
Marija Tomljenović
PhD Student of the Faculty of Law, University of Rijeka,
Associate at the PAR University College in Rijeka
7 Kastavska, Rijeka, Croatia, 51000
https://orcid.org/0000-0001-7369-7281
marija.tomljenovic@student.uniri.hr

Marina Srdoč
Professional Assistant,
PAR University College,
4 Rijeka resolution Square, Rijeka, Croatia, 51000
msrdoch@gmail.com

Abstract. On February 24, 2022, Russia, led by Putin, destroyed the European world peace by a military attack on Ukraine under the pretext that Ukraine poses a constant threat to Russia, hindering the development of Russia and its existence. The Russian invasion of Ukraine, which for Putin is a fiction “about a special military operation”, has greatly affected energy security around the world and provoked uncertainty in the field of energy policy both in Europe and in the world. The authors of this paper do not intend to present their final judgment and outcome on this issue, especially for the reason that the situation in the field of energy policy changes from day to day. However, the authors want to contribute to better understanding of this problem in terms of what can be expected in the future. This involves the measures necessary to achieve energy security, including independence from Russian gas. In addition, it can be assumed that after the introduction of Western sanctions against Russia, Putin manipulates and uses energy policy as his political weapon.

Keywords: energy security, independence from Russian gas, alternative gas solutions, renewable energy sources, the principle of solidarity, the principle of efficiency.

INTRODUCTION

After the economic crisis caused by the coronavirus pandemic Covid 19, February 24, 2022, is a date that will be studied in creation of history, and especially a date that we will never forget. The Russian invasion of Ukraine, as well as Putin’s strategy of warfare, have affected the world, both militarily and geopolitically, economically and financially. On this note, the consequences of the war in Ukraine have a significant impact on energy policy and
energy security. The consequences of the Russian aggression against Ukraine turned out to be unfavorable for the European industry, which is showing the first signs of its closure. We can say that the increase in gas prices and oil supplies in Europe is a huge shock to the commodity market. The energy costs of metallurgical plants are steadily increasing, and the costs of a fertilizer plant and a paper mill are also inevitable. The EU is heavily dependent on Russian energy carriers, whose dependence is related to crude oil, gas and coal, however, although dependence on oil and coal does not pose such a big problem, since there is a possibility of alternatives, it is gas that is difficult to replace.

The consumption of Russian gas in the EU is more than 40%, while the situation in Germany is approaching an alarming state. In this regard, we cannot ignore, in response to the sanctions imposed on Russia, the threats of Russian President Vladimir Putin to close the Nord Stream-1 gas pipeline, the threat of which is most feared by Germany. Nord Stream-1 is the longest offshore gas pipeline, through which 55 billion space meters of gas are transported annually under the Baltic Sea (Hina, 2022). Although the threats to close the gas pipeline did not come true, Gazprom, after imposing sanctions against Russia under the pretext of “force majeure”, in order to “get closer” to non-fulfillment of its contractual obligations within the meaning of the law, began to reduce natural gas supplies, which led to an even greater increase in consumer prices. In the case of the worst-case scenario, Europe should be prepared not only to reduce natural gas supplies, in particular, threats to close the “pipe” indicate that Russian energy policy is a powerful tool that Russia, led by Putin, manipulates and uses as a political weapon, all in order to achieve its own goals.

**IMPLICATIONS FOR THE ENERGY MARKETS**

Russia, one of the largest energy suppliers in the world in the energy market, occupies a unique position, and consequently a great influence not only on Europe, but also on the United States. After Saudi Arabia, as the first largest producer and exporter of crude oil, according to the Central Intelligence Agency (CIA) World Factbook, Russia ranks second in this matter and first in natural gas exports. In 2021 Russia exported approximately 4.7 million barrels of crude oil per day to countries around the world, of which China alone imported 1.6 million barrels of oil per day, and Europe 2.4 million barrels of oil per day. A wide network of export gas pipelines, transit routes through Belarus and Ukraine, as well as pipelines included the EU, whose total consumption of Russian gas is more than 40% (The International Energy Agency (IEA, 2022c). As for oil and coal, the EU imports 27% of oil from Russia and 46% of coal (European Commission and Secretariat -General, 2022).

Regardless of the outcome of the war, Russian aggression against Ukraine will leave behind inevitable consequences for energy markets and, in particular, for energy policy and energy security. Achieving the balance of the energy trilemma (sustainable development, security and accessibility) is necessary, the most important of which is energy security, to the maximum extent possible while reducing the dependence of imported fuel and the efficient functioning of the world market. Despite the fact that a longer period of time is required, achieving increased energy security is also possible with sustainable development by doubling the supply of low-carbon energy, as well as by successfully managing demand (Mackenzie, 2022).

---

1 High gas prices are projected until 2026 and, consequently, high electricity prices, but it is also important to note that by 2026 alternative gas supplies will not be enough, that is, until new LNG from America and Qatar. Such a scenario involves Russia manipulating the volume of gas supplies.
**Current situation**

We can all agree that during the quarantine throughout the pandemic, the instability of global energy markets was on the rise, while an additional unstable situation was disrupted by the Russian invasion of Ukraine due to the high demand for energy compared to its supply. The real consequences of the war in the energy markets will be visible only in a few years. The only accurate and reliable forecast that can be predicted in the near future is uncertainty and further price increases, which can greatly benefit both Russia and other oil and gas producers. Back in April of this year, Joseph Borrell\(^2\) noted the dizzying figure of 1 billion euros of daily import costs from Russia. Thus, it can be concluded that the increase in prices in Europe by 60% for oil and 400% for natural gas is caused by an increase in demand after the weakening of the pandemic and the introduction of sanctions by the West against Russia (Butler, 2022).

In June, 2022, the current situation was such that Russia suspended the physical delivery of gas, regardless of Western sanctions, to countries such as Poland, Bulgaria and Finland. As a *ratio* for Poland and Bulgaria, Putin referred to the non-payment of gas supplies in rubles, and for Finland, *ratio* referred to its statement to NATO. Given one of these facts, Europe’s goal is to create a situation in which Europe becomes independent of Russian gas (Krukowska and Nardelli, 2022). In this regard, the European Commission has concluded an agreement with the United States on the supply of 15 billion cubic meters of gas, while Germany and Italy also conclude their own agreements on gas supplies from Qatar and Algeria. Only an increase in efficiency can lead to the saving of a certain amount of gas, but also to the production of renewable energy sources.

However, nevertheless, this discrepancy between supply and demand and even the scenario of expanding renewable energy production, hence possible supply replacements, remains a current market problem. In addition, independence from Russian gas, that is, energy independence in general, may not happen overnight, so here we are not talking about a short-term, but a long-term problem. In particular, it takes two to three years to develop renewable energy sources in the most favorable conditions, about ten years for hydrogen, and fifteen or more years for new nuclear power plants. It can be concluded that price stability in the coming period cannot be predicted, as well as a decrease in energy prices, which leads to a high cost of living and, ultimately, to economic recession and inflation (Butler, 2022).

**What can we expect in the future?**

In the short term, during the year, we can expect that almost all European countries will refuse to supply Russian oil and find alternative options in sources provided by the Middle East and other countries. In this case, the price of oil will depend on the Organization of the Petroleum Exporting Countries (OPEC) (OPEC, 2022). Back in March of this year, OPEC agreed to a planned increase in production by 400 thousand barrels per day from the beginning of April, which indicates an expected increase in oil demand by 2.1 million barrels per day (IEA, 2022a). As for natural gas, the EU is determined to reduce dependence on Russian gas by even 80%, but one such step requires actions by all EU member states, which

---

\(^2\) Josep Borrell Fontelles is the EU High Representative for Foreign Affairs and the Security Policy and Vice President of the European Commission. From 2004–2007 he was President of the European Parliament.
include, among other things, the necessary investments to redirect energy, which in the end is not cheap at all. The European Commission estimated that in the event of a complete cessation of dependence on gas supplies to Russia, there are enough reserves to survive the upcoming winter (Krukowska and Nardelli, 2022).

Continuing in the same spirit, energy security, and with it the affordable price of energy resources are crucial for the security of the EU. Thus, the importing countries did not sit and wait for the situation to develop, but began to establish partnerships with manufacturers and suppliers from Qatar, as well as from Azerbaijan, which, in fact, can also be viewed through the prism of creating multilateral negotiations and agreements not only on supplies, but also in expanding long-term political, economic and security policy. Nick Butler, visiting professor, president and founder of the Institute of Politics at King’s College London, expressed his point of view, with which the authors of this paper fully agree that one such scenario is not necessarily unfavorable, moreover, in the long term, a new NATO alliance may arise from one such network, that is, the “energy” alliance of NATO, which will unite exporting and importing countries aimed at maintaining energy security.

Consequently, Europe’s insistence on reducing Russian gas imports to the European market, as well as in the context of the international level, is a plan that should be implemented by 2024, and in this regard, the conclusion of long-term contracts in order to achieve energy balance and security in ensuring gas supplies, in which agreements with the already mentioned Qatar as the main gas exporter will play a major role. In addition, it is also necessary to build new gas fields and even in politically sensitive areas, such as the waters off the coasts of Israel and Lebanon. Until such major projects are completed, however, there will be no expected reduction in gas prices, and it is assumed that prices will remain relatively high, as noted in the previous part of this paper. The authors believe that in the foreseeable near or distant future, due to the population growth trend, it will not be possible to avoid the growing demand for energy. It is assumed that solar and wind energy will become necessary means of generating electricity within a certain period of time, however, the authors believe that oil, gas and coal will not stop being produced and consumed as the main necessary energy sources, which will disappear and decrease to zero during the future period, narrower or wider points of use.

Alternative gas solutions

Alternative gas solutions are not the same for every manufacturing sector. In any case, the use of an alternative solution will depend on operating costs, of which renewable energy sources and nuclear energy occupy leading positions in terms of low costs. However, in the end, their quantity in a shorter period of time is not a sufficient replacement for gas. In this case, the alternative solution is the use of coal, which, in turn, due to Russia’s invasion of Ukraine leads to higher costs and, therefore, can be considered as an exclusively temporary alternative solution, which will be by 2024 reduce gas consumption by only 6%. By the same year, bioenergy, the cost of which has not increased due to the consequences of the war, should reduce the consumption of Russian gas by 20%. Now, going back to the beginning and to renewable energy sources, we can say that their, although very slow efficiency, can still get closer to the desired goals. For example, within five years, renewable energy sources will become a sufficient replacement for Russian gas by only 20%, and by 2030 thanks to
renewable energy sources, Russian gas supplies will even decreased by more than 50% (World Economic Forum, 2022).

Nevertheless, alternative solutions for gas as a means by which Europe wants to achieve independence from Russian energy carriers, especially gas, are not a benchmark for energy security (Clifford, 2022). The main goal of independence from Russian energy resources is to achieve energy security as the main goal. Ultimately, this means an excellent functioning of the market on a global scale, which should provide a variety of effective solutions. Energy independence from Russia, to which the EU fully aspires, means dependence solely on its natural sources, local, national or regional sources, and achieving energy security from various sources means that each of them must be flexible and applicable regardless of existing opportunities or difficulties that may be affected or conditioned. The authors believe that energy independence from Russia, which the EU wants to achieve, in accordance with the percentages and a long period of time indicated at the beginning of this subsection, is nevertheless not entirely possible. Full flexibility of sources, and precisely because of various unpredictable situations that must be taken into account, for example, climate change, force majeure, etc., is not fully achievable. On the other hand, in addition to a well-developed plan, short-term and long-term, which is the topic of the next chapter and includes multilateral agreements with other countries of the world and the maximum use of alternative energy sources and their adequate storage, in particular renewable energy sources, can lead to a reduction in dependence on Russian gas, as well as to a long-term stable energy security.

THE EUROPEAN UNION: GAS SUPPLY

The European Union plans to reduce the import of Russian gas by a third. Recall that before the Russian aggression, the EU imported to Ukraine about 380 million cubic meters of Russian gas per day, which is about 140 billion cubic meters annually, of which about 15 billion cubic meters were supplied in the form of liquefied natural gas (LNG). In percentage terms, this is about 45% of the total volume of Russian gas imports and 40% of total gas consumption. Reducing dependence on Russian gas by more than a third in one year includes gas storage this year. The EU plan is in line with the European Green Deal and the results achieved in the IEA Net Zero Emissions by 2050 Roadmap, which the EU wants to implement by the end of 2030. It is important to note that the plan includes investments in new efficient technologies, the conditions of which should correspond to environmentally friendly results, which, however, are not identical in terms of geographical differences and supply conditions in all EU member States, besides they are very diverse. In order for one such plan to be successfully implemented, consistency in international cooperation and policy choice is absolutely necessary to ensure the balance of global markets.

EU Plan

In this part of the paper, the authors will present an EU plan aimed at reducing the EU’s dependence on Russian natural gas. On March 3, 2022, the IEA issued a ten-point plan to reduce the EU’s dependence on Russian natural gas. We are transmitting the plan of measures in full (see Table 1.).
Table 1.

A 10-Point Plan to Reduce the European Union’s Reliance on Russian Natural Gas (IEA, 2022b)

| Measure 1. | Measure 6. |
| No new gas supply contracts with Russia | Enact short-term measures to shelter vulnerable electricity consumers from high prices |
| Measure 2. | Measure 7. |
| Replace Russian supplies with gas from alternative sources | Speed up the replacement of gas boilers with heat pumps |
| Measure 3. | Measure 8. |
| Introduce minimum gas storage obligations to enhance market resilience | Accelerate energy efficiency improvements in buildings and industry |
| Accelerate the deployment of new wind and solar projects | Encourage a temporary thermostat adjustment by consumers |
| Measure 5. | Measure 10. |
| Maximise generation from existing dispatchable low-emissions sources: bioenergy and nuclear | Step up efforts to diversify and decarbonise sources of power system flexibility |

Considering that the agreements concluded between the EU and Gazprom on gas imports in the amount of more than 15 billion cubic meters per year expire at the end of this 2022, while contracts for the import of gas in the volume of 40 billion cubic meters expire by the end of 2030, this gives the EU the opportunity to prepare in time for the conclusion of contracts with other exporting countries for the supply of gas and its consumption and, thus, for the implementation of measure number 1 (IEA, 2022c). The share of natural gas imports from Norway in 2021 amounted to 23.6%, which share including imports of gas from Azerbaijan, could increase by as high as 10 billion cubic meters per year.

All this, and the corresponding measure number 2 indicates the balance of supply and demand for LNG, which means their timely acquisition and, consequently, the already mentioned conclusion of multilateral agreements with various producers and suppliers of natural gas, as well as the efficient use of LNG capacities. In addition, one of the important goals is the extraction of low-carbon gas to reduce emissions by 2030 and 2050. For this purpose, we should not lose sight of the increase in the supply of biogas and biomethane, which will increase domestic gas production in the EU, as well as the production of low-carbon hydrogen by electrolysis, depending on new projects of electrolysers. In accordance with the second measure, the EU will additionally supply gas with 30 billion cubic meters, the sources of which will not depend on Russia (IEA, 2022b). In accordance with the third measure, and in order to achieve a stable and balanced market, it is necessary, especially during the growth of geopolitical tensions, to ensure gas storage.

In particular, such a measure will allow to satisfy seasonal fluctuations, but it will also be able to ensure the ratio of supply and demand and, thus, prevent price increases. Of course, it is important to note that there must be an element of solidarity between the EU member states, both in terms of regional gas storage and access (IEA, 2022c). On renewable energy sources (measure no. 4.), an increase in the production of photovoltaic and wind power
plants will also greatly affect the reduction of consumer spending and, in addition, will lead to a reduction in gas consumption by 6 billion cubic meters (IEA, 2022a). If we look at the measure no. 5. we may conclude that the increase in bioenergy and nuclear energy is very important, given that the main source of low-emission electricity in the EU is nuclear energy. The current problem is the closure of four nuclear reactors by the end of 2022 and another one in 2023. Maintenance of existing nuclear reactors and construction of new ones will reduce the consumption of gas intended for electricity generation by 13 billion cubic meters (IEA, 2022a).

The EU will implement a measure (measure no. 6.) to protect vulnerable consumer groups from high electricity prices. It is already known that the high price of gas is the reason for the not so low wholesale price of electricity, which allows electricity producers to make a profit. „Current market conditions could lead to excess profits of up to EUR 200 billion in the EU for gas, coal, nuclear, hydropower and other renewables in 2022. Temporary tax measures to raise rates on electricity companies’ windfall profits could be considered. These tax receipts should then be redistributed to electricity consumers to partially offset higher energy bills. Measures to tax windfall profits have already been adopted in Italy and Romania in 2022.” (IEA, 2022b) Thus, the effect of such a measure would allow the inflow of additional funds, which would be evenly distributed among vulnerable groups of consumers. Installing heat pumps instead of existing gas boilers in accordance with the seventh measure, although one such project will require an additional investment of 15 billion euros, the EU will still be able to save 2 billion cubic meters of gas in the first year and in the coming years. Ultimately, the installation of heat pumps will increase energy efficiency in consumers’ homes and reduce overall energy costs (IEA, 2022a).

In addition, analyzing the eighth measure, energy efficiency through the modernization of improved insulation in existing homes and non-residential buildings will save 1 billion cubic meters of gas per year, but will also lead to an increase in employment. Tripling the installation of intelligent systems in homes would mean a reduction in gas demand in the amount of 200 million cubic meters per year at a total cost of 1 billion euros. The EU has not spared small and medium-sized businesses. Helping small and medium-sized businesses install intelligent systems will provide 250 million cubic feet of annual energy savings. Thus, energy efficiency will affect increased competition in the industry, but, most importantly, it will reduce gas consumption for heating by about 2 billion cubic meters per year (IEA, 2022c).

A ninth measure is also added to this measure, concerning the correct regulation of the thermostat in households. Installing a heating thermostat at 22 °C will greatly affect the reduction of energy bills, as well as annual savings of 10 billion cubic meters for each degree of reduction (IEA, 2022a). Diversification and decarbonization of energy system flexibility sources as a last resort refers to sustainable and cost-effective ways to manage energy systems. Among other things, such management methods are associated with controlled production with low emissions, the development of long-term and efficient energy storage technology. „Domestically sourced low-carbon gases – including biomethane, low-carbon hydrogen and synthetic methane – could be an important part of the solution, but a much greater demonstration and deployment effort will be required.“ (IEA, 2022b)
Based on the above, it is clear that the EU’s independence from Russian gas mainly depends on renewable energy sources, therefore solar energy, wind on land and wind at sea, ocean energy and hydropower, biomass and biofuels. The second key decision on independence concerns both consumers themselves and their personal control over electricity management, as well as high-quality communication between EU member States and their mutual solidarity, storage of new energy sources and assistance, as well as the establishment and maintenance of strong political, economic and protective ties with third countries states. The proposed measures aimed at achieving EU independence from Russian gas by 2030 represent great ambitions in which significant efforts must be made, since the current situation in the energy markets is such that they cannot reach the desired level of renewable energy of the EU.

If we take into account the closure of nuclear reactors without simultaneous investment in the construction of new ones, the diversity of geographical regions, climate change, the consequences of increasingly frequent earthquakes and, in particular, the negligence of consumers, the above plan can be viewed with some degree of distrust. Thus, the above-mentioned plan of 10 measures represents a long-term process, and given the state of war in Ukraine and the numerous refugees from Ukraine who are in dire need of assistance requiring funds, the pandemic, which is currently in a weaker flow of fluctuations, but do not lose sight of the fact that this will not lead to its stronger intensity again, the authors of this paper believe that this process of EU independence from Russian gas in the sense of full independence is not unattainable, but, nevertheless, it will take a much longer period of time, because by the end of 2030 there are only 8 years left, and that’s not much time.. In any case, it cannot be denied that the EU’s energy security will depend on the EU’s energy independence from Russian gas. We are not sure that the EU will become completely energy independent from other countries and should not strive for this, but we believe that the EU can achieve energy security and price stability in cooperation with other countries if all EU members cooperate with each other, as well as to create an integrated energy market and sustainable energy development sector and energy security.

LEGAL BASIS

In accordance with the above and, in particular, in order to achieve the energy policy goals that the EU is striving for; in the light of the solidarity of all EU member States, the Treaty on the Functioning of the European Union (TFEU) in its article 194 provides for ensuring the functioning of the energy market and, accordingly, ensuring the EU’s energy supply, promoting energy efficiency and energy conservation, as well as the development of new and renewable energy sources, as well as the promotion of interconnectedness of energy networks, noting that each of the EU member States has the right to use and choose its own energy resources (TFEU, 2016).

Thus, taking into account everything that has been written so far, we can clearly identify the goals in the field of EU energy policy related to the diversification of European energy sources and ensuring energy security in accordance with the principle of solidarity as one of the important principles of the Energy union. In addition, the full functioning of the integrated energy market is an important goal of the EU energy policy, which will ensure the free flow of energy to EU member States through the appropriate infrastructure. The principle of efficiency, which we dare to call the key principle of the Energy union, which
will reduce dependence on energy imports, especially Russian gas, and, in addition, will ensure a sustainable, competitive and affordable energy supply to the EU member States. Decarbonizing the economy and promoting research in the field of clean energy, as well as providing advantages to innovations that should be of common interest to all EU member States, in particular, to increase competitiveness in the global energy market.

THE IMPACT OF RUSSIAN AGGRESSION ON UKRAINE REGARDING ENERGY SECURITY FOR THE REPUBLIC OF CROATIA

The President of the European Commission, Ursula von der Leyen, after the Russian invasion of Ukraine on the issue of the energy security crisis, the consequences of which were largely felt by the Republic of Croatia, said that it was necessary for the Republic of Croatia to increase its energy efficiency through the modernization of the gas pipeline (Hina, 2022). However, not everything is as black as it seems at first glance. Ivan Brodić, editor of the Energy Press portal, explained that the Republic of Croatia is not in such an unfavorable situation, moreover, in the past 2021 Croatia was referring to the excess gas through the node in Hungary, through which Croatia imports ground gas, and through the terminal in KRK, the Republic of Croatia imported almost all the necessary amount. With one of these established facts, in the foreseeable future we can assume an increase in terminals, as well as gas production in Croatia, which will be sufficient not only for export, but also for compliance with the principles of energy solidarity in accordance with the EU goals. The only question we can ask in this context is the question of price, because gas as an exchange commodity can only be sold at the exchange price (Brodić for Direktno.hr, 2022). Thus, it can be concluded that the LNG terminal in Krk in this uncertainty caused by the Russian aggression against Ukraine, but also in the future, is crucial for the energy efficiency of the Republic of Croatia. Recall that the KRK LNG for liquefied natural gas, the project of which was co-financed by the European Commission, began with its work in 2021. It should be noted that the terminal has met all expectations for a short period of operation to this day and in this energy crisis situation in Europe occupies a very important position from the point of view of energy policy as an energy facility that can further increase its capacity within two years, including through the construction of a ground terminal. Therefore, despite the fact that the warning of the President of the European Commission sounded like a “boomerang” with the best intentions, the Republic of Croatia, nevertheless, is in a good situation in this energy crisis, and it has decided to resolve the issue of energy security in accordance with the principle of energy solidarity, which is inwrought into the treaties of the European Union.

National goals of the Republic of Croatia

Increasing the consumption of renewable energy sources (RES) is one of the main goals for the Republic of Croatia. In this sense, Croatia aims to achieve by 2030 a share of 36.6% in gross direct energy consumption, 63.8% in gross direct electricity consumption, 36.6% in gross direct energy consumption for heating and cooling and 14% in direct energy consumption for transport. As for 2020 production, we can conclude that Croatia’s goals in the use and consumption of renewable energy sources are not insignificant. (See Table 2.).
Table 2.
Indicative goals of the Republic of Croatia on renewable energy shares until 2030
(Republika Hrvatska, Ministarstvo gospodarstva i održivog razvoja, 2020)

<table>
<thead>
<tr>
<th>Share of renewable energy sources in %</th>
<th>Forecasts for 2020</th>
<th>Goals for 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross immediate energy consumption</td>
<td>29,6</td>
<td>36,6</td>
</tr>
<tr>
<td>Gross immediate electricity consumption</td>
<td>47,0</td>
<td>63,8</td>
</tr>
<tr>
<td>Gross immediate energy consumption for heating and cooling</td>
<td>33,3</td>
<td>36,6</td>
</tr>
<tr>
<td>Immediate energy consumption in transport</td>
<td>10,0</td>
<td>14,0</td>
</tr>
</tbody>
</table>

The achievement of the above goals and for gross immediate energy consumption will strive to be achieved with the help of technologies for obtaining energy from renewable energy sources, as well as with the help of solar energy, solid biomass, gaseous and liquid biofuels, geothermal energy, RES heat and electric RES. The contribution of renewable energy technologies to the electric power industry is associated with the investment and construction of new hydroelectric power plants, wind farms, solar photovoltaic power plants, geothermal power plants and thermal installations for solid and gaseous biomass. Solar energy, solid biomass, geothermal energy and RES heat will be used for immediate energy consumption for heating and cooling, while advanced biofuels and electricity from RES are a technology that will be gradually introduced for energy consumption in transport. Croatia’s goals predict that by 2030 at least 50% of the installed capacity for electricity generation should be at cogeneration power plants. Currently, the total capacity of hydroelectric power plants in Croatia is 2,200 MW, and by the end of 2030 it is expected to build two or three large hydroelectric power plants and several smaller hydroelectric power plants on watercourses and water supply systems, as well as the construction of one pumped storage power plant (Republika Hrvatska, Ministarstvo gospodarstva i održivog razvoja, 2020). If we compare the 10-point plan for the independence of the EU from Russian gas, although adopted in December 2020, the set goals of the Republic of Croatia correspond to the same; the energy transition of the Republic of Croatia and its transition to clean energy indicate that the Republic of Croatia as an EU member state is ready for new challenges, ambitions and investments aimed at using renewable energy sources and reducing the need for gas consumption, in particular, dependence on Russian gas.

**Energy security**

Ensuring energy security for the Republic of Croatia refers to the constant, safe and high-quality supply of all energy carriers, as well as to the launch of the planned supply of all energy resources and forms of energy. From the point of view of gas supply safety, the operational safety of gas supply is inevitable. Croatia currently supplies gas via routes from neighboring Slovenia and Hungary (Republika Hrvatska, Ministarstvo gospodarstva i održivog razvoja, 2020). However, taking into account the Russian aggression against Ukraine, a very important point for the Republic of Croatia will be to ensure the security of natural gas supplies from other countries as well.
of Croatia is to increase the gas storage capacity and precisely by ensuring the volume of gas for the upcoming winter. As for ensuring energy storage in the energy system (EES), the construction of pumping power plants will provide greater flexibility of the system and greater integration of variable renewable energy sources, primarily solar and wind. In addition, an increase in the share of renewable energy leads to a decrease in dependence on energy imports from third countries (Republika Hrvatska, Ministarstvo gospodarstva i održivog razvoja, 2020).

According to the above, the main framework for regulating the security of natural gas supplies in the Republic of Croatia is provided for by Regulation (EU) No. 2017/1938 of the European Parliament and of the European Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010 (Text with EEA relevance) (Official Journal of the European Union, 2017). This regulation is aimed at ensuring that all necessary measures are taken to protect uninterrupted gas supply and, in particular, supplies to protected consumers in the event of severe climatic conditions or interruptions in gas supply. Regulation 2017/1938 entered into force on November 1, 2017, and the purpose of the regulation is to increase solidarity and trust between member States and to establish the measures necessary to achieve these goals through the most cost-effective measures and in such a way as not to disrupt gas markets.

The main improvements compared to the previous Regulation 994/2010 are: the introduction of a solidarity mechanism, according to which, in the event of a serious crisis, neighboring member States will provide assistance in ensuring the supply of households and basic public services; strengthening regional cooperation through regional risk groups, as well as a joint assessment of security risks and coordinated joint preventive and crisis measures and increasing transparency by introducing an obligation to inform the competent authority of contracts between the supplier and the buyer, which account for 28% or more of annual gas consumption on the national market (Republika Hrvatska, Ministarstvo gospodarstva i održivog razvoja, 2020).

Summa summarum, if we consider the energy transition, the total energy consumption in the period up to 2050 will decrease by about 16% compared to previous years, while the own supply in the period up to 2030 will increase to 55.2% with a decrease to 51.7% in 2050. Thus, this increase that its own supply for the Republic of Croatia comes from the sources already mentioned above, that is from renewable energy sources, their systems flexibility, as well as the development and management of transmission networks and systems (Republika Hrvatska, Ministarstvo gospodarstva i održivog razvoja, 2020).

CONCLUSIONS

Energy is the most important branch of the economy that determines the development of the socio-economic policy of each country. Investment projects in power plants, oil and gas terminals, renewable energy sources and their storage, as well as their profitability cannot be fully guaranteed. The reason for this is numerous factors, such as population growth, climatic conditions, the development of science and new technologies, as well as geographical location and population level. Regardless of the outcome of the war in Ukraine, it can be concluded that Russia’s invasion of Ukraine dealt a serious crisis blow to the global

---

3 The increase in own supply concerns already existing pumped storage power plants, existing and planned reversible hydroelectric power plants, battery systems of consumption level, gas power plants, balanced market organizations.
energy market, which ultimately led to an increase in energy prices and the urgent need to harmonize the ratio of demand and consumption.

It is clear that the establishment of energy security is the goal that Europe is striving for, and in this regard, reducing dependence on Russian gas, which was demonstrated in the EU plan and its ten measures, the first, most important of which concerns „no new gas supply contracts with Russia.“ (See Table 1, p. 8). If we consider the Republic of Croatia in this context, the whole complexity of creating energy security and independence from Russian gas will depend precisely on the principle of solidarity and efficiency between the EU member states. Of course, it is necessary to insist on ambitions for renewable energy sources. Although their profitability requires a longer period of time, they, nevertheless, with interstate cooperation, can eventually lead to independence from Russian gas and, consequently, to stable energy security which will also affect more favorable energy prices.

REFERENCES


World Economic Forum. (2022). This is how the war in Ukraine could affect Europe’s clean energy transition. Retrieved from: https://www.weforum.org/agenda/2022/04/ukraine-war-europe-renewable-energy-transition/

Brodić for Direktno: Gas delivery will be restored through the first profile of the North Stream already this weekend. Croatia? We are in a good situation... (2022). Retrieved from: https://direktno.hr/direkt/brodic-za-direktno-isporuka-plina-ce-se-obnoviti-kroz-prvi-profil-sjevernog-toka-vec-za-vikend-hrvatska-u-dobroj-smo-situaciji-285848/

European Commission, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions REPowerEU: Joint European Action for more affordable, secure and sustainable energy.


Republika Hrvatska, Ministarstvo gospodarstva i održivog razvoja. (2020). Integrated national energy and climate plan for the Republic of Croatia, for the period from 2021 to 2030., p.2-246

https://eur-lex.europa.eu/resource.html?uri=cellar:9e8d52e1-2c70-11e6-b497-01aa75ed71a1.0006.01/DOC_3&format=PDF
