ENERGY REORIENTATION OF EUROPE AS A RESULT OF THE WAR IN UKRAINE[1]

ЕНЕРГЕТИЧНА РЕОРІЄНТАЦІЯ ЄВРОПИ ЯК РЕЗУЛЬТАТ ВІЙНИ В УКРАЇНІ

The purpose of this research paper is to analyze different options available to the EU Member States regarding the refusal to extend contracts related to energy trade with Russian Federation. In 2022, Russia's unprovoked and unjustified war against Ukraine changed global perspectives. Most importantly, this war has a devastating human toll and also threatens global economy. The energy sector turned out to be the most vulnerable due to sanctions imposed against Russia as a leading exporter of energy resources. These sanctions have created uncertainty about the future of energy trade between Russia and the EU, as well as the reliability of Russian energy supplies. This has highlighted the need for EU to diversify their energy sources and phase out their energy imports from Russia, which has been a longstanding issue. Therefore, it is important to consider the potential economic and political consequences of such a decision.

Key words: *energy resources, energy prices, gas, oil, renewable sources, reduction, fossil fuels, war, Russia.*

Ця стаття має на меті проаналізувати можливі варіанти відмови від продовження контрактів, пов'язаних з торгівлею енергоносіями між Росією та країнами-членами ЄС. У 2022 році неспровокована та невиправдана війна Росії проти України змінила світові перспективи. Війна має руйнівні людські жертви, а також загрожує глобальному економічному відродженню. Енергетичний сектор виявився найбільш вразливим через санкції, введені проти Росії як провідного експортера енергоресурсів. Ці санкції створили невизначеність щодо майбутнього енергетичної торгівлі між Росією та ЄС, а також стосовно надійності російського енергопостачання. Це підкреслило необхідність для ЄС диверсифікувати свої джерела енергії та поступово відмовитися від імпорту енергоресурсів з Росії. Для досягнення цієї мети ЄС працює над розвитком альтернативних джерел енергії, таких як вітрова, сонячна та гідроенергетика. На даний момент було започатковано проекти з будівництва вітроелектростанцій та сонячних ферм, а також розвиток гідроенергетики, зокрема, за допомогою будівництва гідроакумулюючих електростанцій. Крім того, ЄС активно підтримує енергоефективність та енергозбереження. Важливим кроком в цьому напрямку є перехід на більш екологічні технології та відмова від використання традиційних видів палива, таких як вугілля та нафта. Однак, відмова від енергетичної торгівлі з Росією матиме серйозні економічні та політичні наслідки, особливо для країн, які сильно залежать від таких російських енергоресурсів як нафта та газ. По-перше, це може призвести до зростання цін на енергоресурси внаслідок зменшення доступності дешевих російських постачань. По-друге, реорієнтація енергетичних потоків здатна спричинити енергетичну нестачу в окремих країнах, що за ланцюговою реакцією матиме негативний вплив на розвиток регіону. По-третє, це спричинить складнішу реалізацію кластерної стратегії, тобто стратегії співпраці в області енергетики між країнами ЄС, яка передбачає спільне використання енергетичних ресурсів та їх транзит через території країн-членів ЄС. Та у будь-якому випадку, відмова від енергетичної торгівлі з Росією є фундаментом для гарантування безпеки енергопостачання у Європі.

Ключові слова: *енергетичні ресурси, ціни на енергоносії, газ, нафта, відновлювані джерела, скорочення, викопне паливо.*

UDC 339.7

DOI: https://doi.org/10.32782/infrastruct71-6

Rodionova Tatiana
PhD in Economics, Senior Lecturer
at the Department of World Economy
and International Economic Relations,
Odesa I.I. Mechnikov National University
Adelzberh Tetiana
Student,
Odesa I.I. Mechnikov National University

Formulation of the problem. The Russian war in Ukraine has exacerbated tensions between Russia and the West, leading to a more confrontational stance on both sides. It has increased concerns about the reliability and security of Russian gas supplies. The disruption of energy supplies from Russia has highlighted the need for Europe to diversify its energy sources and reduce its dependence on any one supplier. This has led to a push for greater investment in renewable energy, energy efficiency measures, and the development of alternative gas supplies from sources such as LNG and shale gas. The cost of energy flows reorientation is an important consideration for European countries; therefore, there is a need to research ways to optimize this strategy.

Analysis of recent research and publications. Kamel Si Mohammed et al investigated in their article how the renewable energy market responds to the Ukraine war in 2022 using event studies and network connectedness analyses and compares this effect to traditional energy sources. The results confirm that renewable energy markets have been sustainable during the war, while traditional energy markets are heavily affected [1, p. 7]. Moreover, clean energy has become more appealing to investors, and increased investment in clean energy subsectors leads to improved climate change mitigation.

In a study of European energy policy response to Russia's war on Ukraine, Caroline Kuzemko et al noted that to phase out fossil fuel Europe should diversify imports through new gas infrastructures, such as LNG terminals, pipelines and storage [2, p. 4]. To achieve this, a huge amount of money should be invested what could also become an obstacle for European Union.

There is also a plurality of studies focused on analyzing the impact of Russia's war on Ukraine on European energy system. Among them it is possible to distinguish studies by Bjarne Steffen and Anthony

[1] Supported by the grant from Central European University Foundation of Budapest

Patt [3, p. 4], Tim G. Benton et al [4, pp. 15–17], Mohammad Fazle Rabbi et al [5, p. 6–10].

Problem statement. This aim of this paper is to analyze EU's dependence on Russian fossil fuels, replacement of Russian gas supplies with alternative sources, acceleration of renewables deployment. It will make it possible to understand how the economy of EU countries will develop after changes in the energy export flows, as well as what are the prospects for the development of energy trade in the future.

Presentation of the main material of the study. Energy resources prices hit record levels in 2022 since Russia's invasion of Ukraine. Prices began to rise promptly last summer as the global economy recovery was following the easing of COVID-19 related restrictions [6, p. 7]. Afterwards, Russia's invasion of Ukraine has severely worsened this situation.

Energy prices are increasing elsewhere, as Russia has cut down fossil fuel exports with the aim of forcing the European Union to reduce its support of Ukraine. As a matter of fact, it is crucial to indicate that Russia is the world's third largest oil producer after the United States and Saudi Arabia, as well as the world's largest exporter of oil to global markets and the second largest exporter of crude oil after Saudi Arabia [7].

Figure 1 points out how important Russia was for the EU as an exporter of energy resources in 2021: EU imported about 20% of crude oil, 40% of gas and 30% of coal from Russia [8].

A strong tendency of considering high dependence on gas from Russia as a threat has existed for years in EU. The Russian invasion of Ukraine and the importance of energy resources exports in funding the Russian political elite and its aggressions, have transformed this into an immediate stimulus to cut dependence on Russian gas.

Figure 2 shows the percentage of total crude oil and gas imports from Russia by EU's countries in 2020. Higher level of gas supply in comparison with oil supply indicates that while the moderate increase in the cost of importing oil and petroleum products will be relatively for all EU states, the increase in the cost of exporting gas can lead to significant losses for EU countries.

This graph suggests that solutions and levels of diversifying energy supply sources and resolving the gas supply gap will greatly differ among the EU. Therefore, ways to decrease import dependency on Russian natural gas can't follow a perfect scenario.

It was forecasted that energy prices would rise due to the high level of uncertainty caused by gas supply disruptions [9, p. 6]. As we know, it is the only weapon that Russia can use to blackmail European countries.

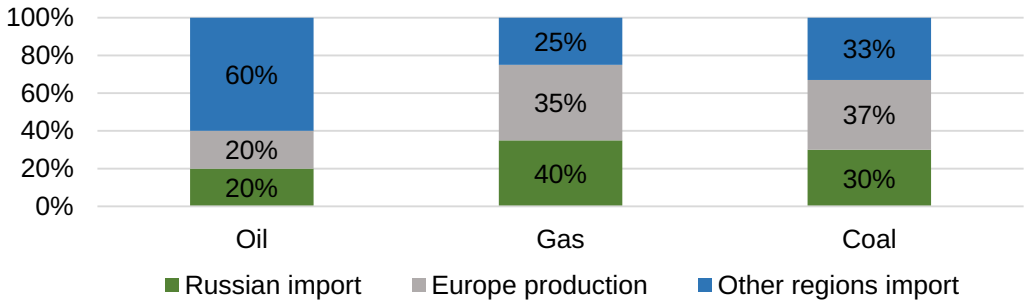

Figure 1. Supply of fossil fuels in Europe by origin in 2021, data in %

Source: "Energy balances", Eurostat metadata [8]

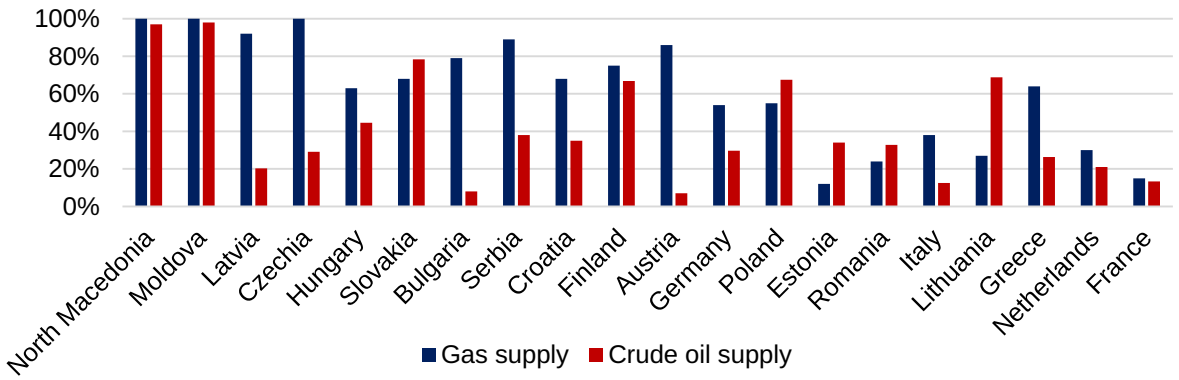

Figure 2. Percentage of total crude oil and gas imports from Russia be EU's countries in 2020 (by country)

Source: "Energy balances", Eurostat metadata [8]

The instabilities of gas supplies, as a result, can cause other economic imbalances as higher inflation rates that lead to negative consequences regarding citizens, because rising domestic energy bills will disproportionately impact low-income households.

In Figure 3 we can see how gas imports flows have changed since the beginning of the Russian invasion of Ukraine.

Despite European gas supply system being compound, the market keeps on functioning even with extremely low volumes of Russian gas, substituting a significant percentage of the deficit with alternative suppliers, but, mostly, with LNG suppliers.

Europe has also diversified its oil imports flows. Since January 2022, volumes of Russian crude oil have greatly been reduced, although Russia continues to be one of the main suppliers of crude to Europe.

Figure 4 shows increasing import flows from Africa, with Libya leading, also from the Middle East and North America, as in the sixth package of sanctions on Russia has been agreed that the European Union should end Russian seaborne crude imports by the end of year [12]. So, the aim to cut off Russian oil import is partly achieved now.

But, as it was mentioned before, to diversify gas import flows is more difficult for Europe than to do the same processes with oil. One of the main solutions of this problem could be a huge permuting of oil flows with Russian energy products satisfying demand in Latin America, Africa and the Middle East, while the released supplies will transfer to Europe.

Despite of diversifying energy supply flows and other steps made by the EU to mitigate the impending consequences of Russian energy dependency reduction, as it was forecasted, gas prices began to rise after Russian invasion in Ukraine. In August they reached all-time peak since 2005, without substantial modification in volumes of trade [13]. It obviously affected European economy in a negative way, because increasing of gas prices are accordingly resulted in growth of electricity prices even in a short-term, threatening households and businesses with higher level of inflation.

In October, however, the price of gas in Europe collapsed due to abnormally warm autumn [14]. Warm weather, along with full gas storages in Europe, eased fears of gas shortages this winter after Russia cut off gas supplies to the EU, demanding the lifting of sanctions on Gazprom and the unblocking of Nord Stream 2.

In November 22, European Commission has proposed a safety cap on gas prices that should prevent such volatility by implementing

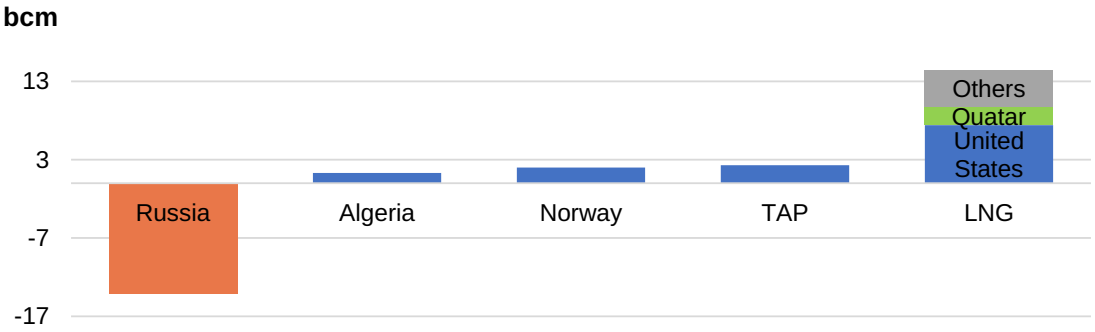

Figure 3. Change in the European Union and United Kingdom natural gas imports by source, last updated 26 Oct 2022

Source: International Energy Agency [10]

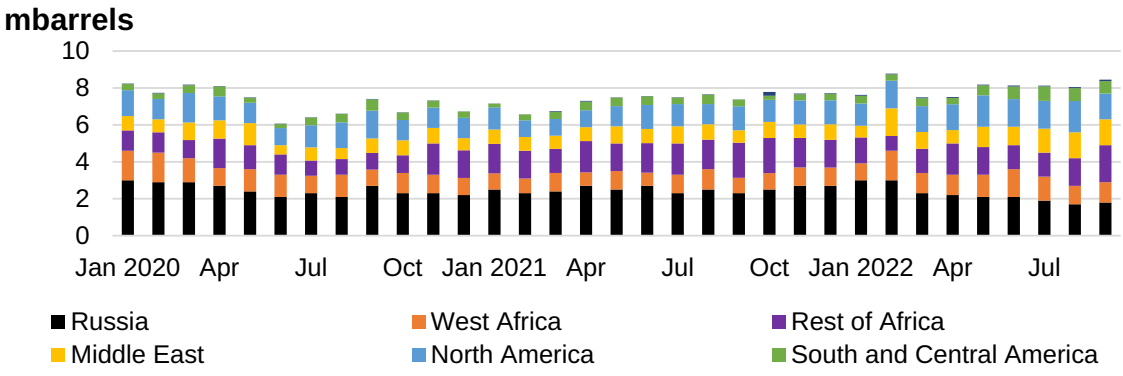

Figure 4. Crude and condensate arrivals in Europe – excluding Turkey, last updated October 12, 2022

Source: Vortexa Ltd [11]

well-targeted instrument to automatically intervene on the gas markets in case of extreme gas price hikes [15, pp. 6–8]. Still, although full gas reserves will serve as a security pillow for Europe when temperatures undoubtedly decrease, the filling of storages will proceed with great difficulties next year's winter in the absence of the regular Russian supplies.

Obviously, the volatility of energy prices and uncertainty concerning providing stable conditions for energy supply diversification have a bunch of reasons with solid background even if do not take into consideration the consequences of Russian invasion of Ukraine.

Firstly, high level of spread between TTF, which is a benchmark for Europe's energy sector, and other regional hubs, that was observed in August, (which normally should be narrow), has shown that this mechanism of price establishment is not so efficient as it was before, especially outside North-Western Europe.

Therefore, there is huge necessity for investing in gas supply inter-connections with the aim of solving regional hubs contradiction of gas prices. New pricing reference benchmark for LNG was one of the additional measures to address high gas prices in European Commission Proposal, published in October, 18 [16].

Secondly, Russia was manipulating European natural gas markets even before the war. Still, the aim to reduce gas usage has become so important and urgent only after the beginning of the war and all consequences that it has led to. Hence, when the increase of gas price happens, economic policies of EU Member states are being implemented not in a harmonized way [17; 5–6].

For instance, some countries begin to subsidize scarce energy for consumers with the aim of mitigating negative impact of high gas prices. Despite these tools being effective in a national view, they threaten to decrease impetus to reduce energy demand and can deteriorate the concordance of cross-border energy trade. So, it is important to coordinate all necessary policy instruments at the EU level.

Electricity and gas demand reduction plays an important role in dealing with the energy crisis. The crisis, that started during the COVID-pandemic and reached its critical level after the Russian invasion of Ukraine, has become a convincing signal that if Europe plans to be reliant on imported fossil fuels in the nearest future, it will obviously be at risk of energy price shocks and possible supplier manipulation, as can be seen in the case of Russia.

In July, Member States agreed to decrease their gas demand by 15% in comparison with their average consumption in the past 5 years, between 1 August 2022 and 31 March 2023 [18, p. 18]. Another important energy efficiency target was set in December 2018, when the Energy Efficiency Directive established an EU-wide 20 % energy consumption-reduction target for 2020 and 32.5 % target for 2030 [19, p. 1].

According to Eurostat data, the EU exceeded its 20 % reduction target for 2020 by 5.4 % for final energy consumption [20]. However, despite decreasing of total use of energy since 1990, especially in the terms of coal (65%) and oil/petroleum products (17%), natural gas usage grew up by 31% [21]. So, a lot of steps should be implemented to reach all necessary targets.

Basically, many short-term measures in order to save energy were proposed in the REPowerEU package in May 2022 [22]. Firstly, they are aimed at the consumer habit changes, which could be represented in, for example, more efficient using of household appliances and public transport, and, secondly, these measures can encourage consumers to buy high-efficiency heating systems, making VAT lower on them. Nevertheless, prioritizing of renewable sources development is one of the main keys to succeed in dealing with the energy crisis.

Fundamentally, growth of renewables was promoting the reduction of coal power, but now they have taken the path of gas replacement.

Despite solar PV and wind costs being expected to increase in the nearest future, their huge significance in terms of fossil fuels dependence reduction levels these price rise, especially against the background of much sharper volatility of natural gas and coal prices.

37% of European Union's electricity in 2021 was provided by renewables, with lower wind speeds due to continuous allowing challenges slowing deployment in Germany, Poland and Italy [23]. Figure 5 shows that flow resources as a percentage of EU's electricity have been constantly growing since 2000s, with wind and solar energy leading.

Certainly, there are many bottlenecks concerning increasing capacity such as EU's high level of dependence on imports from Asia for some crucial components for solar power (wafers, ingots, cells and modules) or the chip shortage, which leads to attaining new suppliers and changing strategic investments; limitations of affordability for low-income household and EMEs are also obstacles for faster deployment of renewables, that's why possibilities of granting aid for fuel switching are being considered now [25, pp. 13–14],

Member States should make a lot of efforts to optimize the functioning of the electricity market to reach the 69% share of renewables in the electricity mix in 2030 as planned due to the REPowerEU, because, generally, energy transition process lacks the same degree of clarity throughout the EU. The volatility of oil and gas prices have been always responsible for the inflationary shocks of Europe, therefore, the ambition on clean energy investment shouldn't be undermined as it's one of the main ways to prevent further possible energy crisis.

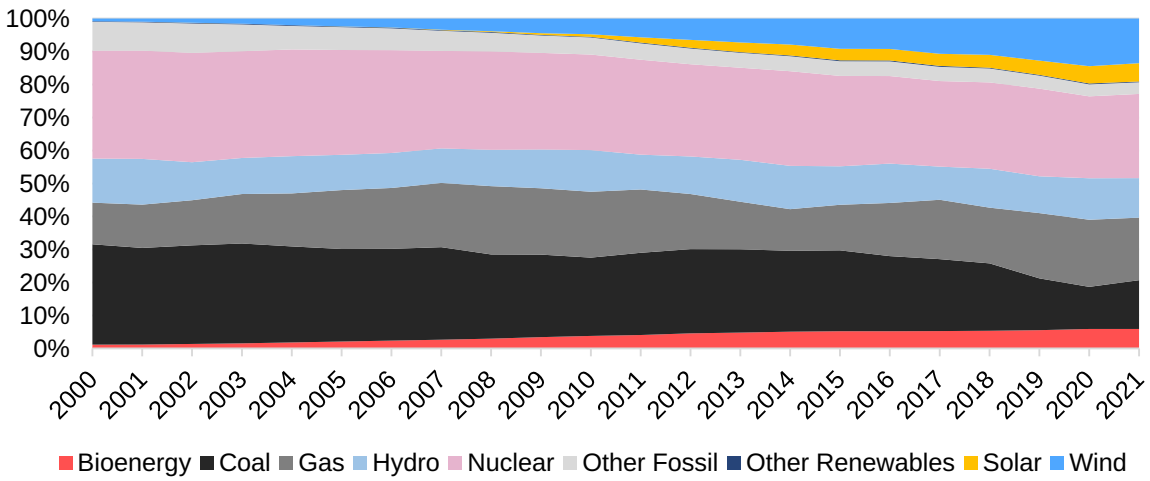

Figure 5. EU electricity generation by source, percentage share

Source: EMBERdata [24]

Conclusions. Energy market volatility threatens European economy and pushes it to implement market correction mechanism as soon as possible. Decisions regarding how to deal with limited energy supply will greatly affect the future of Europe's economic development. Agreement between Member countries in terms of coordinating policy tools is at the level of indispensable significance to the EU.

The analysis of the data revealed that diversification of energy imports flows and increasing of renewable energy consumption simultaneously with fossil fuels reliance reduction are extremely important processes that should become crucial tools in addressing bottlenecks in cross-border electricity trading. Firstly, substitution of Russian supplies with new sources of LNG is connected with great number of risks, e.g., energy price volatility, what erodes the purchasing power of households and puts at risk steady economic development. Therefore, implementing of government coordination mechanism is essential to mitigate the impact of prices fluctuations on consumers. Secondly, higher renewables deployment through installation of new wind and solar power capacity is already promoted by the EU and, although accelerating of renewable energy projects is costly, it's still rather the solution of the problem, but not an obstacle that should stop countries from moving in the direction of clean energy development. Thus, while short-term measures should protect vulnerable households and SMEs that can't successfully manage energy prices leaps by themselves, long-term instruments must provide deeper integration and accelerated investments in renewable energy technologies that have huge potential to reduce high dependence on fossil fuels and play important role in economic and climate grounds.

REFERENCES:

1. Mohammed, K. S., Usman, M., Ahmad, P. *et al.* (2023). Do all renewable energy stocks react to the war in Ukraine? Russo-Ukrainian conflict perspective. *Environ Sci Pollut Res,* p. 7. DOI: https://doi.org/10.1007/s11356-022-24833-5.

2. Kuzemko, C., Blondeel, M., Dupont, C., & Brisbois, M. C. (2022). Russia's war on Ukraine, European energy policy responses & implications for sustainable transformations. *Energy Research and Social Science; Elsevier BV,* p. 4. DOI: https://doi.org/10.1016/j.erss.2022.102842.

3. Steffen B., Patt, A. (2022). A historical turning point? Early evidence on how the Russia-Ukraine war changes public support for clean energy policies. *Energy Research and Social Science; Elsevier BV,* p. 4. DOI: https://doi.org/10.1016/j.erss.2022.102758.

4. Benton G. T., Froggatt A., Wellesley L. & Grafham O., King R., Morisetti N., Nixey J. and Schröder P. (2022). The Ukraine war and threats to food and energy security. *Chatham House, Environment and Society Programme,* pp. 15–17. Available at: http://surl.li/fxwnd.

Rabbi, M. F., Popp, J., Máté, D., & Kovács, S. (2022, October 31). Energy Security and Energy Transition to Achieve Carbon Neutrality. *Energies; MDPI,* pp. 6–10. Available at: https://doi.org/10.3390/en15218126.

5. Council of European Energy Regulators. (2021). *First Analysis of the COVID-19 Pandemic's Effects on the Energy Sector. Council of European Energy Regulators,* vol. 15(21), p. 7. Available at: https://www.ceer.eu/documents/104400/-/-/31d2aad0-f7b3-46cf-b7e9-1ef382ad2e87.

6. Statista Research Department Database. Available at: https://cutt.ly/k02Uqq6 (accessed November 28, 2022).

7. Eurostat Metadata. Energy balances. Available at: https://ec.europa.eu/eurostat/cache/metadata/en/nrg_bal_esms.htm (accessed March 7, 2022).

8. Di Bella, G., Flanagan, M. J., Foda, K., Maslova, S., ienkowski, A., Stuermer, M., & Toscani, F. G. (2022). Natural Gas in Europe: The Potential Impact of Disruptions to Supply. *IMF Working Papers,* 2022(145), A001, p. 6. Available at: https://www.elibrary.imf.org/view/journals/001/2022/145/article-A001-en.xml.

9. IEA. *Year-on-year change in the European Union and United Kingdom natural gas imports by source, Oct 2021 – Jan 2022.* Available at: http://surl.li/eerro (accessed October 26, 2022)

10. Vortexa Ltd. Available at: https://www.vortexa.com.

11. European Commission. (2022). *Russia's war on Ukraine: EU adopts sixth package of sanctions against Russia.* Available at: https://ec.europa.eu/commission/presscorner/detail/en/IP_22_2802.

12. Trading Economics. *Natural gas.* Available at: https://tradingeconomics.com/commodity/natural-gas.

13. Wallace J. Warm. (2022). *Weather Drives Down Gas Prices in Europe. The Wall Street Journal.* Available at: http://surl.li/eesqb.

14. Regulation (EU) 2022/2578. *Establishing a market correction mechanism to protect Union citizens and the economy against excessively high prices.* P. 6–8. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R2578&from=EN.

15. European Comission. (2022, October 18). *Commission makes additional proposals to fight high energy prices and ensure security of supply* [Press release]. Available at: https://ec.europa.eu/commission/presscorner/detail/e%20n/ip_22_6225.

16. McWilliams, B., Sgaravatti, G., Tagliapietra, S., & Zachmann, G. (2022). A grand bargain to steer through the European Union's energy crisis. *Bruegel Policy Contribution,* (14), pp. 5–6. Available at: https://www.bruegel.org/policy-brief/grand-bargain-steer-through-european-unions-energy-crisis.

17. Council of the European Union. (July, 2022). *Regulation on coordinated demand reduction measures for gas,* p.18. Available at: https://data.consilium.europa.eu/doc/document/ST-11625-2022-INIT/en/pdf.

18. European Comissiom. (April, 2019). *Report from the Commission to the European Parliament and the Council,* p. 1. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019DC0224&from=EN.

19. Eurostat. *Energy efficiency statistics.* Available at: http://surl.li/fybft (accessed December 16, 2022).

20. Eurostat. *Energy efficiency.* Available at: http://surl.li/fybek (accessed March 25, 2023).

21. European Commission. (May, 2022). *REPowerEU Plan*. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:fc930f14-d7ae-11ec-a95f-01aa75ed71a1.0001.02/DOC_1&format=PDF.

22. Eurostat. *Share of energy from renewable sources.* Available at: http://surl.li/eetbc (accessed April 20, 2022).

23. EMBER. *EU electricity generation by source*. Available at: https://ember-climate.org/countries-and-regions/regions/europe/ (accessed March 2022).

24. European Commission. (July, 2022). *Save gas for a safe winter,* pp. 13–14. Available at: http://surl.li/fybew.