

What next for the European Green Deal?

Five energy dilemmas for the next five years



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Warsaw, June 2024

Dear Reader,

We have entered the new political cycle in the EU with a wide consensus among different political forces and stakeholders. We all agree, that the competitiveness and resilience of the European economy must be enhanced while protecting the climate and the environment. Therefore care must be taken to ensure that the implementation of energy and climate legislation has a positive impact on prices, the stability of the energy system, and the green transition. The question of how to effectively implement the ambitious energy and climate targets is the main challenge of the current EU political cycle.

As the main producer of electricity and heat in Poland, we at PGE Polska Grupa Energetyczna are well aware, that energy should be emission-free. The Polish energy sector is implementing the decarbonisation process consistently and responsibly, ensuring that emission reductions go hand in hand with energy security and that the final price of electricity and heat is acceptable to our customers. It is a challenge, but as a utility company, we can only make the transitions together with our clients.

The energy sector transition means building a completely new energy system, and the Polish case is not so unique. The current EU Multiannual Financial Framework ends in 2027, and the debate on what should be financed under the next framework has already started. This debate overlaps with the new emissions reduction target for 2040.

To deliver carbon-free electricity and heat, with all the conditions mentioned above, we need ambition – which the EU certainly has – and specific legal and financial instruments. These should not only enable the further development of fossil-free energy sources and electrification but also place greater emphasis on the distribution grids, energy storage, and the district heating sector. I am convinced that the EU should also fully recognize the potential of nuclear power as a contributor to the climate-neutral transition.

Although on the EU level, we tend to agree that the EU needs to be climate-neutral, resilient, and competitive, the paths and the pace remain disputable. As a part of the energy sector, we expect the next College of Commissioners and the MEPs to set realistic frameworks for implementing the European Green Deal. In practice, it means more focus on electricity distribution grids and energy storage to ensure a favourable regulatory and financial framework. We also need a district heating decarbonisation plan in the EU that would fully explore power-to-heat potential, especially in the context of large district heating systems. Regarding the anticipated 2040 reduction target we should focus more on the pathway and financial support for the transition, not on the level of the reduction target itself. In the context of the discussion about the post-2027 Multiannual Financial Framework we expect that technological neutrality in the energy sector transition will be a firm principle. A strong pro-business approach is also needed in the EU state aid rules.

To better highlight the key issues in the current EU debates we asked Polityka Insight – Poland's leading source of political analysis and business intelligence – to produce the report you are reading. It is a guide to the biggest energy challenges and it shows what can be done about them on the European stage. Instead of simple and superficial solutions, you will find a starter pack for anyone who wants to better understand the current state of the EU energy and climate policy and the possible directions it could take. It is intended as an invitation to debate and as food for thought. Enjoy!

Dariusz Marzec
President of the Management Board,
PGE Polska Grupa Energetyczna S.A.

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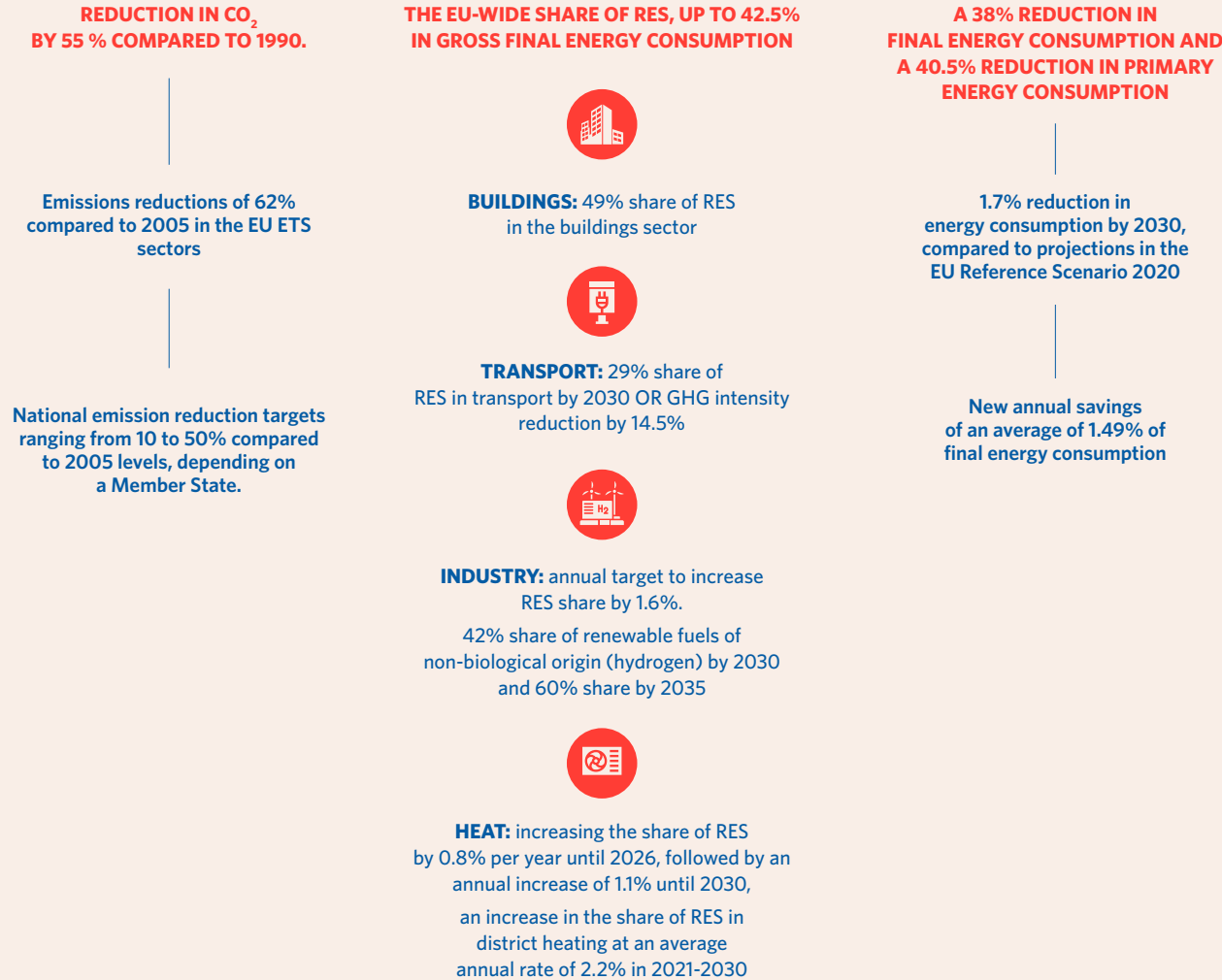
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What next for the European Green Deal?

Over the past five years, the European Union has embarked on a path towards achieving net climate neutrality in 2050. The European Green Deal has become a key EU development agenda to liberate Europe from fossil fuel imports and become the driver of modernisation of the economy. The target of a total reduction in net emissions from the European economy by mid-century is a legal obligation. In 2021, it was enshrined in the European Climate Law.

FIGURE 1. SELECTED OBJECTIVES OF THE FIT-FOR-55 PACKAGE UNTIL 2030



Source: In-house development.

The ambitious climate goals have clashed with reality, though. The pandemic and subsequently the energy crisis and the Russian aggression against Ukraine forced EU countries to focus on saving their economies and protecting consumers against high energy prices. The REPowerEU plan, announced in 2022, envisaged accelerating the development of RES in such a way as to discontinue fuel imports from Russia by 2027. **Climate policy has now become not only a tool to implement EU's economic ambitions, but also a tool to reinforce its security.**



However, the economic crisis, the surge in inflation and broken supply chains undermined EU's position, exacerbating social discontent demonstrated by farmers' protests. **At the same time, Europe began to feel increasing pressure from its foreign partners.** United States and China implemented ambitious policies to accelerate the energy transition while focusing on developing their industries. The EU realised that climate ambitions could contribute to its accelerated deindustrialisation.



The new European Commission and the European Parliament, together with the Council, will decide on the future of the European Green Deal and how to adapt the pace of transition to the new economic and geopolitical situation. This may mean that some sectors will be treated less severely (e.g. agriculture) while others will have to take on an even greater burden of decarbonisation (e.g. energy sector and industry). This will be crucial especially for more industrialised economies. For example Poland (6% of the total value of sold EU industrial production, Eurostat, 2023) has reduced its share of coal in electricity generation from 92 to 61% since joining the EU in 2004 (Ember, 2024), but remains the most coal-reliant Member State.



Achieving climate neutrality by Poland will require not only abandoning coal, but also **electrifying the entire economy and building a new grid** to power it. Investments in power networks, but also in energy storage, cogeneration and nuclear power plants, which will facilitate balancing the energy production from unstable RES sources, will be crucial also in many other EU Member States.



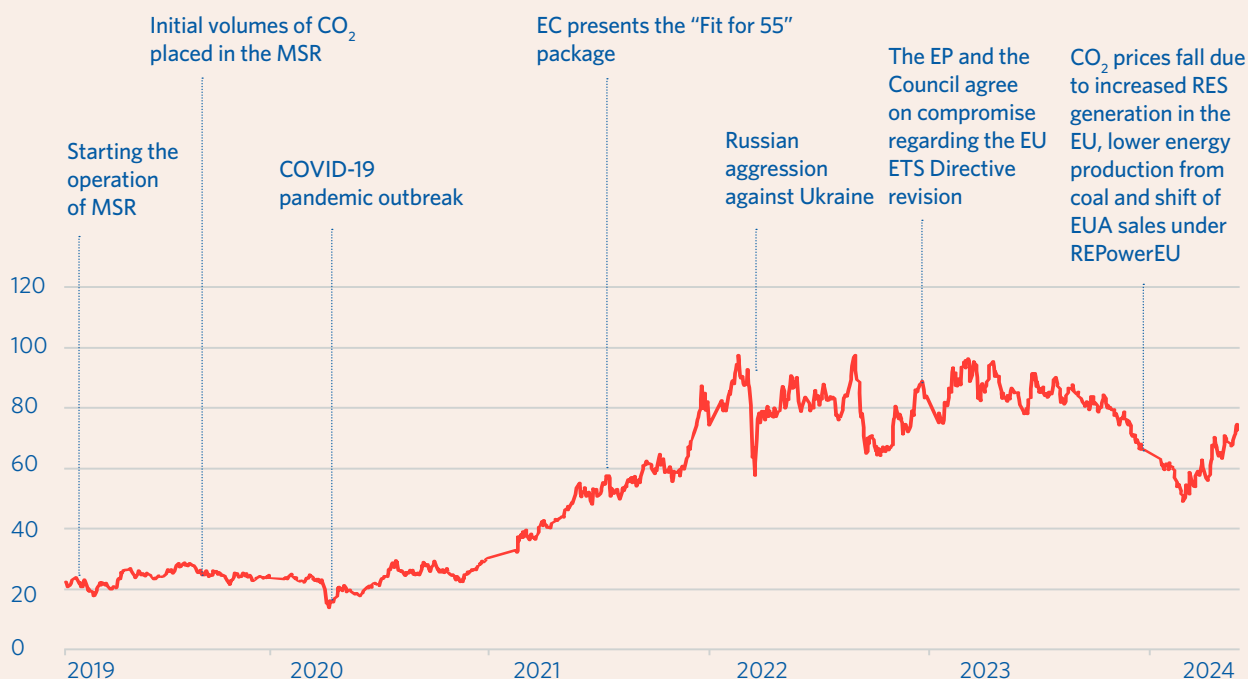
Energy foundations of “Fit for 55”

The tool for realising EU’s climate ambitions is primarily the “Fit for 55”, a package of directives and regulations designed to enable the entire EU economy to achieve a 55% reduction in CO₂ emissions by 2030 compared to 1990 levels. EU economies have managed to reduce emissions by 32.5% compared to 1990, mainly by moving away from coal in the energy sector. **The goal of the “Fit for 55” is to extend the transformation to the entire economy,** including sectors that have so far not had to significantly reduce emissions – such as transport or agriculture.

EU ETS Directive

EU Emissions Trading System (EU ETS) is the EU’s most important climate policy tool. The mechanism imposes an obligation on industrial and energy installations with a thermal capacity exceeding 20 MW to purchase CO₂ emissions allowances. In simple terms, for one tonne of emissions or its equivalent, operators of installations must buy and surrender one allowance. The idea is that the higher the price of allowances, the greater the pressure to reduce fossil fuel consumption and force a transition to low- or zero-carbon sources. Hard coal is twice and lignite three times more carbon-intensive than gas, so electricity generated from it generates a greater demand for CO₂ allowances and thus means additional costs. **In 2012-2017, CO₂ prices fluctuated around €4-8 per tonne,** but once allowances were recognised as financial instruments, these prices **started to rise.**

FIGURE 2. PRICE DEVELOPMENT OF CO₂ EMISSIONS ALLOWANCES (€/TONNE OF CO₂)



Source: European Energy Exchange (EEX).

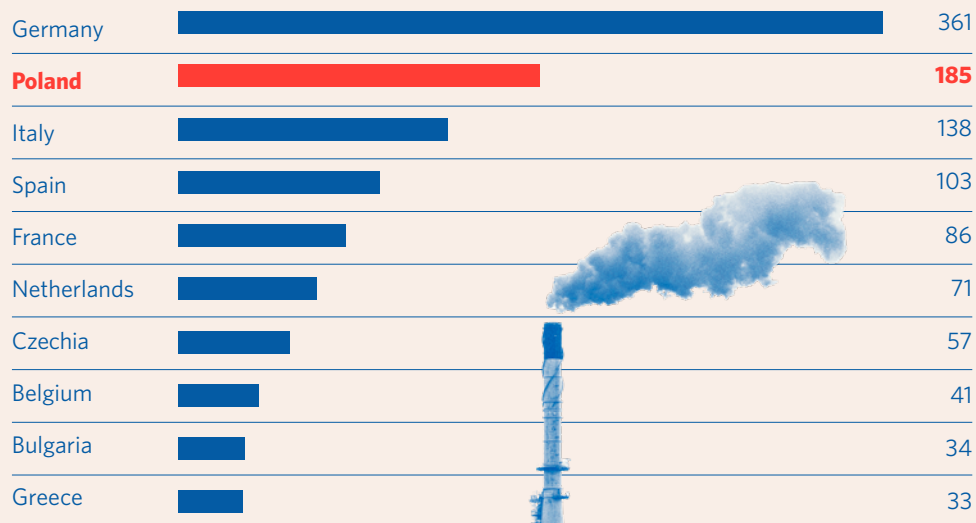
Revision of the EU ETS Directive is the most significant element of the "Fit for 55".

To accelerate the decarbonisation of Europe's energy and industrial sectors, the revision of the legislation agrees to increase the linear reduction factor (LRF), i.e. the rate at which the pool of emissions allowances (EUA) to be auctioned decreases every year, from 2.2% to 4.3% in 2024-2027 and 4.4% from 2028 onwards. **This is to result in emissions from the energy sector and industry declining by 62% by 2030 compared to 2005 levels.** Before the last revision of the directive, the reduction target for these sectors for 2030 was 43%.

In addition, to speed up the pace of emissions reductions, it was agreed to reduce the general pool of allowances put up for auction each year **by 117 million allowances by what is known as rebasing.** This is to happen in two tranches – from 2024, the pool of allowances going to the market will be lower by an additional 90 million and from 2026 by a further 27 million. The agreement also maintains the rate of transfer of surplus allowances to the Market Stability Reserve (MSR), by which the auction pool is reduced each year. The allowances are then cancelled so that their price does not fall¹. The MSR is the main price-forming mechanism responsible for the significant price increases in recent years.

¹ The main premise of the MSR is to control the total number of allowances that are in circulation, for this purpose, the Commission determines every year the total number of allowances in circulation (TNAC). The Reserve takes allowances out of the auction if the TNAC exceeds the 833 million threshold, but returns 100 million allowances to the market if the TNAC falls below 400 million. Allowances, numbering 24%, are taken off auction volumes if the TNAC exceeds 1,096 million; if there are less than 1,096 million allowances on the market and more than 833 million, then the entire difference between the number of allowances and 833 million is directed to the reserve. In practice, they do not return to the market. At the same time, every year the number of allowances in the reserve above 400 million is automatically cancelled. The most recently announced TNAC was 1,111.77 million, so 266.8 million allowances will go into the MSR, to be withdrawn from the auctions between 1 September 2024 and 31 August 2025.

FIGURE 3. THE LARGEST GREENHOUSE GAS EMITTERS UNDER EU ETS IN 2022
(IN MILLIONS OF TONNES OF CO₂)



Source: Eurostat.

The adopted changes to the ETS Directive mean that there are fewer and fewer emissions allowances in the system, **resulting in an increase in their price. Leading think tanks predict that the price of a tonne of CO₂ could exceed the €160 barrier in 2030**, up from around €65 today (August 2024). More importantly, however, if the 4.4% annual rate of reduction in available emissions allowances is maintained, CO₂ emissions allowances for energy and industry sectors will, in fact, run out in 2039 (KOBiZE, 2023).

€160 - can be the price of a tonne of CO₂ by 2030.

In addition, emissions allowances that were to be sold in 2027-2030 have been reallocated for auctioning in 2023-2026 to raise an additional c.a. €20 billion for the REPowerEU programme. This means

that **even fewer allowances will be placed on the market after 2026, so their price will therefore increase further.**

The revision of the directive also provides that **all revenues from CO₂ auctions going to Member States' budgets will be earmarked for climate-related purposes.** Previously, the legislation stipulated that this percentage was a minimum of 50%. Since its creation in 2005, the ETS has generated more than €180 billion, with the largest share going to Member States (European Commission, 2024).

The latest revision of the ETS Directive also envisages the **creation of ETS2, a parallel emissions trading system that will cover road transport and emissions from buildings**. The scheme will cover fuel suppliers, as well as smaller district heating and CHP plants hitherto not covered by the ETS due to not meeting the capacity criterion (below 20 MWt). It is due to start from 2027, but its launch may be delayed by a year if energy prices are high. Under the new system, the cost of emissions will be added to the price of fuel, which is expected to stimulate investments in reducing emissions in transport and housing. Revenues from the scheme are to be put into the Social Climate Fund, which will finance, among other things, investments in the energy renovation of buildings and support for the most affected vulnerable groups.

Renewable Energy Directive

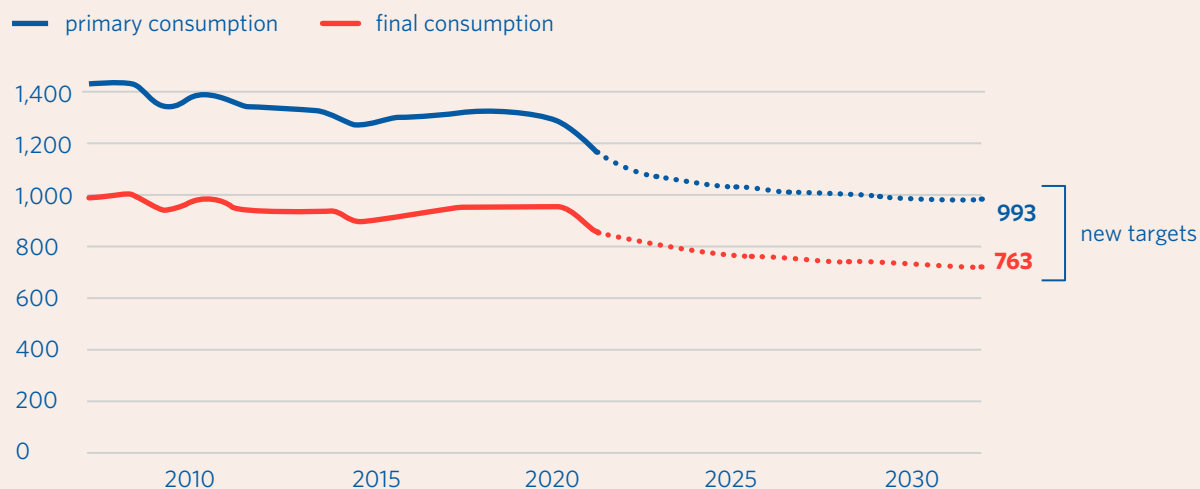
The revised Renewable Energy Directive (REDIII) aligns the regulations with the new 2030 target for the share of RES in final energy consumption. **This level is set at 42.5%, up from the previous 32% of final energy consumption across the EU.** This means a significant acceleration in the development of green installations in the coming years – in 2022, the RES share in EU energy consumption was 23%. The target is legally binding for the entire EU, meaning that all Member States will have to submit their contributions to achieve it. In addition, an indicative target (i.e. not legally binding, but politically important) has been set for district heating, with an average increase in the share of RES energy from 2.2 percentage points per year in 2021-2030.

The new REDIII regulations are to **speed up national permitting procedures for construction and connection of new RES installations** – the maximum approval time for new installations has been set at 12 months in “fast-track development areas” that Member States must designate by 21 February 2026. At the same time, RES projects are to become investments of overriding public interest, which means simplified and shortened administrative and environmental procedures.

Energy Efficiency Directive

By 2030, EU Member States must collectively reduce their energy consumption by at least 11.7% compared to energy consumption projections for 2030 made in 2020. This means that, by the end of the decade, **primary energy consumption within the EU must not exceed 992.5 million tonnes of oil equivalent (Mtoe) and final energy consumption must not exceed 763 Mtoe²**. Member States will be required to notify the Commission of their indicative national contributions as part of the actualisation of their National Energy and Climate Plans (NECPs). If the Commission considers that a country's proposed contribution is insufficient, it may require an adjustment.

FIGURE 4. EU TARGETS FOR REDUCING PRIMARY AND FINAL ENERGY CONSUMPTION BY 2030 (MTOE)



Source: The European Commission.

Commitments to reduce final energy consumption, especially electricity consumption, will be a challenge especially for some Central European Member States due to their higher GDP growth compared to the EU average.

The Directive introduces a new **definition of efficient district heating**, which sets out the share of RES, waste heat (an industrial by-product) and cogeneration (simultaneous generation of heat and electricity) in heat production by 2050. The definition assumes a gradual replacement of the share of high-efficiency cogeneration (both coal- and gas-fired) in district heating systems in favour of waste heat and heat from RES, the share of which will have to be drastically boosted to 35% already in 2035 (from 5% today). As defined in Article 26 of the EED, efficient district heating systems must meet the criteria shown in the figure below.



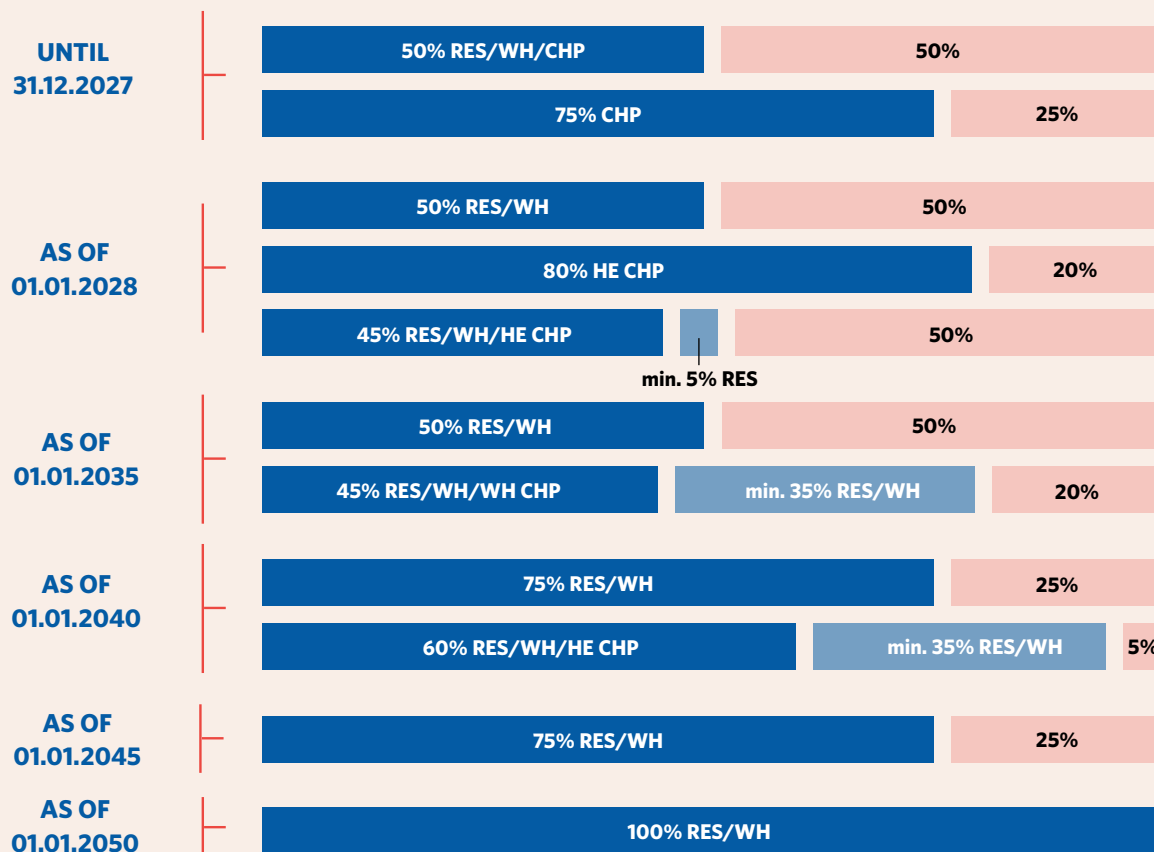
FIGURE 5. REQUIRED SHARES OF HEAT SOURCES FOR EFFICIENT DISTRICT HEATING SYSTEMS (ARTICLE 26 OF THE EED DIRECTIVE)

RES - renewable energy

CHP - cogeneration

WH - waste heat

HE CHP - high-efficiency cogeneration with EPS270



Source: PTEZ 2024.

In addition, an emissions' criterion was also introduced into the definition of high-efficiency cogeneration, which is set at 270 grams of CO₂ per kWh of energy produced – this limit can be met by natural gas, but not coal. **The new definition will apply as of 2028** for new CHP plants or from October 2025 for substantially refurbished units. CHP plants operating before the entry into force of the amended directive – including coal-fired units – will be allowed to **derogate from the application of the emissions**

From 2034, the share of coal (including CHP sources) in district heating systems will have to be limited to **20%**.

criterion until 1 January 2034 r. To do so, however, they must develop a plan to “reduce the emissions to 270 g CO₂ per 1 kWh by 2034”. From 2034 onwards, the share of coal (including CHP sources) in district heating systems will have to be limited to 20%.

Member States may also establish criteria for district heating systems based on the heating system's GHG emissions per unit of heat. However, this method is adequate for those systems that are already partially decarbonised and that will be achieving carbon neutrality from this starting point.

Energy Performance of Buildings Directive

Buildings account for around 40% of EU energy consumption, more than half of gas consumption (mainly for heating) **and 36% of energy-related greenhouse gas emissions**. At the same time, 35% of buildings are over 50 years old and almost 75% are energy inefficient. Achieving climate neutrality without changes to accelerate the energy renovation of buildings is impossible.

Under the new provisions of the EPBD, all new buildings in the EU will have to be zero-emission from 2030, which means a ban on the installation of boilers powered by fossil fuels such as coal, gas, or oil. This obligation will extend to all new buildings used by public authorities two years earlier, i.e. from 2028. The directive also defines the means of powering zero emission buildings (ZEBs). These include energy from efficient district heating systems, from RES or zero-emission grid electricity. However, if none of the above means of power supply are available, Member States will be allowed to set a national standard for ZEBs, allowing the use of other grid electricity.

For residential buildings, Member States will have to introduce measures to reduce average primary energy consumption by at least 16% by 2030 and by at least 20-22% by 2035. **At the same time, EU countries will have to renovate 16% of non-residential buildings with the worst energy performance by 2030**. This ratio will increase to 26% by 2033.

Countries will have to adopt measures that will contribute to the phasing out of fossil fuels from individual building heating systems. From 2025, subsidies to purchases of independent fossil fuel boilers will no longer be allowed. By 2040, fossil fuel boilers are to disappear completely from the market, which means that it will not be possible to buy any. However, it will still be possible to continue to use them where they are already installed. The directive also sets ambitious plans for the **provision of space on buildings for photovoltaic installations**. From 2026, such installations will have to be installed on the roofs of all new public buildings with an area above 250 m². From 2027 onwards, this obligation will be extended to the existing public buildings with a surface area of more than 2,000 m², and from 2030 above 250 m².

Energy Taxation Directive

The draft revision of the Energy Taxation Directive (ETD) is the last major element of the "Fit for 55" package that has not yet been approved.

The ETD sets out structural rules and minimum rates of excise duty for the taxation of energy products – motor fuels, fuels used for heating, or electricity. As long as these minimum thresholds are respected, Member States are free to set their rates. However, most of them tax some energy products, and in some cases electricity, above the minimum rates in the directive. **Amending the directive requires unanimity of all Member States** and the European Parliament's role is limited to issuing a non-binding opinion to the EU Council.

The Commission's draft revision in mid-2021 **envisaged taxing fuels proportionately to their energy content and environmental performance – the higher the impact, the higher the rate.** Proposals for increases meant that work on the draft got stuck in both the Council and the European Parliament. **Revisiting the ETD remains a task for the new term.**

Gas and Hydrogen Market Package

The package creates a regulatory framework for the development of hydrogen infrastructure and markets and for network planning. At the national level, all hydrogen network operators will have to submit a 10-year network development plan and update it every two years. Member States will also have to create a single hydrogen (or gas-hydrogen) network development plan.

A European hydrogen network operators' organisation (ENNOH) is to be established. It will be independent of the already existing European Network of Transmission System Operators for Gas (ENTSO-G) and European Network of Transmission System Operators for Electricity (ENTSO-E). The legislation introduces new quality standards for gas to flow between Member States. Network operators will have to accept input with a 2% hydrogen blend, but individual contracts will be possible that allow a higher blend. This is to avoid segmentation of the European market.

It is expected that hydrogen will be used mainly where electrification is not a viable option, i.e. for example in energy-intensive industries (refineries, steel and chemical production) and in some heavy transport, maritime or aviation sectors.

Electricity Market Reform

In March 2023, the Commission proposed a reform of the EU electricity market to reduce the impact of fossil fuel prices on electricity rates, but also to improve the conditions for investments in RES.

The final shape of the reform was agreed by the European Parliament and the EU Council in December 2023. The changes are being implemented through a revision of the Regulation and Directive on the Internal Electricity Market and the REMIT Regulation. Among other things, it introduces solutions to support and facilitate the use of Power Purchase Agreements (PPA), i.e. long-term contracts for the purchase of electricity, directly between the producer and the

The main purpose of the Electricity Market Reform is to **reduce the impact of fossil fuel prices** on electricity prices.

customer. Such contracts are supposed to increase the stability of energy prices. At the same time, **EU Member States will be obliged to use two-way contracts for difference** when they grant State aid to support investments in new RES and nuclear power.

In addition **the reform is intended to improve operating conditions and facilitate the development of electricity networks.** Among other things, the changes modify the way network tariffs are set to encourage distribution system operators (DSO) and transmission system operators (TSO) to use flexible grid connection agreements. It is also about making a better use of the existing infrastructure and developing storage and the demand side response (DSR), i.e. consumers who can reduce their energy consumption, for example.

CHAPTER 03

Five energy dilemmas

1

How to finance the transition?

Access to capital will be a critical condition for enabling investments in the energy sector and thus for the success of the transition in Europe.

Public funds – national and European – play a key role in mobilising private resources. **There are multiple sources of finance for energy transition, including: the EU budget, the NextGenerationEU instrument, the EU ETS system, or the Norway Grants. For example Poland, until 2027 can raise approximately €43 billion for its energy transition from these sources** (Energy Forum, 2021). However, each of them has strict rules stating when and for what types of projects the financial support can be obtained from them.

The EU Funds also differ in their designs and operating logic. The Recovery and Resilience Facility – RRF (which finances investments from the National Recovery Plan) is a new mechanism that both the Commission and the Member States are learning to use. There is a risk that, because of various procedural requirements, it may not be used in full, which will be to the liking of the EU's net contributors, opposed to taking on EU debt from the outset.

In 2021-2027, Poland can raise a total of c.a. **€43 billion** against the **€370 billion** estimated cost of the energy sector transformation.

The main challenge of raising funds from the RRF is the much shorter deadline for its use than in the case of the standard EU budget. **Investments should be completed by 31 August 2026.**³

In addition, the disbursement of funds is conditional on the pace of legal changes agreed with the Commission to be implement-

ed by Member State. This type of conditionality mainly pleases the Commission, which wants to replicate the “money for reforms” approach in the next Multiannual Financial Framework.

One thing is certain – the cohesion policy will continue, as its funds are enshrined in the EU treaties. **The scale of this support, however, will largely depend on the commitment and strength of the arguments of the beneficiaries of this policy.** Over the 20 years of membership in the EU, central administration, local-governments and businesses from Central European Member States have been highly effective in obtaining funds under the cohesion policy, including for investments in infrastructure such as energy networks. These needs are still enormous, so it makes sense to continue with the tried and tested mechanisms rather than inventing new ones.

Another element of the cohesion policy is the Just Transition Fund (JTF), which supports the decarbonisation and development of regions that have developed Territorial Just Transition Plans (TJTPs) and had them approved by the Commission.

The current Multiannual Financial Framework (MFF) for 2021-2027 assumes spending of €1.2 trillion. For the first time in the history of the EU, those earmarked for climate goals are expected to consume a minimum of 30% of the budget. Adopting the next MFF for the years after 2027 will be difficult, as new disputes over money are arising on top of the existing ones:

- **Budget size.** The countries of the EU North favour financial discipline, in opposition to the countries of the EU South. Direct revenues to the EU budget are a separate issue. There are, for example, proposals in the discussion to allocate part of the revenues from the EU ETS to EU's own resources, which would deplete the pool currently foreseen for national needs.
- **The future of EU debt.** The loan-financed post-pandemic Recovery and Resilience Facility was supposed to be set up as a one-off, but it later turned out that it could help with eliminating reliance on Russia (the REPowerEU programme). The use of this mechanism for defence investment, in response to Russian aggression against Ukraine, is currently discussed.

³ With the exception of the Energy Support Fund and the Offshore Wind Energy Fund, for which loan agreements must be signed by this date.

- **Spending priorities.** In addition to the permanent elements of the debate, such as the cohesion policy promoted by Poland, or agriculture promoted by France, there are also new themes, such as security, strengthening of industry, or support for Ukraine's integration into the EU. Another challenge is to decide how to allocate EU funds, i.e. where grants are needed and where loans will suffice.

The start of formal negotiations of the new MFF may coincide with the Polish presidency of the Council of the European Union in the first half of 2025. The Commission is expected to present its first proposal for a new EU budget in the summer of 2025. The discussion itself will last until 2028, and all national capitals will have to agree on the shape of the new budget.

EU ETS-related funds

An important source of funding for the transition – and separate from the EU budget – is the revenue from the sale of CO₂ emissions allowances and related funds, which are financed by the sale of a separate pool of emissions allowances.

a) Modernisation Fund

The Modernisation Fund (MF) was established in 2021 and is used for the modernisation of the energy sector in lower-income EU Member States, but only with a 2030 perspective. It is financed by revenues from the auctioning of part of the general pool of carbon emissions allowances. In addition, countries can transfer part of their auction pool to the Modernisation Fund, increasing – at the expense of their budget revenues – the value of this instrument. In Poland, funds from the MF will go as subsidies and preferential loans for, among others, investments in electricity distribution networks, RES or district heating. The MF finances, among others, RES installations in rural areas.

b) Innovation Fund

The Innovation Fund (IF) finances technologies that can help achieve climate neutrality by 2050. The Fund is financed by revenues from the auctioning of emissions allowances and has a budget of approximately €40 billion until 2030⁴. Support is granted directly by the European Climate, Infrastructure and Environment Executive Agency (CINEA). Projects implemented by all EU Member States as well as Iceland and Norway are submitted to the Fund. The problem, however, lies in the large number of applications for funding versus a disproportionately small budget of the Fund. In such a race for applications, richer companies from Western Europe, which can demonstrate that their projects are more innovative than those from Central Europe, win a much bigger pot.

⁴ Commission's estimate, with CO₂ at €75 per tonne.

Social Climate Fund

In 2027, the ETS2 is to come into effect in the EU, and will charge the cost of CO₂ emissions to road transport and buildings. The new levy will be paid by fuel producers, who will pass on the increased costs to consumers. As a result, prices for fuels used in vehicles (petrol, diesel) and residual heating (gas, coal) will start to rise. The Social Climate Fund is intended to support the consumers most affected by the burden resulting out of the ETS2. The money will primarily go to households and will not support large investments in RES or power networks. The Fund's budget (€65 billion) will be financed by revenues from the sale of emissions allowances under the new system.

Private investments and the EU Taxonomy

The implementation of the European Green Deal will not be possible without increased investments by the private sector and financial institutions. This is why the EU is implementing the principle of sustainable finance. **The key regulation creating its framework is the EU Taxonomy. It is a classification tool to help investors and companies make informed investment decisions on environmentally and climate-friendly activities.** It is regulated by the EU Regulation of June 2020 on the establishment of a framework to facilitate sustainable investment.

In turn, the provisions of the revised NFRD (Non-Financial Reporting Directive) require undertakings subject to it to disclose information on **how and to what extent their activities meet the requirements of sustainable business.** Such entities must disclose in their reports:

- % turnover from products or services associated with activities that meet the criteria of sustainability (according to precise criteria set out in EU law),
- % investment (CapEx) and/or expenditures (OpEx) for assets or processes associated with activities that meet the criteria of sustainability.

The reporting requirements of the EU Taxonomy mean that **"high-carbon" assets (e.g. coal) without adopted emission reduction strategies will become a liability in banks' portfolios.** As a result, access to capital for companies holding such assets is becoming increasingly difficult. In contrast, projects qualified as "green" or "sustainable" are likely to obtain credits easier and at a lower cost. At the same time, it will be easier to obtain financing for ESG-compliant investments, e.g. in the form of "green bonds".

The EU Taxonomy also defines what energy sources are considered transitional on the way to climate neutrality. Natural gas and nuclear energy have been recognised as such a source – under restrictive conditions.

The role of the European Parliament



While the size of the EU budget is decided by the Member States, i.e. the Council of the European Union, it is the European Parliament that plays an important role in determining how individual EU Funds will function. The work of the Budget (BUDG), Regional Affairs (REGI) and Economic Affairs (ECON) committees will be crucial in this respect. During the 2019-2024 term, the European Parliament has worked hard to ensure that the EU funds were not used for gas and nuclear related investments. It will be crucial to seek the largest possible budget for cohesion policy and for tackling **energy poverty in connection with the entry into force of the ETS2**. Some Member States may also seek an increase in the levels of support allowed under State aid, which will translate into a lower burden for end users and liquidity in the energy sector. It will also be important to develop new rules that will make it easier for Central European countries to access funds for innovation, research and development, for example in areas such as district heating or energy storage. The debate about funds for transformation in the new EU budget will be all the more important, as it is still unclear whether the Modernisation Fund can be maintained after 2030. Its possible closure, or scaling down, would obviously negatively impact the pace of the transition in Central Europe.



The transition will not be possible without increased investments from the private sector and financial institutions. European funds will be needed to stimulate them.



The current Multiannual Financial Framework (MFF) for 2021-2027 assumes expenditure of €1.2 trillion. The climate spending target is expected to be a minimum of 30% of the budget. Adoption of the next MFF will be difficult, because of disputes over budget size, the future of EU debt and spending priorities.



The future of the funds financed with the sale of emissions allowances remains uncertain. Efforts should be made to keep the Modernisation Fund in operation beyond 2030 and to have greater geographical balance in the distribution of the Innovation Fund resources.

What will the EU's 2040 climate target be?

Setting a new climate target for 2040 will set the pace and cost of the EU's transition over the coming years.

On 6 February 2024, the European Commission published a communication on a new 2040 target, compared to 1990 levels. **This is a prelude to discussions between the Member States and the European Parliament on the pace of the EU's transformation after 2030.** In the term that is beginning, the Commission will propose new legislation on this issue. The adoption by the EU of a legally enshrined emissions reduction target for 2040 is a requirement imposed by the European Climate Law.

€660 billion – that's how much EU Member States will spend on the energy sector each year to reach the 2050 climate neutrality target.

In its communication, the Commission considers three emissions reduction scenarios (80%, 85-90% and 90-95%), recommending a 90% reduction target by 2040.

All scenarios assume similar investment needs for 2031-2050. For the energy sector, these amount to

nearly €660 billion (3.2% of EU GDP) annually, and for transport, around €870 billion (4.2% of EU GDP). The Commission estimates that these investments will reduce the number of premature deaths caused by air pollution from 466,000 per year in 2015 to 196,000 per year in 2040, and reduce the associated costs from approximately €1,700 billion in 2015 to €670 billion in 2040.

Investments in the transition will translate into higher electricity prices, but its share in household spending will be decreasing. The Commission expects average electricity prices for EU households to rise from around €200 per MWh in 2023 to around €288 in 2050. However, the share of electricity purchases in household budgets will fall to 8-8.2% in the 2030s and 7.1% in the 2040s.

How does the Commission see the future energy mix?

The Commission's assessment does not provide information on the social and economic impact that the achievement of the 2040 target will have on individual Member States and sectors such as electricity or district heating. It does, however, outline the prospects for the development of technologies that are expected to play a key role in achieving climate neutrality.

The electricity sector is to be almost completely decarbonised by 2040, which means a complete shift away from coal, but also a significant reduction in the role of gas. At the same time, the power sector must achieve the ability to generate negative emissions of 10 million tonnes CO₂ per year (net)⁵. This means that all emission-intensive power plants that remain in operation in 2040 would in practice have to be equipped with carbon capture and storage installations. This is expected to provide a reduction of 32 million tonnes of CO₂ per year.

Technologies will also be needed to capture and store CO₂ from biomass burning plants (BECCS – Bioenergy with Carbon Capture and Storage) and from the air (Direct Air Carbon Capture and Storage – DACCS). The first BECCS project is being implemented at the Drax power station in the UK⁶. Regarding DACCS, on the other hand, there are currently a few pilot projects in Europe, but on a very small scale. The Commission assumes that in 2040 both technologies **will reduce around 153 million tonnes of CO₂ per year. This is as much as is emitted annually by the Polish power and district heating sectors.** Overly optimistic assumptions concerning the carbon capture and storage technologies are one of the main areas of criticism of the Commission's calculations presented in the communication on the 2040 target.

85 % – a share in energy production to be provided by renewables in 2040 in the EU, according to the Commission.

Biomethane is also to be used to reduce emissions, that is to reduce CO₂ production by 22 million tonnes in 2040. The Commission does not envisage a far-reaching conversion of gas-fired power plants to green hydrogen. The reason for this is the still too high cost of acquiring this

fuel. **The dominating technology for energy production in 2040 will be renewable energy sources, that are to already account for as much as 85% of generation in the EU in 2040.** In 2050, this is expected to be 90%.

There will also be a dramatic increase in demand for electricity, due to the progressing electrification of sectors such as transport and the heating industry. In 2040, it will exceed 5,000 TWh in the EU, rising to nearly 7,000 TWh in 2050. For comparison – the EU electricity demand in 2022 was approx. 2,800 TWh.

The Commission's assumption of a decline in the importance of nuclear power in all the scenarios is disputable. In 2040, reactors are expected to account for only around 10% of electricity generation in the EU, compared to 25% in 2023.

5 Negative emissions can be achieved, for example, through the combustion of biomass combined with carbon capture (CCS/CCU), which, according to EU rules, not only produces energy in the overall balance, but also removes a certain amount of carbon dioxide from the natural CO₂ cycle that would normally end up in the atmosphere.

6 https://www.drax.com/press_release/uk-government-approves-planning-application-for-beccs-at-drax-power-station/ [accessed 19.06.2024].

In turn, their capacity is expected to fall from 94 to 71 GW in 2040. However, the Commission's analysis does not include the possibility of developing the SMR technology and ignores the declaration announced by 16 EU Member States of a target of 150 GW of installed nuclear power capacity by 2050.

The role of the European Parliament



The new Commission will present a legislative proposal aimed at incorporating the 2040 target into the EU legislation. The target will also have to be agreed to by the European Parliament, which in the last term sought more ambitious climate policy arrangements. **However, an increase in the number of MEPs more vocal in their criticism of the EU's transition trajectory may nuance the European Parliament's position.** The next step will be the adoption of a package of legislative changes - along the lines of "Fit for 55" - that will bring the legislation in line with the new emissions reduction target. A key task will be to lobby for the **Commission to perform additional analyses of the impact of the introduction of the new reduction target on individual Member States and industries, such as the electricity and heating sectors.**

- » **The EU will decide on a new climate target for 2040 by 2025 at the latest.** Currently, the 90% reduction in emissions is most often mentioned.
- » **The adoption of such a target means that the electricity sector is to be almost completely decarbonised by 2040,** which means a complete shift away from coal, but also a significant reduction in the role of gas.
- » **Renewable energy sources are to be the dominating technology for energy production in 2040,** to account for already as much as 85% of EU generation in 2040. In 2050, this is expected to be 90%.
- » **The Commission assumes a decline in the importance of nuclear power in the EU.** In 2040, nuclear reactors are expected to account for only around 10% of electricity generation, compared to 25% in 2023.



What technologies will be key during the transition?

In 2050, renewable energy sources, supported by energy storage, are expected to account for 90% of the EU's electricity production. Achieving climate neutrality will also require the development of nuclear power and carbon capture technologies (CCU/CCS).

Photovoltaics

Solar power plants are the fastest growing power generation technology and will play a key role in the EU achieving climate neutrality. In 2023, photovoltaics accounted for 9.3% of electricity generated in the EU, with the total capacity of all installations exceeding 256 GW. The REPowerEU plan assumes an increase in PV capacity to 600 GW in 2030.

Photovoltaic panel manufacturing is **dominated by China. As much as 97% of the EU's demand for solar cells is met with imports from there.** In addition, after the US restricted imports of panels from China, the surplus that China is unable to sell in other markets is coming into Europe. The EU is trying to counter Chinese dominance. In February 2024, the European Parliament and the Council agreed on the final version of the Net Zero Industry Act (NZIA) Regulation, which envisages **that the Community will be able to manufacture by itself 40% of strategic technologies such as PV panels by 2030.**

Case study: Photovoltaics in Poland

The huge dynamics of PV growth in Poland is a phenomenon on a European scale. At the end of April 2024, the capacity of photovoltaic installations reached almost 18 GW. Of this, 11 GW are prosumer micro-installations, of which there are already 1.45 million (ARE, 2024). In 2023, the share of solar energy exceeded 7% of the country's electricity production (Ember, 2023). The proposal to update the Energy Policy of Poland (EPP) in 2023 assumed that PV capacity would increase to 27 GW in 2030 and 45 GW in 2040.



9.3 % – the share of PV in EU electricity generation in 2023.

Wind power

Wind turbines are the most important renewable technology of the EU power grid.

In 2023, they supplied 17.5% of the electricity produced, and their total capacity exceeded 218 GW (of which 17 GW are offshore wind farms). The REPowerEU plan assumes an increase in wind capacity to 510 GW in 2030, of which 60 GW would be offshore wind farms.

However, the European wind industry is in crisis, particularly the offshore wind farms.

From 2020 to 2022, the share of European companies in the global production of components necessary for the wind industry fell from 42 to 35% (The European Commission, 2023). The reasons for this are mainly an increasing competition from China in the production of components (e.g. turbines, cables), excessively long permitting procedures, rising inflation, too low profitability of these projects and broken supply chains. The wind industry producers also face a lack of access to raw materials such as copper, silicon and rare earth metals.



European wind industry is in crisis, particularly offshore wind farms.

Nuclear power

According to the International Energy Agency, **without the development of nuclear power, the world will not be able to achieve the climate neutrality target.**

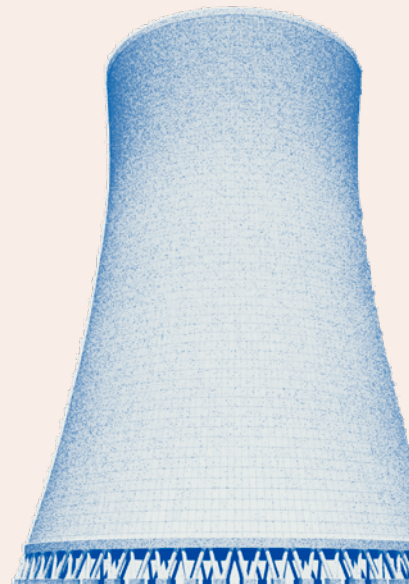
Despite this, EU Member States remain deeply divided over the future of the development of this technology. The development of nuclear power is supported by a group of countries, with France as its informal leader. In contrast, Germany, Austria, Denmark and Luxembourg are against it.

In 2023, nuclear energy accounted for 23% of electricity generation in the EU, and 12 of the 27 Member States had nuclear reactors on their territory.

Russia's invasion of Ukraine has changed the perception of nuclear power in many countries, prompting them to extend the life of already operating units or to plan investing in new units (large-size or SMR). Countries planning to build new reactors include Poland, Czechia, France, Romania, Hungary, the Netherlands, Slovakia, and Sweden.

It is crucial that the EU shall support favourable conditions affecting the cost-effectiveness of investments in nuclear energy. It is also necessary to simplify the acquisition of European funding for large-size nuclear projects, small modular reactors (SMRs) or other supply chain technologies for nuclear investment.

In the dispute over the future of nuclear energy, the Commission takes an ambiguous position. Energy officials emphasise that each country decides its energy mix and that one of the legal foundations of the EU is the EURATOM Treaty. Climate officials, on the other hand, more often highlight the challenges of nuclear power (e.g. waste) and stress that, considering the climate targets for the coming decades, investment in reactors is too time-consuming. New dynamics and new hopes in the nuclear power discussion – also in the European Parliament – have been evoked by SMRs. In 2022, there were only three such units in operation worldwide, located in China and Russia. The first western unit is due to be commissioned in Canada in 2029, based on GE Hitachi technology. However, the Commission is also determined to support the development of European SMR technologies.

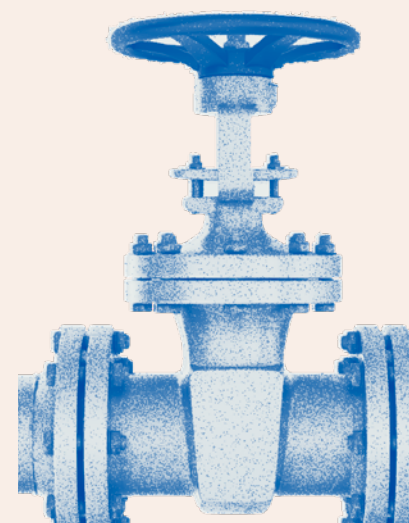


23 % – the share of nuclear reactors in EU electricity generation in 2023.

Gas, biomethane and hydrogen

Gas accounts for about 22% of the EU's total energy consumption, including 20% of electricity generation and 39% of heat. The EU will need gas to balance its energy production from RES, but at the same time it needs to get rid of the emissions associated with the combustion of fuels to achieve climate neutrality. To achieve these two objectives, the EU intends to work towards the decarbonisation of gas by promoting the development of biomethane, while at the same time promoting joint purchase of natural gas by EU companies to ensure security of supply at the lowest prices.

Biomethane is produced by purifying the biogas that is emitted during the fermentation of organic waste. Across the EU, at the end of April 2023, more than 1,300 such plants were already producing 3.5 billion m³ of biomethane per year, and production is expected to increase tenfold by 2030. The second key option for decarbonising gas is to increase the use of green hydrogen, i.e. produced from RES-powered electrolyzers. By 2030, the EU wants to install electrolyzers with a capacity of 123 GW to produce 10 million tonnes of green hydrogen per year. It intends to import an equal amount.



Gas accounts for approximately 22 % of the EU's total energy consumption, including 20 % electricity generation and 39 % of heat.

CCS/CCUS

Achieving climate neutrality will require the EU to capture 477 million tonnes of CO₂ annually by 2050. By 2030, this level is expected to reach 50 million tonnes. For comparison – current community emissions are 3.41 billion tonnes CO₂ per year according to Eurostat.

The EU emissions management strategy is to focus on three aspects of CO₂:

- storage in geological formations (CCS);
- utilisation (CCU) in the economy, e.g. for the production of synthetic fuels or petrochemicals;
- implementing a sustainable carbon cycle, e.g. by directly removing it from the atmosphere (Carbon Removals). Carbon capture is to be developed in sectors where complete elimination of emissions is not possible – the industry (e.g. metallurgy or cement production).

By 2040, the Commission wants CO₂ to become a normal market-traded commodity. For this to happen, the cost of carbon capture must approach the carbon price in the EU ETS market. In the new term, the Commission is planning to present a legislative proposal to accelerate the development of the CCUS market and infrastructure in Europe. This is mainly of interest to the industry that does not have an easy decarbonisation path. CCUS is also important for the electricity and district heating sectors, as it allows for achieving “negative emissions”.

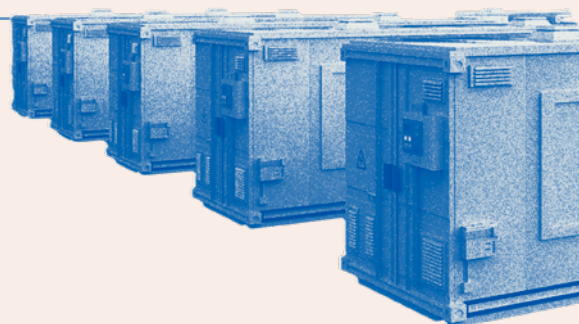


477 million tonnes of CO₂ the EU will need to absorb annually to achieve climate neutrality by 2050.

Energy storage

At present, energy storage is mainly based on pumped storage hydropower plants (PSH), but with the **increase in RES production, there is a growing popularity of lithium-ion batteries to help the power producers store surplus power, and heat storage** such as electrode boilers. At present, in the EU there are 11 GW of electricity storage facilities in operation with a capacity of 14.7 GWh, half of which are connected to the transmission and distribution grids. Projects with a capacity of around 19 GW are under development. However, to meet the EU’s “Fit for 55” and REPowerEU targets, the capacity of stationary energy storage will need to reach around 200 GW by 2030.

At present in the EU there are 11 GW of electricity storage facilities in operation with a capacity of 14.7 GWh.



The role of the European Parliament



The European Parliament will play an important role in the debate on the rules for the disbursement of EU funds in the next financial perspective and in defining pathways to the 2040 reduction goal. In both discussions, it is important to emphasise the importance of technological neutrality and of considering the local economic and geographical conditions. In the very short (from the perspective of the duration of energy sector projects), 2030 and 2050 targets horizon, all technologies leading to emission reductions should be accepted and supported. Narrowing down the list of available tools will not only slow down the transition but will also increase its cost, if only because of the scarcity of skilled workers and problems with the supply of components and critical raw materials.

4

How to provide affordable and clean heating?

As RES capacities grow, the need to develop technologies that can effectively balance the grid will increase too. District heating can be used for this purpose, by turning it into a huge thermal battery.

Growing RES generation creates downward pressure on electricity prices, but drives up the cost of operating the grid, in effect neutralising the positive effects of green energy development for consumers. The solution is **to increase the flexibility of the system through the construction of energy storage facilities** that would take over excess energy production from RES. However, a similar role can be played by power-to-heat technology, e.g. electrode boilers that feed into the district heating network at peak times. Their construction is less expensive than investing in expensive lithium-ion energy storage (Instrat, 2023). The heat stored during warmer weeks can be used for heating later.

Germany has the largest district heating system in Europe. The second-largest system - in Poland - has 5.8 million households connected to the district heating networks, which are heated by district heating and CHP plants with a capacity of over 53 GW. In the Polish case coal accounts for 66.2% of heat production, but its share is gradually declining in favour of RES (12.6%) and gas (8.8%) (ERO, 2022). At the same time, district heating companies in Poland are characterised by low profitability and many of them have limited creditworthiness. This makes it impossible, especially for smaller ones, to invest in modern low-carbon technologies.

In many EU Member States, especially in Central Europe, the district heating sector is facing an accelerated transformation and new requirements. The key challenges are the requirements to meet the new criteria for efficient district heating systems, including among others the introduction of an emission criterion

The introduction of an emission criterion of **270 g CO₂/kWh** for high-efficiency cogeneration from 2028 for new build units will exclude coal-fired units from the efficient systems category.

of 270 g CO₂ /kWh for high-efficiency cogeneration from 2028 for new build units (for existing units a derogation is possible until 2034), which will exclude coal-fired units from the efficient systems category. Furthermore, after 2034, maintaining efficient district heating status will require a minimum share of heat from RES or waste heat of 35% (currently 5%), which will be particularly difficult to achieve for large-scale district heating systems. Losing the status of an efficient district heating system will mean that it

will no longer be possible to obtain financial support from public funds for the modernisation and expansion of system heat markets, which will translate into higher heat prices for consumers.

At the same time, the “greening” of district heating will be advancing According to the REDIII directive, each Member State is obligated to increase the share of RES in this sector by at least 0.8 percentage points on average per year in 2021-2025 and by 1.1 percentage points on average per year in 2026-2030. REDIII has also set out obligations to increase the share of RES and of waste heat and waste cooling in heating and cooling systems by approximately 2.2 percentage points on average per year in 2021-2030.

Thanks to the revision of the EU ETS Directive, the heating sector may receive an additional 30% of free CO₂ allowances, which should be used as a means to accelerate decarbonisation before 2030. To receive the free allocation, however, heating companies will have to invest the market equivalent value of these allowances in technologies significantly reducing emissions before 2030. Everything will take place in accordance with the plans for reaching climate neutrality, which each installation or company was obliged to draw up by May 2024. Finalising the investments before 2030 will be a major challenge for utilities, given the experiences with investments in the energy sector.

The heating sector across the EU **is betting on electrification** with large-scale heat pumps, electrode boilers and storage. Only in the longer term will the transition of the heating sector be able to rely more on biomethane and biomass, or possibly SMRs and the combustion of green hydrogen. Low-temperature district heating networks will also be developed locally, depending on local potential, enabling the utilisation of waste heat from industry or geothermal energy. In some cases, however, it is necessary to maintain a high temperature in the heating system originally powered with coal. Then the best solution is to replace coal with gas. This makes it possible to reduce emissions, but at the same time it exposes the sector to the risk of price fluctuations and supply concerns.

The role of the European Parliament



The scale of the challenges facing district heating should provide a stimulus for the Commission to present a comprehensive action plan for the decarbonisation of the sector, coupled with a plan to support the most promising solutions, such as the power-to-heat technology. The European Parliament should opt for such an action. An objective difficulty, however, is that district heating, popular in Central Europe, is almost unknown in Western Europe (apart from Denmark and Scandinavia).



District heating can be used to improve the operation of the electricity sector. It will be crucial to equip district heating and CHP plants with power-to-heat generation equipment and heat storage.



5

How to integrate everything into the grid?

By 2030, electricity demand in the EU will increase by 60% and the capacity of PV and wind sources from 400 to 1,000 GW. In order for green energy to flow to consumers, investments in electricity grids will be necessary.

For years, power grids in the EU were built with a centralised grid in mind, with energy flowing in only one direction – from the power stations to consumers. The transformation is forcing a departure from this paradigm. **The development of distributed sources means that the existing consumers are now also becoming producers.** This creates new challenges and opportunities for the power industry.

The decentralisation of energy generation necessitates the expansion and modernisation of the transmission and distribution infrastructure. According to the Commission's calculations, the costs associated with these tasks may amount to €584 billion just until 2030. This is how much is needed to adapt the infrastructure for the further development of electromobility, the installation of new capacity in RES sources, as well as the mass installation of heat pumps.

€584 billion – the value of necessary investments in energy networks in the EU to be made by 2030.

Grid operators will have to make “classic” investments in infrastructure development, ensure bidirectional electricity flow, but also develop IT systems allowing dynamic balancing of the grid. The key is the modern-

isation of low- and medium-voltage networks in particular, to which, on average in Europe, around 75% of all RES capacity is being connected. This part of the infrastructure is also the most outdated – **in Europe, more than 40% of distribution networks are over 40 years old**. By the end of this decade alone, investments in the distribution systems will cost €375-425 billion (The European Commission, 2023; Eurelectric 2021).

RES projects in the EU face the challenge of long waiting times to obtain connection rights. Waiting times for a grid connection range from 4 to 10 years, and up to 8-10 years for high voltage. The number of refusals to connect to the distribution grids is increasing.

EU regulations are to further privilege RES development. According to the revised REDIII directive, **Member States have until 21 February 2026 to designate their Renewable Acceleration Areas**. It will be important that these measures also take into account the availability of networks and connection points for green installations. In addition, a balance must be struck between the demand for RES connections, the construction and the expansion of the distribution grid and the actual demand for electricity, as without a rational approach, investments may be overestimated.

The main regulatory challenge concerning the distribution is to activate the role of distribution system operators (DSOs) to become the integrators of the development of distributed energy sources and local markets for flexibility services. This includes the creation of legal opportunities allowing distribution operators to harmonise their activities with the development of demand side response (DSR) and energy storage services. In addition, it is necessary to ensure appropriate financing conditions for investments in distribution networks through legal changes in tariff design and easier access to EU funds.

The role of the European Parliament



Networks are the foundation for the development of the European energy market and are crucial to the success of the energy transition. It is therefore necessary to mobilise more European support for the modernisation and development of the grid in order to accelerate the pace of connecting RES. This objective should also be supported by the European Parliament. Issues concerning distribution system operators (and not just transmission system operators) and their role in changed conditions of functioning of the energy market (e.g. rapid development of RES, two-way energy flow) should be taken into account.

- » **The development of RES sources** means that existing energy consumers are increasingly becoming energy producers. This creates new challenges and opportunities for the energy industry.
- » **It is crucial to strengthen and modernise low - and medium-voltage electricity grids**, to which, on average in Europe, around 75% of all RES capacity is being connected. Currently, RES projects have to wait between 4 and 10 years for grid connection.
- » **In Europe more than 40% of distribution networks** are over 40 years old. By the end of this decade alone, investments in distribution will cost €375-425 billion in the EU.



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