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Reducing European Dependence on Russian Gas: Challenges and New Alternatives

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Introduction

The Russia-Ukraine war has revealed energy reliance between the European Union and Russia as an issue. In addition to the dependence of the European Union (EU) on Russia, particularly in the sphere of energy, it did not alleviate but rather aggravated, Europe's and Russia's security worries about each other.

All happenings raise this question: Can the European Union eliminate its dependence on Russian gas? Is it possible? If possible, for how long can this dependence be eliminated?

Following Russia's tensions in the region, the European Union was forced to take a number of measures. Of course, this was not new. One of them and the most important is energy dependence. The EU gets 45% of its gas and 27% of oil from Russia in 2021¹. This is a very serious figure, and the European Union has developed a strategy aimed at reducing this dependence by two-thirds in the near future. The EU needs energy imported from third countries for its own consumption. Petroleum goods (including crude oil, which is the major component) were the most commonly imported energy product in 2019, accounting for over two-thirds of all energy imports into the EU, followed by gas (27 percent) and solid fossil fuels (6 percent).²

This dependence costs approximately \$118 m a day. As seen from the numbers, the European Union relies significantly on Russian fossil fuels. According to the commission, 90 percent of the gas used in the EU is imported, with Russia contributing 45 percent of those imports at various levels to EU member states in 2021.

EU with 552 bcm consumption is seeking to reduce gas dependency from Russia. For possible energy security, there is a need for alternative energy countries. Alternatives can be Algeria with 4.5 TCM reserves and 90 bcm production, Azerbaijan with 2.6 TCM; 43,9 bcm, and Turkmenistan with 11,326 TCM, and 84 bcm production as well. Those sources can solve the dependency of the EU from Russia in the mid and long term.

The REPowerEU plan proposes to reduce the dependency of Europe on fossil fuels of Russia by 2030. In the long run, it is planned to achieve stronger and cleaner energy transfers under the European Green Deal with alternative and greener energy sources.³⁴

The EU's executive arm revealed that it could scratch out an enormous share of its dependency on Russia by tapping new gas supplies, increasing reserves for next winter, and accelerating efforts to be more energy rational. By the end of this year, the EU can replace 100 billion cubic meters of gas

¹ <https://www.nytimes.com/2022/03/08/business/european-union-russia-oil-gas.html#:~:text=Some%2045%20percent%20of%20the,saving%20energy%20and%20diversifying%20supplies.>

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

³ <https://www.bbc.com/news/science-environment-60664799#:~:text=As%20countries%20scramble%20to%20reduce, costs%20around%20%24118m%20a%20day.>

⁴ https://ec.europa.eu/commission/presscorner/detail/en/fs_22_1513

imports from Russia. That is two-thirds of what the EU import from Russia. The comments came only days before a gathering of EU leaders to consider how to reduce Europe's long-term energy connections with Russia. "We shall phase off our reliance on Russian gas, oil, and coal imports," the 27 leaders will agree. And it is talked that renewable energy projects should be followed and there is enormous potential in inland rooftop solar power.⁵

There are some discussions that are ongoing with current gas suppliers including Norway, Algeria, and Azerbaijan to heave flows.

EU gas dependency on Russia

Following the Russia-Ukraine war, Europe is on the verge of entering an energy crisis, owing to the continent's dependency on Russian gas delivered via pipelines.

In the event of a Russian gas freeze or embargo, data from the European Union Agency for the Cooperation of Energy Regulators reveals which countries' energy supplies would be most at risk. According to the most recent available data, Germany buys over half of its gas from Russia, whereas France only receives a quarter of its supply from the country. Norway was the largest source of French gas, accounting for 35% of total production. With a 46 percent dependency on Russian gas, Italy would be among the hardest hit.

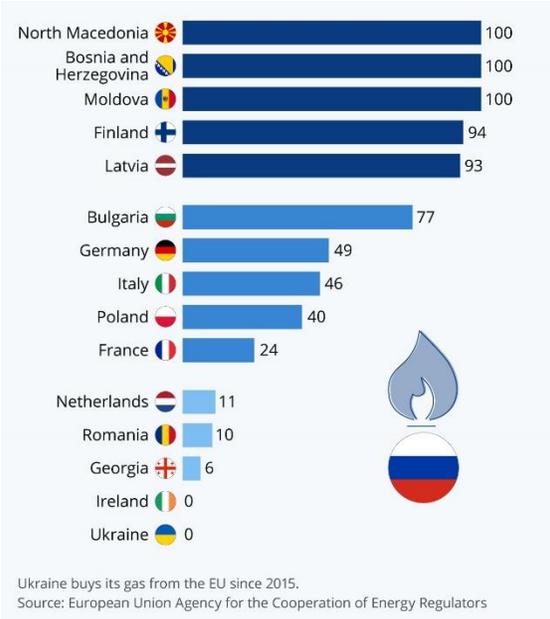
The United Kingdom is in a different situation, with half of its gas coming from domestic sources and the rest coming from Norway and Qatar. Spain is likewise not on Russia's list of key consumers, with Algeria and the United States being the country's two largest trading partners.

North Macedonia, Bosnia and Herzegovina, and Moldova are among the minor European countries that rely solely on Russian gas. According to the most recent available data, dependence on gas supply was also above 90% in Finland and Latvia, and at 89 percent in Serbia. The Netherlands and Romania have low dependence on Russian gas, while Georgia, Ireland, and Ukraine have essentially no dependence. However, following a prior armed war with Russia over Crimea, the latter country has been purchasing natural gas from the EU since 2015. This means it could be exposed to Russian gas re-imports through the bloc.⁶

⁵ <https://www.aljazeera.com/news/2022/3/8/eu-plans-to-slash-2-3-in-russian-gas-imports-this>

⁶ <https://www.statista.com/chart/26768/dependence-on-russian-gas-by-european-country/>

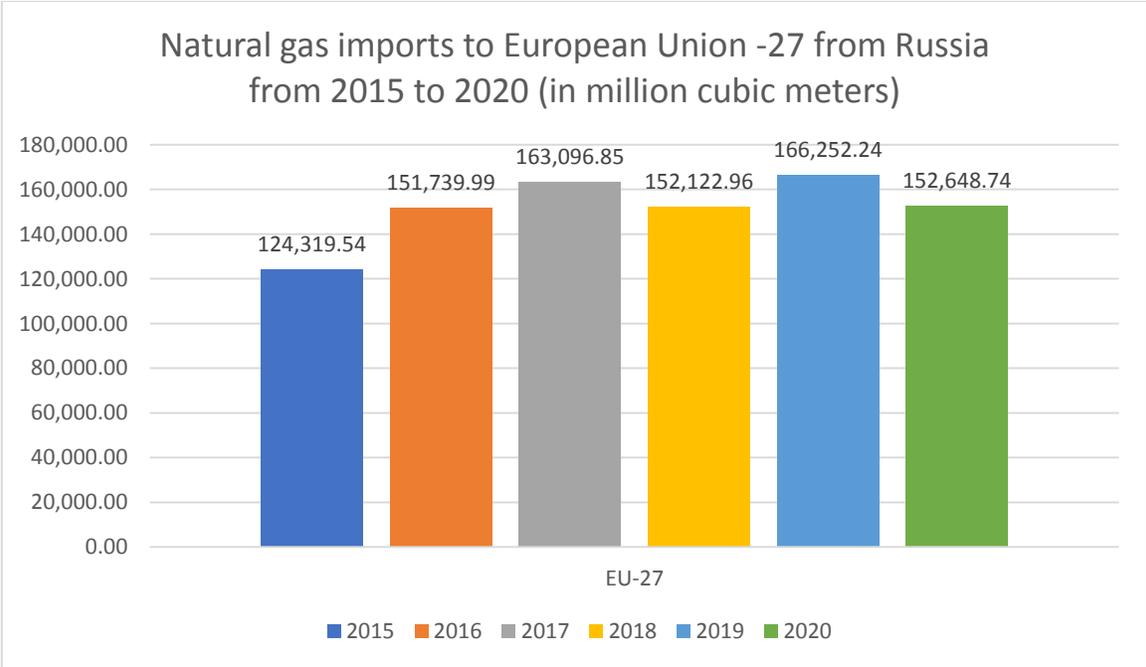
Graph 1. % Share of gas supply from Russia in selected European countries (2020 or latest available)



Source: Statista.com

In Figure 1, the amount of imported natural gas from Russia by the EU is illustrated during 2015-2020 in million cubic meters. The numbers show that the smallest amount is in 2015 with 124,319.54 million cubic meters and the biggest amount is in 2019 with 166,252.24 million cubic meters. One by one, 151,739.99 million cubic meters is in 2016, 163,096.85 million cubic meters in 2017, 152,122.96 million cubic meters is in 2018, and finally, 152,648.74 million cubic meters is in 2020.

Figure 1. Natural gas imports to European Union - 27 from Russia from 2015 to 2020 (in million cubic meters)



Source: *statista.com*⁷

Table 1 depicts all 27 European countries one by one by its dependency amount of Russian gas during 2015-2020. Germany, Italy, Netherlands, and Hungary are the leading countries among others due to the import of gas from Russia.

Table 1. Natural gas imports to European countries from Russia from 2015 to 2020 (in million cubic meters)

Countries	2020	2019	2018	2017	2016	2015
Germany	52,463.57	46,249.99	43,108.05	62,079.78	58,671	43,626
Italy	28,716.08	33,449.39	32,846.36	33,107.88	26,830	27,656
Turkey	16,166	15,196	23,643	28,685	24,541	26,784
Netherlands	15,746.46	16,203.76	17,003.48	9,382.64	12,612.25	8,006.85
Hungary	11,583	17,715	12,109	12,699	8,188	6,450
Poland	9,557.54	9,602.54	9,717.43	10,316.95	10,902	8,786
France	7,780.37	10,772.46	9,812.89	9,075.27	9,391.74	5,694.68
Czechia	7,589.97	9,507.6	7,968.39	8,817	8,121	7,460
Slovakia	3,675	6,707	4,396	4,442	4,326	4,407
Spain	3,387	3,168	868	0	0	0
Greece	2,304.72	1,685.82	3,232.03	2,893.56	2,633	1,947
Bulgaria	2,201.2	2,342.22	3,111.46	3,268.78	3,094	3,010

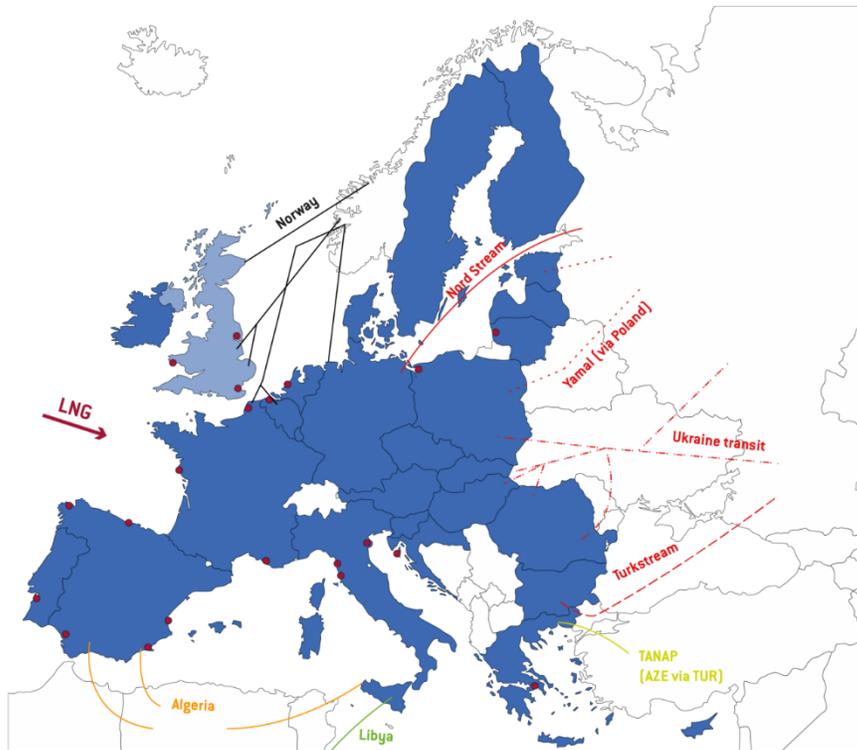
⁷ <https://www.statista.com/statistics/1292984/import-of-natural-gas-by-european-countries-from-russia/>

Norway	10.13	0	0	0	0	0
Liechtenstein	11.76	0	-	-	-	-
Slovenia	78.05	105.78	276.63	207.58	293	244
Sweden	184.3	0	0	0	0	0
Luxembourg	191.55	212.19	211.96	213.66	203	221
Estonia	206.6	481	523	502	518	471
North Macedonia	334	292	251	271	211	135
Portugal	572.71	97.14	0	0	0	0
Romania	959.88	989.59	1,315.18	1,183.09	1,460	183
Moldova	1,056	1,039.6	1,129.7	1,033.48	1,037	1,007
Latvia	1,114.95	1,353.95	1,414.81	1,242.66	1,132	1,306
Lithuania	1,196	1,191	1,303	1,343	869	2,138
Serbia	1,373.7	2,256.73	2,198.33	2,182.63	1,795	1,733

Source: Statista.com

The most important pipeline import routes into the EU are depicted on the map (Figure 2). The majority of Russian gas is delivered by four different pipelines (Nord Stream, Yamal (through Poland), Ukraine, and Turkstream) (via Turkey). These several Russian gas channels are at the center of the present geopolitical problems around Nord Stream II's construction.

Figure 2: Main EU Natural Gas Imports routes



Source: Bruegel.org

The figure 2 shows that the northern gas flow to Europe is predominant. As an alternative, it is possible to get energy from the African continent to Algeria and from Asia to Azerbaijan and Turkmenistan.

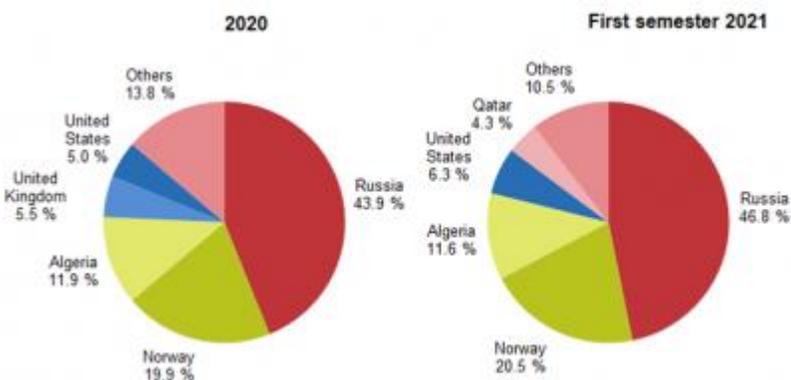
EU gas suppliers and Consumption

In both 2020 and the first semester of 2021, Russia was the EU's largest natural gas supplier (Figure 3); the only other partners with a significant proportion of total additional EU imports were Norway and, at a distance, Algeria. In terms of trade value, all other nations selling natural gas to the EU had a global share of 24.3 percent in 2020 and 21.1 percent in 2021. In 2019, Russia (41%) received over three-quarters of the EU's natural gas imports, followed by Norway (16%), Algeria (8%), and Qatar (5%).⁸⁹

⁸ [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU imports of energy products - recent developments#Main suppliers of natural gas and petroleum oils to the EU](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_imports_of_energy_products_-_recent_developments#Main_suppliers_of_natural_gas_and_petroleum_oils_to_the_EU)

⁹ [https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-2c.html#:~:text=A%20similar%20analysis%20shows%20that,%25\)%20and%20Australia%20\(14%20%25\).](https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-2c.html#:~:text=A%20similar%20analysis%20shows%20that,%25)%20and%20Australia%20(14%20%25).)

Figure 3. Gas imports of EU from countries



Source: Eurostat Database (Comext) and Eurostat Estimates

According to data from the International Energy Agency, the European Union imported 155 billion cubic meters of natural gas from Russia last year, accounting for almost 45 percent of total EU gas imports and close to 40 percent of overall consumption.¹⁰¹¹

In 2020, gross inland natural gas consumption in the EU fell by 2.7 percent compared to 2019 to 15 235 thousand terajoules.¹²¹³

¹⁰ <https://www.iea.org/news/how-europe-can-cut-natural-gas-imports-from-russia-significantly-within-a-year>

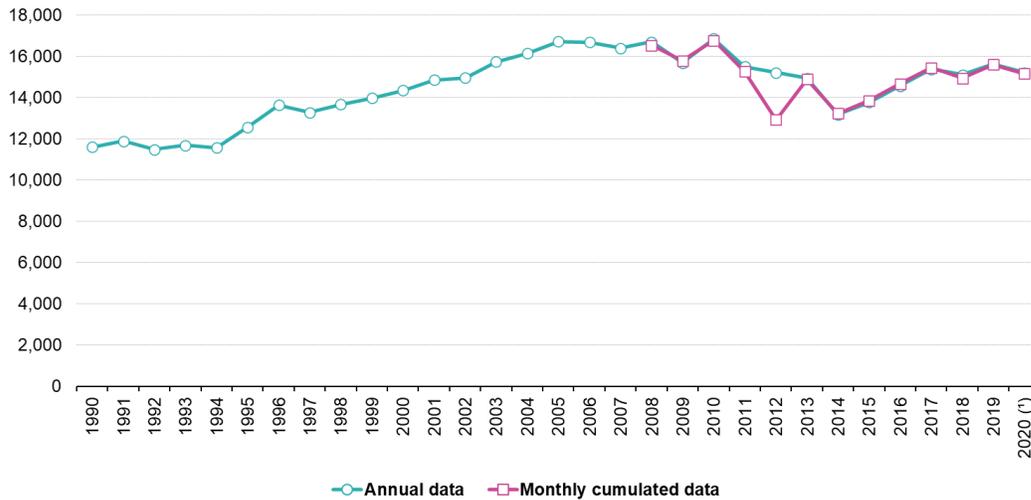
¹¹ <https://www.bloomberg.com/news/articles/2022-03-11/equinor-focused-on-ensuring-natural-gas-supplies-to-europe>

¹² https://ec.europa.eu/eurostat/databrowser/view/nrg_cb_gasm/default/table?lang=en

¹³ https://ec.europa.eu/eurostat/databrowser/view/nrg_cb_gas/default/table?lang=en

Figure 4. Gross inland consumption of natural gas, EU, 1990-2020 (gross calorific value)

Gross inland consumption of natural gas, EU, 1990-2020
(thousand terajoules (Gross Calorific Value))

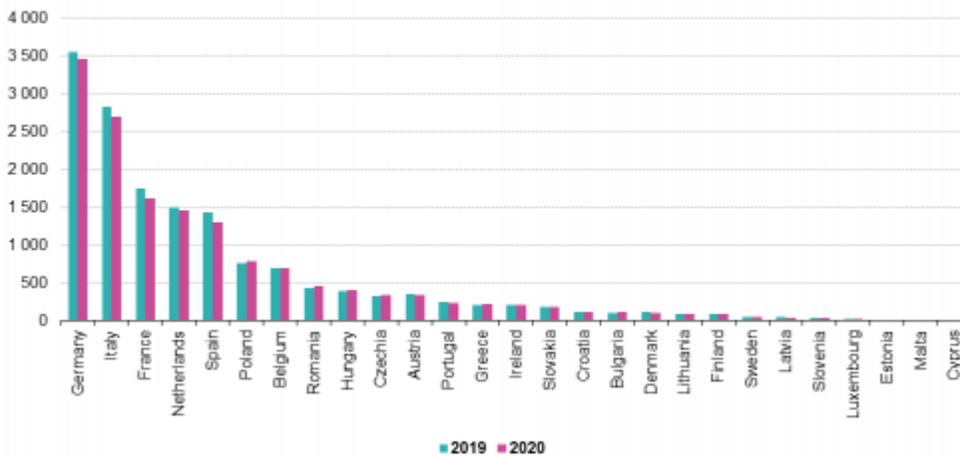


Source: Eurostat Statistics

The consumption of EA-19 grew by 8.1% to 12 786 thousand terajoules. Sweden (11.1 percent), Greece (9.8%), and Lithuania (9.4%) saw the most substantial increases in consumption, while Latvia (-17.1 percent), Spain (-9.7%), and Estonia (-8.5 percent) saw the most significant decreases.¹⁴¹⁵¹⁶

Figure 5. Gross inland consumption of natural gas, by country, 2019-2020, in thousand terajoules (GCV)

Gross inland consumption of natural gas, by country, 2019-2020
(thousand terajoules (Gross Calorific Value))



Source: Eurostat Statistics

¹⁴ https://ec.europa.eu/eurostat/databrowser/view/nrg_103m/default/table?lang=en

¹⁵ https://ec.europa.eu/eurostat/databrowser/view/nrg_124m/default/table?lang=en

¹⁶ https://ec.europa.eu/eurostat/databrowser/view/nrg_134m/default/table?lang=en

Azerbaijan

According to APA-Economics, the Organization of Petroleum Exporting Countries (OPEC) has raised its estimate of verified gas reserves in Azerbaijan, using OPEC's annual statistical bulletin. SOCAR (State Oil Company of Azerbaijan) exported 510.1 million cubic meters of gas in January-February 2022, which is 65% more than the same period last year. In 2021 Azerbaijan gas exports increased by 39.8% reached 19 Bm³. Azerbaijan's gas output increased by 18.1% reached 43.9 B m³ last year.¹⁷

Azerbaijan's proven gas reserves were expected to reach 2,2 trillion cubic meters by the end of 2020, up 14,8 percent from the end of 2019.¹⁸

Azerbaijan Natural Gas Production: OPEC: Marketed Production was 22,408.000 Cub meter million in December 2020, according to OPEC. This is an increase from the previous year's figure of 20,811.000 Cub meter million.

Azerbaijan Natural Gas Production: OPEC: Marketed Production data is updated yearly, with 31 observations, averaging 8,090.000 Cub meter million from December 1990 to 2020.

The statistics ranged from 4,680.000 Cub meter million in 2004 to 22,408.000 Cub meter million in 2020, with a high of 22,408.000 Cub meter million in 2020.¹⁹ It is 43,9 bcm production now.

Azerbaijan has been working for nearly two decades to become a big gas supplier to Europe, with the Trans Adriatic gas pipeline (TAP) set to be completed in late 2020, transporting Azerbaijani gas via Greece and Albania and across the Adriatic Sea to Italy.²⁰

On December 31, 2020, Azerbaijani gas delivered to consumers in Italy, Greece, and Bulgaria via the TAP gas network. Since that time, TAP has transported 8.1 billion cubic meters of gas from Azerbaijan to Europe. Over 6.8 billion cubic meters were transferred to Italy, with about 1.2 billion cubic meters going to Greece and Bulgaria.²¹ Azerbaijan intends to sell 9 billion cubic meters of gas to Europe in 2022 and 11 billion cubic meters in 2023, overall.

Figure 6 below illustrates that Azerbaijan have trade relations with Turkey, Georgia, Islamic Republic of Iran, and Greece on natural gas export.²²

¹⁷ <https://report.az/en/energy/rovshan-najaf-socar-increases-natural-gas-export-by-65/>

¹⁸ <https://apa.az/en/xeber/azerbaijan-energy-and-industry/opec-increases-assessment-of-confirmed-gas-reserves-of-azerbaijan-359036>

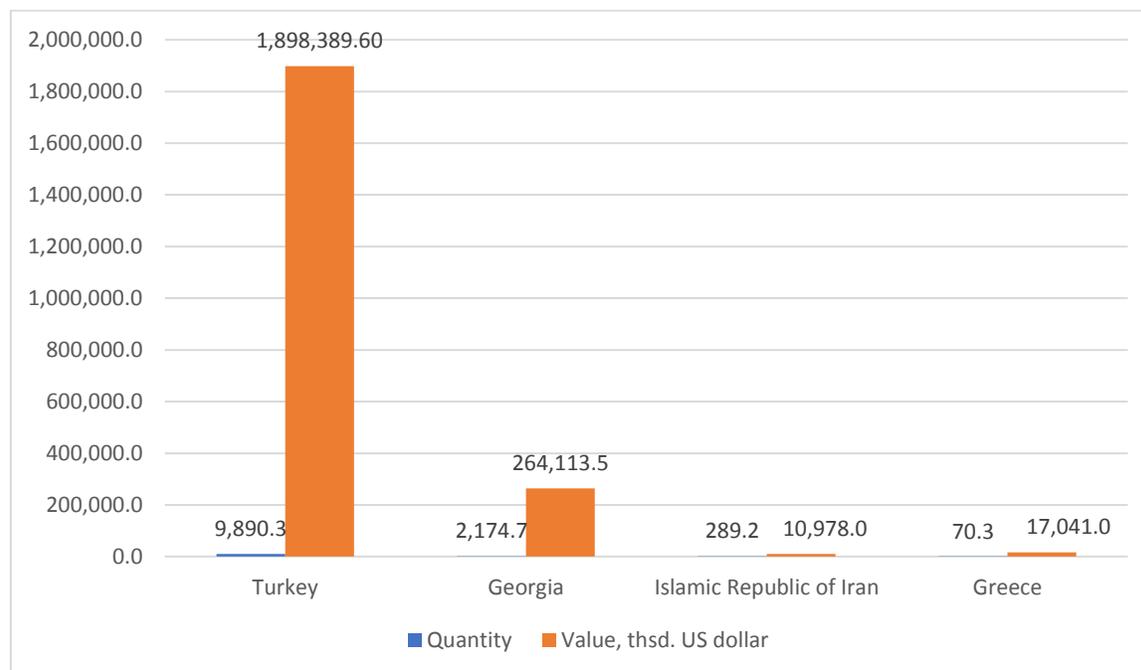
¹⁹ World Trend Plus's Association: Energy Sector – Table RB.OPEC.NG: Natural Gas Production: Marketed Production contains the information.

²⁰ [https://caspiannews.com/news-detail/azerbaijan-to-supply-11-bcm-of-natural-gas-to-europe-in-2023-2021-12-17-58/#:~:text=Natural%20gas%20exports%20from%20Azerbaijan,the%20European%20Union%20\(EU\).](https://caspiannews.com/news-detail/azerbaijan-to-supply-11-bcm-of-natural-gas-to-europe-in-2023-2021-12-17-58/#:~:text=Natural%20gas%20exports%20from%20Azerbaijan,the%20European%20Union%20(EU).)

²¹ <http://caspiannews.com/en/2022/01/tap-announced-final-volumes-of-azerbaijani-gas-supplies-to-europe/>

²² <https://www.stat.gov.az/source/trade/?lang=en>

Figure 6. Exports of natural gas in 2020 (mln. cubic metre)



Source: Azerbaijan State Statistics Committee

Algeria

Algeria Natural Gas Production: OPEC: Marketed Production was 85,119.000 Cub meter million in December 2020, according to OPEC.

This is a reduction from the previous year's figure of 90,302.000 Cub meter million.

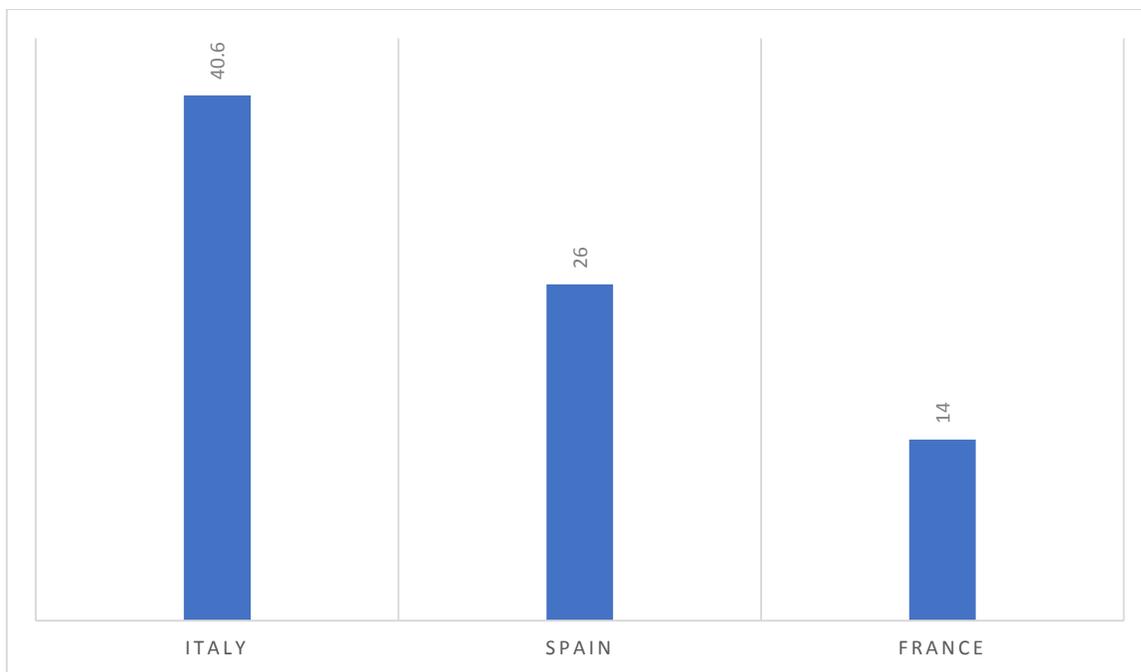
Algeria Natural Gas Production: OPEC: Marketed Production data is updated yearly, with an average of 51,157.000 Cub meter million from December 1960 to December 2020. There are 61 observations total.

In 2018, the data reached an all-time high of 95,898.487 Cub meter million, with a low of 0.000 Cub meter million in 1960.²³ It is 90 bcm production now.

In 2020, Italy was Algeria's top export destination for petroleum gas and other gaseous hydrocarbons. That year, the country accounted for 40.6 percent of total exports. Spain and France came in second and third, with roughly 26% and 14% of the vote, respectively.

²³ <https://www.ceicdata.com/en/indicator/algeria/natural-gas-production-opec-marketed-production>

Figure 7. Distribution of petroleum gas exports from Algeria 2020, by country



Source: Statista.com

Turkmenistan

Turkmenistan Natural Gas Production: OPEC: Marketed Production was 81,662.000 Cub meter million in December 2020, according to OPEC.

This is a reduction from the previous month's figure of 86,662.000 Cub meter million.

Turkmenistan Natural Gas Production: OPEC: Marketed Production data is updated yearly, with an average of 59,100.000 Cub meter million from December 1990 to December 2020.

In 2019, the data hit an all-time high of 86,662.000 Cub meter million, surpassing the previous high of 12,480.000 Cub meter million set in 1998.²⁴ It is 84 bcm production now.

Turkmenistan has 600 million barrels of proved oil reserves and 19.5 trillion cubic meters of proven natural gas reserves, according to the BP Statistical Review of World Energy 2020. Turkmenistan generated 63.2 billion cubic meters of natural gas in 2019, according to the same estimate, of which it consumed 31.5 billion cubic meters domestically and exported 31.6 billion cubic meters to China.²⁵

²⁴ <https://www.ceicdata.com/en/indicator/turkmenistan/natural-gas-production-opec-marketed-production>

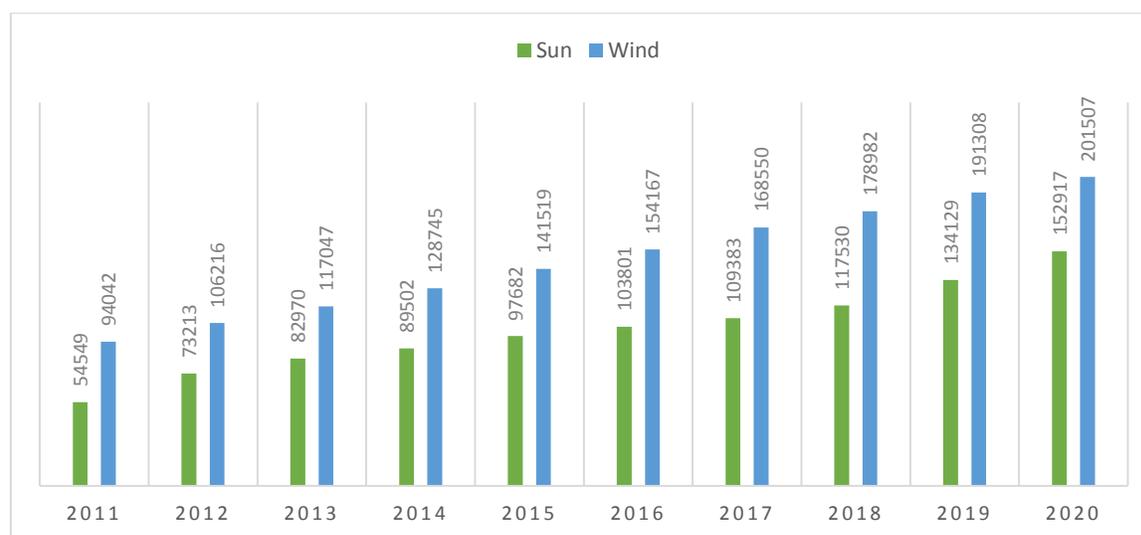
²⁵ <https://www.trade.gov/country-commercial-guides/turkmenistan-oil-gas#:~:text=The%20BP%20Statistical%20Review%20of,proven%20reserves%20of%20natural%20gas.>

In 2020, Turkmen gas accounted for 15% of China's total gas consumption. Since 1991, Russia has been a major importer of Turkmen natural gas and has been re-exporting Turkmen natural gas to Europe at a low price. In 2021, Russia planned to buy approximately 10 billion cubic meters (353 billion cubic feet) of gas from Turkmenistan, nearly double the quantity imported in 2020.²⁶²⁷

Alternative energy sources

Renewable energy sources play an important role in the energy system of the European Union (EU). In 2004, the EU received 8.5% of its total energy consumption from renewable energy sources, but in 2019 this figure rose to 19.7%.²⁸ According to the EU's energy strategy for 2020 and 2030, the share of renewable energy resources was expected to increase to 20% and 27%, respectively. Last year, the EU achieved its first goal. Thus, for the first time in the history of the EU, the share of renewable energy sources in electricity production last year exceeded hydrocarbon sources. The main reason for this is the doubling of the capacity of solar and coal power plants within the Union in the last 5 years. That is why last year, solar and wind energy alone accounted for 20% of the EU's total electricity production. The share of coal decreased by 20% to just 13%.

Figure 8. Solar and wind power generation capacity in the European Union



Source: IEA.org

At present, two main strategies have been identified in the EU as part of the transition to green energy. It should be noted that the European Union aims to reduce carbon emissions by 40% by 2030 (compared to 1990) by December 2020. However, the Union countries increased their ambitions to

²⁶ <https://www.eurasian-research.org/publication/turkmenistan-russia-energy-cooperation-in-the-context-of-natural-gas-trading/>

²⁷ <https://eurasianet.org/turkmenistan-big-on-gas-short-on-options>

²⁸ [https://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics#:~:text=In%202019%2C%20renewable%20energy%20sources,sources%20\(35%20%25%20each\).](https://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics#:~:text=In%202019%2C%20renewable%20energy%20sources,sources%20(35%20%25%20each).)

55% in December 2020. It aims to reduce carbon emissions to zero by 2050. Thus, the European Union is significantly increasing its investment in green energy technologies to achieve these goals. In this context, it is planned to allocate at least 100 billion euros to the member countries with the highest carbon emissions between 2021 and 2027. All this, in turn, accelerates the transition to green energy in the European Union.

Sweden, Finland and Latvia share the top three places in the EU for the use of alternative energy. Sweden gets 55% of its total energy consumption, while Finland gets 41% from renewable energy sources.²⁹ Norway is one of the best examples of energy-rich countries. Thus, about 98% of electricity in this country comes from alternative energy sources.³⁰ The oil and gas produced are mainly exported to bring foreign currency to the country. The world's largest oil fund is located in Norway and currently has about \$ 1.3 trillion in funding.

Conclusion

The study concludes that the European Union is highly dependent on Russian gas. The European Union will have difficulty finding sources to overcome this dependence. It does not seem realistic for the European Union to attract gas from alternative energy and other sources (Azerbaijan, Algeria and Turkmenistan) in the short term. In the mid and long term, the European Union has the potential to overcome dependence.

By increasing alternative energy and getting more gas from sources such as Azerbaijan, Algeria and Turkmenistan, it can eliminate dependence in the mid and long term. Another source country could be Iran. The European Union can take steps to eliminate gas dependence by improving relations with Iran.

The EU must work with alternative countries by reducing gas supplies from the north to reduce its dependence on Russia and targets for alternative energy must be met in order to completely eliminate dependence.

These findings debunk popular beliefs about interdependence's pacifying effects, demonstrating that interdependence can worsen security conflicts, especially when it is concentrated on a single sector and falls short of complex interdependence.

²⁹ <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-4c.html>

³⁰ <https://www.statista.com/statistics/1025497/distribution-of-electricity-production-in-norway-by-source/>

Recommendations

There are some following recommendations for erasing the dependency of the EU on Russian gas.

- 1) Finding alternative energy sources to expand in a new market that is not traditional
- 2) Provide technical assistance to participating countries to increase the capacity of the Southern Gas Corridor
- 3) Intensification of negotiations in Brussels and Astana for Turkmenistan's accession to the Southern Gas Corridor
- 4) Ensuring the supply of more gas to the European market under the tripartite Swap contract between Turkmenistan, Azerbaijan and Iran
- 5) Further increase in political, economic and financial support for the delivery of more gas from Algeria to Europe
- 6) Development and implementation of a new program to expand gas savings in Europe
- 7) Systematize the use of alternative energy sources in Europe

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