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Geopolitical Models before the Decision on the EU Taxonomy

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Abstract

The French Presidency (January-June, 2022) inherits some unresolved and contentious issues within the EU. Among them is energy transition. The paper examines the EU's ambitions to become a leader in climate neutrality by analysing if the necessary natural resources could be provided in scale to meet end consumption without any economic shock. What is further analysed is the scientific opinion on why there is a political dispute between the leading economies in the EU over the so-called taxonomy – the classification of energy sources as climate neutral. As a leader in nuclear energy, the role of France during its presidency of the EU is to persuade the European Commission to include nuclear energy in the taxonomy. The lack of a clear-cut solution to the issue is sending mixed signals to investors and undermining confidence in the European Green Deal. As the EU's most powerful nuclear lobbyist, France will also have to protect the interests of CEE countries where nuclear plants date back to the Soviet era. Outlined are the arguments on the key importance of nuclear power plant countries for energy security. In parallel with nuclear energy, there are discussions on recognizing natural gas as 'green'. Given that Russia is the EU's main supplier of raw materials, the question is whether its recognition will reduce investors' risk and Europe's dependence on Russian influence amid geopolitical tensions between Russia and NATO of which the EU is a major member. Being a low-emission energy source, natural gas is key to the successful green transition of member states on the path to climate neutrality within the 2050 deadline. Two leading hypotheses emerge: only one of the sources to be included in the taxonomy. Nuclear energy would provide EU countries more autonomy in planning and investing in the energy transition. Natural gas

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[2] The paper was completed before the beginning of the Russian-Ukrainian war in February 2022. Given the dynamic developments that have been taking place since then, the author chose not to focus specifically on the implications for the Green deal arising from the disruption of gas supplies from Russia to Europe that have been taking place in the summer of 2022.

as an imported raw material, subject to market mechanisms and influenced by geopolitics, would jeopardize the energy transition and the security of the European energy system.

Keywords: European taxonomy, nuclear energy, carbon emissions, European Green Deal, energy policy, gas, energy supplies
JEL: 052, Q4, Q3

Introduction

Global warming is a climate change phenomenon on Earth. Rising average temperatures in the atmosphere and ocean levels have detrimental effects on natural processes and human health. These changes have economic dimensions. More and more investors regard climate change as a risk factor.

The UN structure recognizes climate change as a threat to the sustainable development of the Earth. The United Nations Framework Convention on Climate Change (UNFCCC) is the first international treaty committed to climate change. Ratified in 1994 by 197 countries to date, the convention recognizes the threat of global warming due to increased greenhouse gas emissions from human activities. The subsequent international agreements of Kyoto (1997), Paris (2015) and Glasgow (2021) have taken and are about to take specific measures to reduce harmful emissions in the atmosphere to levels that limit global warming. These measures target six main greenhouse gases. Carbon dioxide (CO2) has one of largest share of 39% in the atmosphere (IPCC, 2007). Reducing it in the atmosphere will reduce the greenhouse effect. Being among the UNFCCC signatories, the EU has developed a common strategy for member states. The EU is a pioneer in the fight against climate change and takes the problem more seriously than other countries. The European Green Pact, launched in 2020, is the EU's latest strategy to tackle climate change. The aim is to stimulate the economies of the member states to switch to renewable energy sources (RES) to keep the global temperature rising to no more than 2 degrees.

The energy and transport sectors are the leading emitters of carbon emissions both globally and in the EU. Energy use releases 75% of CO2 into the atmosphere of all greenhouse gases. However, energy is a branch of primary importance for the functioning of the economy. The development of spheres such as industry, agriculture and the organization of public life depends on the state of energy. Decarbonisation, or the process of reducing carbon emissions, is key to achieving climate goals. In this respect, the EU has set itself the goal of developing energy with lower or zero CO2 emissions. In order to achieve the set climate neutrality by 2050, the EC has proposed an EU taxonomy project. Its purpose is to guide investors to low-carbon activities. Based on scientific outlooks and technological breakthroughs, the EC believes that private investment should play a leading role in the decarbonisation process. The transition period is the period in which economies must switch to low-carbon sources. By the 2050 deadline, fossil fuels must be replaced by completely alternative emission-free sources. The transition period is

crucial for achieving climate neutrality in time. The choice of energy sources is important for the smooth functioning of energy, respectively the economy. In this regard, the EU must determine which energy sources should be classified as 'green', i.e. with low and zero carbon emissions. The classification of sources is known as the 'EU taxonomy'. Due to the differences in energy resources available to the EU countries and the specifics of energy production, a debate has arisen between some countries regarding the pros and cons of including nuclear energy and natural gas among the low-emission energy sources. The EU taxonomy will put an end to the dispute, which is still unresolved. The classification of sources is an important strategic step for the correct guidance of investors to energy sources to achieve the goals of the European Green Pact (EU Taxonomy, 2022).

Conversely, with continued investment in hydrocarbons, investors should not have a return on their investment. Furthermore, energy transformation requires a huge financial resource, which must be generated in less time than the return on investment. The amount is initially estimated at € 1 trillion for the period 2021-2030. Half of this amount will be provided by the EU budget. The rest will be attracted as private investments according to the EC3. Therefore, the European taxonomy will be a benchmark for investments in green projects, thus ensuring transparent spending of public resources.

The adaptation of the European economy to fully ecological energy depends on the pace of green energy sources' construction and integration in the national energy systems. Gradually, conventional sources should decrease in share, but only when the necessary amount of energy is provided for the needs of the economy. Some member states made considerable progress in implementing green energy, while others are lagging behind. It only makes sense that nuclear power countries rely on it as a commodity throughout the green transition. One of these is France. Globally, the country is only second to the USA in nominal nuclear power of operational plants. Countries of no or insignificant nuclear capacity in their electricity generating systems have no interest in spending EU public financial resources on nuclear projects. There is a consensus among scientists that nuclear energy and natural gas are low-emission sources. After long and time-consuming debates, the EC recognized them as such (European Commission, 2022), but there is no consensus in the EP. The EP decision will be final and will start the decarbonisation process.

Nuclear energy is an energy mix component for 13 of the 27 EU member states, including Bulgaria (Figure 1). Here, it is not harmful emissions that are criticized but rather the safety of this source due to accidents at nuclear power plants such as Chernobyl (1986) and Fukushima (2011). An EP decision excluding it from the taxonomy will harm both France and Bulgaria and the other 11 countries, where nuclear energy has a significant share of the energy mix and guarantees the stability of national energy systems. This also explains the lobbying on the part of France for the inclusion of nuclear energy in the European taxonomy.

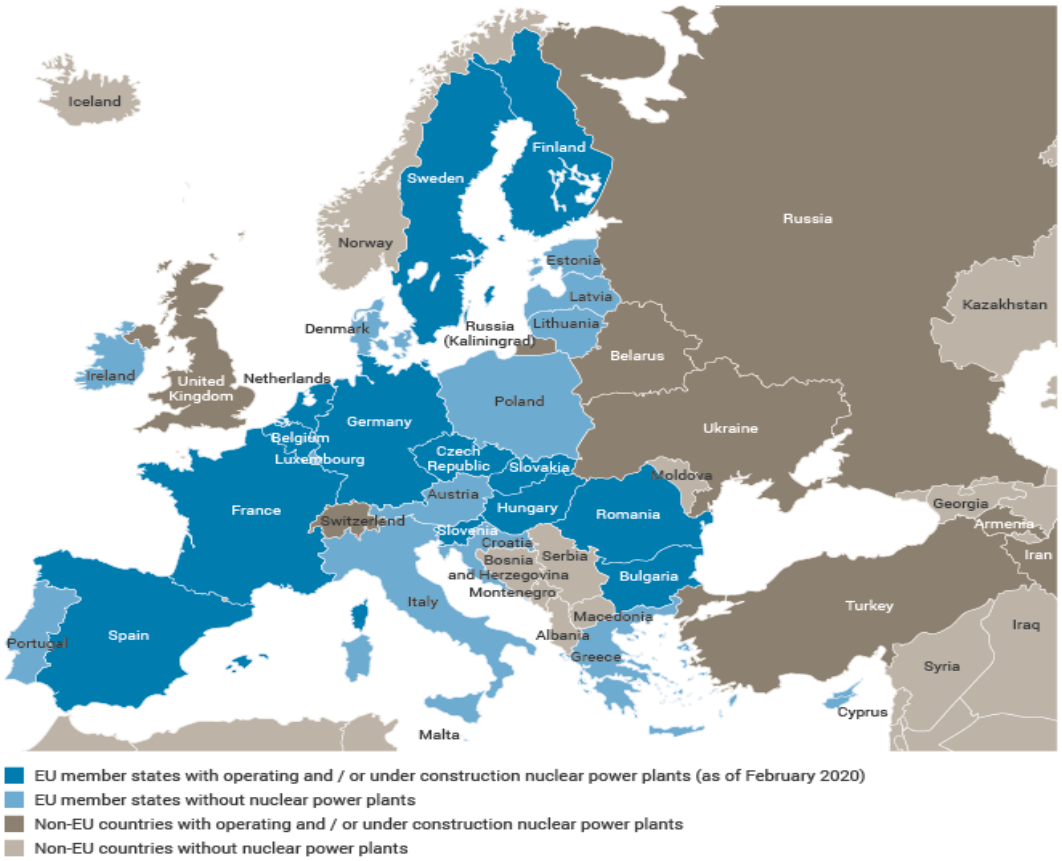

Figure 1. EU member states with nuclear power plants
Source: World Nuclear Association (2022/a)

Half of the EU's 107 nuclear power plants are in France, and 70% of the French national energy mix is from nuclear energy. The 'pros' arguments are for the stability of electricity systems, while the threats to human health and the massive financial consequences from a major nuclear accident are the main counter-arguments. France's 'pros' voice in the EU is among the strongest and the protection of nuclear energy in the EU taxonomy is a policy that also meets the interests of other countries with nuclear power plants in the EU.

Literature review

There are numerous publications on low CO2 emissions and the economic benefits of nuclear energy. Criticism has focused on the safety of nuclear power plants and the environmental damage caused by nuclear waste (Brook et al., 2014). Nuclear energy is always competitive except when a country has direct access to fossil fuels. Besides coal, Europe is otherwise poor in fossil fuels such as oil and gas. The disadvantage of nuclear power is the high capital costs for the construction of new power plants and the higher

maintenance costs compared to RES. In contrast to RES, the energy produced by the NPP has a higher intensity of much more voluminous and climate unlimited production.

Though comparable to nuclear energy, green energy also requires funds in its post-operational period. Like the costs nuclear waste management, renewables require recycling costs. For solar panels, the average cost will reach $ 20-30 per panel in 2035. Hence, the recycling responsibility of renewable energy producers will reduce their profit margin. In the absence of regulations stipulating recycling as their obligation, there is a risk of huge quantities of unprocessed heavy metals ending up in landfills. This conclusion was reached in a study by Harvard Business Review (Atasu et al., 2021). In this respect, the damage from the post-production cycle of RES may be equivalent to the removal and disposal of spent nuclear fuel from NPPs. In both cases there is a risk of soil and groundwater contamination. The environmental damage of both types of energy is similar.

In the case of natural gas, the main damage is in the emissions of CO2. Although low, they are 3 times higher than those released in nuclear energy. Transit infrastructure such as pipelines does less damage to the environment. As with the NPP, there is a risk of accidents that could lead to local environmental damage.

Influence of climate change policies on energy systems modelling

Energy systems modelling aims at ensuring their security and determining the costs for achieving security. It is a common practice to add climate change policies to the analysis due to the need to reduce greenhouse gases.

Studies on the implementation of carbon neutrality strategies are based on two main methodologies. Interpreting the results is a challenge since they can be misleading. This is the conclusion that a group of scientists from several European universities arrived at (Hainsch et al., 2021). According to their report, looking at raw numbers as a model is the most common mistake found in institutional decarbonisation plans. Therefore it is more accurate to develop scenarios using models of energy systems. The scenarios, although less accurate due to the proposed variations, take into account all the permissible errors that may occur in the interpretation of the results (Strachan et al., 2016). The leading conclusion is the centralization of carbon neutrality policies (Ibid.).

Given the differences in the economies of member states and the diverse political palette, centralization could serve as a guarantor in the implementation of energy policies, similar to the first and second energy pillars of the EU. From a technical point of view, the results of the analyses show that electrification plays a decisive role in the decarbonisation processes. This conclusion is necessitated by the reforms in the energy and transport sectors, which rely on fleet electrification and a growing share of green energy. Electricity consumption will increase in the transport sector due to the decommissioning of carbon fuels. Other alternative energy sources in transport, such as green hydrogen, require huge amounts of energy in their production[3]. In all the studied scenarios, the leading one points

[3] Hydrogen is a secondary raw material produced through electrolysis powered by energy.

to achieving carbon neutrality through the development and mass implementation of new technologies. This process will occur in the years after 2030 and 2040 (Strachan et al., 2016: Table 1, Table 2). Until then, economies must gradually steer their energy production from high-emission to low-emission sources. This period will provide a smoother transition to avoid disruptions in energy systems, and thus negative economic consequences will be avoided. Therefore, the EC defines it as a 'transition' period. Turbulence in energy systems could derive from accelerated production technologies development in the green sector. Their integration in electricity grids requires significant investments and regulatory support (Radulov, 2019).

Contribution of nuclear energy and natural gas to the EU taxonomy

Nuclear energy is also relevant to the EU Emissions Trading Scheme (EU ETS). Zero-emission credits for nuclear energy can ensure the economic viability of nuclear power plants. In this respect, they are competitive to subsidized renewable energy sources and cheap gas-fired power plants, according to an analysis by Brattle Group (World Nuclear Association, 2022/b). When identical indicators of advantages and disadvantages are compared, the final price of electricity produced, and the contribution to the energy system is assumed, the following can be summarized (Table 1).

Table 1. Major advantages and disadvantages of electric power as per its source

source	advantages	disadvantages
Nuclear power	- lower CO2 emissions - cheaper energy than fossil fuels - low dependence on imports - developing technologies in the field - energy system, the following can be summarized	- capital intense new facilities - government warranties for investors - high cost of energy produced from new plants - nuclear waste management - premises for accidents affecting larger areas
Natural gas	- the lowest CO2 emissions compared to other fossil fuels - relatively cheap energy at low gas prices	- import dependency - high cost of energy produced at soaring natural gas prices - premises for local accidents (danger of explosions) with impact on a small area, but with a risk of interruption of transit

Source: created by the author

When comparing nuclear energy with natural gas as an energy source, the advantages tip the balance to nuclear energy. Natural gas is generally an imported commodity, while nuclear energy is locally produced. Problems with gas supplies have arisen more than once over the years due to geopolitical disputes between the EU and Russia as a supplier. Almost 40% of the EU's total natural gas consumption is imported from Russia. Therefore, its inclusion in the taxonomy will play an important role in the energy transition,

but if only there is continuity in the supply. Any disruption could lead to delays in green transition policies. There is also the risk of supply problems trickling down to the general market, whereby natural gas prices sky-rocket and gas is turned into a very expensive and unprofitable item in green projects. An appropriate example is the situation with rising gas prices that started in the summer of 2021 (Chart 1).

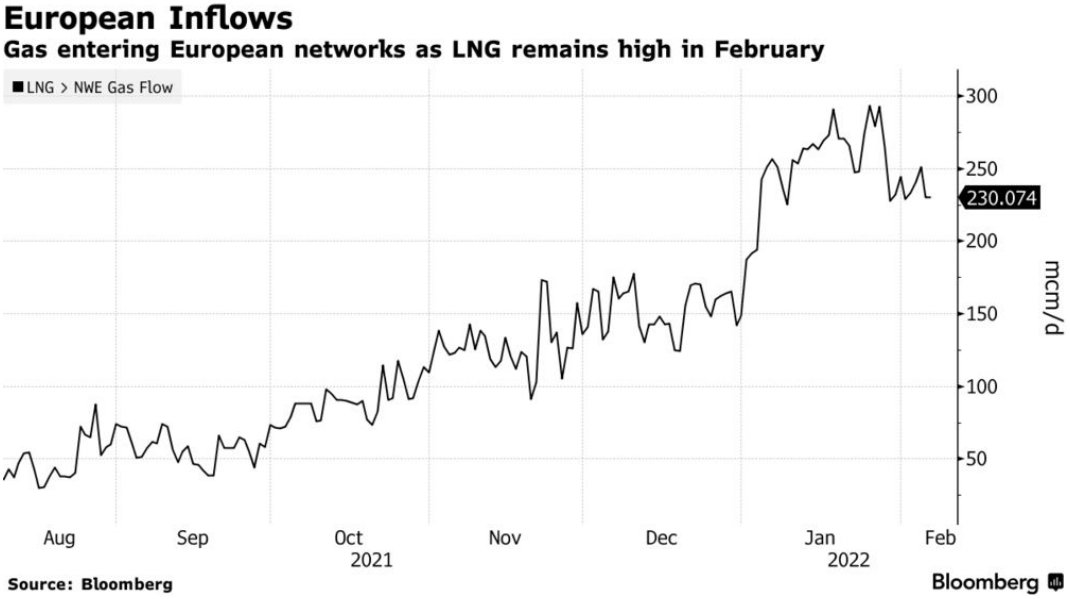

Chart 1. Natural gas prices in Europe by month
Source: Bloomberg LP (2022)

The concerns of eight EU countries are that the green transition could create new energy dependencies on Russian gas imports (Buchholz, 2022). The reduced supplies from Russia to Europe in the autumn and winter of 2021 led to even higher natural gas prices on European exchanges after the largest net importers of Russian gas opened their state reserves to fill the gaps.

Geopolitical risks to the EU taxonomy

The existing geopolitical risks to the inclusion of natural gas in the EU taxonomy are determined mainly by Russia's energy-export policy. In the context of the Russian invasion of eastern Ukraine, energy supplies can be used for political purposes. The sanctions imposed on Russia for its military actions in Ukraine precipitated the freezing of the EU's largest gas pipeline project, Nord Stream 2. The facility was meant to supply gas to Europe, bypassing the existing gas pipeline through Ukraine. This was prompted by the risk of interruption of supplies by Ukraine implemented twice in 2006 and 2009 when, due to a trade dispute with Russia, Ukraine discontinued the transit of Russian gas to the EU. Dependence on

external supplies of raw materials puts at risk both energy security and the implementation of the European Green Pact. Russia continues to supply about 40% of EU gas consumption. In the search for effective solutions, in the event of the worst-case scenario of discontinued supplies from Russia due to a geopolitical conflict with Ukraine, three scenarios are emerging (Zachmann et al., 2022). In all three of them, the Bruegel Institute of Economics identifies adjustments from gas demand in Europe as the most effective solution, instead of simply replacing Russian gas with imports from other countries. Alternative deliveries cannot compensate for the volumes supplied by Russia. New import transactions require a longer negotiation period. And, to state the obvious, the lack of energy infrastructure with third parties hinders gas transit. Turning to another market for gas imports is risky for the EU's energy security in the short term.

The three scenarios described by the Bruegel Institute detail the following variants (see Zachmann et al., 2022):

A/ Continued gas supplies at current levels. This implies high levels of liquefied natural gas imports in line with the average volume of the period 2015-2020. Even with this option, given the depleted reserves of member states' gas storage facilities, the lowest storage level EU-wide will reach 320 terawatt hours (TWh) in April 2022.

B/ Suspension of Russian supplies in February – European gas storage facilities will reach storage levels of 140 TWh in April.

C/ Reduction or partial interruption of supplies from Russia in combination with colder than usual weather in February – gas storage facilities would run empty by the end of March 2022 (Figure 2).

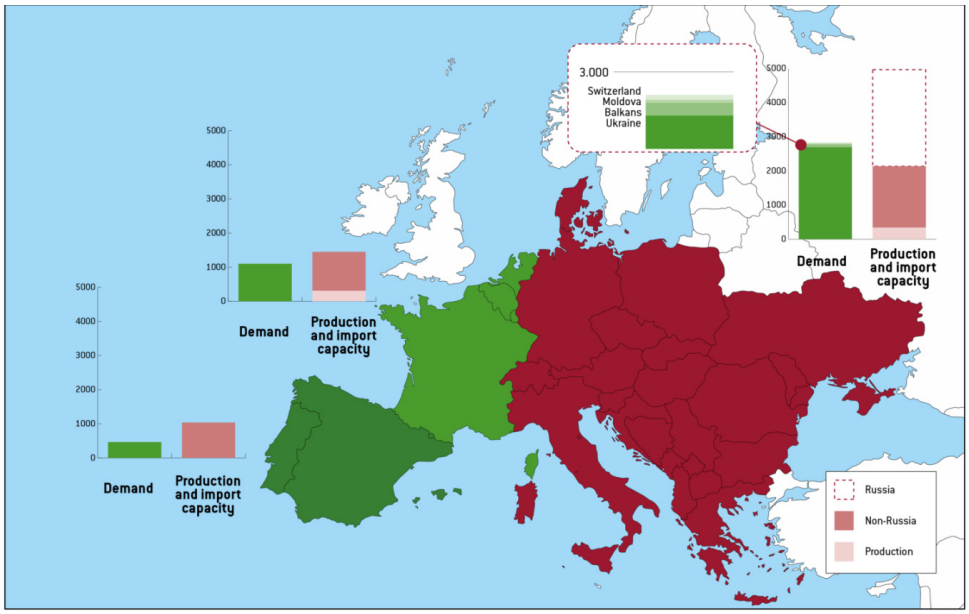

Figure 2. Countries at risk in case of gas supply disruption from Russia
Source: Zachmann et al., 2022: Figure 2

In the early 2022, the Russian invasion in Ukraine radically changed the situation in the EU gas markets. Natural gas was turned into a pressure 'weapon'. The initial EU sanctions impacted the gas-flow infrastructure. Nord Stream 2, the longest undersea pipeline, came under sanctions and did not become operational on schedule. Russia's response was to limit gas supplies to Europe. The situation revealed the EU's close dependency and vulnerability to Russian suppliers. With no available alternative suppliers to fully take over the imports from Russia, the rational solution would have been for the European Parliament to sever natural gas and nuclear power in EU's taxonomy. Thus, energy flows planning removes one of the grave risks to their functioning in rations. The preservation of natural gas as a transition energy source contradicts the European policy towards decreasing dependency on Russian fuels. Energy planning as an element of energy security was also violated. The disruption of natural gas flows from Russia to Europe shed light on some vulnerability of European markets while long-term planning was replaced by an action plan in response to the current situation. The war in Ukraine showcased the argument that a single major supplier of natural gas cannot guarantee the security of the energy system in Europe. The geopolitical risk to natural gas supplies seems to have its gravest impact on the green transition in the EU.

Implications

In case gas supplies from Russia are cut off for more than a year, the European economy will face a huge challenge. Replacement of the main supplier is possible but requires a change in regulatory frameworks at the national and European level and readjustment of technical parameters of European gas storage facilities. An analysis by the Bruegel Institute (see 14) shows that there is spare capacity for natural gas imports into the EU. However, its utilization will translate to higher gas prices mainly due to the more expensive transit sources such as LNG, the construction of LNG terminals and additional gas connections between Member States.

Central and Eastern European countries are most vulnerable to gas-supply problems. Paradoxically, most of the governments of the countries in the region, such as the Czech Republic, Poland, Slovakia, Finland, Hungary and Croatia, are in favour of including natural gas and nuclear energy in the European taxonomy. At the same time, Germany's position is against nuclear energy as part of the taxonomy and support natural gas as a transitional fuel. Both sources are considered in a package by the EC. The conclusion from the considered scenarios is that the risks to energy sovereignty are much higher when relying on natural gas and insignificant when relying on nuclear energy as a resource. Being locally produced and less dependent on external supplies, nuclear energy is a more reliable source of energy security. So far, the issue of separating nuclear energy from natural gas in the EU taxonomy has not been raised at the political level. From an environmental point of view, both types of energy should be considered only as transitional, while the gradual expansion of RES leads to significant decrease of fossil energy sources.

In the process of making the final decision on the EU's taxonomy, France has announced plans to build 124 new nuclear reactors, six of them by 2050, when is the deadline for achieving carbon neutrality. The announcement of French President Emmanuel Macron is logical against the background of the energy crisis in the autumn-winter season of 2021-2022. The country has a tradition in nuclear energy and has basic facilities and technological capabilities for the construction of nuclear power plants. They provide France a well-established internal energy security that is not dependent on external supplies such as natural gas. Only a small portion of the uranium for the nuclear reactors is imported from Russia (Le Comité des Experts, 2017), and almost half from the former French colonies in Africa. In terms of gas supplies, both France and Germany show similar data on the share of natural gas imports from Russia at 25% and 32%, respectively. The share of Russian gas imports in Germany is expected to increase after the launch of the Nord Stream 2 pipeline. The pipeline was included in the EU sanctions against Russia because of the war in Ukraine and is not in operation.

In terms of CO2 emissions generated by the two energy sources, nuclear reactors, for example, emit three times less carbon dioxide than gas-fired power plants. According to the latest data (van Leeuwen, 2017), the nuclear reactor production of 1 KWh releases approximately 117 g of CO2 into the atmosphere, while the production of the same amount of energy from a gas plant releases almost 442 g of CO2.

Given the current scientific evidence, despite the lack of comprehensive consensus, arguments weigh in favour of the use of nuclear energy and natural gas as transitional energy sources due to their low emission intensity. The consideration of the two sources in one category can be explained by the specifics of the energy systems of each EU member state. It would be relevant for each of the larger economies having the strongest voice in the EU to make its own choice of reliable sources to ensure their energy security. The main attributes of energy security are:

- continuity of energy production;
- continuity of supply of energy commodities to ensure production;
- predictability of commodities' prices (increase in supply prices influences the final cost of production per unit of energy trickling down the into other sectors).

Due to the impact of global factors on supply chains and the pricing of raw materials, including energy commodities, the energy sector is becoming increasingly important in the public space. Some 65% of the European citizens believe that the EU should have a more active policy than ever in this area (Eurobarometer, 2018). Public interest in energy policies is also reflected in political campaigns. The French President Emmanuel Macron's statement on a renaissance of the country's nuclear energy was made two months before the presidential vote in France, won by Macron in a narrow victory. Energy policy was also a point of discussion in the German parliamentary elections in September 2021. The Green Party, which opposes the development of nuclear power plants in the EU, is a coalition

partner in Chancellor Olaf Scholz's government. They also oppose the Nord Stream 2 gas pipeline to supply Russian gas to Germany.

One of the major obstacles to the successful implementation of the European Green Pact is electrification in several economic sectors. This will necessitate an increase in green energy. Despite the growing share of renewables in the EU, demand for green energy will outpace supply. In the coming decades, Europe may resort to importing green electricity from North Africa and the Middle East (Leonard et al., 2021). In this case, the incorporation of efficiently operating independent energy sources, such as nuclear power plants and gas pipelines with uninterrupted supply, in the EU ensures the security of the electricity system better than energy imports from countries without adequate transit infrastructure at present.

The Russian-Ukrainian conflict jeopardized Russia's gas supplies to Europe and raised fossil fuel prices in the autumn and winter of 2021/2022. This supported France's arguments in defending the green deal. In parallel with the ongoing disagreements on EU taxonomy, it is time for France to insist that taxonomy definitions should be revised.

Conclusion

The incorporation of natural gas and nuclear energy in the EU taxonomy is a rational solution for the transitional period of energy transformation. Their presence will guarantee the continuity of electricity production while the share of renewable energy sources increases, thus providing energy security. The contribution of gas power plants and gas consumption to the carbon footprint is three times higher compared to the production of electricity from NPPs (Simon and Taylor, 2022). In some EU countries where green targets are met ahead of schedule, nuclear and gas power plants can serve as a backup for the energy system. From a market point of view, both types of energy resources will give clarity to investors on the proper targeting and allocation of financial resources during the green transition.

The geopolitical risk is derived manly from the incorporation of natural gas in the European taxonomy. Being a predominantly imported raw material, there is no supply security. This leads to greater risk for investors and the lack of collateral for basic facilities that rely on natural gas in energy production. In a situation of conflict between the EU and Russia, there is a risk of rising raw material prices to unprofitable levels, mainly due to the cut-off supply and sky-rocketing demand. The conclusion is that natural gas is not a sustainable energy commodity when it comes to imports from Russia, which, at this stage, provides more than 1/3 of the supply of natural gas in Europe. On the other hand, nuclear power is a technologically established tradition among Western European countries. Their investments and know-how could reduce the dependence on Russia of CEE countries where nuclear power plants were built in the Soviet era. Seasonal price fluctuations are rare compared to natural gas, which is traditionally more expensive in winter due to higher

consumption and the relevant growing demand. The lower dependence on imports is an advantage of nuclear energy.

The price pressure on the gas market in the autumn of 2021 jeopardizes the successful implementation of the transition period. At the same time, high prices may stimulate faster reorientation of economies towards more sustainable energy sources. To this end, the EU should reconsider the incorporation of natural gas in the European taxonomy. Although the EC is considering it in tandem with nuclear energy, the texts can be corrected with some provisions before the final entry into force of the taxonomy on January 1, 2023. Even if natural gas remains included in the list of green investments, investors will automatically exclude it due to the financial negatives it brings. The presence of nuclear energy in the taxonomy is sufficient to attract subsidies and investment during the transition period and to reduce potential electricity deficits. Despite the division of MEPs on nuclear energy, its supporters have the upper hand. In compliance with the EP's decision-making process, at least 353 votes will be needed, representing 20% of EU countries or 65% of its population. The majority of them support nuclear energy. Even if the European Parliament excluded by decision one or both of these energy sources from the taxonomy, the Council of the European Union can appeal such decision at the EU Court.

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