EU Policy Factsheet

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Energy Transitions Commission

Energy Security in the EU

Overview

- The 2021/22 gas crisis exposed vulnerabilities in the EU's energy security due to dependence on fossil fuels. Disruptions and shifting global gas flows caused a supply and demand bottleneck, raising consumer prices despite stable production costs.
- Meanwhile, economies of scale have made renewables the cheapest way to generate electricity, even accounting for increased needs for energy storage, stronger electricity grids and flexibility mechanisms.
- Wind and solar surpassed fossil fuels as the main source of electricity generation for the first time in 2022, and have continued to do so since.
- Looking forward, renewable energy is more likely to deliver secure and affordable energy than fossil fuels. Not only are renewables now cheaper, they are also less vulnerable to physical and economic disruption: once installed, renewable energy relies solely on wind and sunshine.
- A successful transition to renewables requires strong policy leadership and continued investment in clean technologies. Setting quantified long-term targets, streamlining permitting, expanding the grid and securing a sustainable supply chain for critical materials are all essential.

The recent energy crisis was driven by overdependence on fossil fuels.

The 2021/22 gas crisis was triggered by a confluence of unique events, but highlighted key structural weaknesses in EU energy security. Although the resulting cost increase has sometimes been attributed to the energy transition, it is actually a primarily fossil-led crisis.

In 2021, low storage and increased global competition due to higher gas use in Asia and Latin America meant that EU and global gas demand was close to supply potential, creating a tight market. This supply and demand bottleneck was exacerbated by (a) an uptick in gas heating due to cold weather; (b) over-reliance on gas due to the long-term phase out of coal and nuclear in the EU power sector; and (c) supply issues due to shifts and disruption in global gas flows. Following the invasion of Ukraine by Russia, the EU ceased payments to import gas from Russia, its largest supplier, radically reducing supply, and pivoted to higher-priced imported Liquified Natural Gas (LNG).

Electricity Market Designs which links price to the cost of gas transferred this volatility to electricity. Despite government subsidies taking on some of this increase, costs were passed on to consumers. Although the cost of producing gas did not increase, the cost to the consumers increased drastically: EU consumers paid around €230 billion more in 2021 than in previous years.

In the face of this challenge, the EU had two key levers: reduce demand and/or increase energy availability. Under RePowerEU and FitFor55, it is acting on clear targets for both.

The share of renewable energy has increased: 2022 was a record year for solar energy, with 41 GW of photovoltaic capacity installed – 60% more than in 2021 (26 GW). Wind power also increased: 19.1 GW of new wind power was installed, an increase of 4% compared to 2021. Increased deployment was felt in energy supply, as in 2022, more electricity was generated in the EU from wind and solar power than from fossil fuels. This trend continued into 2023, when wind produced more electricity than gas for the first time.[1]

Demand has reduced: With the implementation of energy efficiency measures and the availability of renewable energy, milder weather, and high prices, gas consumption fell by more than 18% in 2022 and 2023, compared to the previous five years. Crucially, this fall in consumption was decoupled from economic growth: outside of a Covid-19-related slump in 2020, EU manufacturing output and income has grown every year since 2015, including a 5% increase in 2022, even as gas consumption fell.[2]

Gas availability is assured: Gas storage facilities were filled to 95% of capacity ahead of the winter of 2022–2023 and to over 99% of capacity in October 2023. The overall share of Russian gas (liquefied natural gas and piped natural gas) in EU gas imports has fallen from 45–50% in the pre-crisis years to just 15%.

We know now that renewable energy can deliver cheap and more secure energy to the EU.

The diversification of energy sources away from fossil fuels makes the EU's energy supply more resilient and less susceptible to disruptions: unlike a gas plant, which will require a constant supply of gas to run, once a solar panel or wind turbine is installed, sunshine and wind are all that is required to generate electricity.

More countries have the natural resources needed to generate decarbonised electricity, and this electricity can be generated in-country. Some renewable energy systems, such as rooftop solar panels and small-scale wind turbines, enable even more local, decentralised energy production at the local level, making energy supply more resilient to disruptions.

Renewables have benefitted from economies of scale and are now the cheapest way to generate electricity and deliver affordable energy to EU households and companies. Even accounting for additional investment, new-build solar and wind projects are now cheaper than new-build coal and gas in the EU.[3]

Although additional storage and flexibility solutions are needed to balance the electricity grid through times of high and low renewable electricity generation, these are getting cheaper too. Battery prices are dropping and hydro-pumped storage solutions are growing.[4] Grid operators are implementing smart demand management options that continue to drive costs down by allowing consumers to shift demand (e.g., charging appliances) to times where large amounts of renewable electricity is being generated.

For example, estimates suggest that if Poland meets its 2030 renewable energy targets, this could reduce wholesale power prices by 27%, which could result in significant savings for households.[5] Similarly, EVs are now cheaper to own and run than fossil-fuelled vehicles in 19 out of 22 European countries, and buying an EV outright saves an average of $4,800 over a typical seven-year period of ownership.[6]

The ability of fossil fuels to deliver energy security is not assured.

On the contrary to renewables, fossil fuels prices have risen. This increase has not been driven by climate policy: whilst pricing emissions via the EU Emissions Trading System (ETS) does impact cost, since 2020 fossil fuel prices have risen faster and further since 2020 than the carbon price.[7] The rising cost of fossil fuels has outsized impacts across the EU's economy: around 50% of year-on-year inflation in 2022 could be attributed to growing energy prices.[8]

The Commission estimates that worsening climate impacts could reduce EU GDP by about 7% by the end of the century.[9] Climate impacts are not only expensive, they also directly threaten energy security: increased flooding and extreme temperatures can create supply and demand disruptions. A faster transition to decarbonised energy can reduce the cost of adaptation and climate impacts.[10]

Strong policy leadership is still necessary to achieve a transition to safe and affordable decarbonised energy.

While the decarbonisation of the EU's energy can deliver safe and affordable energy, the gas crisis was a warning: this transition must be managed. Strong and consistent policy is needed to avoid energy bottlenecks by a) increasing the availability of renewable energy, and b) managing the phase-down of fossil fuels.

Increasing deployment of renewable energy:

Setting long-term signals: Strong and consistent policy, including long-term targets for renewables and enabling administration (including speeding up planning and permitting), is essential to maintain momentum on renewable energy deployment and avoid backtracking.

Designing a renewable-ready power market: The power market must be designed in a way that incentivises the deployment of renewables without financial burdens to consumers and industry. The EU's recent revision of the electricity market design to incentivise renewables and reduce reliance on expensive gas is a positive step.

Expanding electricity grids: The current electricity grid infrastructure in many European countries is not well-suited for a large-scale integration of renewable energy sources, which are often geographically dispersed. Significant investments are needed to modernise and expand the grid ready for increasing wind and solar power.

Avoiding permitting delays: Lengthy and complex permitting processes can significantly delay renewable energy projects. Whilst the EU's recent policy pushes to shorten permitting times are starting to take effect, further streamlining these processes is crucial to accelerate the deployment of renewables.

Ensuring supply chain security: The transition to renewables relies on a number of critical raw materials, such as lithium, copper, and silicon. Ensuring a secure and sustainable supply chain for these materials is essential to avoid future bottlenecks and price hikes. Policies such as the Critical Raw Materials Act and Net Zero Industry Act can enable the EU to take steps to secure these supply chains and avoid disruption to the rollout of renewable technologies.

Managing the phase-down of fossil fuels:

Setting ambitious but realistic timelines for phase-out: While renewables are rapidly growing, they may not yet be able to fully replace fossil fuels in some sectors, such as heavy industry. Gas will play a temporary and declining role as a transition fuel, but can and must be phased out in the next decade. Ten Member States, representing 60% of the EU's energy sector, have committed to decarbonising their power sectors by 2035 or sooner.[11] Beyond this point, there will be no need for unabated gas use.

Supporting EU manufacturing in the transition: Well managed short- and long-term support can manage the pressure of high energy prices and CO_2 related costs on EU energy-intensive industries. The Carbon Border Adjustment Mechanism (CBAM) must be made an effective tool by encouraging high carbon prices and ensuring the coverage of key emitting industries to avoid loopholes, create a level playing field with international competition, and avoid carbon leakage. Where appropriate, investment in carbon capture, utilisation and storage will support the decarbonisation of hard-to-abate sectors.

[1] Ember (2024), *European Electricity Review 2024*.
[2] Eurostat (2024), Available at: https://ec.europa.eu/eurostat/databrowser/view/TEIIS080/bookmark/table?lang=en&bookmarkId=8b0475c0-32ed-43c1-8cc6-6c10217e5348.
[3] Ember (2024), *European Electricity Review 2024*.
[4] Hydropower installed capacity in 2022 was 152 GW, and the EU holds a quarter of global installed pumped hydrostorage capacity. See European Commission JRC (2023), *Hydropower and pumped hydropower storage in the European Union.* Available at: https://setis.ec.europa.eu/hydropower-and-pumped-hydropower-storage-european-union-0_en#details.
[5] Reduction in wholesale power price based on cost to produce with renewables vs. cost to produce in BAU scenario.
[6] WEF (2023), *Owning an electric vehicle in Europe could be cheaper than you think, new research shows*.
[7] ETC (2023), *Fossil fuels in transition, Section 7*.
[8] Dezernat Zukunft Institute for Macrofinance (2023), *Fossil fuel to the Fire: Energy and Inflation in Europe*.
[9] European Commission (2024), *Communication on 2040 emission reduction targets*.
[10] ETC (2023), *Fossil fuels in transition*.
[11] Euronews (2024), *Austria, Denmark, Lithuania: Which EU countries have committed to decarbonise power by 2035?*.

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Building Energy Security Through Accelerated Energy Transition