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Course of Energy and Climate Change Policy

The role of natural gas in the European energy policy

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INTRODUCTION

Energy has always been a crucial element in human development and the power to ensure energy supply to the territory under their jurisdiction became a key priority for all States. In the last centuries, the world has witnessed an unprecedented growth in global energy demand, necessary for the modernisation of industry and society, which led to an increasing exploitation of fossil fuels, namely coal, oil and natural gas. Natural gas gained an important role in the global energy system, in particular after the oil shocks of 1973 and 1979, when European States aimed at reducing their dependency on oil from the Middle East. Natural gas, as the other fossil fuels, is not homogeneously distributed throughout the world. Europe, in particular, is not well endowed with this important source and, soon after the birth of a European gas market, it became dependent on a small number of suppliers, first of all the Soviet Union.

The outbreak of the war in Ukraine on 24th February 2022 and the unanimous reaction by the European Union to the illegal invasion of Ukraine caused, among others, a serious threat to the security of natural gas supply in Europe due to the sharp reduction of Russian natural gas imports. The European Union and its Member States acted promptly and secured a stable supply of natural gas during winter 2022/2023; however, several challenges will need to be faced in the near future. The European Union in the last years set ambitious climate targets for the reduction of greenhouse gas emissions deriving from fossil fuels production and consumption. Consequently, decisions taken in order to guarantee the security of gas supply in the next few years need to be evaluated against these environmental targets.

The goal of this thesis is to discuss the role of natural gas in the European energy policy and its future prospects, taking into consideration the impact of the war in Ukraine on the European energy system and the climate targets which the European Union is bound to. To this aim, the evolution of the European natural gas market will be analysed, from the beginning to the present days, with a view on both the European Union legislation and the international relations of its Member States, in order to understand what was the natural gas context in Europe at the time of the Russian invasion of Ukraine in February 2022 and how vulnerable the whole system was.

The first chapter will focus on the historical evolution of the natural gas system in Europe, from the first discoveries in the late 1950s to the natural gas crisis of winter

2021/2022, before the beginning of the war. The aim of the chapter is to understand how the natural gas market in Europe evolved and to explain why Europe was so highly dependent on Russian natural gas imports at the moment of the invasion of Ukraine in February 2022. It will be first described the birth of the European natural gas market in the 1960s thanks to the discoveries of significant gas reserves in Northern Europe. Then, the chapter will analyse the emergence of the relationship on natural gas between Western Europe and the Soviet Union during the 1960s and 1970s and the subsequent construction of four main pipeline systems, beginning from the Brotherhood system to the more recent Nord Stream 2, describing as well the failed project of South Stream. Thirdly, it will be illustrated the impact of the oil shocks of 1973 and 1979 on the evolution of the European gas market and how it led Italy to sign an agreement with Algeria for the construction of the Transmed pipeline connecting the two countries and bringing Algerian natural gas to Italy. Moreover, the chapter will give a clear picture of the natural gas context before the beginning of the war in Ukraine, by analysing the main trends of production, consumption and import dependency of natural gas in Europe and the role of the liquefied natural gas (LNG). Finally, it will be discussed the energy crisis that hit Europe during winter 2021/2022, by first explaining the natural gas pricing mechanism and its historical development.

The second chapter will study the European legislation on natural gas matters, highlighting the three main areas of action: liberalisation of the market, sustainability of energy supply and security of supply. Regarding the first aspect, the concepts of unbundling, third party access and eligible customers will be analysed, focusing on Directive 98/30/EC and the Third Energy Package, reformed by Directive (EU) 2019/692, which extended the scope of application of liberalisation rules to gas transmission lines from and to third countries. Secondly, it will be illustrated the development of the climate targets set by the European Union in order to decarbonise the energy sector, which has a significant impact on the consumption of natural gas in the EU. Finally, the chapter will focus on the security of supply, specifically on its definition and the Regulations adopted on this issue. They envisage an immediate response to emergencies in which the security of natural gas supply is under threat. Some of these measures have been triggered during 2022, as a consequence of the sharp reduction of Russian gas supplies following the invasion of Ukraine.

Chapter 3 will analyse the impact of the war in Ukraine on the European natural gas market. It will first illustrate the pathway which led to the decline of Russian gas

supplies to Europe, explaining the decree adopted by the Russian President Vladimir Putin imposing on European buyers the payment of Russian natural gas in roubles. It will then focus on the response of the European Union to the gas crisis through the adoption of several legislative packages, which contributed to the reduction of gas demand and the security of gas supply during winter 2022/2023. Subsequently, it will be analysed the diversification attempts of the European Union and its Member States, paying attention to the feasibility of the agreements sealed with natural gas suppliers. Finally, the challenges that the European Union will have to face during winter 2023/2024 will be discussed.

As a conclusion, the last chapter will focus on the future prospects for the natural gas system in the European Union, particularly taking into consideration both the climate targets, which require a reduction of natural gas consumption, and the estimated decline of the European gas demand in the near future. It will be discussed how the European Union could secure the necessary natural gas supplies, given the import gap left by the substantial reduction of Russian gas deliveries during the last months, without, at the same time, risking to undermine the ambitious, but fundamental, climate goals for the transition towards a clean energy system based on a high share of renewable sources. For that purpose, some policy recommendations will be proposed.

CHAPTER 1

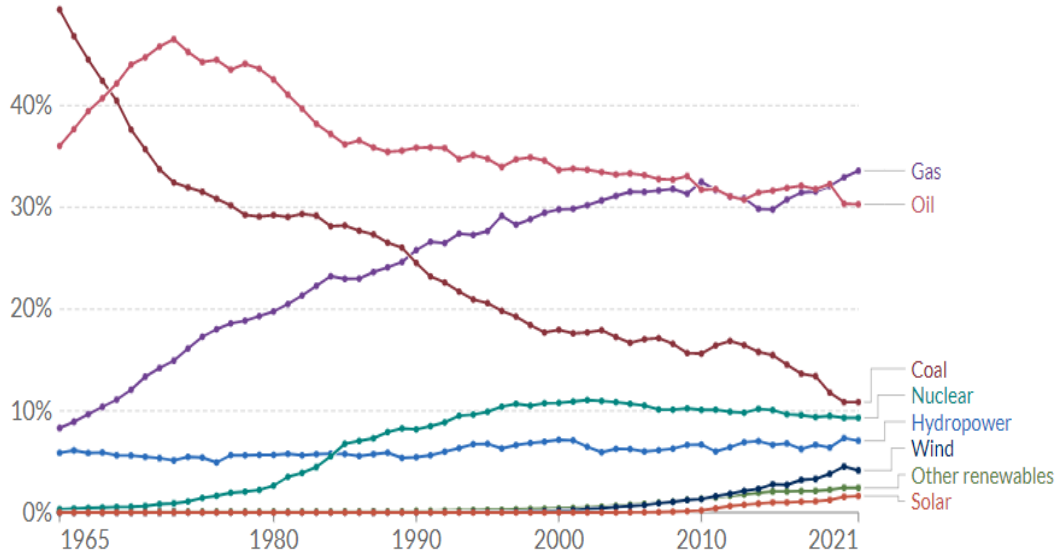
THE DEVELOPMENT OF THE NATURAL GAS MARKET IN EUROPE

1.1. The 1960s: first discoveries and the beginning of a European natural gas market

The United States were one of the first countries to develop a natural gas market. In fact, in 1950, they represented 90% of the production and consumption of natural gas globally[1]. In Europe, the era of natural gas began only at the end and after the Second World War, with the first gas fields discoveries in Italy, the Netherlands and the North Sea. From that moment, the European gas market developed constantly and the share of natural gas consumption over the other energy sources grew steadily.

As shown by Figure 1.1 below, in 1965 the shares of energy consumption in Europe by source were the following: natural gas 8.30%, oil 36.04%, coal 49.44%, hydropower 5.86%: Almost 60 years later, in 2021, they were: natural gas 33.59%, oil 30.30%, coal 10.85%, hydropower 7.06%.

Figure 1.1: Share of energy consumption by source in Europe



Source: Our World in Data

[1] Joe Barnes et al., "Introduction to the Study", in *Natural Gas and Geopolitics: From 1970 to 2040*, ed. David G. Victor, Amy M. Jaffe, and Mark H. Hayes (Cambridge: Cambridge University Press, 2006), 3–26, p. 7.

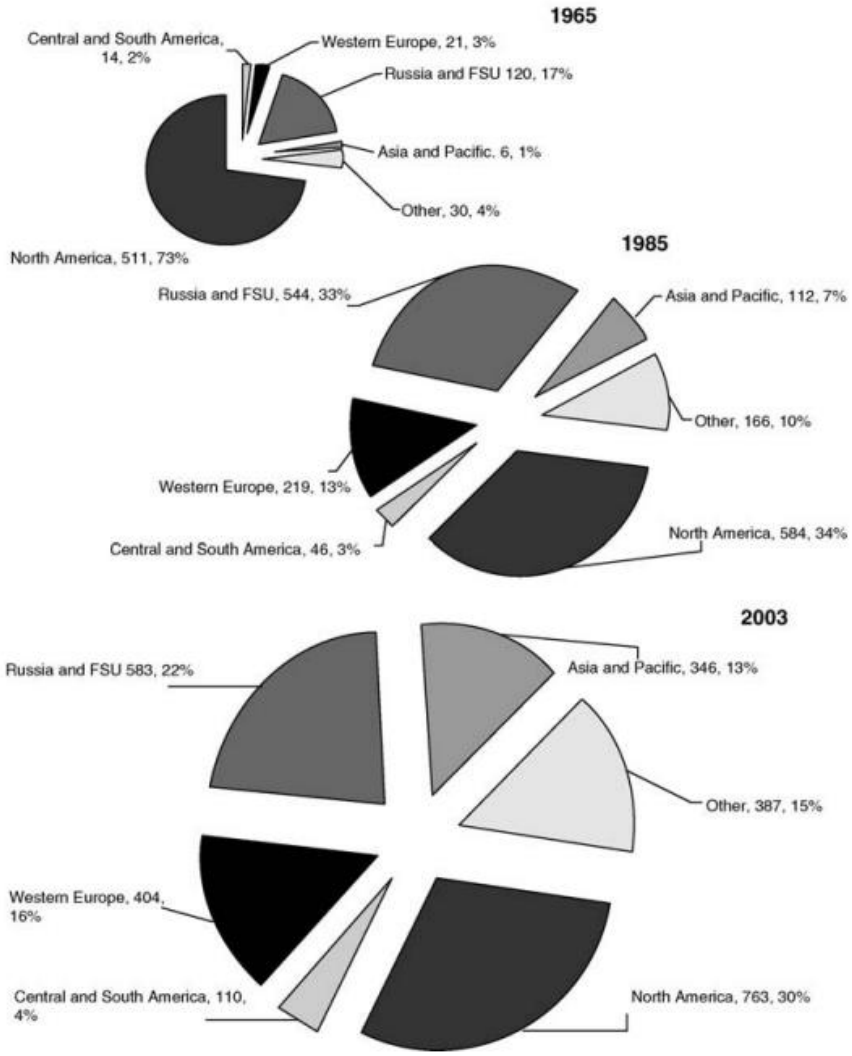
1.1.1. Development of the U.S. natural gas market

In the United States, in the late 19th century, four factors came together, creating the right environment for the development of a natural gas market: relatively large reserves, advanced technological development, in particular in the metallurgical industry, a vibrant market and, at the beginning, a regulatory void[2]. At first, natural gas was considered a waste product of the oil industry, but something changed in the 1880s. In those years, a Pennsylvania oil family, the Pews, started to sell it as a fuel for the oil fields and in 1883 they inaugurated a pipeline to Pittsburgh, the first to supply a big city. As a result, Standard Oil, an American company that operated from 1870 to 1911 in the production, transportation, refinement and marketing of oil, created the Natural Gas Trust, which began piping the natural gas thrown off by the oil industry throughout the United States: at the beginning of the Second World War, in 1940, natural gas represented 12.1% of the U.S. total fossil fuel production.

Figure 1.2 shows the worldwide consumption of natural gas in 1965, 1985, and 2003, with pie charts being proportional in size to total consumption and statistics indicating total consumption in billion cubic metres (bcm) and share of the total. It highlights the decline in the U.S. natural gas consumption over the years, going from 73% of the global consumption in 1965 to 30% in 2003.

[2] Thane Gustafson, *Bridge: Natural Gas in a Redivided Europe* (Cambridge: Harvard University Press, 2020), p.12.

Figure 1.2: Worldwide consumption of natural gas in 1965, 1985 and 2003



Source: British Petroleum, 2004

1.1.2. First natural gas fields discoveries in Italy and France

One of the factors which most influenced the direction of the development of the European natural gas market during the last 70 years was the lack of significant gas reserves. Most of them are located in Norway, the Netherlands, the United Kingdom, Romania, Germany, Italy, Denmark and Poland (from the largest to the smallest producer). In 2015, Norway, the European country with the largest proved gas reserves, 2456 trillion cubic metres (tcm), represented only 1% of global gas reserves. The European Union could count only 1722 tcm[3]. In the same year, Russian proved gas

[3] Agnia Grigas, The New Geopolitics of Natural Gas (Cambridge: Harvard University Press, 2017), pp. 137-174.

reserves amounted to 17.4% of global gas reserves, and the Middle Eastern ones to 42.7%. In addition, discoveries of new gas reserves have been made offshore Cyprus and Israel, whereas production in the European Union has declined steadily. Taking into consideration the current Member States of the European Union and the United Kingdom, natural gas production reached its peak in 1996 at 272 bcm, 35% of which produced by the Netherlands and 33% by the United Kingdom. In 2015, the total amount was 136 bcm, a half in comparison to 1996, which led the European Union to rely increasingly on imports, as it will be analysed later in the Chapter. The share of natural gas on total energy consumption of the fifteen countries that composed the European Union before 2004 reached 23% in 2000 and remained stable since then, even though the enlargement of the Union led to an increase in absolute numbers[4].

In Western Europe, the first discoveries were made in Italy during the Second World War. In particular, Agip, the Italian state oil company, while carrying out exploration activities for oil, discovered relatively large natural gas fields in the Po Valley. Already in 1943, Agip conducted exploratory drillings in Caviaga, near Milan, which showed that it had gas reserves which amounted to billions of cubic metres, which was further proved in 1945-1946: it was an extraordinary discovery, the biggest reserve discovered in a single field in Western Europe until that time[5].

After 1945, Enrico Mattei took the leadership of Agip. Further explorations led to the discovery of other natural gas fields in the Po Valley, namely in Ripalta (1947) and Cortemaggiore (1949). Mattei understood the potential of natural gas, which was not only a substitute for oil but could also represent a strategically important fuel, a cheaper and more functional substitute for imported coal for Italian industries of the North, which were growing a lot in that period[6]. For this reason, several pipeline facilities were laid by the two state-owned companies, Agip and Snam, to supply the industrial activities in the area, leading to more economic growth and revenues from natural gas sales, which were re-invested in the gas sector. In 1953, Ente Nazionale Idrocarburi (ENI) was established under the leadership of Enrico Mattei and was given the mission by the Italian government to meet the growing Italian energy demand. As

[4] *Ibidem*

[5] Fabio Catino, "L'Italia Non è Un Paese Povero: Dall'Agip All'Eni," Treccani, 2013, https://www.treccani.it/enciclopedia/l-italia-non-e-un-paese-povero-dall-agip-all-eni_%28Il-Contributo-italiano-alla-storia-del-Pensiero:-Tecnica%29/.

[6] Mark H. Hayes, "The Transmed and Maghreb Projects: Gas to Europe from North Africa,". In *Natural Gas and Geopolitics: From 1970 to 2040*, ed. David G. Victor, Amy M. Jaffe, and Mark H. Hayes (Cambridge: Cambridge University Press, 2006), 49–90, p. 55.

a result, Italy, by 1965, became the largest gas market in Western Europe, both in terms of production and consumption. However, it soon became evident that Italian national resources were not enough for the Italian growing economy[7].

During the Second World War, France made a relative small discovery of a natural gas field, which could serve Toulouse and Bordeaux. Another significant discovery was made at Lacq in 1957. However, as in the case of Po Valley, these discoveries did not allow to build nation-level gas systems and did not lead to cross-border exports[8]. For that, Europe had to wait two more years.

1.1.3. First discoveries in Northern Europe: birth of a European gas market

In the following years, Europe witnessed further important discoveries of natural gas fields: the Groningen field in the Netherlands in 1959 and the North Sea fields in the 1960s by the United Kingdom and Norway.

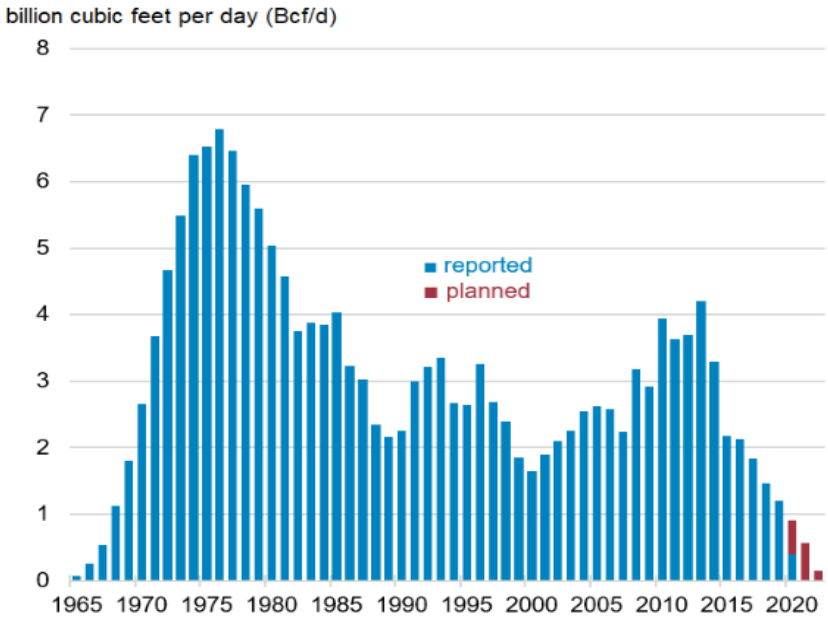
The discovery of the Groningen gas field marked a crucial step for the development of a European gas market. In fact, for the first time, Europe could count a "world-class gas field"[9], which not only could serve the domestic market but also allowed the export to other countries. Moreover, it was cheap enough to compete with coal. From that moment, production and construction of pipelines started, in order to reach Belgium, Germany, France and Italy. The growth of production was fast: since the year of its creation in 1963, GasUnie, a company founded by a public-private partnership between the State of the Netherlands (50%), ExxonMobil (25%) and Royal Dutch Shell (25%), went from shipping 500 million cubic metres to 95 billion cubic metres per year by the mid-1970s. Pipelines, then, connected Groningen to Belgium and Germany in 1965, to France in 1966 and to Italy in 1977[10].

In 2021, the Netherlands represented approximately half of the European Union's natural gas production, more than Romania and Germany together. However, its production is declining. In fact, due to seismic risks connected to the production activities at the Groningen field and to an unusual earthquake happened in 2018, the country decided to reduce gas production: in 2013 it amounted to 53 bcm per year, and

[7] Ivi, p. 56.
[8] Barnes et al., "Introduction to the study", 16.
[9] Gustafson, *Bridge: Natural Gas in a Redivided Europe*, p. 20.
[10] Ivi, pp. 20-29.

in 2018 it decreased to just 20 bcm. Since then, it has been reduced even more, reaching 3.9 bcm in 2022[11]. The goal declared by the Dutch authorities is to end all operations by 2024-2025, which has not changed even in the aftermath of the Russian invasion of Ukraine that started on 24th February 2022, whose consequences on the European gas market will be analysed in Chapter 3[12]. In October 2022, the Netherlands capped the production at 2.9 bcm per year[13].

Figure 1.3: Groningen field natural gas production



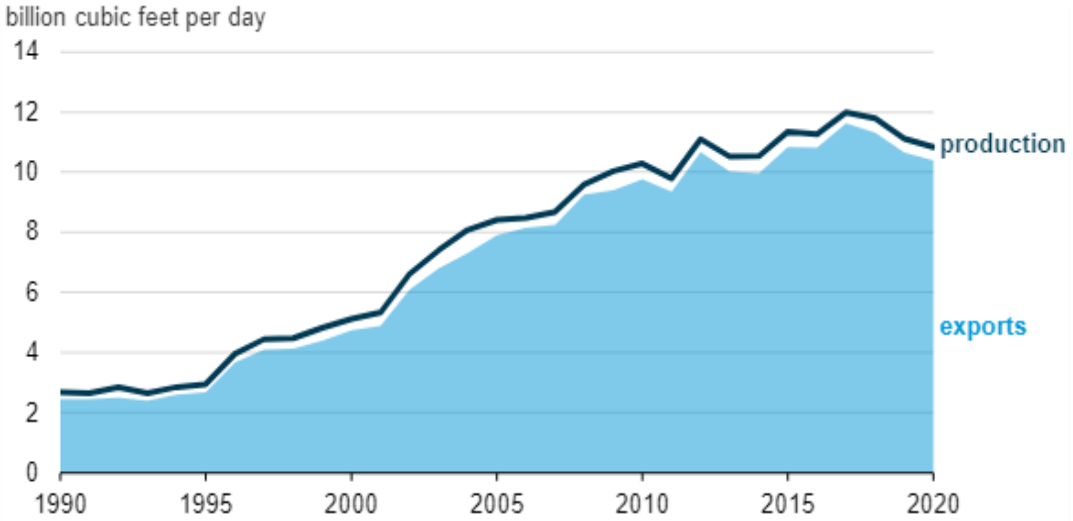
Source: U.S. Energy Information Administration, 2019

The North Sea witnessed the next great discoveries in the 1960s. In 1965 a gas field was discovered by British Petroleum (BP) at West Sole, in the British sector. Later, in 1969 the Ekofisk field and in 1971 the Frigg field were discovered in the Norwegian sector, where gas production started in 1977. The Scandinavian country is still a significant producer of natural gas for the European market, while the natural gas produced from the fields in the British sector is mainly aimed at meeting domestic gas demand. Norway, with larger reserves than the United Kingdom and with great hydropower capacity, exports a large part of its natural gas, supplying one-fifth of

[11] Leonardo Bellodi and Lucio Caracciolo, *Gas E Potere: Geopolitica Dell'energia Dalla Guerra Fredda a Oggi* (Rome, Italy: Luiss University Press, 2022), p. 57.
[12] Bart Meijer, "Dutch Limit Groningen Gas Production despite Energy Crisis," *Reuters*, September 26, 2022, https://www.reuters.com/business/energy/dutch-limit-groningen-gas-production-28-bcm-20222023-2022-09-26/.
[13] Alice Hancock, "Dutch Gasfield That Caused Earthquakes Earned Oil Majors Billions," *Financial Times*, February 25, 2023, https://www.ft.com/content/bf4e5a9e-b5bb-44cb-9593-dbe1b56bb9f6.

pipeline gas to continental Europe in 2020[14]. In 1990, it exported 92% of total natural gas production and, since then, the percentage has remained stable, with an average export of 94% over the production[15]. Figure 1.4 shows the annual dry natural gas production and exports in 1990-2020: it can be noted that export covers almost all the natural gas produced.

Figure 1.4: Norway annual dry natural gas production and exports (1990-2020)



Source: U.S. Energy Information Administration, 2020

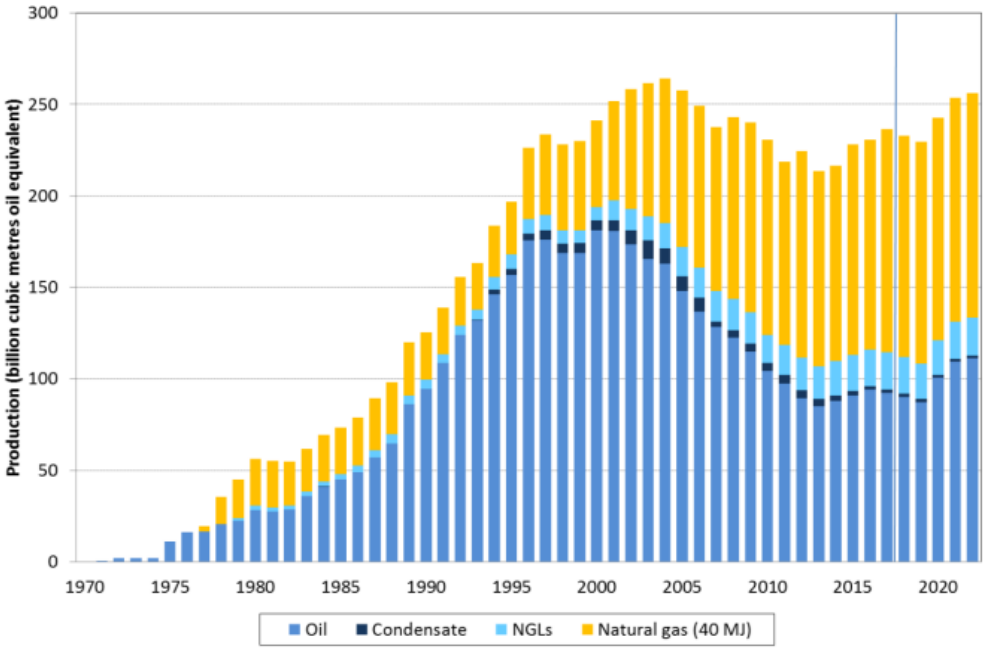
At first, in Norway market and policy considerations restrained the full development of gas resources: oil production and export represented a top priority for the Norwegian government. Three factors were holding back the full development of the gas sector: the need to find European customers willing to sign long-term deals, the need to find investments for building new infrastructures and pipelines and the government's decision to prohibit the gas flaring offshore. The restraints went away with the discovery of the large Troll field in 1979-83, whose natural gas was first produced in 1996 and the resulting contracts for gas sales to continental European countries were agreed in 1986-1990[16]. As shown in Figure 1.5 below, after 2000 gas output has highly increased and in 2012 it surpassed oil output.

Before the war in Ukraine, Norway was the second exporter of natural gas to the European Union after Russia, ranging between 20% and 25%. Mainly, it provides

[14] Gustafson, *Bridge: Natural Gas in a Redivided Europe*, p. 137.
[15] Kimberly Peterson, "Norway Remains a Significant Natural Gas Supplier to the European Union," Homepage - U.S. Energy Information Administration (EIA), November 2022, https://www.eia.gov/todayinenergy/detail.php?id=54479.
[16] Marshall Hall, "Norwegian Gas Exports," *The Oxford Institute For Energy Studies*, 127, March 2018, 1–27, https://doi.org/10.26889/9781784671037, p. 1.

submarine pipeline gas to Germany, France and Belgium and also liquified natural gas (LNG)[17] from Hammerfest terminal, shut down in 2020 due to a fire at the facility and re-opened in June 2022, mainly to France and Spain[18].

Figure 1.5: Norwegian liquids and gas production



Source: The Oxford Institute for Energy Studies, 2018

Besides the important discoveries in the North Sea, the United Kingdom was the first country in the world to house an import LNG terminal, the Canvey Island LNG Terminal, now shut down, which started to receive LNG from Louisiana on the U.S. Gulf Coast and then in 1964 from Azrew, Algeria. In 1965, France received LNG from Algeria as well, followed in 1969 by Spain[19].

LNG technology is the one which permitted the natural gas market to become truly global. In fact, while pipelines are limited to a specific area, LNG is more flexible as to destination and can be traded over long distances. LNG trade had a slower development, due to the cost and improvement of the technology and incidents in the first attempts: the first commercial LNG plant in the world, in Cleveland, Ohio, suffered

[17] LNG is a mixture consisting mainly of 80-90% methane and a decreasing proportion of ethane, propane, nitrogen and heavier hydrocarbons. A cooling process at cryogenic temperatures (around -162°) at atmospheric pressure reduces its volume by 600 times, allowing it to be stored in insulated storage tanks or loaded onto special LNG carriers for transport by sea. Source: Filippo Clô, "Il Gas Naturale Liquefatto: Evoluzione Di Un Mercato Sempre Più Globale," in *Energia e Geopolitica Gli Attori e Le Tendenze Del Prossimo Decennio*, ed. Matteo Varda (Milan, Italy: ISPI, 2014), 127–54. p. 128.
[18] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 58.
[19] Grigas, *New Geopolitics of Natural Gas*, pp. 137-174.

an explosion in 1944, which killed 128 people and was consequently shut down[20]. Today LNG trade has expanded considerably.

1.2. The rise of Western Europe-Soviet Union natural gas relations

While transnational pipelines were being built from Groningen to other European countries, in the east other natural gas connections were being made: in 1944, Ukrainian gas fields were connected to Poland and in 1967 to Czechoslovakia. It seemed, thus, that in 1966-67 two distinct regional pipeline systems were under construction: on the one hand, Dutch gas served NATO members and the European Economic Community (EEC), on the other, Soviet gas was destined for Poland and Czechoslovakia, building on the cooperation system of the Council for Mutual Economic Assistance (COMECON)[21]. The pipeline that arrived in 1967 in Czechoslovakia was named "Bratsvo" (Brotherhood). However, in just a few years, from the late 1960s to the early 1970s this "curtain" fell.

1.2.1. The first gas deal between Western Europe and the Soviet Union

European demand for gas was growing fast and new gas fields were discovered in the Soviet Union, in particular, the huge reserves of West Siberia during the 1960s. Austria was the first country of the European Communities to import Soviet gas resulting from a three-year contract signed with Soviet authorities in 1968. On the one hand, Austria had the strongest need, among the Western European countries, to import Soviet gas: it lacked domestic coal resources and, even though it had been one of the first countries to turn to natural gas industries, thanks also to relatively large gas deposits near Vienna, gas demand was growing and domestic gas production could not meet it[22]. However, the growing necessity of imports could not explain alone how a contract between a Western country and the Soviet Union came into being during the Cold War. In fact, "selling gas is not like selling oil; it is traditionally a business of

[20] Barnes et al., "Introduction to the study", p. 10.
[21] Per Högselius et al., "Natural Gas in Cold War Europe: The Making of a Critical Infrastructure," in *The Making of Europe's Critical Infrastructure*, ed. Per Högselius, Arne Kaijser, and Anique Hommels (London: Palgrave Macmillan, 2013), 27–61, p. 30.
[22] Ivi, p. 33.

relationships"[23]. Two factors can explain it: Austria had become a neutral country only a few years before and, more importantly, it had already built gas relations with Czechoslovakia, importing natural gas in exchange for steel pipe[24]. This relationship created a "loophole" in the Iron Curtain[25]. For this reason, when the Austrian state-owned oil and gas company Österreichische Mineralölverwaltung (ÖMV) came to know about the Soviet-Czechoslovak Bratsvo project, which would bring Soviet natural gas just 5 km from the Austrian border, in 1965, it started a dialogue with Moscow to build a cross-border pipeline and to join the Bratzvo system. However, Soviet authorities did not agree with this project due to the limited natural gas supply on their part[26].

Nonetheless, just a few years later, the Soviet Union and Italy, through ENI, started exploratory dialogues in order to build gas relations, in connection with the exploitation of the new gas field discoveries in West Siberia. In particular, they were discussing the building of the so-called Trans-European pipeline. As a result, ÖMV acted in two directions: in 1966, it approached Italy, hoping to get involved in this new project, and opened a dialogue with Moscow authorities again. ÖMV achieved its goal also thanks to the new cooperation with the Austrian state-owned steel company VOEST: in exchange for gas imports from the Soviet Union, it offered a large amount of steel pipe, to be used for the construction of the gas pipeline[27]. The agreement was signed in June 1968 and the first natural gas deliveries began on 1st September. In the meantime, ENI-Soviet Union negotiations failed in late 1967, but were soon re-opened.

1.2.2. 1969: the first long-term contract between ENI and the Soviet Union

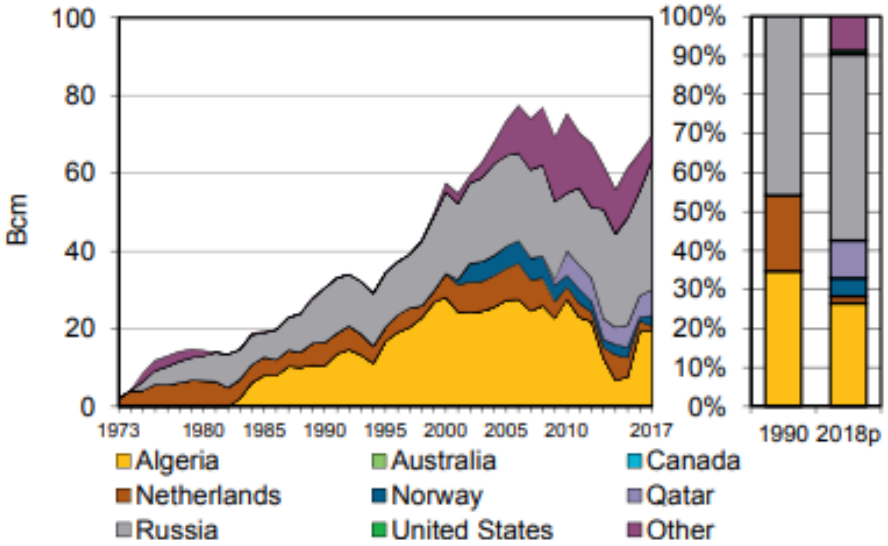
Italian state-owned ENI had good relations with the Soviet Union. In 1958, they had already concluded a contract on crude oil supply to Italy: around 80,000 tons of crude oil in exchange for 10,000 tons of synthetic rubber, various equipment and 240,000 tons of steel pipes, destined for the Soviet Union's industry sector. Another important agreement was signed in 1960, later renewed and extended in 1963, between ENI and Soyuzneftexport (later part of Gazprom), which first granted 12 million tons

[23] Gustafson, *Bridge: Natural Gas in a Redivided Europe*, p. 42.
[24] *Ibidem*.
[25] *Ibidem*.
[26] Högselius et al., "Natural Gas in Cold War Europe: The Making of a Critical Infrastructure," p. 32.
[27] Ivi, p. 33

of Soviet oil supply between 1961 and 1965 and then a further 25 million from 1965 to 1970[28].

In 1965, the newly appointed head of ENI, Eugenio Cefis, made a proposal to the Soviet Minister of Foreign Trade, Nikolay Osipov: in exchange for the supply of Soviet gas, Italy would provide the materials and technology necessary for the construction of the pipeline (at that time, the Soviet plans aimed at the realisation of a 6,000 km network of oil and gas pipelines). In 1967, the negotiations came to a stop, but in 1969 in Rome the Soviet Minister for Foreign Trade, Nikolay Osipov, and Eugenio Cefis signed a twenty-year contract, which stipulated that ENI would receive 6 bcm of natural gas per year via Ukraine through the Austrian-Czechoslovak border and in exchange it would grant Moscow a loan of 200 million dollars to buy the materials needed for the pipeline construction from Italian companies[29]. Deliveries of Soviet gas began in 1975, after the expansion of the Brotherhood system in 1973[30]. Figure 1.6 shows the volume of imported natural gas in billion cubic metres by origin, from 1973 to 2018, in Italy. It can be noted the growing share of Soviet (and later Russian) gas imports over other suppliers, along with Algeria, which, until the Russia invasion of Ukraine, was the second exporter of natural gas to Italy.

Figure 1.6: Italy, gas imports by origin



Source: OECD, 2019

[28] Giovanna De Maio and Nicolò Sartori, "Le Relazioni Tra Italia e Russia," *Osservatorio Di Politica Internazionale*, November 2018, p. 13.
[29] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 11.
[30] Grigas, *New Geopolitics of Natural Gas*, pp. 95-136.

1.2.3. 1970: the first gas agreement between West Germany and the Soviet Union

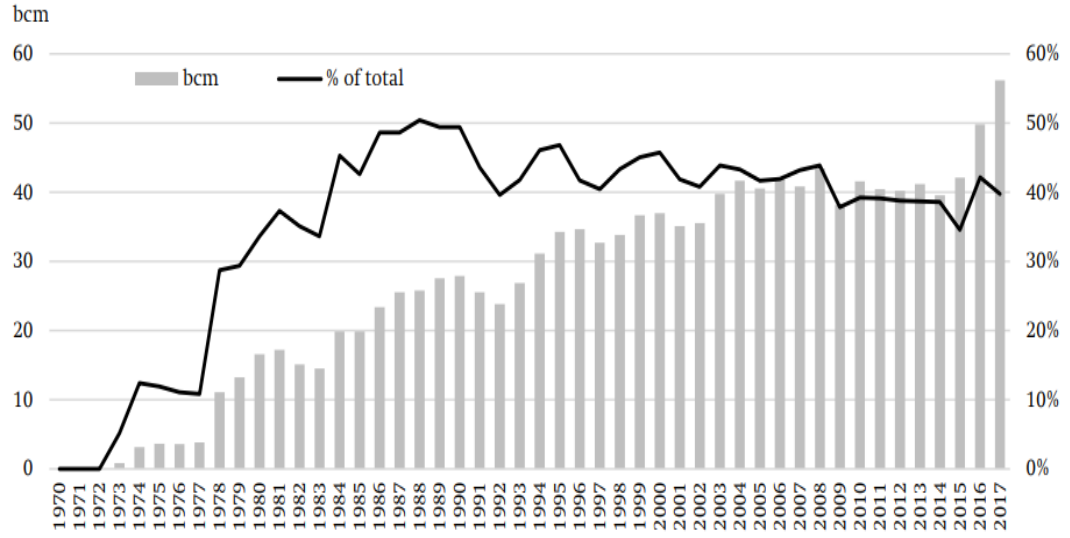
During the same years of the negotiations between Italy and the Soviet Union, Western Germany started negotiations with the Soviet Union for the supply of natural gas as well. In fact, in the 1960s, German demand for natural gas was growing fast, around 30-60% per year: especially in the Bavaria region, the urgency of importing more gas was clear[31]. On the German side, people who made possible an agreement between the two parties were Willy Brandt, the Minister of Foreign Affairs and Chancellor in 1969, Egon Bahr, advisor in the Foreign Office, and Klaus von Dohnavi, State secretary at the Ministry of Economy[32]. Willy Brandt, in particular, pursued a policy called *Ostpolitik*, which aimed at the reunification of the "two Germanies", by promoting détente and re-rapprochement with the Soviet Union[33]. The new agreement for gas supply was designed within the framework of the *Ostpolitik*[34]. Finally, on 1st February 1970, West German gas company Rhurgas, the largest gas distribution company in Germany (dissolved in 2013), signed a twenty-year contract for the import of Soviet gas, determining the first step towards the future Ruhrgas and Gazprom's cooperation[35]. As it happened for the Italy-Soviet Union natural gas agreement, the contract signed in 1970 envisaged that Germany would provide the counterpart with machines and high-quality industrial goods in exchange for Soviet gas[36].

The February 1970 agreement has been the cornerstone of the incipient Soviet-European gas relations and marked the first big step of the breach in the Iron Curtain on natural gas matters, which during the following years would continuously grow[37]. Until the outbreak of the war in Ukraine in February 2022, Germany was one of the most important European trade partners of Russia and the largest importer of Russian

[31] Gustafson, *Bridge: Natural Gas in a Redivided Europe*, p. 73.
[32] Högselius et al., "Natural Gas in Cold War Europe: The Making of a Critical Infrastructure," p. 33.
[33] Gordon A. Craig and Timothy Garton Ash, "Did Ostpolitik Work? The Path to German Reunification," *Foreign Affairs 73*, no. 1 (1994): 162–67, https://doi.org/10.2307/20045899.
[34] Tatiana Mitrova, Aurélie Bros, and Kirsten Westphal, "German-Russian Gas Relations A Special Relationship in Troubled Waters," Stiftung Wissenschaft Und Politik German Institute for International and Security Affairs, 13, RP (December 2017): 5–48, https://doi.org/10.13140/RG.2.2.33394.56003, p. 12
[35] Grigas, *New Geopolitics of Natural Gas*, pp. 95-136.
[36] Patrick Wintour, "'We Were All Wrong': How Germany Got Hooked on Russian Energy," The Guardian, January 2, 2022, https://www.theguardian.com/world/2022/jun/02/germany-dependence-russian-energy-gas-oil-nord-stream.
[37] Gustafson, *Bridge: Natural Gas in a Redivided Europe*, p. 72

gas. Figure 1.7 shows the share of Soviet (and later Russian) gas imports over the total imports in Germany, between 1970 and 2017. It can be noted that the share of Soviet gas increased over time and reached the peak of 50% in 1980, and only slightly decreasing afterwards, remaining stable around 40%.

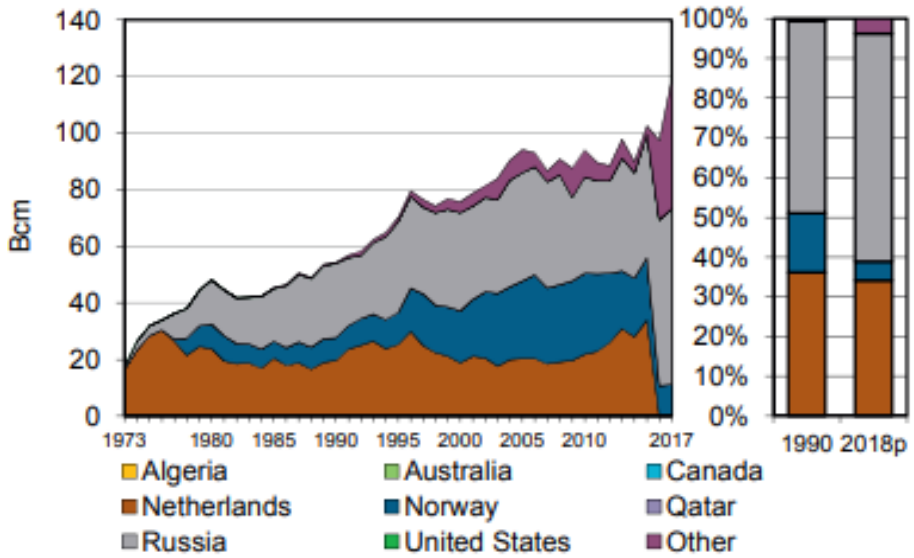
Figure 1.7: German gas imports from USSR/Russia 1970-2017



Source: Aurélie Bros, Tatiana Mitrova, and Kirsten Westphal, 2017

Similarly, Figure 1.8 below shows the amount of natural gas imports expressed in billion cubic metres by origin, from 1973 to 2018, in Germany. It can be noted the growing importance in terms of share of Soviet (and later Russian) gas imports over the other suppliers.

Figure 1.8: Germany, gas imports by origin

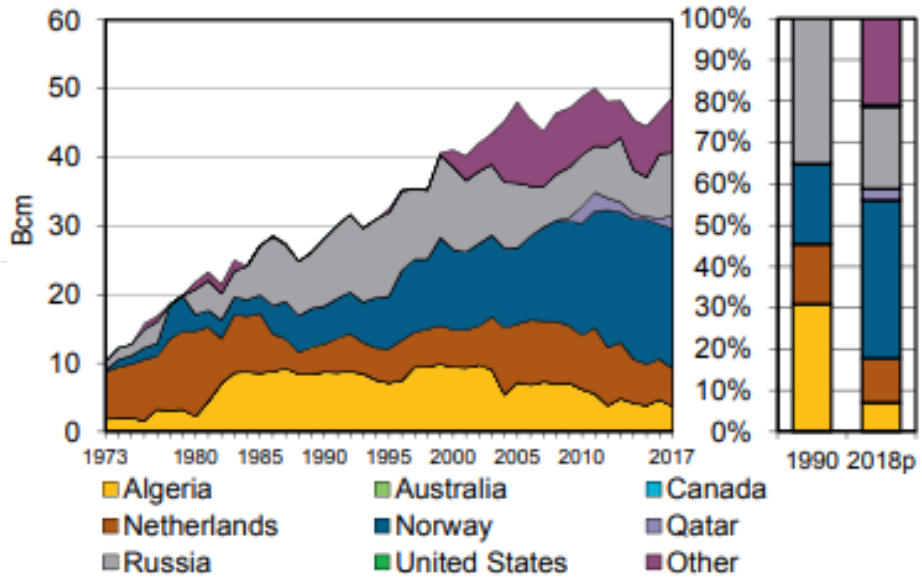


Source: OECD, 2019

1.2.4. First exchanges of natural gas between France and the Soviet Union

France, in September 1969, signed a contract for the import of Soviet natural gas in exchange for the delivery of pipe and equipment for the Soviet gas industry, starting in 1976. Moreover, to be able to receive Soviet natural gas (the Brotherhood pipeline system only reached West Germany in 1980), it sealed swap arrangements with Italy: France would receive the Groningen gas contracted by Italy, while Italy would receive the Soviet gas destined for France[38]. Figure 1.9 shows the share of imports of natural gas expressed in billion cubic metres by origin, from 1973 to 2018, in France. It can be noted that, differently from Germany and Italy, the Soviet (and later Russian) gas was never the predominant supplier of natural gas in this country.

Figure 1.9: France, gas imports by origin



Source: OECD, 2019

Finally, for what concerns the other European countries, Finland and Bulgaria received the first Soviet supplies in 1974, Hungary in 1975 and Yugoslavia in 1978[39].

[38] Grigas, *New Geopolitics of Natural Gas*, pp. 95-136.
[39] Högselius , Åberg, and Kaijser, "Natural Gas in Cold War Europe: The Making of a Critical Infrastructure," p. 36.

1.3. The 1970s: the oil shocks and their impacts on the European gas market

The 1970s marked the cornerstone for the development of the European gas market: the oil shocks turned the European countries towards natural gas as the preferred fuel. The first consequence of the 1973 oil shock was the setting as priority goal of the importing countries to reduce their dependency on oil from the Middle East countries[40]. Moreover, the price of oil became too high, and therefore it was substituted by coal, nuclear and natural gas, whose price grew as well, being indexed to the oil price, but not so dramatically.

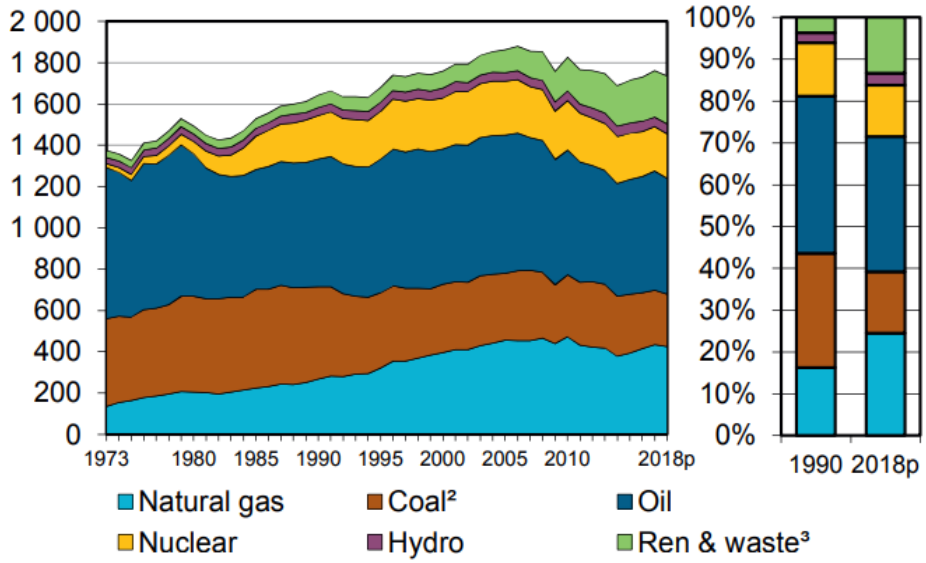
On the Soviet side, the oil shock in 1973 with the subsequent increase of natural gas price, indexed to the oil price, boost gas exports, allowing, at the same time, the maintenance of low internal gas prices. In the 1970s and 1980s, the Soviet Union had a twin-track approach to natural gas export: in the case of CMEA[41] countries, the Soviet authorities sold natural gas at lower prices and by barter exchanges, while exports to Western European countries were negotiated with higher prices, indexed at the oil ones. Moreover, exchanges with the West, facilitated by the period of détente of the 1970s, involved also the exchange of technologies and equipment necessary for the development of the industry sector in the Soviet Union. As a result, in 1980, 62.3% of the Soviet total hard currency revenues came from gas and oil exports, which amounted to $14.7 billion[42].

The European countries, in particular, increased natural gas consumption in order to diversify away from oil. First of all, they reacted to the oil shocks by diversifying their energy mix, reducing their vulnerability due to dependency on oil from OPEC countries. Secondly, after the first period of high excitement for nuclear energy, disappointment for it grew due to rising technical and environmental concerns. In the same way, coal was increasingly considered harmful to the environment. As a

[40] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 14.
[41] "The Council of Mutual Economic Assistance (CMEA, also known as Comecon), set up in 1949 by the Soviet Union and the European countries which had adopted a Soviet-type socialist system after the War, was partly the formal expression of economic solidarity within the newly formed bloc, partly a response to the challenge of the Organisation for European Economic cooperation, set up in 1948 by 16 West European nations.". Source: Domenico Mario Nuti, "Economic Relations between the European Community and CMEA," *EUI Working Papers*, November 1988.
[42] Nadejda M. Victor and David G. Victor, "Bypassing Ukraine: exporting Russian gas to Poland and Germany," in *Natural Gas and Geopolitics: From 1970 to 2040*, ed. David G. Victor, Amy M. Jaffe, and Mark H. Hayes (Cambridge: Cambridge University Press, 2006), 122-68, pp. 131-132.

consequence, natural gas was considered the most eco-friendly fuel among the three[43]. Figure 1.10 below shows the evolution of total primary energy supply by fuel in the European countries of the Organisation for Economic Co-operation and Development (OECD)[44], from 1973 to 2018. It can be noted the growing share of natural gas over the years.

Figure 1.10: Evolution of total primary energy supply (TPES) by fuel in the European OECD countries



Source: OECD, 2019

1.3.1. Natural Gas: "too valuable to waste"

As a result of the oil shocks and the growing concerns for nuclear power, the Netherlands decided to limit natural gas exports from the Groningen field. The policy goal was to retain as much natural gas as possible: GasUnie, the Dutch gas company, was obliged to give up any additional contract for export and could only fulfil the existing ones. The impact of the policy change on European importers was mitigated by the discovery of new gas fields in the North Sea, beginning at the end of the 1960s, particularly in the Norwegian, British, Dutch and Danish sectors.

The Scandinavian countries, except for Finland that in 1974 started to receive Soviet gas, were isolated from the European natural gas pipeline system. In the first

[43] Högselius et al., "Natural Gas in Cold War Europe: The Making of a Critical Infrastructure," p. 36.
[44] The official members of the OECD are: Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

years of the 1980s, Denmark started to supply Southern Sweden and Germany, but, at the same time, the project to connect the North Sea to Soviet gas, by using pipelines across Sweden and the Baltic Sea, failed[45].

It is worth pointing out how, despite the growing importance of natural gas after the oil shocks, at first there was a twin-track approach to it: on the one hand, natural gas was considered "too valuable" for power generation, as clearly stated by a directive from the European Commission in 1975, but, on the other, there was a high demand of natural gas for the industrial and residential sectors. In fact, there was this idea of gas being a scarce good and therefore could not be wasted in power generation.

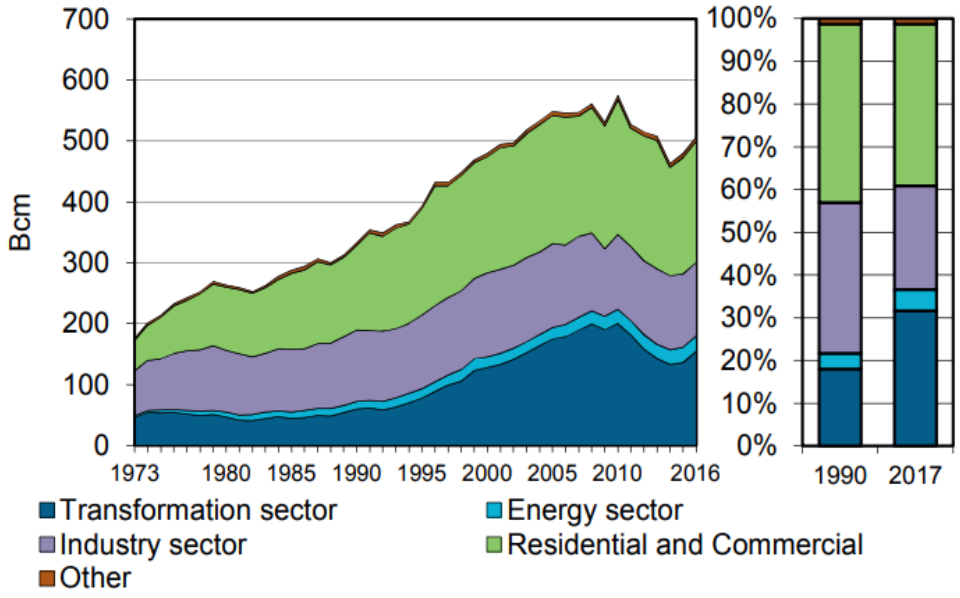
On 13th February 1975, the Council of the European Communities adopted a directive on "the restriction of the use of natural gas in power stations": it dictated that, given that natural gas "quantities available are limited" and has "great advantages for certain specific uses", it should be "converted into electricity only when it cannot be used for other purposes, or in cases of technical or economic necessity". However, it recognised the environmental importance of preferring natural gas over other fuels, by allowing that "special reasons relating to the protection of the environment" could "likewise necessitate the use of natural gas in power stations"[46]. The United States adopted the Fuel Use Act of 1977 with a similar aim.

Consequently, the gas consumption in power generation among the European OECD countries peaked at 32.5 bcm in 1975 and then started decreasing, reaching 25 bcm in 1985. There were, however, some differences among the countries. French and British share of natural gas consumption in the power generation sector was close to zero due to, respectively, pro-nuclear and pro-coal policies. Very differently, in these same countries, natural gas demand reached two-thirds of total energy demand in the industrial and residential sectors. Residential heating with natural gas boomed in the 1970s and 1980s, improving significantly the quality of life of the European citizens. However, in the 1990s, thanks to the high efficiency in power generation from natural gas sources achieved with the use of combined-cycle gas turbine technology, the "too valuable" to waste belief was overcome and a "dash for gas" began in those years[47].

[45] Högselius et al., "Natural Gas in Cold War Europe: The Making of a Critical Infrastructure,", p. 37
[46] Council Directive 75/404/EEC of 13 February 1975 on the restriction of the use of natural gas in power stations [1975] OJ L 178/24.
[47] Gustafson, *Bridge: Natural Gas in a Redivided Europe*, p. 87.

Figure 1.11 below shows the share of natural gas demand by sector among European OECD countries between 1973 and 2017. It can be noted the predominance of the residential and commercial, the industry and the transformation sectors.

Figure 1.11: Natural gas demand by sector in the European OECD countries



Source: OECD, 2019

1.3.2. France and Germany: two different outcomes for nuclear energy

In Europe, the response to the oil shocks in the 1970s was not homogeneous and two countries, in particular, decided to invest greatly in the nuclear sector, with two different outcomes. They were France and Germany. French vulnerability in the energy sector was already an issue before the first oil shock: national coal production was very low and therefore France had to import it, but the share of coal in primary energy demand went from 85% in 1950 to 16% at the beginning of the 1970s. The gap was met by cheap oil import, which reached 70% of primary energy demand on the eve of the crisis. Natural gas did not have a relevant role in the energy mix yet. Therefore, on 6th March 1974, after the first oil shock, the French Council of Ministers opted for a massive development of the nuclear sector: in the following two years, thirteen new reactors and a total of 12 gigawatts of new nuclear capacity should have been realised. The plan was presented as an emergency measure to counteract the oil crisis, but, in

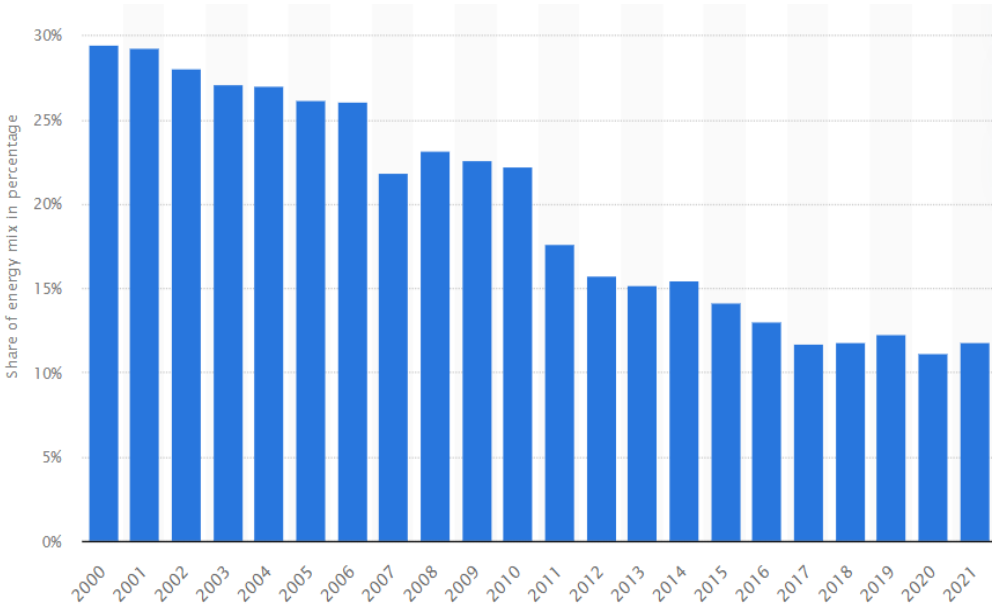
reality, it was the result of a twenty year-long planning, which enabled the development of skills and techniques needed for the program[48].

The development of nuclear energy in West Germany had a different course. As a reaction to the crisis, the oil primary consumption was cut back to 40% of the share by the 1990s and coal share declined as well and went from 75% in 1960 to 30% in 1980. In households, natural gas became the main fuel consumed, in particular for heating. However, in the power sector natural gas suffered from the "too valuable" belief and its share in power generation went from 0% to 18% in 1975 and then declined to 5% in 1980. As a consequence, the power generation sector was fuelled by coal and nuclear energy. The latter, in particular, grew fast, going from 1% in 1965 to 33% in 1990. However, after this strong growth and support, in the 1980s a new movement rose and shattered the consensus for the nuclear program: the anti-nuclear movement.

What differentiated the German experience from the French one was the level of preparedness and expertise at the time of the presentation of the nuclear policy: while, as already mentioned, in France the program was the result of two decades of research and preparation, in West Germany, there was, first of all, a lack of attention to safety issues and, given the lack of preparedness, its program started at a slower pace. On the eve of the first oil shock in 1973, West Germany had already built eight nuclear plants. Then, in September 1973, the Social Democratic Party of Germany (SPD) adopted measures to have fifty nuclear units by 1985. However, after just ten years the support for the program declined and the SPD itself began to oppose it[49]. In Germany, the anti-nuclear movement was successful in slowing the process through protests, electoral gains and the support of the administrative courts[50]. As a result, as shown by Figure 1.12, the share of nuclear energy in the German energy mix declined from the 29.5% in 2000 to 11.8% in 2021.

[48] Ivi, p. 93.
[49] Gustafson, *Bridge: Natural Gas in a Redivided Europe*, pp. 89-95
[50] Sarah Elise Wiliarty, "Nuclear Power in Germany and France," *Polity*, April 2013, 281–96, https://doi.org/10.1057/pol.2013.9.

Figure 1.12: Share of nuclear energy in the German energy mix



Source: Statista, 2023

1.3.3. Italy and Spain: two bridges to Algerian natural gas

In the early 1970s, in the attempt to diversify the energy mix of Italy, ENI, in parallel to the agreements with the Soviet Union and the Netherlands and the new Libyan LNG supplies to the regasification facility in Panigaglia, La Spezia[51], it began negotiations with Algeria and the Algerian gas company Sonatrach to import natural gas. It resulted in a twenty-five-year-long contract for the supply of 11.75 bcm of natural gas per year. However, while in the case of the deals with the Soviet Union and the Netherlands the choice of building or using existing pipelines was straightforward for geographical reasons, in the case of the Algerian gas the decision was made after a long internal debate[52].

The choice of importing Algerian gas was, for both Italy and Spain, between LNG and submarine pipeline, the latter requiring a strong technological development. During the 1970s, the debate within the ENI group was heated and the decision was grounded on several considerations. First of all, when exploratory talks were made in the 1960s to import Algerian LNG, the process of building infrastructure was considered too expensive and ENI began exploring other possibilities, in particular a submarine pipeline between North Africa and Italy. In 1969, the first preliminary

[51] Grigas, *New Geopolitics of Natural Gas*, pp. 137-174.
[52] Hayes, "The Transmed and Maghreb projects: gas to Europe from North Africa," p. 57.

feasibility study was carried out. In the meantime, in 1971, the supplies of Libyan LNG began and the project was characterised by continuous incidents and safety risks.

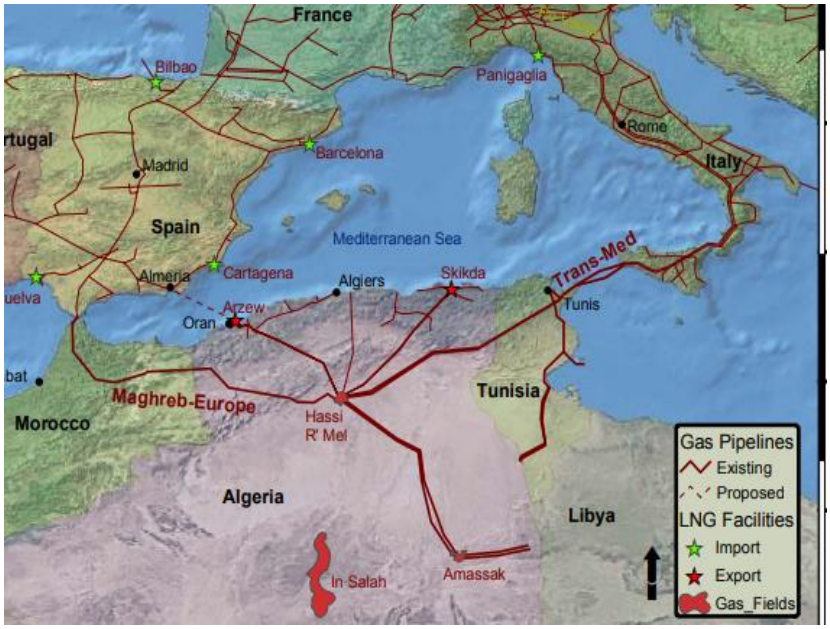
Conversely, Italian authorities considered that a pipeline could secure higher stability on the supply side, forging a long-term partnership between the supplier and the importer of gas[53]. Moreover, the project of a submarine pipeline received a strong support both by the Italian government and by the European Community, which, through the European Investment Bank (EIB), financed the project, in order to promote the expansion of natural gas consumption in "Mezzogiorno" in Southern Italy.

The agreement between Italy and Algeria was finally reached in 1977 and the construction of the pipeline, called Transmed, began in 1978 and finished in 1983. It is 2475 km-long: it departs from the Algerian gas field Hassi R'Mel, runs 550 km to the Tunisian border, from where it runs for 370 km until El Haouaria, on the Tunisian coast, and finally crosses the Mediterranean Sea to Sicily for 155 km[54].

Differently from Italy, in Spain, despite the proposals for building two pipelines from Algeria, supported by the French government as well, the Spanish gas company Enagas decided to import LNG and not pipeline gas. The decision was due to three main reasons: first, the lack of government support; second, the geopolitical tensions between Morocco, through which the pipeline to Gibraltar should have passed, and Algeria and the dispute in Western Sahara; third, the lack of technological expertise for building a long submarine pipeline. Nonetheless, in 1996, a pipeline, called Gaz Maghreb Europe, was built, passing under the Straits of Gibraltar, and bringing Algerian gas through Morocco to Spain and Portugal[55]. Figure 1.13 below shows the current existing gas pipelines which connect Algeria to Italy and Spain.

[53] Ivi, p. 58.
[54] "Trans-Mediterranean Natural Gas Pipeline," Hydrocarbons Technology, accessed May 26, 2023, https://www.hydrocarbons-technology.com/projects/trans-med-pipeline/.
[55] Hayes, "The Transmed and Maghreb projects: gas to Europe from North Africa," pp. 78-89.

Figure 1.13: Gas pipelines and LNG in Algeria, Italy and Spain

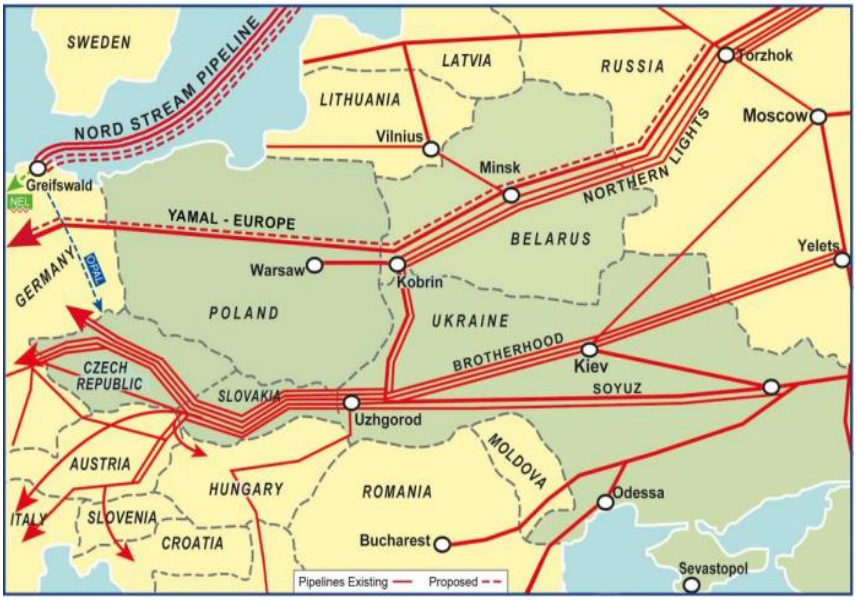


Source: Hayes, 2005

In 2020, Algerian gas represented 8.1% of EU gas imports.

1.4. Development of East-West natural gas relations: a history of pipelines

Figure 1.14: Key Russian gas export pipelines to Europe: Brotherhood and Northern Lights



Source: Oxford Institute for Energy Studies, 2020)

As analysed in the previous paragraph, the 1970s oil shocks increased the European gas demand and promoted an intensification of gas trade, in particular with

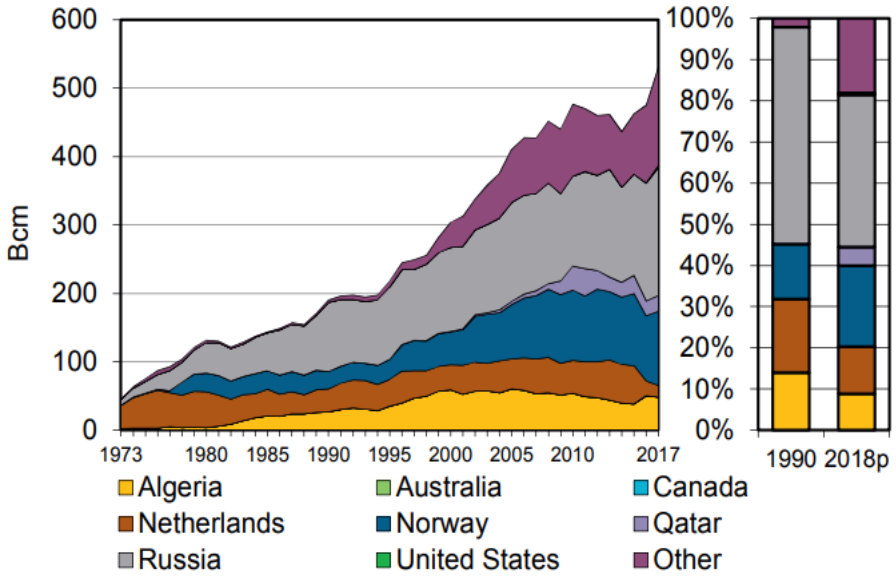
the Soviet Union and, after its dissolution, with Russia. The development of gas relations between the East and the West can be better understood by studying the development of the four main pipeline systems, which resulted in a complex network of gas import-export, as shown in Figure 1.14 above. The main four routes are the following. The Brotherhood (or Bratstvo) pipeline system, which consisted of several pipelines passing through Ukraine to Czechoslovakia, developed in different steps between the 1960s and the 1980s. In 1968 the agreement between the Austrian ÖMV and Soviet Union brought Brotherhood to Western Europe. The second system is Northern Lights, built during the 1970s, which brought Russian gas to the West going through Belarus, after the total depletion of Ukrainian reserves. The third is the Yamal-Europe pipeline, developed in different stages between 1994 and 2006, which brought Russian gas to Germany, passing through Belarus and Poland. Finally, the fourth one, the Nord Stream gas pipeline, called Nord Stream 1, was built between 2005 and 2012 and it connects Russia directly to Germany via the Baltic Sea. In 2015, Gazprom announced the project for the construction of the so-called Nord Stream 2, completed at the end of 2021, but it never came into operation.

In a few years, the change in the structure of gas exports to Europe became evident, showing an increasing share of Soviet gas, and the high degree of dependency on a small number of sources was already becoming a concern, especially within the European Community. In fact, in 1981, the Commission issued a Communication in which it highlighted how "the diversity of countries from which the Community imports natural gas is very small. Algeria, Norway and the USSR accounted for 97% of the European Community imports in 1980 (the remaining imports are accounted for by Libyan deliveries to Italy) and despite the possibility of new imports from other countries, they will continue to account for most imports in the foreseeable future."[56] In particular, accordingly to this document, in that year, natural gas supply from Norway accounted for 53% of the totality of imports, the Soviet Union for 40% and Algeria for 6%. The change is more evident if the percentages are compared to the ones of 1970: the main supplier of natural gas of the OECD European countries was the Netherlands with 31.4 bcm, while the Soviet Union accounted only for 1 bcm and Algeria for 1.6 bcm. In 1988, the absolute numbers of trade gas to these countries

[56] Commission of the European Communities, Communication of the Commission to the Council on natural gas, COM (81) 530, 1st October 1981.

quadrupled and reached 131.8 bcm, of which the Soviet Union gas accounted for 46.8 bcm, becoming the largest exporter[57]. The following figure shows the share of natural gas imports to the European OECD countries by origin starting from 1973. It can be noted an increasing share of Soviet (and later Russian) gas imports.

Figure 1.15: European OECD countries, gas imports by origin



Source: OECD, 2019

1.4.1. Construction of the Brotherhood and Northern Lights systems and the Urengoy-Pomary-Uzhgorod pipeline

The first Soviet gas pipelines to Europe were realised during the 1950s and the 1960s, initially aimed at supplying the Eastern Bloc and then reaching Western Europe through the expansion of the pipeline from Czechoslovakia to Austria agreed upon in 1968. In these first years, the Brotherhood system supplied the recipient countries with gas coming mainly from Ukrainian field, the production of which, after a few years, started to sharply decrease. For this reason, and after the discovery of huge gas fields in Siberia, the already-in-place pipelines started to export Russian instead of Ukrainian gas[58].

In 1976, a new system was inaugurated, the Northern Lights, which supplied the West with West Siberian gas. It is 7400 km long and has a capacity of 51 bcm per

[57] Grigas, *New Geopolitics of Natural Gas*, pp. 137-174.
[58] Ivi, pp. 95-136.

year. Initially, the gas came from the Vukhtyl field, but later the pipeline was connected to the Urengoy gas field[59].

Four years later, in June 1980, Helmut Schmidt, the Western Germany Chancellor, negotiated with the Soviet authorities the construction of a new pipeline to be included in the Brotherhood system, known as the Urengoy-Pomary-Uzhgorod line: it should have been 4800 km-long, from the newly discovered Urengoy field in West Siberia to the Western European countries[60]. The French companies wanted to be part of the project as well, and some months later the French gas company Gaz de France agreed to a contract with the Soviet counterpart Soyuzgas. The project was expected to allow a 40% increase in Soviet upstream gas production[61].

There were two main key differences with the previous projects: the "new political climate" and its "size"[62]. The period of détente of the Cold War had come to an end and the involvement of the Western countries, in particular Germany, in the development of the project was unprecedented: it implied big investments into the development of a new gas field, the Urengoy field, which would be provided by German banks in exchange for gas; German, French and Italian companies would provide the necessary equipment and technology, in particular pipes, compressors and steel. It would also be an opportunity for Germany to employ a large numbers of workers in the midst of a crisis which generated over 25 million unemployed European workers. More specifically, in just a few months European banks opened to the Soviets three times the necessary credit lines: 5.2 billion from the Deutsche Bank, 3.3 billion from Credit Lyonnais, 2 billion from the Dutch Algemene Bank and 1 from the Belgian Société Generale. Subsequently, other credit lines were activated by Italy, Austria and the United Kingdom. Along with gas supplies, massive amounts of equipment and technology (3,000 km of pipe, 125 turbines and 41 compressors) for the Soviet Union were contracted and involved several European-based industries: the German Mannesmann and AEG, the British John Brown, the French Thompson CSF and the Italian Nuova Pignone. U.S. companies were involved as well, such as General Electric, Caterpillar Tractors, Desser Industries and Cooper Industries. The contract indexed the

[59] Manfred Hafner and Simone Tagliapietra, "Turkish Stream: What Strategy for Europe?", *Nota di lavoro: Fondazione Eni Enrico Mattei*, May 2015, p. 4.
[60] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 17.
[61] Daniel Connolly and Jae-Seung Lee, "Pipeline Politics between Europe and Russia: A Historical Review from the Cold War to the Post-Cold War," *The Korean Journal of International Studies* 14, no. 1 (April 2016): 105–29, https://doi.org/10.14731/kjis.2016.4.14.1.105, p. 112.
[62] Victor and Victor, "Bypassing Ukraine: Exporting Russian Gas to Poland and Germany," p. 132.

price of gas to the price of oil and envisaged the supply of 40 bcm of gas per year: 10 to Western Germany, 8 to France and Italy, 5 to Belgium, 4 to Austria and to the Netherlands and 1 to Switzerland[63].

The contractual terms agreed upon then are still typical in nowadays natural gas contracts: long-term "Take-or-Pay" contracts. These types of contracts "link sellers and buyers for a long period, generally 20-25 and even up to 30 years during which both of them have strictly defined obligations. In particular, the take-or-pay clause requires that gas has to be paid whether taken or not and specifies an obligation for the seller to make available defined volumes of gas."[64] If the reserves and the quantity available suffer some changes, the agreed quantity can be modified, but the take-or-pay percentage remains fixed.

1.4.2. U.S. sanctions against the Urengoy-Pomary-Uzhgorod pipeline

The United States did not agree to this Urengoy-Pomary-Uzhgorod line project. It was concerned about the risk of Western European countries becoming energy dependent on the Soviet Union and thus "vulnerable to Soviet threats to cut off the gas in a political crisis" and that the gains resulting from the sale of natural gas would allow the Soviets to increase their military power[65]. At first, the U.S. Administration tried to stop the project using the Coordinating Committee (CoCom)[66], but the equipment under the contract between the European countries and the Soviet Union was not under the competence of this organization. However, after the proclamation of martial law in Poland by General Jaruzelski, backed by Moscow, on 13th December 1981, the U.S.

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[63] *Ibidem.*

[64] Anna Creti and Bertrand Villeneuve, "Longterm Contracts and Take-or-Pay Clauses in Natural Gas Markets," *Energy Studies Review* 13, no. 1 (September 1, 2004): 75–94, https://doi.org/10.15173/esr.v13i1.466, p. 76.

[65] John P. Hardt and Donna L. Gold, "Soviet Gas Pipeline: U.S. Options," UNT Digital Library, 1st June, 2006, https://digital.library.unt.edu/ark:/67531/metacrs8790.

[66] "The Coordinating Committee for Multilateral Export Controls (CoCom) is the informal multilateral organization through which the United States and its allies attempt to coordinate the national controls they apply over the export of strategic materials and technology to the Communist world. It was originally conceived in postwar discussions between the United States, Britain, and France. By 1948, the U.S. Government had begun to enlist the cooperation of its West European allies for a coordinated embargo policy against the Communist bloc. Early negotiations on this matter were private and informal, but they were lent impetus by the events of 194$-49: the proclamation of the People's Republic of China (PRC), the Berlin crisis, the Tito-Stalin split, and the explosion of the Soviet atomic bomb. As East-West tensions grew, the coordination of export controls took on increasing importance." Source: "Multilateral Export Control Policy: The Coordinating Committee (CoCom),"in *Technology and East-West Trade* (Washington, D.C.: Congress of the United States, Office of Technology Assessment, 1979), 153–70, p. 153.

President Reagan announced sanctions against the construction of the pipeline, prohibiting to all Americans and European companies with licenses in the United States to have any kind of trade and commercial exchange with the Soviet Union regarding the Urengoy-Pomary-Uzhgorod line[67]. The European countries responded negatively and the governments of the United Kingdom, France, Germany and Italy invited their companies not to stop the delivery of industrial goods to the Soviet Union[68]. Moreover, the European Communities declared the illegitimacy of these acts, violating the territorial jurisdiction principle, according to the international law, and the Commission adopted the so-called *blocking statutes*, which prohibited European companies to comply with injunctions under foreign laws[69].

Western European governments backed the construction of the pipeline also for geopolitical reasons: as mentioned before, the oil shocks of the 1970s made the diversification away from the OPEC countries the priority for Europe and relations with the Soviet Union were justified from this perspective as well[70]. After months of political and judicial battles, on 13th November 1982, President Reagan announced the end of the sanctions on companies involved with the construction of the pipeline[71]. The Urengoy-Pomary-Uzhgorod was finally inaugurated in January 1984 and became operational in 1985. Until the inauguration of the Nord Stream pipeline, the Brotherhood system, which the Urengoy-Pomary-Uzhgorod pipeline was part of, was the primary means for supplying Western European markets, and Ukraine was a major export route for Russian natural gas to the West[72].

1.4.3. Bypassing Ukraine: Yamal-Europe and Nord Stream 1

The collapse of the Soviet Union in 1991 had a significant effect on the relationship on natural gas between Russia and Europe. Unlike the drop in oil production following the dissolution of the USSR, the oil sector remained relatively stable throughout the transition, thanks to the conversion of the former Ministry of Gas

[67] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 23.
[68] Lee and Connolly, "Pipeline Politics between Europe and Russia: A Historical Review from the Cold War to the Post-Cold War", p. 113.
[69] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 23.
[70] Lee and Connolly, "Pipeline Politics between Europe and Russia: A Historical Review from the Cold War to the Post-Cold War", p. 114.
[71] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 25.
[72] Lee and Connolly, "Pipeline Politics between Europe and Russia: A Historical Review from the Cold War to the Post-Cold War", p. 114.

into Gazprom, a state-owned joint-stock company[73], which controlled all the companies involved in the production, transportation and production of Russian natural gas[74]. However, the collapse of the former Soviet Union brought two significant consequences. The first one was that the disintegration of the Soviet Union led to the creation of fifteen distinct States, seven in the European side: Estonia, Latvia, Lithuania, Belarus, Moldova, Ukraine and Russia. In particular, Belarus and, most of all, Ukraine, which were transit countries for the pipelines which supplied Soviet gas to Europe, became independent States: by 1991, 90% of Russian gas to Europe transited through Ukraine. Secondly, the collapse led to a deep economic crisis and a reduction of 16% of domestic gas consumption, while the production decreased only by 8%, so that a greater amount of gas was ready for Russia to export[75].

Ukraine, as already mentioned, was the main transit country of Russian gas, but was a major buyer as well and their relationship throughout the 1990s became very tense: Ukraine was unable to afford the imported Russian gas for 50 bcm per year at market price, leading to increasing debts. Russia cut off temporarily gas supply twice, in 1993 and 1994, and accused Ukraine of retaining volumes of transit gas destined to European countries[76]. In order to be independent of Ukraine transit, Russia undertook a new project for the construction of a pipeline, the Yamal-Europe pipeline, which is 2000 km long and carries natural gas from the Urengoy field, with a capacity of 32 bcm per year. The project began in 1994 but the pipeline became operational only in 2006. What is particularly noteworthy about Yamal-Europe is that it is the first significant pipeline carrying natural gas destined for Germany to bypass Ukraine: instead of running along Ukrainian Uzhgorod, it transits through Belarus and Poland.

The second step for bypassing Ukraine was the building of Nord Stream 1: negotiations started at the end of the 1990s and the agreement was signed in 2005, in the presence of the 0Russian President Vladimir Putin and German Chancellor Gerhard Schröder. The deal founded the Nord Stream consortium between Gazprom (51% of the share) and the two German energy companies E.ON (with 24%) and Wintershall (with 24,5%)[77]. After this initial agreement, other European energy companies joined

[73] Grigas, *New Geopolitics of Natural Gas*, pp. 95-136.
[74] Catherine Locatelli, "The Russian Gas Industry: Challenges to the 'Gazprom Model'?," *Post-Communist Economies*, June 2014, 53–66, https://doi.org/10.1080/14631377.2014.874232, p. 53
[75] Victor and Victor, "Bypassing Ukraine: Exporting Russian Gas to Poland and Germany," p. 135.
[76] Jonathan Stern, "The Russian-Ukrainian Gas Crisis of January 2006," *Oxford Institute for Energy Studies*, January 2006, 1–17, p. 1.
[77] Grigas, *New Geopolitics of Natural Gas*, pp. 95-136.

the consortium, lowering the share of Wintershall and E.ON to 15.5% each, while both the Dutch GasUnie and the French ENGIE (former Gaz de France) hold the 9%[78]. It was the first time that Western European countries joined a pipeline for Russian gas export project as shareholders[79].

Nord Stream 1 and 2 are the first to avoid any transit country and to connect directly Russia to Germany through the Baltic Sea. In particular, Nord Stream 1 starts in Vyborg, Russia and arrive in Lubmin, in Northern Germany[80]. It is 1224 km long and has a total capacity of 55 bcm per year. The project was completed in 2012, with the coming on stream of the first line in 2011 and the second in 2012. This project met tough criticisms from Eastern European countries, in particular from Poland and the Baltic States. They were concerned about their energy security, being they highly dependent on Russian gas, and the loss of transit fee. In other words, they feared that Russia would have lowered the share of Soviet gas export towards their counties[81]. In a few years, supplies via Nord Stream 1 rose significantly, replacing those via the Brotherhood system, which transits through Ukraine and Slovakia: in 2013, the export of Russian gas through Ukraine to Europe declined by 50%[82]. In 2006, the Nord Stream project was included in the Trans European Network for Energy (TEN-E) guidelines and then nominated project of "European interest" by the European Parliament and the European Council, which meant that it was considered "key to increasing competitiveness in the energy market and security of energy supply, and [...] essential for attracting investors in early stages of construction".[83]

[78] Nord Stream, "Nord Stream - the New Gas Supply Route for Europe," Nord Stream - secure gas supply for Europe, accessed March 26, 2023, https://www.nord-stream.com/about-us/.
[79] Grigas, *New Geopolitics of Natural Gas*, pp. 95-136.
[80] Lincoln Feast and Rachel More, "European Gas Buyers Show Brief Interest in Shuttered Nord Stream Gas," *Reuters*, September 19, 2022, https://www.reuters.com/business/energy/german-gas-buyers-resume-nominations-russias-nord-stream-1-data-2022-09-19/.
[81] Mitrova, Bros and Westphal, "German-Russian Gas Relations: A Special Relationship in Troubled Waters," p. 16.
[82] Fabio Indeo, "La Russia Dopo La Crimea: La Fine Di South Stream e La Proiezione Verso l'Asia", in *Energia e Geopolitica Gli Attori e Le Tendenze Del Prossimo Decennio*, ed. Matteo Varda (Milan, Italy: ISPI, 2014), p. 88.
[83] Grigas, *New Geopolitics of Natural Gas*, pp. 95-136.

1.4.4. South Stream: a failed Russian project

Figure 1.15: Planned South Stream pipeline route

Source: Euractiv, 2014

One important step to understand the history of relationship on natural gas between Russia and Europe is the analysis of the failed realisation of the South Stream Pipeline Project (SSPP), which was first announced in 2006 and finally cancelled in 2014.

SSPP has been characterised by the tense relationship between Russia and Ukraine, in particular by the 2006 and 2009 gas crises and 2014 annexation of the Ukrainian region of Crimea by Russia. The two gas crises led President Putin to strongly support this project, as an additional way to diversify away from Ukraine as a transit country of Russian gas[84].

As already mentioned, after the dissolution of the Soviet Union, Ukrainian and Russian relationship on natural gas was tense and marked by the inability of Ukraine to pay for the imported gas by Russia and the increasing level of its debts; by the resulting reductions of gas supplies by Russia for a few days in order to exert pressure over payment of debts and, consequently, by the unauthorised diversion of the transit gas, destined for Europe, by Ukrainian authorities. In 2005, when European gas prices were increasing, relations became even more tense. This increase made more evident the

[84] Antto Vihma and Umut Turksen, "The Geoconomics of the South Stream Pipeline Project," *Journal of International Affairs* 69, no. 1 (2015): 34–53, p. 42.

difference of the prices paid by some Eastern European countries (around $50-80/kcm) and the price paid by Western European countries (three-four times higher)[85].

During the last trimester of 2005, Gazprom requested that, starting from 2006, Ukraine must pay Russian gas at "European prices" of around $160-230/kcm or, alternatively, ensure to Gazprom an equity in the network of transit pipeline. Ukraine refused, declaring that it would pay market prices, but gradually, and that in 2006 it would not pay more than $80/kcm[86]. A compromise could not be found and on 1st January 2006, at 10:00 am Moscow time, Gazprom cut off gas supplies to Ukraine, formally stating that it did supply the contracted amount of gas to Europe and that it was Ukraine that it was taking gas destined for Europe. Ukraine rejected firmly this accusation[87].

Most countries in Europe registered a sharp reduction in Russian gas supplies. By 2nd January, Hungary received only 40% of Russian gas vis-à-vis normal supplies, while Austria, Slovakia and Romania reported a reduction of 30%, France 25-30%, Poland 14% and Italy 25%. After just 2 days, on 4th January, Gazprom and Ukrainian gas company Naftogaz announced the reaching of a compromise and the signing of a 5-year contract[88]. After this dispute, Russia launched the South Stream project, which was announced in 2007.

The SSPP was initially designed to bring Russian gas to Southern-Eastern Europe through the Black Sea and then the Balkans. Russian goals were to exert pressure on Ukraine and, at the same time, to have the possibility to cut off gas supplies flowing through Ukraine without influencing gas supplies to Europe; moreover, South Stream was thought to be a way of preventing the construction of a Southern Corridor bringing Azeri gas to Europe (a project which was actually finalised in 2020)[89]. Finally, through the SSPP, Russia could have strengthen its influence on the European countries, such as Hungary and Greece, involved in the project[90],

In 2006, Gazprom and Italian state-owned company ENI signed a joint venture for the construction of South Stream and signed a memorandum of understanding in 2007. Subsequently, also the French EdF and the German Winterhsall joined the

[85] Stern, "The Russian-Ukrainian gas crisis of January 2006", pp. 5-6.
[86] *Ibidem*.
[87] Stern, "The Russian-Ukrainian gas crisis of January 2006", pp. 7-8.
[88] Ivi, pp. 8-9.
[89] Vihma and Turksen, "The Geoconomics of the South Stream Pipeline Project", pp. 35-42.
[90] Çağla Gül Yesevī, "Considering Pipeline Politics in Eurasia: South Stream, Turk Stream and TANAP," *Bilge Strategi* 10, no. 18 (March 2018): 11–52, p. 29.

project, establishing in September 2012 a consortium: Gazprom owned 50% of it, ENI 20% and EdF and Winterhsall 15% each. The original plan was to build two lines with a capacity of 31 bcm per year. However, following the 2009 gas crisis between Russia and Ukraine, the project was extended to four lines, with a total capacity of 63 bcm per year, each 930 km long laying from Snaps, on the Russian Black Sea coast, to Varna in Bulgaria, reaching the technically challenging water depths of 2250 metres[91].

The 2009 gas dispute between Russia and Ukraine resulted in a more serious crisis and in a humanitarian emergency in some European countries. The reason was similar to the 2006 crisis: the two parties were not able to reach an agreement over gas prices and, on 1st January 2009, Russian gas supplies to and through Ukraine were cut off. On 6th January, Russian supplies to sixteen EU Member States and Moldova were drastically reduced and, on 7th January, completely cut off. Deliveries of Russian gas began again only on 20th January, following the signing of two ten-years contracts between the two parties. The most affected countries were the Balkan ones, which suffered a humanitarian emergency, with large parts of the population unable, during those days of cold winter, to heat their homes. Hungary and Slovakia suffered serious economic troubles. Both Russia and Ukraine's reputations as, respectively, supplier and transit countries were damaged[92].

Therefore, after the 2009 crisis, the SSPP project was extended to the construction of four lines with a total capacity of 63 bcm per year. The first deliveries through the first line should have started in the last trimester of 2015, then the first two lines would have reached full capacity by the end of 2017. Finally, in 2020 the four lines should have been completely operative. Between 2008-2010, Russia signed intergovernmental agreements (IGAs) with Hungary, Bulgaria, Serbia, Greece, Slovenia, Croatia and Austria for the onshore sections and, in parallel, Gazprom signed bilateral agreements with its national counterparts to set up joint companies, with a 50/50 ownership [93]

Due to growing national and EU regulatory constraints, the routes of the onshore pipelines changed over time: both Italy and Greece were excluded from a direct

[91] Jonathan Stern, Simon Pirani, and Katja Yafimava, "Does the Cancellation of South Stream Signal a Fundamental Reorientation of Russian Gas Export Policy?," *The Oxford Institute for Energy Studies*, January 2015, 1–15, p. 2.
[92] Jonathan Stern, Simon Pirani, and Katja Yafimava, "The Russo-Ukrainian Gas Dispute of January 2009: A Comprehensive Assessment.," Oxford Institute for Energy Studies, February 2009, 1–66, p. 4.
[93] Vihma and Turksen, "The Geoconomics of the South Stream Pipeline Project", p. 42.

connection to the South Stream project [94]. As a consequence of the adoption by the European Parliament and the Council in 2011 of the Third Energy Package (TEP)[95], which introduced the principle of third party access to pipeline capacity and unbundling rules, the SSPP encountered serious challenges[96].

Gazprom decided not to request an exemption to these rules, which was possible under the TEP, and wanted to base the project on intergovernmental agreements (IGAs) with the host countries[97]. The European Commission (EC) declared these agreements in breach of the TEP, while Russian authorities affirmed that the IGAs had precedence over it. Therefore, host countries faced a choice, either to disregard IGAs obligations, having then to pay penalties to Russia, or to disregard EC imposition, therefore making themselves liable to its penalties.

In 2014, following Russian annexation of Crimea, relations between the European Union and Russia became tenser. The European Commission, moreover, launched two infringement procedures against Bulgaria, one for the incompatibility of the IGA with Russia with the TEP, and the other for allegations of corruption linked to the procurement for the pipeline. Consequently Bulgaria suspended the pipeline construction in August 2014[98]. Moreover, in June 2014, the Commission declared that Serbian accession to the European Union could be threatened if its agreement with Russia on the South Stream project was not compatible with EU legislation. Finally, in July 2014, the European Parliament adopted a resolution calling on Member States to cancel any planned energy agreement with Russia, including the South Stream project[99].

On 1st December 2014, President Putin and Gazprom CEO Alexey Miller announced the cancellation of the South Stream Pipeline Project due to both the failure of Bulgaria to ensure that the onshore pipeline could be laid down on its territory and the failure of the European Union to ensure that Russian gas would have been able to flow through it[100].

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[94] Stern, Pirani and Yafimava, "Does the cancellation of South Stream signal a fundamental reorientation of Russian gas policy?", p. 2.
[95] The Third Energy Package will be analysed comprehensively in Chapter 2
[96] Stern, Pirani and Yafimava, "Does the cancellation of South Stream signal a fundamental reorientation of Russian gas policy?", p. 3.
[97] Ivi, p. 4.
[98] *Ibidem*.
[99] Vihma and Turksen, "The Geoconomics of the South Stream Pipeline Project", p. 44.
[100] Stern, Pirani and Yafimava, "Does the cancellation of South Stream signal a fundamental reorientation of Russian gas policy?", p. 5.

1.4.5. Nord Stream 2: a new project amidst increasingly tense relations

In September 2015, Russian Gazprom and the German Badische Anilin- und Soda Fabrik and E.ON, the French ENGIE, the British/Dutch Shell and the Austrian OMW signed a deal and became shareholders for the construction of an additional pipeline along Nord Stream 1, the so-called Nord Stream 2 project. It links directly Russia to Germany, beginning in Ust-Luga and arriving in Greifswald.

Figure 1.16: Nord Stream 1 and Nord Stream 2 routes

Source: Aljazeera, 2022

Nord Stream 2 was completed in September 2021 but was waiting for certification by Germany and the European Union. Finally, on 22nd February 2022, two days before the Russian invasion of Ukraine, Germany halted the project and it never entered into operation[101]. The aim was to double the direct natural gas flow from Russia to Germany, since it would have had a capacity of 55 bcm, equal to the Nord Stream 1.

The project met several protests and criticisms. First of all, in November 2015, ten Eastern European countries addressed a letter to the European Commission condemning the project and stating that it damaged the interests of the European Union. However, the European Commission under the presidency of Juncker only warned about the risk of altering the "landscape of the European Union's gas market", but no

[101] Sarah Marsh and Madeline Chambers, "Germany Freezes Nord Stream 2 Gas Project as Ukraine Crisis Deepens," *Reuters*, February 22, 2022, https://www.reuters.com/business/energy/germanys-scholz-halts-nord-stream-2-certification-2022-02-22/.

action followed[102]. In March 2019, the European Parliament adopted a Resolution in which it "underlines that the EU is currently Russia's largest trading partner and will keep its position as key economic partner for the foreseeable future, but that Nord Stream 2 reinforces EU dependency on Russian gas supplies, threatens the EU internal market and is not in line with EU energy policy or its strategic interests, and therefore needs to be stopped"[103]. Later, in June 2022, Valdis Dombrovkis, the Vice President of the European Commission, announced that the project was put under scrutiny by the Commission to determine its compliance with the EU energy policy[104].

The reasons for the objections were mainly three. First of all, there was the fear that Europe would become even more dependent on Russian gas. Secondly, it was disputed the choice to purchase natural gas from a country responsible for the illegitimate annexation of Crimea in 2014, part of the Ukrainian territory. Third, it was highlighted the risk of Russia using gas as a weapon and political leverage on Poland and Ukraine, given that Russia would have the capacity to export 110 bcm to Europe directly to Germany[105].

The United States intervened with sanctions in order to stop the realisation of Nord Stream 2. On 21st December 2019, the Trump Administration imposed sanctions that targeted the companies involved in the construction of the pipelines: both the European Union and Russia reacted negatively and Germany in particular accused the U.S. of interfering in their sovereign matters[106]. However, in May 2021, the new Biden Administration announced that the U.S. would waive the sanctions imposed on the head company of the project, the Nord Stream 2 AG, Gazprom's property. The U.S. Secretary of State, Antony Blinken, declared: "I have determined that it is in the national interest of the United States to waive the application of sanctions"[107]. However, after just five months, Antony Blinken announced new sanctions on the Russia-linked

[102] Grigas, *New Geopolitics of Natural Gas*, pp. 95-136.
[103] European Parliament resolution of 12 March 2019 on the state of EU-Russia political relations [2019] OJ C 23/7.
[104] Natalia Zinets, "EU Says Russia's Nord Stream 2 Pipeline on Hold for Compliance Review," *Reuters*, January 31, 2022, https://www.reuters.com/business/energy/eus-dombrovskis-says-nord-stream-2-is-pause-compliance-is-reviewed-2022-01-31/.
[105] Stephen Pifer, rep., Nord Stream 2: Background, Objections, and Possible Outcomes (Washington D.C.: Brookings, 2021), p. 4.
[106] "Nord Stream 2: Germany and Russia Decry US Sanctions," *BBC*, December 21, 2019, https://www.bbc.com/news/world-europe-50879435.
[107] Guy Chazan and Katrina Manson, "Biden to Waive Trump-Era Sanctions on Operator of Russian Pipeline," *Financial Times*, May 20, 2021, https://www.ft.com/content/22555df1-0b88-4d46-8287-9e0c8f03cc6a.

Transadria Ltd. and its vessel, involved in the realisation of Nord Stream 2[108]. Finally, on 23rd February 2022, a day before the beginning of the Russian war against Ukraine, Biden decided to impose sanctions on the company Nord Stream 2 AG, in charge of the entire project.

1.5. Turkey: a transit country for natural gas to Europe

Figure 1.17: Turkstream and Blue Stream routes

Source: Euronews, 2020

On 9th January 2020, Russian President Vladimir Putin and his Turkish counterpart Recep Tayyip Erdogan inaugurated the TurkStream pipeline, 930 km long, which connects Russia and Turkey through the Black Sea with a capacity of 31.5 bcm per year to be distributed to Turkey and South-Eastern European countries[109]. It is constituted by two parallel pipelines which depart from Russkaya and arrive at Kiyikoy, near Istanbul. One pipeline reaches Ipsala, at the border with Greece. The second reaches Makoclar, at the border with Bulgaria, where it connects to the trans-Balkan

[108] Kanishka Singh and Eric Beech, "U.S. Imposes Further Sanctions in Connection with Nord Stream 2 Gas Pipeline," *Reuters*, November 23, 2021, https://www.reuters.com/business/energy/us-imposes-further-sanctions-connection-with-nord-stream-2-gas-pipeline-2021-11-22/.

[109] "Russia e Turchia Inaugurano Il TurkStream," *Ansa*, January 9, 2020, https://www.ansa.it/canale_ambiente/notizie/focus_energia/2020/01/09/russia-e-turchia-inaugurano-il-turkstream_49dd4f7c-373c-40b6-b4c7-8eec81015db5.html.

pipeline system. The submarine pipeline system, 2200 metres deep, has been produced by German, Russian and Japanese companies[110].

Another important pipeline was inaugurated in 2020. On 16th December 2020, the Trans Adriatic Pipeline (TAP) was declared to be ready for supplies. It marked the end of the construction of the Southern Gas Corridor which brings Azeri natural gas to Italy and the European Union, which supported the project with the aim of reducing its dependence on Russian gas supplies[111].

Figure 1.18: Southern Gas Corridor route

Source: Trans Adriatic Pipeline website, 2023

Figure 1.18 shows the map of TAP and of the rest of the Southern Gas Corridor, which is composed of three parts: the South Caucasus Pipeline (SCP) is 692 km long (443 km in Azerbaijan and 249 km in Georgia), bringing the Azeri gas from the Caspian coast to the border with Turkey; then the Trans Anatolian Natural Gas Pipeline (TANAP), the longest of the three, being 1811 km long, connects the SCP to the TAP beginning at the Greek border; then the Trans Adriatic Pipeline, which from the Turkish-Greek borders transits through Greece, Albania and the Adriatic Sea, to finally reach the Italian coast.

The TANAP pipeline has a capacity of 16 bcm: 6 bcm destined to Turkey while the resulting 10 bcm to TAP. The 10 bcm were planned to be divided as follows: 8 bcm

[110] Jasmin Bauomy, "TurkStream: Cosa c'è Da Sapere Sul Nuovo Gasdotto Appena Inaugurato," *Euronews*, January 9, 2020, https://it.euronews.com/2020/01/09/turkstream-cosa-c-e-da-sapere-sul-nuovo-gasdotto-appena-inaugurato.

[111] "Gas: Realtà e Paradossi Del Corridoio Meridionale," ISPI, 9th December 2022, https://www.ispionline.it/it/pubblicazione/gas-realta-e-paradossi-del-corridoio-meridionale-28710.

to Italy, 1 bcm to Greece and 1 bcm to Bulgaria, which, however, had to wait for the finalisation of the cross-border interconnection between Greece and Bulgaria in October 2022 to receive the gas. The final goal of the project, supported by the European Union and the United States, was to diversify away from Russian gas, due to the fact that, as it will be analysed in Chapter 2, the European Union since the early 2000s started to be concerned about its energy security and its high dependence on Russian gas imports[112].

1.6. Main trends of the European gas market in the years 2000-2021: Production, Consumption and Import Dependency

In order to have a clearer picture of the natural gas market in Europe at the eve of the Russian invasion of Ukraine, it is necessary to look at four leading indicators: natural gas production, demand, import and prices.

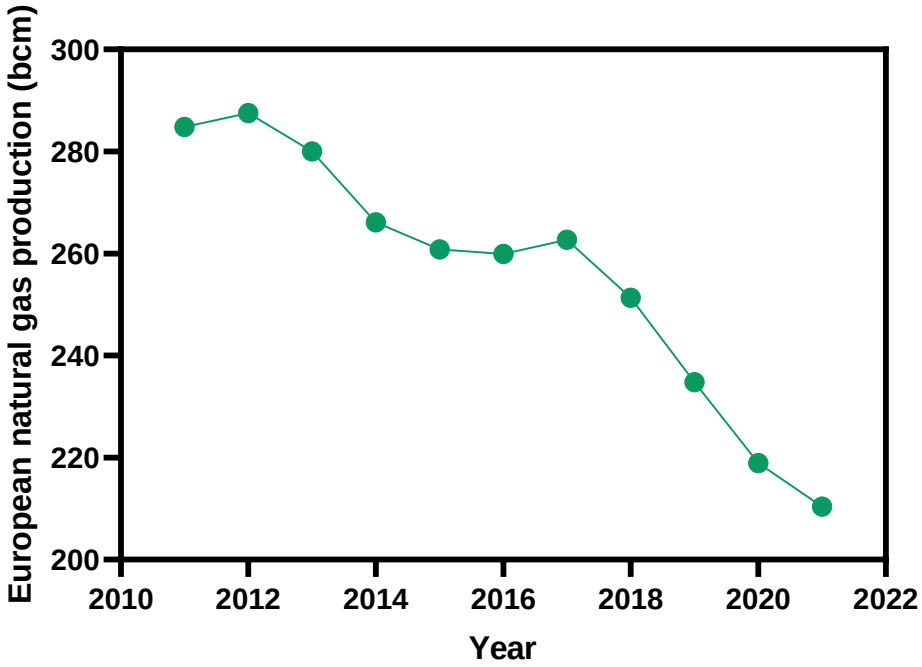
1.6.1. Natural gas in Europe: Production

Natural gas production in Europe declined over time: between 2011 and 2021, production in Europe decreased by 3%, going from 284.8 bcm in 2011 to 210.44 bcm in 2021 (the United States alone in 2021 produced over 934.2 bcm)[113]. Figure 1.19 below shows the trend of domestic production in Europe between 2011 to 2021.

[112] Tsvetelia Tsolova, "Greece-Bulgaria Pipeline Starts Operations to Boost Non-Russian Gas Flows," *Reuters*, October 1, 2022, https://www.reuters.com/business/energy/greece-bulgaria-pipeline-starts-operations-boost-non-russian-gas-flows-2022-10-01/.

[113] *Bp Statistical Review of World Energy 2022*, 71st ed. (London: British Petroleum, 2022), p. 29.

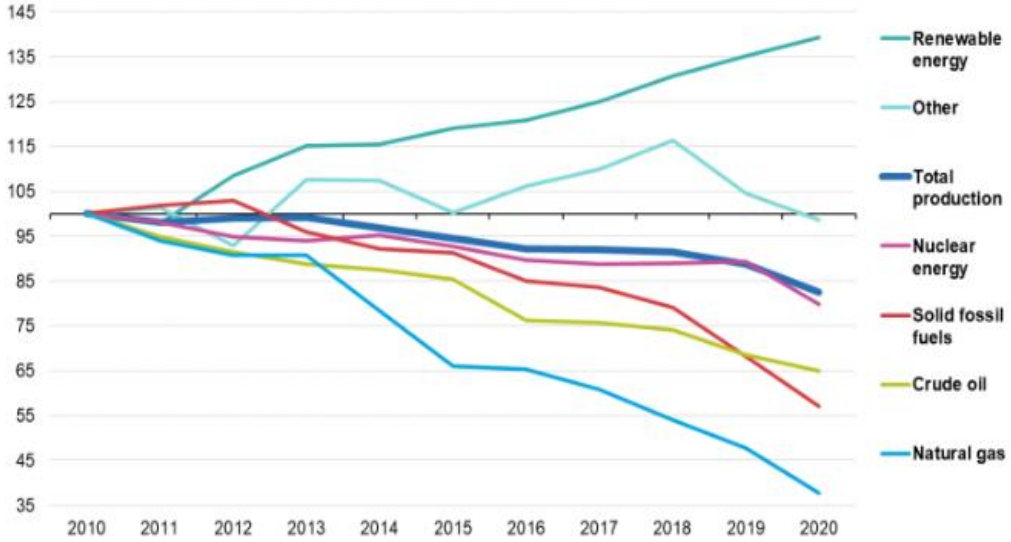
Figure 1.19: European natural gas production 2011-2021



Source: data from bp Statistical Review of World Energy 2022

Production in the European Union declined even more sharply, from 83 bcm in 2017 to 51 bcm in 2021. Domestic production met only 15% of demand in 2021, while in 1980 it met 36%[114]. Figure 1.20 below shows the production of primary energy by fuel type in the European Union between 2010 and 2020, taking 2010 as the basis.

Figure 1.20: Production of primary energy by fuel type in the European Union, 2010-2020



Source: Eurostat, 2023

[114] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 56.

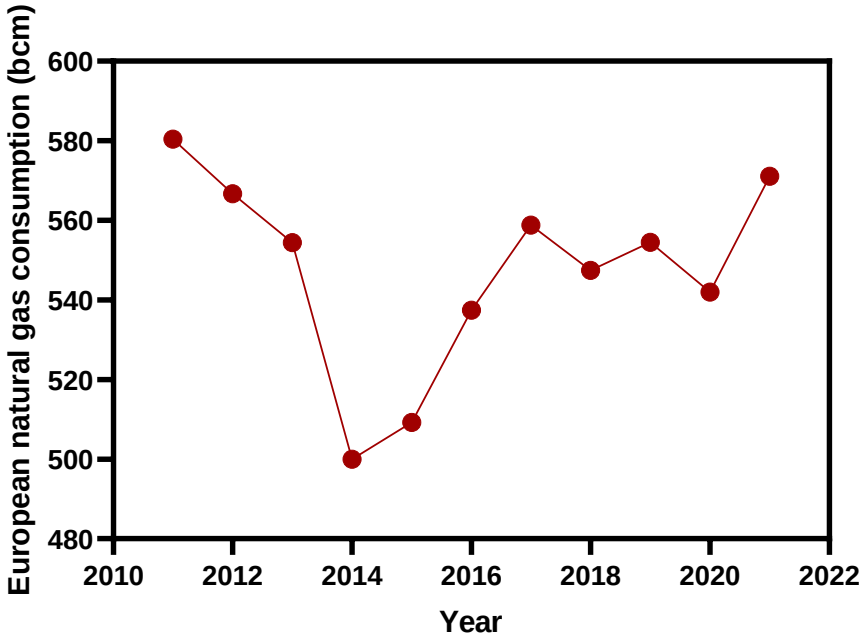
The negative trend in European natural gas production can be explained mainly by the decline of the Groningen field in the Netherlands, where the production went from 53 bcm in 2013 to 20 bcm in 2018. As mentioned early in the Chapter, the definitive shut down of the field has been decided initially for 2022 and then delayed to 2025-2028, due to seismic risks resulting from the depletion of the reservoir. The production of natural gas in the United Kingdom is declining as well, from 113 bcm in 2000 to 28 bcm in 2021. Norway, which is not part of the European Union, on the contrary, continued to support the production and export of its natural gas. It produces 3% of the global gas production, but it is the third country in the world for export. In the aftermath of the beginning of the war in Ukraine, the Norwegian government authorised Equinor, a Norwegian state-owned multinational energy company, to increase by 1 bcm by 30th September 2022 the export of natural gas from Oseberg to the European Union, thus reaching a total of 7 bcm per year, and the export from the Heidrun gas field by 400 million cubic metres per year. It also greenlighted the increase of gas production from the Troll gas field, reaching 38 bcm in 2022[115]. Moreover, after the closure in September 2020 due to a fire incident, the Hammerfest LNG facility has been reopened in June 2022[116].

1.6.2. Natural gas in Europe: Consumption

Natural gas consumption in Europe remained relatively stable. Consumption in Europe first had a negative trend between 2011 to 2014 due to the global economic and financial crisis, declining from 580.4 bcm to 500.0 bcm. From 2014 to 2021 the trend changed and consumption of natural gas went from 500.0 bcm to 571.6 bcm. In conclusion, from 2011 to 2021 European consumption declined by 0.2%[117]. Figure 1.21 shows this trend.

[115] *Ibidem,* p. 57.
[116] "Norway Remains a Significant Natural Gas Supplier to the European Union," Homepage - U.S. Energy Information Administration (EIA), accessed March 26, 2023, https://www.eia.gov/todayinenergy/detail.php?id=54479.
[117] *Bp Statistical Review of World Energy 2022*, p. 31.

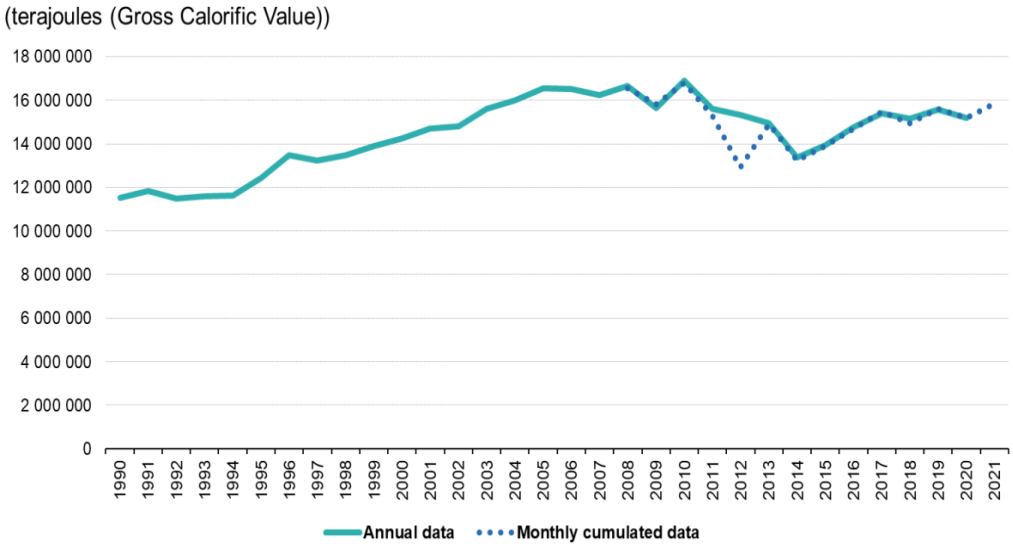
Figure 1.21: European natural gas consumption 2011-2021



Source: data from BP Statistical Review of World Energy 2022

Similarly, the inland demand for natural gas in the European Union has followed the same trend and consumption reached 399.6 bcm in 2020. The following figure shows the change in demand for natural gas in the EU during the period 1990-2021.

Figure 1.22: Inland demand of natural gas, EU, 1990-2021



Source: Eurostat, 2023

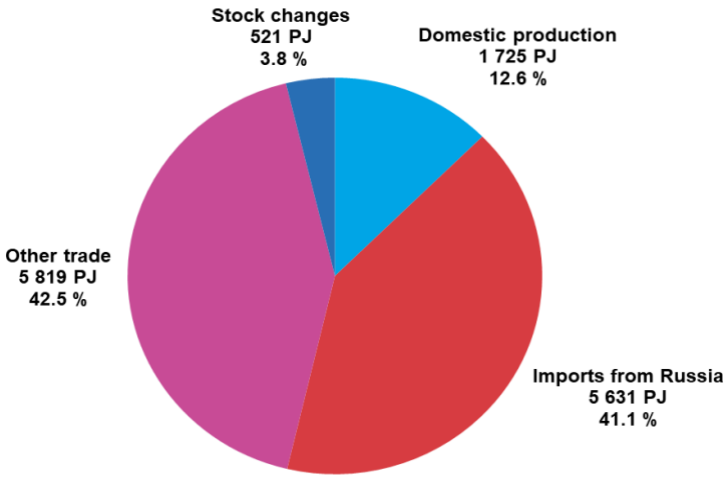
1.6.3. Natural gas in Europe: Import Dependency

The result of flattening consumption and declining production of natural gas in the last ten years meant an increasing dependency on imports. In particular, in the

European Union, in 2020, while the consumption of natural gas amounted to 399.6 bcm, the production fell to 55.7 bcm. For this reason, in the same year, EU import dependency was 84%[118]. In the first semester of 2021, the main exporters of natural gas to the European Union were: Russia (46,8%), Norway (20,5%), Algeria (11.6%) and the two LNG suppliers, the USA (6.3%) and Qatar (4.3%)[119].

Figure 1.23 below shows the percentage of imports from Russia to the European Union in 2020, which amounted to 41.1% of the totality of EU production, trade and imports of natural gas.

Figure 1.23: Natural gas: EU production, trade and imports, 2020 (in % and petajoules, PJ)

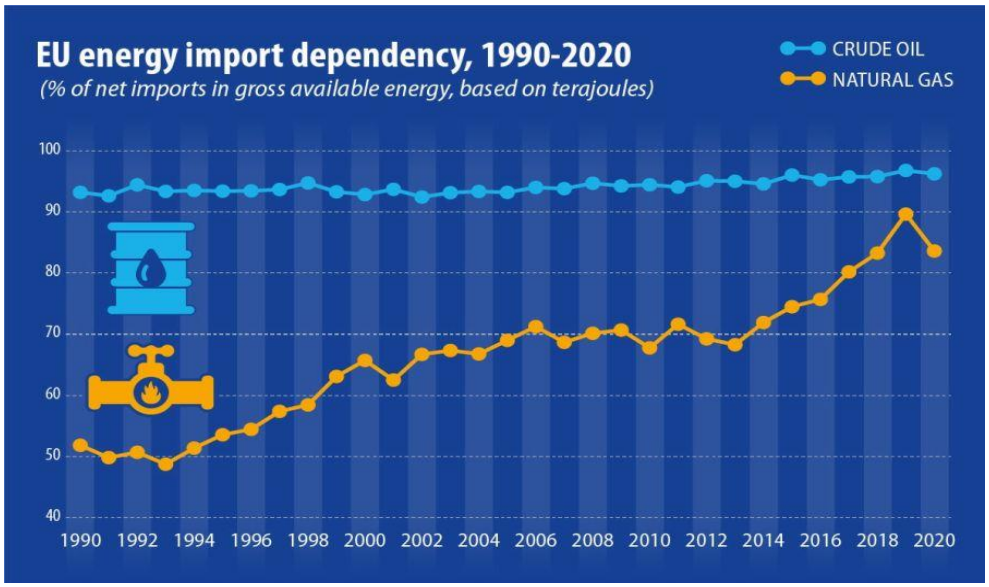


Source: Eurostat, 2022

Figure 1.24 shows the trend of EU energy import dependency in 1990-2020, comparing crude oil and natural gas. It can be noted, differently from the high stable dependency on oil imports, an increasing dependency on gas imports, going from around 50% in 1990 to 84% in 2020.

[118] Gabriel Di Bella et al., "Natural Gas in Europe: The Potential Impact of Disruptions to Supply," *IMF Working Papers* 2022, no. 145 (July 2022): 1–47, https://doi.org/10.5089/9798400215292.001, p. 7.
[119] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 55.

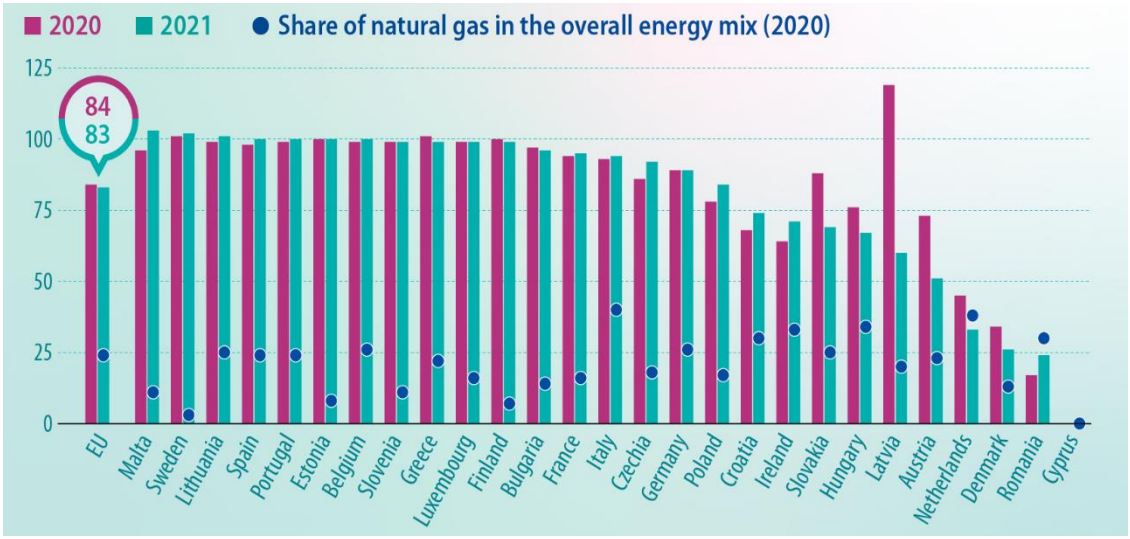
Figure 1.24: EU energy import dependency, 1990-2020



Source: Eurostat, 2022

Finally, the degree of dependency on natural gas imports is not homogeneous among EU countries. It varies significantly, as it is shown in Figure 1.25 below, which compares the share of natural gas import dependency in 2020 and 2021 of the EU member states (data from Cyprus is not available).

Figure 1.25: Natural gas import dependency, 2020 and 2021 (calculated in terajoules (%))



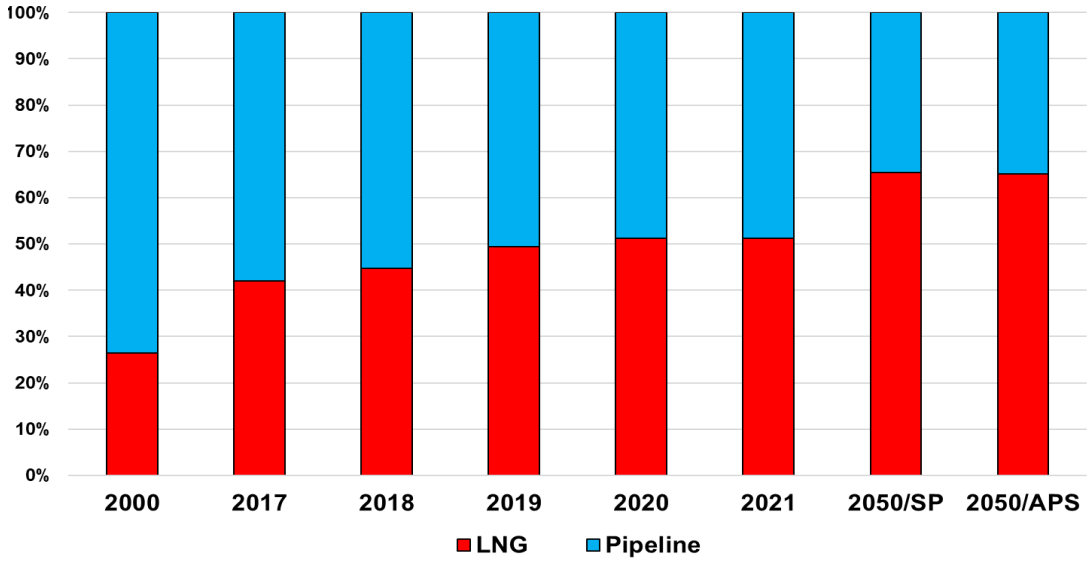
Source: Eurostat, 2023

1.7. Liquified natural gas: recent developments in Europe

Liquified natural gas has the strategic advantage, compared to pipeline gas, of being more flexible as to destination. In particular, seaborne trade of natural gas has greatly contributed to the natural gas market globalisation, which benefitted not only

those countries, such as Japan and Qatar, which find themselves far from, respectively, the main producers and consumers, but also those countries, such as Europeans, which decided to enhance their energy security through diversification of suppliers[120]. For this reason, especially in the last years, LNG became increasingly important in the global gas trade. Between 2008 and 2020, LNG trade increased by 6.2% per year, while pipeline gas trade decreased by 0.4% per year[121]. LNG boom changed geopolitical dynamics: while pipeline gas has physical constraints, LNG is inherently more flexible. Figure 1.26 below shows the world trade of natural gas since 2000, highlighting the share of LNG over pipeline gas. The share of LNG is likely to increase for market and security reasons.

Figure 1.26: World trade of natural gas



Source: IEA-WEO, 2022)

The single most important event that changed significantly the global LNG trade system was the shale gas revolution[122] in the United States[123]. The "revolution", which led to a sharp increase in U.S. gas production, was made possible by new production techniques, in particular horizontal wells and hydraulic fracturing techniques. Thanks to these new technologies, production became less expensive and

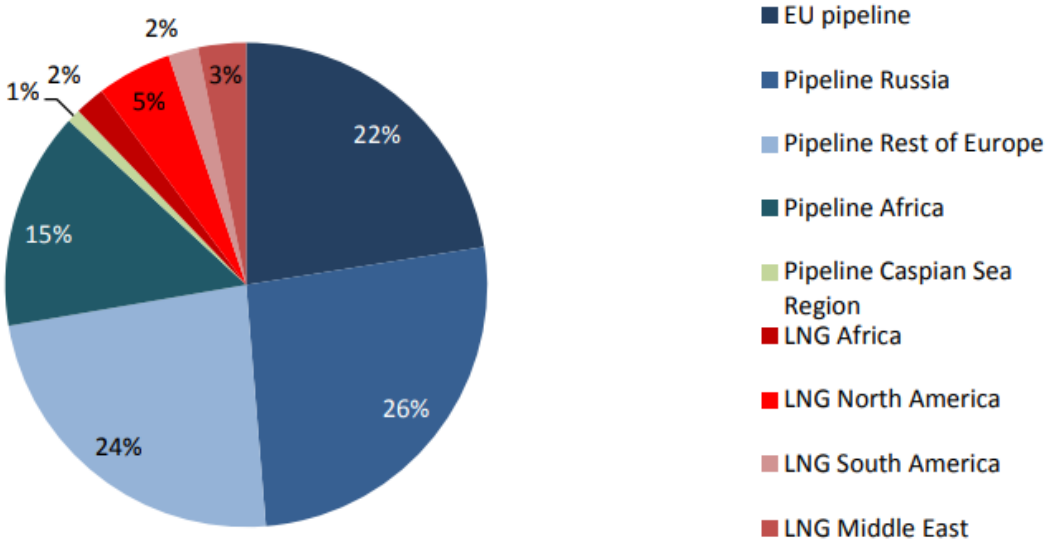
[120] Clô, "Il gas naturale liquefatto: Evoluzione di un mercato sempre più globale," p. 128.
[121] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 71.
[122] Shale gas is methane gas extracted from unconventional deposits in clays derived from the anaerobic decomposition of organic matter.
[123] International Energy Agency, "The US Shale Revolution Has Reshaped the Energy Landscape at Home and Abroad, According to Latest IEA Policy Review - News," IEA, accessed April 2, 2023, https://www.iea.org/news/the-us-shale-revolution-has-reshaped-the-energy-landscape-at-home-and-abroad-according-to-latest-iea-policy-review.

access to vast resources of shale gas was possible[124]. The United States, from being an importer of LNG became a global key exporter.

In the years between 2009-2012, new LNG production and export from Peru, Russia, Yemen, Qatar and Indonesia expanded global trade by 100 bcm, part of which had been previously destined for the U.S., but its shale revolution left it available to other markets. The majority of it was re-destined to the Asian market, another part to South America and the Middle East and 30 bcm went to Europe between 2010-2011[125].

In 2020, in the European Union, the share of LNG imports on total natural gas imports was 15%, as shown in Figure 1.27 below. Since the first shipping of U.S. LNG to Europe in April 2016, in particular with its first cargo to Portugal and the second to Spain, the share of American LNG imports has increased constantly reaching in January 2022 the 44% of total EU LNG imports.

Figure 1.27: Composition of EU natural gas imports in 2020



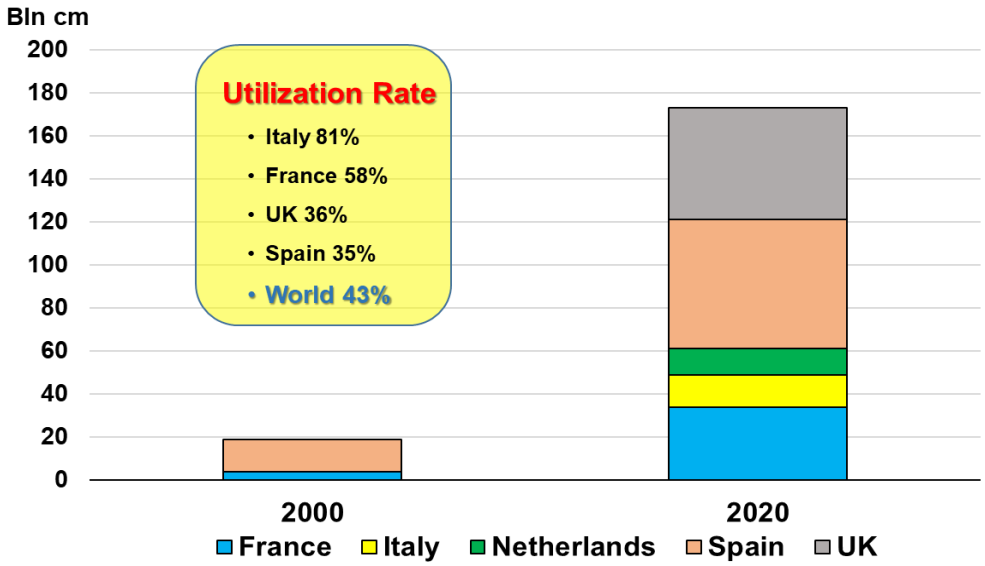
Source: DIW focus, No. 5

As shown by Figure 1.28 below, regasification capacity in Europe has greatly expanded in the last 20 years, reaching around 170 bcm in 2020 from only 20 bcm in 2000. However, it is highly geographically concentrated in a limited number of European countries, namely Spain, Italy, France, the Netherlands and the UK. The

[124] Wanda Troszczynska van Genderen, "The Shale Gas 'Revolution' in the United States: Global Implications, Options for the EU," *Policy Briefing - European Parliament*, April 2013, 1-18, pp. 4-5.
[125] Jonathan Stern and Rogers Howard, "The Dynamics of a Liberalised European Gas Market," *The Oxford Institute for Energy Studies*, December 2014, 1–84, https://doi.org/10.26889/9781784670184, p. 12.

average utilisation rate between Italy, France, UK and Spain is 52.5%, above the world average of 43%. Italy is leading with 81%.

Figure 1.28: LNG, Regassification capacity in Europe



Source: IGU-World LNG Report, 2021

After the beginning of the war and the consequent need to diversify away from Russian pipeline gas, European countries increased their regassification capacity and new regassification terminals are under construction, with some of them expected to be in operation already by 2023[126].

1.8. Energy crisis: winter 2021/2022

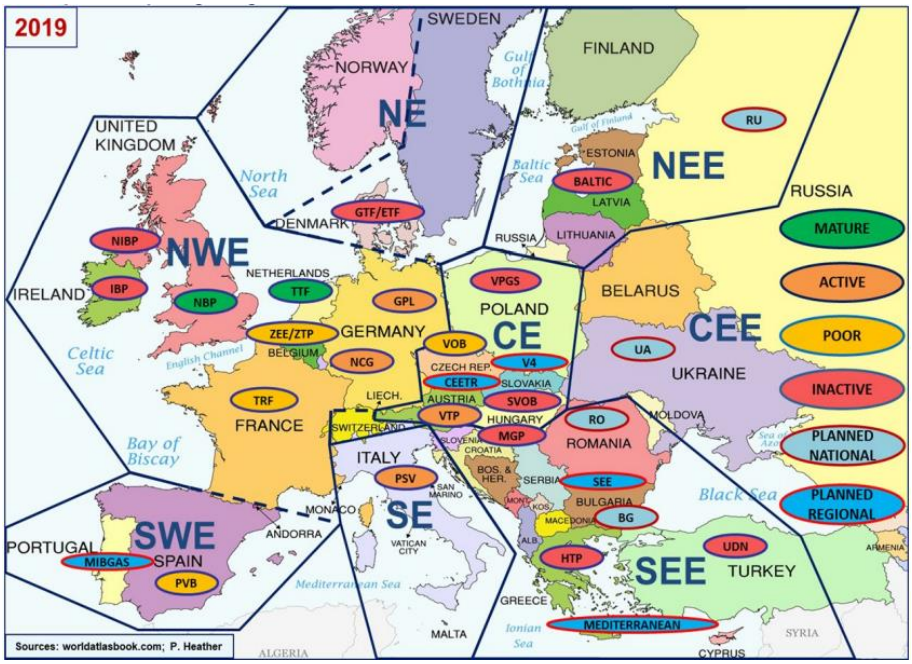
1.8.1. Natural gas pricing: mechanism and historical development

The 2000s witnessed a change in the contracts for natural gas trade. They went from being predominantly long-term (20-25 years) to being partially substituted by spot (short-term) transactions. They are based on a supply-demand mechanism and are quoted on hub platforms[127]. Natural gas hubs are interconnection points between pipelines and LNG terminals and are used as "central pricing points for the network's

[126] Victoria Zaretskaya, "Europe's LNG Import Capacity Set to Expand by One-Third by End of 2024," Homepage - U.S. Energy Information Administration (EIA), November 2022, https://www.eia.gov/todayinenergy/detail.php?id=54780#:~:text=Liquefied%20natural%20gas%20(LNG)%20import,GIIGNL)%20and%20trade%20press%20data.
[127] Clô, "Il gas naturale liquefatto: Evoluzione di un mercato sempre più globale," p. 132.

natural gas"[128]. In these hubs services and quantities of natural gas can be exchanged. Some of the main gas hubs in Europe are the British National Balancing Point (NBP), the Dutch Title Transfer Facility (TTF), created by GasUnie in 2003, the Central European Gas Hub and the two German hubs (Net Connect Germany and Gaspool, created in 2009)[129]. Figure 1.29 below shows the map of gas hubs in Europe in 2019, differentiating between "mature", "active", "poor", "inactive", "planned national", "planned regional". The only hubs defined as mature are the TTF and the NBP.

Figure 1.29: European gas regions, markets and hubs: 2019



Source: Oxford Institute for Energy Studies 2020

The traditional long-term contracts, which marked the birth of a European gas market in the 1960s, were first proposed by the Dutch minister, J.W. de Pous, in 1962, following the discovery of Groningen field. It has been applied since 1984 by the Dutch gas company GasUnie. The structure of the contracts allowed for a balanced risk-sharing between the producing and consuming countries[130]. The main risk for the suppliers was to invest large amounts of capital in the production and transport infrastructures and not sell its gas, in this way not covering the initial, large, investments. In addition, a second risk was that the gas price would not been high enough to ensure fair profits. The answer was long-term contracts, therefore

[128] "Q&A: What Is a Gas Trading Hub, and How Are They Established?," *Reuters*, 29th December 2017, https://www.reuters.com/article/us-china-gas-exchange-q-a-idUSKBN1EN0I1.
[129] Stern and Rogers, "The Dynamics of a Liberalised European Gas Market – Key Determinants of Hub Prices, and Roles and Risks of Major Players", p. 12.
[130] Clô, "Il gas naturale liquefatto: Evoluzione di un mercato sempre più globale," p. 133.

guaranteeing the coverage of the initial investments, with a take-or-pay clause and an annual contract quantity (ACQ). This clause mandates a minimum annual volume that importers must buy or pay for, this level being usually set at 80-90% of the ACQ level. Additionally, these contracts link gas prices to crude oil and oil products prices, guaranteeing stability. For importers, the price mechanism ensured the competitivity of natural gas in comparison with the other energy sources, thus allowing a subsequent reselling of gas going down in the supply chain. In these contracts is usually present a periodic review mechanism ("re-opener") for prices, which guarantees a degree of flexibility[131].

The rise of short-term contracts and transactions on the spot market in Europe happened during the post-financial crisis period. The economic crisis led to a fall in European gas demand: in 2011 it was 5.7% below 2008 levels and in 2013 it was 11%. In the same years, as already mentioned, LNG supply in the global market grew by 100 bcm, 30 of which went to Europe, not tied to long-term contracts[132]. In addition to the decline in demand and increase in supply, gas prices were increasing, driven by the oil price increase, while hub-based prices remained relative low. Hub prices, determined by the supply-demand mechanism, had fallen as a consequence of the gas oversupply. Given that the gas market had been previously liberalised in Europe with the 1998 European Liberalisation Directive, companies operating in the midstream segment[133] found themselves in a position of being obliged, by the long-term contracts, to buy high-priced, oil-indexed gas and, at the same time, to sell at a hub-based price as requested by the consumers[134]. Consequently, they exerted strong pressure on the supplier to renegotiate the terms of their long-term contracts. This transition soon led

[131] Luca Franza, "Contratti Di Importazione Del Gas in Europa: Evoluzione Dei Meccanismi Di Pricing," *Energia*, May 2015, 38–41, p. .
[132] Stern and Rogers, "The Dynamics of a Liberalised European Gas Market – Key Determinants of Hub Prices, and Roles and Risks of Major Players", pp. 11-12.
[133] The natural gas supply chain is divided in three segments: upstream, midstream and downstream. The upstream activities refer mainly to exploration, which includes both geological surveys and obtainment of land rights, and onshore and offshore drilling. In the midstream sector companies take care of the transportation, storage and trading of natural gas. Finally, in the downstream segment natural gas processors bring gas products to consumers.. Source: "Research Guides: Oil and Gas Industry: A Research Guide: Introduction," Introduction - Oil and Gas Industry: A Research Guide - Research Guides at Library of Congress, accessed April 2, 2023, https://guides.loc.gov/oil-and-gas-industry/introduction.
[134] Stern and Rogers, "The Dynamics of a Liberalised European Gas Market – Key Determinants of Hub Prices, and Roles and Risks of Major Players", p. 12.

to the establishment of NGP and TTF hubs as benchmarks and the prices of long-term contracts were renegotiated based on hub prices[135].

1.8.2. Energy crisis in Europe: winter 2021/2022

During winter 2021-2022, Europe witnessed a deep energy crisis and gas prices reached an unprecedented level: 180 €/MWh on 21st December 2021. The first signs of the crisis started to emerge during the late spring of 2021 and could be explained by an intertwin of factors: low gas production, high demand and low storage levels, which led to dramatically increasing gas prices.

European gas production, taking into consideration the European Union and the United Kingdom, in January-August 2021 amounted to 39.9 bcm, while in 2019 it reached 52.4 bcm, a reduction of 12.5 bcm, due to the temporary planned maintenance of the British and Danish production facilities, but also to the already mentioned planned closure of the Groningen field in the Netherlands, due to seismic risks connected to production activities[136].

Net pipeline gas imports declined as well. While supplies from Azerbaijan and North Africa increased in January-August 2021, respectively by 4.5 bcm and 8.8 bcm in comparison to the same period in 2019, Norwegian and Russian gas imports declined sharply. Exports from Norway to Europe declined by 3.1 bcm, one-third of which to the UK and two-thirds to Continental Europe. Nonetheless, the most evident drop in supplies was from Russia, which in January-August 2021 reduced export to Europe by 19.3 bcm compared to the same period in 2019[137].

While Nord Stream 1 maintained stable its gas flow and Turkstream, launched in January 2020, started deliveries, transferring 7.7 bcm in January-August 2021 up from zero in 2019, the real decline of gas flow was registered via Ukraine, with a fall of 27.1 bcm, from 53.2 bcm in 2019 to 26.1 bcm in 2021. Therefore, considering also the additional 7.7 bcm via Turkstream, the net decline of Russian gas to Europe has been of 19.4 bcm. It has been suggested that the reason for the lowering of the volume of gas exports from Russia was due to an attempt by Gazprom to maintain high prices

[135] Franza, "Contratti di importazione del gas in Europa: evoluzione dei meccanismi di pricing", pp. 38-41.
[136] Mike Fulwood and Jack Sharples, "Why Are Gas Prices So High?," *The Oxford Institute for Energy Studies*, September 2021, 1–11, p. 5.
[137] Ivi, p. 6.

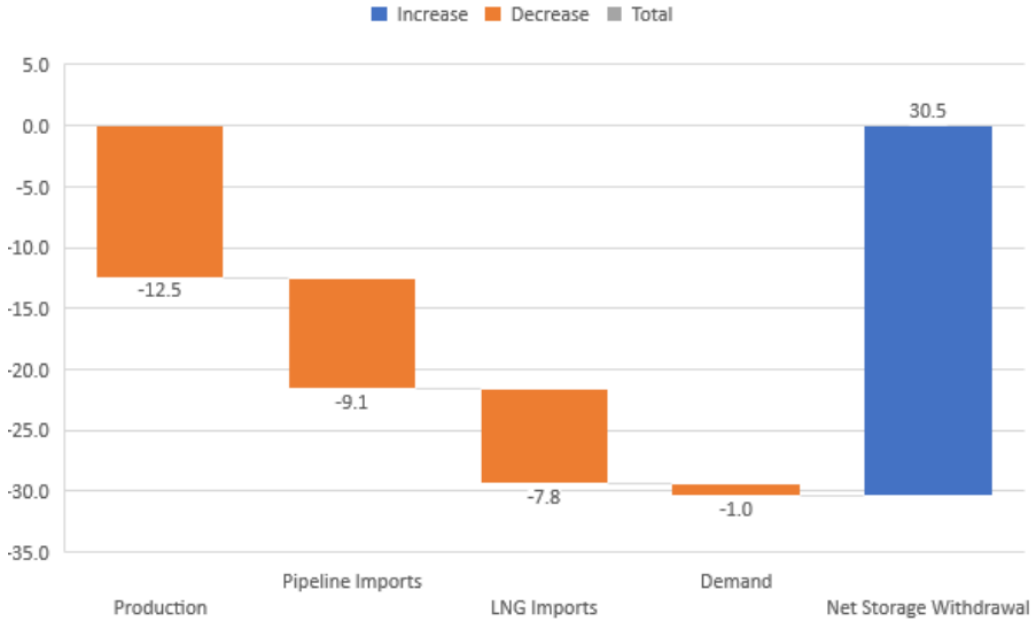
and to exert pressure for the authorisation by the German regulator (BNetzA) of Nord Stream 2 operations. However, it could be explained also by a lack of spare volumes of natural gas to Europe which, to ensure an image of reliability, was not been expressed publicly[138] or, in my view, it could be seen in the context of the preparation of the war. Geopolitical reasons have been suggested as well. In fact, after the decision on 12th December by the new German Foreign Minister Annalene Baerbock to freeze the authorisation process for Nord Stream 2 for lack of compliance with EU regulations, supplies via Ukraine dropped by 46% from December 2021 to January 2022, while gas flows to Europe via Nord Stream 1 remained stable[139].

In addition to the decline in production and pipeline imports, LNG imports dropped as well. Due to the fact that LNG global export focused mainly on the premium Asian market due to its higher demand, prices began to raise and Europe imported 7.8 bcm of LNG less than in 2019.

Finally, gas demand increased by 1.0 bcm due to the economic recovery which followed the softening of Covid-19 restrictions and spending plans adopted by governments. These three factors, lower production, less imports and higher demand, led to a difference in gas supply between 2019 and 2021 of 30.4 bcm. This gap was met by an increase in net storage withdrawals, equal to 30.5 bcm[140]. This resulted, in September 2021, in the lowest European gas storage level of the last years, totalling a fill rate of only 77%, compared to 95% in 2020[141]. Finally, another intervening factor was the reduced wind energy production in Northern Europe due to milder wind speeds than usual. In fact, Britain, Germany and Denmark, the European largest wind producers, used only 14% of installed capacity, in comparison to 20-26% of the previous years. The reduction in wind power generation led to an increasing demand of natural gas at thermal power plants, rising its price and lowering gas storage levels[142].

[138] Fulwood and Sharples, "Why Are Gas Prices So High?", p. 6.
[139] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 50.
[140] Fulwood and Sharples, "Why Are Gas Prices So High?", p. 7.
[141] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 50.
[142] Nora Buli and Stine Jacobsen, "Analysis: Weak Winds Worsened Europe's Power Crunch; Utilities Need Better Storage," *Reuters*, December 22, 2021, https://www.reuters.com/markets/commodities/weak-winds-worsened-europes-power-crunch-utilities-need-better-storage-2021-12-22/.

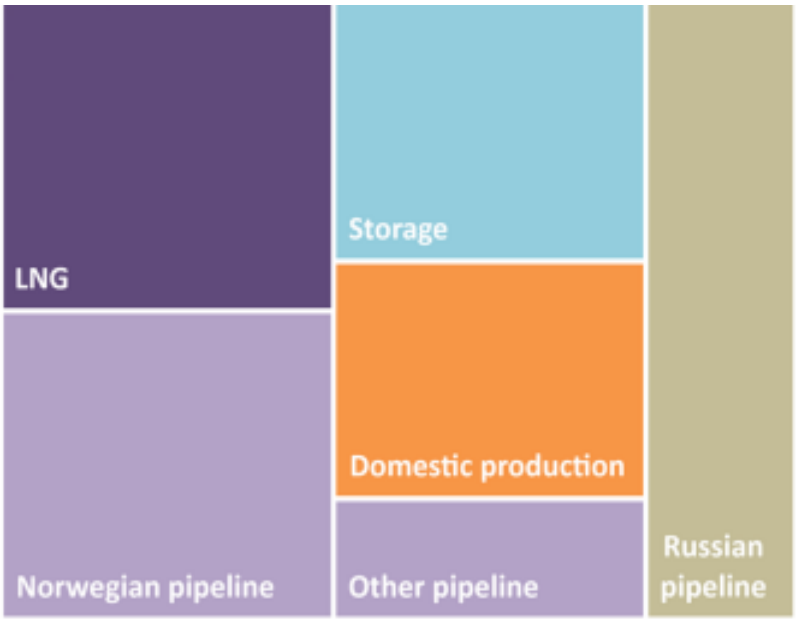
Figure 1.30: Change in supply to the EU+UK market: January-August 2021 vs January-August 2019 (bcm)



Source: Oxford Institute for Energy Studies, 2021

Similarly, Figure 1.31 below shows the different components of gas supply in the European Union and the United Kingdom in Winter 2021/2022. It can be noted that domestic production had a smaller role than LNG, storage, Russian pipeline gas and other countries' pipeline gas.

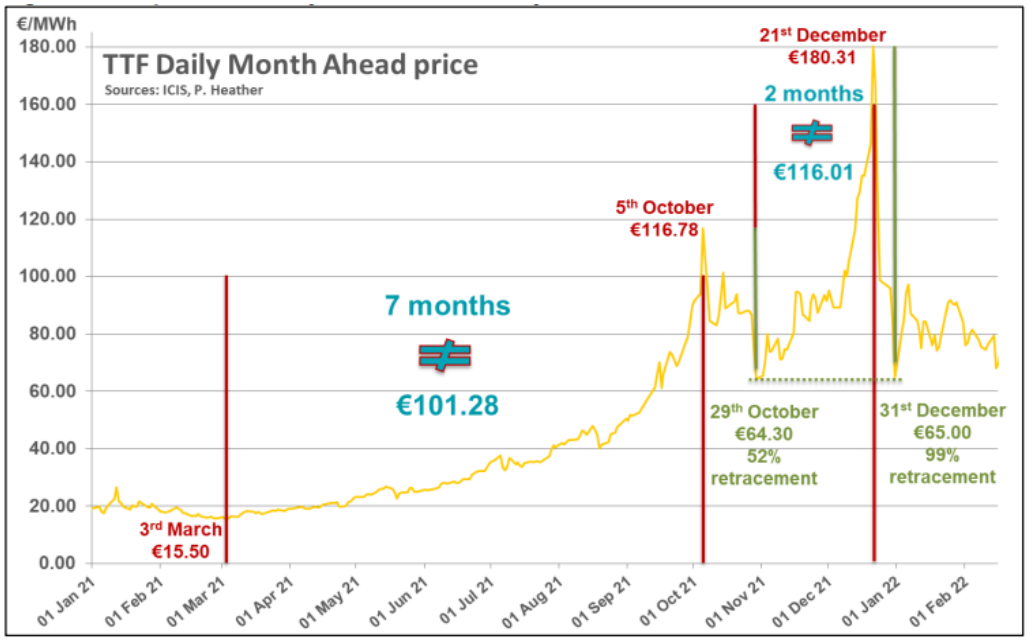
Figure 1.31: Gas supply winter 2021/2022 in EU+UK



Source: World Energy Outlook 2022

Price began to rise already in April 2021 and reached a first record on 5th October 2021 with €116.78/MWh. It then went down to €64.30/MWh and reached its highest peak, at least until the first half of February 2022, on 21st December 2021: €180.31/MWh[143]. The price fluctuation is shown in Figure 1.32 below, which traces TTF prices between 1st January 2021 and 15th February 2022.

Figure 1.32: TTF prices: January 2021 – 15th February 2022



Source: Oxford Institute for Energy Studies, 2022

This was the situation Europe was in on the eve of the Russian invasion of Ukraine: an energy crisis already underway, destined to be highly aggravated by the consequences of the war, as it will be analysed comprehensively in Chapter 3.

[143] Patrick Heather, "A Series of Unfortunate Events Explaining European Gas Prices in 2021 The Role of the Traded Gas Hubs," *The Oxford Institute for Energy Studies*, March 2022, 1–16, p. 7.

CHAPTER 2

THE EUROPEAN LEGISLATION ON NATURAL GAS

Energy is the fundamental source and engine of our civilisation. The European Union, as largely analysed in the previous Chapter, is not well endowed with energy sources, in particular with oil and natural gas, leading to a high import dependency. Given the importance of energy in the European market, the EU in the last twenty years tried to achieve gradually an Energy Union, with the scope of creating a single European energy market, not based on the decision of the single national governments. The vectors of these reforms have been outlined by the Green Paper[144] published by the EU Commission in 2006[145], titled: "A European Strategy for Sustainable, Competitive and Secure Energy ", highlighting the three main domains of the European energy policy: Sustainability, Competitiveness and Energy Security.

In the last twenty years, in particular with the beginning of the era of Vladimir Putin's Presidencies, natural gas has become a source not only of commercial interlink between the European Union and Russia but also of increasing tension, as a consequence of the use of gas as a "political weapon" by the Kremlin[146]. For this reason, the EU, through several acts, tried to strengthen its energy security and, specifically, its security of gas supply. Secondly, with the increasing strategic importance of energy and in particular natural gas, the European Union adopted a series of directives and regulations in an attempt of establishing the Energy Union. An important goal in this regard was the achievement of a truly competitive

[144] "Green papers are documents published by the European Commission to stimulate discussion on given topics at European Union (EU) level. They invite the relevant parties (bodies or individuals) to participate in a consultation process and debate on the basis of the proposals they put forward. Green papers may give rise to legislative developments that are then outlined in white papers." Source: "Green Paper," EUR-Lex Access to European Union law, accessed April 10, 2023, https://eur-lex.europa.eu/EN/legal-content/glossary/green-paper.html#:~:text=Green%20papers%20are%20documents%20published,the%20proposals%20they%20put%20forward.

[145] Commission of the European Communities, Commission Green Paper of 8 March 2006: "A European strategy for sustainable, competitive and secure energy" COM(2006) 105 final [2006]

[146] Grigas, *New Geopolitics of Natural Gas*, pp. 137-174.

European energy market. Thirdly, increasing global environmental concerns have led countries to plan the decrease of greenhouse gas (GHG) emissions, of which the main responsible are fossil fuels, namely coal, oil and natural gas. For this reason, the EU in the last years have adopted several strategies in order to phase out fossil fuels.

Therefore, this Chapter will analyse the directives and regulations adopted by the European Union in natural gas matters, following the division by domain as delineated by the Green Paper of 2006, with a particular focus on the reaction to energy insecurity caused by the "weaponization" of natural gas by Vladimir Putin.

2.1. The division of competences in energy matters between the European Union and Member States

Before discussing the specific decisions, directives and regulations adopted, it is necessary to understand the legal basis for the adoption of acts on energy matters by the European Union. Article 194 of the Treaty on the Functioning of the European Union (TFEU) prescribes that the goals of the Union policy on energy should be to "ensure the functioning of the energy market; ensure security of energy supply in the Union; promote energy efficiency and energy saving and the development of new and renewable forms of energy; and promote the interconnection of energy networks"[147].

Paragraph 2 gives the European Parliament and the Council the competence of establishing the necessary measures to pursue these objectives, after the consultation with the Economic and Social Committee and the Committee of the Regions. However, it adds that these measures "shall not affect a Member State's right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply", leaving a large margin of discretion to EU countries. Finally, paragraph 3, in derogation from paragraph 2, gives the Council the power to establish the measures referred in paragraph 2 following a special legislative procedure when "they are primarily of a fiscal nature" with a unanimous decision and after consultation with the European Parliament. Therefore, the European Parliament and the European Council can adopt

[147] Treaty on the Functioning of the European Union [2008] OJ C 115/134, art 194, par. 1.

measures in the pursuit of the aforementioned objectives. However, Member States have the ultimate choice between different energy sources and their energy supply mix.

Other specific provisions are the following. Article 122 of the TFEU, in the domain of security of supply, prescribes in paragraph 1 that "without prejudice to any other procedures provided for in the Treaties, the Council, on a proposal from the Commission, may decide, in a spirit of solidarity between Member States, upon the measures appropriate to the economic situation, in particular, if severe difficulties arise in the supply of certain products, notably in the area of energy."

Article 170 of the TFEU establishes, in paragraph 1, that "the Union shall contribute to the establishment and development of trans-European networks in the areas of transport, telecommunications and energy infrastructures." In the following Articles 171-172, the TFEU specifies that the Union shall support projects of common interest and decide to cooperate with third countries for projects of mutual interest. In particular, Article 172 prescribes that "the guidelines and other measures referred to in Article 171(1) shall be adopted by the European Parliament and the Council, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee and the Committee of the Regions. Guidelines and projects of common interest which relate to the territory of a Member State shall require the approval of the Member State concerned."

2.2. Liberalisation and Competitiveness: towards a single European natural gas market

The historical development of the energy sector in Europe has been marked by the passage from a system characterised by the strong presence of the State to a system characterised by the freedom of private initiative and a plurality of operators in the market[148]. In particular, during the 1990s, a decade in which national electricity and natural gas markets were substantially still monopolies, both the European Union and its Member States began to liberalise these markets[149].

[148] Michela Giachetti Fantini, "La liberalizzazione del mercato dell'energia elettrica e del gas naturale: il caso italiano nel panorama europeo", *ApertaContrada*, July 2017, 1–103, p.2.
[149] Matteo Ciucci, "Internal Energy Market: Fact Sheets on the European Union: European Parliament," European Parliament, September 2022, https://www.europarl.europa.eu/factsheets/en/sheet/45/internal-energy-market.

2.2.1. Directive 98/30/EC

The process of liberalisation of the natural gas market in the European Union began with the adoption of Directive 98/30/EC concerning common rules for the internal market in natural gas. It was issued by the European Parliament and Committee on 22nd June 1998 and covered the internal gas market, in particular the transportation, distribution, supply and storage. The final goal was the creation of a single European gas market, based on the principles of equality of treatment and non-discriminatory access for all users of the system.

Consistently with the shared competence principle which regulates the division of competencies between the European Union and the Member States in the energy sector, the Directive established common principles to which Member States must conform but leaves to them the faculty of choice among different options based on the national contest. The common principles are: homogeneous minimum conditions for the opening of the national markets; elimination of all forms of monopoly in the areas of production, import, transport and distribution; right of access to network infrastructures and non-discriminatory conditions for operators in line with the third party access[150] principle[151].

Directive 98/30/EC established a mechanism for increasing competitiveness in gas markets by requiring the definition by each Member State of the criteria for the identification of "eligible customers" and, consequently, compliance with a minimum standard of liberalisation. Eligible customers were defined by article 18 of the Directive as: "those customers inside their territory which have the legal capacity to contract for, or to be sold, natural gas". Article 18, paragraph 2, included in the definition also "gas-fired power generators, irrespective of their annual consumption level" and "other final customers consuming more than 25 million cm of gas per year on a consumption-site basis". The document, in Articles 15 and 16, identified two means for third parties to access gas networks: negotiated access and regulated access, leaving to the Member States the choice of which of them to adopt. First of

[150] The Third Party Access criterion establishes that "in order to have effective competition the operators of transmission networks must allow any electricity or gas supplier non-discriminatory access to the transmission network to supply customers". Source: "Questions and Answers on the Third Legislative Package for an Internal EU Gas and Electricity Market," European Commission - European Commission, accessed April 13, 2023, https://ec.europa.eu/commission/presscorner/detail/de/memo_11_125.

[151] Giachetti Fantini, "La liberalizzazione del mercato dell'energia elettrica e del gas naturale: il caso italiano nel panorama europeo", p.7.

all, the procedures of access must be "in accordance with objective, transparent and non-discriminatory criteria"[152]. Article 15 defined negotiated access as the procedure for which "Member States shall take the necessary measures for natural gas undertakings and eligible customers either inside or outside the territory covered by the interconnected system to be able to negotiate access to the system so as to conclude supply contracts with each other on the basis of voluntary commercial agreements". Differently, Article 16 defined regulated access as the procedure for which Member States "shall take the necessary measures to give natural gas undertakings and eligible customers either inside or outside the territory covered by the interconnected system a right of access to the system, on the basis of published tariffs and/or other terms and obligations for use of that system. This right of access for eligible customers may be given by enabling them to enter into supply contracts with competing natural gas undertakings other than the owner and/or operator of the system or a related undertaking."

Finally, the Directive prescribed that natural gas undertakings[153] must submit to audit and publish their annual accounts and that the vertically integrated ones[154] must operate an accounting unbundling, meaning that they need to "keep separate accounts for their natural gas transmission, distribution and storage activities, and, where appropriate, consolidated accounts for non-gas activities" in order to avoid discrimination, cross-subsidization and distortion of competition[155].

Despite the setting of common minimum standards, however, the European energy landscape continued to be highly heterogeneous: while some countries decided to operate a drastic change in their energy sectors, others introduced reforms more gradually, exploiting the degree of autonomy granted by the Directive. As a result, the initial expectations for the achievement of a European gas market were disappointed[156]. Consequently, after five years a new gas directive was adopted.

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[152] Directive 98/30/EC of the European Parliament and of the Council of 22 June 1998 concerning common rules for the internal market in natural gas [1998] OJ L 204/1, art. 14.

[153] Directive 98/30/EC, art. 2: a natural gas undertaking is: "any natural or legal person carrying out at least one of the following functions: production, transmission, distribution, supply, purchase or storage of natural gas, including LNG, which is responsible for the commercial, technical and/or maintenance tasks related to those functions, but shall not include final customers"

[154] Directive 98/30/EC, art. 2: "'vertically integrated undertaking' means a natural gas undertaking performing two or more of the tasks of production, transmission, distribution, supply or storage of natural gas;"

[155] Directive 98/30/EC, art. 13.

[156] Giachetti Fantini., "La liberalizzazione del mercato dell'energia elettrica e del gas naturale: il caso italiano nel panorama europeo", pp. 8-9.

2.2.2. Directive 2003/55/EC

Directive 2003/55/EC, adopted by the European Parliament and the Council on 26th June 2003 and concerning common rules for the internal market of natural gas, repealed Directive 98/30/EC. It aimed at the creation of a single European natural gas market through the liberalisation of this sector. It identified 10th July 2007 as the deadline for the full opening up of national markets. Moreover, it defined the roadmap for Member States for the enlargement of the definition of the eligible customers: from 1st July 2004 non-household customers and from 1st July 2007 all customers, including households[157].

The Directive obliged Member States to designate one or more system operators among natural gas undertakings which own transmission, storage, LNG or distribution facilities[158]. System operators must act in accordance with some principles lied down by Articles 8-10 of the Directive. In particular, they must "refrain from discriminating between system users or classes of system users, particularly in favour of its related undertakings" and "provide system users with the information they need for efficient access to the system"[159]. Under Articles 9 and 13, system operators that owned transmission and distribution systems, if they were vertically integrated undertakings, must be "independent at least in terms of its legal form, organisation and decision making from other activities not relating to transmission". Therefore, corporate unbundling was established as the minimum level of unbundling, accounting unbundling not being enough anymore[160]. However, this did not result in an obligation to separate the ownership of assets of the transmission and distribution systems.

In addition, Directive 2003/55/EC regulated the system of third-party access to the network. It stated that third-party access to the transmission and distribution system and LNG facilities must be regulated in a way to avoid discrimination between system users by using public tariffs, charged to all eligible customers. Consequently, Member States had no longer the possibility to choose between

[157] Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC [2003] OJ L 176/57, art. 23.
[158] Ivi, art. 7
[159] Ivi, art. 8, par. 1.
[160] Giachetti Fantini, "La liberalizzazione del mercato dell'energia elettrica e del gas naturale: il caso italiano nel panorama europeo", p. 12.

regulated and negotiated access, having to guarantee the regulated one, with the only exception of access to storage[161].

Article 20 of the Directive regulated the access to upstream pipeline networks, stating that Member States must ensure that natural gas undertakings and eligible customers are able to access fairly and openly upstream pipeline networks, including facilities providing technical services. The goal was to achieve a competitive natural gas market "avoiding any abuse of a dominant position, taking into account security and regularity of supplies, capacity which is or can reasonably be made available, and environmental protection"[162]. In order to incentivise the construction of new infrastructure, new major infrastructures could be exempted from the access rules if it could be demonstrated that the investment enhances competition in gas supply and security of supply and that the level of risk of the investment was such that it would not have been made without the grant of the exemption[163].

Directive 2003/55/EC established that Member States had to designate one or more competent bodies as regulatory authorities. They must be "wholly independent of the interests of the gas industry" and their functions are to ensure that the principles of non-discrimination, effective competition and efficient functioning of the market are effectively applied. Article 25 then listed the specific powers of the regulatory authorities, which, *inter alia*, must monitor "the rules on the management and allocation of interconnection capacity", "the publication of appropriate information by transmission and distribution system operators", the level of transparency and the compliance with the criterion of accounting unbundling. Regulatory authorities are responsible for fixing the methodologies for setting the conditions for access to national networks, including tariffs and for the provision of balancing services[164]. Finally, the Directive gave Member States the control over security of supply, including the balance between supply and demand, the level of expected future demand for natural gas and available stocks, and the quality of networks.

[161] Directive 2003/55/EC, artt. 18-19.
[162] Ivi, art. 20, par. 2.
[163] Ivi, art. 22.
[164] Ivi, art. 25.

However, notwithstanding this new Directive, the issues that emerged with the previous Directive did not disappear and, even though this time the resistance to the opening of national markets was weaker, benefits for consumers did not appear immediately[165].

2.2.3. The Third Energy Package

On 10th January 2007, the European Commission published a Communication to the European Parliament and the European Council titled "An Energy Policy for Europe"[166]. In that Communication, the Commission pointed out the importance of completing the construction of a single European gas market and furthering liberalisation. It recognised that the aforementioned Directives failed in achieving these objectives and proposed some additional measures. First of all, considering unbundling, the Commission recognised the risk of discrimination and abuse when companies own energy networks as well as production or sales and proposed two alternative options: a Full Independent System Operator, which means the situation "where the vertically integrated company remains the owner of the network assets and receives a regulated return on them, but is not responsible for their operation, maintenance or development", or ownership unbundling, "where network companies are wholly separate from the supply and generation companies. Moreover, the independent energy regulators need to pursue not only national objectives but also the development of a European energy market[167].

On 13th July 2009, the European Parliament and the European Council adopted the so-called Third Package for Energy, which entered into force on 3rd September 2009. It consists of two directives and three regulations: Electricity Directive (2009/72/EC), Gas Directive (2009/73/EC), Regulation Establishing an Agency for the Cooperation of Energy Regulators (EC) No 713/2009, Electricity Regulation (EC) No 714/2009 and Natural Gas Transmission Networks Regulation (EC) No 715/2009. The Package covers mainly the following five areas: unbundling, strengthening of the powers of independent regulators, the establishment of the

[165] Giachetti Fantini, "La liberalizzazione del mercato dell'energia elettrica e del gas naturale: il caso italiano nel panorama europeo", p. 13.
[166] European Commission, Communication from the Commission to the European Council and the European Parliament - an energy policy for Europe {SEC(2007) 12}, 10th January 2007.
[167] *Ibidem.*

Agency for the Cooperation of Energy Regulator (ACER), the creation of the European Network of Transmission System Operators (ENTSO) and European network codes for interconnections and cross-border cooperation and open and fair retail markets. For the purposes of the present dissertation, the analysis of the Third Package will focus on the Gas Directive (2009/73/EC), amended in 2019, and the Natural Gas Transmission Networks Regulation (EC) No 715/2009, still in force at the time of writing.

Directive 2009/73/EC concerning common rules for the internal market in natural gas repealed Directive 2003/55/EC. It was adopted on the basis of the recognition that the principles of non-discrimination and free access to gas networks and sales had not been achieved and that "an equally effective level of regulatory supervision in each Member State do not yet exist"[168]. At the same time, it also recognised that the rules on unbundling under Directive 2003/55/EC were not effective in avoiding discrimination and abuse by system operators. Therefore, following the aforementioned 2007 Communication by the Commission, the Directive established the rule of ownership unbundling, which "implies the appointment of the network owner as the system operator and its independence from any supply and production interests" and ensures the security of supply. As an alternative to ownership unbundling, Member States may opt for the Independent System Operator (ISO) or the Transmission System Operator (TSO). In the case of the ISO system, vertically integrated undertakings may retain ownership of the network, provided that the management is entrusted to a third party, who becomes fully responsible for the operation of the network. Differently, in the TSO system, vertically integrated undertakings can not only retain the ownership of the network system but also of the transmission system operator, of which, however, they must guarantee decision-making and functional independence[169].

The Directive established the strengthening of both the powers and the independence requirements of the regulatory authorities in comparison to Directive 2003/55/EC: Member States had to guarantee that those authorities were in a position to make decisions on all aspects of the market regulation and that they are

[168] Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC [2009] OJ L 211/ 94.
[169] Giachetti Fantini, "La liberalizzazione del mercato dell'energia elettrica e del gas naturale: il caso italiano nel panorama europeo", p. 15.

completely independent of both public and private interests[170]. The authorities were given the key role of removing restrictions on natural gas trade between Member States, facilitating third-party access and improving the integration of national markets. They are given both regulatory and monitoring competencies: among others, setting transmission or distribution tariffs, guaranteeing transparency, ensuring consumer protection and regulating the methods of access to networks[171]. Article 39 set out the conditions which guarantee the independence of the regulatory authorities: they could take actions independently from any political body and have separate annual budget allocations and "the members of the board of the regulatory authority or, in the absence of a board, the regulatory authority's top management are appointed for a fixed term of five up to seven years, renewable once"[172].

Finally, Regulation (EC) No 715/2009 established a European Network of Transmission System Operators for Gas (ENTSO-G) in order to reinforce coordination between national grid operators. The final goal was "setting non-discriminatory rules for access conditions to natural gas transmission systems", "setting non-discriminatory rules for access conditions to LNG facilities and storage facilities", and "facilitating the emergence of a well-functioning and transparent wholesale market with a high level of security of supply in gas and providing mechanisms to harmonise the network access rules for cross-border exchanges in gas"[173].

2.2.4. The antitrust dispute between the European Commission and Gazprom

In 2012, the European Commission started an investigation against Gazprom's activities. In particular, it suspected a violation of EU competition rules by Gazprom which was allegedly abusing its power as the dominant gas supplier in eight East-Central European EU Member States (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland and Slovakia), where it had a market share between 50% and 100%. Consequently, on 22nd April 2015, the Commission

[170] Directive 2009/73/EC, art. 39.
[171] Ivi, art. 40.
[172] Ivi, art. 39.
[173] Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005 [2009] OJ L 211/36, art. 1.

sent a Statement of Objections to Gazprom for alleged abuse of dominance in Central and Eastern European gas supply markets. The preliminary conclusions were that Gazprom was breaching antitrust rules in three ways: "hindering cross-border gas sales, charging unfair prices, and making gas supplies conditional on obtaining unrelated commitments from wholesalers concerning gas transport infrastructure"[174].

In the case of hindering cross-border gas sales, Gazprom used territorial restrictions, namely the export ban clause, destination clauses and other measures such as the one requiring Gazprom's approval for export. In this way, Gazprom prevented gas from flowing freely between these eight countries so as not to have access to imported gas and more competitive prices. On two occasions already, in 2004 and 2009, the Commission had made clear that territorial restrictions to partition markets are uncompetitive[175].

Secondly, Gazprom was accused of charging unfair prices for natural gas to the eight Central and Eastern European countries. In particular, Gazprom was said to exploit market fragmentation to impose unfair prices and to do it also thanks to the indexation of gas prices in supply contracts to oil prices[176].

Thirdly, the Commission was concerned by the fact that Gazprom allegedly exploited its market dominance in Bulgaria and Poland to make gas supplies conditional upon the ensuring of infrastructure-related commitments from wholesalers. In particular, the Commission's preliminary view showed that, in Bulgaria, Gazprom would link wholesale gas supplies to the participation of the wholesaler in the Gazprom infrastructure project (namely, the South Stream pipeline project), notwithstanding the project was not economically convenient. In Poland, Gazprom would make gas supplies conditional upon ensuring that Gazprom kept its control over investment decisions concerning the section of Yamal pipelines transiting through this country[177].

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[174] "Antitrust: Commission Sends Statement of Objections to Gazprom for Alleged Abuse of Dominance on Central and Eastern European Gas Supply Markets," European Commission, April 22, 2015, https://ec.europa.eu/commission/presscorner/detail/en/IP_15_4828.

[175] *Ibidem*.

[176] Marco Siddi, "The Antitrust Dispute between the European Commission and Gazprom: Towards an Amicable Deal," *Finnish Institute of International Affairs*, April 2017.

[177] "Antitrust: Commission Sends Statement of Objections to Gazprom for Alleged Abuse of Dominance on Central and Eastern European Gas Supply Markets," European Commission, April 22, 2015, https://ec.europa.eu/commission/presscorner/detail/en/IP_15_4828.

Given the increasing political tensions between the European Union and Russia, and given that Gazprom is a state-controlled company, Russia saw the anti-trust accuses as a way to put pressure on Russia and to influence prices. On the European Union side, however, Joaquìn Alminia, at the time Commissioner for Competition, emphasised that it was not a political move, but a technical and bureaucratic one. In 2015, formal talks between the EU Commission and Gazprom began and in 2017 the Commission expressed its satisfaction with Gazprom's commitments in resolving the dispute: it agreed to remove territorial restriction so that to enable market integration between the Central and Eastern European countries. Moreover, it agreed in guaranteeing competitive gas prices and committed to not make contracts conditional upon infrastructural projects[178].

Finally, on 24th May 2018, the European Commission adopted a decision imposing legally binding measures on Gazprom in order to "allow free flow of gas at competitive prices in Central and Eastern European gas markets"[179]. The obligations imposed were the following: Gazprom could no longer restrict the re-selling of gas cross-border by its customers; Gazprom would have to promote gas flows between countries so to help isolated countries, in particular Bulgaria and Baltic States; Gazprom would have to enable these countries to reach gas prices reflecting the ones of the more competitive Western European markets; finally, Gazprom would have to no longer use its leverages in order to obtain advantages for infrastructural projects. These obligations legally bound Gazprom under Article 9 of the EU's antitrust Regulation 1/2003[180].

The decision by the Commission was met positively by Gazprom's Deputy CEO Alexander Medvedev, who declared that the company was "satisfied with the commitments decision", which he considered to be "the most reasonable outcome for the well-functioning of the entire European gas market"[181]. However, the Polish state-owned energy company PGNiG strongly criticised the decision for letting

[178] Nicolò Sartori, "The European Commission vs. Gazprom: An Issue of Fair Competition or a Foreign Policy Quarrel?," *Stituto Affari Internazionali (IAI)* 13, no. 03 (January 2013): 1–19.
[179] "Antitrust: Commission Imposes Binding Obligations on Gazprom to Enable Free Flow of Gas at Competitive Prices in Central and Eastern European Gas Markets," European Commission, May 24, 2018, https://ec.europa.eu/commission/presscorner/detail/en/IP_18_3921.
[180] *Ibidem*.
[181] Simon van Dorpe, "Vestager's Big Gazprom Case Upheld in EU Court," Politico, February 2, 2022, https://www.politico.eu/article/vestagers-big-gazprom-case-upheld-in-eu-court/#:~:text=European%20Commission%20wins%20challenge%20on,fine%20for%20Russian%20energy%20giant.

Gazprom settle the dispute without paying any fine and for being "too soft" on the Russian state-owned company[182]. In recent years, in fact, PNGiG filed several court cases against Gazprom and in 2020 the Polish competition authority imposed a fine of €6.5 billion for the agreement between Russia and Germany about the construction of Nord Stream 2 gas pipeline. Finally, in February 2022, the judges of the Court decided that the European Commission's decision did not present any procedural or substantive errors, dismissing PGNiG complaints[183].

2.2.5. Directive (EU) 2019/692: gas transmission lines from and to third countries

On 17th April 2019, the European Parliament and the Council of the European Union adopted Directive (EU) 2019/692 amending Directive 2009/73/EC. The Directive aims at the completion of the European natural gas internal market. Even though it recognised the progress achieved thanks to the two previous Directives (2003 and 2009), it expressed concerns about the obstacles resulting from the non-applicability of the rules set out by the Directives to gas transmission lines to and from third countries. Through this Directive, following a proposal from the European Commission, the rules set out in Directive 2009/73 become applicable also to transmission lines linking the European Union to third countries. In this way, the Parliament hoped to avoid distortion of competition and dangers on the security of supply, as showed by the anti-trust case Commission v. Gazprom. Moreover, it aimed at strengthening transparency and legal certainty, in order to attract more investors.

The Directive allows for the derogation to the application of the Union rules to gas transmission lines to and from third countries, namely Articles 9, 10, 11 and 32 and Article 41(6), (8) and (10), in case of gas transmission lines completed before its entry into force (23rd May 2019), for "objective reasons", for example to recover the investment made for security of supply reasons. The condition is that the derogation

[182] Yun Chee Foo et al., "Blow to Gazprom Critics as EU Court Upholds Antitrust Settlement," *Reuters*, February 2, 2022, https://www.reuters.com/business/energy/eu-court-upholds-antitrust-settlement-gazprom-case-2022-02-02/#:~:text=BRUSSELS%2C%20Feb%202%20(Reuters),investigation%20without%20paying%20a%20fine.

[183] Van Dorpe, "Vestager's big Gazprom case upheld in EU court".

must not be detrimental to "competition or the effective functioning of the internal market in natural gas, or to security of supply in the Union"[184].

Directive (EU) 2019/692 added to Directive 2009 article 49b, which establishes that when a Member States wants to "enter into negotiations with a third country in order to amend, extend, adapt, renew or conclude an agreement on the operation of a transmission line with a third country concerning matters falling, entirely or partly, within the scope of this Directive" it must notify the Commission of its intention. The Commission can decide to deny the Member State the authorisation to enter into negotiations with a third country when the opening of the negotiations are in conflict with the Union law, when they are "detrimental to the functioning of the internal market in natural gas, competition or security of supply in a Member State or in the Union", when they could undermine the negotiations of the Union with a third country and when they are discriminatory. In the examination of the case, the Commission has to consider the eventual contribution to the diversification of natural gas supplies of the agreement concerning a transmission line or an upstream pipeline[185].

Following the adoption of Directive 2019/692, the Nord Stream 2 pipeline company on 26th July 2019 asked the EU Court of Justice to annul the amendments to Gas Directive 2009 for allegedly breaching the fundamental EU legal principles of equal treatment and proportionality[186]. What concerned Nord Stream 2 was the entry into force of the obligation to "unbundle transmission systems and transmission system operators and to introduce a system of non-discriminatory third-party access to gas transmission" for pipeline operators which have a gas transmission pipeline running between a member State and a third State as well[187]. As mentioned in Chapter 1, several Western European companies had significant shares of the Nord Stream 2 company, namely Engie, ÖMV, Shell, Uniper and Wintershall. On that occasion, Sebastian Saas, a Nord Stream 2 lobbyist, described the new Directive as being specifically against the

[184] Directive (EU) 2019/692 of the European Parliament and of the Council of 17 April 2019 amending Directive 2009/73/EC concerning common rules for the internal market in natural gas [2019] OJ L 117/1, art. 1.
[185] Directive 2009/73/EC, art. 46b, as amended by Directive (EU) 2019/692.
[186] "New EU Gas Law, Challenged by Nord Stream 2, Is Valid -Spokeswoman," *Reuters*, 26th July 2019. https://www.reuters.com/business/energy/eu-court-adviser-says-nord-stream-2-can-challenge-eu-rules-2021-10-06/.
[187] "The General Court of the European Union Declares That the Actions Brought by Nord Stream AG and Nord Stream 2 AG against Directive 2019/692, Which Extends Certain Rules of the Internal Market in Natural Gas to Pipelines from Third Countries, Are Inadmissible" (Luxembourg, Luxembourg: General Court of the European Union, 2020), General Court of the European Union.

project, calling it a "lex Nord Stream 2". Moreover, legal experts argued that the derogations granted in the new Directive were applicable to all existing pipelines, except for Nord Stream 2[188].

In its action against the Commission, the Nord Stream 2 company argued that the new Directive would have brought discriminatory obligations to it, forcing the sale of the whole Nord Stream 2 pipeline or alter the business structure. However, on 20th May 2020, the General Court dismissed the action as inadmissible, because it considered the applicant as not being directly impacted by Directive (EU) 2019/692. The Court argued that the Member States, which have to transpose the measures, have wide margins of discretion and can grant derogations or exemptions[189].

2.2.6. Hydrogen and decarbonised gas market package proposal

On 15th December 2021, the Commission adopted a set of legislative proposals for amending Directives 2009/73 and 715/2009 of the Third Package in order to set the conditions for the decarbonisation of the EU gas market and promoting a shift from fossil natural gas to renewable and low-carbon gases, in particular biomethane and hydrogen. The proposals is part of the framework of actions by the European Union to mitigate climate change.

In that occasion, Executive Vice-President for the European Green Deal, Frans Timmermans, said: "Europe needs to turn the page on fossil fuels and move to cleaner energy sources. This includes replacing fossil gas with renewable and low carbon gases, like hydrogen. Today, we are proposing the rules to enable this transition and build the necessary markets, networks and infrastructure. To address methane emissions, we are also proposing a solid legal framework to better track and reduce this powerful greenhouse gas, helping us to fulfil the Global Methane Pledge and tackle the climate crisis". Commissioner for Energy, Kadri Simson, said "With today's proposals, we are creating the conditions for the green transition in our gas sector, boosting the use of clean gases. A key element of this transition is establishing a competitive hydrogen market with dedicated infrastructure. We want Europe to lead the way and be the first in the world to lay down the market rules for this important source of energy

[188] Gotev, Georgi. "Nord Stream 2 Takes Unusual Legal Step against the Commission." Euractiv, July 26, 2019. https://www.euractiv.com/section/energy/news/nord.
[189] General Court of the European Union, Press Release no 62/20.

and storage. We are also proposing strict rules on methane emissions from gas, oil and coal, to reduce emissions in these sectors by 80% by 2030 and to trigger action on methane outside the EU. Our proposals also strengthen the security of gas supply and enhance solidarity between Member States, to counteract price shocks and make our energy system more resilient. As requested by Member States, we improve the EU's gas storage coordination and create the option for voluntary joint purchase of gas reserves"[190].

Therefore, one of the main goals of the proposal is to establish a market for hydrogen, both in terms of investments and infrastructures. To this aim, a new governance structure, the European Network of Network Operators for Hydrogen (ENNOH) should be created, in order to enhance cross-border cooperation and set methods and rules. In order to promote the access of renewable and low-carbon gases to existing grids, the Commission proposed to remove tariffs for cross-border interconnections and to lower tariffs. Moreover, the Commission proposed that "long-term contracts for unabated fossil natural gas should not be extended beyond 2049"[191]. Another main principle of the package is to ensure the possibility for consumers to choose renewables and low-carbon gases over fossil fuels.

The "Hydrogen and decarbonized gas market packages" has been considered an important step for the creation of a regulatory framework towards the decarbonisation of the gas market, however a hydrogen market still does not exist: it is still more a political project than an already in-place market. Hydrogen infrastructure are localized almost exclusively in industrial clusters[192]. In any case, this proposal has not been transformed into EU law yet.

2.3. Sustainability of energy supply

Sustainability is one of the three pillars of the Green Paper published by the European Commission in 2006, titled "A European Strategy for Sustainable, Competitive and Secure Energy", which had to guide EU reforms in the energy sector.

[190] "Hydrogen and Decarbonised Gas Market Package," European Commission - Energy, accessed April 14, 2023, https://energy.ec.europa.eu/topics/markets-and-consumers/market-legislation/hydrogen-and-decarbonised-gas-market-package_en.
[191] *Ibidem.*
[192] Laura Heidecke et al., "The Revision of the Third Energy Package for Gas, Policy Department for Economic, Scientific and Quality of Life Policies of the European Parliament," *European Parliament's Committee on Industry, Research and Energy (ITRE)*, November 2022, p. 9.

In fact, European Union is now considered to be a frontrunner in the fight against climate change, both at the European and at the international level[193]. Moreover, climate targets and environmental commitments under EU legislation influenced the reaction of the European Union and its Member States in the gas sector following the Russian invasion of Ukraine in February 2022. Therefore, in order to have a comprehensive understanding of natural gas market in the European policy framework, it is important to analyse the always more ambitious targets the EU has set to make the energy sector more sustainable.

2.3.1. Climate change: current state of affairs and the role of fossil fuels

In the last decades, awareness about the changing climate and the impact of human activities on the environment has been rising, with an acceleration in the last years. In particular, the focus of the international community has been on the need of an ecological transition of the energy sector in order to replace the use of fossil fuels (coal, oil and natural gas) with renewable sources of energy. The European Union is largely involved in these international initiatives.

In March 2023, the Intergovernmental Panel on Climate Change (IPCC)[194] published the Sixth Assessment Report on Climate Change[195], showing how national policies aimed at mitigating climate change are still not enough in order to keep the increase in global temperature within the limit of 1.5°C more than pre-industrial levels.

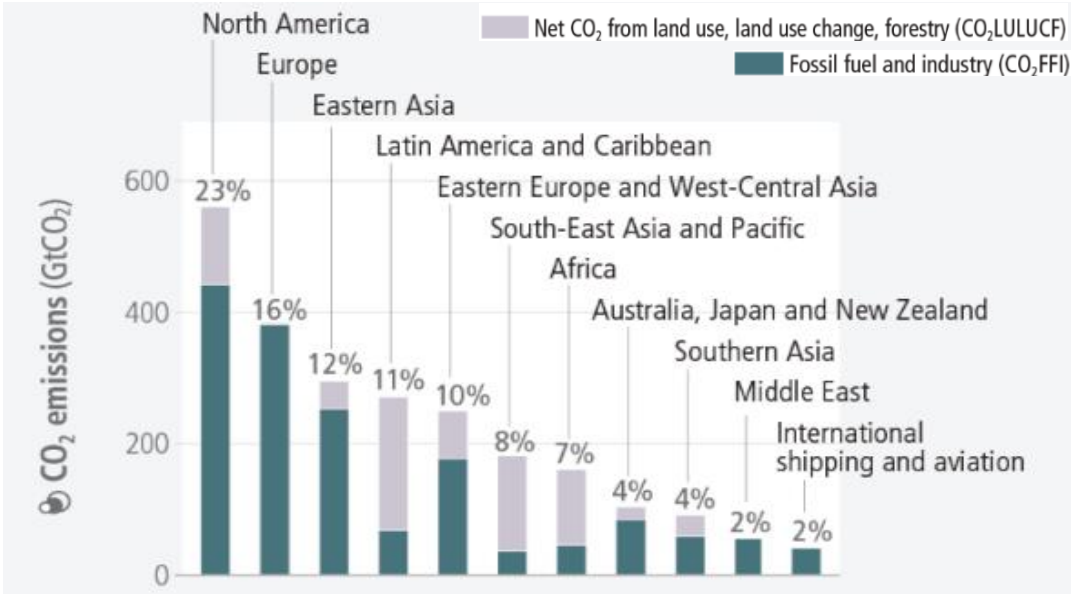
The Report starts from highlighting how climate change, and in particular global warming, is a consequence of human activities. Greenhouse gas emissions from human activities continue to increase and it can be noted a big share of it being CO_2 from fossil fuels and industry. Concentrations of GHGs in the atmosphere has increased rapidly since 1850, with Nitrus oxide (N2=) reaching in 2019 332 parts per billion, Methane (CH4) 1866 parts per billion and Carbone dioxide (CO_2) 410 parts per million. The increase of CO_2 has registered a significant growth rate since the second half of the twentieth century. As a consequence of the increased concentrations of GHGs in the

[193] Tom Delreux and Frauke Ohler, "Climate Policy in European Union Politics", *Oxford Research Encyclopedia of Politics*, March 26, 2019, https://doi.org/10.1093/acrefore/9780190228637.013.1097, p. 1.
[194] The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change.
[195] IPCC, *AR6 Synthesis Report (SYR): Climate Change 2023*, March 2023.

atmosphere, global surface temperature has increased by 1.1 °C by 2011-2020 in comparison to 1850-1900 levels, due mostly to emissions resulting from unsustainable energy use, land use and lifestyles. It is important to point out that, even though during 2010-2019 annual GHG emissions were higher than in any previous decade, the rate of growth has decreased in comparison to the 2000-2009 one.

The Report proves how the countries more responsible for global warming are not the most vulnerable ones to the consequences of climate change. These consequences are, among others, greater frequency and intensity of extreme weather events, changing precipitation patterns, reduction and loss of cryospheric elements and reduction of food security. Figure 2.1 below shows the historical cumulative net anthropogenic CO_2 emissions per region in 1850-2019. North America and Europe together are responsible for the 39% of global cumulative CO_2 emissions. However, developing and least developed countries, who have emitted much less than the global average of historical cumulative CO_2 in the atmosphere suffer from a much higher vulnerability to climate hazards.

Figure 2.1: Historical cumulative net anthropogenic CO_2 emissions per region (1850-2019)

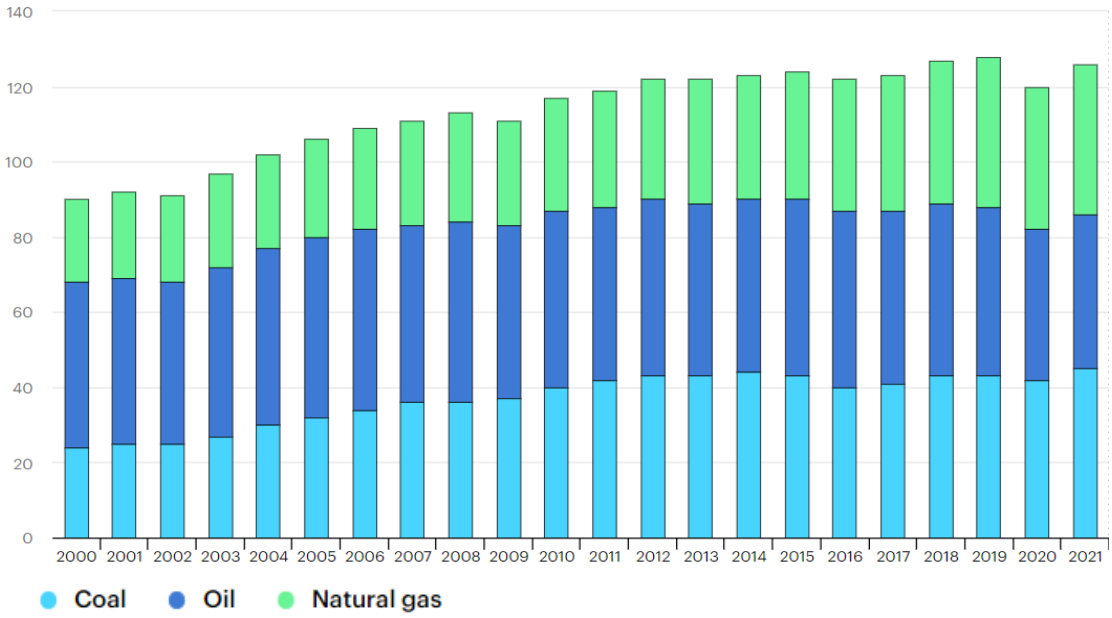


Source: IPCC, 2023

As assessed by the Report, in 2019 the energy sector produced 34% of net global GHG emissions. Combustion of fossil fuels, in particular coal, oil and natural gas, used in the energy sector, causes high level of CO_2 emissions, with some differences between them, with natural gas considered the less polluting among the three. In fact, CO_2

emissions per unit of energy produced from natural gas are 20% lower than oil and 40% lower than coal[196]. In the last years, as a consequence of the status of less polluting fossil fuel among the three, natural gas has been labelled as the "bridge fuel" in the ecological transition towards clean energy. However, while it is true that it produces fewer conventional air pollutants, it has recently been estimated by scientific studies that methane emissions from gas and oil operations are much higher than previously assessed[197]. Methane is the main component of natural gas and is a very dangerous greenhouse gas, 84 times more powerful than carbon dioxide in a twenty-year period of time[198].

Figure 2.2: Methane emissions from fossil fuels, 2000-2030



Source: International Agency of Energy, 2022

Public awareness is rising and the international arena is setting increasingly ambitious goals. Adoption of mitigation policies by nation states are contributing to the decrease in global energy and carbon intensity and renewable sources of energy are becoming cheaper and more competitive.

At the United Nations level, the main milestones achieved have been the adoption of the United Nations Framework Convention on Climate Change

[196] Iea, "Methane Tracker 2020 – Analysis," IEA, March 2020, https://www.iea.org/reports/methane-tracker-2020.
[197] "Is Natural Gas Really the Bridge Fuel the World Needs?," UNEP, January 12, 2023, https://www.unep.org/news-and-stories/story/natural-gas-really-bridge-fuel-world-needs.
[198] *Ibidem*.

(UNFCCC), Kyoto Protocol and Paris Agreement. The Kyoto Protocol, opened to ratifications in 1997 and entered into force in 2005, has been crucial in the development of GHG reporting, accounting and emissions markets. The Paris Agreement, adopted in 2015 at the UN Climate Change Conference (COP21) by 196 parties and entered into force in 2016, has been fundamental for policy development and target-setting both at national and sub-national levels.[199].

The Kyoto Protocol operationalised the UNFCCC, by making industrialised countries limit GHG emissions. In particular, it bound thirty-seven industrialised countries and the European Union to reduce emissions, reaching the combined target of 5% emissions reduction in the period 2008-2012 compared to 1990 levels. On 8th December 2012, the Doha Amendment was adopted and opened for a second commitment period, 2013-2020.

The declared goal of the Paris Agreement is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and to commit "to limit the temperature increase to 1.5°C above pre-industrial levels". It requires all parties to submit, every five years, an updated national climate action plan, the so-called Nationally Determined Contribution (NDC). The Agreement envisages the financing of developing countries in the commitment to mitigate climate change and to strengthen their resilience to climate change consequences as well. However, it is important to point out, that, even though the limit below which Parties to the Paris Agreement must stay is 2 °C above pre-industrial levels, the IPCC set at 1.5°C the point after which climate change will cause significantly more severe consequences[200].

2.3.2. The European Union and its leading role in the fight against climate change

The European Union ratified both the Kyoto Protocol and the Paris Agreement, to which it is legally bound. In both cases, the EU played a leading role in the negotiations process. EU environmental policy competence is based on articles 11 and 191 to 193 of the TFEU. Article 11 requires that "environmental protection requirements must be integrated into the definition and implementation of the Union's

[199] IPCC, *AR6 Synthesis Report (SYR): Climate Change 2023*.
[200] "The Paris Agreement: What Is the Paris Agreement?," United Nations Climate Change, accessed 1st April 2023, https://unfccc.int/process-and-meetings/the-paris-agreement.

policies and activities, in particular with a view to promoting sustainable development". Article 191, more specifically, sets the explicit goal of fighting climate change and promotes the engagement and participation of the European Union in international climate negotiations under the United Nations.

The first steps in the fight against climate change at EU policy level were taken in the late 1980s, with the adoption of a Resolution by the European Parliament in 1986, a Communication by the Commission in 1988 and some Conclusions of the European Council 1990 which expressed the need to maintain GHG emissions 1990-levels by 2000, in very general terms[201]. In the 1990s, more detailed and effective reforms and measures were proposed and adopted[202]. The EU played a leading role in the negotiations of 1997 Kyoto Protocol and, following its ratification, under which the EU committed to reduce GHG emissions by 8% by 2012, a wide range of climate policies have been adopted, as, for example, the Burden Sharing Agreement. It set which measures should have been taken by which EU Member State in compliance with Kyoto targets. Other policies regulated other energy-related areas, such as CO_2 emissions from vehicles, biofuels and energy performance of buildings[203].

The first commitment period under Kyoto Protocol came to an end in 2012. On that perspective, the EU continued developing climate policies for the second commitment period of 2012-2020. With this aim, in 2009, European Union Member States agreed on the adoption of the so-called "20-20-20 by 2020", which set specific goals to be achieved by 2020, and in 2011 agreed on the a Roadmap to 2050. In 2014, the European Council decided to set a threefold target for 2030: reduction of 40% of GHGs emissions, an increase by 32% of renewable energy sources and an increase by 32.5% of energy efficiency. The Paris Agreement in 2015 led to an increase in the EU climate ambitions and to new climate policies. In 2019, the European Commission adopted the "Green Deal", which set the target of reduction of emissions by 55% by 2030 and net-zero emissions by 2050. Following the adoption of this document, the European Commission, on 14th July 2021, adopted the "Fit-for-55" document, which contains a package of reforms in order to achieve the targets set by the Green Deal.

[201] Jason Anderson, "Can Europe Catalyze Climate Action?," *Current History* 108, no. 716 (March 2009): 131–37, https://doi.org/https://doi.org/10.1525/curh.2009.108.716.131.
[202] Delreux and Ohler, "Climate Policy in European Union Politics", p. 2.
[203] Ivi, p. 3.

The commitment in the fight against climate change is not homogenous within the Council. In fact, a division in two groups can be noted among Member States: on the one hand, there are those who support actively climate policies at the EU level, on the other there are those, namely Central and Eastern European Member States, which consider these policies detrimental for their own economies and rely significantly on coal for their domestic energy systems[204].

2.3.3. Main climate policy instruments of the European Union

The policy instruments of the European Union for the fight against climate change can be divided in two groups: the Emission Trading System (ETS) and non-ETS instruments. They cover, each, 50% of total European Union CO_2 emissions[205].

The ETS instrument is aimed at reducing carbon dioxide emissions by mainly the sectors of power generation, heavy industry and intra-European aviation. The definition of "emissions trading" can be found in the Green paper published in March 2000 by the European Commission with the title "Green Paper on greenhouse gas emissions trading within the European Union":

> "Emissions trading, whether domestic or international, is a scheme whereby entities such as companies are allocated allowances for their emissions. Companies that reduce their emissions by more than their allocated allowance can sell their "surplus" to others who are not able to reach their target so easily. This trading does not undermine the environmental objective, since the overall amount of allowances is fixed. Rather, it enables cost-effective implementation of the overall target and provides incentives to invest in environmentally sound technologies"[206].

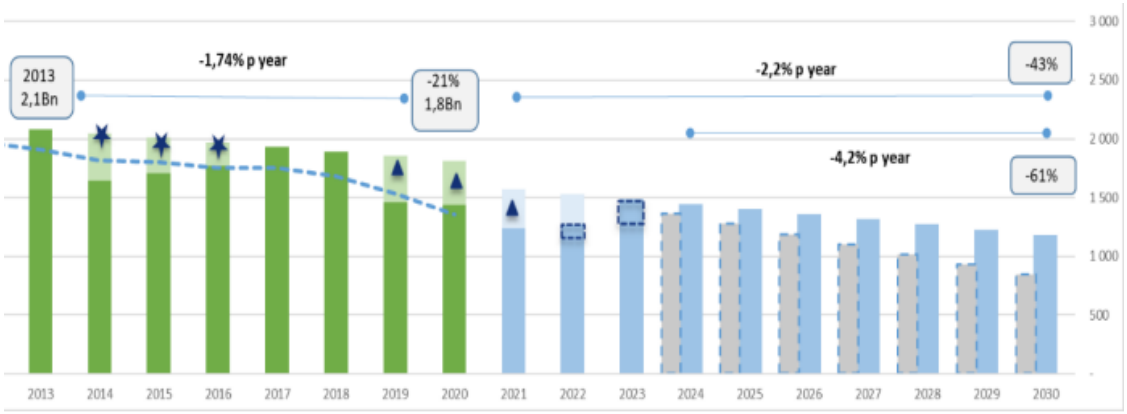
Following the Green Paper, in October 2003 the European Parliament and the Council adopted the EU ETS Directive and the system came into operation in 2005. This system establishes that companies are allocated allowances for each unit of carbon emitted. If companies emit less than they are allocated, they can sell their surplus to the companies that have exceeded their cap. With this system, therefore, the most environmental friendly companies are rewarded, while those who do not comply with the limit in emissions suffer an economic penalisation. Very importantly, allowances to

[204] Ivi, p. 4.
[205] Ivi, p. 7.
[206] European Commission, Green Paper on greenhouse gas emissions trading within the European Union /* COM/2000/0087, 8th March 2000.

companies shrinks overtime, therefore gradually setting more ambitious goals over time. In fact, during phase 2 (2008-2012) of this system, cap on allowances was reduced by 6.5% in comparison to 2005 levels and, on 1st January 2012, the intra-European aviation sector was finally covered by emissions trading.

For phase 3 (2013-2020) some changes have been applied, the main one being the adoption of a single EU-wide cap, while previously there was a system of national caps, which proved to be inefficient. In addition, more sector were included under the ETS system. In the reforms package "Fit-for-55" published by the European Commission in 2021, there was a reform of the Emissions Trading System as well. In particular, it was set the objective to reduce emissions by 43% compared to 2005 levels. To achieve this, for the period 2021-2030 (phase 4) the decline of the number of emission allowances will decline annually by 2.2%, instead of 1.74% of phase 3. Figure 2.3. below shows cap reduction until 2030 applying the linear reduction factor of 2.2% as of 2021.

Figure 2.3: Cap reduction applying the linear reduction factor of 2.2% as of 2021

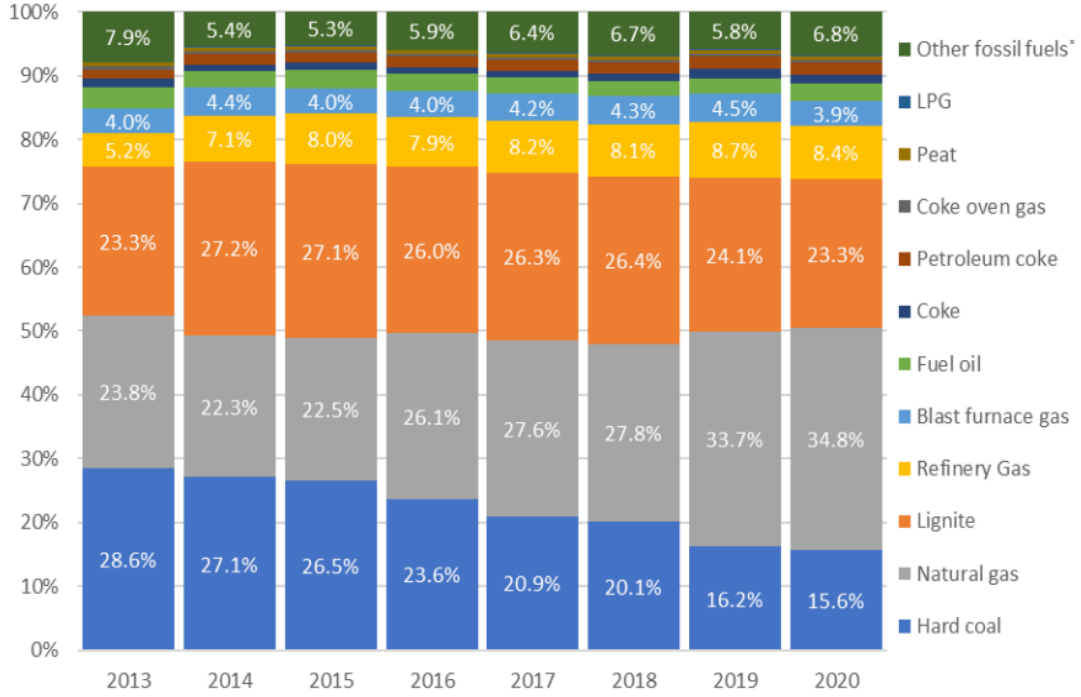


Source: European Commission, 2021

Finally, Figure 2.4 shows the share of emissions by fuel type covered by the Emissions Trading System between 2013 and 2020. It can be noted that hard coal, lignite and natural gas together represents 75% of fossil fuel emissions each year, with natural gas gradually increasing its share (from 23.8% in 2013 to 34.8% in 2020), while the share of coal went from 28.6% in 2013 to 15.6% in 2020.

Figure 2.4: Share of emissions by fuel type (% of total fuel emissions in the EU ETS

Source: European Commission, 2020



Sectors, such as agriculture, transport, small industries and buildings, which are not under the ETS, cover approximately 50% of the greenhouse gas emissions. In order to reduce their emissions, non-ETS instruments are applied. Usually, they are national-level and differ from sector to sector. The European Union establishes the targets and Member States must act accordingly. However, besides providing climate goals, the EU support Member States by adopting regulatory frameworks which help harmonising national rules[207].

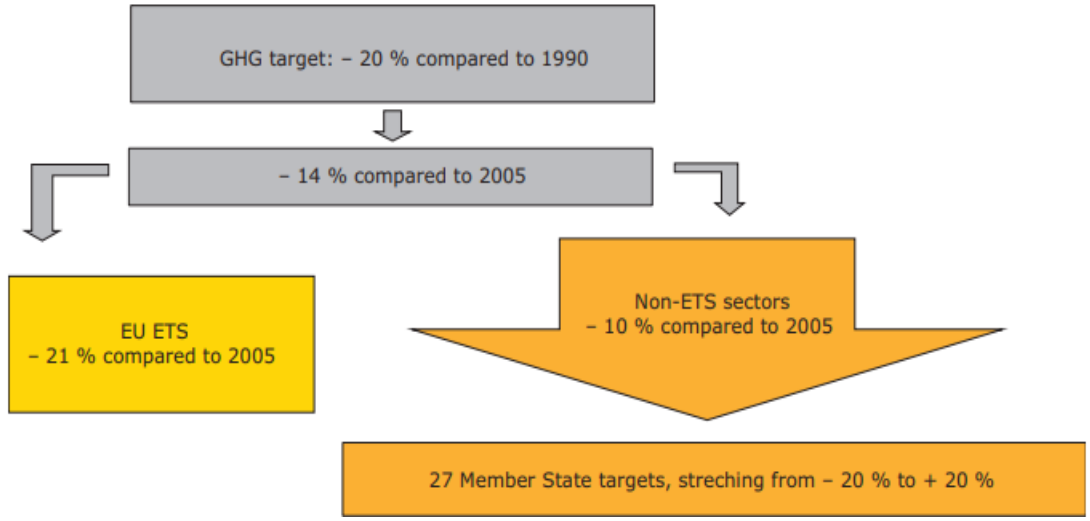
2.3.4. Roadmap to 2020

In March 2007, the EU Heads of State grouped at the European Council adopted a set of three climate targets to be achieved by 2020: the so-called "20-20-20 Package". In particular, compared to 1990 levels, they would have to reduce greenhouse gas emissions by 20%, achieve 20% of EU energy from renewable sources and improve energy efficiency by 20%[208]. Following this agreement, in 2008 the European Commission adopted the "Climate and Energy Package", which consisted of ETS Directive, revising the Emissions Trading System, by introducing a single EU-wide cap

[207] Delreux and Ohler, "Climate Policy in European Union Politics", p. 10.
[208] Council of the European Union, 7224/1/07 REV 1 CONCL 1, , *Presidency conclusions*, 2nd May 2007.

for phase 3 (2013-2020); the Effort Sharing Decision, which regulated national targets for non-ETS sectors; the Renewable Energy Directive; the CCS Directive on carbon capture and storage and the Fuel Quality Directive and CO_2 emission performance standards for cars[209].

Figure 2.5: GHG targets under the Climate and Energy Package

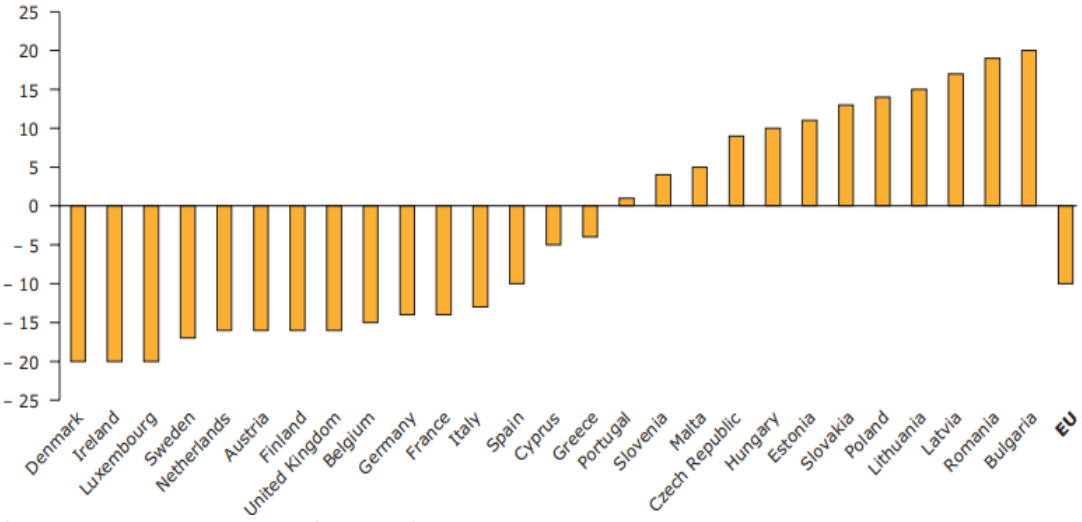


Source: European Environment Agency, 2012

For non-ETS sectors, the Effort Sharing Decision established national reduction targets which varied for each Member State based on their relative wealth calculated using GDP per capita: Member States with a relatively low GDP per capita should be allowed to increase GHGs emissions compared to 2005, but should at least limit the *growth* of emissions, while those with already a high GDP per capita should reduce them. However, "no Member State should be required to reduce its greenhouse gas emissions in 2020 to more than 20 % below 2005 levels nor allowed to increase its greenhouse gas emissions in 2020 to more than 20 % above 2005 levels"[210].

[209] Andreas Prahl, Elena Hofmann, and Mathias Duwe, "European Climate Policy - History and State of Play," Climate Policy Info Hub | Scientific Knowledge for Decision-Makers, November 2014, http://climatepolicyinfohub.eu/european-climate-policy-history-and-state-play.html.
[210] Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 [2009] OJ L 140/136.

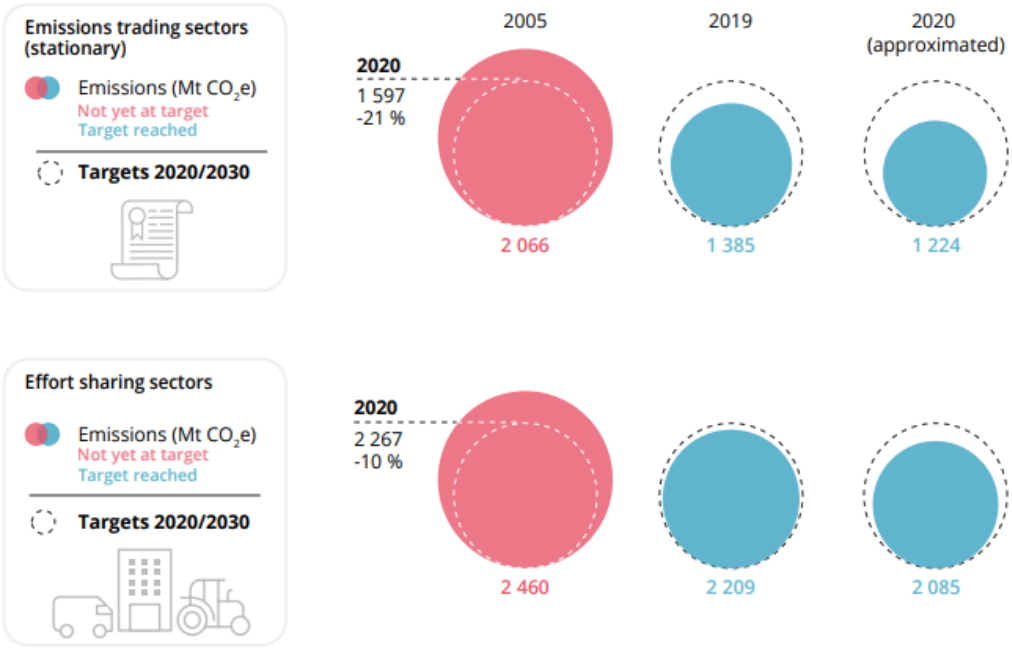
Figure 2.6: National 2020 GHG emission limits under the ESD relative to 2005 emissions levels



Source: European Environment Agency, 2012

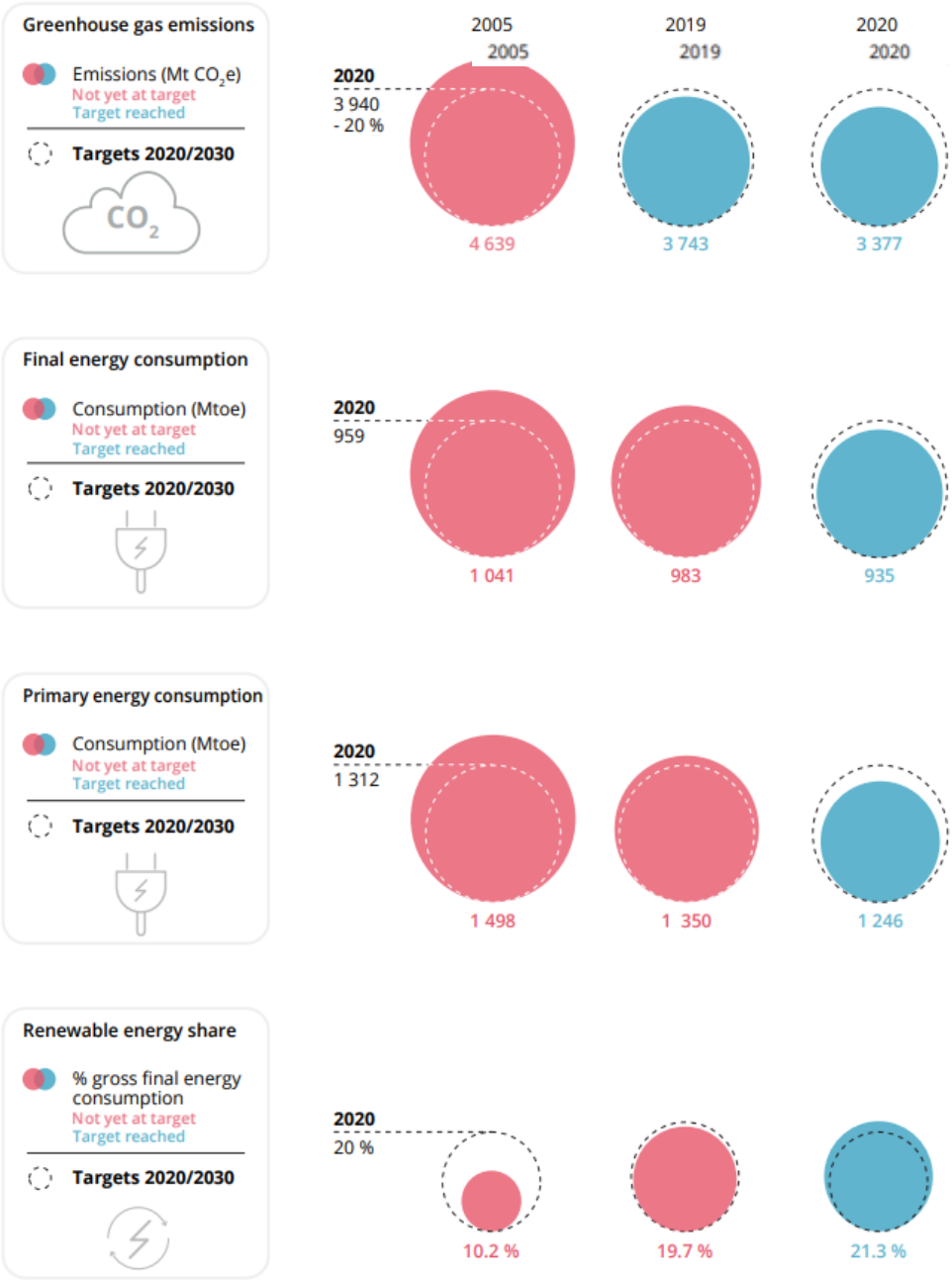
In 2021 the European Environment Agency (EEA) published its Report on "Trends and projections in Europe 2021", in which it analysed the results achieved in terms of GHGs emissions reduction, increasing share of renewable sources of energy and increase in energy efficiency compared to the 20-20-20 targets. The following two Figures show how there was an overachievement of the initial targets.

Figure 2.7: Breakdown of greenhouse gas emissions trends in the sectors covered by the EU Emissions Trading System, the Effort Sharing sectors



Source. European Environment Agency, 2021

Figure 2.8: Progress towards achieving the 2020 and 2030 targets in the EU-27



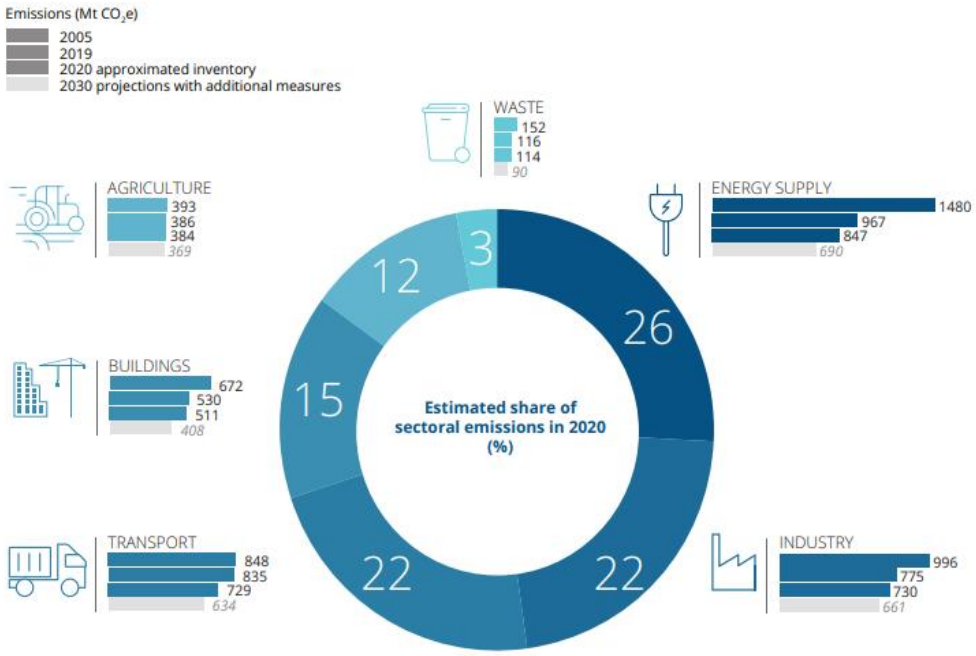
Source: European Environment Agency, 2021

As shown by the previous two Figures, emissions covered by the Emission Trading System were significantly reduced. The reductions were due in a large part to energy industries, including public electricity, heat production, petroleum refining, manufacturing of solid fuels[211]. However, even though emissions from the energy

[211] European Environment Agency, "Trends and projections in Europe 2021", *Report No 13/2021*, October 2021.

sector fell by 43% compared to 2005 levels, the energy supply sector in 2020 represented 26% of total sectoral emissions, as shown by Figure 2.9 below.

Figure 2.9: Sectoral trends and progress towards achieving the 2020 and 2030 targets in the EU-27



Source: European Environment Agency, 2021

2.3.4. Roadmap to 2030 and the European Green Deal

In 2014, the European Council adopted the Climate and Energy Framework which introduced key targets to be achieved by 2030, namely at least a 40% reduction of GHG emissions compared to 1990 levels, at least 27% share of renewable energy and at least 27% of improvement in energy efficiency. In 2018, two of these targets became more ambitious: 32% of renewable energy and 32.5% of increased energy efficiency compared to 1990 levels by 2030. To achieve 40% of reduction in GHG emissions, three strategies are used: the EU Emission Trading System, revised in 2018, the Effort Sharing Regulation, adopted in 2018, and the Land Use, Land Use Change and Forestry Regulation (LULUCF Regulation), adopted in 2018. The latter makes binding the commitment upon Member States to compensate the emissions from land use by removing CO_2 from the atmosphere. It covers the use of soils, trees, plants, biomass and timber.

In 2019, the European Commission adopted the European Green Deal, with the aim of making the European Union a "fair and prosperous society, with a modern, resource-efficient and competitive economy"[212]. Through this Communication, the Commission committed to put forward a plan to achieve climate neutrality in the EU by 2050 and to increase the GHG emissions reduction target by 2030, from 40% set in 2018 to 55% compared to 1990 levels.

Following the European Green Deal, on 14th July 2021, the European Commission adopted a package of reforms (the so-called "Fit-for-55" package) which proposed a concrete pathway towards the targets expressed in the Green Deal communication. In particular, it includes revisions of the EU ETS, the Effort Sharing Regulation and the Land Use, Land Use Change and Forestry Regulation. In order to reduce by 55% the GHG emissions by 2030, it is necessary to increase the targets in renewable energy share and energy efficiency and, to this end, the Commission proposed to increase the target of the share of renewable sources of energy in the total energy mix to 40%[213].

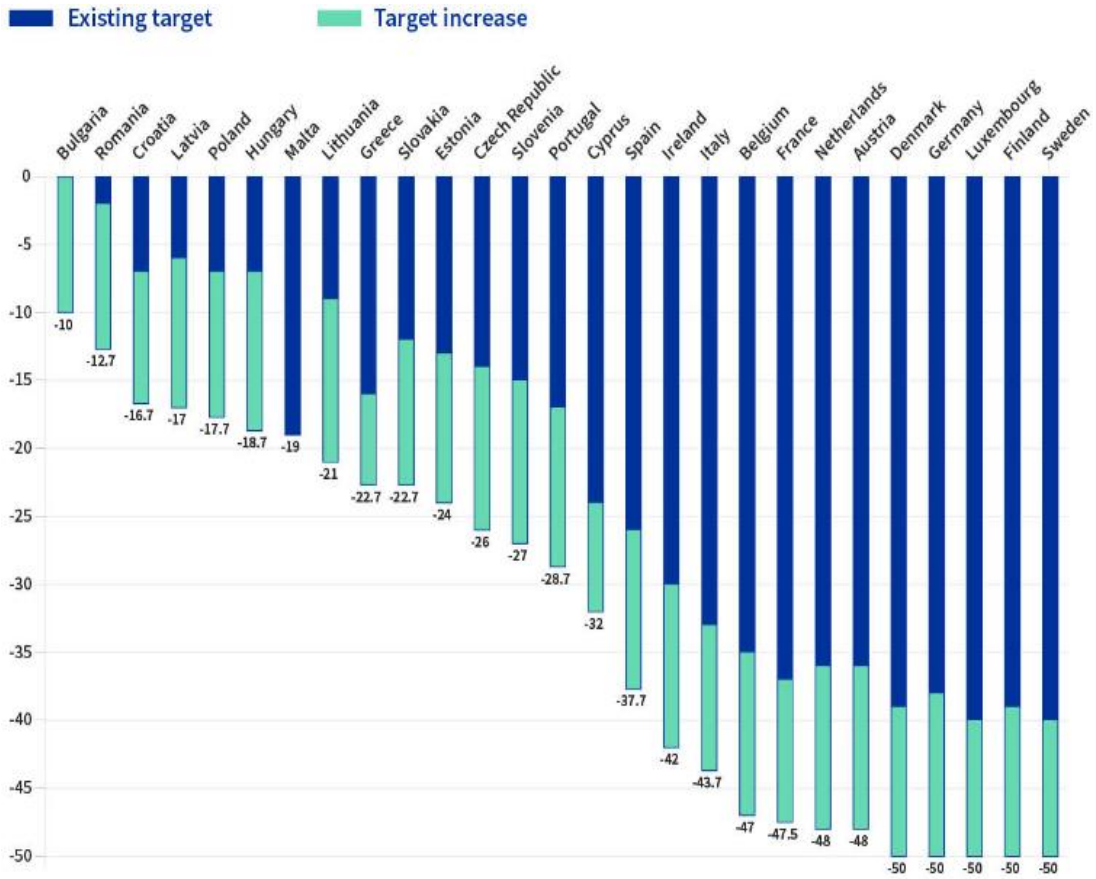
The Fit-for-55 package envisages some reforms to the EU ETS, making it more ambitious. In particular, it includes: "extension to emissions from maritime transport; faster reduction of emissions allowances in the system and gradual phasing-out of free allowances for some sectors; implementation of the global carbon offsetting and reduction scheme for international aviation through the EU ETS; increase of funding for the modernization fund and the innovation fund"[214]. In December 2022, the Environment Council agreed with the European Parliament in increasing the target for GHG emissions reduction by 2030 in the sectors under the EU ETS to 62% from the 61% target proposed by the European Commission (which raised the target from the

[212] European Commission, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions - The European Green Deal COM/2019/640 final, [2019].
[213] Javier Cifuentes-Faura, "European Union Policies and Their Role in Combating Climate Change over the Years," *Air Quality, Atmosphere & Health* 15, no. 8 (January 8, 2022): 1333–40, https://doi.org/10.1007/s11869-022-01156-5. p. 1336.
[214] "Fit for 55 - the EU's Plan for a Green Transition - Consilium," European Council | Council of the European Union, accessed May 27, 2023, https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/.

initial 43%[215]). Moreover, they agreed to include the aviation sector in the System as well[216].

In March 2023, the Council adopted a revision to the Effort Sharing Regulation, adopted in 2018, setting the reduction target to 40% by 2030 compared to 1990 levels from 29% as established in 2018. Figure 2.10 below shows the proposed projected target increases by 2030 per Member State. The Council in the same day adopted a revised regulation for the Land Use, Land Use Change and Forestry Regulation as well, increasing net greenhouse gas removals up to 310 million tons (Mt) by 2030: in the period 2026-2030, Member States will be bound to national targets for 2030, with a degree of flexibility[217].

Figure 2.10: Proposed 2030 emission reduction target of each Member State



Source: European Council, 2023

[215] Sabine Schlacke et al., "Implementing the EU Climate Law via the 'Fit for 55' Package," *Oxford Open Energy* 1 (January 10, 2022): 1–13, https://doi.org/10.1093/ooenergy/oiab002, p. 4.
[216] "Fit for 55 - the EU's Plan for a Green Transition - Consilium," European Council | Council of the European Union.
[217] "Fit for 55 Package: Council Adopts Regulations on Effort Sharing and Land Use and Forestry Sector," European Council | Council of the European Union, March 28, 2023, https://www.consilium.europa.eu/en/press/press-releases/2023/03/28/fit-for-55-package-council-adopts-regulations-on-effort-sharing-and-land-use-and-forestry-sector/.

2.3.5. Roadmap to 2050 and the EU Climate Law

In 2009, the European Council called "upon all Parties to embrace the 2°C objective and to agree to global emission reductions of at least 50%, and aggregate developed country emission reductions of at least 80-95%"[218]. This decision followed the recommendation by the IPCC that stated that these targets were necessary in order to maintain the global warming below 2°C compared to pre-industrial levels[219]. On this basis, the European Commission adopted in 2011 the "Roadmap for Moving to a Competitive Low Carbon Economy in 2050", which assessed the implications for the achievement of this objective. In particular, it calculated that the power sector should be completely decarbonised by 2050, while the transport sector should reduce its GHG emissions by 50%. In 2018, following another IPCC Report which warned the international community that the world needs to avoid a raise in global temperature of more than 1.5°C and that for this goal it is necessary that net-zero CO_2 emissions at global level is achieved by 2050, the European Commission adopted the Communication "A Clean Planet for All"[220]. In this Communication, it called the European Union to reach the Net-Zero scenario by 2050. However, until the adoption of EU Climate Law, this target was not legally binding.

Based on the European Green Deal project, the European Commission in 2020 proposed the European Climate Law, which was then adopted on 30th June 2021 by the European Parliament and the Council as Regulation 2021/1119. It made the Net-Zero target by 2050 in the European Union legally binding, by establishing in Article 2 that "Union-wide greenhouse gas emissions and removals regulated in Union law shall be balanced within the Union at the latest by 2050, thus reducing emissions to net zero by that date, and the Union shall aim to achieve negative emissions thereafter"[221]. It recognises the important role of carbon removal technology as well. The Regulation, as a middle step for the achievement of the final goal, set as legally binding the intermediate target of a reduction by 55% of GHG emissions by 2030. Finally, it includes a mechanism for reporting and holding Member States accountable.

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[218] Council of the European Union, 15265/09, CONCL 3, *Presidency conclusions*, 30th October 2009.
[219] Delreux and Ohler, "Climate Policy in European Union Politics", p. 6.
[220] European Commission, Communication from the Commission - A Clean Planet for All, COM(2018) 773, 28th November 2018.
[221] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law') [2021] OJ L 243/ 1, art. 2.

2.3.6. EU Taxonomy: is natural gas a green fuel?

On 2nd February 2022, the European Commission adopted the Complementary Climate Delegated Act which included, under certain conditions, some nuclear and gas energy activities into the list covered by the EU Taxonomy for sustainable activities. In July 2022, the European Parliament rejected the motion against this Act. The Delegated Act entered into force in January 2023.

EU Taxonomy is "a science-based transparency tool for companies and investors. The purpose of this classification system is to avoid greenwashing and to drive investments towards the transition"[222]. Therefore, it defines clearly which economic activities are sustainable, avoiding greenwashing, and giving investors more clarity about where to invest. Taxonomy Regulation entered into force on 12th July 2020 and established in Article 9 six environmental objectives: a) climate change mitigation; b) climate change adaptation; c) the sustainable use and protection of water and marine resources; d) the transition to a circular economy; e) pollution prevention and control; f) the protection and restoration of biodiversity and ecosystems[223]. Article 3 establishes the criteria for the definition of an economic activity as sustainable. First of all, it must "contribute substantially" to one or more objectives set out in Article 9 and must not "significantly harm" them in any way. Secondly, it must abide by the minimum safeguard criteria laid out in article 18, namely "OECD Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights, including the principles and rights set out in the eight fundamental conventions identified in the Declaration of the International Labour Organisation on Fundamental Principles and Rights at Work and the International Bill of Human Rights". Finally, it must comply with "technical screening criteria" established by the European Commission[224].

The Complementary Climate Delegated Act defines "technical screening criteria for certain gas and nuclear activities as transitional activities to facilitate the transition away from more harmful energy sources e.g. coal and towards a mostly renewables-based future"[225]. The Act specifies strict criteria for the inclusion of these

[222] European Union, "EU taxonomy accelerating sustainable investments", *Factsheet*, February 2022.
[223] Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 [2020] OJ L 198/ 13, art. 9.
[224] Ivi, art. 3.
[225] European Union, "EU taxonomy accelerating sustainable investments".

energy. In particular, they have to respect strict emission limits, replace coal facilities that can not be replaced by renewables, achieve certain emissions reduction goals and shift to renewable or low-carbon gases by 2035[226].

The decision of introducing certain gas and nuclear activities in the EU Taxonomy has received many criticisms, mainly by activists and environmental organisations: in September 2022 Greenpeace requested a legal review of the Act. However, critiques came by a Member State as well. In fact, in October 2022, Austria submitted a lawsuit to the Court of the European Union against it. Leonore Gewessler, the Austrian Minister for Climate Action, declared that the decision of the EU was "irresponsible" and "misleading" to consumers and investors[227].

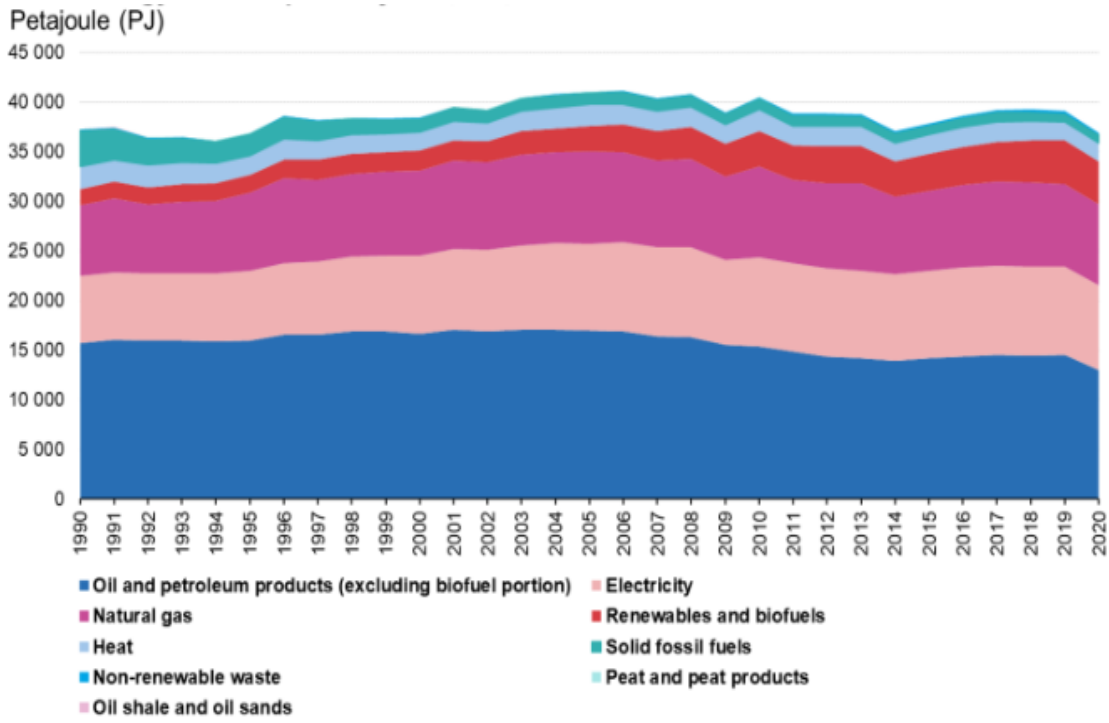
2.4. Security of supply

2.4.1. Definition of energy security

Industrialised societies, such as the European one, need constant inflows of significant quantities of energy to function. Energy is crucial for all types of activities, industrial and civil ones. Historically, the first oil shock of 1973 led them to centre their energy policy on energy security, more specifically on security of supply.[228] Figure 2.11 below shows the final energy consumption[229] by fuel in the European Union between 1990 and 2020, which reached its highest value in 2006 with 41,445 Petajoule (PJ). In 2020, the final energy consumption amounted to 10.5% lower than in 2006, due to Covid-19 pandemic. However, it can be noted that energy consumption moved in a range of 30,000 and 42,000 PJ in the last 20 years.

[226] *Ibidem.*
[227] Martina Igini, "EU Taxonomy Labelling Gas and Nuclear as 'green' Faces Legal Challenges," Earth.Org, October 13, 2022, https://earth.org/eu-taxonomy-legal-challenges/.
[228] Gawdat Bahgat, "Europe's Energy Security: Challenges and Opportunities", *International Affairs (Royal Institute of International Affairs 1944-)* 82, no. 5 (September 2006): 961–75, p. 965.
[229] Final energy consumption is the total energy consumed by end users, such as agriculture, industry and household. For a wider explanation see: "Glossary: Final Energy Consumption," Eurostat - Statistics Explained, accessed April 23, 2023, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary%3AFinal_energy_consumption.

Figure 2.11: Final energy consumption by fuel, EU, 1990-2020



Source: Eurostat, 2022

Therefore, it is crucial that any political entity, including Member States, are able to guarantee a stable supply of energy in the territory under their jurisdiction. In the case of domestic production, it is a matter of policy, meaning that it must be defined where to find and allocate financial, physical and human capital in order to exploit the resources within the territory. However, the State is not able to exercise complete control over the imported energy, which is produced abroad. Therefore, in the case of States that are net importers of energy, the issue of energy security is crucial[230]. The European Union, as analysed in Chapter 1, is a net importer of natural gas.

Barton et al. give a comprehensive definition of energy security, considering it as "a condition in which a nation and all, or most, of its citizens and businesses have access to sufficient energy resources at reasonable prices for the foreseeable future free from serious risk of major disruption of service"[231], therefore pointing out the availability, affordability and reliability factors. To this definition Gawdat Bahgat added that globalisation made energy security "an international issue that necessarily entails growing interdependence between major producers and consumers", and that

[230] Matteo Varda, *Politica Estera e Sicurezza Energetica* (Novi Ligure: Edizioni Epoké, 2012), p. 26.
[231] Barry Barton et al., "Introduction", in *Energy Security Managing Risk in a Dynmic Legal and Regulatory Environment*, ed. Barry Barton et al. (Oxford: Oxford University Press, 2005), 3–14, p. 5.

the key element for ensuring energy security is "diversification of both energy mix and energy sources"[232].

The International Energy Agency defines energy security as "the uninterrupted availability of energy sources at an affordable price. Energy security has many aspects: long-term energy security mainly deals with timely investments to supply energy in line with economic developments and environmental needs. On the other hand, short-term energy security focuses on the ability of the energy system to react promptly to sudden changes in the supply-demand balance"[233]. With this definition, the IEA distinguishes the long-term and the short-term aspects. In the first case, energy security refers primarily to the alignment of energy supply with economic needs and environmental sustainability. In the second case, energy security deals with the resilience of the systems and their ability to properly and timely react to "sudden changes in supply-demand balance".

The Organization for Security and Cooperation in Europe (OSCE) defines energy security as the condition of "having stable access to energy sources on a timely, sustainable and affordable basis": it highlights how energy is fundamental for our societies not only for the supply of basic needs such as food, lighting and water, but also for creating enabling conditions for "economic growth, political stability and prosperity"[234]. In 2014, the European Commission issued a Communication to the European Parliament and the Council titled "European Energy Security Strategy", declaring that the European Union, in order to secure energy security, needs a strategy which "promotes resilience to these shocks and disruptions to energy supplies in the short term and reduced dependency on particular fuels, energy suppliers and routes in the long-term"[235].

States or political entities which are net importer of energy suffer more from energy insecurity, since they depend on the supply from other States which may decide or want to suddenly cut off supplies, as in the case of Russia with the two gas crises in 2006 and 2009. More generally, the factors that influence the level of energy (in)security are several and interact with each other, creating a complex system of factors. They are, among others, the level of technological development and wealth, the

[232] Bahgat, "Europe's Energy Security: Challenges and Opportunities", p. 966.
[233] Iea, "Energy Security - About," IEA, April 14, 2023, https://www.iea.org/about/energy-security.
[234] "Energy Security," OSCE, accessed April 17, 2023, https://www.osce.org/oceea/446236.
[235] European Commission, Communication from the Commission to the European Parliament and the Council: European Energy Security Strategy COM/2014/0330 final, 28th May 2014, p. 2.

amount of natural resources within its jurisdiction, the geographical position and the regional context[236]. Energy security is particularly vulnerable to threats to energy flows and to price volatility.

Reliability of energy flows depends, first of all, on the integrity of infrastructure: if it faces technical issues, flows may be interrupted. Globalisation, as mentioned by Bahgat, makes political entities interdependent and makes impossible a complete control over energy infrastructure, even more if the places where the production and the consumption take place are distant geographically[237]. Furthermore, next to technical issues, infrastructure can be disrupted by criminal and terrorist groups, and energy flows can be cut off for tensions between exporter and transit countries, as it happened in the case of the 2006, 2009 and 2014 gas crises between Russia and Ukraine, when the latter was required to pay gas at market prices and refused, which led to the natural gas cut off by Gazprom.

Prices are also a significant factor of destabilisation for the security of energy systems. Even when energy is available in large amounts, if prices are not affordable, end users will not be able to consume it. The entire economy could be under a great tension and pay serious consequences. In fact, energy demand, in the short term, is rigid and characterised by little elasticity: for example, natural gas used for heating houses or for industrial activities can not be substituted easily and rapidly by other sources of energy[238].

Natural gas, as already mentioned, faces more severe restraints on transport than oil, which means more vulnerability to gas flows interruptions. Natural gas can be transported as LNG or through pipeline. The latter is the cheapest way but, after it is laid down, it entails a relationship of strong interdependence between the exporter and the importer. Moreover, since the construction of pipelines requires huge investments and very long lead-time, usually contracts are long-term, intensifying dependency on both directions. If the importer decides not to import anymore gas or the exporter to cut off supplies, it is not possible, using the same infrastructure, to change commercial partner[239]. It is for this reason, as it will be analysed in the next paragraph, that the European Union, once understood that the reliance on a small number of gas producers,

[236] Matteo Varda, *Politica Estera e sicurezza energetica*, p. 26.
[237] Ivi, p. 32.
[238] *Ibidem.*
[239] Matteo Varda, *Politica Estera e sicurezza energetica*, pp. 56-73.

such as Russia, was a threat to its energy security, promoted the diversification of energy sources and natural gas supplies.

2.4.2. Energy security in the European Union

The European Union became more aware of the vulnerability of its energy system since the gas crises of 2006 and 2009. In fact, the European Commission called them a "wake up call" for the need to build a common European energy policy[240]. However, already in 1981, it expressed its concern for the increasing dependency of the European Community on a small number of exporters, namely the Soviet Union, Algeria and Norway[241]. As shown in Chapter 1, the European Union is not endowed with plenty of energy resources and production has been declining in the last years. In 2021, natural gas import dependency rate of the EU was 83%[242]. In the first semester of 2021, around 78% of natural gas imports in the EU came from three suppliers only: Russia, Norway and Algeria. Russia supplied approximately 47% of it[243]. Gas crises of 2006, 2009 and 2014 showed the unreliability of Russia as natural gas supplier. However, at the same time, it remained, until the outbreak of the war against Ukraine in February 2022, the main supplier of natural gas (and other fundamental goods, as minerals and agricultural products) to the European Union, even though the Commission more than once pointed out the need for diversification.

Already in the Green Paper of 2000, titled "Towards a European strategy for the security of energy supply", the European Commission highlighted the issue of natural gas dependency (at the time the Union imported 40% of gas consumed) and called for diversification[244], but it described Russia as a long-term reliable commercial partner, therefore calling for the development of a long-term partnership and declaring that "it should be noted in this connection that the continuity of supplies from the former Soviet Union, and then Russia, over the last 25 years is testimony to an exemplary stability. A

[240] European Commission, COM/2014/0330 final, p. 2.
[241] European Commission, COM (81) 530.
[242] "EU Natural Gas Import Dependency down to 83% in 2021," Eurostat, April 19, 2022, https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220419-1.
[243] Bellodi and Caracciolo, *Gas e Potere: Geopolitica dell'energia dalla Guerra fredda a oggi*, p. 55.
[244] Commission of the European Communities, Green Paper: Towards a European Strategy for the security of energy supply, COM(2000) 769 final, 29th November 2000, p. 22.

long term strategy in the framework of a partnership with Russia would be an important step to the benefit of supply security"[245].

In 2006, in the Green Paper titled "A European Strategy for Sustainable, Competitive and Secure Energy", the European Commission expressed the need to develop "fully competitive internal energy market" in order to ensure security of supply and, again, addressed the issue of rising energy dependency that undermined EU's energy security, which should be tackled through "(1) an integrated approach – reducing demand, diversifying the EU's energy mix with greater use of competitive indigenous and renewable energy, and diversifying sources and routes of supply of imported energy, (2) creating the framework which will stimulate adequate investments to meet growing energy demand, (3) better equipping the EU to cope with emergencies, (4) improving the conditions for European companies seeking access to global resources, and (5) making sure that all citizens and business have access to energy"[246]. The key elements of this strategy are diversification, reduced demand, greater use of domestic renewable energy, more investments for production and improvement of emergency management.

On 24th May 2014, after the annexation of the Ukrainian region of Crimea by Russia, the European Commission issued a Communication to the European Parliament and the Council titled "European Energy Security Strategy" in which it stressed the need to develop a common European energy security strategy. After 2006 and 2009 gas crises, the European Union reacted accordingly in order to strengthen its energy security, and, the Commission wrote, it was still "vulnerable to external energy shocks". For this reason, it was necessary to increase resilience to these types of shocks in the short term and to diversify energy supplies in order to reduce dependency[247]. Interestingly, the Commission added that the goal of strengthening energy security must be achieved in parallel with the goal of achieving a competitive and low-carbon economy, which reduces the dependency on fossil fuels imports[248].

The strategy proposed by the Commission is composed of eight pillars, with the first one regarding specifically actions to be adopted to avoid energy shortages in winter 2014/2015. The other seven focused on the need to promote solidarity between Member

[245] Ivi, p. 44.
[246] Commission of the European Communities, COM(2006), p. 18.
[247] European Commission, COM/2014/0330 final, p. 2.
[248] *Ibidem*.

States and to strengthen infrastructure, to reduce energy demand, to develop a well-functioning internal market, to increase domestic energy production, to boost technological development in the energy sector, to diversify energy suppliers, to improve cooperation between Member States and to ensure that the Union spoke with one voice in external relations. Some of these elements were already included in Regulation 994/2010, which was adopted after the second gas crisis of January 2009 and dealt specifically with security of natural gas supply. In 2017, a second Regulation was adopted, repealing the first one, which improved the security system of gas supplies in the European Union and which welcomed the 2014 suggestions of the European Commission.

2.4.3. Attempts of diversification: Southern Gas Corridor and Nabucco

One of the main ways to reduce dependency on a small number of natural producers is diversification. In the case of the European Union, in particular after the two gas crises, the main goal was to diversify away from Russian gas. The two major attempts of the European Commission to achieve this objective in the last 20 years have been the Southern Gas Corridor project, bringing Azeri gas to Europe through Turkey, Greece, Bulgaria and Italy, as an alternative to the South Stream project (see Chapter 1), and the Nabucco pipeline, which ultimately failed. While the Nabucco project would have transported Azeri gas, in particular from the Shah Deniz field, as in the case of the Southern Gas Corridor, but it would have involved Eastern-Southern European States, in particular Bulgaria, Romania, Hungary and onward to Austria and the Czech Republic[249].

The Southern Gas Corridor was completed in 2020, when the last part of it, the Trans Adriatic Pipeline, connecting Greece to Italy through Albania and the Adriatic Sea, was inaugurated and declared ready for supplies. It has a capacity of 10 bcm/year[250]. The Nabucco pipeline project was supposed to firstly enter into operation in 2014 and then to be finally completed in 2015, reaching a total capacity of 31 bcm/year[251]. This project was key for enhancing European security of gas supply

[249] Grigas, *New Geopolitics of Natural Gas*, pp. 95-136.
[250] For further details, see Chapter 1.
[251] Erkan Erdogdu, "Bypassing Russia: Nabucco Project and Its Implications for the European Gas Security," *Renewable and Sustainable Energy Reviews* 14, no. 9 (December 9, 2010): 2936–45, https://doi.org/10.1016/j.rser.2010.07.028, p. 2939.

because not only it would have brought non-Russian gas to Europe, as in the case of Southern Gas Corridor, but would have involved Eastern-Southern European countries which were heavily dependent on Russian gas imports, in some cases, namely Romania and Bulgaria, up to 90% of gas demand[252].

Nabucco pipeline project was fully backed by the EU and did not involve any upstream energy company or the producing country. The support of the Union was made clear by the remarks made by the President of the European Commission José Manuel Barroso during the ceremony of the signing of the Intergovernmental Agreement in 2009 between the countries involved in the project, which was facilitated by the Commission. He said that "Nabucco [would] provide energy security to Turkey, to South East Europe, and to Central Europe. Nabucco is thus a truly European project" and that "the European Commission is very proud of the contribution [it] made to this agreement"[253]. Figure 2.12 below shows what would have been the route of Nabucco pipeline.

Figure 2.12: planned Nabucco gas pipeline route

Source: Deutsche Welle, 2012

The shareholders of this projects were ÖMV (Austria), BEH (Bulgaria), RWE (Germany), BOTAS (Turkey), Transgaz (Romania) and MOL (Hungary), each detaining 16.67% of share. Negotiations for the development of Nabucco started in

[252] Fabio Indeo, "Nabucco Addio, per Il Gas L'Europa Sceglie Tap," Limes, 4th July 2015, https://www.limesonline.com/gas-ue-nabucco-addio-leuropa-sceglie-il-tap/49352.
[253] Nicolò Sartori, "Energy and Politics: Behind the Scenes of the Nabucco-TAP Competition," *IAI - Working Papers* 13 (July 2013): 1–8, p. 3.

February 2002 and in June of the same year the parties agreed to a protocol for the construction of the pipeline, which would cross Turkey, Bulgaria, Romania and Hungary, connecting the Middle East to Austria. In October, a Cooperation Agreement was signed. In December 2003, with a Grant Agreement the European Commission agreed to cover 50% of total costs of the study phase. Finally, in 2009, in Ankara, the governments of the transit countries (Austria, Hungary, Romania, Bulgaria and Turkey) signed an Intergovernmental Agreement which contributed to the harmonisation of the legal framework.[254].

However, the construction stalled for years. Finally, when in June 2013 Azerbaijan had to decide between the Southern Gas Corridor and Nabucco pipeline to transport gas from the Shah Deniz Stage 2 field, it opted for the former. This decision led to the final dismissal of the Nabucco project[255].

Different factors explain the failure of the project. One of the first obstacles, which made doubtful the possibility for the pipeline to come into operation, was the uncertainty over the source of natural gas itself. In fact, the Azeri gas alone could not provide for 31 bcm/year. Therefore, another source was necessary: the most likely countries were Iran or Turkmenistan, which, however, were both considered to be "too unstable or hostile" to supply the European Union with natural gas[256].

Moreover, geopolitical forces were in place. Two other "rival" pipeline projects where under development in those years: the South Stream Project and the Southern Gas Corridor, in particular its final part, the Trans-Adriatic pipeline (TAP). In the first case, the project, which would have supplied more Russian gas to Europe, involved the same European countries involved in Nabucco except for Romania, which would have been replaced by Serbia, a traditional Russia's ally. Through the engagement of these same countries, Russia managed to slow down the construction of Nabucco pipeline. The TAP was preferred over Nabucco in 2013 by Azerbaijan for the transport of natural gas from Shah Deniz Stage 2 field. It was the end of Nabucco project[257]. The reason of this choice has been interpreted through the analysis of the role played by non-state actors, namely energy companies. First of all, Norway's Statoil was present both in the Shah Deniz and TAP consortiums. In addition, the Nabucco consortium was composed

[254] *Ibidem*.
[255] Grigas, *New Geopolitics of Natural Gas*, pp. 95-136.
[256] Erdogdu, "Bypassing Russia: Nabucco project and its implications for the European gas security", p. 2941.
[257] Indeo, "Nabucco addio, per il gas l'Europa sceglie Tap".

of not very politically significant companies (the Austrian ÖMV, Romanian Transgaz, Hungarian MOL, Turkish Botas and Bulgarian BEH), which could not exert much pressure for the completion of the project[258].

The failure of Nabucco has been considered a step back in the diversification road for the European Union. First of all, it deprived Bulgaria, Romania and Hungary of an alternative supplier to diversify away from Russian gas, which met close to 90% of their gas demand. Then, while Nabucco was supposed to transport 31 bcm/year, the Trans-Adriatic pipeline has a capacity of only 10 bcm/year, therefore affecting to a lower extent the energy mix of the European Union[259].

2.4.4. Regulation (EU) 994/2010

Security of gas supply in the European Union has been tackled not only through diversification projects, but also through Regulations at the EU level that provided for a legal framework which Member States have to abide by. Regulation (EU) 994/2010 concerning measures to safeguard the security of gas supply have been adopted by the European Parliament and the Council on 20th October 2010, repealing Council Directive 2004/67/EC, adopted in 2004.

The Directive of 2004 provided for "light-touch rules"[260] to ensure gas security of supply in the European Union, leaving large margins of discretion to the Member States. It called upon them to ensure gas supplies, specifically for household customers in cases of emergency, such as "a partial disruption of national gas supplies", "extremely cold temperatures" and "periods of exceptionally high gas demand"[261]. It also established the Gas Coordination Group, composed of representatives of Member States, of the relevant industrial stakeholders and the relevant consumers, chaired by the Commission. Its role was to facilitate coordination between them by the Commission in case of emergency.

Some years later, the two gas crises of 2006 and of 2009, which severely undermined the security of gas supply of the European Union and led to, among other

[258] *Ibidem*.
[259] Indeo, "Nabucco addio, per il gas l'Europa sceglie Tap".
[260] Ruven Fleming, "Security of Gas Supply: The New European Approach," *European Energy Law Report XII*, January 31, 2019, 271–91, https://doi.org/10.1017/9781780688091.015, p. 271.
[261] "Security of Supply of Natural Gas," EUR-Lex , 3rd August 2009, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3Al27047.

consequences, to the shutdown of Italian and German gas-fired plants, showed that a new Regulation by the European Union was needed. In Regulation 994/2010, the EU Parliament and the Council, despite recognising the importance of Directive 2004/67/EC for having established, for the first time, a legal framework at the Community level and the Gas Coordination Group, expressed the concern about the large margin of discretion left to Member States. In particular, when "the security of supply of a Member State is threatened, there is a clear risk that measures developed unilaterally by that Member State may jeopardise the proper functioning of the internal gas market and the supply of gas to customers"[262]. The 2009 gas crisis demonstrated that in cases of gas shortages is necessary to improve solidarity and coordination between Member States, both for preventive plans and for the response to concrete emergencies.

Regulation 994/2010 established a legal framework for security of gas supply, which must be a "shared responsibility of natural gas undertakings, Member states, notably through their Competent Authorities, and the Commission"[263]. It highlights the importance of having "sufficient and diversified gas infrastructure"[264], in particular for the so-called gas islands, whose gas systems are not connected to the ones of other Member States. Moreover, it promotes solidarity and cooperation between Member States, notably in favour of those which are more at risk for geographical or geological reasons. Article 1 of the Regulation expresses the crucial goal of the Regulation: "ensuring the proper and continuous functioning of the internal market in natural gas, by allowing for exceptional measures to be implemented when the market can no longer deliver the required gas supplies"[265].

Article 2 identifies the customers, whose gas supplies must be specifically protected. They are all household customers "connected to a gas distribution network", to which Member States can add as well small and medium-sized enterprises and essential social services (provided that they do not represent more than 20% of the final use of gas), and district heating installations that deliver heating to the aforementioned protected customers and that are not able to switch to other fuels.

[262] Regulation (EU) No 994/2010 of the European Parliament and of the Council of 20 October 2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC [2010] OJ L 295/1.
[263] Ivi, art. 3.
[264] Regulation (EU) No 994/2010.
[265] Ivi, art. 1.

By 3rd December 2011, each Competent Authority had to make a risk assessment of the security of gas supply of the Member State. The assessment had to be conducted using two standards, the infrastructure and supply ones, running various exceptional scenarios of high gas demand and supply disruption. The results had to be made available to the Commission.

The infrastructure standard required that by 3rd December 2014 Member States had to ensure that all measures had been taken so that in the event of a disruption of the "single largest gas infrastructure", the capacity of the remaining infrastructure could meet the total gas demand of the area concerned during a day of exceptionally high gas demand. Moreover, the transmission system operators, by 3rd December 2013, had to guarantee the possibility of physical gas flows in both directions on cross-border interconnection[266]. Supply standard, considered in Article 8, requires that natural gas undertakings, identified by the Competent Authority, guarantee gas supply to the protected customers also in the most extreme cases, specifically in case of "extreme temperatures during a 7-day peak period", "any period of at least 30 days of exceptionally high gas demand" and "for a period of at least 30 days in case of the disruption of the single largest gas infrastructure under average winter conditions"[267].

The Competent Authority of each Member State, in accordance with the natural gas undertakings, the relevant organisations and the national regulatory authority, must establish a Preventive Action Plan[268]. It must contain the measures needed to remove or mitigate the risks identified in the risk assessment. In addition, the Competent Authority must establish an Emergency Plan with the measures needed to remove or mitigate the consequences of a gas supply disruption.

The Emergency Plan must be structured on three crisis levels: early warning, alert and emergency. The early warning level is when there is a concrete threat to gas supply and the situation is likely to degenerate into the alert and emergency levels. The alert level is when exceptionally high gas demand or supply disruption take place, but the market is still able to function without the need of non-market measures. Finally, the emergency level occurs when in case of exceptionally high gas demand or significant gas disruption, the market, despite all relevant market measures have been already taken, need non-market measures to guarantee the supply of gas. When the

[266] Ivi, art. 6.
[267] Ivi, art. 8.
[268] Ivi, art. 4.

Competent Authority declares any of these crisis levels, it must inform immediately the Commission. The Emergency Plan must define "the role and the responsibility of natural gas undertakings and of industrial gas customers including relevant electricity producers" and the role of the Competent Authorities[269]. Moreover, it must identify the contribution of market and non-market measures needed for the alert and emergency levels. The Plan must be updated every two years based on the updated risk assessment.

Under Article 11, following a request of the Competent Authority that has declared an emergency, the Commission may declare a Union emergency or a regional emergency for a specific geographical region. In case of the request from two or more Competent Authorities, the Commission shall declare a Union or regional emergency. If it assesses that there is no basis for the declaration of emergency, the Commission shall declare an end to it. After the declaration of a Union or regional emergency, the Commission must convene the Gas Coordination Group, which is established by the present Regulation in order to "facilitate the coordination of measures"[270].

In cases of emergency, natural gas undertakings concerned must make available to the Competent Authority on a daily basis information on the "daily gas demand and supply forecasts for the following 3 days", "daily flow of gas at all cross-border entry and exit points" and "the period […] for which it is expected that gas supply to the protected customers can be ensured"[271]. In case of Union or regional emergency, the Commission has the right to request the Competent Authority to provide the necessary information, specifically the one provided by natural gas undertakings and about the measures already taken or foreseen.

2.4.5. Regulation (EU) 2017/1938

In October 2017, the European Parliament and the Council adopted Regulation (EU) 2017/1938, repealing Regulation 994/2010. Many instruments and definitions of the previous Regulation remained unchanged, such as the three crisis levels, the infrastructure and supply standards, the risk assessments and the Preventive and Emergency Plans, even though the document have been ordered in a more logical

[269] Ivi, art. 10.
[270] Ivi, art. 12.
[271] Ivi, art. 13, par. 2.

structure[272]. Therefore, the analysis of Regulation 2017/1938 will focus on the novelties brought by it, namely the identification of risk groups and the obligatory solidarity mechanism, envisaged by Article 13 of the Regulation.

The European Union adopted a new Regulation after an assessment of the Commission and the gas "stress test" conducted by the European Network of Transmission Network Operators for Gas on the functioning of the gas infrastructure in October 2014. ENTSO-G assessed how another crisis such as the ones between Russia and Ukraine in 2006 and 2009 would leave East and South-East European Member States very vulnerable and it demonstrated how an increased cooperation between Member States would significantly decrease the impact of gas disruptions[273].

One of the two major innovations of Regulation 2017/1938 is the identification of risk groups for gas supply, based on the following criteria: "gas supply routes, supply country risks and the cohesion of capabilities to exchange gas"[274]. The groups are the "basis for enhanced regional cooperation to increase the security of gas supply"[275]. The composition of the groups can be modified by the Commission in case of evolution of supply risks in the Union and its Member States, also based on simulations carried out by ENTSO-G[276]. The list of the thirteen risk groups is included in the Annex I of the Regulation. Risk groups are divided in four categories: Eastern Gas, North Sea Gas, North African Gas and the South-East Gas. Single countries can be included in several risk groups. Italy, for instance, is in the Ukraine, Norway, Algeria, Libya, Southern Gas Corridor and Eastern Mediterranean gas supply risk groups.

Under Article 7, the Competent Authorities within each risk group shall conduct a common risk assessment at risk group level, on which basis it will then prepare the country-level risk assessments, Preventive Action Plans and Emergency Plans[277]. It allows for a better harmonisation of the individual national plans, fundamental in a increasing interconnected European gas market.

The main tasks of the risk groups are expressed in Article 13, which introduces the solidarity mechanism. Solidarity is not a new concept in the European Union

[272] Ruven Fleming, "Security of Gas Supply: The New European Approach", p. 271.
[273]Ivi, pp. 272-273.
[274] Ivi, p. 276.
[275] Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010 [2017] OJ L 280/1, art. 3.
[276] Ivi, art. 3, par. 8.
[277] Ivi, art. 7, par. 2.

legislation: it is cited in Article 194 of the TFEU, in Directive 2004/67, in Article 1 and 8 of Regulation 994/2010, but Regulation 2017/1938 is the first to identify concrete solidarity measures. The obligation of bi-directional interconnection capacity (reverse flow) was the only concrete solidarity measure envisaged by Regulation 994/2010 and it granted a large number of exemptions, which undermined the increase of bi-directional interconnections, which only went from 24% in 2009 to 40% in 2014[278]. According to a gas stress test conducted by ENTSO-G, the situation of lack of interconnectors poses a real threat to security of gas supply in the European Union: at the time of the adoption of Regulation 2017/1938, in case of gas crisis, Western markets would have proved unable to transport gas to the Eastern European market, heavily dependent on Russian gas imports[279].

Article 13 paragraph 1 on Solidarity envisages that if a Member State has requested the application of the solidarity measure, a Member State "directly connected to the requesting Member State" shall take the proper measures in order to ensure that the gas supply to solidarity protected customers in the requesting Member State is satisfied, reducing gas supply the customers other than solidarity protected customers on its territory, as long as it is necessary. A solidarity protected customer is "a household customer who is connected to a gas distribution network" and might include also a district heating installation and an essential social services under certain conditions[280]. The solidarity measure applies as a last resort and only if the requesting Member State has "not been able to cover the deficit in gas supply to its solidarity protected customers", "exhausted all market-based measures and all measures provided in its emergency plan", "notified an explicit request to the Commission" and "undertaken to pay fair and prompt compensation to the Member State providing solidarity"[281].

[278] Ruven Fleming, ""Security of Gas Supply: The New European Approach", pp. 283-284.
[279] ENTSO-G, 'Union-wide Security of Supply Simulation Report 2017 ' available at: https:// www.entsog.eu/public/uploads/files/publications/sos/ENTSOG%20Union%20wide%20 SoS%20simulation%20report_INV0262-171121.pdf
[280] Regulation (EU) 2017/1938, art. 2.
[281] Ivi, art. 13, par. 3.

2.4.6. TEN-E framework: Regulation (EU) 347/2013

Security of gas supply, as expressed in the previous two Regulations, can not be pursued without the development of Union-wide infrastructure networks which aims at diversifying supply routes and at interconnecting Member States. In this way, in case of gas cut off from a single gas supplier, as it happened with Russia in 2006 and 2009 and as a consequence of the invasion of Ukraine in February 2022, the most affected countries may rely on a developed gas infrastructure and on solidarity mechanisms envisaged by Regulation 2017/1938.

Regulation 347/2013, repealing Decision 1364/2006/EC, established the Trans-European Networks for Energy (TEN-E) framework, aiming at the "the timely development and interoperability of priority corridors and areas of trans-European energy infrastructure"[282]. More concretely, the Regulation lays down the criteria for the identification of projects of common interest (PCIs) and their financing[283]. Article 2 defined a PCI as "a project necessary to implement the energy infrastructure priority corridors and areas"[284], which have a Union-wide impact, contributing to the development of the internal energy market.

Regarding natural gas, Article 4 paragraph 2(b) laid down the criteria according to which gas projects could be labelled as PCIs. They had to contribute significantly to at least one of the following criteria: market integration, security of supply, competition and sustainability[285]. The PCIs are included in a Union list, which can be adopted and reviewed by the Commission. The list is updated every two years. The projects included in the Union list become part of the relevant regional investment plans[286]. In fact, as envisaged by Article 14, the PCIs are "eligible for Union financial assistance in the form of grants for studies and financial instruments"[287]. Certain PCIs are eligible for financing from the Connecting Europe Facility (CEF). Therefore, TEN-E framework promotes the development of infrastructure which strengthens the energy interconnection between Member States and contributes to the security of gas supply.

[282] Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009 [2013] OJ L 115/39, art. 1, par. 1.
[283] Ivi, art. 1, par. 2.
[284] Ivi, art. 2.
[285] Ivi, art. 4, par. 2.
[286] Ivi, art. 3, par. 6.
[287] Ivi, art. 14.

On 15th December 2020, the Commission proposed a revision of the TEN-E framework, in order to align it to the climate objectives. The new Regulation, following this proposal, was adopted in May 2022. It envisages the end of the financing of projects concerning fossil fuels and promotes the development of infrastructure involving clean energy technologies[288].

Chapter 2 provides an analysis of the regulatory framework and the actions of the European Union in natural gas matters, divided in three areas (competitivity, sustainability and security of supply), even though they are strongly interconnected. The development of the EU legal framework and the actions undertaken by the Commission mirrored an increased tense relationship with Russia and the increasing perception of insecurity due to high import dependency on a few gas suppliers. In Chapter 3, it will be analysed the impact of the invasion of Ukraine by Russia on 24th February 2022 on the European gas market and the resulting development of the European policy in natural gas matters.

[288] Regulation (EU) 2022/869 of the European Parliament and of the Council on guidelines for trans-European energy infrastructure, amending Regulations (EC) No 715/2009, (EU) 2019/942 and (EU) 2019/943 and Directives 2009/73/EC and (EU) 2019/944, and repealing Regulation (EU) No 347/2013, [2022] OJ L 152/45.

CHAPTER 3

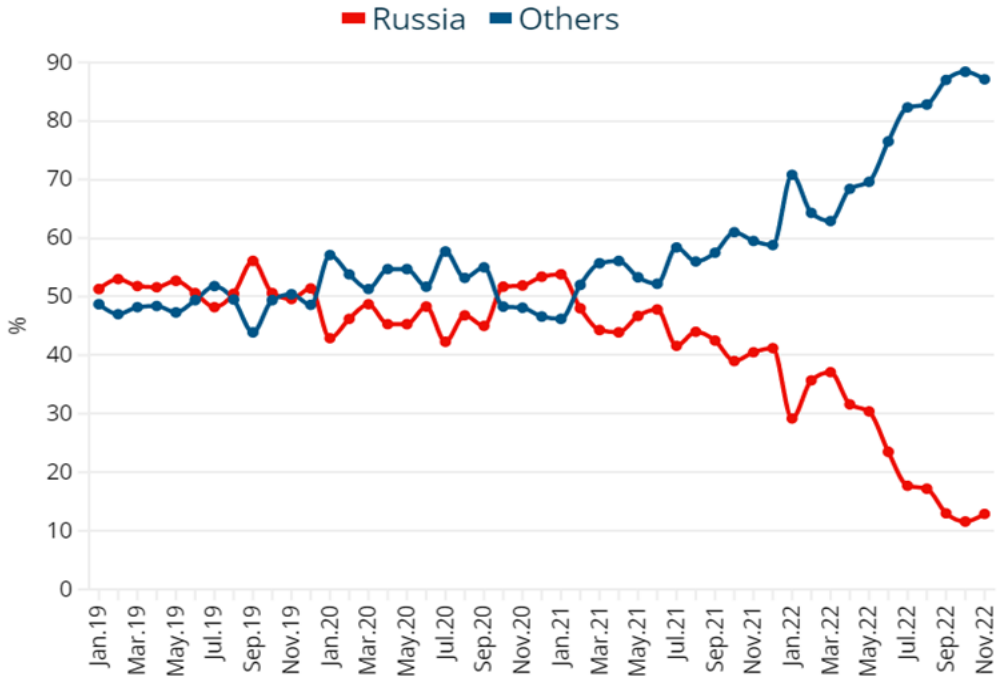
IMPACT OF THE WAR IN UKRAINE ON THE EUROPEAN NATURAL GAS MARKET

On 24th February 2022, Russia invaded Ukraine, after having recognised the independentist Ukrainian regions of Donetsk and Luhansk on 21st February. The breakout of the war and the support of the European Union and its Member States to Ukraine led to a significant reduction of Russian gas flows to Europe. In fact, the share of Russian gas in the total of imported gas decreased from 31.3% of the first quarter of 2022 to 9.9% of the last quarter of the same year[289]. More notably, Russian pipeline imports between July and September 2022 were 74% less in comparison to the same period in 2021. In particular, gas through Belarus was 96% less, via Nord Stream 1 85%, via Ukraine 63%, while through Turkey – via TurkStream pipeline – imports increased by 21%[290].

Figure 3.1 below shows how the European Union gradually shifted away from Russian gas. The decrease of the share of Russian gas on total imported gas began already in 2021, but since the outbreak of the war it declined more sharply. Since June 2022, the share of Russian gas on EU total gas imports is below 20%. In November 2022, it represented only 12.9% of it[291].

[289] "Translate EU Imports of Energy Products - Latest Developments," Eurostat - Statistics Explained, March 2023, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_imports_of_energy_products_recent_developments&oldid=554503#.
[290] European Commission, Quaterly report on European gas markets, *Market Observatory for Energy DG Energy*, No. 15, 3, 2023, p. 4.
[291] "Infographic - Where Does the EU's Gas Come from?," European Council | Council of the European Union, February 7, 2023, https://www.consilium.europa.eu/en/infographics/eu-gas-supply/.

Figure 3.1: Shifting away from Russian gas in the EU (January 2019 – November 2022)



Source: Euronews, 2023

Despite the decrease in gas flows to Europe, Russia managed to increase its profits over gas export to Europe by adding a surcharge of over 200 €/MWh (€800 million a day in March 2022). However, since October 2022, earnings decreased to €130 million a day, mostly because of the significant reduction of gas export to Europe after the damages to Nord Stream 1 and 2, on 26th September 2022[292]. The dramatic reduction of Russian gas imports and the measures adopted by the European Union in order to face gas shortage led to increasing gas prices and, in particular, of the price of the TTF European gas benchmark. In late August 2022, it hit a record high of 343 €/MWh, causing serious difficulties to industries and consumers[293].

This Chapter illustrates the impact of the war and its consequences on the European gas market and the resulting European policy on natural gas. First of all, a reconstruction of the breakdown of Russian gas supplies to Europe will be conducted, in order to understand the urgent need of the European Union to guarantee the security of gas supply. Secondly, the EU regulations and directives adopted as a response to the energy "insecurity" will be explained, highlighting both their real impacts on gas

[292] Alessandro Gili, "Between Transition and Security: The EU's Response to the Energy Crisis," ISPI, November 29, 2022, https://www.ispionline.it/en/publication/between-transition-and-security-eus-response-energy-crisis-36819.
[293] Laura Dubois and Shotaro Tani, "EU Launches Joint Gas Purchases for 80 Companies," *Financial Times*, April 25, 2023, https://www.ft.com/content/5e2e8e47-67a9-4f80-a140-3a8f5c11f7df.

security and their limits. Finally, the important aspect of diversification from Russian gas will be analysed, focusing on the increasing share of LNG on total imported gas in Europe and the strengthening of the relationship on gas supply with the United States and North Africa.

3.1. Breakdown of Russian-EU relationship on natural gas

3.1.1. Western sanctions and gas payments in roubles

Following the Russian invasion of Ukraine on 24th February 2022, the United States, the European Union and other countries adopted sanctions against Russia. Immediately after the breakout of the war, the U.S. and the EU began coordinating with SWIFT[294], the international payments system, to understand if it was possible to remove Russian banks from the financial payments service without preventing the country to trade oil and natural gas, thus minimising the negative consequences on Europe and the world[295]. On 2nd March, the European Union, in coordination with the United States, the United Kingdom and Canada, decided to exclude some key Russian banks from SWIFT. The sanction became effective on 12th March 2022. President of the European Commission Ursula von der Leyen commented this decisions declaring that: "Today's decision to disconnect key Russian banks from the SWIFT network will send yet another very clear signal to Putin and the Kremlin"[296].

Seven Russian banks were removed from SWIFT system, all connected to the State and to the war effort: VEB, Bank Rossiya Novikombank, Promsvyabank, Bank Otkritie and Russia's second-largest bank VTB. Substantially, the ban prevented them from making international transactions using SWIFT. The banks closely related to energy transactions were not included in the list, being Europe concerned about a possible cut off of energy flows. In particular, Sberbank, Russia's largest lender, and

[294] "What it does is allow banks to send each other instructions on how to transfer funds across borders. With no globally accepted alternative, it is essential plumbing for global finance". Source: Charles Riley, "What Is SWIFT and How Is It Being Used against Russia?," *CNN Business*, February 28, 2022, https://edition.cnn.com/2022/02/28/business/swift-sanctions-explainer/index.html.
[295] Lili Bayer, Ben Lefebvre, and Alex Ward, "Western Leaders Agree New Russia Sanctions, Including SWIFT Curbs," *Politico*, February 27, 2022, https://www.politico.eu/article/commission-proposes-new-financial-sanctions-on-russia/.
[296] "Ukraine: EU Agrees to Exclude Key Russian Banks from SWIFT," *European Commission*, March 2, 2022, European Commission, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1484.

Gazprombank were not included in the SWIFT system, due to their important role in the transactions for energy exports to Europe. Polish Prime Minister Mateusz Morawiecki harshly criticised this decisions to exclude them and demanded that "all Russian entities, thanks to which Russia finances the war in Ukraine, be effectively and fully covered by sanctions"[297]. Moreover, G7 countries and European Union governments decided to prevent the Central Bank of Russia to access almost half of its $630 billion worth of foreign currency and gold reserves[298]. These sanctions put in great restraint Russian economy and greatly limited its ability to pay foreign debts, due to the lack of access to foreign currency. The Kremlin replied imposing that payments for pipeline gas would switch from dollar and euro to Russian roubles.

On 28th March, Putin ordered to the Russian Central Bank, the Government and Gazprom to propose a measure for imposing on unfriendly countries, among which EU Member States, the payments for gas in roubles. On 31st March, he adopted the Presidential Decree No 172, demanding that companies in the list of unfriendly countries use roubles as the currency for gas transactions, starting from 1st April 2022.

Until the entry into force of this Decree, buyers in the European Union used to deliver their payment in euros to Gazprom through a direct transfer from their accounts in a European bank to Gazprom's designated account in a European bank as well, which acted as correspondent bank for Gazprombank. The payment procedure was considered completed once the transfer to Gazprom's designated account in the European bank was over. The Decree changed this mechanism, adding new intermediate steps. The European buyer had to open two accounts in Gazprombank, one in euros and the other one in roubles, and deliver the payment in euros in the correspondent account. Then, Gazprombank had to convert it into roubles through the Moscow Exchange, to which it would sell euros and buy roubles. The payment is considered completed after this last step is over[299]. Failure to pay following this method could lead to a series of penalties, up to the complete suspension of gas deliveries, in one or more of the following

[297] Philip Blenkinsop, "EU Bars 7 Banks from SWIFT, but Spares Those in Energy," *Reuters*, March 3, 2022, https://www.reuters.com/business/finance/eu-excludes-seven-russian-banks-swift-official-journal-2022-03-02/.
[298] Mike Dolan, "Column: Russia Central Bank Freeze May Hasten 'Peak' World FX Reserves", ," *Reuters*, March 2, 2022, https://www.reuters.com/markets/europe/russia-central-bank-freeze-may-hasten-peak-world-fx-reserves-mike-dolan-2022-03-02/.
[299] Katja Yafimava, "The EC Guidance on the Russian 'Gas for Roubles' Decree: All Things to All People," *The Oxford Institute for Energy Studies*, May 2022, 1–6, p. 3.

circumstances: no payment, partial payment, payment in a foreign currency and payment to a non-authorised bank[300].

Several explanations for Putin's decision to change the method of payment for gas purchases have been proposed. First of all, Russian authorities feared that payment would be withheld in the European banks following the imposition of Western sanctions. The new procedure made it impossible[301]. Secondly, it would have led to a strengthening of the rouble through its use in the transactions, considering that the sanctions were causing a serious crisis of the Russian currency. Finally, Putin was hoping to create tensions between EU Member States, forcing them to choose between the compliance with the sanctions imposed by the European Union on Russia and the delivery of gas supplies, deemed necessary for the normal functioning of their essential services and critical infrastructure[302].

The main issue from the European Union perspective was to understand whether the new payment procedure was compatible with the sanctions imposed on Russia. Notwithstanding the declarations of some of the representatives of the EU bodies, the Decree did not seem to violate any specific measure of the sanctions. First of all, Gazprombank, as already mentioned, was not included in the March sanction removing the main Russian banks from the SWIFT system. Moreover, no role in the procedure is played by the Russian Central Bank, included in the sanctions. Finally, even though the Decree does not establish a precise timeframe within which the transaction must take place, therefore rising the perception that payments from the European gas companies could be considered a short-term loan, not allowed by sanctions, it does not really envisages payments as loans[303].

At first, EU governments seemed primarily relieved by the mechanism proposed by the Decree. For instance, the Italian Minister for the Energy Transition of the time, Roberto Cingolani, said: "If things remain like this, not a lot will change…Putin could

[300] Agnieszka Ason, "Rouble Gas Payment Mechanism: Implications for Gas Supply Contracts," *The Oxford Institute for Energy Studies*, April 2022, 1–11, p. 6.
[301] Ivi, p. 3.
[302] Anne-Sophie Corbeau, "A Divide and Rule Game: Will Russian Gas Supplies to Europe Be Cut? ," Center on Global Energy Policy at Columbia University | SIPA, August 4, 2022, https://www.energypolicy.columbia.edu/publications/divide-and-rule-game-will-russian-gas-supplies-europe-be-cut.
[303] Yafimava, "The EC guidance on the Russian 'gas for roubles' decree: all things to all people", p. 3.

show that the Europeans are paying in roubles and Europe could pay in euros"[304]. However, already on 14th April, the Netherlands advised companies to not sign new contracts with Gazprom and a spokesperson for the Ministry of Economic Affairs and Climate Policy declared that "We informed [Dutch companies] that the Commission and Council assessment concluded that the rouble payment system is illegal and therefore companies can't sign contracts"[305]. Germany as well warned companies to not agree to Russian demands and German Minister for Economic Affairs and Climate Action Robert Habeck in an interview declared that "there is an expert opinion that says that this second bank account, which is to be set up, would be a way of circumventing the sanctions" and that they "cannot allow any circumvention of the sanctions through the back doors"[306].

In a guidance published on 22nd April, the European Commission answered to frequently asked questions about the Decree No 172 and its compatibility with obligations upon Member States arising from the sanctions imposed on Russia. In the guidance, the Commission expresses its "preference" that Member States follow the old payment procedure, for example by inviting them to consider applying for derogations, granted under the Decree[307]. However, the Commission did not exclude explicitly the compatibility of the Decree with the sanctions and recognised that "The existing sanctions do not prohibit engagement with Gazprom or Gazprombank" and that "they do not prohibit opening an account with Gazprombank"[308]. It did not specify, however, whether the opening of an account in roubles with Gazprombank was allowed or not. However, on 28th April, the EC chief spokesperson, Eric Mamer declared that it "cannot accept" that "companies are obliged to open a second account in roubles and that the payment is complete only when payment is converted in roubles" and that the new payment procedure was a "circumvention" of the sanctions imposed by the EU to Russia[309]. Then he added that it was upon the Member States to ensure the compliance

[304] Stephen Jawkes and Francesca Landini, "Russia Gas Payment Decree Does Not Change Much - Italy Minister," *Reuters,* April 1, 2022, https://www.reuters.com/business/energy/russia-gas-payment-decree-does-not-change-much-italy-minister-2022-04-01/.
[305] Paola Tamma, Leonie Kijewski, and Hans von der Burchard, "Brussels Warns EU Countries That Ruble Gas Payments May Breach Sanctions," *Politico,* April 14, 2022, https://www.politico.eu/article/brussels-warns-eu-countries-that-ruble-gas-payments-may-breach-sanctions/.
[306] *Ibidem.*
[307] Yafimava, "The EC guidance on the Russian 'gas for roubles' decree: all things to all people", p. 5.
[308] European Commission, "Frequently asked questions on gas imports concerning sanctions adopted following Russian invasion of Ukraine", April 2022.
[309] Yafimava, "The EC guidance on the Russian 'gas for roubles' decree: all things to all people?", p. 5.

with the sanctions. On 2nd May, EU Energy Commissioner Kadri Simson declared that "paying roubles through the conversion mechanism managed by the Russian public authorities and a second dedicated account in Gazprombank is a violation of the sanctions and cannot be accepted"[310].

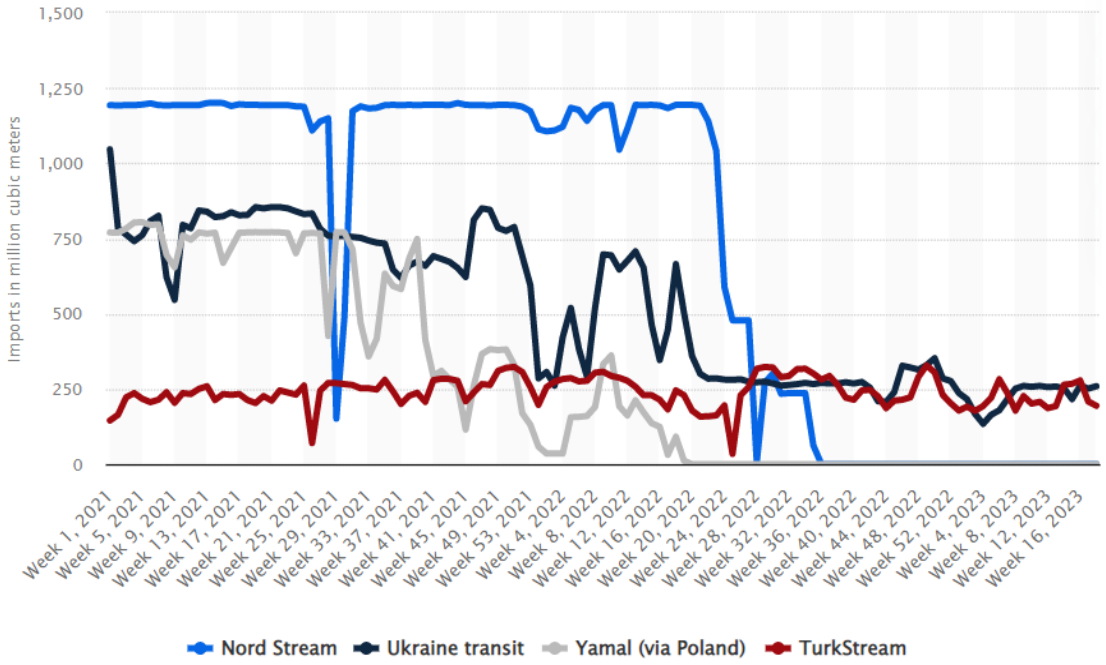
Finally, the guidance identified two main critical issues which could make the Decree incompatible with EU sanctions: the possible intermediary role of the Central Bank of Russia (CBR) and the lack of the definition of a time limit for the new payment method. In the first case, as already mentioned, the Decree does not envisage any role for CBR. Moreover, on 4th May 2022, another presidential decree was adopted by the Kremlin and clarified that the currency conversion would be carried out by the National Clearing Centre, owned by the Moscow Exchange, therefore excluding the involvement of the CBR[311]. For what concerns the timing, on 29th April 2022, Elvira Nabiullina, head of CBR, declared that the conversion from euros to roubles would take two working days, therefore excluding the possibility of payments being seen as short-term loans[312].

As can be understood, the situation was not clear at all and Member States were on their own in the decision of what to do, whether to prohibit to their companies to abide by the new payment procedure or to allow it. Contractual deadlines came up in the end of April and May, therefore making the issue urgent. In the next paragraph, it will be illustrated how some Member States decided to act and how, as a consequence of this natural gas payment dispute as well, Russian pipeline gas supplies to the European Union declined during 2022.

[310] Kate Abnett, "EU Prepares Russian Oil Sanctions, Warns against Rouble Gas Payments," *Reuters*, May 2, 2022, https://www.reuters.com/world/europe/eu-set-ban-russian-oil-ministers-hold-crisis-talks-gas-2022-05-02/.
[311] Yafimava, "The EC gudance on the Russian 'gas for roubles' decree: all things to all people?", p. 4.
[312] *Ibidem*.

3.1.2. Russian gas deliveries disruption

Figure 3.2: Natural gas import volume from Russia in the EU and the UK from week 1, 2021 to week 18, 2023, by exporting route



Source: Statista, 2023

Figure 3.2 above illustrates the amount of Russian gas deliveries to Europe in billion cubic metres through the main pipeline routes: Nord Stream 1, Ukraine transit, Yamal (via Poland) and Turkstream. It can be noted that Turkstream flows remained relatively stable throughout 2022, while the other three routes registered significant changes: around the first half of May 2022, the Ukraine transit halved its gas deliveries, while gas supplies through Yamal were completely cut off. Finally, Nord Stream 1 gas imports remained relatively stable until June, when Russia began to reduce significantly deliveries. Then, on 26th September 2022, due to a sabotage, supplies through Nord Stream 1 completely stopped.

In the first nine months of 2022, eleven Member States issued early warning notices, while Germany declared alert level under its gas emergency plan, under Regulation (EU) 2017/1938. The first country to issue an early warning was Italy on 26th February 2022, two days after the beginning of Russian invasion of Ukraine, then Lithuania on 9th March. On 30th March, one day before the adoption of Decree No 172, Austria and Germany issued early warnings. The German government explained its decision by linking it to the announcement of the Kremlin of the Decree which would

be adopted in the following day and that it constituted "a breach of the private supply contracts"[313]. As a consequence of the early warning, in Germany "every gas consumer" was "required to reduce their consumption as much as possible"[314].

The first significant consequence of the Presidential Decree issued by Putin which imposed the new natural gas payment procedure happened on 26th April 2022, when Gazprom announced the complete stop of gas deliveries to Poland via the Yamal-Europe and to Bulgaria from the following day. In fact, as a consequence of the refusal from both Poland and Bulgaria to pay in roubles, Russia decided to suspend gas supplies from 27th April, "until the payments are made according to the procedure outlined in the Decree"[315]. PGNiG, the Polish gas utility, declared that the decision had no contractual basis, while Polish Prime Minister Mateusz Morawiecki considered the halt to gas deliveries as a "direct attack on Poland"[316]. Bulgarian Minister of Energy Alexander Nikolov explained that the two-stage payment procedure was not clear enough and that it would leave the entire control of the operation to Russian hands. He added that "obviously, natural gas is used as a political and economic weapon, from a legal and trade point of view, the Bulgarian side has no violation"[317]. Finally, the unilateral decision by Gazprom was strongly criticised by the Commission President Ursula von der Leyen, who highlighted the "unreliability of Russia as a gas supplier" and called that decision as "an instrument of blackmail"[318]. Moreover, she called for coordination and solidarity between Member States. As a consequence of the decision by Russia to cut off gas supply to Poland and Bulgaria, gas prices of the EU benchmark TTF trading hub on 27th April in the morning jumped to 125 €/MWh and then stabilised on 108 €/MWh [319].

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[313] Nikolaus J. Kurmayer, "Germany Declares 'Early Warning' on Gas Supplies," *Euractiv*, March 30, 2022, https://www.euractiv.com/section/energy/news/germany-declares-early-warning-on-gas-supplies/.
[314] *Ibidem*.
[315] "Gazprom Fully Suspends Gas Supplies to Bulgaria, Poland Due to Failure to Pay in Roubles," TASS, April 27, 2022, https://tass.com/economy/1443811.
[316] America Hernandez and Zosia Wanat, "Russia Halts Gas Shipments to Poland and Bulgaria," *Politico*, April 26, 2022, https://www.politico.eu/article/poland-russia-gas-europe-halt-shipments-ukraine-war/.
[317] "Bulgarian Ministry of Energy: We Have Enough Gas for a Sufficiently Foreseeable Period," Novinite.com - Sofia News Agency, April 27, 2022, https://www.novinite.com/articles/214883/Bulgarian+Ministry+of+Energy%3A+We+have+Enough+Gas+for+a+Sufficiently+Foreseeable+Period.
[318] "Statement by Commission President von Der Leyen Following the Announcement by Gazprom on the Disruption of Gas Deliveries to Certain EU Member States," April 27, 2022, European Commission, https://ec.europa.eu/commission/presscorner/detail/en/statement_22_2682.
[319] *Ibidem*.

Despite the cut off of gas deliveries to Poland and Bulgaria, gas destined for other customers continued to transit through pipelines. Both Polish and Bulgarian authorities expressed their preparedness to face the stop of Russian gas imports. Polish Climate and Environment Minister Anna Moskwa declared that Poland had gas storage at 80% and the necessary gas reserves and sources of supply to meet gas demand. Moreover, the country would continue to buy gas on the European and international markets. On the Bulgarian side, which at the time of the halt imported 90% of its gas from Russia, authorities declared that there was no need to restrict gas consumption in the country[320].

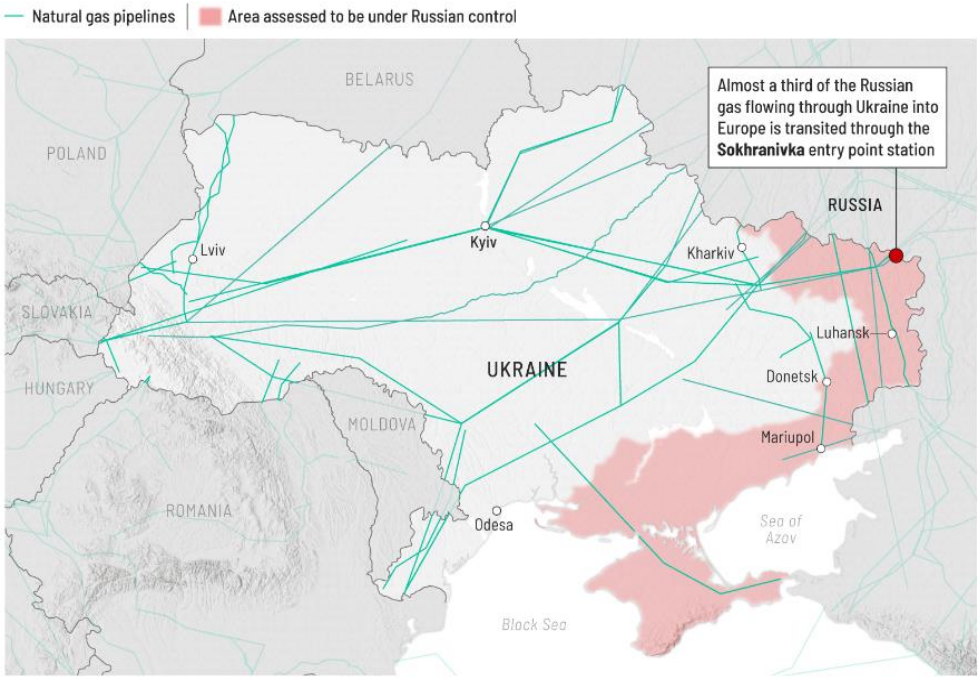
On 11th May, Ukraine's state-owned gas grid operator GTSOU suspended gas flows through the Sokhranovka transit point, which processed 32.6 mcm/day, equal to 8% of Russian gas supply to Europe. It was the first interruption of Russian gas flowing through Ukraine since the outbreak of the Ukrainian war. As a consequence of the interruption, Russian gas destined for Europe declined by 25%. The decision to stop the use of the Sokhranovka transit point was justified by Kyiv as due to "interference by the occupying forces"[321]: since the pipeline passing through Sokhranovka runs through Lunhansk, one of the two separatist regions, Kyiv accused Russia of closing two valves in the gas network in the territory under its control. GTSOU proposed to divert gas flows to Europe to the Sudhza entry point, which is located north-west of the country. Gazprom declared it not technically feasible.

The halt to Russian gas supplies through the Sokhranovka transit point caused a new peak in gas prices: Europe's benchmark TTF gas price reached 100€/MWh on 11th May. At that point, gas price was 250% higher than in the same period in 2021[322]. The following day, on 12th May, gas flows through Sudzha transit point declined to 53 mcm/day from 70 mcm/day of the day before. However, the European Commission did not consider the Ukrainian halt of Russian gas as an immediate emergency[323]. Figure 3.3 below shows the natural gas pipelines running across Ukraine as of 10th May 2022.

[320] Hernandez and Wanat, "Russia halts gas shipments to Poland and Bulgaria".
[321] Anna Cooban, "Europe Is Running out of Time to Find Alternatives to Russian Gas," *CNN Business*, May 12, 2022, https://edition.cnn.com/2022/05/12/energy/russian-gas-ukraine-europe/index.html.
[322] Nina Chestney, "Russian Gas Flows to Europe via Ukraine Fall after Kyiv Shuts One Route," *Reuters*, May 11, 2022, https://www.reuters.com/business/energy/requests-russian-gas-via-key-ukraine-transit-point-fall-zero-data-shows-2022-05-11/.
[323] "Europe Faces Gas Supply Disruption after Russia Imposes Sanctions," *Aljazeera*, May 12, 2022, https://www.aljazeera.com/news/2022/5/12/europes-gas-supply-crisis-grows-after-russia-imposes-sanctions.

It highlights the area assessed to be under Russian control and points out the location of the Sokhranovka transit point.

Figure 3.3: Natural gas pipelines running across Ukraine as of 10th May 2022



Source: CNN, 2022

On 12th May, Moscow included in a sanction list thirty-one companies, affecting mostly Gazprom subsidiaries in Europe and EuRoPol Gaz, the owner of the Polish part of the Yamal pipeline. Gazprom subsidiaries subject to the sanctions operated mostly in countries which had already imposed sanctions on Russia as a consequence of the invasion of Ukraine, such as Italy, Germany, Poland, France and Austria. Yamal-Europe pipeline was one of the major routes for Russian gas destined for Europe and Gazprom subsidies in Europe were significantly involved in the European gas market and in the delivery of gas to industries and households[324]. Russia made clear that it was not allowed to make deals and to export products or raw materials to companies included in the sanction list. This decision was explained to be a reaction to sanctions from the United States and its allies against Russia[325]. On 12th May, gas prices at the TTF hub increased by 20%.

[324] Georgi Gotev, "Russia Puts Sanctions on Gazprom Subisidiaries in Europe," *Euractiv*, May 12, 2022, https://www.euractiv.com/section/global-europe/news/russia-puts-sanctions-on-gazprom-subsidiaries-in-europe/.
[325] *Ibidem.*

Gazprom declared that "a ban on transactions and payments to entities under sanctions has been implemented. For Gazprom, this means a ban on the use of a gas pipeline owned by EuRoPol Gaz to transport Russian gas through Poland"[326]. Consequently, Gazprom completely suspended gas deliveries through Yamal-Europe pipeline[327].

On 20th May, Gasum, the Finnish state-owned gas wholesaler, issued a communication declaring that in the afternoon has been informed by Gazprom that from the following day, on 21st May, gas supplies to Finland would be cut off[328]. Russia decided to halt flows of natural gas to Finland after Gasum refusal to pay in roubles. While the majority of natural gas consumed in the country came from Russia, only 5% of energy consumption was met by gas[329]. Gasum's CEO, Mika Wiljanen, declared in that occasion that "it is highly regrettable that natural gas supplies under our supply contract will now be halted. However, we have been carefully preparing for this situation and provided that there will be no disruptions in the gas transmission network, we will be able to supply all our customers with gas in the coming months"[330].

Since June 2022, Gazprom gradually halted gas flows through Nord Stream 1, due to, according to official statements, maintenance issues. On 15th June, Gazprom announced a cut to gas supplies through the pipeline, bringing Nord Stream 1 flows at just 40% capacity, meaning 67 mcm/day. The Russian company at first blamed delays in getting Siemens Energy equipment from Canada, where it was under maintenance, but German energy regulator disproved it. German Minister for Economic Affairs and Climate Action Robert Habeck declared that "the Russian side's argument is simply a pretext. It is obviously a strategy to unsettle and drive up prices"[331].

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[326] "Europe Faces Gas Supply Disruption after Russia Imposes Sanctions," *Aljazeera*, May 12, 2022, https://www.aljazeera.com/news/2022/5/12/europes-gas-supply-crisis-grows-after-russia-imposes-sanctions#:~:text=Europe%20is%20facing%20increased%20pressure,transit%20route%2C%20pushing%20prices%20higher.

[327] Anna Cooban, "Europe is running out of time to find alternatives".

[328] "Natural Gas Imports from Russia under Gasum's Supply Contract Will Be Halted on Saturday 21 May at 07.00," Gasum, May 20, 2022, https://www.gasum.com/en/About-gasum/for-the-media/News/2022/natural-gas-imports-from-russia-under-gasums-supply-contract-will-be-halted-on-saturday-21-may-at-07.00/.

[329] Anne Kauranen and Nora Buli, "Russia to Halt Gas Flows to Finland on Saturday," *Reuters*, May 20, 2022, https://www.reuters.com/business/energy/russian-gas-flows-finland-stop-saturday-says-gasum-2022-05-20/.

[330] "Natural Gas Imports from Russia under Gasum's Supply Contract Will Be Halted on Saturday 21 May at 07.00," Gasum

[331] Madeline Chambers and Christoph Steitz, "Nord Stream 1 Gas Supply Cut Aimed at Sowing Uncertainty, Germany Warns," *Reuters*, June 15, 2022, https://www.reuters.com/business/energy/german-minister-accuses-russia-finding-excuse-cut-nord-stream-1-gas-2022-06-15/.

Following the cut off of gas flows through Nord Stream 1 pipeline, on 23rd June Germany triggered the "alarm stage", the second crisis level in its emergency gas plan, after having triggered the first level, the "early warning", on 30th March. According to the Emergency Plan for Gas for the Federal Republic of Germany, pursuant to Art. 8 of Regulation (EU) 2017/1938, the alert level is triggered when one or more of the following indicators occur: "absence/lack/serious reduction of gas flow at key physical entry points; long-lasting very low storage levels; shutdown of important sources of supply; lengthy technical failure of major infrastructure with the possibility of alternative supply; extreme weather conditions coupled with very high demand; high risk of long-term shortage; request for solidarity to Germany"[332]. Some of the implications are that the transmission system operators must submit timely reports to the Ministry of Economy once a day and gas undertakings must fully support the Ministry in the assessment of the situation and participate in the crisis team. In the second stage of the three-level crisis system, market-based measures are still considered sufficient to face the gas crisis, while the emergency level would require a State intervention.

In the period 11 - 21st July 2022, Nord Stream 1 shut down for maintenance, as it was previously announced and after ten days gas flow started again, but only at 20% of capacity, for which Kremlin blamed Germany. In particular, according to Moscow, Germany failed to return important equipment due to the sanctions against Russia[333]. On 31st August, Gazprom halted gas flow through Nord Stream 1 again for maintenance reasons for three days, but due to allegedly new technical issues, gas deliveries stopped again almost immediately. During those months, at the European Union level, negotiations were proceeding in order to reduce high gas and electricity prices: Gazprom frequent shut downs of Nord Stream 1 for "maintenance reasons" was considered to be a way to raise gas prices and to exert pressure on European countries. In particular, the statement on 2nd September by Gazprom to maintain the stop to gas

[332] Federal Ministry for Economic Affairs and Energy of the Federal Republic of Germany, "Emergency Plan for Gas for the Federal Republic of Germany", September 2019, section 6.3.2.
[333] Kate Connolly, ""Nord Stream 1: Russia Switches off Gas Pipeline Citing Maintenance," *The Guardian*, August 31, 2022, https://www.theguardian.com/business/2022/aug/31/nord-stream-1-russia-switches-off-gas-pipeline-citing-maintenance.

flow through Nord Stream 1 came after G7 countries had agreed on how to put a cap on Russian oil price[334].

Finally, on 26th September 2022, both Nord Stream 1 and 2 were hit by explosions and suffered a complete rupture: even though Nord Stream 1 was operating at reduced capacity and Nord Stream 2 was not active but contained a certain amount of gas, the leaks of gas due to the blasts caused "the worst release of methane in history" and a consequent huge environmental damage[335]. The explosions occurred in the economic zones of Denmark and Sweden, which described them as deliberate, but could not identify who was responsible[336]. Many theories have been reported as of who ordered the sabotage: Russia, the United States and Ukraine. The last theory is the one reported by Germany's Die Zeit newspaper and German public broadcaster ARD and SWR, which blamed a group of five men and a woman who carried out the attack using a yacht hired by a Ukrainian company based in Poland[337].

As a consequence of the sabotage, the only pipelines carrying Russian gas to Europe that remained into operation are the one running through Ukraine, via the Sudhza transit point, and Turkstream. The latter connects first Russia to Turkey, with a 15.75 bcm/year capacity, and subsequently connects Turkey to Europe via Bulgaria. European countries which receive Turkstream gas are Greece, Serbia, Romania, Bosnia and Herzegovina, North Macedonia, Hungary and Romania. Turkstream pipeline to Europe delivered 1.09 bcm of gas to Southeast Europe in September 2022[338]. Therefore, in the first ten months of 2022, Russian gas supplies to the European Union halved in

[334] "Cosa Succede Con Il Gasdotto Nord Stream 1," *Il Post*, September 3, 2022, https://www.ilpost.it/2022/09/03/cosa-succede-con-il-gasdotto-nord-stream-1/#:~:text=Per%20la%20Russia%2C%20il%20gasdotto,trovate%20altre%20fonti%20di%20approvvigionamento.

[335] Matthew Lee, "A Global Mystery: What's Known about Nord Stream Explosions," *Associated Press*, March 9, 2023, https://apnews.com/article/us-germany-russia-denmark-ukraine-gas-pipeline-attack-nord-stream-2561f98ba6462db700f7609352a28c24.

[336] Johan Ahlander, "State Actor Involvement in Nord Stream Pipeline Attacks Is 'Main Scenario', Says Swedish Investigator," *Reuters*, April 6, 2023, https://www.reuters.com/world/europe/swedish-prosecutor-says-still-unclear-who-behind-nord-stream-sabotage-2023-04-06/.

[337] Lee, "A global mystery: What's known about Nord Stream explosions".

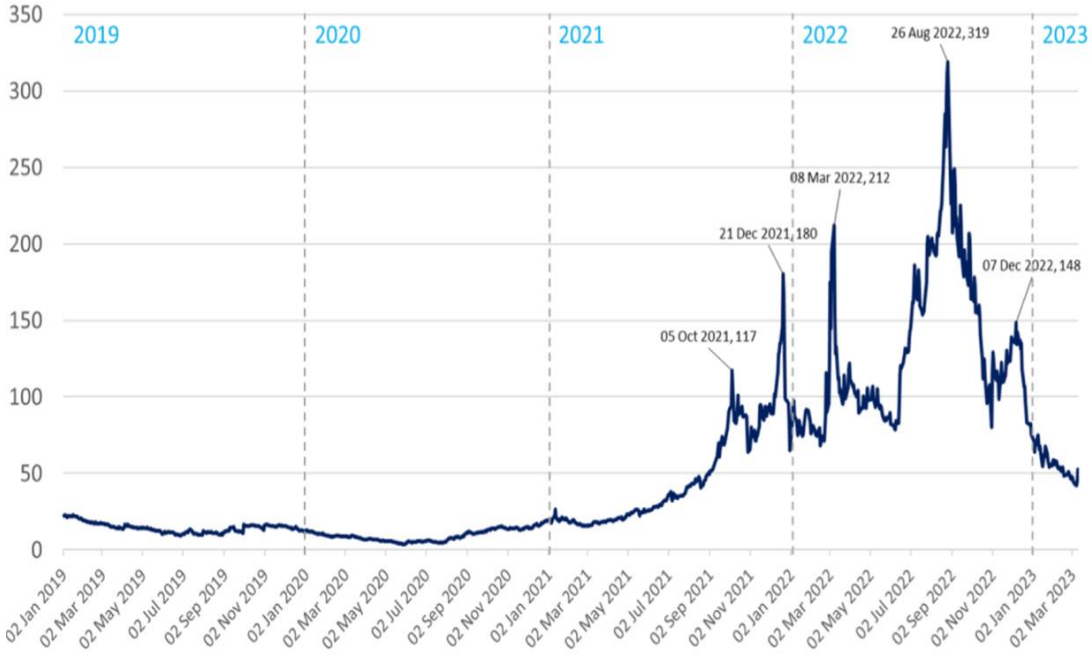
[338] Stuart Elliott, "Turkstream Gas Link Operation 'secured' after Dutch Permit Return: Hungary," S&P Global Commodity Insights, October 19, 2022, https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/101922-turkstream-gas-link-operation-secured-after-dutch-permit-return-hungary#:~:text=%22The%20operation%20of%20TurkStream%20is,the%20license%20had%20been%20renewed.

comparison to the same period in 2021, totalling only 60 bcm[339]. At the same time, the EU and its Member States made huge efforts in increasing non-Russian pipeline gas supplies, diversifying gas routes and find new suppliers: by October 2022, pipeline deliveries from Norway increased by 5% and from Azerbaijan via TAP by around 50%[340].

3.1.3. European natural gas prices crisis

Europe witnessed a serious gas crisis already in 2021, when in April of that year prices began to rise, reaching the highest peak of 2021 on 21st December with 180.31 €/MWh. The war and its resulting gas dispute between the European Union and Russia caused an even more significant increase in gas prices and a fluctuation which followed the different steps of the dispute. Figure 3.4 below shows the fluctuation of Dutch TTF natural gas price, the European benchmark, until March 2023.

Figure 3.4: TTF Front-Month gas prices from January 2019 to 10 March 2023 (midpoint, Euro/MWh)



Source: Financial Times, 2023

[339] International Energy Agency, "Never Too Early to Prepare for Next Winter: Europe's Gas Balance for 2023-2024", November 2022, https://www.iea.org/reports/never-too-early-to-prepare-for-next-winter, p. 4.
[340] *Ibidem.*

In late August, gas prices hit a record peak of 343 €/MWh, also as a consequence of the measures adopted by the EU Member States to fill their storage capacity in view of the upcoming winter, as demanded by a EU Regulation. Afterwards, TTF gas price began decreasing, reaching in April 2023 40 €/MWh, thanks to a combination of factors: mild weather, significant LNG supply, gas demand reduction and gas storage levels[341]. Notwithstanding the low price of 40 €/MWh compared to the record 343 €/MWh in late August 2022, the price was still almost three times higher than 2019 levels, when the average price was 14.6 €/MWh [342].

3.2. The European Union response to natural gas crisis

The European Union from the beginning took a firm stance against Russia, condemning its aggression against Ukraine, and faced the subsequent threat to the energy, and specifically gas, supply. Through the adoption of directives, regulations and communications, the Union bodies tackled the gas crisis with a multilateral approach, taking into consideration storage levels, demand reduction, rising prices and need to boost energy efficiency and promote the use of renewable sources of energy. Natural gas showed its vulnerability for being more difficult to transport and store than coal and oil, for its significant reliance on Russian imports and for the uneven distribution of import capacities of liquified natural gas[343]. Finally, diversification of natural gas supplies proved to be the other key pillar of the European Union strategy to guarantee the security of supply.

On 1st March 2022, the European Parliament in a special plenary session called for the reduction of the European Union energy dependence on Russia. In particular, it called "for the import of the most important Russian export goods, including oil and gas, to be restricted"[344], and for the significant reduction of "energy dependence, in particular on Russian gas, oil and coal, by, inter alia, diversifying energy sources, including expanding natural gas terminals and supply routes, unbundling gas storage,

[341] International Energy Agency, "Never Too Early to Prepare for Next Winter: Europe's Gas Balance for 2023-2024", November 2022, https://www.iea.org/reports/never-too-early-to-prepare-for-next-winter, p. 4.
[342] Dubois and Tani, "EU launches joint gas purchases for 80 companies".
[343] Lasse Boehm and Alex Wilson, ""EU Energy Security and the War in Ukraine: From Sprint to Marathon," *European Parliamentary Research Service*, February 2023.
[344] European Parliament resolution of 1 March 2022 on the Russian aggression against Ukraine (2022/2564(RSP)) [2022] OJ C 125/2, art. 17.

and increasing energy efficiency and the speed of the clean energy transition; call for the Nord Stream 2 pipeline to be definitively abandoned and therefore welcomes the decision of the German Government to halt the certification of Nord Stream 2; calls on the Commission and the Member States to create a coordination mechanism and to use all possible gas depositories in order to ensure uninterrupted gas supply across the EU"[345]. Therefore, in this Resolution, the European Parliament, inter alia, calls for the end of gas dependence on Russia, to be achieved through different, but complementary strategies, such as diversification of gas sources, increase of LNG supply and acceleration of the clean energy transition. These same strategies have been proposed more than once by the Commission in later communications and have been the object of regulations, decisions and directives adopted during the consequent deepening of the gas dispute with Russia.

On 3rd March 2022, the European Commission and the International Energy Agency presented a joint plan, the "10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas", to be implemented in 2022. In order to reduce gas dependence on Russia, the plan proposed ten goals to be pursued: among them, to not sign new gas supply contracts with Russia; to diversify away from Russian gas through alternative gas sources; to set a minimum gas storage obligation; to increase the share of renewable sources in the energy mix and of low-emission sources, such as bioenergy and nuclear; to enact short-term measures to shelter vulnerable electricity consumers from high prices; to speed up the replacement of gas boilers with heat pumps; to promote energy efficiency and decarbonization efforts. According to the International Energy Agency, the implementation of these measures could have reduced gas imports from Russia by over 30%. Moreover, this Plan was said to be consistent with the EU climate goals and the Green Deal, as well as with the IEA Net Zero Emissions by 2050 Roadmap[346].

On 10 - 11th March 2022, the 27 European Union Heads of State or Government issued the Versailles Declaration, in which they demanded Russia to withdraw "immediately and unconditionally" from Ukraine and agreed on the need for the EU to become independent from Russian gas, oil and coal. They identified the following

[345] Ivi, art. 22.
[346] Iea, "A 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas – Analysis," IEA, March 3, 2022, https://www.iea.org/reports/a-10-point-plan-to-reduce-the-european-unions-reliance-on-russian-natural-gas.

actions to achieve this goal: "accelerating the reduction of our overall reliance on fossil fuels"; "diversifying our supplies and routes including through the use of LNG and the development of biogas"; "further developing a hydrogen market for Europe"; "speeding up the development of renewables and the production of their key components"; "completing and improving the interconnections of European gas and electricity networks"; "reinforcing EU contingency planning for security of supply"; "improving energy efficiency and the management of energy consumption"[347]. As in the case of the European Parliament Resolution, the main areas of action are: diversification of energy sources, acceleration of the use of renewable sources and boost of energy efficiency. In this case, however, the Heads of State mentioned the critical issue of the lack of a complete integration of the European energy networks as an obstacle to energy security.

On 7th April 2022, the European Parliament issued a Resolution on the conclusions of the European Council meeting of 24-25th March 2022, in which it called "for an immediate full embargo on Russian imports of oil, coal, nuclear fuel, and gas, for Nord Stream 1 and 2 to be completely abandoned, and for a plan to continue ensuring the EU's security of energy supply to be presented"[348]. Moreover, it reiterated the need of diversification and to promote energy efficiency and renewable energy, and to further invest in gas storage solutions and sustainable long-term investments "in line with the European Green Deal". Finally, it called for "common strategy energy reserves and energy purchasing mechanisms [and the creation of] a gas union, based on common purchases of gas by Member States"[349] at the EU level. The Parliament highlighted the need to have a common European gas policy given the interdependence between Member States and the fundamental role natural gas plays in the European market.

In the same day, 7th April, the European Commission established the EU Energy Purchase Platform for the common purchase of gas, LNG and hydrogen, following the agreement between the Heads of State and Government in the European Council on 25th March. It is a voluntary coordination mechanism, composed of the representatives of the Commission and the Member States, with the role of coordinating gas and hydrogen purchasing for the European Union. It had the mandate to ensure the refilling

[347] European Council, "Versailles Declaration", *Informal meeting of the Heads of State or Government*, March 2022.
[348] European Parliament resolution of 7 April 2022 on the conclusions of the European Council meeting of 24-25 March 2022, including the latest developments of the war against Ukraine and the EU sanctions against Russia and their implementation (2022/2560(RSP)) [2022] OJ C 434/59.
[349] *Ibidem.*

of gas storage facilities as well. Finally, in a long-term view, it was agreed that the Platform would enhance cooperation with key partners on renewables and hydrogen[350]. In October 2022, the European Council endorsed the joint purchasing of gas. On 19th December 2022, the Council Regulation (EU) 2022/2576 was adopted, providing the EU Energy Platform for a legal framework, in view of winter 2023/24. Finally, on 25th April 2023, the Commission launched the AggregateEU mechanism, a demand aggregation and joint purchasing service, as a central component of the EU Energy Platform. It allows companies to register their gas purchase needs in order to prepare for a joint purchasing of gas at the European Union level[351]. This mechanism represents an important step forward towards the establishment of a European Energy Union, by coordinating gas purchases by companies based in different Member States.

On 18th May 2022, the European Commission issued a Communication and presented the REPowerEU Plan, as a response to the double challenge that 2022 presented to Europe: ending of the EU's dependence on Russian fossil fuels and mitigation of climate change. The Plan is based on three main pillars: energy savings, diversification of energy supplies and acceleration of fossil fuels replacement with renewable sources of energy. Regarding energy savings, the Commission proposed to increase the energy efficiency target by 2030 from 9%, identified by the Energy Efficiency Target under the "Fit for 55" package, to 13%. The second pillar is diversification of supplies: to this aim, on the same day the Commission adopted a Communication on the "EU external energy engagement in a changing world". According to the Commission, the EU external energy policy should have aimed at the strengthening of its energy security, at the acceleration of the green energy transition, at the support of Ukraine and the countries affected by the Russian invasion and at the building of long-lasting international partnerships. Finally, the third pillar of the REPowerEU plan is the acceleration of renewable energy share in power generation, industry, buildings and transport, both in compliance with EU climate goals and with the aim of achieving its energy independence. Therefore, the Commission proposed to increase the target by 2030 under the "Fit for 55" package of the share of renewable sources of energy in the EU energy mix from 40% to 45%.

[350] "Energy Security: Commission Hosts First Meeting of EU Energy Purchase Platform to Secure Supply of Gas, LNG and Hydrogen," April 8, 2022, European Commission, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2387.
[351] "EU Energy Platform: Commission Launches First Call for Companies to Jointly Buy Gas," April 25, 2023, European Commission, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_2403.

It is worth pointing out how, as in the case of the aforementioned declarations by the European Parliament and the Council, the issue of energy security is considered as inextricably linked to the transition towards clean sources of energy, which is usually explained in environmental terms. In fact, while mitigating climate change is surely an issue of security in broader terms, involving migration, food and water security, among the others, renewable energy have also the absolute advantage of having the possibility to be produced domestically, while the great majority of fossil fuels consumed in Europe is imported. Therefore, increasing the share of renewables sources over fossil fuels means increasing energy independence, even though there is the need to tackle the issue of critical raw materials, fundamental for the promotion of renewable energy. Critical raw materials are produced in very few countries in the world and could lead Europe to go from the current dependency on Russian fossil fuels to a future dependency on critical raw materials from countries such as China.

The Commission calculated that the pursuing of the REPowerEU Plan would require an additional investment of €210 billion between the 2022 and 2027, which could be supported by the Recovery and Resilience Facility (RRF), a temporary recovery instrument which "allows the Commission to raise funds to help Member States implement reforms and investments that are in line with the EU's priorities"[352]. The Commission proposed some amendments to the RRF Regulation in order to integrate in the Recovery and Resilience Plans of each Member States specific REPowerEU chapters. RRF Regulation has been amended accordingly, with the adoption of Regulation (EU) 2023/435 on 27th February 2023.

3.2.1. Gas storage

Ensuring an adequate level of gas storage among Member States became a key priority in the aftermath of Russian invasion of Ukraine on 24th February 2022. In particular, the main concern of the European Union was to be able to face the 2022/2023 winter season. High gas storage levels enable Member States to ensure adequate gas supplies to consumers even in cases of significantly cold weather or sudden

[352] "Recovery and Resilience Facility," European Commission, accessed May 18, 2023, https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en. European Commission, "Recovery and Resilience Facility". https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en.

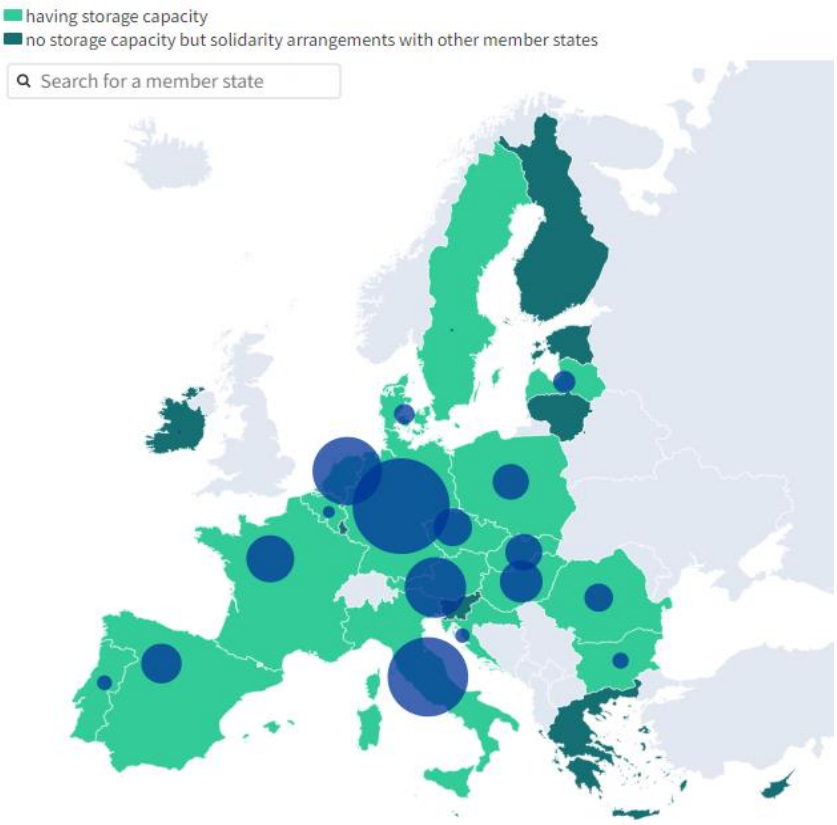
interruptions of gas deliveries. For this reason, the Commission first proposed a Regulation setting common goals for gas storage levels, which was finally adopted on 29th June 2022 by the European Parliament and the Council, amending Regulations (EU) 2017/1938 and (EC) No 715/2009 regarding gas storage, as Regulation (EU) 2022/1032.

The legislators recognised that high gas prices, as a result of the war, could lower the incentives to fill underground gas storage facilities, undermining gas security of supply. In January 2022, the EU gas storage filling level was at 53% of its capacity, while in March 2022, when the Commission issued the proposal for the Regulation, it was at its lowest, with 26% of filling capacity. For this reason, on the basis of the Commission and the Gas Coordination Group's analysis on the reinforced risk preparedness at the Union level and the Commission analysis on the adequacy of measures to secure gas supply, Regulation 2022/1032 envisages an obligation upon Member States to ensure that underground gas storage facilities are filled at, at least, 90% of their capacity by 1st November of every year, with intermediate targets in May, July, September and February. For the first year, by November 2022, a lower goal was set at 80%. For the achievement of this objective, Member States should first apply market-based measures, in order to avoid market distortions. However, no specific instruments are imposed on Member States, which are left free to choose the best one to meet the intermediate and final targets.

The Regulation envisaged a solidarity mechanism as well: "to share the burden sharing of ensuring that underground gas storage facilities in the Union are sufficiently filled to safeguard the security of gas supply, in a spirit of solidarity, Member States without underground gas storage facilities should use underground gas storage facilities in other member States"[353]. In this case, the Member State must ensure that the arrangement with other Member States guarantee storage volumes equal to at least 15% of their average annual gas consumption over the previous five years. Figure 3.5 below illustrates the gas storage capacity and filling level in the Member States (as of 19th March 2023) and highlights countries that do not have storage capacity but solidarity arrangements with other member States. The size of the blue circles indicates the gas storage filling level of each Member State.

[353] Regulation (EU) 2022/1032 of the European Parliament and of the Council of 29 June 2022 amending Regulations (EU) 2017/1938 and (EC) No 715/2009 with regard to gas storage [2022] OJ L 173/17, p. 4.

Figure 3.5: Gas storage capacity and filling level in the EU Member States (as of 19th March 2023)

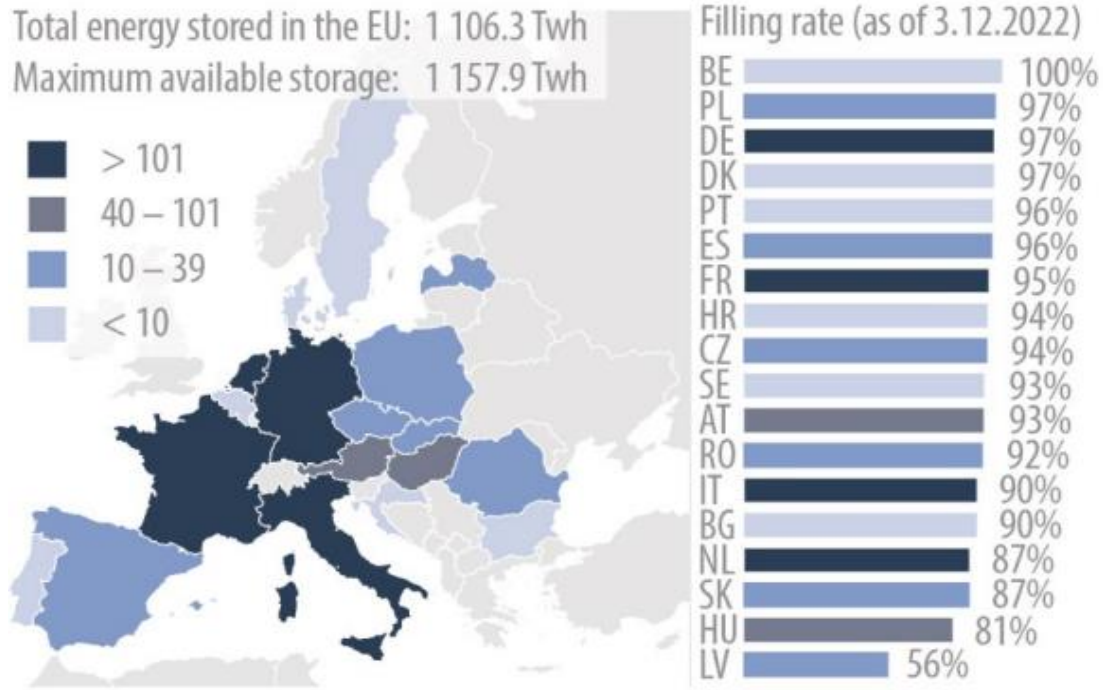


Source: European Council, 2023

By early December 2022, the majority of Member States had gas storage facilities filled at over 90% of their capacity, exceeding the target set by the Regulation for winter 2022/2023 of 80%, as shown by Figure 3.6 below. The implementation of the Regulation was helped considerably by both a milder winter than it was expected and by the reduction of gas demand, as a result of EU intervention and high gas prices[354]. As of March 2023, at the end of the cold season the storage filling level was around 55%, compared to 26% of March 2022.

[354] Boehm and Wilson, "EU energy security and the war in Ukraine. From sprint to marathon".

Figure 3.6: Gas storage filling level in the EU Member States (as of 3rd December 2022)



Source: European Council, 2023

3.2.2. Demand reduction

Demand reduction, alongside filling gas storage, before the upcoming winter period of 2022/2023 was considered a key priority by the European Union in order to ensure security of gas supply and avoid excessively high gas prices. However, differently from gas storage, demand reduction does not depend only on Member State measures, but on the actions of all consumers and market participants. Taking into consideration this aspect, the European Commission, in May 2022, adopted the Save Energy plan, in which it proposed both voluntary actions individuals can adopt to save energy and structural measures Member States may pursue to reduce gas (and oil) demand by increasing energy efficiency, in the long term. In August 2022, a voluntary gas consumption reduction target of 15% was set by Council Regulation 2022/1369, along with mandatory reduction target in case of Union alert.

On 18th May, as part of the REPowerEU plan, the Commission issued a communication to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, titled "EU 'Save Energy'", with the purpose of identifying new strategies for reducing energy consumption through voluntary behaviours, energy efficiency measures and price signals. The Commission defined it "the cheapest, safest and cleanest way to reduce our reliance on fossil fuel

imports from Russia"[355]. Moreover, it highlighted how saving energy means improving security of supply and achieving more easily filling storage requirements, alongside the compliance with clean energy transition targets. The plan focused mainly on the reduction of oil and gas consumption: the following analysis will consider specifically the strategy set out in the Communication for gas saving.

EU 'Save Energy' plan follows a twofold approach: a short-term view through voluntary choices and a mid to long-term one through structural energy efficiency measures. In relation to the first strategy, the Commission identified some personal choices consumers and market participants could make in order to achieve immediate energy savings, mainly related to the residential and household sector, considering that natural gas contributes to 42% of the energy used for space heating. Moreover, attention has been given to saving electricity as well, since gas, oil and coal are used for power generation. Member States can have the role of providing for support actions, mainly divided in two categories: information actions, e.g. making energy users understand what they can do and why it is important to reduce energy consumption; incitement and supporting actions, e.g. concrete support to energy users through incentives and other instruments. Some of the gas-related measures proposed by this plan are: "savings from turning down heating", "providing information about keeping condensing boiler temperatures below 60 degrees", "information about servicing boilers, simple insulation measures" and "consider modifying the energy pricing and introduce progressive tariff structures"[356]. The IEA estimated that thanks to these gas-related measures, a 5% gas use reduction could have been achieved in just over a year.

Accelerating and strengthening structural, mid- to long-term energy efficiency measures are the other side of the energy saving strategy. Member States had already put in place measures and legislation to promote energy efficiency in all sectors of the economy, with a special focus on the residential and household sector, in which natural gas represents a significant share of energy used. Thanks to these previous efforts, the Commission estimated that more ambitious targets proposed did not require the creation of any new framework or body. In particular, some of the EU 'Save Energy' plan proposal for the strengthening of the regulatory framework for energy efficiency

[355] European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions "EU Save Energy", COM(2022) 240 final, [2022], p.4.
[356] *Ibidem.*

are the following: "increasing the ambition of national savings obligation", "strengthening the implementation of energy audit results to ensure that cost-effective measures are implemented", "introduce additional Minimum Energy Performance Standards for buildings to boost renovations that encompass also heating (and cooling) systems […] and setting a pathway to upgrade worst-performing buildings" and "introduce national bans for boilers based on fossil fuels in existing and new buildings"[357]. Finally, it proposed to increase to 13% by 2030 the binding target set in the Energy Efficiency Directive, up from the current 9%. On 10th March 2023, the Council and the Parliament reached a provisional agreement for the amendment of the Directive. In particular, they agreed upon setting a new target: Member States must collectively reduce final consumption at EU level by at least 11.7% by 2030, compared with the 2030 energy consumption forecasts estimated in 2020. The provisional agreement set as well a gradual increase of the annual energy saving targets between 2024 and 2030: each year Member States must save 1.49% of final energy on average and reach 1.9% on 31st December 2030[358].

On 5th August 2022, the Council of the European Union adopted Council Regulation (EU) 2022/1369 on coordinated demand-reduction measures for gas. The Council accused Russia to use gas supply as a "political weapon" and noted gas deliveries from Russia have been reduced to less than 30% than the average gas deliveries in the period 2016-2021. The decrease in Russian gas imports led to high energy prices. The Council highlighted as well the need to prepare "for the possibility of a full disruption of gas supply from Russia at any moment"[359]. To this aim, it stressed the need to have a coordinated approach at EU level based on the principle of solidarity. The legal framework set by Regulation (EU) 2017/1938 does not addresses emergencies in which disruption of a major gas route lasts more than 30 days: the Regulation adopted in August 2022 aims at providing a Union level response in case of major disruptions.

[357] European Commission, "EU Save Energy", COM(2022) 240 final, p. 7.
[358] "Council and Parliament Strike Deal on Energy Efficiency Directive," March 10, 2023, Council of the EU, https://www.consilium.europa.eu/en/press/press-releases/2023/03/10/council-and-parliament-strike-deal-on-energy-efficiency-directive/#:~:text=The%20Council%20and%20Parliament%20agreed%20to%20a%20gradual%20increase%20of,1.9%25%20on%2031%20December%202030.
[359] Council Regulation (EU) 2022/1369 of 5 August 2022 on coordinated demand-reduction measures for gas [2022] OJ L 206/1.

It sets a voluntary and a mandatory demand reduction targets. Article 3 calls upon Member States to "use their best efforts to reduce their gas consumption in the period from 1 August 2022 to 31 March 2023 at least by 15%" in comparison to the average gas consumption in the same period of the previous five years. The 15% target has been chosen taking into account "the volumes of gas demand which would be at risk of non-delivery in the event of a full disruption of Russian gas supply"[360]. Member States are left free to choose the measures they deem to be more suitable for the situation, provided that these measures do not distort competition and the correct functioning of internal gas market and do not endanger the security of gas supply of the other Member States.

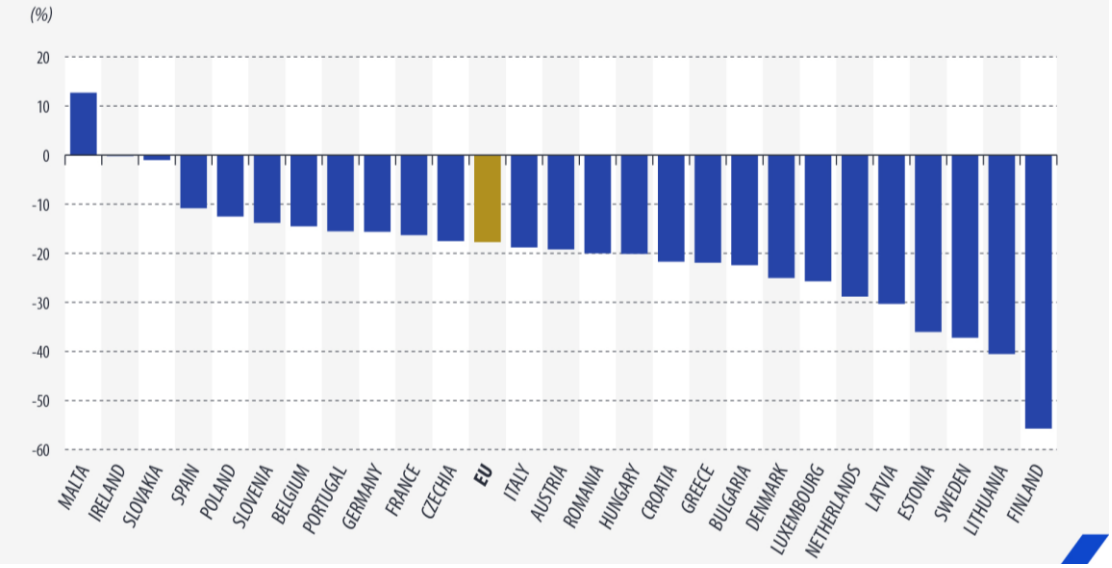
Article 5 sets a mandatory target: in the case of the declaration of a Union alert by the Council, "gas consumption on each Member State over the period from 1 August 2022 to 31 March 2023 ('reduction period') shall be 15% lower compared to its reference gas consumption". The Union alert is not linked to any of the three crisis levels established by Regulation 2017/1938 on security of gas supply (see Chapter 2). It is declared by the Council with a qualified majority in cases of "a substantial risk of a severe as supply shortage or where an exceptionally high demand for gas occurs"[361]. However, the Council is obliged to declare it when five or more Member States declare a national alert. The aim of the mandatory reduction is to save as much gas as possible to support the most affected Member States in case of Russian gas supply disruption, under the principle of solidarity[362].

As a result of these measures and thanks to milder weather and high prices, in the period August 2022 – March 2023, gas consumption decreased by 17.7% in comparison to the average of the same period in the years 2017-2022[363]. As it can be noted in Figure 3.7 below, most of EU Member States achieved the 15% gas consumption reduction, with the only exception of Belgium (-14.5%), Slovenia (-13.8%), Poland (-12.5%), Spain (-10.8%), Slovakia (-1.0%) and Ireland (-0.2%). Malta, the smallest gas consumer of EU countries, increased its gas consumption by 12.7% in

[360] *Ibidem.*
[361] Council Regulation (EU) 2022/1369, art. 4.
[362] Katja Yafimava, "EU Solidarity at a Time of Gas Crisis: Even with a Will the Way Still Looks Difficul," *The Oxford Institute for Energy Studies*, February 2023, 1–35, p. 16.
[363] "EU Gas Consumption Decreased by 17.7%," EU gas consumption decreased by 17.7% - Products Eurostat News - Eurostat, April 19, 2023, https://ec.europa.eu/eurostat/web/products-eurostat-news/w/DDN-20230419-1.

the same period. The Member States that registered the largest decline are Finland (-55.7%), Lithuania (-40.5%) and Sweden (-32.7%)[364].

Figure 3.7: Natural gas consumption reduction (August 2022-March 2023 vs 2017-2022 average)

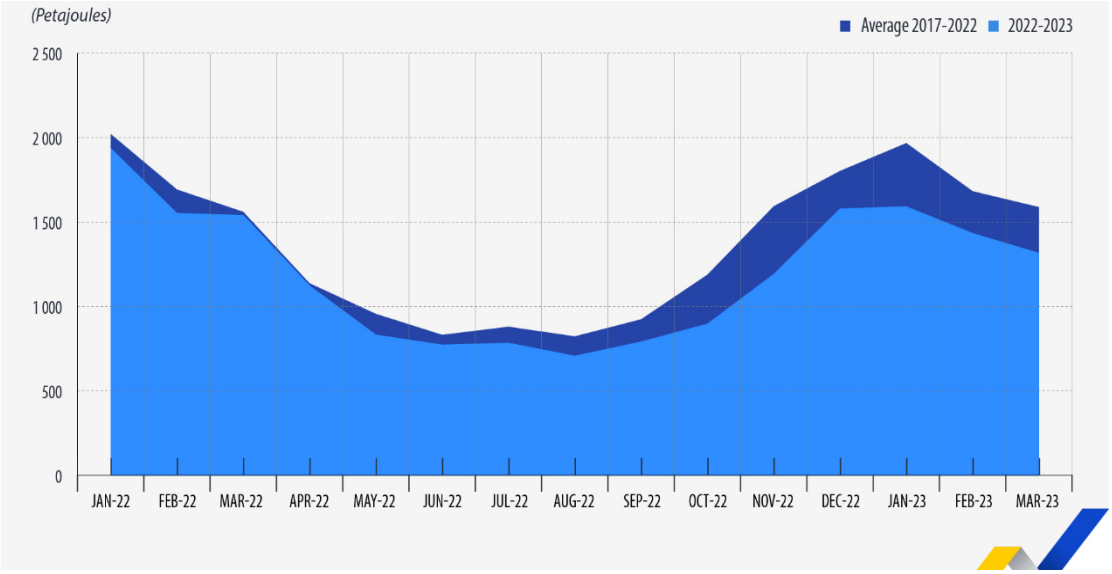


Source: Eurostat, 2023

Figure 3.8 below compares the monthly data of EU natural gas consumption of the period January 2022 – March 2023 with the average monthly consumption in the years 2017-2022. It can be noted that in the January 2022 - March 2023 period the consumption has been consistently below, in particular starting from August 2022, with a monthly reduction of 14.0%, then 14.3% in September, 24.4% in October, 25.0% in November and 12.3% in December[365].

[364] *Ibidem.*
[365] *Ibidem.*

Figure 3.8: EU natural gas consumption (calculated), 2017-2023



Source: Eurostat, 2023

While milder winter temperatures contributed to the overachievement of the 15% target for the reduction of gas consumption, policy-driven changes have been crucial. Moreover, some weather anomalies caused an increase in gas demand in some sectors: in Southern Europe low levels of rainfall led to a crisis of the hydropower sector and a surge of gas-fired power. Finally, high prices, as already mentioned, significantly contributed to reducing gas demand, most notably in gas-intensive industrial sectors[366].

As a whole, the power sector was the only one that increased gas demand in comparison to 2021, with some exceptions. Policy support in the renewable sector led to the installation of 50 GW of wind and solar plants in the EU during 2022, which could meet the equivalent of 11 bcm of natural gas in the power sector. On the other hand, the nuclear and hydropower sector registered a declined in energy output, which led to an increase demand for gas-fired power and to a net increase of gas consumption in the power sector. Finally, in the European Union in 2022 there was a decrease in electricity demand by 3%, meaning a 14 bcm reduction in gas demand for this sector[367].

The building sector, including households and public and commercial spaces, registered a decrease in gas demand by 20%, equivalent to 28 bcm less than in 2021. Weather effects contributed to a reduction of the demand by 18 bcm. In fact, Heating

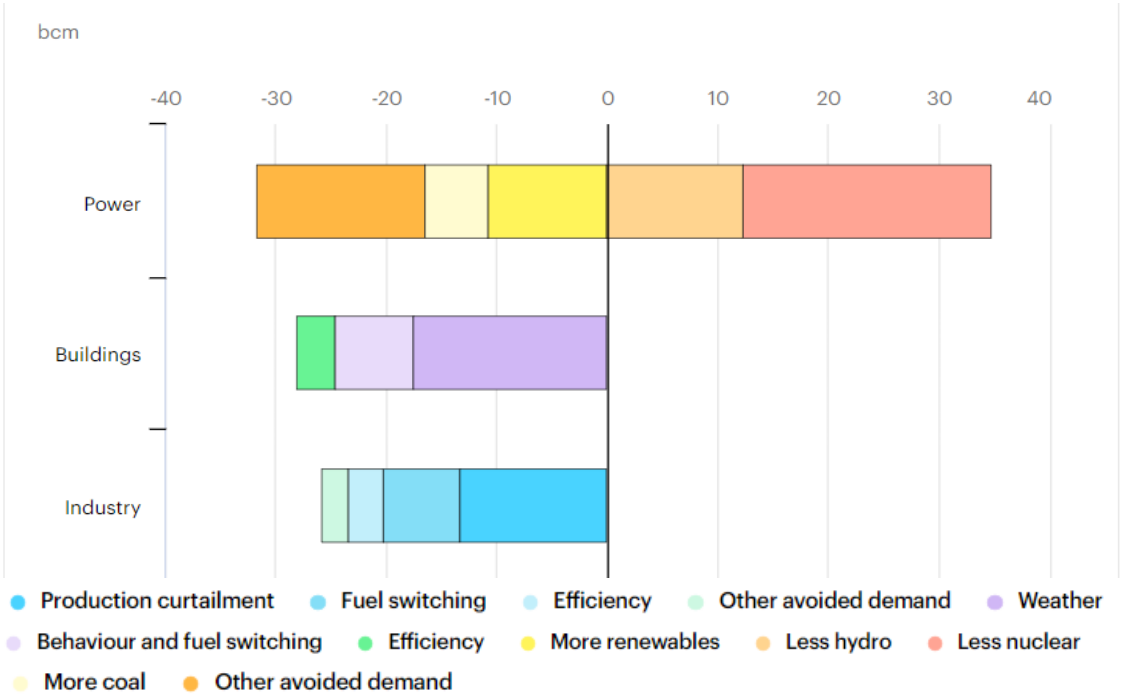
[366] Peter Zeniewski, Paul Hugues, and Gergely Molnar, "Europe's Energy Crisis: What Factors Drove the Record Fall in Natural Gas Demand in 2022? – Analysis," IEA, March 14, 2023, https://www.iea.org/commentaries/europe-s-energy-crisis-what-factors-drove-the-record-fall-in-natural-gas-demand-in-2022.
[367] *Ibidem*.

Degree Days, a measurement which quantifies the energy needed to heat a building due to the fall of temperature below a reference temperature, in the EU were 12% lower than in 2021. Another contributing factor in the building sector was behaviour and fuel switching, which explained 7 out of the 28 bcm of gas demand reduction. It has been estimated that consumers lowered their thermostats with an average of 0.6 °C. The other side of the coin, however, is that gas consumption decreased due to fuel poverty: consumers that could not afford gas due to higher bills, reduced their consumption and/or switched to cheaper and sometimes more polluting fuels, such as charcoal, waste or low-quality fuel oil and wood pellets. Finally, the decline of gas consumption in the building sectors was due also to improved energy efficiency. In fact, structural changes in energy performance of buildings, such as boiler replacements and energy retrofits, led to a reduction of gas demand of 3.5 bcm[368].

Finally, the industrial sector registered a reduction of gas consumption of 25 bcm, equivalent to 25%. It resulted both from production curtailment and fuel switching. Gas price shocks led gas-intensive industries to significantly lower their production, up to 8% in comparison to 2021. In some cases, plants increased imports of finished products from outside the European Union while in other cases they reduced gas consumption by importing intermediate gas-intensive goods, namely aluminium, steel and fertilisers. In 2022, the fertiliser sector contributed to half of the reduction of natural gas as a consequence of production curtailment. Finally, the International Energy Agency estimated that during 2022 in the industrial sector a fuel switch from gas to oil occurred, leading to an additional decrease in gas consumption by 7 bcm[369]. Figure 3.9 below illustrates the estimated drivers of change in natural gas demand in power, buildings and industry in the European Union in 2022 compared to 2021.

[368] *Ibidem.*
[369] *Ibidem.*

Figure 3.9: Estimated drivers of change in natural gas demand in power, buildings and industry in the European Union, 2022 versus 2021



Source: IEA, 2023

On 30th March 2023, the Council of the European Union adopted Council Regulation (EU) 2023/706 amending Regulation (EU) 2022/1369, prolonging the target reduction of gas consumption by 15% to March 2024. The Council based its decision on a proposal of the Commission and on the following considerations. First of all, global gas market difficulties of February 2022 have not changed and the European Union still rely on a small amount of imported Russian pipeline gas. Secondly, Asian LNG demand registered a rebound, therefore reducing LNG available in the global market. Moreover, a report carried out by the European Commission concluded that "without continued demand reduction, storage levels would only reach 69 bcm by the end of October 2'23, which is significantly below the 90% (89.4 bcm) target for 1 November set out in Regulation (EU) 2017/1938 and that storage levels would be fully depleted by February 2024"[370]. Therefore, the extension of the gas demand reduction target is considered crucial to avoid that gas shortages occur during the 2023/2024 winter period[371].

[370] Council Regulation (EU) 2023/706 of 30 March 2023 amending Regulation (EU) 2022/1369 as regards prolonging the demand-reduction period for demand-reduction measures for gas and reinforcing the reporting and monitoring of their implementation [2023] OJ L 93/1.
[371] *Ibidem*.

3.2.3. EU Solidarity mechanism: reforms and limits

Regulation 1938/2017 introduced a solidarity mechanism that envisaged a reduction of gas supply to customers of a Member States, except for solidarity-protected customers, in case another Member State, connected to the first one, is unable to provide natural gas to its protected customers, declares a national emergency and requests the activation of the solidarity mechanism. To this aim, the Regulation required the conclusion of bilateral agreements between Member States, which had to laid down the specific technical and financial measures for the implementation of this mechanism, by 31st December 2018. As of the time of writing, only six such agreements have been concluded, involving a total of nine Member States. Among the most affected countries in case of a disruption of the already reduced Russian gas supplies, namely Central and Eastern European countries, Hungary and Czechia have not stipulated any deal with neighbouring Member States, while Germany only with Austria and Denmark, but not with France, the Netherlands, Belgium or Czechia[372].

To avoid that the lack of bilateral agreements undermines the effectiveness of the important solidarity mechanism, on 19th December 2022, the Council adopted Council Regulation (EU) 2022/2576, which, beside establishing a better coordination purchasing mechanism and price benchmarks, introduced in Article 27 default rules for solidarity measures in absence of bilateral agreements. It enables the triggering of the solidarity mechanism without the need of a pre-existent agreement between Member States, which, if in place, prevails on the default rules. Article 23, moreover, envisages the enforcement of solidarity measures also in case of threats to critical gas volumes for security of supply of electricity. Finally, Article 26 extends the obligation to provide solidarity measures to Member States with LNG facilities as well, "provided the necessary capacity in the relevant infrastructure, including the LNG vessels and carriers, is available"[373].

However, despite the strengthening of the solidarity mechanism, its actual applicability and effectiveness is undermined by the topology of the European Union natural gas network. In fact, while the most vulnerable countries to possible additional

[372] Yafimava, "EU solidarity at a time of gas crisis: even with a will the way still looks difficult", p. iii.
[373] Council Regulation (EU) 2022/2576 of 19 December 2022 enhancing solidarity through better coordination of gas purchases, reliable price benchmarks and exchanges of gas across borders [2022] OJ L 335/1, art. 26.

Russian supplies disruption are Eastern and Central European Member States, the gas network does not allow for significant west-east flows. Consequently, these countries can not rely completely on Western European Member States' support and need to count on each other for the sharing of their gas, when possible. However, thanks to the extension of the obligation to provide solidarity measures to Member States with LNG facilities, and considered that Hungary, Czechia, Austria, Slovakia and Germany are endowed with LNG imports terminals, as well as the Member States to which they are, directly or via a third country, connected, therefore softening the aforementioned limits imposed by the EU natural gas network, the implementation of this mechanism would have a "positive non-negligible impact"[374].

3.2.4. Natural gas prices: attempts of stabilisation

Gas prices during 2022 were very volatile and reach high peaks, with the record one in August of €343 MWh. Within the European Union there has been a strong debate on the necessity, on one hand, to prevent speculations and to protect consumers and industries from such high prices, and, on the other, to avoid a significant distortion of the functioning of the European gas markets. In December, to this aim, two Regulations were adopted: Council Regulation (EU) 2022/2576 of 19th December 2022, which established a joint gas purchasing mechanism and measures to avoid excessive price volatility, and Council Regulation (EU) 2022/2578 of 22nd December 2022, which established a "new market mechanism" to put a cap on very high gas prices.

Regulation 2022/2576, as already mentioned previously in the Chapter, laid down the legal framework for the EU Energy Platform and regulated the joint gas purchasing mechanism. However, it dealt with pricing as well. In fact, the Council recognised how the "weaponization of the gas supply and the Russian Federation's manipulation of the markets through international disruptions of gas flows have led to skyrocketing energy prices in the Union"[375]. The EU Energy Platform is envisaged as an instrument to increase to security of supply and to lower import prices of gas purchased at the global market. Nonetheless, the Council points out the issue of high

[374] Yafimava, "EU solidarity at a time of gas crisis: even with a will the way still looks difficult", p. 24.
[375] Council Regulation (EU) 2022/2576 of 19 December 2022 enhancing solidarity through better coordination of gas purchases, reliable price benchmarks and exchanges of gas across borders [2022] OJ L 335/1.

intra-day volatility of gas prices and for this reason established a mechanism "to ensure that operators essential for the security of the energy supply in all Member States benefit from safeguards against large price movements that are detrimental to the continued operation of their business, which would also be detrimental to the end-consumers"[376]. To this end, Article 15 of the Regulation mandated that, no later than 31st January 2023, each trading venue had to identify price boundaries (upper and lower ones), above and below which orders can not be executed.

Finally, Regulation 2022/2576 regulates LNG price assessment as well. In fact, the Council recognised that the European Union needs to diversify its gas supplies and that LNG is one of the main instruments. However, the LNG market for Europe is relatively new and therefore it is "difficult to assess the accuracy of prices that prevail in this marketplace"[377]. For this reason, the Regulation, in Article 8, gives the mandate to the European Union Agency for the Cooperation of Energy Regulators (ACER) to produce a daily LNG price assessment starting non later that 13th January 2023 and, starting on 31st March 2023, to "publish a daily LNG benchmark determined by the spread between the daily LNG price assessment and the settlement price for the TTF Gas Futures front-month contract established by ICE Endex Markets B.V."[378].

Regulation (EU) 2022/2578 adopted on 22nd December 2022, establishing a "dynamic safety cap", was approved by the Energy Council after months of discussions. In fact, as a reaction to high gas prices and their impact on the economy, fifteen Member States requested a Union-wide gas price cap. On 22nd November 2022, the Commission proposed a price cap mechanism which would be triggered if two conditions occurred: in case that the front-month TTF contract exceeded 275 €/MWh for two consecutive weeks and the contract was 58€ higher than a LNG reference price for ten consecutive trading days. Some countries, namely Italy, Greece, Belgium, Poland and other countries criticised this proposal, considering the conditions too strict and that, therefore, the cap would have never been applied. On the other hand, Germany, the Netherlands and Denmark were opposed to the adoption of a gas price cap, highlighting

[376] *Ibidem*.
[377] *Ibidem.*
[378] Council Regulation (EU) 2022/2576, art. 18.

the risk of distortion of the gas market and that gas suppliers could decide to export somewhere else where prices are higher than the EU's capped price[379].

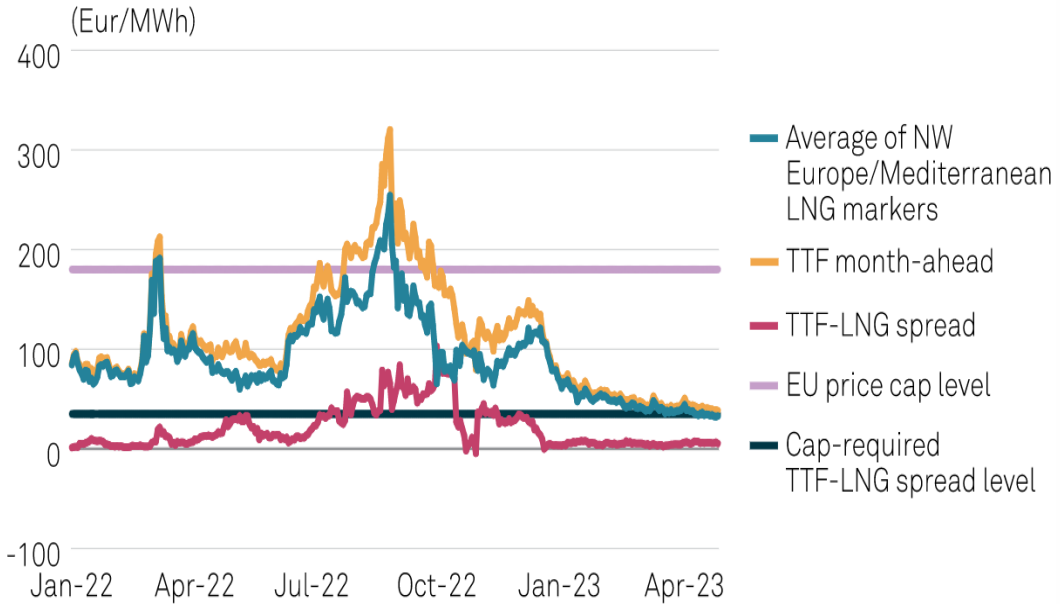
Despite opposition, on 22nd December Member States agreed to the establishment of a Union-wide price cap and to lower the conditions previously proposed by the Commission. The Regulation is titled "establishing a market correction mechanism to protect Union citizens and the economy against excessively high prices" and reads: "Higher natural gas prices endanger the economy of the Union through sustained high inflation caused by higher electricity prices, undermining consumer purchasing power, as well as through raising the cost of manufacturing, particularly in energy-intensive industry, and seriously threaten the security of supply"[380]. The main goal, and challenge, was to prevent possible speculation on gas price and guarantee consumer purchasing power on one hand, while maintaining the proper functioning of the EU gas market on the other. The result was the adoption of a temporary market correction mechanism (MCM) for "orders placed for trading TTF derivatives[381] and derivatives linked to other virtual trading points[382] (VTPs)"[383] in the occurrence of the following two conditions: when the front-month TTF derivative settlement price "exceeds EUR 180/MWh for three working days and is EUR 35 higher than the reference price[384]" during the same period[385]. When the two conditions are met, ACER publishes a notice on its website and informs the Council, the Commission, the European Central Bank and the European Securities and Markets Authority (ESMA). As a consequence, from the day after the publication of the market correction notice "market operators shall not accept and TTF derivatives market participants shall not submit orders for TTF derivatives that are due to expire in the period from the expiry

[379] Susanna Twidale, Kate Abnett, and Gabriela Baczynska, "Explainer: Europe's Fiercely Contested Plan to Cap Gas Prices," *Reuters*, December 13, 2022, https://www.reuters.com/business/energy/europes-much-debated-plan-cap-gas-prices-2022-11-22/.
[380] Council Regulation (EU) 2022/2578 of 22 December 2022 establishing a market correction mechanism to protect Union citizens and the economy against excessively high prices [2022] OJ L 335/45.
[381] Ivi, art. 2: "TTF derivative means a commodity derivative as defined in Article 2(1), point (30), of Regulation (EU) No 600/2014 of the European Parliament and of the Council, traded on a regulated market, the underlying of which is a transaction in the Title Transfer Facility (TTF), a virtual trading point operated by Gasunie Transport Services B.V".
[382] Ivi, art. 2: "VTP means a non-physical commercial point within an entry-exit system where gas is exchanged between a seller and a buyer without the need to book transmission or distribution capacity".
[383] Ivi, art. 1.
[384] The reference price is the daily average price of the LNG Northweast Europe Marker, the LNG Mediterranean Marker, the LNG Northeast Asia Marker, the front-month NBP derivative settlement price assessments and the price of the daily price assessment carried out by ACER.
[385] Council Regulation (EU) 2022/2578, art. 4, par. 1.

date of the front-month TTF derivative to the expiry date of the front-year derivative with prices of EUR 35 above the reference price published by ACER on the previous day"[386].

In order to preserve the normal functioning of the markets, Article 6 provides for a suspension system of the MCM. In particular, the Commission must suspend the market correction mechanism in case of market disturbances and risk of disturbances that threatens the security of supply, intra-Union gas flows or the financial stability. The market correction mechanism became operational in February 2023 (with its end set for February 2024), but since then prices have stayed below the EU gas price cap level, as Figure 3.10 below shows, and for this reason it has never been triggered, as for the time of writing.

Figure 3.10: TTF month-ahead price still well below EU price cap level



Source: S&P Global Commodity Insights, 2023

On 31st March 2023, the European Commission adopted the implementing act of Regulation 2022/2578, extending the market correction mechanism to derivatives linked to gas trading in all European Union hubs, in order to provide the EU of "an even broader shield from high and volatile gas prices"[387]. This act came into effect on 1st May 2023.

[386] Ivi, art. 4, par. 5.
[387] Stuart Elliott, "EU Gas Market Correction Mechanism Extension to Other Hubs Comes into Force," S&P Global Commodity Insights, May 2, 2023, https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/050223-eu-gas-market-correction-mechanism-extension-to-other-hubs-comes-into-force.

On 1st March 2023, both ACER and ESMA, as tasked by the Regulation, submitted to the Commission the assessment conducted on the effects on the market of the MCM. The assessment did not highlight any significant impact on gas prices (neither positive nor negative)[388]. However, in the occasion of the adoption of the implementing act that extended the MCM to all EU gas hubs, EU Commissioner for Energy Kadri Simson declared that the mechanism is playing a key role in mitigating energy crisis and recognised that "gas markets have been calm since last December with much less volatility, and prices have fallen to their lowest levels since the war in Ukraine started. The Market Correction Mechanism plays a key role in the EU's crisis response toolbox"[389].

3.2.5. Acceleration of renewable sources of energy

Renewable sources of energy have the strategic role of contributing to the mitigation of climate change and to the improvement of energy security, enabling Europe to phase-out fossil fuels, the majority of which is imported. For both reasons, in the REPowerEU Communication, published on 18th May 2022, the Commission proposed to increase the target by 2030 under the "Fit for 55" package of the share of renewable sources of energy in the EU energy mix from 40% to 45%, even though the legally binding target for 2030 was still 32%, as set by the Directive (EU) 2018/2001, which revised Directive 2009/28/EC. On 30th March 2023, the European Parliament and the Council reached a provisional agreement, rising the binding target from 32% to 42.5% and agreeing on the commitment of EU to reach 45% of renewable sources. Once the legislative procedure is completed, the new Directive will enter into force[390]. Accordingly to the Commission's Quaterly report on European electricity markets, during the third quarter of 2022 "the share of renewables increased to 39%", in particular "renewable generation rose by 1% (+3TWh) year-on-year. On yearly basis, solar generation rose by 28% (+16TWh), onshore wind by 7% (+4 TWh) and biomass

[388] ACER, Market Correction Mechanism: Effects assessment report, *Report* 1st March 2023.
[389] "Commission Extends Market Correction Mechanism to Other Trading Hubs," European Commission - Energy, March 31, 2023, https://energy.ec.europa.eu/news/commission-extends-market-correction-mechanism-other-trading-hubs-2023-03-31_en.
[390] "European Green Deal: EU Agrees Stronger Legislation to Accelerate the Rollout of Renewable Energy," March 30, 2023, European Commission, https://ec.europa.eu/commission/presscorner/detail/en/IP_23_2061.

by 2% (+0.5 TWh), offsetting a bad quarter in hydro generation, which fell by 21% (-17TWh)"[391].

On 22nd December 2022, Council Regulation (EU) 2022/2577 was adopted, laying down a framework to accelerate the deployment of renewable energy, recognising the important role of renewables in counteracting the "weaponization" of natural gas by Russia. In particular, it defined the "planning, construction and operation of plants and installations for the production of energy from renewable sources, and their connection to the grid, the related grid itself and storage assets" as "overriding public interest and serving public health and safety when balancing legal interests in the individual case"[392]. Moreover, it allows Member States to accelerate the approval of renewable projects introducing exemptions from some compulsory assessments required by the EU environmental legislation. In particular, the exemptions can be granted to if two conditions are met: in the case that "the project is located in a dedicated renewable or grid area" and if "the area has been subjected to a strategic environmental assessment"[393]. The Regulation applies for 18 months since its entry into force.

3.3. Diversification of natural gas supplies

3.3.1. Overview of the European Union diversification strategy

Diversification is the other key explanation for the successful management of winter 2022/2023 for what concerns security of gas supply in the European Union. As expressed by the European Commission in the REPowerEU, the third pillar to face the energy crisis, alongside energy saving and acceleration of renewables, is diversification of energy supplies, in this case of natural gas. As observed in Chapter 1, Europe has been always reliant on a small number of natural gas suppliers, namely the Russian Federation (and before, the Soviet Union), Algeria, Norway, the Netherlands and Libya. Notwithstanding the recognition of the threat this dependency meant for Europe since the Communication of the Commission in 1981[394] and the several suggestions of the

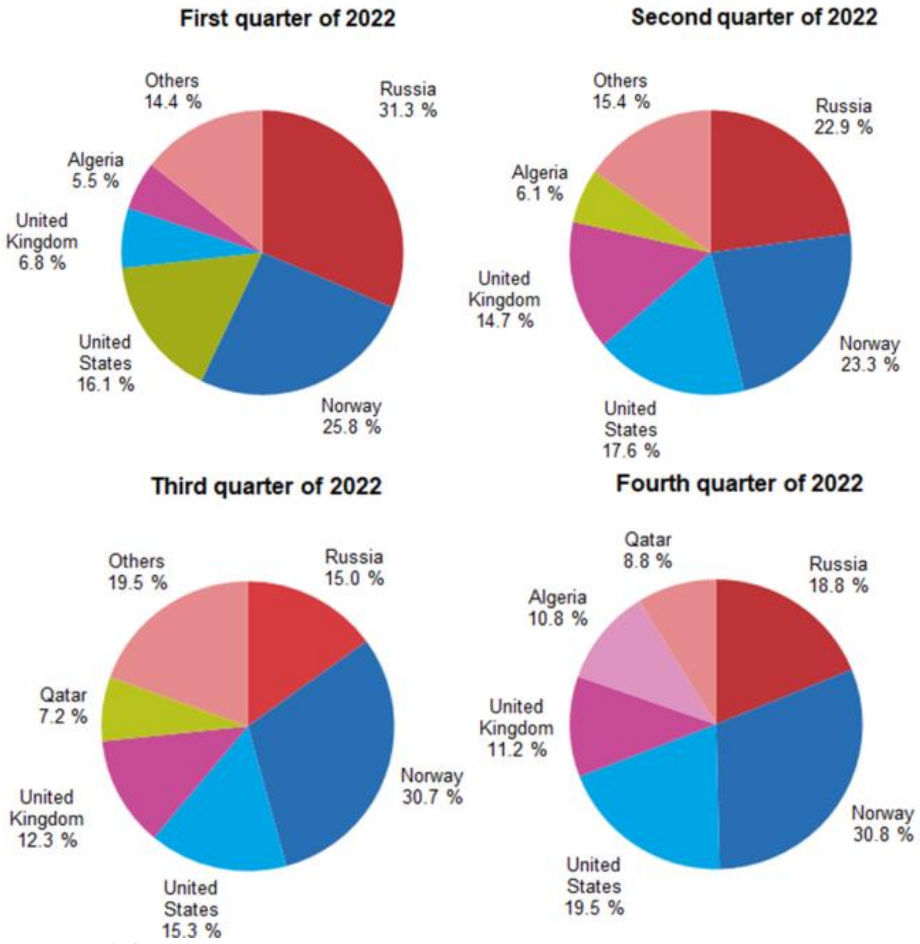
[391] Market Observatory for Energy of the European Commission, "Quaterly report on European electricity markets", Volume 15, issue 3, 2023.
[392] Council Regulation (EU) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy [2022] OJ L 335/36, art. 3.
[393] Ivi, art. 6.
[394] See Chapter 2

Commission that followed in order to diversify natural gas sources, on the eve of the Russian invasion of Ukraine, the European Union imported around 40% of its gas consumption from Russia. With the outbreak of the war in Ukraine and the sharp decrease of Russian gas deliveries to Europe, the need to diversify gas suppliers became a key priority. As it can be noted in Figure 3.11 below, Russia was the largest supplier of natural gas to the European Union in the first quarter of 2022, with a share of 31.3% of trade in value. It was followed by Norway with 25.8%, United States with 16.1% and United Kingdom with 6.8%. Already by the second quarter of 2022 (April-June) the picture changed considerably: Russian share decreased to 22.9%, surpassed by Norway which represented 23.3% of total extra-EU imports. Finally, during the fourth quarter of 2022, the main extra-EU natural gas suppliers were: Norway (30.8%), United States (19.5%), Russia (18.8%), United Kingdom (11.2%), Algeria (10.8%), and Qatar (8.8%). United States' share of trade in value of total extra-EU natural gas imports by partner overcame Russian share since the third quarter of 2022[395]. Overall, between January and November 2022, Russian total gas imports decreased by 64 bcm in comparison to 2021: pipeline gas imports decreased by 69 bcm, but Russian LNG increased by 4.5 bcm during the same months[396].

[395] "EU Imports of Energy Products - Latest Developments," Eurostat - Statistics Explained, March 2022, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_imports_of_energy_products_recent_developments&oldid=554503#Main_suppliers_of_natural_gas_and_petroleum_oils_to_the_EU.

[396] Market Observatory for Energy of the European Commission, *Quarterly report on European gas markets*, p. 4.

Figure 3.11: Extra-EU imports of natural gas by partner (share (%) of trade in value

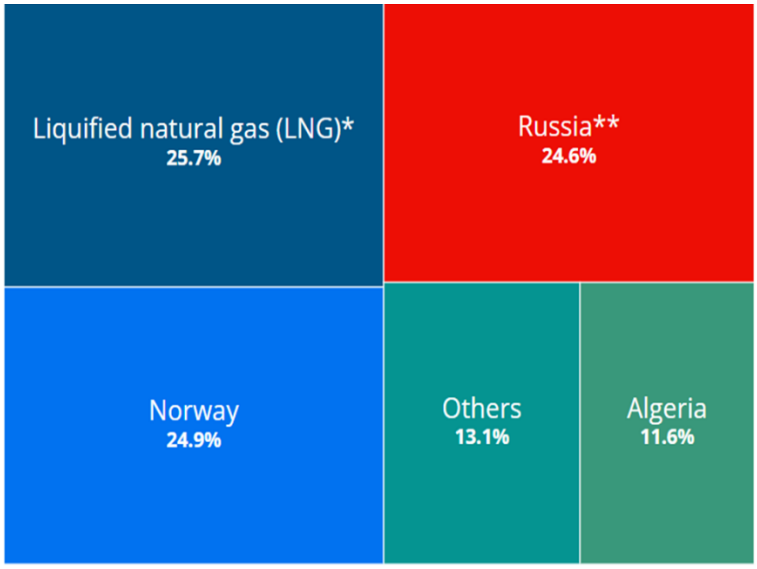


Source: Eurostat, 2023

Figure 3.12 below illustrates another important side of the same phenomenon. On December 2021, the share of Russia on the natural gas market was 41.2%, already lower than 53.4% of December 2020. The share of Russian gas imports over the total of natural gas import sources for the period January-November was 24.6% (including the share of Russian LNG, which slightly increased during these months, differently from the pipeline gas). LNG imports (mainly from the United States, Qatar and Nigeria, and excluded Russian LNG) accounted for 25.7% of total imports, followed by Norway (24.9%), Algeria (11.6%) and others (13%)[397].

[397] European Commission, "Infographic: Where does the EU's gas come from?".

Figure 3.12: Sources of EU gas imports (January – November 2022)



Source: Euronews, 2023

These percentages highlight the increasing importance gained by LNG in Europe in the aftermath of the Russian invasion of Ukraine. In fact, the European Union mainly followed a twofold approach: signing of new LNG contracts and intensification of gas supplies through already in place pipelines. LNG in particular proved crucial in facing decreasing gas supplies from Russia. European LNG imports increased by 60% in 2022[398]. The largest LNG exporters to the European Union were the United States, Russia and Qatar, even though Norway is an important LNG supplier as well[399]. The development of new LNG contracts and the strengthening of already-in-place contracts with reliable LNG suppliers allows, from the European point of view, to reconcile two important sides of the current EU energy policy: security of energy supply and decarbonisation of the EU economy to achieve carbon neutrality by 2050. LNG, as already mentioned, is more flexible and does not require necessarily the signing of long-term contracts as in the case of pipeline gas. Therefore, Member States and the European Union can, in the short term, focus on guaranteeing gas supply and, at the same time, not jeopardise their climate targets by committing to long-term gas contracts.

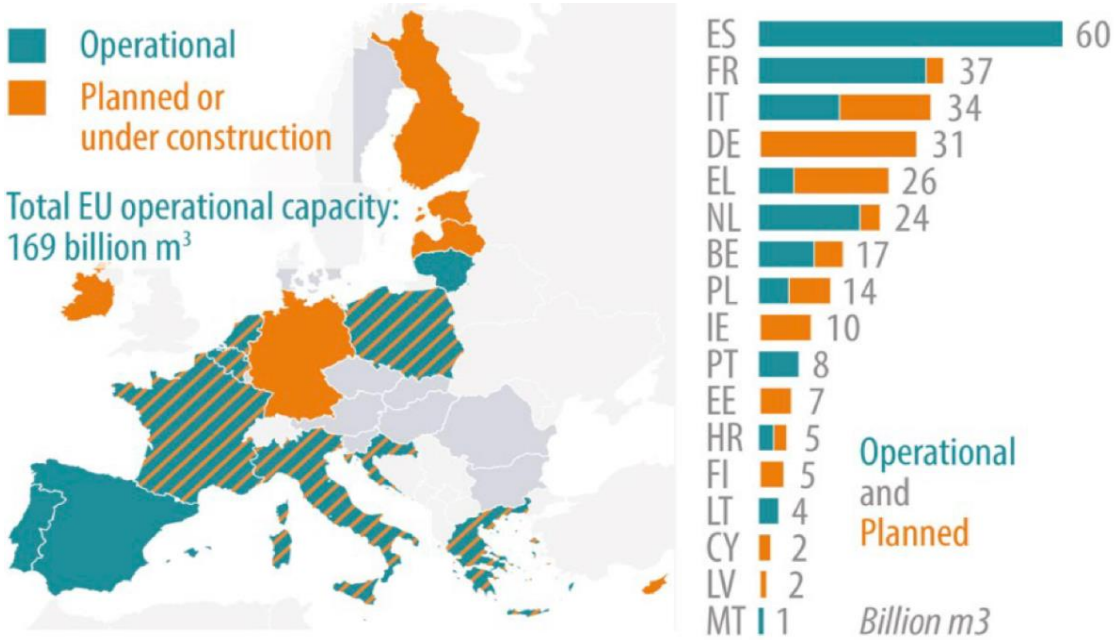
However, as mentioned in Chapter 1, the distribution of LNG import terminals in the EU is highly uneven. Spain holds the highest capacity, around 60 bcm/year, but

[398] Ben McWilliams et al., "Preparing for the next Winter: Europe's Gas Outlook for 2023," *Bruegel*, February 2, 2023, https://www.bruegel.org/policy-brief/european-union-gas-survival-plan-2023.
[399] "Liquefied Natural Gas," European Commission - Energy, accessed May 16, 2023, https://energy.ec.europa.eu/topics/oil-gas-and-coal/liquefied-natural-gas_en.

its pipeline interconnection capacity with France is very modest, around 7 bcm/year[400]. To improve the interconnection between the two countries, a new gas and hydrogen pipeline project, which would connect Barcelona (Spain) to Marseilles (France), is under consideration[401]. After Spain, LNG import capacity is mainly concentrated in North-Western Europe. For this reason, throughout 2022, many EU Member States sought to build new LNG facilities, in particular floating storage and regasification units (FSRUs). They are offshore facilities, different from the onshore ones, and became very popular in the last two decades, especially in developing countries. They are specialised ships or offshore vessels with regasification capacity. They are cheaper to build than onshore units, quicker to enter into operation and more flexible in terms of timing[402]. Differently, onshore LNG facilities require around five years to be built[403]. Germany, which did not have any LNG capacity prior to the natural gas crisis of 2022, developed several FSRUs during 2022 and in January 2023 opened its second LNG terminal[404]. In Italy, on 4th May 2023, the new FSRU in Piombino received the first LNG vessel from Egypt of an amount of 70 kmc. Another FSRU is expected to enter into operation in 2024 in Ravenna, in Emilia Romagna region. They are not the first LNG facilities in Italy: there is an offshore unit in Tuscany (Livorno), operating since 2013, with a total capacity of 3.75 bcm/year, an onshore terminal in Panigaglia, near La Spezia, with a capacity of 3.5 bcm/year and an offshore terminal in Rovigo with a capacity of 8 bcm/year[405]. Overall, European LNG capacity is expected to grow by one third by 2024[406]. The Netherlands expanded the GATE terminal (4 bcm/year)[407]. and opened the Eemshaven LNG terminal (8 bcm/year). Figure 3.13 below illustrates the LNG capacity per Member States: in October 2022, total EU operational capacity was 169 bcm/year.

[400] Pier Paolo Raimondi, "Natural Gas in Italy: Features and Perspectives in Light of Russia's War in Ukraine," *Istituto Affari Internazionali (IAI)*, September 28, 2022, 3–41, p. 36.
[401] Laura Canali, "Carta: L'emancipazione Dell'Europa Dal Gas Russo," Limes, November 8, 2022, https://www.limesonline.com/carta-gas-russo-europa-diversificazione-fonti-energia/129848.
[402] "Offshore LNG Technologies & Facilities," Office of Fossil Energy and Carbon Management Home, February 24, 2021, https://www.energy.gov/fecm/articles/offshore-lng-technologies-facilities.
[403] Raimondi, "Natural Gas in Italy: Features and Perspectives in Light of Russia's War in Ukraine", p. 20.
[404] Boehm and Wilson, "EU Energy Security and the war in Ukraine: From sprint to marathon", p. 5.
[405] "Il Rigassificatore Di Piombino è Pronto," *Il Post*, April 29, 2023, https://www.ilpost.it/2023/04/29/rigassificatore-piombino-pronto/#:~:text=L'installazione%20di%20un%20rigassificatore,tre%20gi%C3%A0%20attivi%20in%20Italia.
[406] Victoria Zaretskaya, "Europe Was the Main Destination for U.S. LNG Exports in 2022," U.S. Energy Information Administration (EIA), March 22, 2023, https://www.eia.gov/todayinenergy/detail.php?id=55920.
[407] International Energy Agency , *Gas Market Report - Q4-2022*, October 2022, p. 14.

Figure 3.13: LNG capacity per Member State (billion m³, October 2022)



Source: IEA, 2023

As it will be analysed in the next paragraphs, the European Union and its Member States, besides procuring new LNG supplies, focused on diversification of their pipeline imports and on enhancing EU interconnectivity as well. For this reason, Italy and Algeria during 2022 and more recently in January 2023, signed Memoranda of Understanding in order to strengthen their cooperation on energy matters and increase gas imports through the already-in-place natural gas pipeline, the Transmed. Moreover, plans to increase imports from Libya are under development as well, with the signing of a long-term agreement between Italy's ENI and Libyan National Oil Corporation (NOC) in January 2023. In July 2022, the President of the European Commission Ursula von der Layen visited Azerbaijan and signed a Memorandum of Understanding, in order to secure increasing gas imports through the Southern Gas Corridor. Finally, on 27th September 2022, the Baltic Pipeline, connecting Norway to Poland, came on stream. It has a transmission capacity from Norway to Denmark and Poland of 10 bcm/year and from Poland to Denmark of 3 bcm/year[408]. This project has been included in the list of the EU Projects of Common Interest (PCIs) and financed through the financial instrument of Connecting Europe Facility (CEF)[409].

Finally, in order to enhance EU gas market resilience by enabling increasing amount of gas flows towards the European Union, during 2022 several interconnections

[408] *Ibidem*.
[409] See Chapter 2.

have been commissioned, in particular between Lithuania and Poland, Poland and Slovakia and Greece and Bulgaria. In December 2022, Greece, Romania, Hungary and Bulgaria agreed on strengthening the interconnection and transport capacity of their gas grids[410].

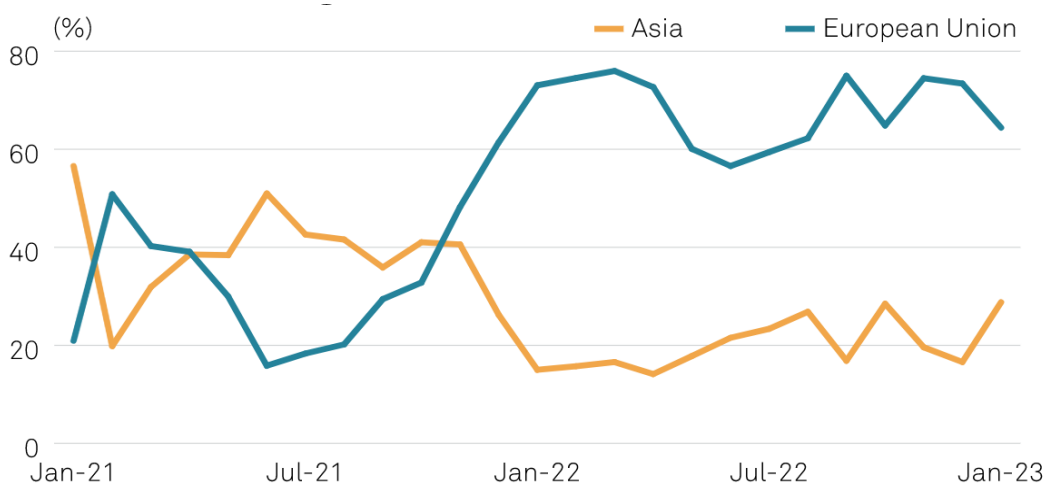
In the following paragraphs, it will be analysed the effort by the European Union and its Member States to secure new natural gas imports, focusing on the main suppliers.

3.3.2. United States and Qatar

United States, Qatar and Australia are the major global LNG exporters: while Australia only exported a very low percentage of LNG to Europe, the United States and Qatar contributed significantly to the security of energy supply of Europe. The United States in particular have the advantage of a lower freight cost in comparison to Australia (a half less) and Qatar (one third less)[411]. U.S. LNG exports to the European Union and the UK increased by 141% in comparison to 2021, equal to approximately 113 mcm/day and represented 64% of total U.S. exports: France, the United Kingdom, Spain and the Netherlands together accounted for 74% of it. This sharp increase of exports to Europe was led by higher European LNG demand and was made possible by the reduction of Asian LNG demand by 46% in comparison to 2021, with the most significant decline in China, which decreased its demand by 20%[412]. Figure 3.14 below illustrates this change.

[410] Angeliki Koutantou, "Greece, Bulgaria, Romania, Hungary Agree to Boost Gas Grid Interconnections," *Reuters*, December 1, 2022, https://www.reuters.com/business/energy/greece-bulgaria-romania-hungary-agree-boost-gas-grid-interconnections-2022-12-01/.
[411] Gavin Maguire, "Column: U.S. LNG Exports Both a Lifeline and a Drain for Europe in 2023," *Reuters*, December 21, 2022, https://www.reuters.com/business/energy/us-lng-exports-both-lifeline-drain-europe-2023-maguire-2022-12-20/.
[412] Victoria Zaretskaya, "Europe Was the Main Destination for U.S. LNG Exports in 2022," Homepage - U.S. Energy Information Administration (EIA), March 22, 2023, https://www.eia.gov/todayinenergy/detail.php?id=55920.

Figure 3.14: US LNG export cargoes by destination



Cargo percentage data for Asia includes China, Indonesia, Japan, SIngapore, South Korea, Taiwan and Thailand. EU includes member nations plus United Kingdom.

Source: S&P Global Commodity Insights, 2023)

On 25th March 2022, the United States and the European Union announced the establishment of an energy task force with the aim of reducing European dependency on Russian fossil fuels and agreed on the supply of 15 bcm of additional LNG from the U.S. to the EU. This target was more than doubled: in 2022, the U.S. exported to the European Union 53 bcm of LNG, up from 22 bcm in 2021[413]. On 4th April 2023, during the 10th EU-U.S. Energy Council, the United States committed in exporting "at least" 50 bcm to Europe in 2023[414].

The United States expect to increase their global LNG exports by 14% in 2023 in comparison to 2022, also thanks to the return into service of the Freeport LNG export terminal, after it was shut down due to a fire in June 2022[415], and to new LNG exports projects, namely Golden Pass LNG, Plaquemines LNG an Corpus Christi Stage III, which will increase U.S. LNG export capacity by around 160 mcm/day by the beginning of 2025[416].

[413] EU – U-S- Task Force on Energy Security, *Progress Report and Outlook 2022-2023*, April 2023.
[414] Federica Di Sario and Antonia Zimmerman, "US Pledges to Keep Pumping Natural Gas to Europe," *Politico*, April 4, 2023, https://www.politico.eu/article/us-supply-natural-gas-lng-eu-antony-blinken/.
[415] Victoria Zaretskaya, "Liquefied Natural Gas Will Continue to Lead Growth in U.S. Natural Gas Exports," U.S. Energy Information Administration (EIA), March 8, 2023, https://www.eia.gov/todayinenergy/detail.php?id=55741#:~:text=In%20our%20March%20STEO%2C%20we,Bcf%2Fd)%20next%20year.
[416] Victoria Zaretskaya and James Easton, "U.S. LNG Export Capacity to Grow as Three Additional Projects Begin Construction," U.S. Energy Information Administration (EIA), September 6, 2022, https://www.eia.gov/todayinenergy/detail.php?id=53719.

Qatar is the other major supplier of LNG to the European Union. On November 2022, Germany and Qatar agreed on the first long-term deal for LNG imports to the EU since the beginning of the war in Ukraine. They agreed for almost 3 bcm/year of LNG export to Germany for at least fifteen years, beginning from 2026. Supplies will come from the Qatari North Field East and North Field South projects, which enable the increase in Qatari LNG production from the current approximate 108 bcm/year to 177 bcm/year by 2027[417]. In fact, it is expected that, overall, its LNG production capacity will increase by more than 60%[418].

3.3.3. Norway: Europe's largest natural gas supplier in 2022

Norway was a key natural gas exporter to the European Union in 2022: while before the beginning of the war in Ukraine Norwegian gas represented 20% of total EU imports, in 2022 it met 25% of its gas demand, surpassing Russia as the largest supplier of natural gas to Europe[419].

In particular, it exported 120 bcm of natural gas to the European Union and the United Kingdom. 116.9 bcm were pipeline gas, through a system of twenty-two pipelines for a total of 8,800 kilometres. Norway owns a liquefaction terminal as well, the Hammerfest LNG terminal, which can deliver 6.5 bcm/year. However, due to a fire incident in September 2020, the LNG plant remained closed until May 2022: for this reason, in 2022 LNG exports amounted to 3.7 bcm[420]. Main importers of Norwegian gas were United Kingdom, France, Germany and Belgium and, as previously mentioned, in September 2022 the new Baltic Pipe, connecting Norway with Poland

[417] Shotaro Tani and Guy Chazan, "Qatar to Supply Germany with LNG as EU Seeks Secure Energy Options," *Financial Times*, November 29, 2022, https://www.ft.com/content/43f60031-c0cf-41f7-8a93-cf931006507a.
[418] Clifford Krauss, "Qatar Extends Its Natural Gas Dominance at Russia's Expense," *The New York Times*, December 9, 2022, https://www.nytimes.com/2022/12/09/business/energy-environment/qatar-gas-oil.html.
[419] Lisa Jucca, "Norway Gas Lifeline for Europe Is the Smart Move," *Reuters*, September 9, 2022, https://www.reuters.com/breakingviews/norway-gas-lifeline-europe-is-smart-move-2022-09-09/.
[420] Nora Buli and Nerijus Adomaitis, "Explainer: How Does Norway Export Its Natural Gas?," *Reuters*, March 17, 2023, https://www.reuters.com/business/energy/how-does-norway-export-its-natural-gas-2023-03-17/#:~:text=OSLO%2C%20March%2017%20(Reuters),such%20as%20Britain%20and%20German.

through Denmark, became operational. In particular, gas supplies to Germany rose by 11% in comparison to 2021 and to France by 4.7%[421].

On 23rd June 2022, the European Commission Executive Vice-President Frans Timmermans, Commissioner for Energy Kadri Simson and Norwegian Minister of Petroleun and Energy Terje Aasland signed an agreement for the strengthening of energy cooperation between the European Union and Norway, "underscoring the reliability of Norway as a safe and prudent supplier of oil and gas to Europe over the last 50 years"[422].

3.3.4. North Africa and Eastern Mediterranean

North Africa, due to its geographical proximity and its endowment with significant resources, specifically fossil fuels, became the natural target of diversification attempts after the sharp decline of Russian gas supplies. Algeria provided to the European Union 11.6% of total gas imports in 2022, totalling 22 bcm, up from 20 bcm in 2021, and since April 2022 surpassed Russia as the major gas supplier for Italy. In fact, in this same month, Italian company ENI and Algerian national oil company Sonatrach signed a new deal for the increase of gas flows through the Transmed pipeline under the long-term contract already in place. As illustrated in Chapter 1, the Transmed pipeline connects Algeria to Italy, transiting through Tunisia, and has a capacity of 34 bcm. The agreement consists in fully exploiting the spare capacity of the pipeline, around 13 bcm in 2021, and to gradually reach 9 bcm/year additional gas by 2023/2024[423]. On January 2023, the Italian Prime Minister Giorgia Meloni visited Algeria: during the visit ENI and Sonatrach signed two Memoranda of Interest, outlining future cooperation partnership between them in the areas of energy supply, energy transition and decarbonisation. The agreement was signed by Giorgia Meloni and Algerian President Abdelmadjid Tebboune as well. They agreed on the

[421] Nora Buli, "Norway Piped Gas Exports Rise 3.3% in 2022, Set Record for Germany," *Reuters*, January 23, 2023, https://www.reuters.com/business/energy/norway-piped-gas-exports-rise-33-2022-fall-just-shy-record-2023-01-23/#:~:text=OSLO%2C%20Jan%2023%20(Reuters),operator%20Gassco%20said%20on%20Monday.

[422] "Joint EU-Norway Statement on Strengthening Energy Cooperation," European Commission, June 23, 2022, https://ec-europa-eu.translate.goog/commission/presscorner/detail/en/statement_22_3975?_x_tr_sl=en&_x_tr_tl=it&_x_tr_hl=it&_x_tr_pto=sc&_x_tr_hist=true.

[423] Raimondi, "Natural Gas in Italy: Features and Perspectives in Light of Russia's War in Ukraine", p. 22.

increase of Algerian gas deliveries to Italy, reducing greenhouse gas and methane gas emissions, defining energy efficiency initiatives, the development of renewables, green hydrogen production, and carbon capture and storage projects[424].

However, notwithstanding the enhanced cooperation between Algeria and Italy and the increase in gas supplies, Algerian gas exports to Europe decreased by 6 bcm in 2022, totalling 44 bcm, due to a reduction in LNG exports to Europe and in gas pipeline to Spain. In late 2021, the GME line, connecting Algeria to Spain, was closed and the only other gas route, the Medgaz pipeline, increased its supplies just from 8 to 9 bcm. As a result, Spain registered a reduction in Algerian imports by 35% in 2022 in comparison to 2021. Moreover, LNG exports to Europe decreased as well, totalling just 13 bcm in 2022, down from the 17 bcm in 2021[425].

To remain a reliable gas supplier for Europe, Algeria needs to face two main issues: the depletion of its gas fields, even more considering the recent surge of domestic gas demand, and the environmental concerns for its gas production. In the first case, there have been some recent development and in June 2022 a new formation at the huge Hassi R'Mel field has been discovered. Nonetheless, it needs to attract new investments, by reforming its regulatory framework[426]. For what regards environmental concerns, Algeria has a high methane intensity of production and Hassi R'Mel basin is a global ethane hotspot[427]. For this reason, the European Union can not avoid to take into consideration this environmental aspect if it wants to be coherent with its climate commitments.

Libya, the other North African country which could play a significant role in the EU diversification strategy, has important gas reserves, representing the fifth African country with the largest gas reserves. Considering that its only LNG terminal, the Marsa el-Brega, is not operative since 2011, the only Libyan route for gas exports to Europe is the Greenstream pipeline with a capacity of 12 bcm/year which connects

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[424] "Eni e Sonatrach Firmano Accordi Strategici per Accelerare La Riduzione Delle Emissioni e Rafforzare La Sicurezza Energetica," *Eni.Com*, January 23, 2023, ENI, https://www.eni.com/it-IT/media/comunicati-stampa/2023/01/eni-sonatrac-firmano-accordi-strategici-riduzione-emissioni.html.

[425] Hassan Butt, "Algerian Gas Flows to Europe Shrink, but Italy Gains as Trade Ties Strengthen," S&P Global Commodity Insights, January 31, 2023, https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/013123-algerian-gas-flows-to-europe-shrink-but-italy-gains-as-trade-ties-strengthen.

[426] Raimondi, "Natural Gas in Italy: Features and Perspectives in Light of Russia's War in Ukraine", p. 25.

[427] *Ibidem.*

Libya to Italy. After the Arab Springs and the highly unstable political context in the country, natural gas flows have declined to 3.2 bcm in 2021. Libya has a great gas potential, in particular in its offshore fields[428]. On January 2023, ENI and Libyan National Oil Corporation (NOC) agreed on a $8 billion gas production deal in order to increase Libyan gas production for domestic needs and exports to Europe through Italy. The projects will guarantee an output of around 21 million cubic metres per day starting from 2026, through the development of two offshore gas fields. The project include the construction of a carbon capture and storage (CCUS) plant at Mellitah[429].

The Eastern Mediterranean region has a great potential for the diversification of the European gas supply. In particular, the European Union has mainly focused on two countries: Israel and Egypt. In April 2022, ENI agreed with Egypt for the supply of 3 bcm of Egyptian LNG to Europe and Italy in 2022. Then, in June 2022, the European Commission signed a trilateral Memorandum of Understanding (MoU) with Israel and Egypt for the supply of Israeli gas via Egyptian LNG export infrastructure to Europe. In fact, Egypt has two key LNG export facilities, the Idku facility, with a capacity of 10 bcm/year and operated by Shell, and the Damietta plant, with a capacity of around 7 bcm/year and operated by ENI[430]. The deal was the most cost-effective solution for increasing Israeli gas exports to Europe, thanks to the ongoing underutilisation of the two facilities. In the same area, another country has a great potential, even though it is not a gas producing country yet: Cyprus. In the last years, offshore gas fields have been discovered near its coast, but exploratory activities have been made difficult by the political situation of the island and the traditional rivalry in the region between Greece and Turkey[431].

[428] Ivi, p. 29.
[429] "Eni Avvia Un Importante Progetto Di Sviluppo Del Gas in Libia," *Eni.Com*, January 28, 2023, ENI, https://www.eni.com/it-IT/media/comunicati-stampa/2023/01/eni-avvia-un-importante-progetto-di-sviluppo-del-gas-in-libia.html.
[430] Stuart Elliott, "EC Inks Trilateral MOU for Supply of Israeli Gas to Europe via Egypt," S&P Global Commodity Insights, June 15, 2022, https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/061522-ec-inks-trilateral-mou-for-supply-of-israeli-gas-to-europe-via-egypt.
[431] Raimondi, "Natural Gas in Italy: Features and Perspectives in Light of Russia's War in Ukraine", p. 34.

3.3.5. Azerbaijan

On 18th July 2022, Commission President Ursula von der Leyen and President of Azerbaijan Ilham Aliyev signed a Memorandum of Understanding on a Strategic Partnership in the Field of Energy and undertook the commitment to double the capacity of the Southern Gas Corridor by 2027, in order to guarantee the supply of 20 bcm of natural gas per year. In 2022, Azerbaijan supplied around 11.3 bcm of natural gas to Europe, up from 8.2 bcm in 2021. President Aliyev declared that gas exports to Europe in 2023 are expected to reach a total of 11.6 bcm[432]. Even though the Southern Gas Corridor, which was finalised in 2020 with the entry into operation of its last section, the Trans-Adriatic Pipeline, connecting Turkey to Italy transiting through Greece and Bulgaria (see Chapter 1), is considered to be one of the most strategic opportunities to phase out from Russian gas, "politics are nearly in place, but project deliverability is not"[433].

In fact, analysts have argued that the target set by the MoU is far from being easily achievable: the main issues are the mismatch between the timing by which the European Union needs to receive the additional gas supplies and the timing required to increase the capacity of pipelines and to find new natural gas sources. In fact, the field from which natural gas flowing through the Southern Gas Corridor comes from, the Shah Deniz field, is almost at its full production capacity. Therefore, if Azerbaijan wants to export more natural gas, it needs to import it from elsewhere. In January 2022, Azerbaijan started to receive natural gas from Turkmenistan thanks to an Iran 1-2 bcm/year swap. Moreover, it received around 1 bcm between November 2022 and March 2023 from Russia[434].

Apart from the key issue of where to source additional natural gas in order to achieve the goal set by the MoU between the European Commission and the President of Azerbaijan of 20 bcm/year by 2027, another problem regards the infrastructure. In fact, the Southern Gas Corridor at this moment has not the capacity to increase its gas deliveries and, for this reason, investment will be necessary for compressors and

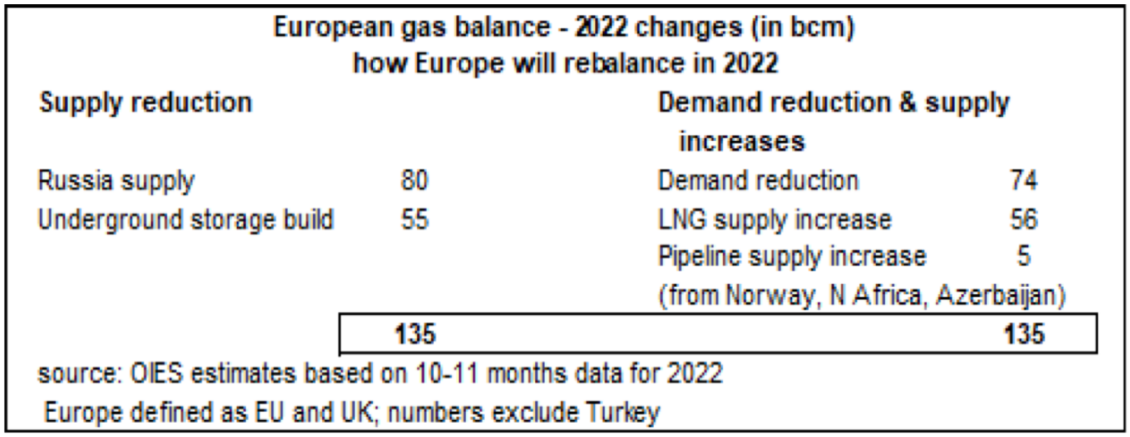
[432] Vladimir Soldatkin , "Azerbaijan Sees Gas Exports to Europe Edging up in 2023, Interfax Reports," *Reuters*, December 17, 2022, https://www.reuters.com/business/energy/azerbaijan-sees-gas-exports-europe-edging-up-2023-interfax-2022-12-17/.
[433] John Roberts and Julian Bowden, "Europe and the Caspian: The Gas Supply Conundrum," Atlantic Council, December 12, 2022, https://www.atlanticcouncil.org/blogs/energysource/europe-and-the-caspian-the-gas-supply-conundrum/, p. 1.
[434] Ivi, p. 4.

probably also parallel pipelining. Moreover, additional investment would be needed to increase production from potential offshore natural gas projects, adding 3 bcm/year to the total Azeri gas output[435].

Finally, new pipeline capacity will be needed in the Italian pipeline network, starting from the point the Azeri gas reaches the European Union. In fact, with the increasing imports from Algeria through Italy, there is not enough spare capacity for the envisaged additional gas coming through the Southern Gas Corridor. For this reason, in January 2023, Snam, the Italian gas grid operator, announced its investment plan for the period 2022-2026: 10 billion euros, 23% more than in the previous plan. 9 billion euros will go to the construction of the Adriatic Line, to be completed by 2027, in order to increase natural gas pipeline capacity from Southern to Northern Italy, included gas coming from the Trans-Adriatic Pipeline[436].

Figure 3.15 below illustrates schematically the overall changes in European gas balance in 2022 (including the European Union and the United Kingdom), highlighting supply reduction on the one hand and demand reduction and supply increases on the other.

Figure 3.15: European gas balance – 2022 changes (in bcm)



Source: Atlantic Council, 2022

[435] Ivi, p. 6.

[436] Francesca Landini, "Snam Bets on Italy's Role in Europe with Higher Gas Investments," *Reuters*, January 19, 2023, https://www.reuters.com/business/energy/snam-invest-10-bln-euros-2026-italys-gas-security-2023-01-19/#:~:text=Snam%2C%20whose%20efforts%20were%20vital,than%20in%20the%20previous%20plan.

3.3. Winter 2023/2024: new and old challenges

Winter 2022/2023, notwithstanding the concerns of the European Union and its Member States, was successfully faced and natural gas supplies were secured for the entirety of the cold season. As already analysed, it was the result of both of the several legislative packages adopted by the EU and enforced by individual countries, and exceptional conditions, such as warmer weather and reduced LNG demand in Asia, in particular from China, which registered a reduction in its demand by 20% in comparison to 2021 as a result of the Zero-Covid strategy. However, the European Union now needs to prepare for winter 2023/2024, by considering the two main variables: potential additional decrease of Russian gas supplies and competition for global LNG supplies.

On March 2023, the Council prolonged gas demand reduction target of 15% for another year, until March 2024. Bruegel, in a policy brief published in February 2023, estimated different percentages of gas reduction, in comparison with the average of demand of the previous five years, needed in order to successfully face winter 2023/2024 on the basis of potential additional decrease in Russian gas deliveries to the EU, based on the assumption that Member States must refill their gas storage by 1st November 2023 by 90%, as set by Regulation 2022/1032. In particular, if Russian pipeline gas will flow unaltered during 2023, through the still active transit routes of Ukraine and the Turkstream pipeline, Member States will have to reduce their gas demand by just 13%. Differently, in case of halt of gas supplies through Ukraine, the decrease needs to be of 17%. Finally, in case of complete cut off of Russian gas deliveries trough both routes, Member States will have to reduce their demand by 20%[437].

The key factor which enabled the European Union to diversify its gas supplies in 2022 has been LNG. The International Energy Agency estimates that global LNG supply will increase by 20 bcm in 2023, mostly due to the new LNG facilities (the Calcasieu Pass in the United States and the Coral South in Mozambique) and the return into operation of the Freeport LNG plant in the United States. However, this increase would not be enough in case of additional decrease in Russian gas supplies to Europe. Moreover, Chinese LNG demand is expected to rebound, as a result of economic

[437] McWilliams et al., "Preparing for the next winter: Europe's gas outlook for 2023", pp. 5-7.

growth and the end of the Zero-Covid strategy: Chinese LNG demand increase could cover up to 85% of global LNG supply increase, therefore reducing the amount available for Europe. Finally, European Union will likely increase its natural gas supplies to Ukraine and it is estimated that the country will need 5 bcm of gas during summer 2023 in order to guarantee gas storage levels of 14 bcm by the beginning of the winter season[438].

Considering the whole picture, the European Union and its Member States need to continue taking actions following the path laid down by the Commission in its REPowerEU plan of May 2022: increase of the share of renewable sources in the energy mix, gas demand reduction, by implementing energy efficiency measures, and diversification of gas suppliers, by focusing, in the short term, on LNG producers, which are able to guarantee rapidly additional gas supplies. On the infrastructural side, as mentioned in the previous paragraphs, the EU Member States acted promptly in order to both improve interconnectivity in the European gas market and increase LNG import capacity. They will prove crucial in case of significant additional reduction of Russian gas supply.

[438] International Energy Agency, *Never Too Early to Prepare for Next Winter: Europe's Gas Balance for 2023/2024*, pp. 8-9.

CONCLUSION

THE FUTURE OF THE EUROPEAN ENERGY POLICY ON NATURAL GAS

With the outbreak of the war in Ukraine, energy security has gained momentum. It is not a new concept at all, but for the first time Europe could not ignore the consequences of the strong dependency on energy imports, specifically on Russian fossil fuels. In the previous three Chapters, it has been analysed the development of the natural gas market in Europe, the energy policy regarding natural gas of the European Union and, finally, the impact of the Russian invasion of Ukraine on EU gas market and the subsequent reactions by the European Union and its Member States. The incoming winter 2023/2024 will pose challenges and Europe will have to face them jointly, as partially done during the previous months.

However, the present study would be incomplete if it did not include some final considerations on the future prospects for the natural gas market in Europe and, even more importantly, a reflection on which should be the next steps in the EU energy policy on natural gas matters. What the current energy crisis has made clear is that a proper energy policy with a long-term view has to take into consideration three fundamental aspects: energy security, environmental sustainability and energy equity, the latter meaning an affordable and universal access to energy. This is the so-called "energy trilemma", a concept that underlines the difficult challenge to guarantee the three factors at the same time.

As shown in Chapter 3, energy security in the last year became the main focus of the European Union energy policy, even though attention has been given to affordability and sustainability as well. During the last months, the EU had to face the serious issue of finding other natural gas sources, after the increasing reduction of Russian gas supply. It succeeded in ensuring a secure and without a significant gas shortage winter, thanks both to the adoption of several legislative packages and to exceptional and non-controllable factors, such as a warmer weather than usual and low LNG demand in Asia, particularly in China. However, natural gas prices reached unprecedented levels (343 €/MWh in late August 2022) and price volatility was significantly high, seriously undermining the energy purchasing power of customers

and industries. The European Union in this regard reached an agreement for a price cap mechanism in December 2022 and took important actions to avoid an excessive financial burden on final customers. Finally, environmental sustainability, and, therefore, clean energy transition, on the one hand, gained momentum during 2022, also because it is considered one of the most effective way of ensuring energy security, through the reduction of dependency on fossil fuels imports. However, on the other hand, investments on new natural gas projects have created concerns among analysts over their compatibility with the EU climate targets.

It has been argued that the European Union does not need to build new natural gas infrastructure to face the decreasing Russian supplies[439]. In fact, the main challenge is thought to come from the tightening of LNG global supply as a consequence of the rebound of LNG demand in Asia, as already discussed in Chapter 3. Therefore, critics have been moved towards the new investments in the European Union for new gas projects and the signing of new agreements, some of which are long-term and could be considered to be incompatible with climate targets set by the European Union for 2030 and with the binding carbon neutrality goal by 2050, as laid down by the EU Climate Law of 2021. On the other hand, however, security of gas supply needs to be guaranteed and, as it will be shown in the next paragraphs, even though the EU gas demand will decrease in the next years, the disruption of Russian natural gas deliveries left Europe in need of alternative gas contracts.

One way to deal with the energy trilemma might be to disentangle the monolithic concept of "energy policy" in two, or three, segments: short-term, medium-term and long-term measures. This separation allows policymakers to not having to consider environmental sustainability, energy security and energy equity all at once, but to focus on each of them at the proper time and with the proper perspectives for the future. This seems to be the case for the European Union strategy, at least formally: secure short-term and flexible natural gas contracts and, at the same time, accelerate clean transition in order to meet its climate goals by 2030 and 2050.

In the next paragraphs, it will be examined how the European Union should act on natural gas matters, specifically on diversification projects and interconnection capacity of the European gas markets, in order to compensate for the disruption of

[439] Julian Schwartzkpoff, "The Future Role of Gas in a Climate-Neutral Europe," *Heinrich-Boll-Stiftung European Union and Environmental Action Germany*, June 2022, 6–70, p. 22.

Russian gas supplies. In parallel, the analysis and the proposals will be constantly weighted against the EU climate targets.

4.1. New gas sources and decreasing natural gas demand

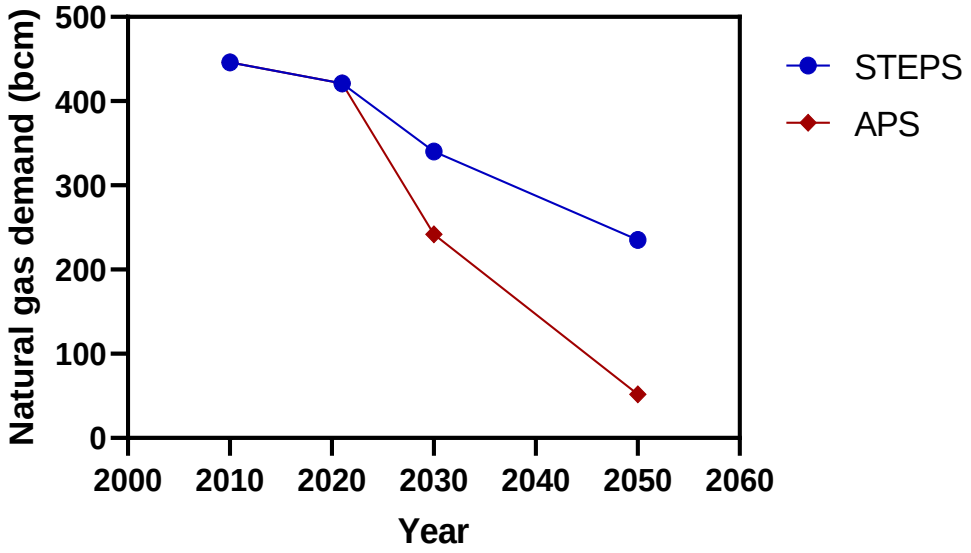
The key dilemma for the European Union in the current energy and geopolitical scenario is where to achieve additional natural gas supplies given the decreasing Russian deliveries, taking also into consideration the estimated decline of EU gas demand in the future decades. In fact, in order to secure additional gas imports from countries with which a pipeline connection already exists, such as Algeria and Azerbaijan, new long-term investments would be needed, as it will be explained. However, given the uncertainty over the trend of natural gas demand globally and specifically in Europe, investors doubts over whether to invest or not.

The International Energy Agency in its Would Energy Outlook 2022 has estimated the natural gas demand trend in the European Union based on three different scenarios. The scenarios are: the Stated Policies Scenario (STEPS), the Announced Pledges Scenario (APS) and the Net Zero Emissions by 2050 (NZE) Scenario. The first one shows the evolution of the energy system on the basis of the current policy setting, without taking into consideration climate goals and pledges declared by States, unless they are supported by concrete and detailed plans of how to achieve them. Secondly, the APS analyses the evolution of the energy system taking for granted that all the targets set by States are fully and timely achieved. Finally, the NZE illustrates a path (not the only possible one), through which the goal of zero emissions by 2050 in order to maintain the rise of global temperature in comparison to pre-industrial levels under 1.5°C can be achieved.

According to this report, natural gas demand in the European Union, regardless of the scenario, will decrease significantly over the next years. In particular, as Figure 4.1 below shows, according to STEPS, demand will go from 421 bcm/year in 2021 to 340 bcm/year in 2030, around 20% less. Differently, according to APS, natural gas demand in the EU in 2030 will be 242 bcm/year, around 60% less than in 2021, and 52 bcm/year in 2050. It means that by 2030, even if EU Member States do not implement measures adopted under the “Fit-for-55” package, natural gas demand will register a

decline of 20%. If, on the other hand, the European Union and its Member States comply with their climate and energy targets, the demand reduction will exceed 50%.

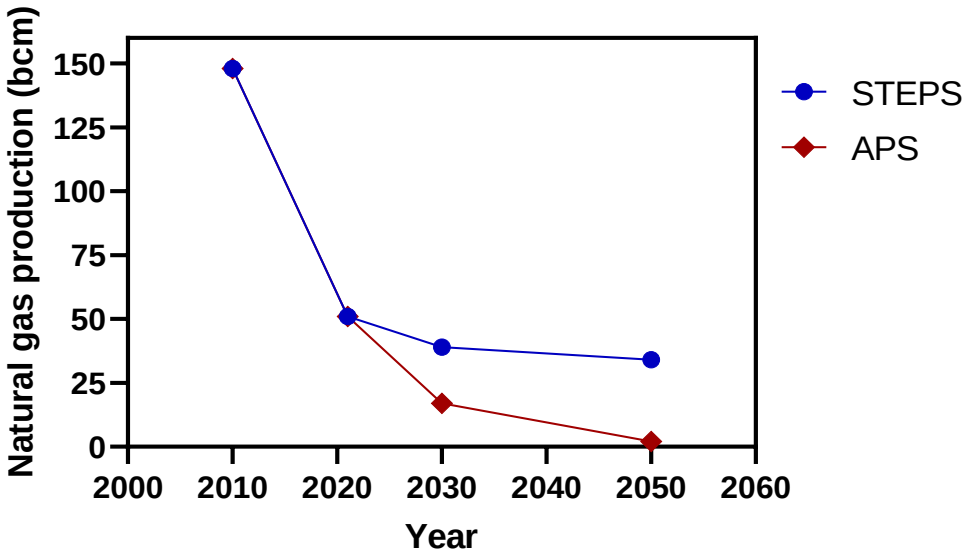
Figure 4.1: Natural gas demand in the European Union in STEPS and APS



Source: data from World Outlook 2022 by International Energy Agency, 2022

The World Outlook 2022 estimated a significant decline in natural gas production in the European Union as well, continuing a long-lasting trend. In fact, as already discussed in Chapter 1, domestic production went from meeting 36% of gas demand in 1980 to meeting only 15% of it in 2021. As it can be noted in Figure 4.2 below, the decline will continue both in STEPS and APS. In particular, in the Stated Policies Scenario, EU domestic production will decrease from 51 bcm/year in 2021 to 39 bcm/year in 2030 and to 34 bcm/year in 2050. Differently, in the Announced Pledges Scenario, it will decrease to 17 bcm in 2030 and to 2 bcm in 2050. It means that, by 2030, the production of natural gas in the European Union will register a decline of between 25% and 75%.

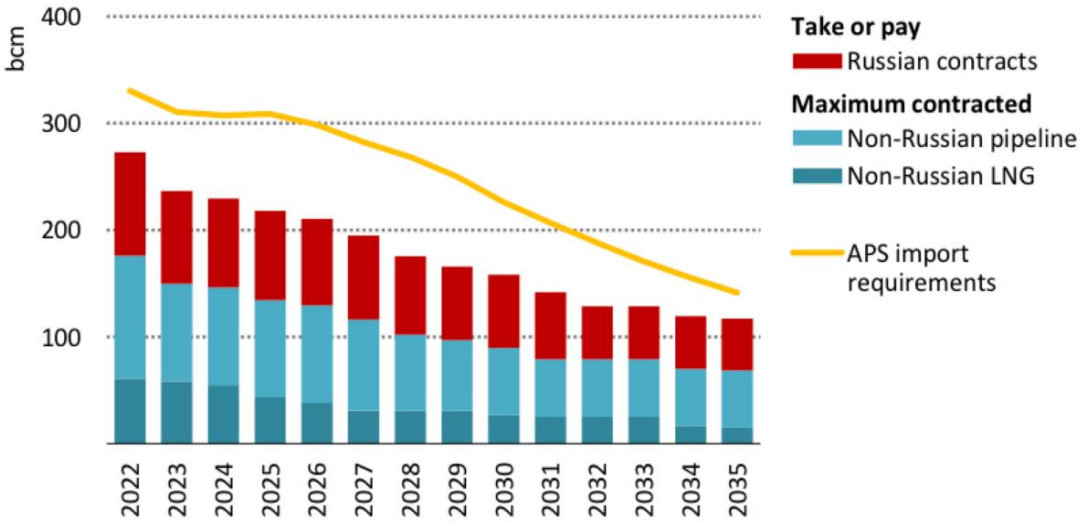
Figure 4.2: Natural gas production in the European Union in STEPS and APS



Source: data from World Outlook 2022 by International Energy Agency, 2022

Finally, Figure 4.3 below explains how, even on the most optimistic scenario between the two in terms of natural gas demand reduction, the European Union, as a consequence of the increasing decline of Russian gas deliveries following the war in Ukraine, will need more imported gas than what foreseen under the currently existing contracts with natural gas suppliers. In particular the chart compares the European Union natural gas contract balance to import requirements under the Announced Pledges Scenario (which foresees a greater decrease in gas demand than STEPS), assuming that Russia will continue to reduce its natural gas supplies to the EU.

Figure 4.3: European Union natural gas contract balance compared with import requirement in the APS, 2022- 2035



Source: IEA, 2022

Therefore, in APS the European Union import demand is envisaged to go from 370 bcm/year in 2021 to 230 bcm/year in 2030 and decrease to 140 bcm/year by 2035. However, besides the "Take-or-Pay" Russian contracts and the maximum contracted for Russian and non-Russian LNG, the EU will need a maximum of 170 bcm/year of additional natural gas by 2030 and 70 bcm/year by 2035[440].

In conclusion, given the need for new natural gas supplies in the short and medium term and the parallel decline of natural gas demand, the European Union faces the key choice between stability and flexibility, which determines the choice between more stable or more volatile prices as well. In the first case, the EU and its Member States could invest in and sponsor new gas projects, primarily for LNG trade or for already-in-place pipelines, by involving countries such as Azerbaijan and Algeria that have a great potential in terms of gas resources but their existing gas fields are depleting. However, uncertainty over the trend of gas demand in Europe is holding back long-term and capital intensive investments. New LNG contracts could be signed, such as the aforementioned 15-years contract between Qatar and Germany. These contracts allow for a stabilisation of prices but, on the other hand, rise doubts over the compliance with pressing climate targets in the European Union. On the other hand, Europe could acquire natural gas from the LNG cargoes on the sport market. While it has the absolute advantage of not requiring long-term and binding contracts, therefore avoiding the risk of having to import more natural gas than needed in the future, on the other hand, in order to attract those cargoes, the European Union would need to pay a premium in order to divert them from other markets, such as the Asian one. Around 50% of current LNG trade, equal to 250 bcm, is contractually flexible. Prices would be higher and more volatile[441].

The solution is not straightforward and one of the three sides of the aforementioned energy trilemma would be probably undermined. In theory, two alternative solutions could be proposed: the signing of ten-years contracts or the signing of twenty-years contracts for flexible volumes of natural gas, with the possibility to sell the gas no longer needed to the Asian markets. However, in the first case, the break-even gas price would need to be increased by 20% in order to recoup investments costs in a shorter period of time. In the second case, the deal would be feasible in the Stated

[440] International Energy Agency, *The World Energy Outlook 2022*, p. 391.
[441] *Ibidem.*

Policies Scenario only, according to which global LNG demand will continue to increase up to 2050. On the other hand, both in the Announced Pledges Scenario and in the Net Zero Scenario, global LNG demand reaches the peak before 2030[442].

The European Union could follow a multilateral approach: new agreements with "old" natural gas suppliers to bring the pipeline gas at its maximum capacity, where it is possible without the need to invest in long-term projects for the increasing of productive capacity, and sponsor the development of new flexible LNG trade projects with reliable suppliers. In fact, even though new LNG infrastructure is not necessary to meet the future EU gas demand, the European Union needs new LNG suppliers, especially considered the estimated rebound of Asian LNG demand in the next few years, as discussed in Chapter 3. The immediate question is what could be the future reliable natural gas trade partners for the European Union, in terms of both capacity and internal political stability.

In the previous Chapter, it has been analysed how the European Commission and some EU Member States have planned to replace Russian natural gas supplies with additional gas coming from, mainly, North Africa, Azerbaijan and Eastern Mediterranean. During 2022, there has been a significant increase of U.S. LNG imports as well, but, as already mentioned, the United States supplies only are not sufficient to meet EU gas demand. In particular, the Commission signed a Memorandum of Understanding with Azerbaijan in order to double gas deliveries through the Southern Gas Corridor from 10 bcm/year to 20 bcm/year by 2027. Secondly, Italian state-owned company ENI signed new deals with its Algerian and Libyan counterparts in order to increase natural gas imports through, respectively, the Transmed and Greenstream pipelines. These agreements have been already discussed in Chapter 3, but it is important to understand whether these countries are truly able to increase their production in order to export more natural gas to Europe in the near future.

Algeria and Libya have both significant gas reserves, having, respectively, the African second and fourth largest proven gas reserves. ENI agreements with Algeria Sonatrach and Libyan NOC could enable additional gas supplies to Italy (and then to the European Union) equivalent to 10 to 15 bcm of incremental annual volumes in the next three to five years[443]. However, in order to expand gas supply from the two North

[442] International Energy Agency, The World Energy Outlook 2022, p. 392.
[443] Mostefa Ouki, "Italy and Its North African Gas Interconnections: A Potential Mediterranean Gas 'Hub'?," *The Oxford Institute for Energy Studies*, March 2023, 1–6, p. 4.

African countries, new long-term international investments would be needed. In a context of projected decline of EU gas demand, uncertainty over the European natural gas system in the years is limiting these investments[444]. Moreover, Libya is still a highly politically unstable State and for the European Union it would be a hazard to increase its import dependency on that country. Finally, even though international long-term investments are realised and productive capacity is expanded in Libya and Algeria, their only natural gas buyers are European countries and therefore could not re-direct their exports to other markets when Europe will not need anymore their gas supplies.

Secondly, Azerbaijan signed a Memorandum of Understanding with the European Commission President Ursula von der Layen to double its gas deliveries to Europe through the Southern Gas Corridor. However, the Southern Gas Corridor, as already discussed, at this moment has not the capacity to increase its gas deliveries and, for this reason, new investment will be necessary. Additional investment would be needed to increase production from potential offshore natural gas projects as well, adding 3 bcm/year to the total Azeri gas output[445]. As already illustrated, long-term investments are difficult to put in place due to uncertainty over natural gas demand projection in Europe. Moreover, the gas field from which natural gas flowing through the pipeline comes from, the Shah Deniz field, is almost at its full production capacity. In January 2022, Azerbaijan started to receive natural gas from Turkmenistan thanks to an Iran 1-2 bcm/year swap. Moreover, it received around 1 bcm between November 2022 and March 2023 from Russia[446]. However, in order to guarantee the doubling of gas deliveries by 2027, Azerbaijan needs to find new gas sources. A potential solution could be Turkmenistan, but recent declarations from Turkmen authorities make negotiations difficult. In fact, even though, thanks to the Iran swap, Turkmen gas could already reach Azerbaijan and then, through the SGC, Europe and despite having enough capacity to cover the additional gas supply for the expansion of the SGC, there are two main obstacles: the capacity of the Iran pipeline limited to 3 bcm/year and the mismatch between the European and Turkmen aspirations. The first obstacle could be overcome with the Trans Caspian Connector project, which would be ready within a few months with an estimated cost of $400-600 million and would connect Turkmen and Azeri

[444] Ivi, p. 3.
[445] Roberts and Bowden, "Europe and the Caspian: The gas supply conundrum", p. 6.
[446] Ivi, p. 4.

offshore facilities with a 78 km long pipeline[447]. However, Turkmenistan wants a long-term project, a 30 bcm/year pipeline connecting Turkmenistan directly to Italy: it would require more than $20 billion and would not be ready before 2030, when the European Union will have significantly reduced its natural gas demand and overcome its security of gas supply challenge[448].

Finally, the Eastern Mediterranean region, in particular considering the latest developments in Cyprus, has a great potential and could provide the European Union with the additional LNG supplies that it needs to meet its, even if declining, natural gas demand. Egypt has been a natural gas exporter since mid-1990s and mainly sells LNG on the spot market. After a period of being a net importer of gas (2015-2019), following the important discovery by ENI of the Zohr gas field offshore Egypt in 2015, the largest discovery until now in the Mediterranean, Egypt became an important LNG exporter of the region again. Zohr field contributed to 40% of total Egyptian gas production in 2020[449]. The North African country owns two LNG terminals, the Idku and the Damietta plants. Conversely, natural gas production in Israel began only in 2004 and registered an important increase from 2013, reaching 19.4 bcm in 2021 (while Egypt produced 67.8 bcm in the same year). The country has a great offshore potential and discovered important gas fields during these last twenty years, such as the Tamar and the Leviathan gas fields. However, since it does not have any gas export infrastructure in order to supply Europe, since 2020 Israel exports natural gas to Egypt[450]. On this basis, as discussed in Chapter 3, in June 2022, the European Commission signed a trilateral memorandum of understanding (MoU) with Israel and Egypt for the supply of Israeli gas via Egyptian LNG export infrastructure to Europe.

Energy companies in the area are planning to increase production and significant discoveries have been made recently, as it shown by Figure 4.4 below. Finally, an important event occurred in October 2022, when Lebanon and Israel signed a maritime border and gas fields deal, which enables Israel gas production from the Karish maritime reservoir and potentially could increase natural gas production in the area. It has been described as an historic agreement by international analysts,

[447] Ivi, p. 7.
[448] *Ibidem*.
[449] Raimondi, "Natural Gas in Italy: Features and Perspectives in Light of Russia's War in Ukraine", p. 31.
[450] Ivi, pp. 33-32.

considering that the two neighbouring countries are officially at war since 1948, year of the creation of Israel[451].

Figure 4.4: Key Eastern Mediterranean Discoveries in 2022

Site	Estimated size, in billion cubic meters (bcm)	Operator	Country	Discovered
Athena	8 bcm	Energean	Israel	May
Cronos-1	70 bcm	Eni	Cyprus	August
Hermes	7-15 bcm	Energean	Israel	October
Zeus-1	13 bcm	Energean	Israel	October
Zeus-01	57-84 bcm	TotalEnergies	Cyprus	December
Narges-1X	99 bcm	Chevron	Egypt	December

Source: The Middle East Institute, 2023

Moreover, there is another country, Cyprus, which could bring additional natural gas supplies to the market. In fact, as previously mentioned, Cyprus has huge offshore gas potential, but it is not a producing country yet. The development of its gas system has been seriously undermined by the geopolitical tensions between Turkey and Greece, considering the *de facto* division of the island in the internationally recognised Republic of Cyprus and the Turkish Republic of Northern Cyprus, recognised only by Turkey. One of its most important gas fields, Aphrodite, is estimated to have gas reserves amounting to 127.4 bcm and in 2019 Glaucus-1 field was discovered with estimated reserves of 130 bcm[452].

For years, it has been discussed the possibility to build an Eastern Mediterranean pipeline (EastMed), which would connect the Levantin Basin, in the Eastern Mediterranean, to continental Greece via Cyprus and Crete. In 2013 the project was included in the Projects of Common Interest list (and in 2021 as well); however, to this date, due to, among other reasons, geopolitical tensions between Turkey and Greece and the dispute over Cyprus, the construction of EastMed has never started. In January 2022, the United States withdrew their support for the project due to its incompatibility

[451] Bethan McKernan, "Israel and Lebanon Reach 'Historic' Maritime Border and Gas Fields Deal," *The Guardian*, October 11, 2022, https://www.theguardian.com/world/2022/oct/11/israel-lebanon-historic-maritime-border-deal.

[452] "Gas Fields and Tensions in the Eastern Mediterranean," *Euractiv*, October 26, 2022, https://www.euractiv.com/section/energy-environment/news/gas-fields-and-tensions-in-the-eastern-mediterranean/.

with climate targets and tensions between the involved countries[453]. In fact, the construction of a pipeline requires a long period of time and is capital-intensive, two factors which, as previously explained, are not in line with the projected decline of the European gas demand[454].

On 15th May 2023, the Cypriot Minister of Energy, Commerce and Industry Giorgos Papanastasiou declared that Cyprus and Israel are negotiating for the construction of a pipeline that will bring the natural gas from both Israeli and Cypriot gas fields to the island where it will be liquified in a LNG plant, to be built as well. After the liquefaction, LNG will be exported to Europe by ship. The Minister presented it as a smaller version of the EastMed and stated that "When you have liquefied natural gas, it can go in any direction … Europe now needs it more, but markets can also be found in Asia"[455]. The project consists of a 320 km long pipeline and a LNG plant in Cyprus. According to the first estimates, the pipeline should cost around €450 million and be ready in 18 months, while the LNG facility should cost around €1 billion and be ready in two years and a half. The Minister declared that two major gas companies have already expressed their interest in the project and that a Cypriot delegation will go to Israel in mid-June 2023 to discuss the details of the project[456].

The natural gas potential of the Eastern Mediterranean, in particular considering the combined offshore natural gas of Egypt, Israel and Cyprus, could be an important element in the diversification efforts of the European Union, ensuring both significant amounts of gas supplies and great margins of flexibility, being this gas primarily sold at the spot market. Even though it is not a secondary matter that it would make the EU subject to price volatility and high prices, as discussed above, both the flexibility guaranteed by the LNG trade and the geographical proximity of the region could be significantly beneficial for the European Union natural gas policy.

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[453] Annalisa Perteghella, "Abbiamo Bisogno Del Gasdotto EastMed?," ECCO - Il think tank italiano per il clima, May 12, 2022, https://eccoclimate.org/it/abbiamo-bisogno-del-gasdotto-eastmed/.
[454] *Ibidem*.
[455] Menelaos Hadjicostis, "Cyprus, Israel Working on Deal for Natural Gas Pipeline, Processing Plant in Cyprus," *Associated Press*, May 15, 2023, https://apnews.com/article/cyprus-israel-natural-gas-pipeline-liquefaction-mediterranean-3d74bbc70e512e6aa1dba70aadb1c6e0.
[456] Menelaos Hadjicostis, "Minister: 2 Major Gas Companies Keen on Israel-Cyprus Plan for Pipeline, Gas Processing Facility," *Associated Press*, May 16, 2023, https://apnews.com/article/cyprus-israel-gas-pipeline-57176025a20c7d78a8c0ac9946a62b25.

4.2. Piano Mattei: Italy as the new gas hub for Europe?

Since the inaugural speech of the Italian Prime Minister Giorgia Meloni, the new Italian government has presented its project called "Piano Mattei". It has never been clearly delineated, but it consists in a renewed closer collaboration with African countries on a range of matters, first of all on energy. In fact, the government has expressed the aspiration for Italy to become a new energy hub for Europe, with a focus on natural gas. The idea of transforming Italy in a gas hub actually first took shape in the 1990s, with the entry into operation of Transmed and the construction of the Greenstream pipeline connecting Libya to Sicily. European natural gas demand was increasing and pushed Italy to sponsor several gas projects in the Mediterranean, including the Trans-Adriatic Pipeline. Another project was conceived but not completed, the Galsi ("Gasdotto Algeria Sardegna Italia") pipeline, that would have connected Algeria with Northern Italy via Sardinia. However, the shale gas revolution and the consequent increase of global LNG trade and the Arab springs, which left North Africa with extremely instable and fragile political systems, did not make possible for Italy to become a gas hub for Europe. Moreover, after the Arab springs, the European States began considering Russia as a more reliable gas supplier and intensified energy exchanges with Moscow[457].

With the outbreak of the war in Ukraine and the sharp decrease of Russian natural gas deliveries to Europe, the newly established Italian government saw the opportunity to exploit the Italian geographical position in the middle of the Mediterranean to make the country a gas hub, through the intensification of the relationship on natural gas with, in particular, Algeria, Libya and Azerbaijan. In fact, as mentioned in Chapter 3, in January 2023, ENI and a delegation of the government started negotiations with the North African countries in order to increase natural gas imports. Moreover, during the same month, Snam, the Italian gas grid operator, announced its investment plan for the period 2022-2026: 10 billion euros, 23% more than in the previous plan. 9 billion euros will go to the construction of the Adriatic Line, to be completed by 2027, in order to increase natural gas pipeline capacity from

[457] Arturo Varvelli, "Gassy Ambitions: The Obstacles to Italy's Planned Gas Hub for Europe," European Council on Foreign Relations (ecfr.eu), February 14, 2023, https://ecfr.eu/article/gassy-ambitions-the-obstacles-to-italys-planned-gas-hub-for-europe/.

Southern to Northern Italy, included gas coming from the Trans-Adriatic Pipeline[458]. Finally, the plan envisages the construction of two additional fixed import LNG plants in addition to the FSRUs (floating storage regassification units) in Ravenna and Piombino[459].

However, the feasibility of such a project is currently under debate. The main concern is the one already discussed: timing. In fact, the European Union needs new natural gas sources now in order to replace Russian gas supplies, while a significant increase in natural gas production in Algeria, Libya and Azerbaijan would require new investments and more time, making the gas hub project incompatible with the pace of natural gas demand reduction in the European Union and its climate targets.

During the visit of the Italian Prime Minister Meloni to Algeria, she and the Algerian President Abdelmadjid Tebboune announced an agreement for the construction of the Galsi pipeline, a project that had been already proposed in the past but never completed. It will be 248 km-long with a maximum water depth of 2,880 metres and will start from the Algerian port of Koudiet Draouche and arrive at Porto Botte in Sardinia. From there, natural gas will be transported to Olbia through an onshore pipeline. Then, a submarine pipeline will connect Olbia to Piombino, Tuscany, where it will be connected to the entire Italian network. Galsi pipeline is conceived with the aim of transporting natural gas and green hydrogen and electricity as well[460]. This is how the project of an energy hub for Europe should be compatible with European climate goals and decrease in natural gas demand: the pipeline, once there will be no longer need for natural gas, it will carry electricity and green hydrogen[461] to Europe through Italy. However, gas pipelines used for transporting also hydrogen allow for only a small amount of hydrogen to flow and analysts argue that it would be better to

[458] Francesca Landini, "Snam bets on Italy's role in Europe with higher gas investments".
[459] "Italy, a Renewable Energy Hub," ECCO - The Italian climate change think tank, February 1, 2023, https://eccoclimate.org/italy-a-renewable-energy-hub/.
[460] Annalisa Girard, "Energia, Meloni in Algeria: 'Italia Diventerà Hub Europeo, Realizzeremo Nuovo Gasdotto per l'idrogeno' Continua Su: Https://Www.Fanpage.It/Politica/Energia-Meloni-in-Algeria-Italia-Diventera-Hub-Europeo-Realizzeremo-Nuovo-Gasdotto-per-Lidrogeno/ Https://Www.Fanpage.It/," *Fanpage.It*, January 23, 2023, https://www.fanpage.it/politica/energia-meloni-in-algeria-italia-diventera-hub-europeo-realizzeremo-nuovo-gasdotto-per-lidrogeno/.
[461] Depending on the production methods, hydrogen can be labelled as "grey", "blue" or "green". Green hydrogen, which is produced using renwable electricity, is considered to be a strong instrument for reaching the decarbonization target by 2050. In particular, it could be used to decarbonize the so-called "hard-to-abate" sectors, such as heavy industry, shipping and aviation. Source: Abhinav Chugh and Emanuele Taibi, "What Is Green Hydrogen and Why Do We Need It? An Expert Explains," World Economic Forum, December 21, 2021, https://www.weforum.org/agenda/2021/12/what-is-green-hydrogen-expert-explains-benefits/.

build new infrastructure specifically dedicated to hydrogen[462], as in the case for the new H2MED project, agreed upon by France, Spain and Portugal, which is planned to transport 2 million tons of hydrogen per year[463].

4.3. Resilience and ecological transition: it is time to complete the Energy Union

Building an integrated European gas market has been one of the key drivers of the legislation on natural gas adopted by the European Union in the past decades. The European Commission, particularly under the Presidency of Jean-Claude Juncker, has explicitly pushed for the creation of an Energy Union. The consequences of the war in Ukraine on the EU gas system has shown that this goal is still far from being achieved. On the one hand, during 2022, the EU bodies and its Member States have successfully come together and decided collectively to reduce natural gas demand, to set ambitious targets for gas storage levels and to establish a cap price mechanism in order to avoid an excessive burden on consumers and industries, even though with some oppositions. The European Commission established an Energy Purchase Platform for the common purchase of gas, LNG and hydrogen and at its core it has been set up the AggregateEU mechanism, which enables, on a voluntary basis, companies to register their gas purchase needs in order to prepare for a joint purchasing of gas at the European Union level. Diversification efforts by Member States and the Commission are bringing to the European Union natural gas from new and, hopefully, more reliable sources. Therefore, the role of the European Union in coordinating the response to the gas crisis have been a success; however, there are some criticalities that have been highlighted in these Chapters and that the European Union should address in order to build a stronger and more resilient Energy Union: infrastructural constraints and uncoordinated path towards the clean energy transition.

[462] Varvelli, "Gassy ambitions: The obstacles to Italy's planned gas hub for Europe", p. 3.
[463] Alice Tidey, "Hydrogen Pipeline between Spain and France to Be Complete by 2030 and Cost €2.5 Billion," *Euronews*, December 9, 2022, https://www.euronews.com/my-europe/2022/12/09/hydrogen-pipeline-between-spain-and-france-to-be-complete-by-2030-and-cost-25-billion.

4.3.1. Solving infrastructure bottlenecks

The sharp reduction of natural gas from Russia to the European Union since the beginning of the war in Ukraine has clearly shown the importance of having a truly interconnected gas system, able to divert natural gas to the most vulnerable regions in situations of emergency. In Chapter 3, when analysing the effectiveness of the EU solidarity mechanism, it has been highlighted that, while the most vulnerable countries to Russian supplies disruption are Eastern and Central European Member States, the European natural gas network does not allow for significant west-east flows, as it has been conceived for east-west flows. As a consequence, these countries can not rely completely on Western European Member States' support and need to count on each other for the sharing of their gas, when possible. Moreover, difficult relationships between Spain and France led to Spain becoming a so-called "energy island", given that, even though the Iberian country has the highest LNG import capacity of the Union, around 60 bcm/year, it has a pipeline connection capacity with France of only 7 bcm/year. In November 2022, one of the two pipelines connecting Spain and France, the Irun pipeline, began operating at an expanded capacity of 66%, equal to additional 1.5 bcm[464].

A financing system for building a more integrated and interconnected system is already in place under the TEN-E Regulation (see Chapter 2) and during 2022 several interconnections have been commissioned, in particular between Lithuania and Poland, Poland and Slovakia and Greece and Bulgaria. In December 2022, Greece, Romania, Hungary and Bulgaria agreed on strengthening the interconnection and transport capacity of their gas grids[465]. The European Union should continue and increase interconnection projects and, as suggested by the International Monetary Fund in July 2022, solve the infrastructure bottlenecks. Short-term measure which could effectively improve the security of gas supply would enable reverse flows from West to East and to harmonise gas quality among EU Member States[466]. In fact, natural gas comes in different forms and presents distinct qualities, depending on its origin and each Member

[464] Alyssa McMurtry, "Spain and France Boost Capacity of Irun Gas Pipeline by 66%," Anadolu Ajansi, November 1, 2022, https://www.aa.com.tr/en/europe/spain-and-france-boost-capacity-of-irun-gas-pipeline-by-66-/2726624.
[465] Koutantou, "Greece, Bulgaria, Romania, Hungary agree to boost gas grids interconnections".
[466] Gabriele Di Bella et al., "Natural Gas in Europe: The Potential Impact of Disruptions to Supply," *IMF Working Papers* 2022, no. 145 (July 2022): 1–47, pp. 29-30.

State has its own quality standard. This difference among States poses the risk of natural gas coming from another Member State being rejected by the transmission system operators due to not being compliant with the standards in the receiving State. The European Union, through the adoption of a regulatory framework, should work on the harmonisation of these standards.

4.3.2. An Energy Agency for the clean energy transition

Energy policy in the European Union is a shared competence between the Union and its Member States. Under article 194 TFEU, the European Parliament and the Council have the role to establish the necessary measures to guarantee the right functioning of the energy market, to ensure security of energy supply, to promote energy efficiency, energy saving and the development of renewable sources and to enhance the interconnection of the EU energy networks. However, the Article leaves a large margin of discretion to Member States, namely the right to decide the composition of their energy mix and the specific measures to adopt in order to pursue the aforementioned objectives.

However, the freedom enjoyed by Member States in energy matters could undermine the achievement of climate goals set by the European Union, if an independent coordination body is not established. Simone Tagliapietra, Professor of Energy, Climate and Environmental Policy at the Catholic University of Milan and at the John Hopkins University, and other energy and climate economists have suggested the creation of an independent body, a European Energy Agency, mirroring the European Environment Agency, with the mandate to "deliver knowledge and data to support Europe's environment and climate goals"[467]. However, the Agency could work as a coordinating body between the distinct energy policies of Member States as well. It could analyse their energy policies in the context of climate targets in order to have a thorough picture of all energy policies combined and establish a dialogue with each Member State. The dialogues would aim at providing governments with a more complete view on the European energy policy context and at suggesting the best

[467] Simone Tagliapietra et al., "Green Transition: Create a European Energy Agency," *Bruegel*, April 26, 2023, https://www.bruegel.org/first-glance/green-transition-create-european-energy-agency.

pathway towards carbon neutrality based on the actions taken by other Member States. The Agency could be an instrument for the promotion of a true European Energy Union.

4.4. Final remarks

Natural gas has been, and still is, an important fuel for Europe and enabled European States to reduce their dependency on oil after the two oil shocks of 1973 and 1979. Since then, the share of natural gas in the European energy mix has steadily increased and began being considered as a "bridge fuel" for the clean energy transition. In fact, even though it is a fossil fuel, natural gas is less polluting than both coal and oil. However, with the increasingly ambitious climate goals set at the European Union level, Member States need to replace the use of natural gas with renewable sources of energy, in order to achieve the important target of net zero emissions by 2050 and keep the rise of global temperature under the threshold of 1.5°C above pre-industrial levels.

The factor which most impacted on the development of the natural gas market in the European Union has been the scarcity of gas reserves in its territory. High import dependency characterises the EU natural gas system and historically Member States have relied on a small number of suppliers, particularly on the Soviet Union first and on the Russian Federation after. The European Commission since the 1980s called upon States to diversify their gas sources, but geopolitical and economic reasons did not allow for it, as well as due to the intrinsic characteristics of natural gas. Already with the gas crises of 2006, 2009 and 2014, the European Union could witness the frailty of its gas system and the vulnerability of the Member States highly reliant on Russian gas imports. The outbreak of the war in Ukraine and its consequences threatened the security of supply of the European Union. It used to import around 40% of its natural gas from Russia and in the aftermath of the invasion of Ukraine supplies from Moscow began declining, forcing the EU and its Member States to find new gas suppliers and to reduce their gas demand.

The measures adopted during 2022 by the European Union and its diversification efforts, combined with an exceptional warm weather and low LNG demand in Asia, guaranteed the security of gas supply during winter 2022/2023. However, the EU has to address new challenges in order to successfully face winter 2023/2024. The next few years, with a steady decline in natural gas demand in the

European Union coupled with the need to secure new gas supplies, will require a strong coordination between Member States and attention over where to address investments. While, on the one hand, long-term contracts are not compatible with the prospected European gas scenario and climate targets, on the other prices at the global LNG market are highly volatile and could impose an excessive burden on consumers and industries. A more integrated gas market and the completion of an Energy Union will enable the European Union to better address the three sides of the energy trilemma: energy security, environmental sustainability and energy equity.

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SUMMARY

Energy has always been a crucial element in human development and the power to ensure energy supply to the territory under their jurisdiction became a key priority for all States. Natural gas gained an important role in the global energy system, in particular after the oil shocks of 1973 and 1979, when European States aimed at reducing their dependency on oil from the Middle East. Natural gas, as the other fossil fuels, is not homogeneously distributed throughout the world. Europe, in particular, is not well endowed with this important source and, soon after the birth of a European gas market, it became dependent on a small number of suppliers, first of all the Soviet Union. The goal of this thesis is to discuss the role of natural gas in the European energy policy and its future prospects, taking into consideration the impact of the war in Ukraine on the European energy system and the climate targets which the European Union is bound to. To this aim, the evolution of the European natural gas market will be analysed, from the beginning to the present days, with a view on both the European Union legislation and the international relations of its Member States, in order to understand what was the natural gas context in Europe at the time of the Russian invasion of Ukraine in February 2022 and how vulnerable the whole system was.

One of the factors which most influenced the direction of the development of the European natural gas market during the last 70 years was the lack of significant gas reserves. Most of them are located in Norway, the Netherlands, the United Kingdom, Romania, Germany, Italy, Denmark and Poland (from the largest to the smallest producer). In Europe, the natural gas era only began at the end of and after the Second World War, with the discovery of the first gas fields in Italy, the Netherlands, especially Groningen, and the North Sea. Since then, the European gas market has developed steadily and the share of natural gas consumption in relation to other energy sources has increasingly grown, in parallel with the discovery of important new gas fields in the Soviet Union.

Austria was the first country of the European Community to import Soviet gas thanks to a three-year contract signed with the Soviet authorities in 1968. Immediately after, Italy and Germany signed agreements with the Soviet Union to import natural gas in exchange for machinery and high-quality industrial goods. The 1970s marked a turning point for the development of the European gas market: oil shocks prompted

European countries to choose natural gas as the preferred fuel, both because of rising oil prices and to reduce dependence on oil from the Middle East. In the 1970s and 1980s, the Soviet Union had a twin-track approach to natural gas export: in the case of the European countries under their influence, the Soviet authorities sold natural gas at lower prices and by barter exchanges, while exports to Western European countries were negotiated with higher prices, indexed at the oil ones. Moreover, exchanges with the West, facilitated by the period of détente of the 1970s, involved also the exchange of technologies and equipment necessary for the development of the industry sector in the Soviet Union.

In the early 1970s, in an attempt to diversify Italy's energy mix, the Italian state-owned energy company ENI, in parallel to the agreements with the Soviet Union and the Netherlands and the new imports of Libyan liquefied natural gas (LNG), started negotiations with Algeria to import natural gas. The agreement between Italy and Algeria was finally reached in 1977 and the construction of the Transmed pipeline began in 1978, ending in 1983. Unlike Italy, in Spain, despite proposals to build two gas pipelines from Algeria, the Spanish company Enagas decided to import LNG and not pipeline gas. Nevertheless, in 1996, a gas pipeline was built, called Gaz Maghreb Europe, which transits under the Strait of Gibraltar and brings Algerian gas to Spain and Portugal via Morocco.

The development of the relationship on natural gas between Western Europe and the Soviet Union can be better understood by studying the development of the four main gas pipeline systems, which resulted in a complex network of gas import-export. The Brotherhood gas pipeline system, which consisted in several pipelines running through Ukraine to Czechoslovakia, developed in several stages between the 1960s and 1980s. In 1968, the agreement between the Austrian OMV and the Soviet Union brought Brotherhood to Western Europe. The second system is Northern Lights, built during the 1970s, which brought Russian gas to the West going through Belarus, after the total depletion of Ukrainian reserves. After the collapse of the Soviet Union and the formation of, among others, the new Ukrainian state, Russia developed natural gas export projects to Europe that did not involve Ukraine as a transit country, particularly after the two gas crises of 1993 and 1994. During these crises, Russia temporarily interrupted gas supplies flowing through the transit country due to Ukraine's non-payment of debts. Consequently, Russia decided to build the third pipeline system, the Yamal-Europe, developed in several stages between 1994 and 2006, which brought

Russian gas to Germany via Belarus and Poland, avoiding the transit through Ukraine. Finally, the fourth, the Nord Stream gas pipeline, called Nord Stream 1, was built between 2005 and 2012 and connects Russia directly to Germany via the Baltic Sea. In 2015, Gazprom announced plans to build the Nord Stream 2, which was completed at the end of 2021, but never came into operation. Nord Stream 1 and 2 are the first to avoid any transit country and to directly connect Russia to Germany via the Baltic Sea. In 2006, the construction of the South Stream pipeline was announced, which would have transported Russian gas to South-Eastern European countries. However, as a result of growing tensions between Russia and the European Union, in particular with the gas crises of 2006, 2009 and 2014, the project was finally cancelled in 2014.

In a few years, the change in the structure of gas exports to Europe became evident, showing an increasing share of Soviet gas, and the high degree of dependency on a small number of sources was already becoming a concern, especially within the European Community. In fact, in 1981, the Commission issued a Communication in which it highlighted how the diversity of countries from which the Community imported natural gas was very small. Algeria, Norway and the USSR accounted for 97% of the European Community imports in 1980.

Finally, Turkey is another important transit country for European natural gas imports. In 2020, the Trans Adriatic Pipeline (TAP), the final section of the Southern Gas Corridor, was inaugurated, bringing natural gas from Azerbaijan to Europe. The Southern Gas Corridor is composed of three parts: the South Caucasus Pipeline (SCP), bringing the Azeri gas from the Caspian coast to the border with Turkey; then the Trans Anatolian Natural Gas Pipeline, the longest of the three, connects the SCP to the TAP, which begins at the Greek border; then the Trans Adriatic Pipeline, which from the Turkish-Greek borders transits through Greece, Albania and the Adriatic Sea, finally reaches the Italian coast. The aim of this project was for the European Union to diversify away from Russian gas. Moreover, Turkey is connected to Russian through the Turkstream pipeline, which then connects Turkey to Europe via Bulgaria. The European countries receiving gas from Turkstream are Greece, Serbia, Romania, Bosnia-Herzegovina, North Macedonia and Hungary.

Natural gas production in Europe has decreased over time: between 2011 and 2021, it declined by 3%. Natural gas consumption remained relatively stable, decreasing by only 0.2% over the same period. The result of the stabilisation of consumption and the parallel decrease in natural gas production over the last ten years

has been an increasing dependence on imports. In particular, the EU's import dependency in 2020 was 84%. In the first half of 2021, the main exporters of natural gas to the EU were Russia (46.8%), Norway (20.5%), Algeria (11.6%) and the two LNG suppliers, the United States (6.3%) and Qatar (4.3%).

Liquefied natural gas has the strategic advantage, compared to pipeline gas, of being more flexible in terms of destination, allowing for greater diversification of supplies. For this reason, especially in recent years, LNG has become increasingly important in the global gas trade. In 2020, in the European Union, the share of LNG imports on total natural gas imports was 15%. The share of U.S. LNG imports increased steadily, reaching 44% of total EU LNG imports in January 2022. Regassification capacity in Europe has grown significantly over the past 20 years, reaching around 170 bcm in 2020 compared to only 20 bcm in 2000. However, it is highly concentrated geographically in a limited number of European countries, namely Spain, Italy, France, the Netherlands and the UK.

The 2000s saw a change in natural gas trading contracts. They went from being predominantly long-term (20-25 years) to being partially replaced by spot (short-term) transactions. The increase in short-term contracts and spot market transactions in Europe occurred in the period after the financial crisis of 2009-2010. During winter 2021/2022, Europe experienced a deep energy crisis and gas prices reached an unprecedented level of 180 €/MWh on 21st December 2021. The crisis could be explained by a combination of factors: low gas production, high demand and low storage levels, which led to a dramatic increase in gas prices.

Given the importance of energy in the European market, over the past two decades the EU has sought to gradually establish an Energy Union, with the aim of creating a single European energy market, not based on the decisions of the single national governments. The vectors of these reforms were outlined in the Green Paper published by the European Commission in 2006, entitled: "A European Strategy for Sustainable, Competitive and Secure Energy", which highlights the three main areas of the European energy policy: Sustainability, Competitiveness and Energy Security.

The process of liberalisation of the natural gas market in the European Union began with the adoption of Directive 98/30/EC concerning common rules for the internal market in natural gas. The Directive, issued on 22nd June 1998, covered the internal gas market, in particular transmission, distribution, supply and storage. The ultimate goal was the creation of a single European gas market, based on the principles

of equal treatment and non-discriminatory access for all system users. The Directive established common principles which Member States must comply with, but left them free to choose between different options depending on the national context. Two of these common principles were the elimination of all forms of monopoly in the production, import, transport and distribution sectors and the third-party access. However, despite the definition of common minimum standards, the European energy landscape continued to be very heterogeneous: while some countries decided to make drastic changes in their energy sectors, others introduced reforms more gradually, taking advantage of the degree of autonomy granted by the Directive.

Directive 2003/55/EC, adopted on 26th June 2003, repealed Directive 98/30/EC. The Directive obliged Member States to designate one or more system operators among natural gas undertakings which own transmission, storage, LNG or distribution facilities. It also stipulated that third-party access to the transmission and distribution system and LNG facilities must be regulated so as to avoid discrimination between system users by using public tariffs, applied to all eligible customers. The Directive stipulated that Member States must designate one or more competent bodies as regulatory authorities. They must be totally independent of the interests of the gas industry and their functions are to ensure the effective application of the principles of non-discrimination, effective competition and efficient market functioning. However, despite this new Directive, the problems that arose with the previous one did not disappear and, although resistance to the opening of national markets was weaker this time, the benefits for consumers did not appear immediately.

On 13th July 2009, the European Parliament and the European Council adopted the so-called Third Energy Package, which entered into force on 3rd September 2009. It consists of two directives and three regulations: Electricity Directive (2009/72/EC), Gas Directive (2009/73/EC), Regulation Establishing an Agency for the Cooperation of Energy Regulators (EC) No 713/2009, Electricity Regulation (EC) No 714/2009 and Natural Gas Transmission Networks Regulation (EC) No 715/2009. The Package mainly covers the following five areas: unbundling, strengthening the powers of independent regulators, establishing the Agency for the Cooperation of Energy Regulators (ACER), creating the European Network of Transmission System Operators (ENTSO) and European grid codes for interconnections and cross-border cooperation, and open and fair retail markets. Directive 2009/73/EC was adopted on the basis of the recognition that the principles of non-discrimination and free access to gas networks

and sales had not been achieved and that an equally effective level of regulatory supervision in each Member State did not yet exist. At the same time, it also recognised that the rules on unbundling under Directive 2003/55/EC were not effective in avoiding discrimination and abuse by system operators. Therefore, it established the rule of ownership unbundling, which implies the appointment of the network owner as the system operator and its independence from any supply and production interest and guarantees security of supply. As an alternative to ownership unbundling, Member States may opt for the independent system operator (ISO) or the transmission system operator (TSO). Finally, Regulation (EC) 715/2009 established the European Network of Transmission System Operators for Gas (ENTSO-G) to strengthen coordination between national network operators.

In 2012, the European Commission opened an investigation into Gazprom's activities. In particular, it suspected a violation of EU competition rules by Gazprom, which allegedly abused its power as a dominant gas supplier in eight EU Member States in Central and Eastern Europe, where it held a market share of between 50% and 100%. Finally, on 24th May 2018, the European Commission adopted a decision imposing legally binding measures on Gazprom to enable the free flow of gas at competitive prices.

On 17th April 2019, the European Parliament and the Council adopted Directive (EU) 2019/692 amending Directive 2009/73/EC. The Directive aims at the completion of the European internal market for natural gas. With this Directive the rules laid down in Directive 2009/73 also became applicable to transmission lines connecting the European Union to third countries. As a consequence, on 26th July 2019, the Nord Stream 2 company asked the Court of Justice of the EU to annul the amendments to the 2009 Gas Directive for alleged violation of the fundamental EU legal principles of equal treatment and proportionality. However, on 20th May 2020, the General Court declared the application inadmissible, as it found that the applicant was not directly affected by Directive (EU) 2019/692.

On 15th December 2021, the Commission adopted a set of legislative proposals to amend Directives 2009/73 and 715/2009 of the Third Package, in order to create the conditions for the decarbonisation of the EU gas market and promote the shift from fossil natural gas to renewable and low-carbon gases, in particular biomethane and hydrogen. The proposals are part of the EU's actions to mitigate climate change.

Sustainability is the second of the three pillars of the EU energy policy. Indeed, the European Union is now considered to be at the forefront of the fight against climate change, both at European and international level. Moreover, climate targets and environmental commitments in EU legislation influenced the actions of the EU and its Member States in the natural gas sector after the Russian invasion of Ukraine in February 2022. The EU ratified both the Kyoto Protocol and the Paris Agreement, to which it is legally bound. In 2009, EU Member States agreed to adopt the so-called "20-20-20 by 2020", which set specific targets to be achieved by 2020, and in 2011 they agreed on a Roadmap to 2050. In 2014, the European Council decided to set a triple target for 2030: a 40% reduction in greenhouse gas emissions, a 32% increase in renewable energy sources and a 32.5% increase in energy efficiency. The 2015 Paris Agreement led to increased EU climate ambitions and new climate policies. In 2019, the European Commission adopted the Green Deal, which sets a target to reduce emissions by 55% by 2030 and to zero emissions by 2050. Following the adoption of this document, on 14th July 2021 the European Commission adopted the "Fit-for-55" package, containing a series of proposals to achieve the targets set by the Green Deal. Based on the European Green Deal project, the European Commission in 2020 proposed the European Climate Law, which was then adopted on 30th June 2021. It made the Net-Zero target by 2050 and the intermediate target of a reduction by 55% of GHG emissions by 2030 in the European Union legally binding.

The third pillar of European energy policy on natural gas is security of supply. The European Union became more aware of the vulnerability of its energy system after the gas crises of 2006 and 2009, which consisted in a temporary interruption of Russian gas supplies to Europe causing significant damages. The European Commission called them a "wake-up call" for the need to build a common European energy policy. The gas crises of 2006, 2009 and 2014 demonstrated Russia's unreliability as a supplier of natural gas.

One of the main ways to reduce dependence on a small number of energy producers is diversification. The two main attempts of the European Commission to diversify away from Russian natural gas in the last twenty years were the Southern Gas Corridor, which brought Azeri gas to Europe, and the Nabucco pipeline, which eventually failed. However, the security of gas supply in the European Union has been addressed through regulations and directives as well, providing for a legal framework for Member States to comply with. On October 2010, the European Parliament and the

Council adopted Regulation (EU) 994/2010, which established a legal framework for security of gas supply, which must be a shared responsibility of the natural gas companies, the Member States and the European Commission. It emphasises the importance of having adequate and diversified gas infrastructures. In addition, it promotes solidarity and cooperation between Member States. It also imposes the respect of the infrastructure and supply standards. The infrastructure standard requires that the supply of natural gas is guaranteed even in the event of a disruption of the largest infrastructure on a day of exceptionally high demand, while the supply standard requires gas companies to guarantee the supply of gas to protected customers even in the most extreme cases. In addition, the Competent Authority of each Member State must establish a Preventive Action Plan. This Plan must contain the measures necessary to eliminate or mitigate the risks identified in the risk assessment. Moreover, the Competent Authority must establish an Emergency Plan with the necessary measures to eliminate or mitigate the consequences of a major gas supply disruption. The Emergency Plan must be structured on three crisis levels: early warning, alert and emergency.

In October 2017, Regulation (EU) 2017/1938 was adopted, repealing Regulation 994/2010. Many tools and definitions from the previous Regulation have remained unchanged, such as the three crisis levels, the infrastructure and supply standard, risk assessments, and Prevention and Emergency Plans, although the document has been ordered in a more logical structure. One of the two main innovations of the Regulation is the identification of risk groups for gas supply among Member States, based on the following criteria: gas supply routes, risks of supplier countries and cohesion of gas trading capacities. The Regulation also includes as a novelty a solidarity mechanism, whereby if a Member State requests the application of the solidarity measure, a Member State directly connected to the requesting one shall take appropriate measures to ensure that the supply of gas to protected customers in the requesting Member State is met by curtailing the supply of gas to customers other than protected customers on its territory, for as long as necessary.

Security of gas supply, as expressed in the two previous regulations, cannot be pursued without the development of EU-wide infrastructure networks that aims to diversify supply routes and interconnect Member States. In this way, in the event of a natural gas supply disruption from a single supplier, as happened with Russia in 2006, 2009 and 2014 and as a consequence of the invasion of Ukraine in February 2022, the

most affected countries can rely on a developed gas infrastructure and the solidarity mechanisms provided by Regulation 2017/1938. To this aim, Regulation 247/2013, establishing the Trans-European Networks for Energy (TEN-E) framework, aimed at the timely development and interoperability of trans-European energy infrastructure corridors and priority areas, was adopted in 2013. More concretely, the Regulation establishes the criteria for the identification of projects of common interest (PCI) and their financing. A PCI is a project necessary for the implementation of corridors and priority areas of the energy infrastructure, which has an impact at EU level, contributing to the development of the internal energy market.

Following Russia's invasion of Ukraine on 24th February 2022 and its impact on Europe's natural gas system, eleven Member States issued early warnings in the first nine months of the year, while Germany declared the alert level. The outbreak of the war and the support of the European Union and its Member States to Ukraine led to a significant reduction in Russian gas flows to Europe. In fact, the share of Russian gas on total imported gas decreased from 31.3% in the first quarter of 2022 to 9.9% in the last quarter of the same year. Following the Russian invasion of Ukraine, the United States, the European Union and other countries adopted sanctions against Russia. As a reaction, on 31st March, Russian President Vladimir Putin adopted Presidential Decree No. 172, which requires companies belonging to countries inserted in a list of unfriendly countries (substantially, all European countries) to use the rouble as currency for natural gas transactions, starting from 1st April 2022. Until its entry into force, EU countries used to pay in euros. According to the Decree, failure to pay in roubles could lead to a complete interruption of Russian gas supplies. From the EU perspective, the main problem was to understand whether the new payment procedure was compatible with the sanctions previously imposed on Russia. Despite statements by some representatives of EU bodies, the Decree did not seem to violate any specific measure of the sanctions. The situation was not clear at all and Member States had to autonomously decide how to act, whether to prohibit their companies from complying with the new payment procedure or to allow it. The contractual deadlines came at the end of April and May, thus making the matter urgent. Poland and Bulgaria refused to follow the new procedure imposed by the Decree and on 27th April Gazprom stopped gas flows to these two countries.

On 12th May, Moscow placed thirty-one companies on a sanctions list, mainly concerning Gazprom's subsidiaries in Europe and EuRoPol Gaz, owner of the Polish

part of the Yamal pipeline. The Yamal-Europe pipeline was one of the main routes for Russian gas to Europe and Gazprom's subsidiaries in Europe were significantly involved in the European gas market. This decision was explained as a reaction to the sanctions of the U.S. and its allies against Russia. As a result, Gazprom completely suspended gas supplies through the Yamal-Europe pipeline.

Since June 2022, Gazprom has been gradually cutting off gas flows through Nord Stream 1, due to, accordingly to official statements, maintenance issues. Finally, on 26th September 2022, both Nord Stream 1 and Nord Stream 2 were hit by explosions- Following the sabotage, the pipelines transporting Russian gas to Europe that remain in operation are the one through Ukraine and Turkstream. Thus, in the first ten months of 2022, Russian gas supplies to the EU halved compared to the same period in 2021, totalling only 60 bcm. At the same time, the EU and its Member States diversified their gas routes and found new suppliers: by October 2022, pipeline deliveries from Norway increased by 5% and those from Azerbaijan via TAP by about 50%.

After the energy crisis of 2021 and the rise in gas prices, the war and subsequent tension over the natural gas issue between the European Union and Russia caused gas prices to rise even more significantly. At the end of August 2022, gas prices reached a record high of €343/MWh. Subsequently, it started to decline again, reaching 40 €/MWh in April 2023, due to a combination of factors: mild weather, significant LNG supply, reduced gas demand and high storage levels. However, despite the low price of 40 €/MWh compared to the record of 343 €/MWh at the end of August, the price was still almost three times higher than 2019 levels, when the average price was 14.6 €/MWh.

Through the adoption of directives, regulations and communications, EU bodies have addressed the gas crisis with a multilateral approach, taking into account storage levels, reduced demand and rising prices. On 18th May 2022, the European Commission published a Communication, the REPowerEU plan, as a response to the double challenge that 2022 posed to Europe: ending the EU's dependence on Russian fossil fuels and mitigating climate change. The Plan is based on three main pillars: energy saving, diversification of energy supplies and acceleration of the replacement of fossil fuels with renewable energy sources.

Ensuring an adequate level of gas storage among Member States became a key priority. In particular, the main concern of the European Union was to be able to cope with the 2022/2023 winter season. High levels of gas storage enable Member States to

ensure adequate gas supplies to consumers even in the event of very cold weather or sudden gas supply disruptions. To this end, Regulation (EU) 2022/1032 was adopted on 29th June 2022, obliging Member States to ensure that gas storage facilities are filled to at least 90% of their capacity by 1st November of each year. For the first year, by November 2022, a lower target of 80% was set. The Regulation also provides for a solidarity mechanism. By the beginning of December 2022, most Member States had filled their gas storage facilities by more than 90% of their capacity, exceeding the target set by the Regulation for winter 2022/2023 of 80%.

Demand reduction, together with the filling of gas storage, has been considered a key priority by the EU to ensure security of gas supply and to avoid excessively high prices. However, unlike gas storage, demand reduction depends not only on the measures of Member States, but on the actions of all consumers and market participants as well. With this in mind, the European Commission adopted the Save Energy plan in May 2022, in which it proposed both voluntary actions that individuals can take to save energy and structural measures that Member States can pursue to reduce gas (and oil) demand, by increasing energy efficiency in the long run. In August 2022, Council Regulation 2022/1369 set a voluntary target to reduce gas consumption by 15%, as well as a mandatory reduction target in the event of a Union alert. As a result of these measures and thanks to the milder weather and high prices, gas consumption in the period August 2022 - March 2023 decreased by 17.7% compared to the average for the same period in the years 2017-2022. On 30th March 2023, the Council of the European Union adopted Regulation (EU) 2023/706, extending the 15% gas consumption reduction target to March 2024.

Gas prices during 2022 were very volatile and reached high peaks, with the August 2022 record of 343 €/MWh. A strong debate has developed within the European Union about the need, on the one hand, to prevent speculation and protect consumers and industries from such high prices and, on the other hand, to avoid a significant distortion in the functioning of the European gas markets. In December, two regulations were adopted to this end: Council Regulation (EU) 2022/2576, which established a joint gas purchase mechanism and measures to prevent excessive price volatility, and Council Regulation (EU) 2022/2578, which established a new market mechanism to cap very high gas prices. This second Regulation provides for a gas price cap that is triggered when the price exceeds 180 €/MWh for three consecutive working days and is 35€ higher than the reference price. The market correction mechanism became

operational in February 2023 and will be in place until February 2024, but since then prices have remained below the level of the EU gas price cap and, for this reason, the mechanism has never been triggered, as for the time of writing.

Renewable energy sources have the strategic role of contributing to climate change mitigation and improving energy security, allowing Europe to phase out fossil fuels, most of which are imported. For both reasons, in the REPowerEU plan, the Commission proposed to increase the 2030 target of the share of renewable energy sources in the EU's energy mix from 40% to 45%. On 30th March 2023, the European Parliament and the Council reached a provisional agreement, increasing the binding target from to 42.5% and agreeing on the EU's commitment to reach 45% of renewables.

Diversification is the other key explanation for the successful management of the 2022/2023 winter in terms of security of gas supply in the European Union. With the outbreak of war in Ukraine and the sharp reduction of Russian gas supplies to Europe, the need to diversify gas suppliers became crucial. Overall, between January and November 2022, total Russian gas imports decreased by 64 bcm compared to 2021. The European Union mainly followed a twofold approach: signing new LNG contracts and increasing gas supplies through existing pipelines. LNG, in particular, proved to be crucial in coping with the decrease of gas supplies from Russia. European LNG imports increased by 60% in 2022. The largest LNG exporters to the EU have been the United States, Russia and Qatar. In particular, U.S. LNG exports to the European Union and the UK increased by 141% in comparison to 2021, equal to approximately 113 mcm/day and represented 64% of total U.S. exports. Developing new LNG contracts and strengthening existing ones with reliable LNG suppliers allow, from a European perspective, to reconcile two important aspects of the current EU energy policy: security of energy supply and decarbonisation of the EU economy to achieve carbon neutrality by 2050. LNG, as already mentioned, is more flexible and does not necessarily require long-term contracts as in the case of pipeline gas. However, the distribution of LNG import terminals in the EU is very uneven. Therefore, during 2022, many EU Member States sought to build new LNG facilities, in particular floating storage and regasification units (FSRUs). Overall, European LNG capacity is expected to grow by a third by 2024.

The European Union and its Member States, in addition to procuring new LNG supplies, have focused on diversifying pipeline imports and improving EU

interconnectivity. For this reason, Italy and Algeria signed Memoranda of Understanding to strengthen their cooperation in the energy field and increase gas imports through the existing gas pipeline, Transmed. In addition, plans are also being developed to increase imports from Libya, with the signing of a long-term agreement between Italy's ENI and the Libyan National Oil Corporation (NOC) in January 2023. In July 2022, European Commission President Ursula von der Layen signed a Memorandum of Understanding with the President of Azerbaijan in order to increase gas supplies through the Southern Gas Corridor, doubling them by 2027. Moreover, on 27th September 2022, the Baltic Gas Pipeline, which connects Norway to Poland, came into operation. Finally, in order to improve the resilience of the EU gas market by enabling increased gas flows to the EU, several interconnections were commissione in 2022, notably between Lithuania and Poland, Poland and Slovakia and Greece and Bulgaria.

Winter 2022/2023, notwithstanding the concerns of the European Union and its Member States, was successfully faced and natural gas supplies were secured for the entirety of the cold season, but winter 2023/2024 poses new challenges. The key factor which enabled the European Union to diversify its gas supplies in 2022 was LNG. The International Energy Agency estimates that global LNG supply will increase by 20 bcm in 2023. However, this increase will not be enough in case of additional decrease in Russian gas supplies to Europe. Moreover, Chinese LNG demand is expected to rebound, as a result of economic growth and the end of Zero-Covid strategy, and could cover up to 85% of global LNG supply increase, therefore reducing the amount available for Europe.

Considering the whole picture, the European Union and its Member States need to continue taking actions in order to guarantee the European energy security, following the path laid down by the Commission in the REPowerEU plan of May 2022: acceleration of the green transition, gas demand reduction and diversification of suppliers, by focusing, in the short-term, on LNG producers, which are able to guarantee rapid additional gas supplies. On the infrastructural side, the EU Member States acted promptly in order to both improve interconnectivity in the European gas market and increase LNG import capacity. This will prove crucial in case of significant additional reduction of Russian gas supplies.

For the next years, the key dilemma for the European Union in the current energy and geopolitical scenario is where to achieve additional natural gas supplies

given the decreasing Russian deliveries, taking also into consideration the estimated decline of EU gas demand in the future decades and the binding climate targets. In fact, in order to secure additional gas imports from countries with which a pipeline connection already exists, such as Algeria and Azerbaijan, new long-term investments would be needed. However, given the uncertainty over the trend of natural gas demand globally and specifically in Europe, investors doubts over whether to invest or not. Given the need for new natural gas supplies in the short and medium term and the parallel decline of natural gas demand, the European Union faces the key choice between stability and flexibility. In the first case, the EU and its Member States could invest in and sponsor new gas projects, by involving countries such as Azerbaijan and Algeria that have a great potential in terms of gas resources, but their existing gas fields are depleting. However, long-term investments are difficult to put in place due to uncertainty over natural gas demand projection in Europe. For these reasons, the Mattei Plan, envisaged by the new Italian government, based on the idea of making Italy a new gas hub for Europe, through an intensification of cooperation with North Africa, would incompatible with the pace of natural gas demand reduction in the European Union and its climate targets.

On the other hand, Europe could acquire natural gas from the LNG cargoes on the sport market. While it has the absolute advantage of not requiring long-term and binding contracts, on the other hand, in order to attract those cargoes, the European Union would need to pay a premium in order to divert them from other markets, such as the Asian one. Prices would be higher and more volatile.

The European Union could follow a multilateral approach: new agreements with "old" natural gas suppliers to bring the gas pipelines at its maximum capacity, where it is possible without the need to invest in long-term projects for the increasing of productive capacity, and sponsor the development of new flexible LNG trade projects with reliable suppliers. The immediate question is what could be the future reliable natural gas trade partners for the European Union, in terms of both capacity and internal political stability. The Eastern Mediterranean region, in particular considering the latest developments in Cyprus, has a great potential and could provide the European Union with the additional LNG supplies that it needs to meet its, even if declining, natural gas demand.

Moreover, the European Union faces two main criticalities that do not allow for the complete realisation of an Energy Union: infrastructural constraints and

uncoordinated path towards the clean energy transition. In fact, the sharp reduction of natural gas from Russia to the European Union since the beginning of the war in Ukraine has clearly shown the importance of having a truly interconnected gas system, able to divert natural gas to the most vulnerable regions during emergencies. The European Union should continue and increase interconnection projects and, as suggested by the International Monetary Fund in July 2022, solve the infrastructure bottlenecks. Short-term measure which could effectively improve the security of gas supply would enable reverse flows from West to East and to harmonise gas quality among EU Member States

Finally, energy policy in the European Union is a shared competence between the Union and its Member States, but the freedom enjoyed by Member States in energy matters could undermine the achievement of climate goals set by the European Union, if an independent coordination body is not established. A new European Energy Agency could work as a coordinating body between the distinct energy policies of Member States, suggesting to Member States the best pathway towards carbon neutrality based on the actions taken by other Member States. The Agency could be an instrument for the promotion of a true European Energy Union.