

EUROPEAN UNION ENERGY POLICY AT A TIME OF CRISIS

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Introduction

The imminent supply crisis under the European Union's (EU) energy crisis might have come to an end, but then again, it all depends how one defines a crisis. The Russian Federation's large-scale invasion of Ukraine on 24 February 2022 exacerbated a number of energy-related crises that the EU was already tackling, including the fallout of the COVID-19 pandemic and the intensifying negative effects of climate change. The responses of politicians, policymakers and market participants to the war reflected normative commitments and ambitions to reduce market risks: support Ukraine by limiting the Russian Government's fossil fuel revenues, while eliminating the bloc's dependence on imports of Russian fossil fuels. Leaders have largely accomplished this task within the span of two years or so, but this does not put an end to the EU's energy woes, limiting its ability to abandon a 'crisis mode' altogether. The bloc continues to rely on imported fossil fuels, the burning of which sustains susceptibility to international market volatility and literally fuels global heating. By mid-2024 energy prices might have stabilized, but they remain higher than their pre-crisis levels, forcing governments across the EU to tackle rampant inflation and a cost-of-living crisis. A glimmer of hope at the end of this tunnel is the continued emphasis on the energy transition throughout the EU, which could provide a common solution to these issues but itself is not without challenges.

This essay surveys the EU's energy policy responses since the outbreak of the war in early 2022, providing a bird's eye view of changes during this tumultuous period. The horror of the war has provided the EU with an urgent stimulus to accelerate the shift from its deep dependence on imported Russian fossil fuels to greener forms of energy, in effectively fusing security and climate action. Immediately after Russia's invasion, the EU introduced short-term fixes to ensure its access to energy carriers. Some of these have had lasting implications, such as the build-out of liquefied natural gas (LNG) infrastructure. Meanwhile, the bloc's leaders also accelerated lasting change that would also enable the fight against climate change. While this reflects increased ambition, momentum for action is fizzling out and requires continuous support. Policymakers are forced to tread water carefully, allowing for a new energy system to take form and shrinking the fossil fuel-based energy system without fundamentally destabilizing it. Recent events show how goals, such as security and decarbonization, can overlap and thus garner support from various political factions, but here too, a delicate balance can be easily upset as protests and opposition to the green transition have emerged in various polities, jeopardizing the bloc's climate ambitions.

Volatility and Sanctions

The Russian decision to escalate the war against Ukraine in 2022 shattered EU–Russia relations, but the destabilization of European energy affairs dates back to 2021. Natural gas in storage was low in early 2021, and cold spells throughout Europe and Asia led to an increase in consumption. Moreover, economies were reopening after the COVID-19 pandemic, further increasing demand. Supply-side bottlenecks also emerged as hydrocarbons producers began overdue maintenance works. A combination of heightened LNG demand from South America, owing to low hydropower output, and rising oil-indexed LNG cargo prices in Asia, exacerbated natural gas's supply–demand mismatch. Natural gas prices that had been in the €5–€15 per MWh band on the Dutch Title Transfer Facility—Europe's largest natural gas trading hub—began to rise, peaking at just under €100 per MWh in 2021. This contributed to soaring electricity prices, as grid operators typically rely on natural gas to meet the marginal unit of electricity demand. The stage was set for Russian major energy company Gazprom to wield the 'gas weapon' by late 2021, which it did by suspending volumes auctioned for short-term delivery. Natural gas prices climbed to €240 per MWh as Russia launched its invasion, while those of electricity also soared to highs above €450 per MWh during 2022, driven by high natural gas prices, outages in France's nuclear generation and droughts obstructing hydropower output. Policymakers scrambled as the risk of Russia suspending all natural gas deliveries increased.

The Russian decision to withhold natural gas supplies to the EU came after the latter introduced a host of economic and technology sanctions. The European Council adopted 14 sanctions packages between February 2022 and June 2024. The Council banned coal imports from Russia with its fifth round of sanctions on 8 April 2022. The EU sourced 46% of its coal from Russia in 2021, but the fungibility of the resource allowed buyers to move towards other suppliers—including Indonesia, Australia and the USA—as they depleted the coal hoarded prior to the measure taking effect in August 2022. The EU's coal consumption jumped in 2022, driven by high electricity prices, but it returned to its long-term declining trend in 2023. The sanctions severed Russia's access to its main coal export market, which it addressed by diverting cargoes to India and, to a lesser extent, the People's Republic of China. Following an initial rise in shipments to new buyers, Russia has had trouble maintaining its market share, as a result of the competitiveness of supplies from Australia, Indonesia and South Africa.

The EU also sanctioned Russia's lucrative oil exports. The sixth package of sanctions, announced on 3 June 2022, imposed a ban on crude oil and petroleum products, but the EU's deep-

seated dependence on Russian crude (which accounted for 26% of imports in 2020), with some member states almost entirely reliant on Russia for their imports, made this a deeply divisive issue. A pivot in oil's case was technologically challenging and led refiners to incur additional costs. EU Governments nevertheless agreed to suspend imports by the end of 2022, although Bulgaria, Croatia, Hungary and Slovakia received exemptions. Despite derogations, market actors in these cases acknowledged the need to diversify from Russian reliance, but politics did not always allow for this. Hungary and Slovakia's case underscored the point, when refineries had to face the prospect of not being able to access Russian crude oil in 2024, owing to the Ukrainian government-imposed sanctions. The matter can be understood as the materialization of animosity between Hungarian and Ukrainian leadership but exposed the risks inherent in dependence on Russia hydrocarbons—a matter even more susceptible to risk, owing to it being transited via Ukraine.

To further curtail Russia's access to hydrocarbons revenues, Australia, Canada, the EU, Japan, the United Kingdom and the USA established the so-called Price Cap Coalition to leverage their control over the global oil shipping industry and insurance for the oil trade by imposing a cap on the price at which Russian oil could be traded—US \$60 per barrel for crude oil and \$45 per barrel for petroleum products that trade at a discount to crude (e.g. fuel oil) or \$100 per barrel for those that trade at a premium to crude (e.g. diesel, kerosene and gasoline). Their objective was to reduce Russia's income from hydrocarbons while not restricting global supply, in which it was initially seen as an effective tool, but numerous loopholes and the lack of stringent monitoring and enforcement undermined its ability to meet expectations.

The EU did not impose sanctions on natural gas deliveries but introduced measures targeting technology and financing that Russian companies needed to develop new projects. The first two rounds of sanctions (imposed on 23 and 25 February 2022; the day before and after the Russian invasion, respectively) both restricted Russian access to Western capital and technology, which was exacerbated by major international firms, including BP and Shell (UK), withdrawing from the Russian market and abandoning joint ventures. The lack of access to technology is a major blow to the Russian energy sector with long-term effects affecting drilling in the environmentally challenging Arctic or developing LNG liquefaction capacities. China has entered this market, providing drilling equipment and components for LNG terminals to Russian companies, but the risk of being locked out of US markets has led some market actors to reconsider co-operation. Sanctions also led Novatek, the Russian LNG leader, to develop proprietary technologies that would help to substitute Western alternatives. Even if these endeavours are eventually successful, they would delay projects such as Arctic LNG quite substantially, curtailing the ability of Russia to re-route its pipeline exports to the high seas.

Gazprom cut off exports to EU buyers in response to the third and fourth round of sanctions (28 February and 15 March 2022). These barred Russian financial institutions' ability to use the SWIFT international financial payments and messaging system, its energy companies' access to capital and dealings with the Bank Rossii (Central Bank of the Russian Federation). Sanctions were designed not to affect the ability of European buyers to pay for their natural gas, but this emerged as a contentious issue in April, when scheduled payments became due. The Russian Government requested that contracts

be honoured in rubles to create demand for the currency and prop up its value—something that buyers could do only by dealing with the sanctioned Bank Rossii. The Russian state proposed a workaround, as did the European Commission, but there was no clear route about how to proceed. Bulgaria and Poland were the first to have to pay for their imports under the new conditions: neither of them observed the changes and paid as they had done in the past. Gazprombank returned its respective funds, and Russia cut off its natural gas supplies, citing non-compliance with the new system. These were the first in a series of supply disruptions that would affect EU member states. Most supplies were suspended, and Gazprom blamed legal technicalities for breaching contracts, but flows to Germany were halted following the clandestine bombing of Nord Stream and Nord Stream 2 in September 2022.

By mid-2024 Russian piped natural gas exports to Europe had become negligible, but the role of LNG trade increased, despite the animosity between the parties. Austria and Hungary remain the odd ones out in the EU, given their sustained reliance on piped natural gas, the supply of which that they have not reduced. If anything, Hungary's imports of Russian natural gas have increased in 2024 and are above contracted volumes, indicating that it was re-exporting the commodity, as storage levels remained stable. Italy is the only other EU country that continues to import Russian gas but has reduced the fuel's role and indicated a gradual phase-out. Meanwhile, the role of Russian LNG has remained stable since the outbreak of the war, hovering between one-sixth and one-seventh of the EU's total LNG imports, playing important roles in Spain, France and Belgium. Russian LNG might continue to play an important role, but EU leaders have begun to target the energy carrier by banning its re-export from EU ports upon the imposition of the 14th round of sanctions in June 2024, further curtailing the Russian Government's hydrocarbons-related revenues.

Russia also plays a central role in Europe's civilian nuclear affairs, making the introduction of sanctions especially challenging, but something that some EU leaders proposed. Five EU member states—Bulgaria, Czech Republic (Czechia), Finland, Hungary and Slovakia—operated water–water energetic reactors (VVER) designed during Soviet times, and two of these—Hungary and Slovakia—are developing another four reactors with Russian state-owned Rosatom. The room to change technology providers in VVER reactors is challenging, owing to the complexity of the matter, be that with regard to acquiring spare parts during refurbishment processes or substituting the fuel rods that Rosatom's subsidiary, TVEL, provides specifically for these units. States nevertheless took action to diversify their fuel rod imports, as CEZ (Czechia), Fennovoima (Finland), Kozloduy NPP (Bulgaria) and Slovenské Elektrárne (Slovakia) all signed agreements with US Westinghouse. Even Russia-friendly Hungary looked to alternatives but has not yet signed alternative supply agreements in this area. The approach also extends to the new reactors, where the Hungarian Government has maintained that only Rosatom can complete the construction of its planned reactors. In Slovakia's case, the Government has opted for an open tender that explicitly excludes Rosatom, which has been maintained by the newly elected, Russia-friendly Government led by Prime Minister Robert Fico. To further complicate matters, Russia's role in EU nuclear power runs even deeper, owing to its central role throughout the supply chain, from the production and conversion of uranium to its enrichment. The EU's general reliance

on Russian uranium and the lengthy diversification process made the sanctioning of Russia's civilian nuclear sector something floated by some actors—most vocal of which was nuclear power-free Germany—but an approach that was unlikely to gain substantial traction in the near future.

The EU designed its sanctions to maximize the economic damage that they inflicted on Russia while limiting repercussions, but they nevertheless added to energy market volatility and increased prices. Coal- and oil-related prices rose only modestly, as EU interventions did not reduce supply. Instead, flows were re-routed, and Russian commodities typically came to be traded at a discount. Natural gas and closely linked electricity markets differed. Globally available natural gas declined substantially as Russian exports dissipated, since Gazprom could not re-route pipeline flows to alternative markets. This drove prices to record highs, which—compounded with nuclear generation outages in France, underperforming wind- and hydropower generation, as well as German efforts to retire coal and nuclear generation—increased electricity prices in Europe. Prices eventually stabilized, and it could be argued that the integrated EU market worked well as a catastrophe was averted. Events conveyed that the market might offer an efficient distribution of resources, but the EU could avoid future crises only by limiting its import dependence. Existing capacities by and large enabled the formation of a new equilibrium that featured higher prices facilitating investments into alternative green technologies, but substantial efforts were directed at expanding natural gas import infrastructure.

Opening the LNG Floodgates

The most immediate action that EU member state governments and the European Commission took following the outbreak of the war was to secure alternative natural gas imports. Suppliers could slightly increase cargoes by operating above nominal capacity where possible—this was the case for some US terminals—while pipeline imports also remained strong from Norway and North Africa, but all of these had upper limits. To gain access to additional volumes, the EU launched diplomatic efforts to secure LNG cargoes, but it was the price mechanism that ultimately reigned supreme, as high natural gas prices on European exchanges attracted cargoes that might otherwise have been sold to other countries or were already contracted to non-European buyers. Price margins were so favourable that traders would re-route shipments bound to Japan, for instance, even if this meant paying penalties for voiding their contracts. European countries also attracted cargoes destined for the Global South (e.g. Bangladesh or Pakistan), inflicting substantial harm on the energy systems of these countries and their respective populations. Moreover, the EU was fortunate in that Chinese demand was relatively weak, allowing them to avoid a bidding war. High prices and integrated global LNG markets helped the EU to gain access to the coveted energy carrier, but it also prompted a flood of investment into the sector.

High prices prompted a wave of positive investment decisions linked to ongoing and newly conceived projects. Investors took decisions to expand global LNG export capacities substantially, led by Qatar and the USA. The EU's Agency for the Cooperation of Energy Regulators reported that 17 projects were in the construction phase in mid-2024, which would add a

combined capacity of 173m. metric tons per annum of LNG to global supply by the end of the decade. Such growth effectively increases globally traded LNG by one-half, wildly surpassing demand that the International Energy Agency anticipates in most of its scenarios. Such dynamics are bound to lead to collapsing prices, which might benefit consumers but go against climate objectives. There is no room for the EU to increase its dependence on natural gas, as climate scientists Kevin Anderson and John Broderick made it unequivocally clear already in 2017: '[f]or the EU, fossil fuels, including natural gas, can have no substantial role in an EU 2°C energy system beyond 2035'. Meanwhile, it could help the decarbonization efforts of the Global South in principle by facilitating a coal-to-gas switch, but the costliness of developing domestic infrastructure, risks linked to lock-ins, difficulties in finding financing and competitive renewables undermine this path of action and could lead to stranded assets. State actions have, however, been quite supportive of projects since the outbreak of the war.

EU member states revisited their natural gas infrastructure development plans and opted to expand import capacities in response to Russia's invasion of Ukraine. Although their total import capacity was sufficient to meet prospective demand, supply bottlenecks impeded full-scale utilization. Most import infrastructure is on the Western flank of the continent (the Iberian Peninsula and the UK) and the Mediterranean, while Central Europe is generally reliant on pipelines. Some measures were taken to further integrate national grids and allow the flow of LNG that draws on existing regasification capacities, but states and energy companies opted for 13 capacity additions throughout the continent—Adriatic LNG (Italy), Gate Terminal (the Netherlands), Fos Cavaou (France), Krk (Croatia), EemsEnergy (the Netherlands), Wilhelmshaven (Germany), Inkoo (Finland), the Gulf of Saros (Turkey), Brunsbüttel (Germany), Ostsee/Lubmin (Germany), Piombino (Italy), El Musel (Spain) and Le Havre (France)—according to the Institute for Energy Economics and Financial Analysis between the outset of the war and early 2024. These expanded import capacities by 53,500m. cu m a year, in addition to which a number of further projects were nearing completion (e.g. Alexandroupolis in Greece or the expansion of Świnoujście) and are set to be followed by additional projects that will lead to Europe's (including the EU-27, the UK, Norway and Türkiye, as Turkey has been known since 2022) entire regasification fleet growing to nearly 405,000m. cu m a year by the end of this decade, equalling 87% of 2023 total demand, which stood at 463,000m. cu m. Actions thus not only eliminate bottleneck issues but allow for increases in natural gas consumption throughout Europe. Moreover, measures reflect state ambitions to develop national import capacities, as opposed to relying on an integrated European market—something that the EU had been working towards since the 1990s.

There is little rationale for the infrastructure expansion that Europe undertook in light of the crisis, as it might very well be the basis of new crises, be that in relation to the climate or by producing stranded assets. Utilization rates indicate the potential problem, as average utilization declined from 63% in 2022 to 59% in 2023, and only four terminals remained above 80%—Porto Levante (Italy), Świnoujście (Poland), Rotterdam (the Netherlands) and Krk (Croatia). An overcapacity of import infrastructure thus remains clear, which is unlikely to be offset, even if natural gas-intensive industry relocates back to Europe after being moved to areas with lower prices (e.g. the USA). Developers tend to underscore that most new additions to the

import fleet are Floating Storage Regasification Units that can be re-located to the Global South to enable local coal-to-gas transitions or are discussed as ‘hydrogen-ready’ infrastructures that can help the EU to import low carbon hydrogen in the future. Both endeavours are challenging, as the rationale in support of a shift to natural gas in the Global South is difficult and costly in a rising number of cases (see above), while a number of uncertainties related to hydrogen technology, costs and its emissions remain unclear as well. That is not to say that these infrastructures did not help to alleviate some supply pressures, but they cater to expanding the role of an energy carrier that the EU (and the rest of the world) needs to phase out.

Towards a New Equilibrium?

By mid-2024 the EU’s energy markets had moved into a new equilibrium: higher but stable energy prices, coupled with the roll-out of green technologies. Natural gas prices stabilized within the €35–€50 per MWh band—higher than their pre-crisis levels but at what seemed to be a new equilibrium. Electricity prices followed suit, stabilizing across the continent at above pre-crisis levels but generally lower than those between 2021 and 2022. Higher prices were here to stay. The bloc’s access to abundant and relatively inexpensive Russian energy dissipated, which also provided momentum for the EU to continue its energy transition. The Commission introduced the ‘Fit for 55’ package (in 2021), raising the EU’s greenhouse gas emission reduction target to 55% by 2030 (compared with 1990 levels) from an earlier target of 40% and developed a number of policy measures to facilitate the green transition. While the trilogues for ‘Fit for 55’ were ongoing, the Commission proposed the REPowerEU Plan to support further action in response to the war, increasing renewable energy and energy efficiency targets to reduce emissions by 57% by 2030. The high energy price environment also supported renewable energy projects. In Germany, for instance, solar photovoltaic (PV) plant owners would have recouped their investments in a mere two years, if electricity prices stayed at the levels that they reached during the summer of 2022. However, obstacles to the meteoric rise of renewables also surfaced as the sector grew and geopolitical relations deteriorated.

Solar PV growth has been robust in recent years, and in 2023 additions in the EU amounted to 56 GW, and newly added capacities have expanded by at least 40% in the past three consecutive years. However, the picture for 2024 is gloomy, according to SolarPower Europe, a leading European solar lobby group. The Association expects new additions to grow by double digits, but at a more modest pace, as a result of challenges linked to inflation, trade barriers, grid flexibility, shortages in a qualified labour force and building permissions. These weigh on REPowerEU ambitions, as installed capacity needs to grow from 2023’s figure of 263 GW to targets of 320 GW in 2025 and 600 GW in 2030—an expansion that the sector is unlikely to meet without change in circumstances. Challenges became even more evident following the modest ambitions that member state governments articulated in their revised National Energy and Climate Plans. The wind sector is also facing trouble. EU member states might have installed 16 GW of wind power in 2023, which was a new record, but this is only one-half of what would have been needed for it to meet its 2030

targets. Here too, the sector faces a number of hurdles, including supply-chain issues, grid bottlenecks, administrative problems and high capital costs, according to WindEurope. To make matters worse, political blowback against renewables has become evident throughout Europe during the numerous elections held throughout the continent in 2024. A rising backlash among various segments of the population was amplified by increasingly influential populist right-wing parties from the Netherlands to Poland, posing a potential impediment to the transition.

The energy transition was not expected to be a smooth endeavour, but as the expansion of green electricity generation saturated the grid and societies had to tackle other, even more challenging sectors, the manifold issues became evident. Member states made strides in reducing the bloc’s dependence on imported, emitting sources of energy in 2023, when fossil fuels’ role in electricity generation declined by 19% (coal fell by 26%, and natural gas by 15%), while renewables’ role surged to 44%, according to EMBER, an independent energy think tank that aims to accelerate the clean energy transition by promoting data and policy. However, these still fall short of targets and issues linked to balancing the grid came to the fore. Electricity generated from solar photovoltaics tended to skyrocket during the day, but the management of this via storage or demand-side interventions was not adopted widely, frequently leading to negative electricity prices amid oversupply. However, as the sun set and on particularly hot summer days, demand for electricity climbed to new seasonal highs, leading to substantially higher prices and introducing unprecedented intra-day volatility that could range between negative prices and multiple hundreds of euros per MWh. The phenomenon underlined how the energy transition dampened the impact of the crisis but had to be tackled on multiple fronts, and even so, a smooth shift is not guaranteed.

Decarbonizing heat and industry also rose to the top of government agendas, as both were deeply reliant on imported natural gas. Reducing demand was key in both areas, and price signals led industrial consumers and households that were subject to market forces (e.g. the UK or the Netherlands) to seek efficiency gains, switch fuels or, in the case of industry, even shift their producing activities to areas where energy was cheaper (e.g. the USA). Public discourse and media narratives also featured prominently in persuading consumers to reduce consumption. The EU reduced total natural gas demand by 13% in 2022 as a result of these forces, but this was only a first step of many through which the bloc needed to tackle energy efficiency. Actions with a long-term impact include the Commission’s new Energy Efficiency Directive (2023), which aims for EU-level savings of 11.7% by 2030. Ambition is once again in place, and the Recovery and Resilience Funds also provide the means to support action, but it remains to be seen whether member states will deliver these changes. The complexity of organizing refurbishment programmes and the moderate political gains that they provide have continuously impeded progress with the matter.

The decarbonization of household heat supply depended on the widescale deployment of heat pumps, which produced mixed results following the outbreak of the war. Sales and installations leapt in the immediate aftermath of the invasion, but total sales in 2023 declined year on year, and, if sales continue at the current level, the EU would miss its 2030 targets by approximately one-quarter. In mid-2024 the Commission was still working on the Heat Pump Action Plan, which could

accelerate the deployment of respective technology, but the sector's growth tends to be weighed down by abrupt changes in policies and support schemes alongside the disproportionately large tax burdens that states tend to impose on electricity compared with natural gas. The stabilization of natural gas prices and state intervention to provide subsidies for heating homes dampened the challenges faced by governments and households, but this also reduced the incentives for the latter to change their heating systems.

A final facet of EU energy policy that needs to be considered is that of hydrogen: an energy carrier surrounded by much enthusiasm during the period of analysis. Hydrogen was at the front and centre of energy and industrial policy, as many observers considered it to be the 'Swiss army knife' of decarbonization, but its applications came to be understood as much more circumspect—generally limited to industry, with possible use in heating and some areas of transport. Its main attraction stemmed from its ability to substitute natural gas while also reducing emissions, but projects have not materialized. The Commission and a number of member states might have introduced strategies, and REPowerEU has set an electrolyser capacity of 120 GW by 2030, but there was a substantial mismatch between the projects that were discussed and those that were approved. The Commission has established the European Hydrogen Bank to help to overcome the price mismatch between supply and demand, thereby fast-tracking projects. The European Court of Auditors has reported that the EU was far from meeting its set goals: policymakers might have developed the regulatory framework for a hydrogen market, but the financing and business cases for projects were scant, and applicants for funding faced challenges in finding sufficient support. Thus, the 'hydrogen disruption' was still considered elemental to the EU's energy transition, but it was expected to take much longer and remain limited in its impact.

Conclusion

The EU has weathered the most severe energy supply crisis that it has faced since the 1970s, but this has not put an end to the energy crises that it has confronted since the invasion of Ukraine. The bloc introduced sanctions targeting Russia's energy sector in retaliation for Russia's war on Ukraine, and Gazprom responded by suspending natural gas supplies to most EU buyers. Higher LNG imports, demand moderation and the acceleration of the green transition have defused the imminent supply crisis, and the bloc has reduced its dependence on imported fossil fuels. It has been able to fast-track most facets of the energy transition, but issues are mounting: growth is slowing, and the Climate Action Tracker indicates that measures have been 'insufficient' in achieving the target set at the UN Climate Change Conference in Paris in 2015 to limit the average global rise in temperature to 1.5°C above pre-industrial levels. Furthermore, the revised National Energy and Climate Plans in their current form also fall well short of the ambition needed to maintain the momentum of the energy transition.

The EU must accelerate its energy transition while addressing the challenges of rising renewable energy penetration rates. Balancing the grid has become a crucial issue as intra-day electricity market volatility reaches unprecedented highs, while the effects of climate change exacerbate the matter—be that hydroelectricity generation becoming volatile, due to dry spells, nuclear output reduced, owing to the high temperatures of water flows used to cool reactors, or skyrocketing demand for household cooling during scorching summer evenings. EU energy policy will thus remain in a 'crisis mode' as its continued energy import dependence, the need to accelerate the energy transition and address arising issues, as well as managing potential volatility and high prices, all require continued attentiveness and action.