures differ in scope, timing and estimation method and are therefore not directly additive, they do reflect the scale of the investment challenge facing the EU and the high (public and private) financing needs they involve. Not to mention the additional investments that will be necessary to meet the climate targets, which should be approved by the next 2024-2029 Commission, as foreseen by the European Climate Law.

In 2020, immediately after publishing the EGD, the European Commission presented the **European GDIP**, with the aim of covering the investment needs for the climate transition. The plan presents a combination of legislative and non-legislative measures that has three dimensions. One is aimed at mobilising €1 trillion to support sustainable investments until 2030, using the EU budget and other associated instruments, such as the InvestEU programme,⁵¹ to attract private investment through guarantees. The second one, which provides an appropriate framework for sustainable investments, introduces specific measures to help private investors and public entities make investment decisions. This is the case of the EU Taxonomy which provides a common definition of what a sustainable investment is, as well as a classification system to identify environmentally sustainable economic activities. The third dimension is intended to provide counselling to the general governments of the Member States and to promoters of sustainable projects in bridging the gap between economically sound concepts and projects.

In addition, the EU and its Member States have **pledged to allocate €578 billion** (32.6% of total spending) **of the long-term EU budget for 2021-2027** (the Multiannual Financial Framework (MFF)) **and the NextGenerationEU recovery instrument, to climate**

⁵⁰ https://climate.ec.europa.eu/document/download/60a04592-cf1f-4e31-865b-2b5b51b9d09f_en

⁵¹ https://investeu.europa.eu/investeu-programme_en?prefLang=es

action. In the case of the MFF, this figure exceeds the initial climate spending target of 30% and is underpinned by specific spending targets for several of its programmes, such as 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%) or the LIFE programme (61%). The foregoing figure covers 37% of the €627.5 billion provisioned for the RRF – as part of the NextGenerationEU recovery fund – and earmarked for reforms and investments related to climate sustainability, in this case channelled at national level through the RRFs being implemented by the Member States. As discussed in Section 3, in 2023 the Member States included new REPowerEU chapters in their RRFs. New or expanded reforms and investments to accelerate the energy transition and gradually reduce the EU's dependence on Russian fossil fuels will benefit from additional financial resources (€20 billion in new grants from the auctioning of ETS and ETS2 allowances), transfers from other MFF funds and the possibility of using NGEU loans not yet applied for.

The EU has set up a number of specific instruments or mechanisms aimed at supporting the regions and groups most affected by climate transition measures, investment in innovation and R&D, environmental protection and the fight against climate change outside the EU (at international level).

Among the funding mechanisms aimed at supporting affected regions and groups, the **Just Transition Mechanism** aims to mitigate the negative effects of climate transition on those regions and sectors most negatively affected by their dependence on fossil fuels. This mechanism will contribute to mobilising between €65 billion and €75 billion over the period 2021-2027, via three channels: (i) the Just Transition Fund, with a €20.3 billion allowance, aimed at activating more than €25 billion in investments (€9.2 billion from the MFF and an additional €10.9 billion from NGEU); (ii) a specific regime under the InvestEU programme framework, with budgetary guarantees for mobilising up to €15 billion of private investment in the most affected regions, and (iii) a public sector loan facility in the form of grants from the EU budget and loans from the European Investment Bank (EIB), aiming to increase public investments in regional development.

Second, as part of the Fit for 55 package, the **Social Climate Fund** (SCF), was established alongside ETS2 (as mentioned in Section 2) to support vulnerable citizens and businesses most affected by the extension of the emissions trading system to the buildings and road transport sectors. The Fund will pool future revenues from ETS2, up to a maximum amount of €65 billion over the 2026-2032 period, which will be complemented by national contributions and will be earmarked for direct income support and investments in both energy efficiency-related building renovations and sustainable transport. As the Social Climate Fund is scheduled to start in 2026, one year before ETS2, it will initially be endowed with €50 million of funding from the original ETS. Resources will also be channelled through the **Modernisation Fund**, financed with 2% of the total auctioning of ETS allowances for the 2021-2030 period. This programme will allocate around €48 billion over this period

to improving energy systems in low-income countries,⁵² in particular to boost renewable energies, energy efficiency, energy storage, energy networks, and a just transition in carbon-dependent regions.

One of the instruments aimed at boosting innovation and R&D is the **Innovation Fund**, also financed under the ETS framework, which will allocate around €40 billion over the current decade to develop innovative low-carbon technologies (technologies and processes in energy-intensive industries, in carbon capture, use and storage, in renewable energy and in energy storage). Likewise, under the umbrella of the **Horizon Europe** programme, and through the Framework Programme for Research and Innovation (R&I) for 2021-2027, €95.5 billion (€5.4 billion from the NGEU) will be allocated to promote climate-related research and innovation projects.

As regards protecting the environment, under the **new LIFE programme** €5.5 billion will be allocated up to 2027 to finance projects and actions in four sub-programmes: Nature and biodiversity, circular economy and quality of life, climate change mitigation and adaptation, and clean energy transition. On the external front, funds from the EU budget, the European Development Fund and the EIB will be earmarked to help developing countries reduce their GHG emissions. In 2022 €28.5 billion were mobilised from public sources and €11.9 billion from private financing, positioning the EU and its Member States as the world's largest providers of financing for combating climate change.

Lastly, in the context of the GDIP, the STEP Platform, whose €10 billion envelope will support investments in the defence industry, has been approved.

As noted at the start of this section, mobilising private capital is a prerequisite for reaching the level of investment that the green transition requires. Aside from the above-mentioned mechanisms for securing and leveraging private funding with public funds, deeper and more integrated financial markets in the EU – a true capital markets union (CMU)⁵³ – would provide critical support. This is why, after several action plans in this area, European institutions and other relevant actors are discussing how to make an additional qualitative and transformational leap towards the CMU. Developing specific instruments to finance the climate transition is also necessary so that private capital can be efficiently distributed through the markets. The EU is a global leader in green finance, an area in which significant headway has been made.⁵⁴

⁵² The beneficiary Member States are Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia.

⁵³ https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/capital-markets-union_en

⁵⁴ https://finance.ec.europa.eu/sustainable-finance_en

6 Concluding remarks

The climate and green transition has been at the heart of the policies implemented by the von der Leyen Commission between 2019 and 2024 and has become an integral part of the EU's growth strategy. However, the approach and nature of the measures proposed and adopted have been modified over the course of the legislature and in response to the events that have marked this mandate.

The COVID-19 pandemic, the war in Ukraine and the approval of a green industry public support programme in the US (the IRA) have influenced policy-making, which has focused more on economic security and autonomy in strategic sectors, and have incorporated greater concern about the European industry's global competitiveness and the risk of deindustrialisation. In any event, the commitment to climate transition and sustainability has not wavered.

To be implemented, climate transition policies require significant financial resources. Given the externalities associated with tackling climate change and the asymmetries between Member States in their fiscal capacity to implement these policies, funding at EU level has played a key role. Establishing the NGEU recovery fund was a very important step in this regard, as it provided relevant funding for reforms and investments linked to the green transition that are part of the Member States' RRP. However, cross-border and pan-European projects have received much less support via this channel. Although the REPowerEU and GDIP initiatives were not accompanied by new funding in equivalent amounts, successive re-allocations of the remaining funds from the NGEU fund are contributing to their implementation.

It is important to bear in mind that substantial investments will be needed to complete the climate transition over the coming decades. This will require the concurrence of more abundant flows of private financing and of greater public investments and support to carry them out. In this regard, it would be important to introduce a common funding instrument to finance projects providing public goods at European level, such as those related to combating climate change.⁵⁵ Using the flexibility of the EU State aid framework, which allows national governments to provide tax support to their firms, has been common in recent years. However, the use of State aid can create asymmetries in the level of support for companies in the different Member States and damage and fragment the internal market, affecting competition on a level playing field.

As regards private-sector funding, the plan to give a fresh boost to financial market integration in Europe, by developing the CMU, should help channel internal savings in the EU (while also attracting external funding) towards projects related to Europe's green transition.

Following the intense legislative activity of the years 2019-2024, the new regulatory framework that should underpin the transition to a climate-neutral European economy is

⁵⁵ See the Foreword by the Governor (p. 27) and Chapter 2 (p. 136) of the Banco de España's *Annual Report 2023*.

starting to become a reality. The implementation of these standards has raised concerns in some sectors, such as agriculture and fossil fuel-dependent industrial sectors, which may experience adverse impacts from these measures. In this connection, both the Member States and the EU have promoted the creation of instruments aimed at mitigating and alleviating, to the extent possible, these impacts.

The road to carbon neutrality by 2050 is still long. The new Commission emerging from the June 2024 European elections will have to approve the climate targets for 2040 and adopt the measures and promote the investments needed to achieve them. These actions should be consistent with the shift in EU priorities towards defence, economic security and strategic autonomy. In addition, particular attention should be paid to the uneven effects of the climate transition on different regions, sectors, businesses and households in order to mitigate the adverse impact, in particular on the most vulnerable groups.⁵⁶ The introduction of a permanent common funding instrument that will make it possible to finance large-scale projects while avoiding an excessive or uneven impact on national public finances and a deterioration of the single market would be very valuable in addressing these challenges.⁵⁷

⁵⁶ See Section 10 of Chapter 2 of the Banco de España *Annual Report 2023* or Section 5 of the Foreword by the Governor thereto.

⁵⁷ See Chapter 2 of the Banco de España *Annual Report 2023*.

EMERGENCY MEASURES TAKEN DURING THE ENERGY CRISIS

- On 5 August 2022, the Council adopted an emergency regulation aimed at achieving a voluntary and coordinated 15% gas demand reduction in the EU between August 2022 and March 2023. The regulation, which included a mechanism whereby the Council (on a proposal from the Commission) can declare an EU alert and impose a mandatory gas demand reduction, was extended until 31 March 2024¹ and again until 31 March 2025,² to secure gas supply and storage capacity. The rule incorporates an element of solidarity in gas supply between Member States, which takes into account the degree of interconnection of their gas infrastructures.
- On 6 October 2022 the Council approved a new emergency regulation³ to **address high electricity prices**. The rule: (i) included measures to limit demand for electricity, including a mandatory reduction of 5% of demand in peak hours (in force until March 2023); (ii) introduced a cap (of €180/MWh) on revenues obtained by electricity generators that use inframarginal technologies, such as renewables (in force until June 2023); (iii) allowed Member States to regulate retail prices for households and SMEs under certain circumstances (until December 2023); and (iv) set a solidarity contribution from EU firms in the gas, crude petroleum, coal and refinery sectors, calculated on the basis of their surplus profits in the 2022-2023 period, to soften the impact of high electricity prices on vulnerable consumers.

In May 2023, the Commission published an assessment of the measures of 6 October 2022, *inter alia*,⁴ concluding that there was no need to prolong them, given the marked improvement in market conditions. The Commission incorporated some of these measures in its proposal for a reform of the electricity market design.⁵ However, the cap on revenues from inframarginal technologies,⁶ one of the most controversial measures, was discarded because it affected the marginal pricing mechanism for electricity, considered a key element of market design.

- On 19 December 2022, following intense discussions, the Council of Energy Ministers reached an agreement

on three new emergency regulations⁷ aimed at: (i) enhancing solidarity among Member States through better coordination of gas purchases and cross-border exchanges of gas; (ii) shortening permit-granting processes for carrying out investments in renewables; and (iii) establishing a market correction mechanism (MCM) for gas in the derivatives market to avoid excess volatility. The regulations were extended at the Energy Council meeting of 19 December 2023.

- The first of these regulations establishes the legal framework for joint gas purchases, through the EU Energy Platform. The platform, set up in April 2022, was used to enter into agreements with external gas suppliers and to diversify supplies to the EU. In December 2022, it was provided with a demand aggregation mechanism (AggregateEU) to which Member States had to contribute mandatorily with 15% of their gas storage needs, in order to procure gas in higher volumes and on more advantageous terms, and with a voluntary system for the formation of purchasing consortia by participating firms. Four tendering rounds were organised between April and December 2023 and in 2024 the platform launched mid-term tenders to cover seasonal demand for periods of up to five years. Following the extension, the regulation will be in force until 31 December 2024.⁸
- Under the second regulation, aimed at accelerating the installation of renewables, permit-granting for investments in solar energy equipment and for repowering existing renewable energy plants cannot exceed three and six months, respectively. It also promotes the installation of heat pumps in buildings. Following the extension of December 2023, this regulation will be in force until 30 June 2025.
- The MCM aims to protect businesses and households from episodes of excessively high gas prices and has been extended until 31 January 2025.

1 Regulations <https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX:32022R1369> and <https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX:32023R0706>.

2 Press releases https://ec.europa.eu/commission/presscorner/detail/en/ip_24_1142 and <https://www.consilium.europa.eu/es/press/press-releases/2024/03/04/security-of-gas-supply-member-states-agree-on-recommendation-to-continue-voluntary-demand-reduction-measures/>.

3 See regulation <https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX:32022R1854> on an emergency intervention to address high energy prices.

4 See Communication [Short-term energy market interventions and long term improvements to the electricity market design. A course for action](#), of 18 May 2022.

5 This Commission proposal, which was published in March 2023 under the usual co-decision procedure, was integrated in the Green Deal Industrial Plan, which is discussed in greater detail in Section 4.

6 In its assessment, the Commission noted that the implementation of the cap on revenues from inframarginal technologies was uneven across Member States. Spain introduced a cap in September 2021 and in June 2022, after the Commission's approval, introduced the so-called "Iberian exception", together with Portugal.

7 The emergency measures adopted in regulations (EU) 2022/2576, (EU) 2022/2577 and (EU) 2022/2578 were proposed by the Commission in October 2022, in its communication [Energy Emergency - preparing, purchasing and protecting the EU together](#). They were approved pursuant to Article 122 of the TFEU.

8 However, Member States' obligation to participate in the demand aggregation mechanism for negotiating joint gas purchases has been eliminated.

THE US INFLATION REDUCTION ACT (IRA)

The IRA provides for a sharp increase in federal spending aimed at reducing US GHG emissions, as well as lowering household health costs (extending Obamacare). To finance this spending, the law increases corporate tax on large corporations and modifies the prescription drug pricing system, among other measures. According to initial estimates by the US Congressional Budget Office, these measures can raise around \$780 billion, of which \$390 billion will be allocated to investments related to energy security and climate change, to be made in the period 2022-2031.¹ In addition, the law contemplates the granting of tax credits to promote green investments, without setting any cap on spending, so that the final amount spent could be much higher, depending on demand by firms and consumers.²

While the actions derived from the IRA are not expected to have a significant macroeconomic impact in the US, they will be crucial in the specific sectors they target. In particular, it is expected that the law will act as a catalyst for investments to: (i) increase clean energy production, (ii) accelerate the electrification of transport, (iii) foster US leadership in cutting-edge technologies (such as carbon capture and clean hydrogen), and (iv) domestically manufacture key components for the transition, which are currently largely controlled by China. Another main focus of action is the domestic supply of critical minerals (such as lithium, nickel and graphite), whose global markets are currently dominated by China.

1 <https://www.crfb.org/blogs/cbo-scores-ira-238-billion-deficit-reduction>

2 It is estimated that in the first six months of the law being in force over 100,000 clean energy jobs were created in the United States as a result of the almost \$90 billion invested in projects of this kind. https://www-atlanticcouncil-org.translate.goog/blogs/energysource/a-year-after-the-ira-industrial-policy-has-gone-global/?_x_tr_sl=en&_x_tr_tl=it&_x_tr_hl=it&_x_tr_pto=wapp

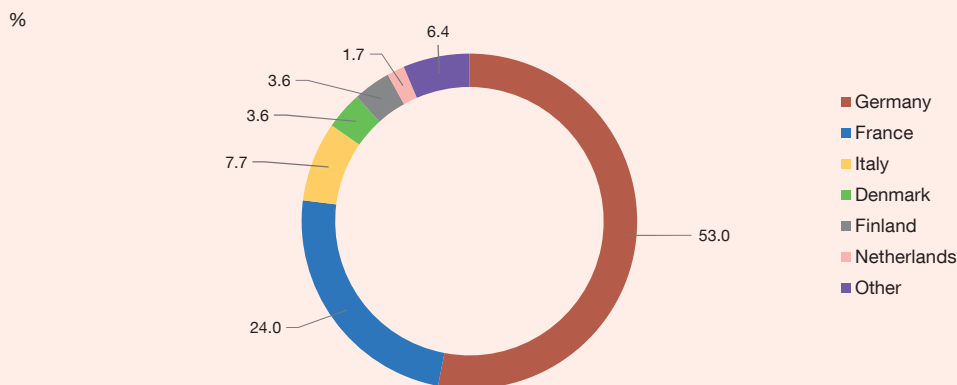
THE STATE AID TEMPORARY CRISIS AND TRANSITION FRAMEWORK (TCTF)

On 9 March 2023, the European Commission adopted the State aid Temporary Crisis and Transition Framework (TCTF) in the context of the GDIP. The TCTF broadens and prolongs the State aid rules set out in the previous Temporary Crisis Framework (established in March 2022 in response to Russia’s invasion of Ukraine) until the end of 2025. The framework provides public support for manufacturing in six key areas (with certain limits, to avoid distorting competition in the internal market): batteries, solar panels, wind turbines, heat pumps, electrolysers and carbon capture technology, as well as for production of components and raw materials necessary for their manufacture. Aid can take the form of direct grants, tax advantages or loans (both subsidised and guaranteed). Investment aid of up to 45% of the total investment is allowed, although if the aid is granted in a competitive bidding process it can reach 100%. The TCTF also introduces the possibility for the Commission to approve aid above these thresholds, up to the amount of the grant that the beneficiary could receive in a third country (the so-called “matching aid”).

This clause aims to prevent the diversion of investments to the United States, incentivised by IRA subsidies, or to China.¹

The Commission also amended the General Block Exemption Regulation (GBER) to facilitate and accelerate the green and digital transitions. The GBER allows Member States to grant State aid without prior notification to the Commission, subject to certain conditions. The amendment raises the ceiling for exempted aid and introduces the possibility of granting higher amounts of aid in less developed Member States. These measures will be in force until end-2026.² It should be noted, however, that while such support is necessary to counter the impact of the IRA, the indiscriminate granting of State aid can have significant negative effects on competition on an equal footing and fragment the EU’s internal market. Indeed, as shown in Chart 1, in 2022 nearly €671.78 billion of State aid was approved in the context of the Temporary Crisis Framework (TCF), of which more than three quarters were granted in Germany (53%) and France (24%).³

Chart 1
Distribution of State aid approved by the European Commission's Directorate-General for Competition in 2022, by country



SOURCE: Eurostat / European Commission https://competition-policy.ec.europa.eu/system/files/2023-07/state_aid_brief_1_2023_kdam23001enn_TCTF_survey_0.pdf

1 [https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/747106/EPRS_BRI\(2023\)747106_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/747106/EPRS_BRI(2023)747106_EN.pdf)
 2 [https://www.europarl.europa.eu/RegData/etudes/IDAN/2023/740087/IPOL_IDA\(2023\)740087_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/IDAN/2023/740087/IPOL_IDA(2023)740087_EN.pdf)
 3 https://competition-policy.ec.europa.eu/system/files/2023-07/state_aid_brief_1_2023_kdam23001enn_TCTF_survey_0.pdf

Glossary

Abbreviations

CBAM	Carbon Border Adjustment Mechanism
CMU	Capital Markets Union
CRMA	Critical Raw Materials Act
EGD	European Green Deal
EMD	Electricity Market Design
ETD	Energy Taxation Directive
ETS	Emissions Trading System
EU	European Union
GBER	General Block Exemption Regulation
GDIP	Green Deal Investment Plan
GHG	Greenhouse gas
IRA	Inflation Reduction Act
LNG	Liquefied natural gas
LULUCF	Land use, land-use change and forestry
MCM	Market Correction Mechanism
MFF	Multiannual Financial Framework
NGEU	Next Generation EU
NZIA	Net-Zero Industry Act
RRF	Recovery and Resilience Facility
RRP	Recovery and Resilience Plan
R&D	Research and Development
SCF	Social climate fund
TCTF	Temporary Crisis and Transition Framework
US	United States
WTO	World Trade Organization

Annex

Table A.1

List of legislative acts addressing different priorities (2019-2024)

Date of European Commission initiative	Package	Initiative	Legislative / non-legislative (a)	Type	Status
A EUROPEAN GREEN DEAL					
2019		The European Green Deal	NL	C	
2020		European Climate Law enshrining the 2050 climate neutrality objective	L	R	AD
2020		The European Climate Pact	NL	C	
2020		European Green Deal Investment Plan	NL	C	
2020		Regulation of the European Parliament and of the Council establishing the Just Transition Fund	L	R	AD
2020		Farm to Fork strategy on sustainable food system	NL	C	
2020		New Circular Economy Action Plan	NL	C	
2020		EU Biodiversity Strategy for 2030	NL	C	
2020		Chemicals strategy for sustainability	NL	C	
2020		New Batteries Regulation	L	R	AD
2020		Public sector loan facility under the Joint Transition Mechanism (JTM)	L	R	AD
2020		A hydrogen strategy for a climate-neutral Europe	NL	C	
2020		Multiannual financial framework - InvestEU programme 2021–2027	L	R	AD
2021		New EU Forest Strategy for 2030	NL	C	
2021	Fit for 55	ReFuelEU Aviation - Sustainable Aviation Fuels	L	R	AD
		Fuel EU Maritime - Sustainable maritime fuels	L	R	AD
		Revision of the EU emission trading system (ETS)	L	D	AD
		Notification on the Carbon Offsetting and Reduction Scheme for International Aviation (CORSA)	L	D	AD
		Revision of the EU Emissions Trading System for aviation, as part of the European Green Deal	L	D	AD
		Carbon border adjustment mechanism as part of the European Green Deal	L	R	AD
		Review of the Effort-Sharing Regulation	L	R	AD
		Revision of the Renewable Energy Directive	L	D	AD
		Revision of the Energy Efficiency Directive	L	D	AD
		Amending the Regulation on greenhouse gas emissions and removals from land use, land use change and forestry	L	R	AD
		Reducing methane emissions in the energy sector	L	R	CA
		Revision of the Energy Tax Directive (ETD)	L	D	TA
		Revision of the Directive on deployment of alternative fuels infrastructure	L	D	AD
		Revision of CO2 emission performance standards for cars and vans, as part of the European Green Deal	L	R	AD
		Revision of the energy performance of Buildings Directive	L	D	CA
		Revision of the EU Gas Regulation	L	R	CA
		Revision of the EU Gas Directive	L	D	CA
	Social Climate Fund	L	D	AD	
	Revision of the EU ETS Market Stability Reserve as part of the European Green Deal	L	D	AD	

SOURCE: <https://www.europarl.europa.eu/legislative-train/schedule> and <https://eur-lex.europa.eu/homepage.html>

a NL = Non-Legislative; L = Legislative; D = Directive; R = Regulation; C = Communication; CR = Council Regulation; CIR = Commission Implementing Regulation; EPR = European Parliament Resolution; TA = Tabled; AD = Adopted; AN = Announced; CA = Close to adoption.

Table A.1

List of legislative acts addressing different priorities (2019-2024) (cont'd)

Date of European Commission initiative	Package	Initiative	Legislative / non-legislative (a)	Type	Status
A EUROPEAN GREEN DEAL					
2022	REPowerEU	REPowerEU: Joint European Action for more affordable, secure and sustainable energy	NL	C	
		REPowerEU chapters in recovery and resilience plans	L	R	AD
		EU Solar Energy Strategy	NL	C	
		EU Save Energy	NL	C	
		REPower EU plan legislative proposal	L	D	CA
2022		New EU regulation on gas storage	L	R	AD
2023		Review of the CO2 emission standards for heavy-duty vehicles	L	R	CA
2023		EU Hydrogen Bank	NL	C	
2023		Proposal for a directive amending Directive 2012/19/EU on waste electrical and electronic equipment	L	D	CA
2023	GDIP for the Net-Zero Age	Revision of EU electricity market design	L	R	CA
2024		2040 climate target	NL	C	
A EUROPE FIT FOR THE DIGITAL AGE					
2023	GDIP for the Net-Zero Age	Net-zero industry act	L	R	CA
2023	GDIP for the Net-Zero Age	European critical raw materials act	L	R	CA
2023		Strategic Technologies for Europe Platform (STEP)	L	R	AD
AN ECONOMY THAT WORKS FOR PEOPLE					
2020		Regulation of the European Parliament and of the Council establishing a Recovery and Resilience Facility	L	R	AD
OTHER					
2020		European Union Recovery Instrument (NGEU)	L	CR	
2020		Modernization Fund	L	CIR	
2021		Tackling rising energy prices: a toolbox for action and support	NL	C	
2022		EU Energy Platform	L	CR	
2022		Market Correction Mechanism	L	CR	
2022		Short-Term Energy Market Interventions and Long Term Improvements to the Electricity Market Design – a course for action	NL	C	
2022		Security of supply and affordable energy prices: Options for immediate measures and preparing for next winter	NL	C	
2022		Energy Emergency - preparing, purchasing and protecting the EU together	NL	C	
2022		Strengthening the EU through ambitious reforms and investments	NL	C	
2022		Coordinated demand-reduction measures for gas	L	CR	
2022		Emergency intervention to address high energy prices	L	CR	
2022		Enhancing solidarity through better coordination of gas purchases, reliable price benchmarks and exchanges of gas across borders	L	CR	
2022		Laying down a framework to accelerate the deployment of renewable energy	L	CR	
2023		Amendment to the Temporary Crisis and Transition Framework	NL	C	
2023		Report on the implementation of the Recovery and Resilience Facility: Moving forward	NL	C	
2023		Resolution on the opening of negotiations of an agreement with the United States of America on strengthening international supply chains of critical minerals	NL	EPR	
2023		Prolonging the demand-reduction period for demand-reduction measures for gas and reinforcing the reporting and monitoring of their implementation	L	CR	

SOURCE: <https://www.europarl.europa.eu/legislative-train/schedule> and <https://eur-lex.europa.eu/homepage.html>

a NL = Non-Legislative; L = Legislative; D = Directive; R = Regulation; C = Communication; CR = Council Regulation; CIR = Commission Implementing Regulation; EPR = European Parliament Resolution; TA = Tabled; AD = Adopted; AN = Announced; CA = Close to adoption.

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