

Changing European Energy Policy – The Challenge of the Energy Price Storm

TEKLA SZÉP, PHD
ASSOCIATE PROFESSOR

INSTITUTE OF WORLD AND REGIONAL ECONOMICS,
FACULTY OF ECONOMICS, UNIVERSITY OF MISKOLC
e-mail: regtekl@uni-miskolc.hu

MOHAMMAD JABER
PHD CANDIDATE

INSTITUTE OF WORLD AND REGIONAL ECONOMICS,
FACULTY OF ECONOMICS, UNIVERSITY OF MISKOLC
e-mail: regjaber@uni-miskolc.hu

MOHAMMAD KASHOUR
PHD STUDENT

INSTITUTE OF WORLD AND REGIONAL ECONOMICS, FACULTY OF ECONOMICS, UNIVERSITY OF
MISKOLC
e-mail: qgtmhmd@uni-miskolc.hu

SUMMARY

This paper examines the roots of the European energy crisis within the period of 2021–2022, the reasons for the European gas shortage, the effect of the Russian invasion of Ukraine, and the potential EU responses. The current crisis is a result of several factors, starting from the Covid-19 pandemic in 2020 and amplified severely by the current conflict between Russia and Ukraine. In addition, five reasons were identified as worsening the EU energy situation. These include market-based gas prices, external dependency, global imbalances, the EU's climate policies, and low European energy stocks. The Russian invasion of Ukraine put pressure on the oil and gas supplies to the EU. This situation led the EU to introduce sanctions and measures that target increasing the share of renewable energy while reducing the dependence on Russian gas. Finally, we shed light on the energy transition as an opportunity to deal with climate change and limited energy resources while also showing the challenges that would hinder a just transition.

Keywords: energy prices, volatility, energy transition, war

JEL Codes: F00, F51, Q49

DOI: <https://doi.org/10.18096/TMP.2022.02.04>

INTRODUCTION

The energy sector is cyclical, and history has often demonstrated that a severe market collapse follows growth. However, the energy crisis of 2021–2022 will differ from earlier ones. The recent hike in energy prices may lead to an improper transition to a low-carbon economy that is not managed against scarcity and volatility and might result in market crunches (Popkostova, 2022).

The current global energy crisis is one outcome of several problems. Covid-19 lowered the global

demand for oil and other energy sources, limiting their output. However, the world's unexpectedly quick recovery from the epidemic has resulted in a rapid spike in energy needs, leading to inflation that doubled the price of coal and crude oil. Also, central banks intend to maintain low-interest rates and a wave of low-cost cash, despite record levels of consumer spending and a 30% increase in Chinese exports. Both are stressing supply systems already strained by the epidemic (Helman 2021). In addition, the globe has witnessed severe weather conditions. Heavy rains in South and Southeast Asia have made coal mining difficult in nations like India and China, resulting in a coal shortage in these countries. The energy situation in Europe has been exacerbated by

a cold winter in 2021-2022 as it depleted its gas reserves. We can add in Russia's failure to provide nearly as much gas to Europe as promised, possibly as a tactic to push the approval of Nord Stream 2.

However, there are other reasons as well. Fossil fuels have been so demonised by the greenhouse gas emission-cutting movement that institutional investors and governments have removed them from their portfolios, directing capital to more socially appropriate low-carbon substitutes. The substitute for these fuel types, renewable energy, is still insufficient to fill the gap. This is why Germans are now rethinking the decision to shut down their nuclear power plants in recent years, and the Dutch are reconsidering closing the Groningen gas field. In the US, for instance, according to the US Energy Information Administration, renewable energy sources, excluding hydropower, generated a little less than 10% of total electricity output in July 2021, while gas generated 42% (Helman 2021).

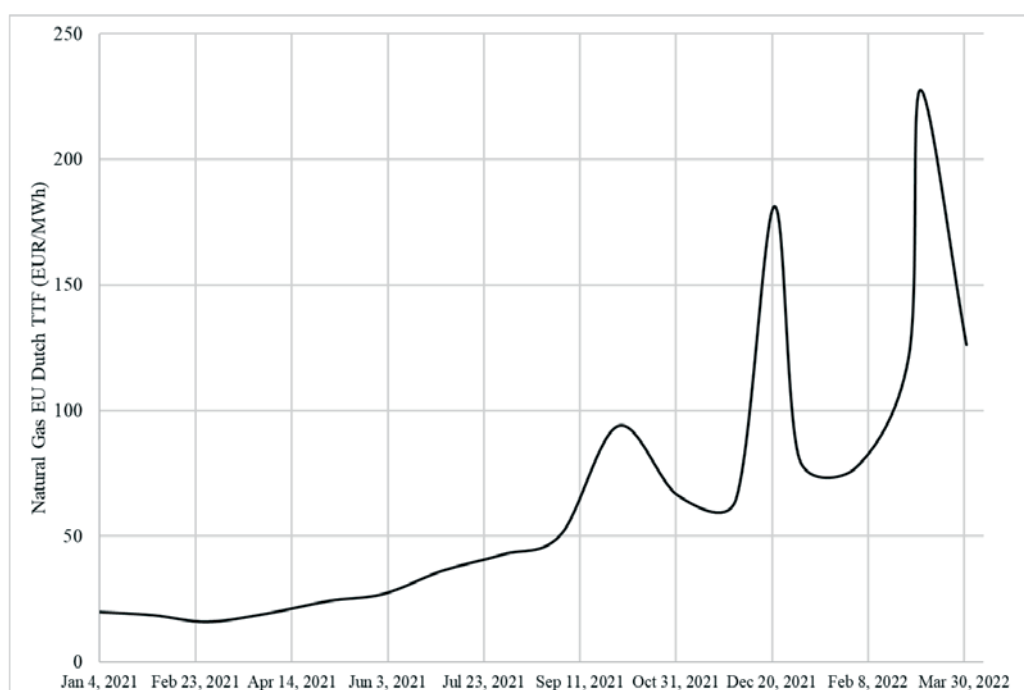
Nevertheless, we should admit that our existing energy system is vulnerable due to its reliance on fossil fuels. The fight against climate change necessitates a dramatic shift in global energy sources requiring billions of dollars in investment. If world leaders do nothing to address the climate danger, depletion will continue to eat away at the world's oil, gas, and coal supplies. The quality of today's fossil fuel supply is worse than it was decades before. If it is a must to move away from our current reliance on fossil fuels, in what ways will we make the transition to renewable energy? A switch to renewable energy for power generation suggests a potential for increased efficiency. Generally, the transition will involve an exchange between the costs of having a renewable energy system function almost identical to the current one and the costs of adjusting our energy consumption patterns to the characteristics of renewables ("The Energy Crisis" 2022).

This paper examines the roots of the European energy crisis in 2021, the reasons for the European gas shortage, the effect of the Russian invasion of Ukraine, and the potential EU responses. Also, it

recommends short, medium, and long-term strategies to combat the crisis.

THE EUROPEAN ENERGY CRISIS EXPLAINED – REVEALING THE MAIN CAUSES

Natural gas prices have risen in Europe as worldwide demand increases. While this is true of most commodities, natural gas has been a particular concern. The prices have reached record highs across the continent. From January 2021 to March 2022, European gas prices rose by 1100%. In 2021, U.S. natural gas futures volatility increased to a record level due to the global energy crisis that has driven up prices. In September 2021, implied volatility reached a record high of 122.5%, breaking the previous high of 117.5% in November 2018. The market has become more unpredictable as competitiveness for the few liquefied natural gas (LNG) shipments from the United States grows between Europe and Asia. Manufacturing activity has been restricted in Europe, and power issues have occurred in China as a result of this competition, which helped in the price increase. With the escalation of the Ukrainian war, energy price volatility and supply uncertainty increased in Europe (Disavino 2021). Similar pressures have been seen for coal. Coal prices increased from 56.57 USD/tonne in January 2021 to 402.68 USD/tonne in March 2022 (Markets Insider 2022). With natural gas and coal being key to flexible power generation, price spikes have translated into record electricity prices. In some countries, European average monthly electricity wholesale prices increased up to 500%. In Germany, the price rose from around 50 to more than 250 EUR/MWh (Statista, 2022). Figure 1 shows the prices of European natural gas, daily TTF (the Dutch hub price, a European benchmark), during the energy crisis and before the Russian invasion of Ukraine (4 January 2021–30 March 2022).



Source: Authors' compilation based on ("EU Natural Gas 2022 Data," 2022)

Figure 1. The European natural gas prices, daily TTF (the Dutch hub price, a European benchmark), 4 January 2021 – 30 March 2022 (EUR/MWh).

As coal, an environmentally harmful fuel, is gradually phased out, many nations turn to natural gas as a bridging fuel until green alternatives can be implemented. Furthermore, gas is utilised for household cooking and heating, making the price increase even more evident in customers' final costs. In 2021, citizens in many EU member states also suffered record-high energy costs. Governments are on high alert, with ministers trying to develop emergency measures to soften the effects. To consumers' dissatisfaction, the equilibrium between the three components of the energy trilemma – security, affordability, and sustainability – has deteriorated. If not handled properly, the issue may jeopardise the EU's overall net-zero emissions goal and fuel an anti-transition attitude, destroying support for the flagship European Green Deal (EGD) and threatening the EU's global climate leadership (Popkostova, 2022).

The energy situation in Europe has been worsening since 2021, and the reasons are complicated and linked. In this section, the five main reasons will be presented; namely, 1) market-based gas prices, 2) external dependency, 3) global imbalances, 4) EU climate policies, and 5) low European energy stocks.

Market-Based Gas Prices

Most of Europe's gas consumed in the 1990s was acquired and sold under long-term contracts based on a percentage of crude oil prices. Because gas prices were based on fluctuations in the oil market, they did not reflect the supply and demand of the gas market. The oil-indexed gas pricing percentage dropped from 92% in 2005 to 20% in 2020 (Kennedy, 2022); due to liberalisation, deep and liquid gas trading hubs formed, with futures contracts and financial derivatives allowing market participants to manage their exposure to gas market fundamentals while benefitting from price fluctuations. Over the last decade, Europe has saved approximately 70 billion USD (Kennedy, 2022) in lower gas import expenditures by moving away from oil indexation toward market-based gas prices. However, in the second half of 2021, rising worldwide gas prices wiped out a significant portion of those savings. The IEA predicted in October 2021 that "EU countries would spend about 30 billion USD more for natural gas in 2021 than they would have remained with oil-indexation" (Kennedy, 2022). This resulted in long-term contract holders gaining a vast sum of money by reselling comparably low-priced oil-indexed gas into illegal markets in the winter of 2021.

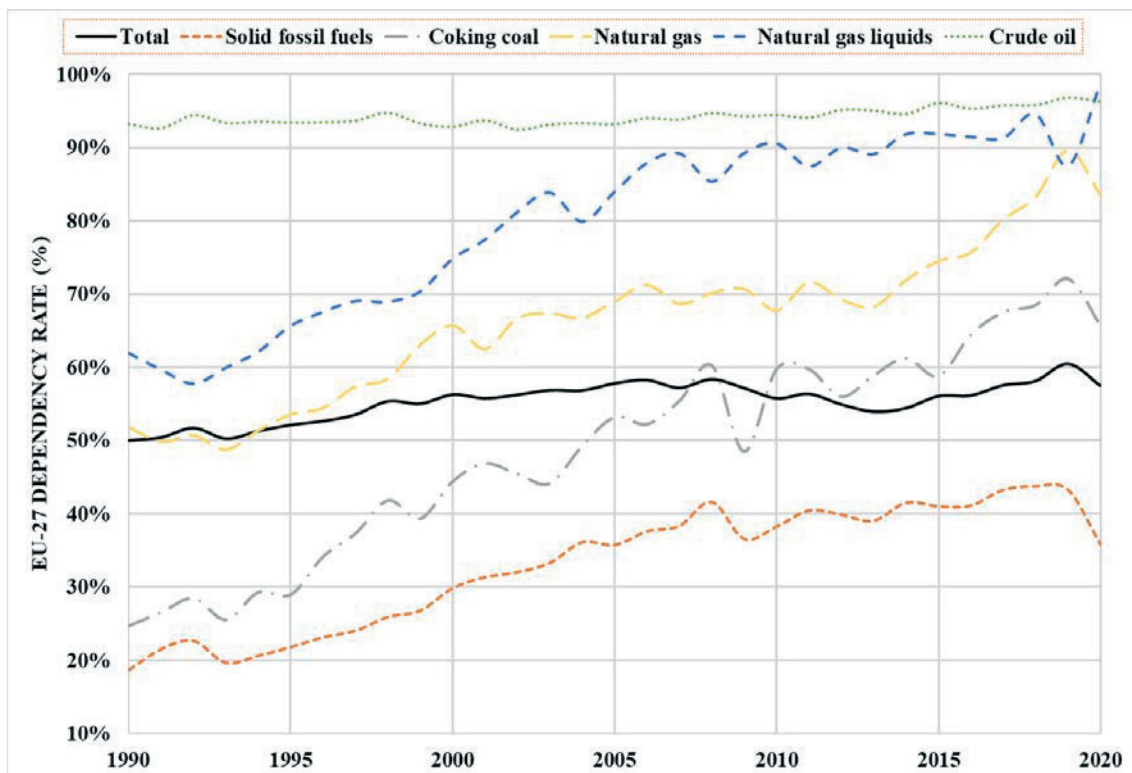
External Dependency

In 2019, the EU's energy dependency rate was 61%, implying that net imports provided more than half of the EU's energy requirements. This percentage varies widely, from over 90% in Malta, Luxembourg and Cyprus to 5% in Estonia. Since 2000, when it was just 56%, the EU's reliance on energy imports has risen. Figure 2 shows the EU-27 energy dependency rate for different fuel types from 1990 to 2020. For all fuel types, the dependency rate increased throughout the period. It increased the most for coking coal with 41%, followed by natural gas liquids with 37%, and 32% for natural gas. Crude oil rose the least at 3% only. In 1990, crude oil was the most relied on fuel by the EU-27, with a 93% dependency rate. However, in 2020, natural gas liquid overtook the value of crude oil with a 99% dependency rate.

The EU's energy supply resilience may be compromised if a substantial percentage of imports is concentrated among a few partners. Figure 3 provides information about the shares and partners

of the EU solid fuel, natural gas, and crude oil imports in 2019. Russia is the leading EU supplier of crude oil, natural gas and reliable fossil fuels. It was the source of 47% of fossil fuels, followed by the United States (18%), Australia (14%), and Colombia (8%). Regarding natural gas, 41% of it was exported by Russia, followed by Norway (16%), Algeria (8%), and Qatar (5%) in 2019. While accounted for nearly two-thirds of the crude oil imports came from Russia, Iraq (9%), Nigeria and Saudi Arabia (both 8%) and Kazakhstan and Norway (both 7%) in the same year.

The external dependency is not limited to the fuels mentioned above but to liquefied natural gas (LNG). Regarding LNG, Europe mostly depends on the United States, Qatar, and Russia. According to the EIA, the US became Europe's top LNG supplier in 2021, with 26% of all LNG imported by EU member countries and the UK, followed by Qatar (24%) and Russia (20%). As a result of the high natural gas prices and supply issues in Europe, the United States supplied more than half of all LNG imports into the continent in January 2022 (Wright, 2022).



Source: Authors' compilation based on Eurostat (2022b)

Figure 2: The EU-27 energy dependency rate for different fuel types from 1990 to 2020.

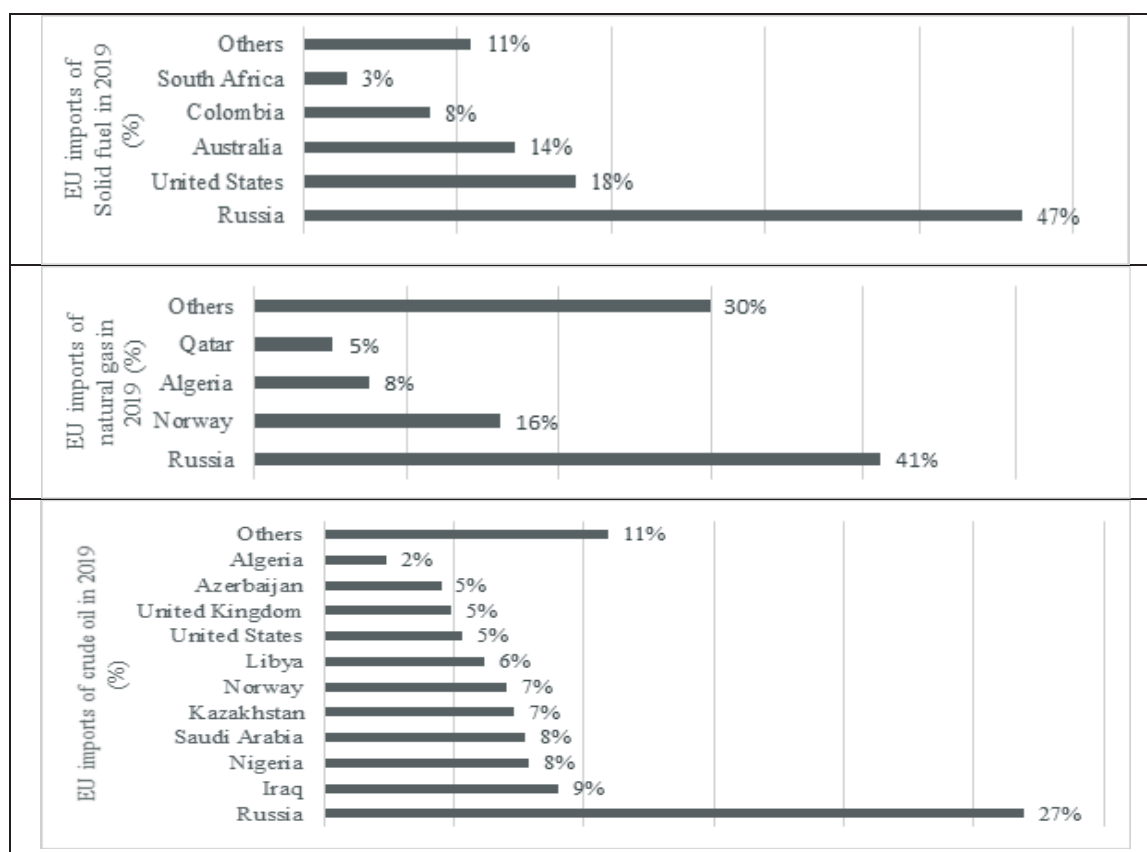
Nonetheless, in terms of energy, the EU mostly depends on Russia. The Russian supply to the EU was down from 2019 levels in 2021. Already in 2020-2021, there have been fears that Russia may be exploiting the situation to agitate for the Nord

Stream 2 pipeline by refusing to supply more natural gas to Europe's storage facilities (Euronews, 2022). Nord Stream 2 was completed in September 2021 but has not yet been certified by the German government. Since the pipeline's announcement in

2015, the United States and several European countries have opposed it, fearing the project would boost Russia's influence in Europe. Germany tried to keep the pipeline out of politics. Still, after the invasion of Ukraine, it was difficult to stand up for the project (Horowitz, 2022). Russia recently has been reducing gas supplies into Europe, sometimes by two-thirds, then raising them unreasonably after the harm has been done – increasing them to keep markets unstable and the future uncertain (King, 2021). Because prices were lower before the war, Russia limited gas exports to Europe. It predicted that once the Russian-Ukrainian conflict started, gas prices would jump, so it increased exports. Russian gas deliveries to Europe hit their greatest level since December 2021 in the 48 hours following the commencement of the war (Bloomberg, 2022).

Moreover, Ukraine was once a vital link in the European energy system, but its significance has

declined. Most of Russia's gas shipments to Europe in the 1990s travelled through Ukraine. Russia, on the other hand, has widened its horizons since then. It began construction on the Yamal–Europe pipeline in 2006, which goes through Belarus and Poland. Russia built the Blue Stream pipeline to Turkey in 2003, the Nord Stream pipeline to Germany in 2011, and the TurkStream pipeline to Turkey in 2020. These initiatives have reduced Ukrainian transit from 1998 to 2021 by 70% (Tsafos, 2022). While Ukraine has not purchased gas from Russia since 2015 and has underground storage of the commodity, its domestic gas supply is intertwined with the transit gas pipelines that go from Russia to Europe; if these were to shut down, the pressure in the system would drop, leaving Ukraine unable to provide the gas it requires for internal use. Europe, indeed, would confront gas shortages as a result (The European Institute for International Law and International Relations, 2022).



Source: Authors' compilation based on Eurostat (2022a)

Figure 3. The shares and partners of solid fuel, natural gas, and crude oil imports to the European Union in 2019

Global imbalances - China is to Blame

China is the world's top generator of greenhouse gases. As a response, the world requires the Chinese government to take bold, immediate action to decrease emissions (Lewis & Edwards, 2021). In accordance with its climate and energy policies, China prohibited coal shipments from Australia when Australia urged that China conduct a thorough inquiry into the sources of Covid-19 in Wuhan (Oriental News Nigeria, 2021). Due to coal scarcity, the country has witnessed its most significant power crunch in years. In September 2021, most of northeast China experienced power outages regularly. At least 17 provinces throughout China have experienced blackouts, including Guangdong, Zhejiang, Shandong, Anhui, and Jiangsu. In the provinces of Jilin and Liaoning, traffic lights and medical facilities have been without electricity at times. Electricity cutbacks are projected to "occur often" until March 2022, according to one Jilin utility company, and will most likely be irregular, unscheduled, and unannounced (Turland, 2021). It has tried to increase imports from Indonesia, Russia, South Africa and even the United States to meet its demands. Indonesia supplied roughly half of China's thermal coal demand between January and August 2021 (Chattopadhyay, 2021). China also imported around 3.7 million tons of thermal coal from Russia in September 2021. This is up 28% from August and more than 2300% from a year ago. This is not a one-time event. Since May 2021, China's thermal coal imports from Russia have quadrupled or tripled from 2020 (Cheng, 2021).

In addition, China witnessed soaring imports of liquefied natural gas (LNG). China has been declared the world's giant LNG importer in 2021. Government policies to reduce air pollution and meet emissions targets triggered China's move from coal to natural gas. A rapid increase in LNG import capacity has assisted China's growth in LNG imports. Between 2013 and 2020, China's LNG import capacity increased from 164 million m³/day to 331 million m³/day. China's LNG imports were the world's most extensive in the first ten months of 2021, overtaking Japan. They averaged 292 million m³/day from January to October 2021, up 57 million m³/day (24%) over the same period in 2020. In comparison, Japan's LNG imports averaged 272 million m³/day (Weetch, 2021). China being the largest importer of LNG affects many countries, mainly in Europe, as the Asian and European markets are linked to the same gas suppliers. This resulted in increased gas demand on Europe.

It could have been a good idea to switch from coal to natural gas from an environmental standpoint. Still, the market price quadrupled when China, Japan and

South Korea imported large amounts of (LNG). Then, floods in China's eastern coal mines suspended much of the country's coal output, limiting energy generation and causing acute power shortages. China ordered several industries to cease or reduce production, resulting in global shortages of many essential products. As a result, East Asia has become a profitable market for LNG producers, and Europe was cut off from its standard LNG spot market supply. Prices on the spot market increased nearly twenty times (Staff, 2021).

EU's Climate Policies

The Emission Trading Scheme (ETS) covers over 10,000 power plants and industrial facilities across the EU and is based on a "cap and trade" approach. Over time, the cap is tightened, and carbon permit prices steadily rise. This trend encourages the energy sector to abandon fossil fuels, favouring sustainable alternatives. The post-pandemic economic recovery and energy crisis have increased the carbon price by over 76%, from EUR 34 in mid-January 2021 to nearly EUR 60 in late October 2021. Consumers, particularly in coal-dependent countries, are in danger of bearing the cost of the additional expense (Liboreiro & de Filippis, 2021). Figure 4 shows the EU carbon permit price increase through the energy crisis, up to the 7th of February 2022. Mateusz Morawiecki, the Polish Prime Minister, has stated that the EU's climate policy is to blame for the current energy price issue. The European Commission, a strong proponent of the ETS, is fighting back, claiming that the global economic recovery and strong demand from Asian countries are the driving forces behind the pricing problem. According to Brussels, ETS permits account for only a tiny fraction (about 20%) of the increase (Liboreiro & Filippis, 2021).

Moreover, before the 2021-2022 energy crisis in Europe and in line with the climate goals, European governments have recently moved away from fossil fuels. As a result, domestic natural gas and coal capacity will be reduced. For instance, Europe's top producer of natural gas, the Netherlands, started to phase out its gas field in 2018 (*The EU's Energy Crisis Explained - TLDR News - YouTube* 2021). Europe in 2021 is running out of natural gas. Therefore, despite its climate and energy goals, the region sometimes turns to coal to fulfil rising electrical demand. Coal use in Europe increased from 10% to 15% from the beginning of the year until June 2021 after a colder and longer-than-usual winter depleted gas storage sites. Countries like Germany, the Netherlands, and Poland have resorted to coal to keep the lights on while their economies recover and people return to work (Countercurrents 2021). Moving away from coal production in Europe puts more pressure on natural gas and increases

demand. Europe reduced its hard coal production dramatically during the last few decades. Figure 5 shows the EU production of hard coal from 1990 to 2020. In 2020, the EU production of hard coal was just 46 million tons, 80% less than the 277 million tons in 1990. Poland increased its production share from 53% in 1990 to 96% in 2020, showing that it was almost the only EU country producing hard coal (Eurostat 2021).

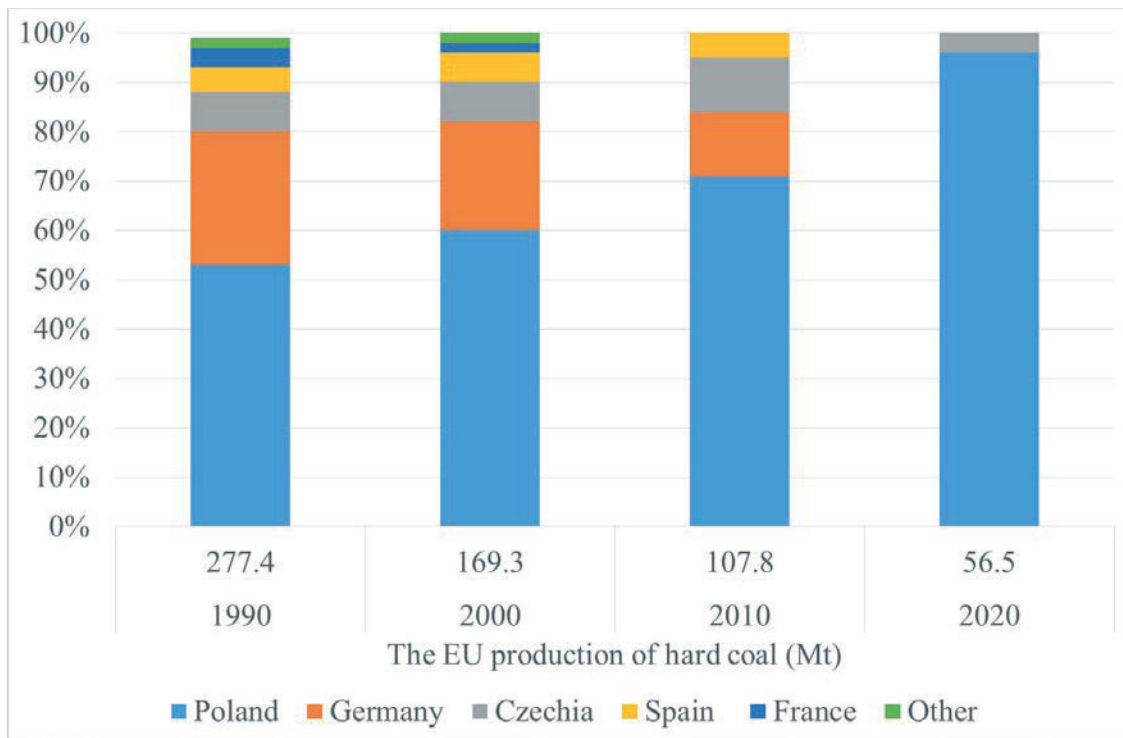
Having said that, the incorporation of nuclear and renewable energy into the energy mix of EU member states contributed to stabilising the user energy price. The short-term stability of the energy supply, which significantly affects price stability, will be aided by the existing nuclear power plants and renewable energy sources in EU member states. Without the

current nuclear capability, the crisis' impact on the energy sector would undoubtedly be far more significant. To support the leadership role of renewables in the shift to energy systems with net zero emissions, nuclear power is a source of low-emission electricity that is accessible on demand. The marginal costs of nuclear power plants, like those of renewable energy sources, do not include any CO₂ fees because they do not emit a substantial quantity of CO₂ when operating. Thus, they are not impacted by the fluctuating price of carbon which mainly affects the price of coal and gas (Vocasek 2022).



Source: Authors' compilation based on "EU Carbon Permits - 2022 Data,"

Figure 4. The EU carbon permit price increased during the energy crisis (EUR)



Source: Authors' compilation based on Eurostat (2021)

Figure 5. The EU production of hard coal from 1990 to 2020 (Mt)

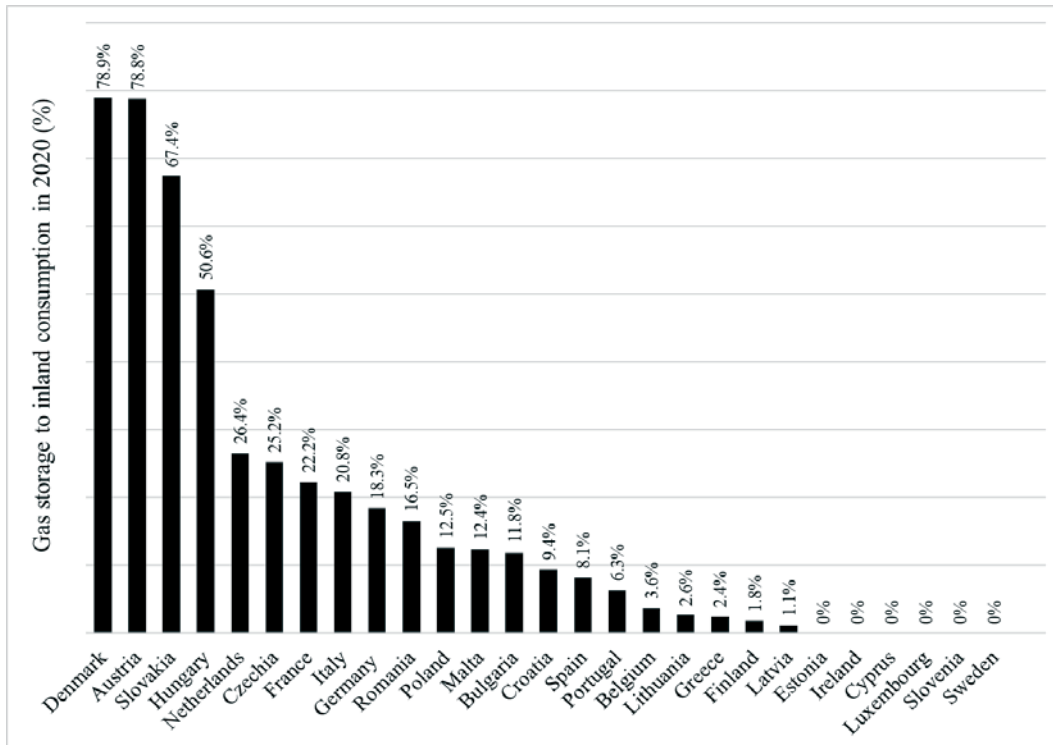
Low European Energy Stocks

In Europe, the winter gas season runs from October to March and the summer gas season starts in April. Wholesale gas costs and demand are frequently lower in the summer, and more gas is stored. However, this did not happen in 2021. Due to high demand in the first half of 2021, there was insufficient time to build up gas reserves in storage facilities before the winter. As a result, Europe has become increasingly reliant on imports. As of December 2021, storage levels were lower than any of the prior five years' minimum volumes at this time of year. Europe had 690 TWh of gas in storage as of mid-December 2021. From 2016 to 2020, it took until the third week of January, on average, for reserves to fall to this low level (Zachmann et al. 2021). Gas output has dropped in recent years because of the shutdown of gas sources in Europe. As a result, production capacity has decreased. Furthermore, domestic gas fields were utilised for 'swing production', which meant ramping up supplies during the winter to meet increasing demand. Thus their disappearance is felt more acutely during the winter. Figure 6 shows the percentages of natural gas storage volume to inland consumption for the EU member states in 2020.

Additionally, global LNG supply was limited due to increased Asian demand and lower-than-normal Russian gas pipeline flows. Wholesale prices were exceptionally high throughout the summer, restricting gas injections into storage. As a result, as

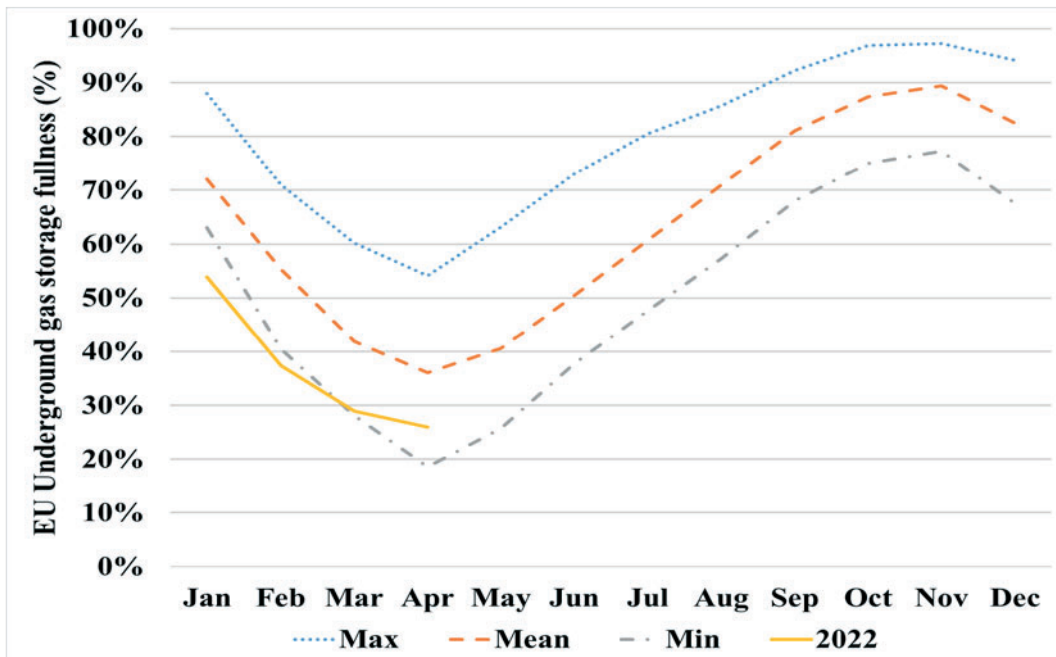
winter came, Europe's gas storage levels were at their lowest in at least ten years (Buli 2022). Figure 7 shows the EU underground gas storage levels compared to the historical observed average, minimum and maximum data. It is noteworthy that the gas storage level at the beginning of 2022 is less than the minimum historical value.

In June 2022, Russian gas deliveries to Europe dropped short of demand again, aligning with an early heat wave hitting the continent's south and raising benchmark prices on fears that the continent would not have enough storage in time for winter (Chestney 2022a). Because of issues with fixing turbines in Canada, Russia indicated that Nord Stream 1 pipeline flows might be totally interrupted. It stated that the supply cuts were not planned and were due to maintenance concerns, a reference to prior statements in which Russia stated that it could not ensure the return of equipment transferred to Canada for repairs. Germany said that Russia's reason was "technically unfounded" and was instead intended to raise gas costs. According to Italy, Moscow may use the situation to apply political pressure (Chestney 2022b). Leaders in the European Union want to take advantage of the warm summer to build gas stores in preparation for winter and any more instability in energy markets caused by the Russia-Ukraine conflict. To improve European energy security, the European Commission's plan required EU member states to attain a minimum of 80% gas storage capacity by November 2022, with the goal of increasing to 90% in the following years (Beaman 2022).



Source: Authors' compilation based on Eurostat data

Figure 6. Gas storage to inland gas consumption ratio for the EU-2 member states in 2020 (%).



Source: Authors' compilation based on Kyos (2022)

Figure 7. EU underground gas storage fullness compared to historical observed average, minimum and maximum data (%)

THE RUSSIA-UKRAINE WAR AND THE EU'S RESPONSE

In February 2022, the world witnessed the Russian invasion of Ukraine (CNN, 2022). It is an issue that is not new; the conflict dates back to 2014, when Russia annexed the Crimea region (Biersack & O'Lear 2014; Grant 2015). The current conflict's implications not only affect Russia and Ukraine but also extend to the rest of the world, starting from the EU countries. Russia and Ukraine are significant exporters of oil, natural gas, coal, and wheat, among other vital commodities (Mbah & Wasum 2022). However, some tried to underestimate the influence of Russia on the global economy, describing it as “unimportant to the global economy and only serves as a huge gas station” (Cohen & Ewing 2022). The escalation of the situation pushed the EU to declare sanctions on Russia, which was a way to impair the Kremlin's ability to finance the war, impose costs on Russian elites, and diminish the economic base (“EU sanctions against Russia following the invasion of Ukraine” 2022). In return, Russia claimed some demands against the sanctions, which included that all gas payments should be made using the Russian Ruble (Davies & Roth 2022). Later, Russia decided to halt gas supplies to Bulgaria and Poland as they refused to meet the demands to pay in RUB (Abnett 2022). The Russian invasion of Ukraine has global economic impacts; this is evident through both energy and trade shocks which mainly led to a rising of commodity prices, including energy and food; a direct cause of the rise of the current global inflation (Ozili 2022). While nearly half of natural gas imports come from Russia, it is clear that the EU needs to reconsider its current energy plans, including energy transition and also fulfilling its climate pledges.

The European energy policy

Diversifying energy sources is one of the critical issues countries face to enhance their energy security status. Energy security became necessary after the first significant energy crisis in 1973, when some Arab and OPEC countries decided to start an oil embargo on the United States (Bielecki 2002; Vitošević et al. 2021). An event brought the idea of “energy diplomacy” into the scene because the world's political influence is strategic and economic development-oriented (Vitošević et al. 2021). Back to the definition of energy security, the International Energy Agency (IEA) defines it as “the uninterrupted availability of energy at an affordable price.” (Soysal & Soysal 2020). As mentioned

before, natural gas prices increased dramatically since the second half of 2021, more than 600% until April 2022, two months after the Russian invasion of Ukraine (“Commodity Markets” 2022).

Energy security is only one side of the story; it is accompanied by two other essential components, energy equity and sustainability. Together, these three components form the energy trilemma. The World Energy Council (WEC) publishes an annual report on the status of the energy trilemma; it also provides in-depth details for each partner country (*World Energy Trilemma Index 2021, 2021*). Europe as a continent shows a leadership position on the trilemma index. The newly published index report shows that the EU has made vast steps toward achieving sustainability. In addition, the region scores high in terms of equity, showing improvement primarily due to the subsidy system. Finally, it indicates that the region's political and economic stability affects the efforts toward energy transition (“World Energy Trilemma Index” 2022). Achieving the three dimensions produces a healthy energy system (Khan et al. 2022).

The EU has already taken immediate and medium-term measures to deal with the increase in energy prices in 2021. The European Commission launched a communication on energy prices, including a toolbox that aims to face the prices rise and strengthen the resilience against future shocks (European Commission, 2021). The introduced toolbox applies both short- and long-term measures; those measures target the protection of vulnerable consumers and small businesses. The immediate measures included income support to energy-poor consumers; temporary deferrals of bill payments, applying several precautions to avoid disconnection from the grid; reductions in taxation rates for vulnerable households; support for companies and industries; improving international energy outreach to ensure transparency; investigating possible anti-competitive behaviour in the energy market; and facilitating more comprehensive access to renewable power purchase agreements. On the other hand, the medium-term measures stressed issues related to energy resilience and decarbonisation.

The EU can benefit from accelerating its renewable energy transition to achieve energy independence in the long term. Energy independence means relying on national or local energy sources (Clifford 2022). As mentioned before, the EU acted according to the current conflict. In addition to the current sanctions, some interventions had to be made to regulate energy prices while considering people's welfare. The EU launched the REPowerEU programme. It stated that although every EU country is free to decide its

energy mix, it should follow the internal EU energy market while considering the EU's climate ambitions ("EU energy prices" 2022). The strategy focuses on four key areas: investment and reform, energy supplier diversification, renewable energy transition acceleration, and energy efficiency and savings. This strategy aims to phase out the reliance on Russian energy by 2027 (Tagliapietra 2022). Member states can use €250 billion from The Recovery and Resilience Facility (RRF) alongside other sources of funding such as private investment, The European Investment Bank and Cohesion Policy funds, among others ("REPowerEU" 2022). Two pillars were introduced to enhance the resilience of the EU energy system, first, by increasing the imports of liquified natural gas (LNG) from non-Russian suppliers, and second by boosting energy efficiency, enhancing infrastructure, and increasing renewables. In collaboration with the IEA, the "Playing my Part" report was published to guide individuals in taking action. The action steps are meant to help people reduce their energy use, save money, reduce fossil fuel consumption, while at the same time support Ukraine (IEA, 2022).

CONCLUSION

There are several energy security and development issues facing the EU. Climate change is also one of the urgent topics in the region. Climate change and environmental degradation were highlighted and centred in the European Green Deal, described as an existential threat to the world and the EU. Within the new European Green Deal, the European Commission prioritises sustainability by including sustainable development goals (SDGs) and citizens' well-being (European Commission, 2019a). The EU is aware of the global dimensions of climate change; that is why the EU will utilise its influence to help neighbouring countries and partners to join the sustainability track. The new deal included nuclear energy as a "green energy source". Fit for 55 was launched in 2021, with the purpose of ensuring that EU policies are in accordance with the climate targets agreed upon by the Council and the European Parliament, the Fit for 55 package is a bundle of measures to modify and update EU legislation as well as to put new initiatives into place, and with a mid-term goal of implementing the European Green Deal by 2030 ("Fit for 55," 2021). A major plan is to make the EU the first neutral continent by 2050 (LaBelle et al. 2022). A significant challenge may arise from improving the equality between old member states and post-communist member states to ensure continuous development while reducing greenhouse gas (GHG) emissions.

In 2018, the International Renewable Energy Agency (IRENA) published a study on renewable energy prospects for the EU. The study findings indicated that the EU has a cost potential for utilising more renewables, and renewable share in the energy mix could double from 17% in 2015 to 34% in 2030 (International Renewable Energy Agency and European Commission, 2018). To reduce their GHGs emissions by 55% by 2030, the EU seeks to increase the share of renewable energy resources in the overall energy mix to 40% ("Renewable energy targets" 2022). The progress toward achieving the targets is well observed; the EU had already reached 22.1% of its gross energy consumption from renewables in 2020, compared to 2004, when the share was only 9.6% ("Renewable energy statistics" 2022). It is worth noting here that Sweden and Croatia exceeded their targets by +11 percentage points, followed by Bulgaria (+7 pp), whereas France failed to meet the target (-3.9).

The European Green Deal emphasises the importance of clean energy transition. 75% of the emitted GHGs are from the energy sector. The EU want to ensure a secure, efficient, and fully integrated energy supply. The deal aims to build interconnected energy systems, promote a modern infrastructure, boost eco-design and efficiency of the products, decarbonise the gas sector, empower consumers, globalise the EU's energy standards, and develop the full potential of offshore wind energy ("Energy and the Green Deal" 2019).

Phasing out coal in the EU poses a challenge. Countries such as Poland, Germany, and the Czech Republic, among others, rely on coal as one of their energy sources and provide thousands of jobs in these countries (Hafner and Raimondi 2020). By 2018, the coal industry employed about 237,000 (Alves Dias et al., 2018) Achieving the energy transition means most of those working in this sector will lose their jobs in return. Those countries must address the impacts on employment and their economy soon. Addressing labour market needs and possible shifts can serve as a base for the process of coal phase-out. Conflicts may arise between those who live in communities that rely on coal mining and industry vs governments and environmental groups.

While achieving a safe energy transition, energy poverty is one of the significant challenges in the region. Policies targeting air pollution can affect fuel prices, choices, and energy efficiency requirements. Coal-burning furnaces are a source of pollutants and smog, a significant source of deaths in Poland. A transition to natural gas will decrease the deaths related to air pollution, but it will increase energy poverty rates (Karpinska & Śmiech 2021). A household's energy expenditure that exceeds 10% of

its disposable income is considered a fuel/energy-poor household (Boardman 1991). Unlike the involuntary past energy transitions, the current movement is led by policies aided by timely goals. This transition is “just” and centred around the effects on the shift's labour and income distribution to a sustainable energy mix (García-García et al. 2020). In the long term, the energy transition will benefit both society and the environment, but in the short run, it may amplify the problem of energy poverty (Middlemiss et al. 2020).

As of June 2022, with Russia's threat of cutting gas supplies, Germany, Austria, and the Netherlands announced that they would restart coal power plants. A decision came due to the alarming threat of not meeting energy needs in European countries (Frost 2022). European countries were left with little choice concerning enhancing their energy security during the crisis era. Such a decision will affect years of progress and policies toward reducing emissions and achieving climate ambitions.

REFERENCES

- ABNETT, K., 2022. EU energy ministers hold crisis talks after Russian gas cuts. Reuters.
- ALVES DIAS, P., KANELLOPOULOS, K., MEDARAC, H., KAPETAKI, Z., MIRANDA-BARBOSA, E., SHORTALL, R., VERONICA, C., TELSNIIG, T., CRISTINA, V.-H., LACAL ARANTEGUI, R., NIJS, W., GONZÁLEZ-APARICIO, I., TROMBETTI, M., MANDRAS, G., PETEVES, S., TZIMAS, E., 2018. EU coal regions: opportunities and challenges ahead. <https://doi.org/10.2760/064809>
- BEAMAN, J., 2022. EU proposes new gas storage and purchasing strategy to hedge against Putin. *Washington Examiner*.
- BIELECKI, J., 2002. Energy security: is the wolf at the door? *The Quarterly Review of Economics and Finance* 42, 235–250. [https://doi.org/10.1016/S1062-9769\(02\)00137-0](https://doi.org/10.1016/S1062-9769(02)00137-0)
- BIERSACK, J., O'LEAR, S., 2014. The geopolitics of Russia's annexation of Crimea: narratives, identity, silences, and energy. *Eurasian Geography and Economics* 55, 247–269. <https://doi.org/10.1080/15387216.2014.985241>
- BOARDMAN, B., 1991. *Fuel Poverty: From Cold Homes to Affordable Warmth*. John Wiley & Sons Ltd, London ; New York.
- BULI, N., 2022. European gas storage levels survive winter but summer refilling looms. Reuters.
- CHATTOPADHYAY, D., 2021. China's import restrictions on Australian coal boomerangs, escalate energy crisis: Reports. *Republic World*. URL <https://www.republicworld.com/world-news/china/chinas-import-restrictions-on-australian-coal-boomerangs-escalate-energy-crisis-reports.html> (accessed 6.26.22).
- CHENG, E., 2021. China is ramping up coal imports from Russia — but not Australia. *CNBC*. URL <https://www.cnbc.com/2021/10/28/china-is-ramping-up-coal-imports-from-russia-but-not-australia.html> (accessed 6.26.22).
- CHESTNEY, N., 2022a. Russian gas flows to Europe fall short, threaten storage buildup. *The Globe and Mail*.
- CHESTNEY, N., 2022b. Russian gas flows to Europe fall, hindering bid to refill stores. Reuters.
- CLIFFORD, C., 2022. Russia's war with Ukraine offers critical lessons for global energy markets. *CNBC*. URL <https://www.cnbc.com/2022/03/02/russia-ukraine-war-lessons-for-global-energy-markets.html> (accessed 5.6.22).
- CNN, 2022. February 23, 2022 Ukraine-Russia news. *CNN*. URL <https://www.cnn.com/europe/live-news/ukraine-russia-news-02-23-22/index.html> (accessed 5.3.22).
- COHEN, P., Ewing, J., 2022. What's at Stake for the Global Economy as Conflict Looms in Ukraine. *The New York Times*.
- COMMODITY MARKETS, 2022. . World Bank. URL <https://www.worldbank.org/en/research/commodity-markets> (accessed 5.5.22).
- COUNTERCURRENTS, 2021. Coal Is Coming Back In Europe As Gas Is Scarce. URL <https://countercurrents.org/2021/06/coal-is-coming-back-in-europe-as-gas-is-scarce/> (accessed 6.24.22).
- DAVIES, R., ROTH, A., 2022. Putin signs order demanding gas payments in roubles from Friday. *The Guardian*.
- DISAVINO, S., 2021. U.S. natgas volatility jumps to a record as prices soar worldwide. Reuters.
- EU energy prices, 2022. URL https://energy.ec.europa.eu/topics/markets-and-consumers/eu-energy-prices_en (accessed 5.4.22).
- EU Natural Gas 2022 Data, 2022. URL <https://tradingeconomics.com/commodity/eu-natural-gas> (accessed 6.26.22).
- EURONEWS, 2022. Why is there an energy crisis in Europe? *euronews*.

- EUROPEAN COMMISSION, 2022a. EU sanctions against Russia following the invasion of Ukraine. European Commission. URL https://ec.europa.eu/info/strategy/priorities-2019-2024/stronger-europe-world/eu-solidarity-ukraine/eu-sanctions-against-russia-following-invasion-ukraine_en (accessed 5.3.22).
- EUROPEAN COMMISSION, 2022b. REPowerEU: affordable, secure and sustainable energy for Europe. European Commission. URL https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en (accessed 9.16.22).
- EUROPEAN COMMISSION, 2021. Energy prices. European Commission.
- EUROPEAN COMMISSION, 2019a. Communication The European green deal.
- EUROPEAN COMMISSION, 2019b. Energy and the Green Deal. European Commission. URL https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/energy-and-green-deal_en (accessed 5.17.22).
- EUROSTAT, 2022a. Shedding light on energy in the EU: From where do we import energy? Shedding light on energy in the EU. URL <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-2c.html> (accessed 6.26.22).
- EUROSTAT, 2022b. Energy imports dependency. URL https://ec.europa.eu/eurostat/databrowser/view/NRG_IND_ID_custom_2592412/default/table?lang=en (accessed 6.26.22).
- EUROSTAT, 2021. Coal production and consumption. URL https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Coal_production_and_consumption_copy_Kreslic%C3%AD_pl%C3%A1tno_1.png (accessed 6.26.22).
- FIT for 55, 2021. URL <https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/> (accessed 11.7.22).
- FROST, R., 2022. European countries return to coal as Russia threatens to turn off gas. euronews. URL <https://www.euronews.com/green/2022/06/24/all-the-european-countries-returning-to-dirty-coal-as-russia-threatens-to-turn-off-the-gas> (accessed 9.16.22).
- GARCÍA-GARCÍA, P., CARPINTERO, Ó., BUENDÍA, L., 2020. Just energy transitions to low carbon economies: A review of the concept and its effects on labour and income. *Energy Research & Social Science* 70, 101664. <https://doi.org/10.1016/j.erss.2020.101664>
- GRANT, T.D., 2015. Annexation of Crimea. *Am. j. int. law* 109, 68–95. <https://doi.org/10.5305/amerjintelaw.109.1.0068>
- HAFNER, M., RAIMONDI, P.P., 2020. Priorities and challenges of the EU energy transition: From the European Green Package to the new Green Deal. *RUJEC* 6, 374–389. <https://doi.org/10.32609/j.ruje.6.55375>
- HELMAN, C., 2021. Energy Crisis 2021: How Bad Is It, And How Long Will It Last? *Forbes*. URL <https://www.forbes.com/sites/christopherhelman/2021/10/19/energy-crisis-2021-how-bad-is-it-and-how-long-will-it-last/> (accessed 6.24.22).
- HOROWITZ, C.R., JULIA, 2022. Germany halts Nord Stream 2 and Russia responds with a stark warning | CNN Business. CNN. URL <https://www.cnn.com/2022/02/22/business/nord-stream-2-germany-russia/index.html> (accessed 9.16.22).
- IEA, 2022. Playing my part. IEA, Paris.
- INTERNATIONAL RENEWABLE ENERGY AGENCY, EUROPEAN COMMISSION, 2018. Renewable Energy Prospects for the European Union. International Renewable Energy Agency (IRENA), Abu Dhabi.
- KARPINSKA, L., ŚMIECH, S., 2021. Will energy transition in Poland increase the extent and depth of energy poverty? *Journal of Cleaner Production* 328, 129480. <https://doi.org/10.1016/j.jclepro.2021.129480>
- KENNEDY, 2022. Energy transition = volatility (part 2) - by Seb Kennedy. URL <https://www.energyflux.news/p/energy-transition-volatility-part?s=r> (accessed 6.26.22).
- KHAN, I., ZAKARI, A., ZHANG, J., DAGAR, V., SINGH, S., 2022. A study of trilemma energy balance, clean energy transitions, and economic expansion in the midst of environmental sustainability: New insights from three trilemma leadership. *Energy* 248, 123619. <https://doi.org/10.1016/j.energy.2022.123619>
- KING, L., 2021. How Europe Triggered An Energy Crisis, And Now Is Paying Dearly For It [WWW Document]. *Forbes*. URL <https://www.forbes.com/sites/llewellynking/2021/11/27/how-europe-triggered-an-energy-crisis-and-now-is-paying-dearly-for-it/> (accessed 6.26.22).
- KYOS, 2022. KYOS - European Gas Storage - Underground gas storage data. URL <https://gas.kyos.com/gas/eu> (accessed 6.26.22).
- LABELLE, M., SZÉP, T., TÓTH, G., 2022. Not Fit for 55: The Hdi Spatial Injustice of Residential Energy Consumption in the European Union. *SSRN Journal*. <https://doi.org/10.2139/ssrn.4010386>
- LEWIS, J., EDWARDS, L., 2021. Assessing China's Energy and Climate Goals. Center for American Progress.
- LIBOREIRO, J., DE FILIPPIS, A., 2021. Why Europe's energy prices are soaring and could get much worse.
- MARKETS INSIDER, 2022. Coal Price Today. [markets.businessinsider.com](https://markets.businessinsider.com/commodities/coal-price/euro). URL <https://markets.businessinsider.com/commodities/coal-price/euro> (accessed 6.26.22).

- MBAH, R.E., WASUM, D., 2022. Russian-Ukraine 2022 War: A Review of the Economic Impact of Russian-Ukraine Crisis on the USA, UK, Canada, and Europe. *ASSRJ* 9, 144–153. <https://doi.org/10.14738/assrj.93.12005>
- MIDDLEMISS, L., MULDER, P., HESSELMAN, M., FEENSTRA, M., HERRERO, S.T., STRAVER, K., 2020. ENERGY POVERTY AND THE ENERGY TRANSITION 38.
- ORIENTAL NEWS NIGERIA, 2021. US and EU must react to escalating global energy crisis.
- OZILI, P.K., 2022. Global Economic Consequence of Russian Invasion of Ukraine. *SSRN Journal*. <https://doi.org/10.2139/ssrn.4064770>
- POPKOSTOVA, Y., 2022. Europe's energy crisis conundrum. European Union Institute for Security Studies. Renewable energy statistics, 2022. URL https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Renewable_energy_statistics (accessed 5.12.22).
- Renewable energy targets, 2022. URL https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-targets_en (accessed 5.12.22).
- RESILIENCE, 2022. The Energy Crisis. Resilience. URL <https://www.resilience.org/the-energy-crisis/> (accessed 6.26.22).
- SOYSAL, O.A., SOYSAL, H.S., 2020. Energy for Sustainable Society: From Resources to Users, 1st ed. Wiley. <https://doi.org/10.1002/9781119561330>
- STAFF, O., 2021. US and EU must react to escalating global energy crisis. *Oriental News Nigeria*. URL <https://orientalnewsng.com/us-and-eu-must-react-to-escalating-global-energy-crisis/> (accessed 11.7.22).
- STATISTA, 2022. Electricity price Germany 2022. URL <https://www.statista.com/statistics/1267541/germany-monthly-wholesale-electricity-price/> (accessed 6.26.22).
- TAGLIAPIETRA, S., 2022. REPowerEU: will EU countries really make it work? Bruegel | The Brussels-based economic think tank. URL <https://www.bruegel.org/blog-post/repowereu-will-eu-countries-really-make-it-work> (accessed 9.16.22).
- THE EUROPEAN INSTITUTE FOR INTERNATIONAL LAW AND INTERNATIONAL RELATIONS, 2022. Impact of the Ukraine-Russia conflict on energy supply. The European Institute for International Law and International Relations. URL <https://www.eiir.eu/strategic-affairs/energy-security/impact-of-the-ukraine-russia-conflict-on-energy-supply/> (accessed 6.26.22).
- The EU's Energy Crisis Explained - TLDR News - YouTube, 2021.
- Trading Economics, 2022. EU Carbon Permits. URL <https://tradingeconomics.com/commodity/carbon> (accessed 6.26.22).
- TSAFOS, N., 2022. Can European Energy Cope with a Conflict in Ukraine? URL <https://www.csis.org/analysis/can-european-energy-cope-conflict-ukraine> (accessed 6.26.22).
- TURLAND, J., 2021. Coal Shortages Force Blackouts Across China [WWW Document]. URL <https://thediplomat.com/2021/09/coal-shortages-force-blackouts-across-china/> (accessed 6.26.22).
- VITOŠEVIĆ, J., LUKINOVIC, M., ŠKVARENINOVA, L., 2021. Energy security: The impact of environmental policies on energy security. *Megatrend revija* 18, 41–56. <https://doi.org/10.5937/MegRev2104041V>
- VOCASEK, T., 2022. Role of nuclear energy in the stability of EU energy prices.
- WEETCH, B., 2021. China announced as world's largest LNG importer during first 10 months of 2021 [WWW Document]. *Hydrocarbon Engineering*. URL <https://www.hydrocarbonengineering.com/gas-processing/17122021/china-announced-as-worlds-largest-lng-importer-during-first-10-months-of-2021/> (accessed 6.24.22).
- World Energy Trilemma Index, 2022.
- World Energy Trilemma Index 2021, 2021. . London.
- WRIGHT, B., 2022. Trio Supplying Lion's Share of LNG to Europe. *Journal of Petroleum Technology*. URL <https://jpt.spe.org/trio-supplying-lions-share-of-lng-to-europe> (accessed 9.16.22).
- ZACHMANN, G., MCWILLIAMS, B., SGARAVATTI, G., 2021. How serious is Europe's natural gas storage shortfall? | Bruegel. URL <https://www.bruegel.org/2021/12/how-serious-is-europes-natural-gas-storage-shortfall/> (accessed 6.26.22).