

Energy transition in the EU

SUMMARY

Energy is central to the European Union's transition towards climate neutrality by 2050, in line with the European Green Deal. As the biggest source of greenhouse gas emissions in the European Union (EU), the energy sector is undergoing a profound transformation on the path to a net-zero economy. The shift to a more sustainable energy system entails switching from fossil fuels to low-carbon and renewable energy sources, improving energy efficiency in products, industry and buildings, and creating a more sustainable energy system based on clean technologies.

The EU has developed a number of policies to support the energy transition. EU legislation sets targets for renewables in consumption, energy efficiency and building renovations. It also fosters sustainable transport, energy labelling of products, and clean technologies. The energy union and climate action governance framework includes long-term national energy and climate plans prepared by all EU countries to enhance their contribution to EU energy and climate objectives.

According to the European Commission, energy investments in the EU will have to reach €396 billion per year from 2021 to 2030 and €520-575 billion per year in the subsequent decades until 2050. The EU budget sets a target of 30 % climate spending, a large part of which includes energy actions such as energy efficiency and deployment of renewables, energy infrastructure and smart energy systems. The bulk of EU energy spending is channelled through the Recovery and Resilience Facility, cohesion policy funds, the Modernisation Fund and several others. Specific instruments also exist to support a socially fair transition, notably the Just Transition Fund and the Social Climate Fund.

While the EU energy transition has advanced despite the recent energy crisis, several challenges remain. These include technological aspects such as electrification, grid interconnections, storage systems, further roll-out of renewables and integrating other energy sources such as hydrogen and biomethane. However, the transformation of the EU energy system also involves taking into account the need to ensure energy security, boost energy independence and domestic manufacturing of clean technologies, and improve energy affordability.



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Introduction

The energy transition is part of a broader [green transition](#), which the EU defines as the transition of the economy and society towards the achievement of the climate and environmental objectives, in line with the European Green Deal. As energy [accounts](#) for 75 % of overall EU greenhouse gas (GHG) emissions, it plays a central role in this process. Decarbonisation of the energy system requires a structural transformation in the way energy is produced and consumed, phasing out fossil fuels and replacing them with renewable and low-carbon energy sources. It also requires incentives for consumers and businesses to reduce energy use, for instance by using energy-efficient appliances and adopting cleaner manufacturing processes.

While the energy transition was already on the EU agenda (e.g. the [clean energy package](#) adopted in 2019), the European Green Deal provided it with new impetus and became its main driver. This was further strengthened by the REPowerEU plan of 2022, which highlighted the energy security dimension and brought renewed focus to domestic energy production and the need to boost renewables. A number of immediate short-term [actions](#) to address reduced energy supply and high energy prices were complemented by initiatives to support the EU's long-term energy policies. According to the European Commission, the energy crisis sparked by Russia's invasion of Ukraine has paradoxically [contributed](#) to accelerating the energy transition.

EU policies

European Green Deal and 'fit for 55'

In 2019, the Commission adopted a long-term vision – the [European Green Deal](#) – with the aim of achieving climate neutrality by 2050. The [European Climate Law](#), passed in 2021, enshrined in EU legislation the target of climate neutrality by 2050 (i.e. net-zero greenhouse gas emissions), along with an intermediate target of reducing net emissions by 55 % by 2030, compared with 1990 levels. In order to achieve this transformation, the European Green Deal entailed a set of legislative proposals, many of which related to energy. In July and December 2021 the Commission published the '[fit for 55](#)' package (referring to the goal of a 55 % emissions reduction by 2030). The legislative proposals included the revision of several energy-related pieces of legislation to align them with the new climate targets: the Renewable Energy Directive (RED), the Energy Efficiency Directive (EED), the Energy Performance of Buildings Directive (EPBD), the Energy Taxation Directive and the gas and hydrogen package. New proposals included the Social Climate Fund (SCF) Regulation. Three of these legislative acts – the RED, the EED and the SCF – were adopted in 2023; the rest are ongoing.

REPowerEU

The [REPowerEU plan](#) of May 2022 highlighted the need to phase out fossil fuels and accelerate the clean energy transition. Aiming to end the EU's dependence on Russian energy, the plan advocated energy savings, diversification of energy imports and a boost for the use of renewables.

The REPowerEU included two legislative proposals. One legislative [proposal](#) amended three energy directives (RED, EED and EPBD) in order to set higher targets for renewables in consumption and energy efficiency, promote solar installations on buildings and accelerate permit granting for renewable projects. The other legislative proposal amended the Recovery and Resilience Facility (RRF) [Regulation](#) to include a [REPowerEU chapter](#) in the national recovery and resilience plans, outlining the energy investments funded under RRF to meet the REPowerEU objectives.

REPowerEU also proposed several strategies: the solar energy strategy, the EU save energy plan, EU external energy engagement strategy, the biomethane action plan, the hydrogen accelerator, and an EU energy platform for voluntary common purchases of gas, liquified natural gas (LNG) and hydrogen.

Renewable energy

Renewable energy is a cornerstone of the EU energy transition. In 2021, the share of [renewables](#) in EU energy consumption was 21.8 % (latest available Eurostat data, an early European Environment Agency (EEA) [estimate](#) shows 22.5 % in 2022). This share is tracked across three sectors: electricity (37.5 %), heating and cooling (22.9 %) and transport (9.1 %), although EU legislation sets subtargets only for the latter two (see below). When it comes to production, the majority of renewable energy comes from bioenergy, such as biomass (55.7 %), followed by wind (13.6 %), hydro (12.3 %), solar (7.5 %), ambient heat i.e. heat pumps (6.2 %) and geothermal energy (2.8 %).

The [Renewable Energy Directive](#) – revised in 2023 and now referred to as RED III – set a target for the share of renewable energy sources (RES) in EU energy consumption of 42.5 % by 2030. This goal refers to an EU average, while Member States set their own national contributions to the target. Some Member States have a significantly higher share than the current EU average (which is currently around 22 %), with Sweden (62.6 %), Finland (43.1 %) and Latvia (42.1 %) at the top. The majority of Member States are below the EU average, with Belgium, Ireland, the Netherlands, Malta and Luxembourg recording the lowest renewables share (all under 13 %).

RED III also set additional targets for the transport, buildings, industry, and heating and cooling sectors. On transport, Member States can choose between a committing to a 14.5 % reduction in GHG intensity or ensuring a renewables share of at least 29 % by 2030. The annual target increase for the share of RES in industry has been set at 1.6 %, with additional targets for renewable hydrogen (42 % by 2030 and 60 % by 2035). For heating and cooling there is a national binding target of a 0.8 % annual RES share increase by 2026, followed by a 1.1 % annual increase until 2030. The indicative (i.e. non-binding) target for the RES share in the buildings sector is 49 % by 2030.

Further EU targets for specific renewable sources are set in other EU initiatives. The [solar energy strategy](#) (adopted in 2022 as part of the REPowerEU plan) establishes a target of over 320 GW of newly installed solar photovoltaic capacity by 2025, and almost 600 GW by 2030. The strategy proposes measures to help achieve this goal, such as a European solar rooftops initiative, an EU large-scale skills partnership for renewable energy, the EU Solar PV Industry Alliance and legislation on permits for solar energy projects. Furthermore, the [European wind power package](#) launched in October 2023 seeks to address challenges in the EU wind energy sector and enable the achievement of the previously [agreed](#) EU target of approximately 111 GW of offshore renewable generation capacity by 2030. The package includes action on the further acceleration of permitting, improvements to auction systems across the EU, skills, access to finance, and stable supply chains.

Energy efficiency

Using less energy is another important aspect of the energy transition. 'Energy efficiency first' is a guiding principle in EU policy in order to ensure that only the energy that is really needed is produced and that energy demand is managed in a sustainable way. Reduced consumption of energy also helps to lower energy costs for households and industry.

The revised [Energy Efficiency Directive](#) was adopted in 2023. It sets a binding EU target for the reduction of final energy consumption (total energy consumed by end users) at 11.7 % by 2030, compared with a 2020 EU reference scenario, and the same indicative target for primary energy consumption (which includes energy used to produce energy). EU Member States must achieve average energy savings of 1.5 % per year by 2030 (this varies depending on the year: a 1.3 % reduction by the end of 2025, followed by a 1.5 % reduction by the end of 2027, and a 1.9 % reduction by the end of 2030). A higher target is set for the public sector (reduction of final energy consumption of 1.9 % each year), along with an obligation to renovate at least 3 % of the total floor area of buildings owned by public bodies and transform them into at least nearly zero-energy buildings or zero-emission buildings.

Energy performance of buildings

Buildings account for about [40 %](#) of EU energy consumption and generate approximately 36 % of energy-related greenhouse gas emissions. Heating and cooling, electricity and domestic hot water account for most of the energy consumed in buildings. About 35 % of the EU's buildings are over 50 years old and almost 75 % of EU building stock is not energy-efficient.

The proposed [revision](#) of the Energy Performance of Buildings Directive (negotiations ongoing) sets new targets for building renovations in order to decarbonise the EU's building stock. Proposed measures include making all new buildings in the EU zero-emission by 2030 (all new public buildings by 2027), and setting minimum energy performance standards at EU level, with timelines for accelerating the upgrade of energy performance certificates (EPC) with the lowest (class G) to higher energy performance classes (F or E). Moreover, EU countries must establish national building renovation plans, aimed at decarbonising national building stocks by 2050, with indicative milestones for 2030, 2040 and 2050.

Eco-design and energy labelling

The success of the energy transition also depends on consumer habits and incentives for producers to manufacture energy-efficient products. The proposed [eco-design regulation](#) (negotiations ongoing) establishes a framework for setting eco-design requirements for sustainable products. It would replace the currently binding 2009 [Eco-design Directive](#), which sets requirements for energy-related products and obliges producers to reduce energy consumption throughout the product life cycle. The new regulation will integrate sustainability considerations into the characteristics of a product and into processes throughout its value chain, focusing on aspects such as durability and reliability, reusability, reparability, and energy and resource efficiency. The new law will broaden the scope of current ecodesign requirements to a wider group of products and improve transparency about their environmental impact.

EU eco-design legislation is complemented by the 2017 EU [Energy Labelling Regulation](#), which sets out a framework for labelling energy-related products and an obligation to provide information about their energy efficiency. The labelling scale is from A to G and the aim is to help consumers make informed purchase decisions.

Governance of energy union and climate action

The 2018 [Regulation](#) on the Governance of the Energy Union and Climate Action sets common rules for reporting and monitoring implementation of energy union and EU climate goals. The energy union strategy was launched in 2015 and has five dimensions: i) energy security; ii) integrated internal energy market; iii) energy efficiency; iv) decarbonisation; and v) research, innovation and competitiveness. Progress on all these five dimensions is tracked every year and presented in a [state of the energy union](#) report. The 2023 [report](#) states that EU GHG emissions continue to fall steadily each year (they have fallen by 31 % compared with 1990 levels, according to EEA [data](#)), while renewables are growing and energy efficiency is improving. The report nevertheless calls for accelerated implementation of European Green Deal initiatives, in order to stay on track.

As part of Governance Regulation implementation, each Member State has to produce a 10-year [national energy and climate plan](#) (NECP). The process of updating the NECPs is ongoing, as the final updated NECPs are due by 30 June 2024. In October 2023, the Commission published an [assessment](#) of progress towards the objectives of the energy union and climate action, based on progress reports on NECP implementation sent by the Member States in March 2023. A revision of the Governance Regulation is [planned](#) for early 2024, to take into account the objectives of the fit for 55 package and the REPowerEU plan.

Gas, hydrogen and electricity

Gas emits less CO₂ than other fossil fuels and was for a long time [considered](#) a 'transition' fuel on the way to climate neutrality, especially in the context of switching from coal. In recent years, the EU has also made efforts to accelerate the shift from natural gas to renewable and low-carbon gases. The 2021 fit for 55 set of proposals included a [hydrogen and decarbonised gas market package](#), revising the existing gas directive and regulation. The package seeks to facilitate the integration of renewable and low-carbon gases into the existing gas network, remove barriers to cross-border hydrogen infrastructure and create the conditions for a more cost-effective transition. The legislative procedure is currently ongoing.

Hydrogen is [predicted](#) to play an important role in the transition to a net-zero energy system. The [hydrogen strategy](#) adopted in 2020 proposed strategic objectives for hydrogen production and key [actions](#) in five areas: investment; boosting production and demand; a supportive framework (hydrogen market and infrastructure); research; and international cooperation. As part of the [hydrogen accelerator](#) initiative under REPowerEU, previous targets have been revised upwards to 10 million tonnes of renewable hydrogen produced and 10 million tonnes imported by 2030. The [European Hydrogen Bank](#) established in 2023 meanwhile offers financing [mechanisms](#) to boost both the creation of EU domestic market and international imports into the EU.

Electrification is another important part of the energy transition, especially in terms of energy use in industrial processes, transport (electric vehicles) and buildings (heat pumps). The Commission expects [electricity demand](#) to increase significantly, with the share of electricity in final energy consumption growing from 23 % today to around 30 % in 2030, and towards 50 % by 2050. The [electricity market reform](#) proposed in 2023 (procedure ongoing) aims to accelerate investment in renewables and improve consumer access to renewable and low-carbon energy.

Industry

The energy transition is also impacting the EU's industrial sector, because of its role in reducing emissions but also in terms of EU domestic production of clean energy technologies. The idea behind the [Green Deal industrial plan](#) of February 2023 is to secure the EU industrial leadership in net-zero technologies and boost a strong domestic manufacturing base, through improved access to funding and skills. The related legislative proposals, the [net-zero industry act](#) and the [critical raw materials act](#) (both procedures ongoing) would simplify the regulatory framework for investments, reduce the EU's reliance on imports, and increase the circular economy approach in the supply of strategic raw materials.

The 2023 progress [report](#) on the competitiveness of clean energy technologies analyses opportunities and challenges in terms of EU resources, the skills base and research, with a sub-analysis of specific strategic net-zero technologies: solar photovoltaics (PV) and thermal; onshore and offshore wind; ocean energy; batteries; heat pumps; geothermal energy; hydrogen; biogas and biomethane; carbon capture and storage (CCS); and grid technologies. Furthermore, the recently proposed [strategic technologies for Europe platform](#) (STEP) includes clean technologies as one of its three priority areas. In terms of energy, these clean technologies include: renewable energy; electricity and heat storage; heat pumps; electricity grids; renewable fuels of non-biological origin; sustainable alternative fuels; electrolyzers and fuel cells; carbon capture, utilisation and storage; energy efficiency; and hydrogen.

Socially just transition

Energy transition policies must also take into account socio-economic impacts. These vary depending on the sector, region and country. However, the most common impacts relate to the restructuring of industrial systems, job reallocations, and the expenditure associated with switching to cleaner technologies, both in industrial processes and in daily life (such as exchanging coal or gas

heating for heat pumps powered by electricity). High energy bills are also a problem, while long-term solutions, such as home renovations, energy efficiency improvements and electric vehicles, are often expensive. According to the 2022 Council [recommendation](#) on ensuring a fair transition, public support is therefore necessary. This could include, for instance, reduced taxes and other incentives for efficient heating systems and insulation in buildings, in a way that avoids locking consumers into the current system based on fossil fuels. [Energy poverty](#) is another important issue to address and particular attention must be paid to vulnerable groups such as low-income households who spend a high share of their income on essential services such as energy, transport and housing, as well as small and medium-sized companies. Accompanying policies to ease the short-term costs and price pressures resulting from the internalisation of emission costs in prices or the costs of adaptation to low-emission alternatives are needed, along with policies that ensure a fair distribution of the benefits and costs of the transition. The lack of such measures can lead to lower social acceptance of the transition, protests against green legislation and calls to delay the measures owing to the high costs of decarbonisation for people and industry.

Social Climate Fund

Adopted in May 2023, the [Social Climate Fund](#) (SCF) will support the most vulnerable citizens and businesses affected by the extension of the EU emissions trading system (ETS) to the buildings and road transport sectors. With a budget of €65 billion (up to €86.7 billion with national contributions) over the 2026-2032 period, it can be used for direct income support and investment in the energy efficiency of buildings and sustainable transport. The fund will become a major EU weapon in the fight against energy poverty.

By the end of June 2025, EU countries are required to submit their [social climate plans](#) outlining concrete measures that help to reduce end users' reliance on fossil fuels, boost building renovations, decarbonise heating and cooling systems, integrate renewable energy and increase the uptake of zero- and low-emission mobility and transport. Temporary income support can be used only to support vulnerable households and transport users.

Just Transition Fund

The [Just Transition Fund](#) (JTF), adopted in 2021, offers support for regions reliant on fossil fuels and high-emission industries. A budget of €17.5 billion can be used for investment in areas such as clean energy technologies, the circular economy, emissions reduction, regeneration of sites, reskilling of workers, job creation, sustainable local transport, and the upgrading of district heating networks powered by renewable sources.

EU Member States have prepared [territorial just transition plans](#) that identify the places supported and outline how their investments will be spent. The territories to be funded under the JTF are those most negatively affected by the economic and social impacts resulting from the transition, with particular regard to the expected adaptation of workers or job losses in fossil fuel production and the transformation needs of the production processes of industrial facilities with the highest greenhouse gas intensity. [Implementation](#) of the Just Transition Fund is currently well under way; it is managed as part of EU cohesion policy funds for 2021 to 2027.

Funding

[Estimating](#) the funding needed for the EU's energy transition is a complex task. The Commission's 2023 [Strategic Foresight Report](#) calculates that additional annual investment of over €620 billion is needed to meet the European Green Deal and REPowerEU objectives. Moreover, the Commission [forecasts](#) that the REPowerEU plan alone entails additional investment of around €300 billion between 2022 and 2030, on top of what is needed to meet the objectives of the fit for 55 proposals.

The International Energy Agency (IEA) estimates that EU annual [investment](#) in clean energy will have to rise to €530 billion a year by 2030 from €330 billion in 2022 in order to align with the IEA net-zero

emissions by 2050 scenario. According to the European Commission's calculations, quoted in a 2023 European Investment Bank (EIB) [report](#), energy investment in the EU must almost double during the decade from 2021 to 2030, i.e. from €229 billion per year on average over the 2011-2020 period to €396 billion per year from 2021 to 2030. In subsequent decades, this will have to increase to €520 billion to €575 billion per year, more than 2.5 times the current level.

In terms of specific energy transition investments, the Commission [estimates](#) that in the years 2021 to 2030, the 55 % GHG emissions reduction target will require €98.5 billion in annual investments in power plants and grids, and €180.1 billion in the residential sector, with overall energy system investment reaching €1051.3 billion (the exact numbers depend on the scenario adopted).

EU budget and Next Generation EU

The green transition is supported by the EU budget's 30 % spending target for climate action. This target refers jointly to the 2021-2027 multiannual financial framework ([MFF](#)) and the [Next Generation EU](#) (NGEU) instrument that covers the years 2021 to 2026. This translates to around [€600 billion](#) (if the loan component of the RRF is used in full). Energy is an important part of this spending. Specific energy-related actions that contribute to this goal are linked mainly to renewable energy and energy efficiency, as specified in the energy cluster of the climate-tracking [methodology](#). They can also include green energy infrastructure, electricity transmission, distribution and storage, CO₂ transport and storage, renewable and low-carbon gases, including hydrogen, high efficiency co-generation, district heating and cooling, and smart energy systems (such as smart grids and information and communications technology systems).

The main component of the NGEU programme is the [Recovery and Resilience Facility](#) (RRF), implemented through national recovery and resilience plans ([NRRPs](#)). The RRF also has a climate spending target, which amounts to 37 % of each recovery and resilience plan's total allocation. This share is calculated on the basis of a separate methodology for climate tracking set out in Annex VI to the [RRF Regulation](#). The bulk of energy-related [investment](#) focuses on energy efficiency, renewable energy and networks. The resources dedicated to the energy dimension vary across Member States, though almost all countries are [financing](#) measures in the two main categories of energy efficiency (€54.85 billion, i.e. 62 % of the total) and clean energy, including investment in renewable energy sources and energy infrastructure and networks (€33.64 billion, i.e. 38 % of the total). According to the RRF Regulation, the NRRPs must also specify how the measures will contribute to the green transition. The national plans must ensure complementarity between measures funded under the RRF and actions supported via other EU funds (see overview below).

Following the REPowerEU programme, the national plans were [updated](#) to include a REPowerEU chapter, which outlines reform and investment contributing to at least some of the following objectives: improving energy infrastructure to meet security of supply needs; boosting energy efficiency in buildings and critical energy infrastructure; decarbonising industry; accelerating the deployment of renewable energy; addressing energy poverty; incentivising reduced energy demand; addressing internal and cross-border energy transmission and distribution bottlenecks; supporting electricity storage; reskilling the workforce towards green skills; and supporting value chains in critical raw materials and technologies linked to the green transition.

Specific funds

The EU provides energy transition funding through a variety of instruments.

The [InvestEU Fund](#) (endowed with an EU budget guarantee of €26.2 billion) finances 'sustainable infrastructure' as one of its policy windows. This includes renewable energy, energy efficiency and building renovation. The Commission proposal for a strategic technologies for Europe platform ([STEP](#)) establishes an additional EU guarantee of €7.5 billion. The energy-related 'clean technologies' under the STEP proposal include: renewable energy; electricity and heat storage; heat pumps; electricity grid; renewable fuels of non-biological origin; sustainable alternative fuels;

electrolysers and fuel cells; carbon capture, utilisation and storage (CCUS); energy efficiency; hydrogen and its related infrastructure; and smart energy solutions.

The [Modernisation Fund](#) is funded from EU ETS allowances, which makes its budget hard to predict, but the European Commission [estimates](#) that it could reach over €48 billion in the years 2021 to 2030. The fund can be used for investment in renewable energy, energy efficiency, energy storage, modernisation of energy networks (including district heating, pipelines and grids) and just transition in carbon-dependent regions (e.g. redeployment, re-skilling and upskilling of workers, education, job-seeking initiatives and start-ups). It is [available](#) to 10 lower-income countries: Bulgaria, Czechia, Estonia, Croatia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia. From 2024, three more countries will be [supported](#): Greece, Portugal and Slovenia.

The [Innovation Fund](#), with a projected budget of €40 billion, obtained from ETS allowances (over the 2020 to 2030 period), finances projects based on highly innovative technologies. The eligible sectors are energy-intensive industries, renewable energy, energy storage, and CCUS. The fund also supports cross-cutting projects for innovative low-carbon solutions that lead to emissions reductions in multiple sectors.

[Cohesion policy](#), with a budget for 2021 to 2027 totalling €392 billion, covers several funds that can support the energy transition. The principle of 'thematic concentration' requires that a proportion of funds must be dedicated to one of the policy's objectives on a greener, low-carbon Europe transitioning towards a net-zero economy. The European Regional Development Fund ([ERDF](#)) can be used for [actions](#) such as energy efficiency, reducing GHG emissions, renewable energy, developing smart energy systems, grids and storage outside the trans-European energy network (TEN-E), as well as promoting sustainable transport. The [Cohesion Fund](#) is available only to 15 Member States. It supports investment in environment and transport, including in particular renewable energy. European Social Fund Plus ([ESF+](#)) focuses mainly on employment, social inclusion and skills. In the context of energy transition, it can be used for the adaptation of workers to change, reskilling, education and training, job creation in the energy sector, and the social integration of people at risk of poverty or social exclusion.

The [Just Transition Fund](#) (JTF) – formally a cohesion policy fund – supports those regions worst affected by the transition towards climate neutrality. These are mainly carbon-intensive regions, for instance relying on fossil fuels and high-emission industries. The fund supports investments in clean energy technologies, emissions reduction, regeneration of sites, reskilling of workers, job creation, reducing energy poverty etc. Member States prepare just transition plans that explain how support will be used to achieve the transition. The JTF is part of the broader [Just Transition Mechanism](#), which also includes a scheme under InvestEU and a [public sector loan facility](#) implemented together with the European Investment Bank.

The [Social Climate Fund](#) with a budget of up to €86.7 billion provides support for vulnerable groups and companies affected by the green transition. It can be used to finance building renovations, sustainable mobility and income support (see above).

The [Connecting Europe Facility](#) has a special component for energy. With a budget of €5.84 billion in the 2021-2027 period it can fund projects identified under the TEN-E Regulation (projects of common interest – PCIs) designed to improve the EU's cross-border energy infrastructure.

With a budget of approximately €1 billion for the 2021-2027 period, the [LIFE Clean Energy Transition sub-programme](#), targets market barriers that hamper the socio-economic transition to sustainable energy. It focuses on five areas of intervention: building a policy framework in support of clean energy transition; accelerating technology, skills and the roll-out of new business models; attracting private finance for sustainable energy; supporting the development of local and regional investment projects; and involving and empowering citizens in the clean energy transition.

The [EU renewable energy financing mechanism](#) provides grants that cover either the installation of a renewable energy production facility or the actual production of renewable energy in sectors such as electricity, heating and cooling, and transport. The call for projects is published once a year.

[Horizon Europe](#), the EU's research and innovation funding programme, has a budget of €95.5 billion for the 2021-2027 period. Research projects focusing on energy are funded mainly from the [Climate, energy and mobility](#) cluster, which includes areas of intervention such as energy supply, energy systems, energy storage, clean transport and buildings, and industrial facilities in energy transition.

Calling itself '[Europe's climate bank](#)', the EIB adopted its [energy lending policy](#) back in 2019. Its focus is on transforming the energy sector through energy efficiency, low-carbon supply, innovation and enabling infrastructure. EIB does not support traditional fossil fuel projects, including natural gas, and was the first international finance institution to end financing for fossil fuel projects. According to EIB [estimates](#), the bank has been supporting the EU's energy transition with €10-12 billion per year in recent years.

The [European Globalisation Adjustment Fund for Displaced Workers](#) (EGF) is a special instrument that offers support to workers who lose their jobs due to the transition to a low-carbon economy, among other things. It does not co-finance social protection measures such as pensions or unemployment benefits, but can be used for instance for career advice, education and training, entrepreneurship and business creation. It has an annual budget of €210 million for 2021 to 2027.

The [Technical Support Instrument](#), part of EU structural reform support, provides tailor-made technical expertise to design and implement reforms, including those relating to energy transition. It has a budget of €864 million for the 2021-2027 period.

European Parliament

The European Parliament supports an ambitious climate and energy policy. Its 2019 [resolution](#) on the climate and environment emergency called for far-reaching reform of EU energy and infrastructure investment policies, ensuring a fair and equitable transition that supports job creation, and recognised its own institutional responsibility to reduce its carbon footprint.

In its 2020 [resolution](#) on the European Green Deal, Parliament highlighted the central role of energy in the transition to a net-zero economy and called for the revision of several EU energy directives (the RED, the EED, the EPBD and the Energy Taxation Directive) to align them with the new decarbonisation goals, while paying special attention to vulnerable citizens and economic predictability for the sectors concerned.

In its two resolutions adopted in the aftermath of Russia's invasion of Ukraine ([resolution](#) of March 2022 on Russia's aggression against Ukraine and [resolution](#) of May 2022 on the social and economic consequences for the EU of the Russian war in Ukraine), Parliament highlighted the need to speed up the clean energy transition as one way to contain the energy crisis.

In its [resolution](#) on the UN COP28 conference, adopted in November 2023, Parliament highlighted the way in which Russia's invasion of Ukraine had added urgency to the need to transform the global energy system. Parliament supported a global target for tripling renewable energy and doubling energy efficiency by 2030, to be adopted at COP28, together with the phasing-out of fossil fuels. It also welcomed EU energy policy initiatives leading to reducing the EU's dependence on fossil fuels. Parliament highlighted the need to accelerate electrification, build a renewables-based energy system, tackle energy poverty and ensure a just energy transition.

Outlook

The coming years will bring multiple challenges for the EU, as it tries to balance implementation of its green transition agenda with energy supply issues linked to geopolitical tensions, energy affordability issues, and structural shifts in the economy and energy use. An increasingly important

issue is also that of preserving EU competitiveness and boosting domestic industry to ensure stable energy supply chains and boost the independence of the energy system, while avoiding over-reliance on third countries.

According to a 2023 Jacques Delors Institute [report](#), solving the 'energy trilemma' (i.e. achieving climate neutrality while guaranteeing security of supply and reasonable prices) must be based on three key elements: enhanced energy and climate governance, an increased EU budget for energy, and improved involvement of citizens in decision-making. In terms of funding, the International Energy Agency [estimates](#) that spending for solar PV, battery storage and energy efficiency is close to being sufficient to meet the EU's 2030 investment needs, but annual investment in the clean electrification of industry, buildings and transport, grids (a key enabler for the clean energy transition), and low-emission fuels must be increased.

The EU's negotiating [position](#) for the 28th UN Climate Change Conference (COP28), taking place in Dubai between 30 November and 12 December 2023, reiterates the EU's commitment to the green transition. It highlights the need for an energy sector predominantly free of fossil fuels, striving for a decarbonised global electricity system, tripling installed global renewable energy capacity and doubling the rate of energy efficiency improvements. It also calls for the phasing-out of fossil fuel subsidies that do not address energy poverty or the just transition. The [EU Energy Days](#) at COP28, on 4 and 5 December 2023, offer an opportunity to explore the EU's approach to energy transition.

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