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# ANALYSIS

## EUROPEAN ENERGY CRISIS: BETWEEN DECARBONIZATION AND GROWING ENERGY DEMAND

### Introduction

It is worth noting that in recent years, fundamental changes are happening in the European energy sector. The European Union aims to transform itself into a low-carbon economy. The European Union's 27 member states plan to drastically reduce their CO<sub>2</sub> emissions, primarily by replacing fossil fuels with clean energy. The European power generation mix is becoming increasingly low carbon with a growing share of renewables. Although energy transition is bringing unprecedented challenges, the deep decarbonization of electricity, transport, industry, and buildings is already an environmental imperative for the European Union.

The European electricity sector is on the verge of structural change, as renewables are gradually replacing coal in electricity production. While other regions including Asia, Latin America, and Africa continue to increase dependence on coal for power generation, some EU member states have switched to renewable sources of energy. We expect renewable electricity to decarbonize a large share of the EU energy consumption by 2050, but not all of it. In the meantime, most European countries will probably keep using fossil fuels as their primary sources of energy.

Given a significant dependence on the import of energy, the need for a common energy policy became an increasingly significant priority for the European Union. There are, however, huge discrepancies between EU member states. While some nations such as Germany, Czech Republic, Poland and Bulgaria still produce coal-based electricity, France relies on nuclear energy, and in Netherland, natural gas remains the most important energy source. In other words, each state is sovereign over its choice of energy mix and supply connections.

European Union's policy agenda under the European Green Deal aims at decreasing greenhouse gas emissions with an ambitious target of at least 55 percent reduction by 2030, which is why the EU members are expected to replace natural gas, coal, and oil with carbon-free energy sources.

In the meantime, during the energy transition period, member states cannot rely on only a few energy

sources; on the contrary, they have to diversify energy supplies and sources. Therefore, the share of natural gas in the EU's energy mix in the near future will be higher owing to its Green Deal goals. Natural gas can be considered a cleaner "transition fuel" because it leads to the emission of less CO<sub>2</sub> than coal.

Another important fact is that natural gas supports renewable energy sources because it can quickly compensate for dips in solar or wind power supply and rapidly respond to sudden increases in demand. In addition, it is a good partner for hydropower, providing a secure electricity supply when there is insufficient rainfall.

European countries support various natural gas projects to ensure energy security, and despite critics, European countries remain involved in the construction of the Nord Stream 2 natural gas pipeline that will link Russia and Germany via the Baltic Sea, and Moscow has already started providing gas to Europe via TurkStream pipeline – an offshore gas pipeline stretching from Russia to Turkey across the Black Sea.

### **The EU energy Mix**

In 2019, the European Union produced around 39 percent of its own energy, while 61 percent was imported. That year, the energy mix in the EU, meaning the range of energy sources available, was mainly made up by five different sources: Petroleum products, including crude oil, (36 percent), natural gas (22 percent), renewable energy (15 percent), nuclear energy and solid fossil fuels (both 13 percent).<sup>1</sup> In 2020, however, renewables in Europe generated more electricity than fossil fuels. According to reports, fossil fuel-powered energy fell to 37 percent whereas renewable sources rose to 38 percent in 2020.<sup>2</sup> At the same time, overall energy demand significantly decreased all across Europe as a consequence of the Covid-19 pandemic, the subsequent preventive measures and economic recession.

#### *Renewables*

The European Union is expected to increase the amount of renewable energy it uses and cut energy consumption by 2030 by 40 percent. One of the goals of the EU countries is to collectively cut energy consumption by nine percent by 2030. To hit that goal, member states will be required to put in place measures to cut their final energy consumption by 1.5 percent each year from 2024 to 2030. At the same time, the EU plans to increase the share of renewables to 32 percent of its overall energy mix by 2030, up from just under 20 percent currently. But that target will have to be raised to 38-40 percent in order to meet the bloc's updated climate goals for 2030. At this point, however, it remains highly uncertain if the EU will manage to achieve such ambitious goals. It is worth remembering that, according to the 2010 EU Parliament directive, "by 31 December 2020, all new buildings must be nearly zero-energy buildings".<sup>3</sup> Given that such a plan was not fully implemented to this day, it remains to be seen if the EU authorities will manage to achieve their new energy goals.

In 2008, the EU aimed to reach 20 percent renewable energy target by 2020<sup>4</sup>. Between 2005 and 2019, the renewable energy share almost doubled. In 2019, 14 Member States (Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Greece, Italy, Latvia, Lithuania, Romania, Slovakia and Sweden) had reportedly reached their 2020 targets. On the other hand, thirteen member states still needed to increase

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<sup>1</sup> <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-2a.html>

<sup>2</sup> <https://www.forbes.com/sites/davidrvetter/2021/01/25/its-official-in-2020-renewable-energy-beat-fossil-fuels-across-europe/?sh=6ce7e51660e8>

<sup>3</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583922805643&uri=CELEX:02010L0031-20181224>

<sup>4</sup> <https://www.wind-energy-the-facts.org/wind-in-the-eus-energy-mix.html>

their share of renewable energy between 2019 and 2020 to reach their targets. Still, Goldman Sachs analysts expect renewable sources to make up over 55 percent of Europe's power generation mix by 2030.<sup>5</sup>

Besides "traditional" renewable sources such as wind and sun, the European Union is placing a major bet on hydrogen as a replacement for fossil fuels. Although hydrogen emits no CO<sub>2</sub>, it still represents a modest fraction of the EU energy mix. Almost all EU member states have included plans for clean hydrogen in their National Energy and Climate Plans. The priority for the EU is to develop renewable hydrogen, produced using mainly wind and solar energy.<sup>6</sup>

Hydrogen is produced through a process of electrolysis, in which machines known as electrolyzers use electricity to split water into hydrogen and oxygen ions, but hydrogen fuel's ultimate carbon footprint depends on the energy source used to produce that electricity. Presently, most hydrogen in the EU is produced using fossil fuels, given that switching to clean hydrogen, or green hydrogen, is still very expensive.<sup>7</sup> The achievement of the renewable energy, and energy efficiency goals adopted at the European level, is expected to result in an emissions reduction of 48 percent in 2030.

#### *Coal, nuclear energy, natural gas and crude oil*

Europe as a whole still generates more power from coal than solar. While most coal generation centers on a small number of countries, predominantly Poland and Germany, many countries retain some form of coal generation. Still, some reports suggest that coal is increasingly being replaced by renewables. In 2019 the share of coal in electricity generation decreased in the EU27+UK to 14.6 percent - almost 4.4 percent less than in 2018.<sup>8</sup>

Coal consumption continued to decline throughout 2020 as well, namely because of COVID-19 lockdowns across the continent. Half of the decline in coal is attributed to renewables while the other half was due to falling demand caused by the COVID crisis. In addition, half of Europe's 324 coal-fueled power plants have either closed or announced a retirement date before 2030. EU financial institutions have also introduced nearly 40 coal-restricting policies in 2020 alone, while the UK, although out of the EU, was the first country to announce in 2015 its ambition to be coal-free, aiming to reach that target by 2025.

In 2020, the consumption of hard coal declined by 35% compared to 2018 whilst the use of brown coal was reduced by 33 percent.<sup>9</sup> However, during the energy crisis in the fall of 2021, European consumers requested more coal supplies from Russia, which suggests that, for the foreseeable future, coal will likely remain one of the pillars of Europe's energy sector.<sup>10</sup>

In spite of that, it is expected that 70 percent of all coal plants in Western Europe will be phased out in the next five years. In addition, it is estimated that by the end of the 2020s, coal will remain in place only in a minority of markets such as Germany, Poland, Romania, Bulgaria, Czech Republic, and Slovenia<sup>11</sup>. Since Germany is already shutting down its coal mines, Poland remains one of few EU countries with

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<sup>5</sup> <https://www.goldmansachs.com/insights/pages/infographics/european-renewables/>

<sup>6</sup> [https://ec.europa.eu/energy/sites/ener/files/hydrogen\\_strategy.pdf](https://ec.europa.eu/energy/sites/ener/files/hydrogen_strategy.pdf)

<sup>7</sup> <https://www.euronews.com/next/2021/07/19/europe-is-hedging-its-bets-on-clean-hydrogen-to-reach-climate-neutrality-will-it-work>

<sup>8</sup> <https://climateactiontracker.org/countries/eu/>

<sup>9</sup> <https://www.powerengineeringint.com/coal-fired/europe-shows-downward-trend-in-coal-production-and-usage/>

<sup>10</sup> <https://finance.yahoo.com/news/europe-turns-russia-more-coal-190000162.html>

<sup>11</sup> <https://balkangreenenergynews.com/these-eu-countries-will-have-dirtiest-power-systems-in-2030/>

significant coal reserves. It has proven reserves equivalent to 191.2 times its annual consumption<sup>12</sup>. Neighboring Ukraine, although out of the EU, is also a coal-rich nation, but most of its coal is located in the Donbass region, which is currently controlled by the Russia-backed self-proclaimed Donetsk People's Republic and Lugansk People's Republic. Thus, the future of Ukraine's coal will likely depend on the political regulation of the conflict in the Donbass, as well as on the country's relations with Russia. Meanwhile, coal-rich Balkan countries that are out of the European Union could play a significant role in energy supplies. According to an analysis by the Energy Community Secretariat<sup>13</sup> lignite-fired power plants constitute between 50 and 97 percent of electricity generation in all of the so called Western Balkan countries. Albania is the only exception, as it produces virtually all of its electricity from hydropower. There are, reportedly, plans to build new coal-fired power plants across the region, even though this will make it more difficult for the Balkans nations to meet renewable energy generation and emissions reduction targets.

Environmental groups insist on shutting down not only Europe's coal and gas-fired power plants, but also remaining nuclear power plants. In spite of that, nuclear energy accounted for 70.6 percent of total French electricity generation in 2019, and about 90 percent of France's electricity comes from low carbon sources (nuclear and renewable).<sup>14</sup> Other EU members are also interested in producing electricity through nuclear power plants. There is an ongoing tender process for construction of two new reactors at Dukovany in Czech Republic<sup>15</sup>, while in Hungary, after some 15 years of preparation, an application for a construction license for two new Russian designed reactors at the Paks site was submitted in June 2020. Indeed, Russia is expected to play a key role in this project<sup>16</sup>, as it did in the construction of the Astravets nuclear power in Belarus. Although out of the EU, and sanctioned by the Union, Belarus has a potential of becoming an energy supplier to neighboring EU Baltic states. However, Lithuania, Latvia and Estonia plan to connect their grids to the EU's by 2025 in a bid to boost their energy security and reduce dependence on Russia.<sup>17</sup> The problem, however, is that the EU, at least at this point, has no specific policy to reduce imports of Russian hydrocarbons, nor can countries that already do business with Russia's state-owned Rosatom – a giant corporation that specializes in nuclear energy – easily switch to other partners in the field of nuclear energy.

Phasing out oil will not be an easy task either. Europe accounts for 16 percent of global oil demand. In 2019 it consumed 15.5 million barrels per day. The transportation sector is the main driver of this demand, accounting for two thirds of final oil and petroleum consumption. It is expected that Europe's transport sector will remain heavily dependent on oil at least until 2030.<sup>18</sup> Reductions in oil demand has long been a priority for the EU, which is not surprising given that some 80 percent of oil demand gets imported. The major imports come from Russia. Such a dependence on oil imports for the EU's energy supply creates risks surrounding the security of that supply, especially because – from Brussels' perspective – the EU depends on “unstable countries”, namely Russia. The EU is facing the same problem in the field of natural gas supplies, which became quite obvious during the latest gas crisis in Europe when Russian supplies became “inexplicably low”.<sup>19</sup> Surge in demand after lockdowns, a longer colder winter resulting in very low reserves, less energy than expected from renewables, and poor planning by some European buyers,

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<sup>12</sup> <https://www.worldometers.info/coal/poland-coal/>

<sup>13</sup> <https://europeanwesternbalkans.com/2020/02/05/eu-coal-output-falls-24-in-2019/>

<sup>14</sup> <https://cnpp.iaea.org/countryprofiles/France/France.htm>

<sup>15</sup> <https://www.world-nuclear-news.org/Articles/Czech-Republic-weighs-strategic-value-of-nuclear-s>

<sup>16</sup> <https://tass.com/economy/1329525>

<sup>17</sup> <https://www.reuters.com/article/belarus-nuclear-eu-idUSL4N2KH1RF>

<sup>18</sup> <https://www.euractiv.com/section/transport/news/europes-oil-dependency-to-stick-to-transport-up-to-2030/>

<sup>19</sup> <https://finance.yahoo.com/news/russia-gas-limits-pose-increasing-203016711.html>

has resulted in extreme high prices of natural gas in Europe.

## The EU energy Policy

Russia continues to be the main supplier of natural gas to Europe. The world's geographically largest country has a 40.6 percent share of natural gas imports to the EU and is the cheapest supplier. The EU, on the other hand, spends roughly \$445 billion each year on energy imports, including natural gas.<sup>20</sup>

In 2019, almost two thirds of the EU's crude oil imports came from Russia (27 percent), Iraq (nine percent), Nigeria and Saudi Arabia (both 8 percent) and Kazakhstan and Norway (both seven percent). In 2020, Russia remained the top supplier of seaborne oil to the EU (accounting for 28 percent of volumes), although the net import declined by 13 percent comparing to 2019 as a result of COVID-19 lockdowns.<sup>21</sup>

A similar analysis shows that almost three quarters of the EU's imports of natural gas came from Russia (41 percent), Norway (16 percent), Algeria (eight percent) and Qatar (five percent), while over three quarters of solid fuel (mostly coal) imports originated from Russia (47 percent), the United States (18 percent) and Australia (14 percent).<sup>22</sup>

Norway exports nearly 95 percent of its gas production and 98 percent of its oil production to the European markets. Norwegian natural gas is expected to play an important role in the transition to the EU's low-carbon economy. The government anticipates oil and gas extraction, which made Norway one of the world's wealthiest nations, will naturally decline by 65 percent by 2050.<sup>23</sup> Russian extractable reserves of oil, on the other hand, are expected to last 58 years. For gas, it is more than 60 years.<sup>24</sup> In other words, oil and gas will remain significant factors throughout the world for another 30 or 40 years.

The EU aims to diversify its oil and gas supply routes, but in the short-term it will likely remain locked to Russia due to the existing infrastructure, geographical proximity, as well as Russia's energy volumes. Moreover, Russia still remains Europe's cheapest option although hypothetically the EU could look towards the Middle East for natural gas supply. The problem, however, is that the distance between the EU and Middle East implies an increase in costs for the European countries. Even North African energy rich countries can hardly represent a sustainable alternative to the Russian energy. Algeria, for instance, is a reliable and competitive supplier of natural gas for the EU, but the rapidly rising Algerian energy demand is putting a downward pressure on gas volumes available for foreign exports decreasing the profitability of the Algerian energy sector.

Some Eastern European countries such as Poland and Lithuania continue to welcome imports of the US gas as a way to displace coal. US energy, however, cannot meet all of Europe's energy needs, and the problem is that the American LNG supplies to the EU are much more expensive than the Russian natural gas. That is why countries such as Germany and Ireland show signs of reconsidering increased gas imports from the US. In the mid-term, the role of LNG in Europe will also be influenced by the course of the energy transition both in Europe and worldwide. Still, according to the International Energy Agency, imports of liquefied natural gas to Europe are expected to increase by almost 20% by 2040 compared to 2016 levels.

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<sup>20</sup> <https://carnegieeurope.eu/2019/11/28/geopolitics-of-energy-security-in-europe-pub-80423>

<sup>21</sup> <https://www.hellenicshippingnews.com/eu-crude-oil-imports-took-a-dive-in-2020-as-the-pandemic-raged/>

<sup>22</sup> <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-2c.html>

<sup>23</sup> <https://www.reuters.com/business/energy/norway-not-ready-let-go-oil-gas-push-hydrogen-offshore-wind-2021-06-11/>

<sup>24</sup> <https://globalenergyprize.org/en/2021/04/13/for-how-long-will-russias-oil-and-gas-last/>

Although European gas consumption rose by over five percent year-on-year between 1 October 2020 and 30 April 2021, LNG imports to Europe fell by almost 30 percent during the same period. During this period Europe's increased gas demand was met by pipeline deliveries as global LNG supply was unloaded in higher-priced Asian markets. Unlike most of Asia, Europe has access to huge volumes of pipeline gas as well as higher levels of gas storage capacity than other parts of the world. For instance, imports of liquefied natural gas (LNG) to Europe reached 81.6 million tons in 2020. This was a decrease of roughly five percent compared to the previous year. Spain is home to the greatest number of operational LNG import terminals in Europe.<sup>25</sup>

In the long term, the successful development of the renewable energy sector as well as diversification of supplies and routes in the EU could undermine Russia's political influence in certain European countries. Moreover, the renewable energy revolution could have a negative impact on the Russian economy that is still heavily dependent on exports of raw materials, including oil and natural gas.

## **Important Energy projects**

### **Nord Stream 2**

The pipeline, which runs parallel to the existing Nord Stream 1, is expected to deliver enough gas to supply 26 million European households. Although Nord Stream 2 is widely seen as a Russian geopolitical project, in reality, it is a product of an agreement between Russia's state-owned energy giant Gazprom and several European oil and gas corporations, namely Royal Dutch Shell, German utility company E. ON, French electric utility Engie, and Austrian integrated oil and gas company OMV. Nord Stream 2 is being built by Nord Stream 2 AG, a consortium incorporated in Switzerland. Its chairman of the board of directors is Gerhard Schröder, German chancellor from 1998 to 2005 and the subject of fierce criticism for his ties to Russia.

Over the years, the European Commission formally has opposed the Nord Stream 2 project but was powerless to stop it. Critics have been arguing the pipeline was not compatible with European climate goals, as that the project increases the region's dependence on Russian energy exports. Although attempts to prevent the construction of Nord Stream 2 failed, the new pipe will not lead to an increase in European gas deliveries from Russia, at least in the short-term. The reason is simple: whenever the pipeline starts, Gazprom's planned deliveries to Europe for full-2021 are set at 183 billion cubic meters. The new pipe could ship an additional 5.6 billion cubic meters, but this won't make a big difference.<sup>26</sup>

The Nord Stream 2 pipeline crosses into the exclusive economic zones of five countries: Russia, Germany, Denmark, Finland and Sweden. The estimated costs of the project run to €9.5 billion, and it is believed that Germany would receive considerable transit fees each year to transport gas to Southern and Eastern European nations. German gas consumption has been on the rise since 2014, supplied largely by record imports from Gazprom.

The United States threatened several times to block the construction of the pipeline, and even sanctioned some companies involved in the project. However, in May the US President Joe Biden decided to waive sanctions because the project was "almost completely finished". Many countries in Eastern Europe, such as Poland, Slovakia, and Ukraine, oppose Nord Stream 2, partially because of expectations of a loss of transit fees. Indeed, once Nord Stream 2 becomes fully operational, Ukraine and Poland could be faced

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<sup>25</sup> <https://www.statista.com/statistics/468431/lng-total-imports-europe/>

<sup>26</sup> <https://finance.yahoo.com/news/europe-needs-nord-stream-2-220000519.html>

with significantly declining transit revenues, and their position in negotiations with Gazprom will be weakened. Russia has already reduced the volume of gas transiting through Ukraine, and Nord Stream 2 is expected to deprive Kiev of up to US\$3 billion in annual revenue by allowing Moscow to circumvent the former Soviet republic when sending gas to Europe<sup>27</sup>. Ukraine's gas transit agreement with Russia expires in 2024, and at this point it is highly uncertain if it will be extended. Another key question will be volume of gas which Russia may agree to export through the territory of Ukraine. Nevertheless, if Russia is determined in its decision to bypass Ukraine as a transit country, it can always say that pipelines running through the Eastern European country are too old and in poor condition. Indeed, the pipelines in Ukraine have reached the end of their service life, which means that they must be repaired and replaced. Some 20,000 kilometers of a total 33,000 kilometers of transmission pipelines are more than 33 years old<sup>28</sup>, which is another reason why the Kremlin is expected to gradually reduce the volume of gas transit through the Eastern European country.

Besides potentially bypassing Ukraine, Nord Stream 2 could also reduce the growth of LNG imports in Europe, but will unlikely bring down gas prices in the continent. After ten years of relatively low gas prices, Europe started facing with energy price shock as the cost of natural gas and electricity surged to record levels. Gas prices are expected to remain high well beyond 2025.<sup>29</sup>

Given that the Dutch government decided to shut down the gas extraction from the giant Groningen gas field – the largest natural gas field in Europe and the tenth-largest in the world – by 2022, the EU will not be able to count on its own gas production, which means that for the foreseeable future it will remain heavily dependent on the Russian natural gas.

On the other hand, despite Moscow's pivot to Asia, the Russian energy industry remains highly dependent on the lucrative European market. There is, however, a concern that more Russian gas coming into Europe will make it more vulnerable to Russian political pressure. The EU, for its part, can respond to such Russian actions. Even if the German authorities grant Gazprom and its Nord Stream 2 partners a permit for the pipeline, the European Commission can cancel it if it finds the project violates European energy law. Such an action would, however, have an additional impact on the current gas crisis in Europe. Gazprom has an obligation to book a minimum amount of transit each month via Poland and Ukraine with the option of booking more. Currently, the Russian energy giant uses only a third of available capacity through those countries, which has sent energy prices soaring even higher, now above \$900 per 1,000 cubic meters.<sup>30</sup> At the same time, natural gas prices keep hitting new records in Europe, as the drop in supplies sparked a new wave of volatility across the European gas market. It is believed the Kremlin wants Nord Stream 2 without any compliance with European rules, which is why Gazprom reportedly refuses to send enough gas to Europe until its demands are fulfilled.

## **TurkStream**

TurkStream natural gas pipeline is an excellent example of Turkish-Russian cooperation in the field of energy. The project arose after the 2014 cancellation of Russia's South Stream project, a Gazprom-led venture that would have transported Russian natural gas across the Black Sea to Bulgaria and further into Europe. In late 2014, after Moscow announced South Stream's cancellation, Gazprom signed a

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<sup>27</sup> <https://asiatimes.com/2021/07/ukraine-wins-and-loses-in-nord-stream-2-power-play/>

<sup>28</sup> <https://www.aa.com.tr/en/analysis/analysis-turkstream-to-strengthen-turkey-s-energy-hub-position/1695585>

<sup>29</sup> <https://www.swp-berlin.org/en/publication/nord-stream-2-and-the-energy-security-dilemma>

<sup>30</sup> <https://economics.segodnya.ua/economics/enews/gazprom-otkazalsya-ot-dopolnitelnyh-moshchnostey-dlya-tranzita-gaza-cherez-ukrainu-1574826.html>

memorandum of understanding with BOTAŞ Petroleum Pipeline Corporation, a Turkish state-owned company, to construct the TurkStream pipeline.

The TurkStream gas pipeline runs along the bottom of the Black Sea from Russia to the coast of Turkey. Its throughput capacity is 31.5 billion cubic meters of gas per year. Turkey currently has a contract for eight billion cubic meters of natural gas transported via TurkStream from Russia, four billion cubic meters of which is imported by the private sector and the rest is by state-owned Petroleum Pipeline Company.<sup>31</sup>

The 1,100-kilometer-long pipeline delivers gas to Turkey and southern and southeastern European countries transiting Turkey. Its construction on Turkish territory was completed in November 2019. On January 8, 2020, the pipeline was officially put into operation. This project is making potential competitors, be it LNG terminals in Greece or eventually Croatia, gas flowing through the Southern Gas Corridor, or the East Med Pipeline, uneasy at the prospect of more Russian gas in the region. The 930-kilometer-long pipeline is the biggest-diameter offshore gas pipeline in the world. A final section of the TurkStream onshore extension is being built by Hungary's gas TSO FGSZ. It envisages a six billion of cubic meters a year Serbia-Hungary link running for 15 km from the Serbian border to the southern Hungarian gas hub of Kiskundorozsma plus metering stations.

TurkStream may not be as big as Nord Stream 1 and 2, but it is an integral part of Gazprom's broader strategy to cement its position as a major energy supplier in Europe and the EU without being dependent on the transit through Ukraine.<sup>32</sup> It is worth noting that Ukraine's neighbor Hungary has recently agreed a long-term gas deal with Russian energy giant Gazprom. According to the agreement, 4.5 billion cubic meters of Russian natural gas to Hungary will go via two routes: 3.5 billion cubic meters via Serbia and one billion cubic meters via Austria. In the past, Hungary relied on Russian natural gas imports being delivered via a pipeline through Ukraine, but the new Russo-Hungarian deal will likely deprive Ukraine of lucrative transit fees.

That is why for Ukraine TurkStream is another step in a long process of the country's declining role as a transit for Russian hydrocarbons. This pipeline, just like Nord Stream 2, will additionally reduce Ukraine's role as a transit state. Now it will be Turkey, rather than Ukraine, that will play the role of the regional gas hub. Ankara, for its part, expects that the supplies of natural gas via the TurkStream pipeline will soon be increased, although the project will undoubtedly also increase the mutual dependency between Ankara and Moscow. At the same time, the pipeline will remain an important route for meeting the natural gas needs not just of Turkey, but of Europe in general. Presently, Turkey stands out as one of the most reliable routes for meeting the EU's energy needs, and it is not very probable that TurkStream will join the S-400 missile controversy and affect relations between Ankara and Washington.

TurkStream consists of two lines, each capable of delivering 15.75 billion cubic meters of natural gas annually. One string is intended for consumers in Turkey, from where the pipeline continues under the name "Balkan Stream" to Bulgaria, Serbia, Hungary and Austria. In May 2021 Serbia and the European Investment Bank have signed the Loan Agreement for the project of building a gas interconnection Serbia-Bulgaria. Once completed, Serbia's second interconnector with Bulgaria could also be used to import gas from Azerbaijan, and diversify the country's natural gas supplies,<sup>33</sup> although the Balkan nation has already

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<sup>31</sup> <https://www.dailysabah.com/business/energy/turkish-firms-start-talks-with-gazprom-to-land-new-gas-agreement>

<sup>32</sup> <https://www.atlanticcouncil.org/blogs/energysource/turkstream-is-south-stream-2-0-has-the-eu-done-its-homework-this-time/>

<sup>33</sup> <https://www.rts.rs/page/stories/ci/story/5/ekonomija/4379455/potpisan-ugovor-gasni-interkonektor-srbija-bugarska.html>

started receiving gas from the TurkStream pipeline.<sup>34</sup>

Even though TurkStream has made Bulgaria a very important transit country, the Eastern European nation's dependence on the Russian gas has decreased. It is expected to keep declining for reasons including the start of gas imports from Azerbaijan as of January 2021, as well as expanding opportunities to import LNG.<sup>35</sup> On the other hand, from January 1 to September 19, 2021, Gazprom supplied 20.3 billion cubic meters of natural gas to Turkey, which is 153% (12.3 billion cubic meters) more than in 2020.<sup>36</sup> Thus, in the mid-term, Turkey is expected to remain dependent on the Russian energy, although Ankara will undoubtedly tend to diversify its gas supply. The recent discovery of new natural-gas deposits in the Black Sea means that Ankara could become less dependent on Russia for energy eventually, but in the meantime TurkStream, the Akkuyu project, and the S-400 missile system are likely to ensure a long-term Russian presence in Turkey.

### **The Trans-Adriatic Pipeline**

Rich natural gas reserves of the Caspian region used to be strategically important for the European energy markets. Today, Azerbaijan is supplying the first natural gas from the Caspian region to Europe, and in this way, the country contributes to the energy security of the European partners. Azerbaijan created the milestone for delivery of the first Caspian natural gas by implementing an inter-regional energy project - Southern Gas Corridor (SGC). This strategic energy project has resulted from a successful energy policy implemented by the country.

The SGC targets to supply natural gas from SD Stage 2 to the European energy consumers. By doing that, this mega energy project will connect the gas supply of the Caspian basin to the European energy markets.

The SGC comprises of four projects, those being<sup>37</sup>;

- Operation of Shah Deniz natural gas-condensate field ("SD1" project) and its full-field development ("SD2" project);
- Operation of the South Caucasus Pipeline ("SCP" project) and its expansion ("SCPX" project);
- Construction of the Trans-Anatolian Natural Gas Pipeline ("TANAP" project);
- Construction of the Trans Adriatic Pipeline ("TAP" project) (SD2, SCPX, TANAP and TAP collectively, the "Projects").

It is worth underlying that despite the COVID-19 pandemic and the Second Karabakh War, the SGC has been successfully finalized, and the first deliveries of the Azerbaijani gas to Europe have been realized on December 31, 2020.<sup>38</sup> Delivering the Azerbaijani gas to the European energy consumers via Trans Adriatic Pipeline (TAP), which is the European segment of the SGC, was a historic event. The TAP pipeline starts in Greece at the Greek-Turkish border connecting to the TANAP pipeline and crossing Greece, Albania and the Adriatic Sea with its final destination in Italy connecting to the natural gas network of Snam Rete Gas.

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<sup>34</sup> <https://www.aa.com.tr/en/europe/serbia-gas-arriving-in-europe-via-turkstream-pipeline/2095749#:~:text=Serbia%20on%20Friday%20said%20it,route%20crossing%20Turkey%20and%20Bulgaria.&text=The%20commercial%20opening%20of%20the,the%20first%20projects%20of%202021>

<sup>35</sup> [https://www.osw.waw.pl/en/publikacje/osw-commentary/2021-04-08/turkstream-diversifying-south-eastern-european-gas-market#\\_ftnref4](https://www.osw.waw.pl/en/publikacje/osw-commentary/2021-04-08/turkstream-diversifying-south-eastern-european-gas-market#_ftnref4)

<sup>36</sup> <https://www.interfax.ru/business/792481>

<sup>37</sup> <https://www.sgc.az/az>

<sup>38</sup> [https://azertag.az/en/xeber/TAP\\_transports\\_first\\_1\\_billion\\_cubic\\_meters\\_of\\_natural\\_gas\\_to\\_Europe-1738601](https://azertag.az/en/xeber/TAP_transports_first_1_billion_cubic_meters_of_natural_gas_to_Europe-1738601)

TAP was selected as the shortest and most direct way to export Azerbaijani gas from the Caspian Sea to European energy consumers. The pipeline contributes significantly to the diversification of supply sources and routes in Europe and strengthens its energy security.

In its initial stage, the SGC was set to deliver about 16 billion cubic meters (bcm) of gas: 6 billion to Turkey and 10 billion to Europe. However, the project is also built with potential expansion capacity, which could be increased to 31 bcm in SCPX and the Trans-Anatolian Natural Gas Pipeline (TANAP), and up to 20 bcm in TAP, thus doubling the latter's capacity.<sup>39</sup> So, it means that Azerbaijan, having additional natural gas reserves in the fields such as Babek, Absheron, Umid, Karabakh and Dan Ulduzu will be able to increase gas exports to the European energy markets.

The SGC opens also a window for future gas supplies from Central Asia to European energy markets. The Trans-Caspian Pipeline (TCP), which can bring Turkmen natural gas to Europe is a strategic energy project for the USA and EU. After the signing of the Caspian Convention, the EU officials resumed talks with Turkmenistan regarding the TCP. TCP is a project which supports diversification of gas sources and routes for the EU, and the gas pipeline to the EU from Turkmenistan and Azerbaijan via Georgia and Turkey, known as the combination of "Trans-Caspian Gas Pipeline" (TCP), "South-Caucasus Pipeline Future Expansion" (SCPFX) became the "Project of Common Interest" for the EU.

It is clear that various natural gas projects will play an important role in the energy market and, towards this end, Caspian gas supports the diversification of sources and routes. Azerbaijan has transported 5 billion cubic meters of natural gas to Europe via TAP since the commencement of gas flows via the pipeline in December 2020<sup>40</sup>, and the pipeline will carry 8 bcm of natural gas from Azerbaijan to the European markets by the end of 2021.<sup>41</sup>

Taking into consideration the above-mentioned, we can underline that the SGC created the backbone for interregional cooperation. For example, the TAP pipeline offers several advantages to transit countries. Italy will support its energy security by diversifying energy supplies and routes. Greece will also diversify its supply sources and strengthen its transit position by transporting natural gas to Southeast European countries. For Albania, the pipeline will promote the gas master-plan of the country. Albania will become part of a network and strengthen regional cooperation. Finally, TAP opens a window for Azerbaijan to supply gas directly to one of the biggest natural gas markets in the world. In addition, the TAP thus supports the development of gas interconnectors in Europe, which is one of the priorities of the EU's energy security strategy. In this regard, Southeast European countries like Greece and Bulgaria, and others, will benefit from this alternative gas source, which will also strengthen Italy's and Greece's position as energy hubs.

## Conclusion

The analysis of the EU energy markets shows that natural gas and petroleum products are dominant, and a high dependence on a few suppliers is not favorable for energy security. Diversification of supplies and routes, as well as close cooperation between member states will be an effective way to overcome future challenges. Given that the EU accounts for about 20 percent of global oil imports, in the mid to long-term Europe's transition to renewables – which is a process that will last for decades – will likely have an impact

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<sup>39</sup> [https://ewswdata.rightsindevelopment.org/files/documents/16/WB-P157416\\_sHJ8FpW.pdf](https://ewswdata.rightsindevelopment.org/files/documents/16/WB-P157416_sHJ8FpW.pdf)

<sup>40</sup> <https://caspiannews.com/news-detail/tap-delivers-5-bcm-of-azerbaijani-gas-to-european-markets-2021-9-18-0/>

<sup>41</sup> <https://caspiannews.com/news-detail/tap-to-deliver-8-bcm-of-azerbaijani-gas-to-europe-by-late-2021-2021-10-8-0/>

on the global oil market. Meanwhile, the EU could become a standard-setter for the global energy transition, although for quite some time coal will remain the main fuel source for electricity production, especially in eastern members of the European Union.

Despite ambitious goals to decarbonize its economy, the EU will likely keep attempting to first diversify its energy imports, and also to reduce its dependence on Russian oil and natural gas. However, the EU's diversification away from Russian gas is unlikely to succeed in the near future. The EU will continue to rely on Russia for its energy needs, while Moscow will remain dependent on the European Union for revenues. In the short to mid-term, significant diversification is possible in small markets in southeast Europe, which have been completely dependent on Russian gas. For them, alternative sources of gas imports, namely the Southern Gas Corridor, would represent competitive and secure sources of supply.

It should be emphasized that that various natural gas projects will be crucial to meet EU energy needs, and the natural gas sources from the Caspian region will support the diversification of sources and routes. Also, the SGC can create a backbone for the central Asian gas sources, especially from Turkmenistan in the future. Now, it is clear that during the energy transition period, European countries cannot rely on only a few energy sources; on the contrary, they have to diversify energy supply sources and routes. Therefore, the share of natural gas in the EU's energy mix in the near future will be higher owing to its Green Deal goals. Therefore, natural gas will maintain its importance as a "bridging" fuel to facilitate the energy transition and further reduce the percentage of coal in the energy balance.

In the end, natural gas interconnectors between Member States, LNG and the use of renewables are effective mechanisms to ensure the energy security. So far, to increase the share of renewables to 32 percent of its overall energy mix by 2030, as well as LNG supplies will support the diversification process and ensure energy security.

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