HCSS Geo-economics

Gas Supply Security in the Netherlands: Geopolitical and Environmental Dilemmas

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Summary

Until recently, the Netherlands has been a self-sufficient country that could, to a certain extent, discard concerns regarding natural gas security of supply. The decline in the domestic production of natural gas, paired with the relatively stable expected gas demand until 2030, leads to several political dilemmas for the Netherlands and the European Union (EU). The gap caused by declining domestic production will be primarily filled by increased imports of Russian gas, as well as liquefied natural gas (LNG) from the United States (US), Russia, and Qatar, among others.

Although the Netherlands will remain an important player in the international gas market, the country is facing challenges in securing natural gas supplies for the following decades. Concerns refer to the future role of gas storage facilities, to the conversion of imported high-calorific gas and to Europe being a 'market of last resort' for LNG. A further challenge is the sub-optimal business climate for the Dutch upstream gas industry. Despite remaining resources, it will become difficult for domestic companies to secure gas supplies for the years leading up to the complete transition to renewable energy.

More importantly, however, geopolitical and environmental issues associated with increased reliance on gas imports arise. **The Netherlands' and the EU's rapidly growing import dependency leads to three dilemmas.**

1. **The geopolitical influence of the Netherlands and the EU is undermined by their strong economic dependence on Russia for natural gas supplies.** The effectiveness of European Neighbourhood policies and large amounts of development aid is weakened by the inability to combat Russian interference in non-EU countries in Eastern Europe and the Middle East. When even highly controversial events lead to minor impacts on EU-Russian fossil fuel trade, Russia gets lee-way to engage in other actions that are considered problematic by EU countries.

2. **EU member states tend to act according to sovereignty rather than solidarity in securing energy supplies.** EU countries lack policy coherence and a geopolitically motivated approach to energy relations, partly due to diverging national interests and partly to the private nature of energy companies in the EU. Fragmentation opens up opportunities for countries such as Russia to apply 'divide and conquer' strategies with the purpose of causing instability and distrust.

3. From an environmental perspective, the sharp increase in imports negatively influences global climate ambitions. **Importing gas is far more problematic from the perspective of greenhouse gas (GHG) emissions than European domestic production.** GHG emissions will be significantly higher when importing pipeline gas from Russia or LNG from the US. Methane leaks along these gas supply chains have been reportedly much higher than Dutch, British or Norwegian ones.

Ensuring strategic autonomy and achieving climate neutrality are core priorities of the EU and of the Netherlands. Energy import dependency is a key inhibiting factor to achieving this objective. The wide range of uncertainties associated with diversification

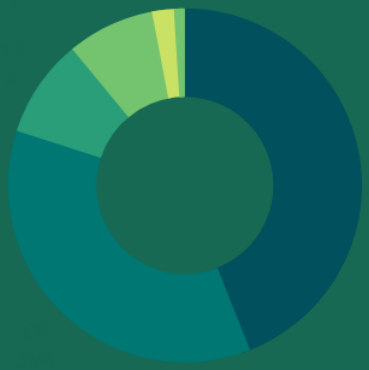
options further complicate the issue. **It is essential that the Netherlands and other EU members – which until now have been emphasizing the economic aspects of energy imports – acknowledge the geopolitical and environmental dimensions of dependency**. There are serious political costs associated with dependency and, as shown in this report, the resulting dilemmas lack a clear-cut solution. **Diversification, enhanced EU (energy) cooperation, stricter methane emissions regulation, and an accelerated energy transition** represent some of the building blocks of an effective approach toward gas security of supply and climate goals in the Netherlands.

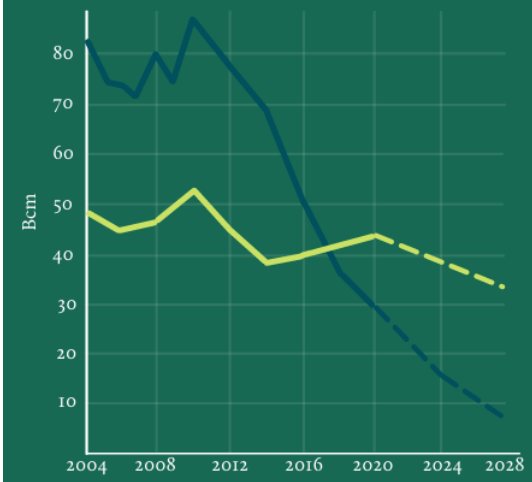
Gas Supply Security in the Netherlands

The rapidly increasing gas import dependency as a result of the decline in Dutch production, brings important geopolitical and environmental dilemmas for the Netherlands and the EU.

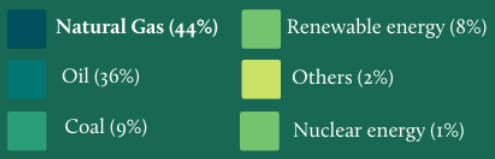
The Hague Centre for Strategic Studies

1 The share of natural gas in the Dutch energy mix remains significant



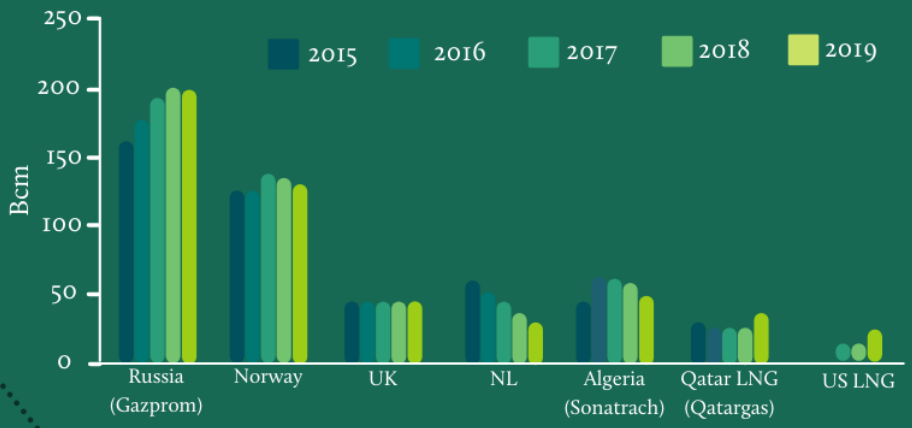


2 Natural gas demand can no longer be fulfilled by Dutch domestic production

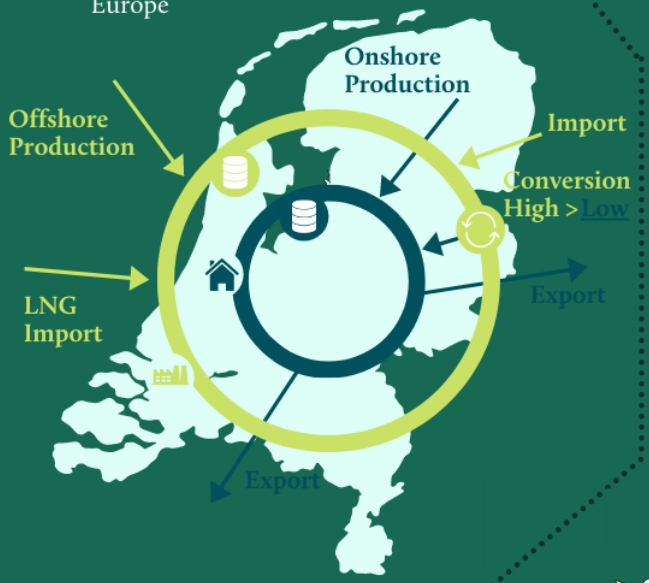


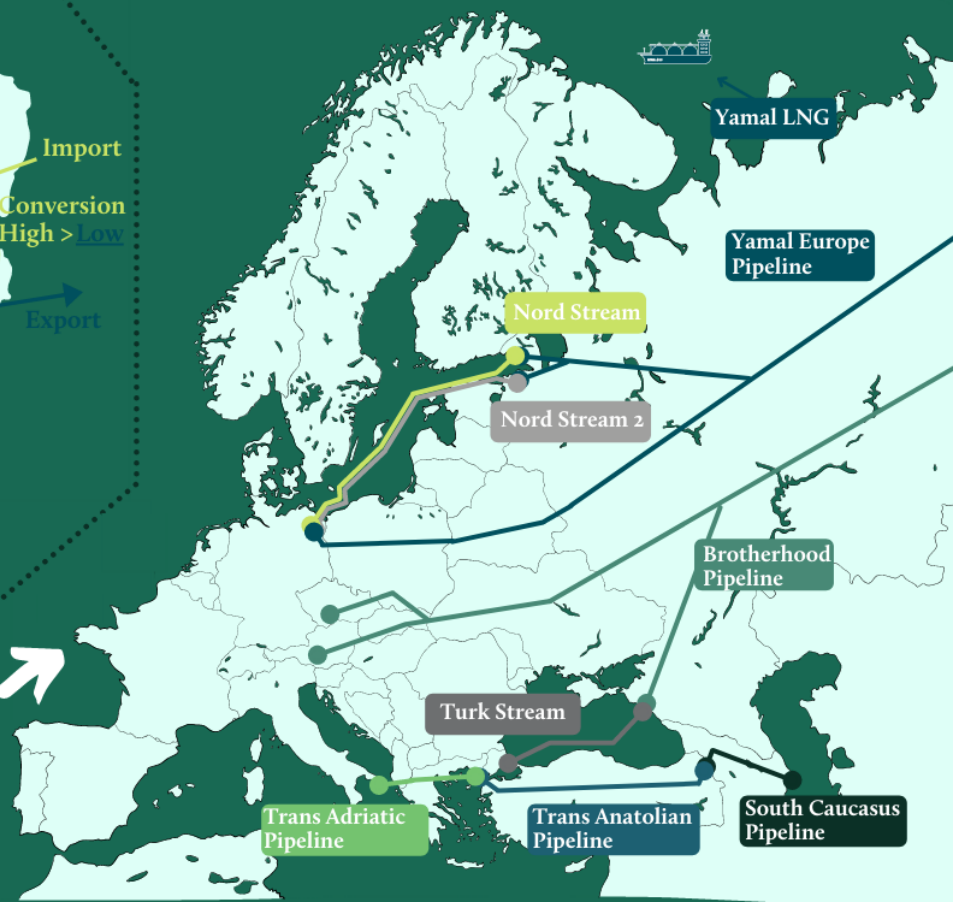
Primary energy mix The Netherlands (2019)

4 Main suppliers of natural gas to Europe
(source: Oxford Institute for Energy Studies, Gazprom).



3 Extensive gas infrastructure allows the Netherlands to be a "gas roundabout" for Western Europe





5 Russia has been consolidating its position as Europe's main gas supplier through new pipelines and development of LNG capabilities

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1. Introduction

Natural gas has been the principal energy resource in the Netherlands. However, the last decade represented a turning point in the Netherlands' domestic natural gas outlook. The earthquake that struck Huizinge[1] in 2012 was the catalyst in an already tense gas production environment, characterized by public outrage over the consequences of gas extraction and increasing support for climate goals. The ensuing series of events led to the Dutch government's decision to stop production of gas from the Groningen gas field by 2022. At the same time, it established a strongly held view among a large part of the Dutch population that it is no longer acceptable to produce gas domestically. The Netherlands decided under the *Klimaatakkoord* that the decarbonization of the Dutch economy represents a priority for the decades leading up to 2050.

However, these plans are still in an early phase of implementation. The interplay of several factors raises dilemmas regarding energy security of supply in the future decades: the decision to phase-out the production of Groningen gas, a relatively stable domestic gas demand, and ambitious climate goals. The country now faces a similar situation to its European counterparts, being reliant on foreign imports primarily as Russian pipeline gas, complemented by limited Norwegian supplies and American or Qatari liquefied natural gas (LNG).

The novelty of the Netherlands' position as a natural gas importer has been widely discussed from an economic point of view, yet the geopolitical and environmental dimensions are often overlooked. This paper aims to fulfil this gap by exploring the political dilemmas that the Netherlands is facing in relation to its rapidly increasing gas import dependency. On one hand, we analyze the main geopolitical dilemmas associated with the Netherlands' high reliance on Russian gas. On the other hand, we discuss the relationship between increased imports of gas – from Russia and elsewhere – and the level of greenhouse gas (GHG) emissions.

The paper opens with a brief overview of the historical, current and expected importance of natural gas in the Netherlands. Given that the consequences arising from a decrease in Dutch gas production will not only affect the Netherlands, but also the European Union (EU), the Netherlands is placed within the context of European import dependency. The paper is dedicated to the geopolitical dimension of gas import dependency and discusses the weakening of geopolitical influence and EU fragmentation as two main geopolitical dilemmas. Also, the environmental dimension is described by exploring the prospects of gas import dependence in relation to GHG emissions. The dilemma arises as a result of high methane emissions along the supply chains of imported gas from, among others, the United States (US) and Russia. The paper concludes with an overview of potential options for the Netherlands and the EU to mitigate the vulnerabilities arising from geopolitical and environmental dilemmas.

[1] The strongest induced earthquake in the Groningen province (3.6 magnitude). Huizinge prompted the introduction of production caps for gas extraction from the Groningen field.

2. Natural gas in the Netherlands

Since 1959, natural gas exploration and production have been pivotal to the development of the Dutch economy.[2] The discovery and subsequent exploitation of the giant Groningen field, as well as that of small fields – additional smaller onshore and offshore gas reserves –, placed the Netherlands in a highly advantageous position, both domestically and internationally.

Domestic gas reserves provided not only a secure energy source to the population, but also generated significant governmental revenue. The Netherlands has been a central energy supplier for North Western Europe (NWE). Belgium, Germany, France, the United Kingdom and Italy represented important export markets for Dutch gas, having been connected to a common grid since the 1960s.[3] Given that the Dutch government has participated in the gas market since its inception, a significant part of gas revenues was collected by The Hague.[4]

The considerable benefits derived from abundant Groningen gas reserves have been matched by increased seismicity and social unrest. Progressively more disruptive earthquakes have been recorded in the Groningen region since 1991. Although induced by gas extraction, the players involved in gas exploitation – the Nederlandse Aardolie Maatschappij (NAM) and the Dutch state – failed to adequately address the consequences of seismicity.[5] This was until 2012, when the most intense earthquake to date occurred – the Huizinge earthquake. Issues relating to damaged houses losing market value and the psychological burden of the residents in Groningen became salient. This development took place against the backdrop of an already tense environment concerning gas production, caused by years of neglect by The Hague.[6]

The period after 2012 was characterized by significant pressure to limit and ultimately stop gas extraction altogether. The increased societal opposition to gas production and gas market players coincided with the Paris Climate Agreement of 2015 and a push for ambitious climate goals in the Netherlands. Overall, the anti-gas sentiment became central to public discourse, leading to a decision to phase-out production from the

[2] Anouk Honoré, "The Dutch Gas Market: Trials, Tribulations and Trends," OIES Paper (The Oxford Institute for Energy Studies, 2017), 14.
[3] For a comprehensive overview regarding natural gas exploration and production in the Netherlands, see the reference book by Correljé, van der Linde and Westerwoudt. *Natural Gas in the Netherlands: From Cooperation to Competition?* (Oranje-Nassau Groep, 2003).
[4] "Aardgasbaten uit gaswinning bijna 417 miljard euro," webpagina, Centraal Bureau voor de Statistiek, May 28, 2019, https://www.cbs.nl/nl-nl/nieuws/2019/22/aardgasbaten-uit-gaswinning-bijna-417-miljard-euro.
[5] Jilles van den Beukel and Lucia van Geuns, "Groningen Gas the Loss of a Social License to Operate," HCSS Geo-Economics (The Hague Centre for Strategic Studies, February 2019), 12, https://hcss.nl/sites/default/files/files/reports/15.2.19%20Groningen%20gas%20the%20loss%20of%20a%20social%20license%20to%20operate.pdf.
[6] In the aftermath of the Huizinge earthquake, the Dutch Safety Board launched an investigation into the decision-making process surrounding Groningen gas. The results showed that the safety and well-being of Groningen residents had no impact on decision making. The parties involved – including the Ministry of Economic Affairs and NAM – considered safety risks to be negligible. Dutch Safety Board, "Summary Earthquake Risks in Groningen" (The Hague, February 2015), https://www.onderzoeksraad.nl/en/media/attachment/2018/7/10/972d8bf7f1d1summary_gaswinning_groningen_en.pdf.

Groningen field by 2022.[7] Additionally, gas production from small fields is expected to decline to 2 - 5 billion cubic metres (bcm) in 2030.[8]

Yet the decrease in gas production does not correspond to a contraction of domestic demand. The next sections outline the current and projected gas consumption levels in the Netherlands, with the purpose of illustrating the discrepancy between the political discourse of a gas phase-out and the reality of a relatively constant domestic demand up to 2030.

Energy mix and gas consumption

The Netherlands' energy consumption is primarily based on fossil fuels. Together, crude oil and natural gas represented in 2019 approximately 80 % of total primary energy use – 36.7 and 43.7 %, respectively.[9] The share of coal was 8.8 % of the total, while renewable sources provided 7.7 % of energy.[10] The share of gas in the Netherlands' energy mix is thus significant. The historical legacy of one of Europe's biggest gas producers is translated into a large domestic consumption of gas compared to other EU countries. Gas is primarily used for the generation of heat – 90 % of buildings and 40-50 % of heat used in industry are based on gas.[11] In 2018, gas supported 51 % of electricity generation, 28 % of industrial energy demand as well as 90 % of residential heating.[12]

One of the primary determinants of gas consumption is the severity of the cold seasons. This accounts for some of the short-term fluctuations in consumption. The price of gas and coal in general, as well as of GHG emissions under the EU Emission Trading System (ETS) can also cause fluctuations in consumption. Between 2018 and 2020, for instance, low natural gas prices compared to coal led to an increased amount of electricity generation from gas, and thus of gas consumption. Overall, the consumption of natural gas in the Netherlands has only slightly decreased in the last 15 years, from approximately 48.6 bcm in 2004 to 42.5 bcm in 2019.

During the COVID-19 pandemic, the demand for gas shrunk in European countries such as Italy and France, by 11.5 and 13.2 %, respectively.[13] Lockdown measures led to reduced industrial activity which, due to these countries' high proportion of gas consumption by industry (rather than households), caused a decrease in demand compared to 2019. This was not the case in the Netherlands, where demand did not suffer a dramatic contraction as a result of the household consumption of gas.

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[7] Karel Beckman and Jilles van den Beukel, "The Great Dutch Gas Transition," Oxford Energy Insight (The Oxford Institute for Energy Studies, July 2019), 4, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2019/07/The-great-Dutch-gas-transition-54.pdf.
[8] Jilles van den Beukel and Lucia van Geuns, "The Deteriorating Outlook for Dutch Small Natural Gas Fields," HCSS Geo-Economics (The Hague Centre for Strategic Studies, January 2020), 13.
[9] CBS, "Energy balance sheet," StatLine, December 16, 2020, https://opendata.cbs.nl/statline/#/CBS/en/dataset/83989ENG/table?ts=1609771553727.
[10] CBS.
[11] Beckman and van den Beukel, "The Great Dutch Gas Transition," 2.
[12] IEA, "The Netherlands 2020," Energy Policy Review, 2020, 184.
[13] Anouk Honoré, "Natural Gas Demand in Europe: The Impacts of COVID-19 and Other Influences in 2020," Oxford Energy Comment (The Oxford Institute for Energy Studies, June 2020), 5.

Projected demand: 2030

The Climate Agreement of 2019 (*Klimaatakkoord*) is the key document for Dutch climate policy. It consists of actionable points leading to a reduction of 49 % of GHG emissions by 2030 (compared to 1990 levels). The year 2050 is supposed to see a reduction of 95 % of GHG emissions, compared to the benchmark of 1990.[14] These policy goals have several implications for natural gas consumption in the following decades. Natural gas is expected to be completely replaced by alternative energy sources by 2050.

The role of natural gas in the transition toward renewable energy is often emphasized due to its relatively low carbon footprint compared to the other fossil fuels. As such, gas plays an important role in bridging the gap created by moving away from coal, in anticipation of a successful transition towards renewable energy. The decreased domestic production of gas, paired with a relatively steady consumption pattern in the Netherlands, leave the country in need of greater gas imports.

Two factors that could impact gas demand are the increasingly mild temperatures in cold seasons caused by global warming, and, more importantly, a larger share of renewable energy sources as projected by the Climate Agreement.[15] On one hand, gas is increasing in the European energy mix as a result of gradual coal phase-outs, despite milder winters in Europe.[16] On the other hand, the supply of energy from alternative sources is not yet sufficient to securely cover the entire demand of the Netherlands.[17] Thus, these factors are not expected to lead to a significant short-term decrease in demand. According to PBL's (Netherlands Environmental Assessment Agency) 2020 estimations, gas demand is expected to continue playing a significant role in the Dutch energy mix until at least 2030.[18] PBL expects a demand of about 32 bcm in 2030, decreased from 42.5 bcm in 2019.[19]

[14] "Climate Policy," Government.nl (Ministerie van Algemene Zaken, February 1, 2019), https://www.government.nl/topics/climate-change/climate-policy.
[15] Honoré, "Natural Gas Demand in Europe: The Impacts of COVID-19 and Other Influences in 2020," 5.
[16] CBS, "Less Coal and More Natural Gas Consumption in 2019," Statistics Netherlands, May 13, 2020, https://www.cbs.nl/en-gb/news/2020/20/less-coal-and-more-natural-gas-consumption-in-2019.
[17] van den Beukel and van Geuns, "The Deteriorating Outlook for Dutch Small Natural Gas Fields," 3.
[18] PBL, "Klimaat- en Energieverkenning 2020" (Den Haag: Planbureau voor de Leefomgeving, 2020), 93.
[19] PBL, 93.

3. The Netherlands in the European context

Like the Netherlands, virtually all EU countries are undertaking reforms to transition away from fossil fuels, in accordance with the European Green Deal. This is the main priority of the EU for the following decades. The Deal involves a complete transition from fossil fuels to renewable energy sources, leading to climate neutrality.[20]

As mentioned above, the gap caused by the transition from coal, as well as nuclear energy in some EU countries, is temporarily filled by an increase in natural gas consumption.[21] Despite differences between individual states' energy mixes, oil and gas still dominate consumption in most EU countries, including the Netherlands.[22] Unlike oil, natural gas is more difficult to source, and import dependency more difficult to mitigate. Oil can be sourced from a wide range of locations and suppliers, given the relative ease of transport and storage associated with the fuel, as well as the mature international market.[23] Gas, however, usually requires costly pipelines and long-term commitments between suppliers and consumers.[24] The emergence of LNG allowed natural gas to become an internationally traded commodity, with gas trade taking place between geographical locations at a large distance. LNG trade led to increased liquidity on the gas market, which is now partly regulated by trading hubs. Although LNG prices are becoming increasingly competitive with pipeline gas and oil, costs of regasification infrastructure remain high.

While most gas trading had been done through long-term contracts, the situation changed with the development of the EU internal energy market. It allowed end-users to purchase gas at hubs, where prices are set through market-based supply and demand.[25] On one hand, this meant that Gazprom – the main Russian gas supplier to the EU – was forced to renegotiate long-term contract conditions and remove oil indexation from gas prices. On the other hand, EU consumers needed to compete with the highly competitive world gas market, leading to increased price variations compared to fixed contracts. Still, long-term contracts remain central to the European gas market, with "legacy contracts" leading up to 2030.[26]

The Netherlands, unlike its European counterparts, has become increasingly reliant on the spot market, with long-term contracts playing a very limited role. Countries such as Spain and Germany have concluded long-term deals that will secure 94 % and 64 %,

[20] European Commission, "A European Green Deal," Text, Priorities 2019-2024 - European Commission, 2020, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.
[21] Rystad Energy, "Germany's Gas Demand to Top 110 Bcm by 2034 and Nord Stream 2 Is the Cheapest New Supply Option," Press Release, November 11, 2020, https://www.rystadenergy.com/newsevents/news/press-releases/germany-gas-demand-to-top-110-bcm-by-2034-and-nord-stream-2-is-the-cheapest-new-supply-option/.
[22] See Eurostat, "Energy Statistics - an Overview," Statistics Explained, July 2020, https://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_statistics_-_an_overview#Gross_inland_energy_consumption.
[23] Pasquale De Micco, "A Cold Winter to Come? The EU Seeks Alternatives to Russian Gas," Policy Briefing (Belgium: European Union, 2014), 5.
[24] Correljé, van der Linde, and Westerwoudt, Natural Gas in the Netherlands, 143–44.
[25] Luca Franza, Coby van der Linde, and Pier Stapersma, "Europe's Energy Relations: Between Legacy and Transformation," CIEP Paper, 2018, 27, https://www.clingendaelenergy.com/inc/upload/files/CIEP_Paper_2018-02_Web.pdf.
[26] Franza, van der Linde, and Stapersma, 11.

respectively, of their total demand in 2023.[27] In contrast, only 0.4 % of the Dutch demand in 2023 will be covered by long-term contracts. This decision of the Netherlands has implications for the country's future security of supply, although LNG imports and storage capacity can mitigate some of the risks.

The sections below outline the position of the Netherlands in the EU gas market. The former's recently acquired status of net gas importer places it in a similar position to its EU, and specifically North Western European (NWE), counterparts. How dependent are the Netherlands and the EU on gas imports, and how is this situation changing as a result of the Groningen gas phase-out? Below, we consider the increasing import dependency on the EU level, as well as the prospects and challenges of replacing Dutch gas in the EU energy mix.

Import dependency

Most of the EU's gas demand is fulfilled by imports – in the third quarter of 2020, domestic production provided 11 bcm of natural gas, while imports represented 77 bcm of total.[28] Moreover, in the first half of 2020, 25 % of all energy imported to the EU consisted of gas – 16 % in gaseous state and 9 % as LNG. Russia has for a long time been the EU's main fossil fuel supplier. In 2019 and 2020, Russia supplied 44.7 % and, respectively, 39.3 % of the EU's total imports of natural gas (Figure 1). Once completed, the Nord Stream 2 pipeline will increase NWE's natural gas pipeline capacity for Russian imports. The Nord Stream 2[29] project complements its twin Nord Stream pipeline, which has been transporting natural gas directly from Russia since 2011. This development, together with the Turkstream pipeline[30] bringing gas from Russia to Southern Europe, consolidates the position of Russia as the main gas supplier of the EU.

[27] Simon Blakey et al., "The Swing in Dutch Gas: From Autonomy to Full Dependence," Strategic Report (IHS Markit, November 2018), 5, https://cdn.ihs.com/www/pdf/1118/IHS-Markit-The-Swing-Dutch-Gas.pdf.
[28] Note that the total gas supply was divided between EU consumption (71 bcm) and storage (17 bcm). For more details, see European Commission, "Quarterly Report on European Gas Markets," 2021, https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_gas_markets_q3_2020.pdf.
[29] Together, Nord Stream and Nord Stream 2 will be delivering 110 bcm of natural gas per year to Germany. The Nord Stream 2 pipeline has yet to be completed, although the initial finalization date was expected at the end of 2019. Significant backlash from Central and Eastern European countries as well as US sanctions under the 'Protecting Europe's Energy Security Act' led to delays in construction. Concerns were raised regarding Russia's geopolitical interests in securing its share in the European gas market.
[30] Turkstream has become operational at the beginning of 2020. It will provide 31.5 bcm/year of gas from Russia through the Black Sea and Turkey, to markets in South and South-East Europe. For more information, see https://turkstream.info/project/.

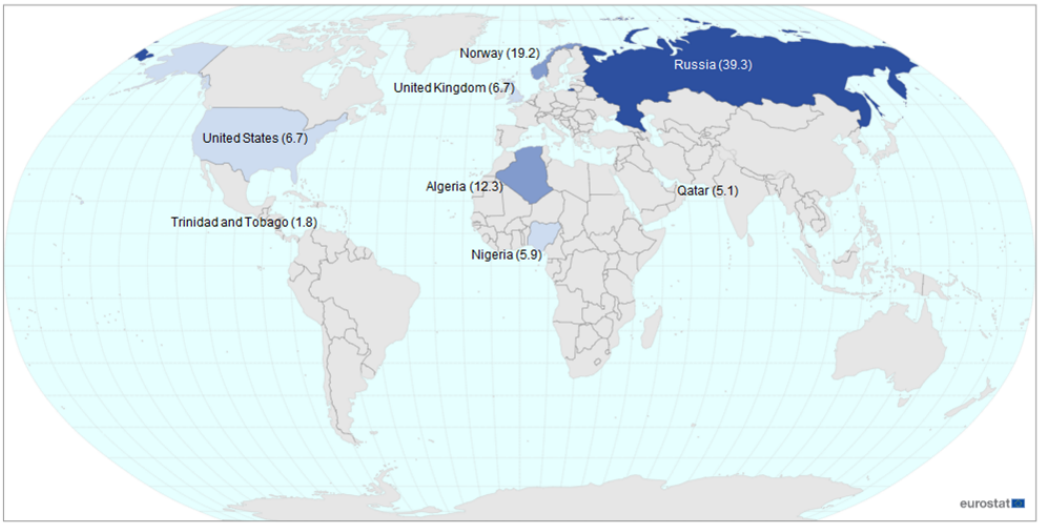

Figure 1 Main natural gas suppliers to the EU (shares %) from Eurostat[31]

The second largest supplier is Norway, but its production plateau led to a market share of only about 20 % of total EU gas imports in 2019 and the first quarter of 2020.[32] Algeria is the third largest supplier, delivering about 12 % of EU gas in 2019-2020, while the US and Qatar have market shares of under 10 %.[33] The second half of 2020 saw the commissioning of a new pipeline project, the Southern Gas Corridor (SGC), which now delivers 10 bcm of gas per year from Azerbaijan. The SGC consists of three sections: South Caucasus Pipeline, Trans Anatolian Pipeline and Trans Adriatic Pipeline.

The member states that were most dependent on Russian oil and gas in the first half of 2020 were Germany, Italy, the Netherlands, France and Spain.[34] Specifically, the Netherlands' energy product import dependency rate has been on an increasing trend since 2008, reaching around 60 % in 2018.[35]

Outlook: replacing Dutch gas

Reducing Dutch domestic production of gas to 2-5 bcm by 2030[36] while demand is relatively stable leaves the Netherlands and, by extension, the EU heavily reliant on imports. Although not yet phased out on a national level, remaining gas production is insufficient to satisfy Dutch or NWE demand. In 2018, the Netherlands became a net importer of natural gas, primarily from Norway and Russia.[37] Norwegian gas supplies have been playing an important role in the European gas market. However, depleting

[31] Eurostat, "EU Imports of Energy Products - Recent Developments," Statistics Explained, 2020, https://ec.europa.eu/eurostat/statistics-explained/pdfscache/46126.pdf.
[32] Eurostat, 4.
[33] Eurostat, 4.
[34] These calculations do not account for intra-EU trade after gas has been imported from Russia. Eurostat, 10.
[35] Eurostat, "Energy Production and Imports," Statistics Explained, June 2020, https://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_production_and_imports#The_EU_and_its_Member_States_are_all_net_importers_of_energy.
[36] van den Beukel and van Geuns, "The Deteriorating Outlook for Dutch Small Natural Gas Fields," 13.
[37] CBS, "Natural Gas Trade Deficit for the First Time in 2018," Statistics Netherlands, March 12, 2019, https://www.cbs.nl/en-gb/news/2019/11/natural-gas-trade-deficit-for-the-first-time-in-2018.

fields and reduced exploration activities will lead to a decrease in output from 2023 onwards.[38] The gap left by decreased Dutch and Norwegian production is likely to be filled by Russian gas. Current Russian pipeline supplies will be supplemented by the inauguration of Nord Stream 2 and of the second leg of Turkstream.

In addition to pipeline supplies, LNG from the US, Qatar and Russia contribute to satisfying Dutch and European demand. The LNG Gate terminal in the Port of Rotterdam plays an important role in this regard. Most gas coming through the terminal is from the spot market, although longer-term contracts have also been completed with, among others, Qatargas.[39] The Russian Yamal LNG project also delivers increasing amounts of gas, having reached about 18 bcm in 2019.[40] Large investments are being made in American LNG production as well. The US already exports LNG to the Netherlands and the EU, and is expected to gain a larger share of the EU gas market in the following decade.

Challenges

Despite the wide availability of natural gas on the international market, there are several challenges that complicate the EU's search for security of supply. One important issue is related to the existing infrastructure in the Netherlands and neighbouring countries being based primarily on low range calorific gas (L-gas). L-gas has a lower-range calorific value (below 10.5 kWh/cm) and more nitrogen than the high calorific variant (H-gas).[41] Gas extracted from Groningen and certain small fields in the Netherlands is L-gas. As a result, most Dutch households and a part of industry (about 25 %) are dependent on supplies of L-gas. The supply of L-gas will significantly decrease when Groningen gas is phased out. Most gas that will replace it, whether imported through pipelines or as LNG, is H-gas, which requires either a different transmission grid or conversion into L-gas by adding nitrogen. This issue affects not only the Netherlands, but also its previous export markets, including Germany, Belgium and France.[42]

The Dutch government has adopted a combination of policies aiming to convert and store increasing amounts of L-gas. Currently, the Netherlands has a capacity for converting H-gas into L-gas of 20 bcm/year.[43] In order to accommodate the decline in Groningen L-gas, Gasunie Transport Services (GTS) – the owner of the Dutch transmission system – is expanding its existing conversion facilities by opening a new nitrogen plant in Zuidbroek, by 2022. This will allow the Netherlands to fill the gap

[38] Kira Savcenko and Gary Hornby, "The Future of European Gas after Groningen," Natural Gas Special Report (S&P Global Platts, February 2020), 11, https://www.spglobal.com/platts/plattscontent/_assets/_files/en/specialreports/naturalgas/groningen-european-gas-report.pdf.
[39] Karolin Schaps, "Netherlands Turns to LNG," Petroleum Economist, May 1, 2019, https://www.petroleum-economist.com/articles/politics-economics/europe-eurasia/2019/netherlands-turns-to-lng.
[40] Savcenko and Hornby, "The Future of European Gas after Groningen," 11.
[41] Honoré, "The Dutch Gas Market," 18.
[42] For a detailed overview of how Belgium, France and Germany are managing the decrease in Groningen gas imports, see Savcenko and Hornby, "The Future of European Gas after Groningen," 11.
[43] Savcenko and Hornby, 6.

caused by Groningen gas domestically, as well as export 'pseudo' L-gas to neighbouring countries in order to fulfil its long-term contractual commitments.[44]

Despite investment in conversion capabilities, the natural gas landscape has become quite deficient in this regard. At the national level, energy transition plans and anti-gas sentiments led to an uncertain investment climate in the Netherlands, despite offshore reserves remaining unexploited. Similarly, EU-level investments in natural gas projects are seen in an unfavourable light. A regulatory framework that recognises the role of gas in the Green Deal lacks, both as a transition fuel and as a means of producing hydrogen.[45]

The poor business climate and anti-gas views have implications for existing gas infrastructure as well. Storage facilities are pivotal to ensuring sufficient availability of natural gas in the event of supply disruptions or cold temperatures, yet their future utility is increasingly questioned. Although a final decision has not been made, NAM is considering the closing of one of the Netherlands' and the EU's largest seasonal gas storage facilities – Grijpskerk. Closing important storage facilities such as Grijpskerk or Norg would have severe consequences for the Netherlands' security of supply, as found in a study by Brattle.[46] Capacity shortages could be registered until 2030 in the Netherlands if storage facilities became unavailable. As such, it is vital that the government of the Netherlands acknowledges the continuous importance of gas in the domestic energy mix and takes an active role in securing the gas supplies for the following decade.[47]

Storage facilities are also important in the Netherlands' goal to remain an important gas trading player. In Europe, the UK's National Balancing Point (NBP) and the Dutch Title Transfer Facility (TTF) are the only mature gas trading hubs.[48] The TTF in particular has developed into the most relevant European hub.[49] An extensive transmission grid connecting the country to NWE, important storage capacity, and the LNG terminal, place the Netherlands in a highly advantageous position. These features mitigate the supply security risks deriving from the lack of long-term gas contracts from 2023 onwards. The TTF functions both as a physical and as a virtual trading hub, depending on the needs of gas importers. The Netherlands, through its 'gas roundabout' policy, became a facilitator not only for investments and trading but also for transporting LNG bought by neighbouring countries to the final destination.[50]

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[44] "Kwaliteitsconversie," Gasunie Zuidbroek, accessed January 12, 2021, https://zuidbroek.gasunie.nl/kwaliteitsconversie.
[45] Simon Skillings and Lisa Fischer, "A New EU Gas Market Must Expose It to All Clean Energy Solutions, Not Just Gas-on-Gas," *Energy Post* (blog), January 15, 2021, https://energypost.eu/a-new-eu-gas-market-must-expose-it-to-all-clean-energy-solutions-not-just-gas-on-gas/.
[46] Dan Harris, Marcella Fantini, and Matteo Coriglioni, "The Dutch Gas Market 2020-2030" (The Brattle Group, June 1, 2020), 30.
[47] Mijnraad, "Mijnraadadvies Sluiting Productielocaties En Minimum Flow Groningenveld," July 16, 2020, https://www.rijksoverheid.nl/documenten/kamerstukken/2020/07/16/mijnraadadvies-sluiting-productielocaties-en-minimum-flow-groningenveld.
[48] Patrick Heather, "European Traded Gas Hubs: The Supremacy of TTF," Oxford Energy Comment, May 2020, 2.
[49] According to the Oxford Energy Programme, the TTF has registered in 2020 the most active members and became the most liquid hub in Europe . See Heather, 4.
[50] Franza, van der Linde, and Stapersma, "Europe's Energy Relations: Between Legacy and Transformation," 52.

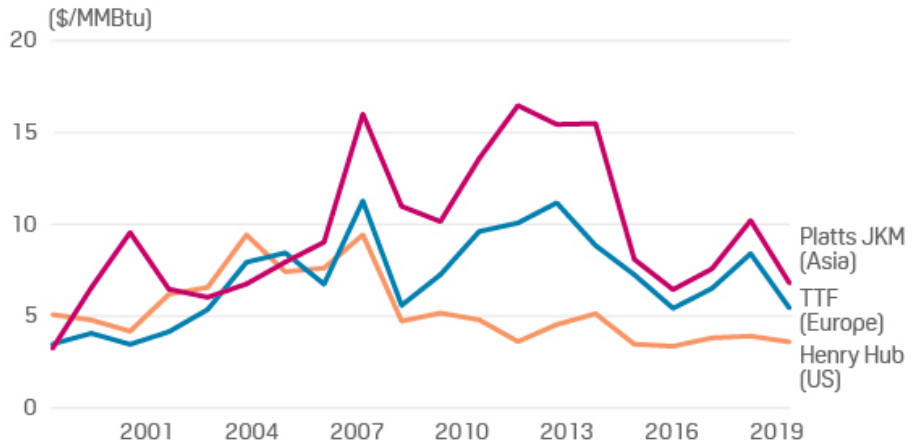

Figure 2 Global gas prices 2001-2019, from S&P Global Platts Analytics, 2019.

The growing importance of European hubs in gas trading is challenged by the fact that Europe has been perceived as a 'market of last resort' for LNG exporters.[51] Since 2014, the oversupply of gas on the international market – caused by low oil prices and weak demand in Asia – has led to an increased flow of LNG into Europe.[52] This development was further stimulated by the EU's large and underutilised LNG import capacity. As illustrated in Figure 2[53], however, spot market prices in Asia have been higher than European ones over the last decade. The high gas demand in countries like China, Japan and South Korea has led suppliers to choose the Asian market over the European one. The high demand and prices in south-east Asia, together with Russia's monopolistic position in the EU allowing it to provide less expensive pipeline gas compared to LNG, make Europe dependent on global gas market trends.

The COVID-19 pandemic led to important developments in the global gas market. Lockdown measures and a decrease in global industrial activity led to a contraction of gas demand and thus to oversupply. The EU's capability of being a 'market of last resort' met its limitations, as it was unable to absorb sufficient gas to mitigate the global issue of oversupply.[54] At the moment of writing this report, gas market prices are increasing due to resumption of activity in south-east Asia and to the very cold weather in the region. Record LNG price volatility rates have been registered in January 2021 as a result of these factors.[55] EU gas demand is also expected to partially recover in 2021. At the moment, however, the amount of LNG that will reach European hubs is uncertain given the skyrocketing demand and price in Asia.

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[51] Luca Franza, "Outlook for LNG Imports into the EU to 2025," CIEP Paper, CIEP Perspectives on EU Gas Market Fundamentals (CIEP, 2016), 16, https://www.clingendaelenergy.com/inc/upload/files/CIEP_paper_2016_2D_LNG_web.pdf.

[52] See Honoré, "Natural Gas Demand in Europe: The Impacts of COVID-19 and Other Influences in 2020," 2.

[53] S&P Global Platts, "The LNG Sector Is Breaking Taboos to Stay Competitive," June 27, 2019, https://www.spglobal.com/platts/en/market-insights/blogs/lng/062719-the-lng-sector-is-breaking-taboos-to-stay-competitive.

[54] The Oxford Institute for Energy Studies, "Quarterly Gas Review: The Impact of COVID-19 on Global Gas Markets," Quarterly Gas Review, May 2020, 1, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2020/05/Quarterly-Gas-Review-Issue-9.pdf.

[55] Greg Molnar, "Asian Spot LNG Volatility Breaks Historical Highs | Global LNG Hub," *Global LNG Hub* (blog), January 11, 2021, https://globallnghub.com/asian-spot-lng-volatility-breaks-historical-highs.html.

While the effects of long-term global gas market trends remain to be seen, one aspect becomes clear: there is an abundance of gas that can be traded internationally, from a variety of suppliers, whether it is via pipelines or LNG. The EU, in its search for security of supply, is not limited by a lack of gas, but rather by other geopolitical and environmental considerations that are discussed in chapters 4 and 5.

4. The geopolitical dimension

Satisfying domestic gas demand is essential for performing daily socio-economic activities across the EU. The lack of domestic resources and consequent import dependency place EU member states in vulnerable positions, especially when they are highly reliant on a country with different (geo)political priorities. To what extent can the EU and its members secure their gas supplies, and what are the political dilemmas that arise from this process?

Security of supply

In light of the high import dependency of the EU and the Netherlands, security of supply becomes pivotal to energy policy. While the concept of energy security of supply does not have a universally agreed upon definition, it generally refers to "the uninterrupted availability of energy sources at an affordable price".[56] It encompasses environmental, social, economic and even military considerations.

Security of supply concerns came to the forefront of EU energy policy after the 2006, 2009 and 2014 tensions between Russia and Ukraine. Both the 2006 and 2009 crises culminated in gas interruptions from Gazprom to Ukraine and to the EU. The year of 2009, in particular, saw the most severe interruption in EU gas imports.[57] Significant import dependency on a sole supplier meant that EU member states were unable to act effectively against disruptions along their main gas supply chain (the one transiting Ukraine). Once gas imports to south eastern European states were stopped, the lack of interconnections with NWE meant that no additional supplies (e.g., from Norway) could reach the countries in need.

Yet the situation is different today. Since the Lisbon Treaty in 2009, energy security of supply became codified as a shared competency between the EU and national governments.[58] The three energy packages, and in particular the last one, established an internal energy market within member states. The market was liberalized through the unbundling of vertically integrated companies, which also increased competitiveness.[59]

Import dependency in the EU is characterized by significant fragmentation between member states, specifically between NWE and Central and Eastern European (CEE) countries.[60] As a result of historical legacies, CEE states perceive reliance on Russia as a threat to their national sovereignty. Gas import dependency is a geopolitical issue, whereby Russia could interfere in the domestic affairs of CEE, due to the imminent threat of supply interruption. Contrastingly, NWE states approach import dependency from an economic perspective, with security of supply often playing a secondary role. The Netherlands is included in this latter category.

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[56] IEA, "Energy Security," IEA, December 2, 2019, https://www.iea.org/areas-of-work/ensuring-energy-security.
[57] For an in-depth analysis of the 2009 Russian-Ukraine gas dispute, see Sijbren De Jong, Jan Wouters, and Steven Sterkx, "The 2009 Russian-Ukrainian Gas Dispute: Lessons for European Energy Crisis Management after Lisbon," *European Foreign Affairs Review* 15 (January 1, 2010): 512.
[58] De Jong, Wouters, and Sterkx, 530.
[59] European Commission, "Third Energy Package," Text, Energy, May 21, 2019, https://ec.europa.eu/energy/topics/markets-and-consumers/market-legislation/third-energy-package_en.
[60] Ole Gunnar Austvik, "The Energy Union and Security-of-Gas Supply," *Energy Policy* 96 (September 1, 2016): 375, https://doi.org/10.1016/j.enpol.2016.06.013.

The Crimean crisis served as a true wake-up call for NWE countries that until then had been more concerned with strengthening the Single Market and developing climate policies than with security of supply. The Energy Union was established in 2015 as a reaction to growing tensions with Russia after the illegal annexation of Crimea. Its main goals were to coordinate and centralize member states' energy policies in order to increase solidarity between countries and secure supplies for all citizens.[61] The main pillars of the Energy Union are secure and diversified supplies, a fully integrated energy market, energy efficiency, climate action, as well as research, innovation and competitiveness.[62]

Despite repeated attempts to centralize energy policies among member states in the Energy Union, the EU still lacks the legislative capability to act on behalf of its members. Energy policy is a mixed competency, with an important part belonging to the national competency of member states. These tend to emphasize different pillars of the Union according to their sovereign interests.[63] Moreover, market-based energy actors are the main players securing energy supplies, given the liberalized nature of the EU's internal market. As such, energy companies and governments have dynamic relationships, in which the latter create the legislative framework that bounds autonomous companies.

Until now, the Netherlands has been a self-sufficient country that could, to a certain extent, depart itself from such gas security of supply tensions. Its new position of net importer and dependency on Russia requires the Netherlands to be involved in geopolitical and strategic considerations.

Dilemmas

Political tensions and economic interdependence are the two main elements characterizing EU-Russian relations. The 2009 gas crisis, the annexation of Crimea, the downing of the MH-17 passenger plane over Ukraine – in which Russia was directly involved – have led to significant political and military tensions between EU countries and Russia. The MH-17 tragedy in 2014 was particularly salient in the Netherlands, given that the aircraft had left from Amsterdam and the majority of the victims were Dutch citizens. The most recent topic of contention was the poisoning of Russian opposition leader and anti-corruption activist Alexei Navalny in August 2020. Similarly to the MH-17 situation, Russia denies any allegation of poisoning Navalny and refuses to start an investigation.

Political differences become particularly problematic due to the economic interdependence between Russia and the EU. Trade in energy products, particularly natural gas and crude oil, is the main avenue of economic cooperation, but not the only one. While the Netherlands imports primarily mineral fuels from Russia, Dutch exports include machines and transport equipment, chemical as well as industrial products.[64]

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[61] Ole Gunnar Austvik, "The Energy Union and Security-of-Gas Supply," *Energy Policy* 96 (September 2016): 377, https://doi.org/10.1016/j.enpol.2016.06.013.
[62] European Commission, "Energy Union," Text, Energy, March 8, 2017, https://ec.europa.eu/energy/topics/energy-strategy/energy-union_en.
[63] Kacper Szulecki and Kirsten Westphal, "Taking Security Seriously in EU Energy Governance: Crimean Shock and the Energy Union," in *Energy Security in Europe: Divergent Perceptions and Policy Challenges*, ed. Kacper Szulecki, Energy, Climate and the Environment (Palgrave Macmillan, 2018), 189, https://doi.org/10.1007/978-3-319-64964-1.
[64] Nieke Aerts et al., "De Nederlandse import- en exportafhankelijkheid van China, Rusland en de Verenigde Staten," Centraal Bureau voor de Statistiek, December 10, 2020, https://www.cbs.nl/nl-

In turn, due to the state ownership of many petroleum companies such as Gazprom and Rosneft, Russia is highly dependent on revenues derived from oil and gas exports to the EU. Given that Russia exports most of its gas through pipelines, an increase in the consumption of LNG threatens its pricing power.[65]

The strong economic ties thus make it unlikely that a disruption in gas supplies would occur for a long term. Instead, it is the geopolitical dimension that makes the interdependence problematic. A country that the EU and the Netherlands have repeatedly condemned and opposed, has the permanent ability to interfere with the member states' energy provision.

Political influence

The EU and the Netherlands praise themselves with the support for the rule of law and human rights. Not only does the EU aim to maintain its domestic democratic order, but also to promote such values within surrounding areas. Countries such as Belarus, Ukraine and Syria are part of the EU's Neighbourhood Policy (ENP), through which the Union seeks to promote economic, political and social stability. More than €15 billion was spent in the ENP between 2004 and 2020.[66] A large part of the union's legitimacy is built upon such declared goals. The Netherlands, similarly, conducts much of its foreign policy by supporting less developed countries in achieving peace and security. Dutch development aid is primarily focused on unstable regions around Europe.[67]

The inability to effectively react to Russian aggression places EU countries in a vulnerable position. Their credibility of responsible international actors fades. Several rounds of economic sanctions against Russia have been imposed in the last decade, including asset freezes, travel bans, and sectoral sanctions in (among others) defence and energy. While Russia was able to adapt quite rapidly to these, through for instance tax breaks and devaluation of the Rouble, the effect of sanctions is expected to become particularly noticeable on the long term.[68] That is partly due to the inability of accessing foreign technology and investments. Yet the EU cannot afford to fully sanction fossil fuel imports – the most important traded product and the main revenue stream of the Russian government.

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nl/longread/aanvullende-statistische-diensten/2020/de-nederlandse-import-en-exportafhankelijkheid-van-china-rusland-en-de-verenigde-staten.

[65] For an extensive overview of the inner workings of Russia's petroleum industry, see Jilles van den Beukel and Lucia van Geuns, "Russia's Unsustainable Business Model: Going All In on Oil and Gas," HCSS Geo-Economics (The Hague Centre for Strategic Studies, January 2021), https://hcss.nl/sites/default/files/files/reports/Russias%20Unsustainable%20Business%20Model.pdf.

[66] EEAS Strategic Communications, "European Neighbourhood Policy (ENP)," Text, EEAS - European External Action Service - European Commission, December 21, 2016, https://eeas.europa.eu/diplomatic-network/european-neighbourhood-policy-enp/330/european-neighbourhood-policy-enp_en.

[67] Ministerie van Buitenlandse Zaken, "Dutch Policy - Development Cooperation," Government of the Netherlands (Ministerie van Algemene Zaken), accessed January 6, 2021, https://www.government.nl/topics/development-cooperation/the-development-policy-of-the-netherlands.

[68] Tatiana Mitrova, Ekaterina Grushevenko, and Artyom Malov, "The Future Of Oil Production In Russia: Life Under Sanctions" (Skolkovo, March 2018), 4.

Additionally, fuzzy laws in certain European countries create a form of tax haven.[69] In other words, regulatory frameworks that do not require companies to declare beneficial ownership, may be facilitating money laundry operations. This money might fund activities, such as financing repressive regimes, that do not align with European goals.

There are several instances in which the EU faced the **political dilemma** of having to choose between emphasizing political strength by imposing sanctions or economic stability by securing supplies. The completion of the Nord Stream 2 pipeline, not a particularly attractive project from a commercial point of view, will have geopolitical implications for the stability of the EU's neighbourhood. The only direct pipeline connection between Russia and the EU will leave current transit countries such as Ukraine more vulnerable. Revenues derived from transit and bargaining positions in relation to pricing will be endangered, as Russia will have an alternative avenue to deliver gas to Europe. The country will be less dependent on transit countries and thus less concerned with preserving a certain degree of stability in these countries.

This is problematic for the EU given the declared goal of maintaining a peaceful neighbourhood both in order to preserve stability in Europe and to ensure secure gas and oil supply routes. In addition to Russian constant political or military interference in Ukraine, the sovereignty of Belarus and Moldova is targeted too. The high dependency of the EU's Eastern neighbours on Russia, in areas ranging from energy and economic affairs to culture and religion, makes them highly vulnerable.[70] The annexation of Crimea as well as the continuous political interference in Belarus show that Russia might adopt an interventionist approach. Additionally, the natural gas transit contract between Ukrainian and Russian companies will expire in 2024, leaving great uncertainty as to what could happen next between the two countries.[71] By being reliant on Russian gas , the EU becomes ineffective in protecting its own interests in the region.

When Alexei Navalny was hospitalized in Germany and his poisoning was confirmed, much pressure centred on the German government to take action. Angela Merkel's spokesman stated that action against Nord Stream 2 was not excluded as a reaction to Russia.[72] Ultimately, however, the costs for Germany and energy companies to take decisive action in relation to Nord Stream 2 were too high. The German government allowed the project to continue.

Similarly, taking measures against the MH-17 plane crash by the Netherlands could ultimately harm energy relations with Russia. The criminal investigation of four individuals (three of Russian and one of Ukrainian nationality) for the plane crash started in March 2020.[73] Despite the Russian government denying interference, the

[69] David Pegg, "EU States 'dragging Their Feet' over Financial Transparency, Report Finds," *The Guardian*, March 22, 2020, sec. Business, https://www.theguardian.com/business/2020/mar/22/eu-states-fail-dragging-their-feet-over-financial-transparency-report-finds.
[70] Mathieu Boulègue, Orysia Lutsevych, and Anaïs Marin, "Civil Society Under Russia's Threat: Building Resilience in Ukraine, Belarus and Moldova" (Chatham House, November 2018), 2–3.
[71] Savcenko and Hornby, "The Future of European Gas after Groningen," 9.
[72] Euractiv, "Merkel Doesn't Rule out Nord Stream Fallout over Navalny," *Www.Euractiv.Com*, September 8, 2020, sec. Energy & Environment, https://www.euractiv.com/section/energy-environment/news/merkel-doesnt-rule-out-nord-stream-fallout-over-navalny/.
[73] Ministerie van Justitie en Veiligheid, "Prosecution and Trial - MH17 Plane Crash," Netherlands Public Prosecution Service (Ministerie van Justitie en Veiligheid), accessed December 17, 2020, https://www.prosecutionservice.nl/topics/mh17-plane-crash/prosecution-and-trial.

Netherlands has accused the country of involvement under international law. However, the limited ability of the Netherlands and the EU to impose meaningful sanctions on Russia leads to a loss of political leverage and negotiating power. The lack of credibility affects not only the relation with Russia, but also with other competing international powers.

When even highly controversial events lead to minor impacts on EU-Russian fossil fuel trade, Russia gets lee-way to engage in other actions that are considered problematic by EU countries. As such, the EU and the Netherlands are positioned between two afflicted scenarios. While continuing imports from Russia weakens the EU's geopolitical influence, freezing energy relations could have direct consequences on citizens as a result of interrupted of supplies. This is the first **political dilemma** related to gas import dependency on Russia.

Fragmentation

The second **political dilemma** derives from inconsistencies within EU energy policy. Importing natural gas from a monopolist makes it difficult to bargain over trade conditions or pricing. This is particularly the case when neighbouring EU states seem to act according to sovereign rather than solidary principles. The EU has been attempting to address the fragmentation in individual member states' energy policies by repeatedly promoting solidarity in the context of gas security of supply. If solidarity principles are applied effectively, countries that use a common transmission system should assist each other in securing gas supplies, in the case of emergency.[74] Working together in the field of energy and leveraging the internal market would strengthen the position of countries when negotiating with Russia, which is similarly vulnerable in view of security of demand.

Yet the lack of solidarity is persistent and was particularly visible in the disagreements surrounding Nord Stream 2. Poland claimed that Germany is securing its own supply by weakening the position of CEE countries. EU members lack policy coherence and a geopolitical approach to energy relations, partly due to diverging national interests and partly to the private nature of energy corporations in the EU.

The emphasis of different priorities by member states in securing gas supplies leads to a loss of negotiation power for certain individual countries. Tensions are further heightened by the limited ability of the EU to act on behalf of its member states on energy policy. Moreover, it coincides with an already tense environment in the EU, marked by lack of consensus about, among others, the COVID-19 response and the climate priorities for next decades.

Additionally, unlike Gazprom, a company in which the Russian state has a majority share and which tends to further Moscow's geopolitical agenda, European companies are market-based actors.[75] The latter focus on economic and competitive gains, rather than on longer-term strategic considerations. This makesit difficult for the EU states to secure supplies from a geopolitical perspective. Energy products can be considered a

[74] Marie-Claire Aoun and Daan Rutten, "EU Security of Gas Supplies: Solidarity Runs Through the Pipeline" (CIEP and IFRI, May 2016), 3, https://www.ifri.org/sites/default/files/atoms/files/hors-ifri_eu_security_gas_supplies_aoun.pdf.
[75] van den Beukel and van Geuns, "Russia's Unsustainable Business Model: Going All In on Oil and Gas," 15.

sort of public good that, at least in the EU, is provided privately. Thus, there is an imbalance between European public actors' need to diversify and secure gas supply and the lack of coordination with private actors.

This consideration is relevant, among others, in relation the Eastern Mediterranean gas reserves. The East Med pipeline would help the diversification of suppliers to the EU as well as bypass Russia and Turkey – two supply routes considered unstable. For these reasons, it has been included in the EU's 'Projects of Common Interest' programme. Yet from an economic point of view, the pipeline is only marginally competitive with other gas supplies in Southern Europe.[76] The East Med would therefore be a geopolitical rather than a purely economic pipeline, making it difficult for private companies to move forward with the project.

Member states are faced with the **dilemma** of choosing between strengthening EU cooperation, and maintaining autonomy at the expense of a weaker geopolitical position. By staying divided, they undermine the goals derived from EU membership, i.e., integration and cooperation that ultimately benefits every country. Additionally, fragmentation opens up opportunities for countries such as Russia to apply 'divide and conquer' strategies with the purpose of causing instability and distrust. On the other hand, energy policy is entrenched as a sovereign competency given that the stakes are high and consequences direct. Insecure energy supplies could significantly impact the stability of member states, which until now have been reticent in shifting this competency to the supranational European level.

[76] Isabella Ruble, "European Union Energy Supply Security: The Benefits of Natural Gas Imports from the Eastern Mediterranean," *Energy Policy* 105 (June 1, 2017): 349, https://doi.org/10.1016/j.enpol.2017.03.010.

5. The environmental dimension

Until the climate ambitions in the Dutch Climate Agreement and the European Green Deal are achieved, the demand for natural gas is expected to gradually decline, whilst remaining quite stable until 2030. As mentioned in section 3, the EU's domestic gas production will be far too low to satisfy this demand, thus relying on imports. What are the implications of gas import dependency in terms of GHG emissions, and how do increasing imports affect global climate ambitions?

GHG emissions

Decreasing GHG emissions requires a good understanding of how these are produced. Regarding carbon dioxide (CO_2), which in the energy sector is emitted directly through fossil fuel combustion, there is wide consensus as to its characteristics and measurement techniques. In addition to CO_2 emissions, however, fossil fuel energy production also leads to methane (CH_4) emissions . CH_4 is a more environmentally harmful GHG than CO_2, as it stays in atmosphere for less time, but it is more impactful toward the ozone layer.[77]

Generally, CH_4 can be released into the atmosphere in three ways: through leaks, venting and incomplete flaring.[78] Leaks, or fugitive emissions, occur unintentionally due to faulty equipment or components along the gas supply chain – including production sites, transmission systems as well as distribution.[79] Fugitive emissions are accidental and therefore the most difficult to measure. Secondly, methane can be vented – i.e., released intentionally due to safety reasons or operational procedures.[80] Lastly, incomplete flaring is a procedure whereby natural gas that cannot be sold is instead burnt. Most gas turns into CO_2 and water, but methane can escape into the atmosphere if the flaring is incomplete.

Flaring takes place particularly at oil production sites, given that natural gas is a by-product of oil. This is a widespread and extremely wasteful practice, given that valuable natural gas is simply burnt instead of used by countries in need. Worldwide, 150 bcm of natural gas are flared at oil production sites, causing 400 million tons of CO_2 equivalent emissions per year.[81] This amount represents almost 5 times the Dutch projected demand for 2030.

At the moment, there is significant uncertainty regarding the levels of methane emissions released purposefully or accidentally along oil and gas supply chains. These include an overview of extraction, production, transport and storage, as well as

[77] European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on an EU Strategy to Reduce Methane Emissions" (Brussels, October 14, 2020), 2, https://ec.europa.eu/energy/sites/ener/files/eu_methane_strategy.pdf.
[78] European Commission, 2.
[79] GIE and Macrogaz, "Potential Ways the Gas Industry Can Contribute to the Reduction of Methane Emissions," Report for the Madrid Forum (Madrid, June 2019), 13, https://ec.europa.eu/info/sites/info/files/gie-marcogaz_-_report_-_reduction_of_methane_emissions.pdf.
[80] IEA, "Interactive Country and Regional Estimates – Methane Tracker 2020," IEA, March 2020, https://www.iea.org/reports/methane-tracker-2020/methane-abatement-options.
[81] World Bank, "Global Gas Flaring Reduction Partnership (GGFR)," Text/HTML, World Bank, accessed January 6, 2021, https://www.worldbank.org/en/programs/gasflaringreduction.

distribution to the end-consumer. In the case of LNG, liquefaction, transport and regassification are included in the downstream sector. As discussed below, when accounting for the entire supply chain, production and transport emissions are much higher for imported gas.

Yet the lack of a universal measurement method makes it difficult to determine the exact level of GHG emissions along global supply chains of natural gas. The EUand most of its member states currently use the tier 1 emission measurement criteria, which includes all direct greenhouse gas emissions. The International Panel for Climate Change (IPCC) distinguishes between three measurement techniques, structured along three tiers.[82] Tier 1 is the simplest method, focusing on the amount of combusted fuel and a default emission factor provided by the IPCC. Tier 2 is a more specific indicator, including a country-specific factor for each type of gas. This country-specific factor is approximated based on the carbon content of fuels, carbon oxidation factors and the state of technological development. The most complicated method, tier 3, complements tier 2 by also taking into account (among others) combustion technology, quality of maintenance, age of equipment and operating conditions. Tier 3 can provide a more accurate account of non-CO_2 emissions compared to tiers 1 and 2, yet it is only used in a few European countries.[83]

The most recent European Commission communication from October 2020 on methane emissions[84] presents ambitions to establish tier 3 reporting in the energy sector as the European standard. Moreover, in collaboration with, among others, the UN Environmental Programme and the International Energy Agency (IEA), the EU aims at establishing an independent organization in charge of monitoring and centralizing data on global methane emissions. The new EU strategy also mentions the World Bank's Global Gas Flaring Reduction programme and initiative on Zero Routine Flaring by 2030, which so far have been joined by 88 governments, oil companies and development institutions.[85]

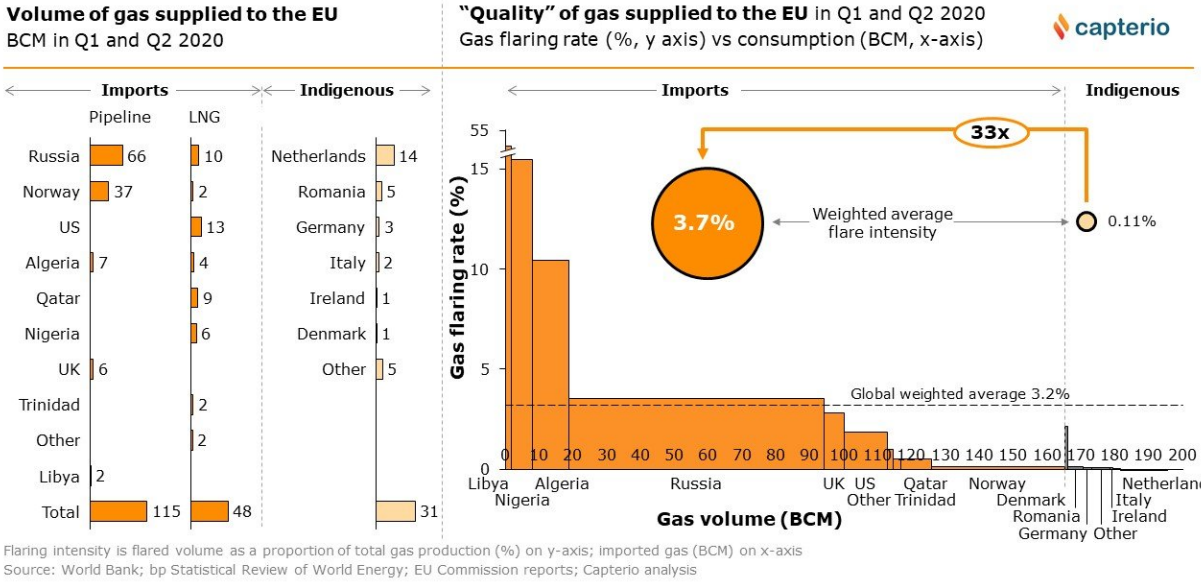
Dilemma: climate ambitions

The decision to stop domestic gas production was caused by a large number of factors, including the desire to reach climate goals. The relatively stable gas demand in the Netherlands and the EU in the following decades will be fulfilled by increasing amounts of imports from, among others, Russia, the US and Qatar.

One important factor to consider when choosing to import gas rather than produce it domestically is the level of emissions along the supply chain. GHG emissions will be significantly higher when importing pipeline gas from Russia or LNG from the US. The IEA's 2021 Methane tracker shows particularly high methane emissions from US shale

[82] IPCC, "2006 IPCC Guidelines for National Greenhouse Gas Inventories - Volume 2," 2006, 1.6-1.7, https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf.
[83] European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on an EU Strategy to Reduce Methane Emissions," 4.
[84] European Commission, 4–5.
[85] World Bank, "As Part of a New Methane Reduction Strategy, the European Union Pledges to Support Gas Flaring Reduction," Text/HTML, World Bank, accessed January 6, 2021, https://www.worldbank.org/en/programs/gasflaringreduction/brief/as-part-of-a-new-methane-reduction-strategy-the-european-union-pledges-to-support-gas-flaring-reduction.

fields and Russian pipelines.[86] Figure 3 illustrates the difference in gas flaring rates and thus in emissions between different suppliers of the EU. Additionally, the energy required for transport of pipeline gas and regasification of LNG will lead to more emissions along the downstream supply chain. Overall, estimations point to a 30 % higher global carbon footprint resulting from importing Russian gas and LNG rather than producing it domestically.[87]



Flaring intensity is flared volume as a proportion of total gas production (%) on y-axis; imported gas (BCM) on x-axis
Source: World Bank; bp Statistical Review of World Energy; EU Commission reports; Capterio analysis

Figure 3 Gas flaring rates of EU's gas suppliers, from Capterio.[88]

Due to the commonly accepted tier 1 method of calculating emissions, however, the additional emissions occurring outside Dutch territory are not included in the Netherlands' footprint. Instead, they are officially included in suppliers' carbon footprints. The main supplier, Russia, places climate goals quite low in its 2035 Energy Strategy.[89] Despite the lack of official designation in the carbon footprint, however, CH_4 leaks and CO_2 emissions associated with European and Dutch imports do take place. The progress made through solar and wind power in the Netherlands is virtually negated by the increased emissions derived from EU gas imports due to the declining Dutch gas production.[90]

In spite of the emissions associated with increasing imports, the Dutch investment climate and regulatory framework surrounding gas exploration is discouraging. The national anti-gas sentiment makes investing in the remaining exploitable reserves difficult. The political support for measures to stimulate Dutch gas production is limited.

[86] IEA, "Methane Tracker 2021," IEA, January 18, 2021, https://www.iea.org/reports/methane-tracker-2021.
[87] van den Beukel and van Geuns, "The Deteriorating Outlook for Dutch Small Natural Gas Fields," 16.
[88] John-Henry Charles and Mark Davis, "Twelve Things The EU Should Do About Gas Flaring," Capterio, November 23, 2020, https://capterio.com/insights/twelve-things-the-eu-should-do-about-gas-flaring.
[89] Tatiana Mitrova and Vitaly Yermakov, "Russia's Energy Strategy-2035: Struggling to Remain Relevant," Russie.NEI.Reports (Ifri, December 10, 2019), 16, https://www.ifri.org/en/publications/etudes-de-lifri/russieneireports/russias-energy-strategy-2035-struggling-remain.
[90] van den Beukel and van Geuns, "The Deteriorating Outlook for Dutch Small Natural Gas Fields," 16.

A mismatch can be observed between political will and reality– refusing to portray gas as a useful (or at the least inevitable) fuel in the energy transition while domestic demand is stable and imports are growing.[91] The **political dilemma** that the Netherlands faces, thus, is associated with its commitment to global climate goals. Although decreasing domestic gas production was perceived by the public as a positive development in relation to green goals, importing gas is in fact more problematic when looking at emissions.

[91] Luca Franza, *The Political-Economic Dimension Of Transformations In Eu-Russia Gas Trade Mechanisms* (The Hague: Clingendael International Energy Programme, 2020), 263, https://www.clingendaelenergy.com/inc/upload/files/THE%20POLITICAL-ECONOMIC%20DIMENSION%20OF%20TRANSFORMATIONS%20IN%20EU-RUSSIA%20GAS%20TRADE%20MECHANISMS%20secured.pdf.

6. Opportunities: how to mitigate vulnerabilities?

Ensuring strategic autonomy and achieving climate neutrality are core priorities of the EU and of the Netherlands. Energy import dependency is a key inhibiting factor to achieving this objective. The wide range of uncertainties associated with diversification options further complicate the issue. It is essential that the Netherlands and other EU members – which until now have been emphasizing the economic aspects of energy imports – acknowledge the geopolitical and environmental dimensions of dependency. There are serious political costs associated with dependency and, as shown in this report, the resulting dilemmas lack a clear-cut solution. Diversification is important but insufficient. In addition to alternative imports to Russian gas, a combination of approaches is needed. Collaboration and solidarity between EU countries is pivotal in this regard.

Diversification

From a geopolitical perspective, a core strategy for ensuring security of gas supplies is diversification of suppliers and supply routes. None of the EU's diversification options are optimal. There are both benefits and risks associated with all of them, including the Southern Gas Corridor and the projected EastMed pipeline.[92] The essential role played by Turkey in both of these projects can also be problematic.[93] For the Netherlands, the main issue arising from these European diversification projects is that the additional gas would likely not reach NWE. In other words, the Netherlands' geopolitical vulnerabilities arising from import dependency on Russia would not be mitigated.

LNG represents a good geopolitical alternative for the Netherlands. The regassification terminal in the port of Rotterdam together with the existence of the TTF place the Netherlands in an advantageous position in relation to LNG. The extensive interconnections of gas infrastructure with NWE could make the Netherlands valuable for neighbouring countries' security of supply too. Current high supply and low prices further render LNG to be an attractive option.

Nonetheless, the expected resumption in economic activity resulting from looser COVID-19 measures is likely to lead to an increase in gas demand and prices. The cold month of January 2021 in Northeast Asia has also had a significant impact on prices.[94] While LNG is important geopolitically, uncertainties remain as to how much will reach Europe. Additionally, the usefulness of LNG in securing supply in the Netherlands depends on the amount that the Gate terminal in the port of Rotterdam can receive and regasify. Temporary shortages of supply and gas price peaks can be partly mitigated by ensuring sufficient available storage facilities in the EU. At the same time, an increase in LNG imports is problematic from a GHG emissions point of view.

[92] Among others, risks refer to the recent military escalation in the Nagorno-Karabakh region, as well as the high costs and distant time horizon associated with EastMed.
[93] Many of the EU's diversification strategies away from Russia require cooperation with Turkey. Yet President Erdogan's governance approach and tensions in the Mediterranean made EU leaders question the close partnership with Turkey.
[94] Sabrina Valle, "GLOBAL LNG-Asian Spot Prices Rise to Record High," *Reuters*, January 8, 2021, https://www.reuters.com/article/global-lng-idUSL1N2JJ1LT.

Enhancing EU (energy) cooperation

Moving forward with a fragmented and purely economic strategy weakens the EU's – and by extension, the Netherlands' – ability to achieve strategic autonomy and strengthen global influence. The lack of concrete plans outlining the role of natural gas in the production of hydrogen and the energy transition could leave the EU in a situation where domestic production is absent, countries are still highly dependent on gas and LNG supply is limited. A coordinated approach that acknowledges the role of gas in the transition would lead to a more realistic and better coordinated gas security of supply strategy at the EU level.

Dealing with a geopolitically oriented player in the energy market such as Russia requires EU countries to work together. Certain diversified supply routes, although they would not reach the Netherlands, could still help the country indirectly. For instance, the SGC brings gas to Bulgaria, Greece and Italy from Azerbaijan, thus decreasing their dependency on Russia. As a result, the EU as a whole also became less reliant on Russian gas, gaining a better bargaining position as well as more power to – if needed – exert influence against Russian actions. It is thus advantageous for the Netherlands to support more cooperation at the EU level, to reap indirect geopolitical benefits from EU-wide diversification plans.

Due to the far-reaching geopolitical and environmental implications of import dependency, an integrated approach between different sectors is appropriate for mitigating vulnerabilities. Such an approach would allow the Netherlands and NWE to more effectively engage in constructive dialogue with Russia. Combining the energy dossier with mutually concerning issues like arms control, terrorism and piracy would increase interdependence and decrease the risk of geopolitically motivated supply interruptions.

Decreasing methane emissions

The EU's strategy on reducing methane emissions is a good step in tackling the environmental dimension of import dependency. Its effectiveness, however, depends on member states and companies adhering to the proposed higher standards. In order to achieve this, the Netherlands should support the revision of legislative documents at the EU level, which, according to the strategy, will be introduced and proposed in 2021. The revised documents will include a more comprehensive methodology for measuring GHG emissions (tier 3 method), as well as flaring reduction targets.

The GHG emissions associated with imported products could be managed through different instruments, such as a producer responsibility scheme proposed by Margriet Kuijper Consultancy et al.[95] or a carbon border tax. Both policy tools are based on the idea of compelling those companies active on EU and Dutch territory to obey the methane reduction goals. Otherwise, domestic manufacturers who obey strict sustainable regulations under the Green Deal would be disadvantaged compared to

[95] Margriet Kuijper Consultancy, De Gemeynt, and Royal HaskoningDHV, "Carbon Takeback Obligation: A Producers Responsibility Scheme on the Way to a Climate Neutral Energy System," De Gemeynt, January 21, 2021, https://gemeynt.nl/bericht/carbon-takeback-obligation-a-producers-responsibility-scheme-on-the-way-to-a-climate-neutral-energy-system.

foreign ones.[96] Most producers of imported goods do not need to account for all emissions along supply chains. This is the case with natural gas as well, whereby many of the EU's gas suppliers do not prioritize climate goals, nor do they operate their businesses sustainably. Although a challenging project to define and develop, a carbon border adjustment mechanism was proposed by the European Commission in 2020, awaiting adoption in 2021.[97] Natural gas imports should be incorporated in the carbon border tax.

An accelerated energy transition

Securing gas supplies would no longer be necessary if the Netherlands engaged in an accelerated energy transition. At this moment, environmental agencies such as PBL estimate that natural gas will play an important role in the Dutch energy mix until at least 2030.[98] However, a larger reduction of domestic consumption sooner than 2030 would result in less gas import dependency. More energy efficiency, large-scale deployment of offshore renewable energy infrastructure and an increase in hydrogen-based energy are some of the shorter-term measures that can be applied in the coming years. In this way, geopolitical and environmental dilemmas would be mitigated. Given the popularity and saliency of hydrogen in Dutch public discourse, this option is briefly discussed below.

The Netherlands aims to become 'a hydrogen leader', as indicated by the ambitious plans of developing hydrogen infrastructure.[99] The above-mentioned advantages of Dutch infrastructure – extensive connections with NWE and port facilities – can aid the Netherlands in becoming a leader in hydrogen production. Not only is the Netherlands integrated in the largest hydrogen network in the Europe (Air-Liquide), but it could also use its pre-existing natural gas infrastructure for hydrogen transport.[100] Yet this route is still uncertain, particularly due to the high costs associated with the production of low-carbon hydrogen (both green and blue)[101].

The Dutch government should, however, continue supporting this option by decreasing the risk of investments and supporting the industry in adopting hydrogen energy production. This requires large scale subsidization programmes, such as the Stimulation of Sustainable Energy Production scheme (SDE ++), to be rigorous in financing carbon capture and storage technologies, electrolysis and hydrogen production.[102] Achieving hydrogen goals also requires cooperation on the European level, not only within the environmental policy realm, but also in the industrial one. The EU industrial policy and the ETS should be integrated with climate goals on hydrogen in order to encourage its large-scale deployment.

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[96] Nikos Tsafos, "How Can Europe Get Carbon Border Adjustment Right?" CSIS, August 7, 2020, https://www.csis.org/analysis/how-can-europe-get-carbon-border-adjustment-right.
[97] European Commission, "EU Green Deal (Carbon Border Adjustment Mechanism)," Have your say, 2020, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12228-Carbon-Border-Adjustment-Mechanism.
[98] PBL, "Klimaat- en Energieverkenning 2020," 93.
[99] Beckman and van den Beukel, "The Great Dutch Gas Transition," 9.
[100] IEA, "The Netherlands 2020," 193.
[101] Green hydrogen is made through electrolysis with renewable energy. The production of blue hydrogen is based on natural gas with carbon capture and storage (CCS) technologies.
[102] IEA, "The Netherlands 2020," 205.

7. Conclusion

The decline in Dutch gas production does not only have ramifications for the Netherlands' security of supply, but also for the EU as a whole. In general, a mismatch can be observed between political will and reality. The government of the Netherlands refrains from portraying gas as a useful (or at the least inevitable) fuel in the energy transition, despite domestic demand being relatively stable and imports rapidly growing. The sub-optimal business climate for the Dutch upstream gas industry makes it difficult for domestic companies to secure gas supplies for the following years. This leads to an increased import dependency until at least 2030 and to several geopolitical and environmental concerns. Below, the key takeaways of this report are outlined.

- **Dilemma 1:** Increasing gas imports from Russia undermines the Netherlands' and the EU's geopolitical influence in neighbouring regions. The commitment to promote liberal democratic values in the EU Neighbourhood or the Middle East is weakened by the EU's need to continue purchasing large amounts of oil and gas from Russia, despite tense moments of Russian interference.

- **Dilemma 2:** EU member states tend to emphasize different priorities in their energy policy, acting according to sovereignty rather than solidarity principles. The fragmentation in approaches leads to internal tensions, allowing centralized and geopolitically oriented actors like Russia to more easily achieve their goals.

- **Dilemma 3:** Imported natural gas, whether from Russia or elsewhere, is associated with significantly higher GHG emissions compared to gas produced by the Netherlands or Norway. The Netherlands' efforts in renewable energy generation are to a large extent negated by the increased emissions along the imported gas supply chains.

Political costs derived from import dependency are high, yet outside of situations when a crisis such as the annexation of Crimea occurs, they seem to be neglected by many EU and Dutch leaders. There are several actions that, in combination, can have a mitigating effect on the above-mentioned dilemmas.

- **Diversification of suppliers** – particularly through LNG, away from Russia – can be beneficial for fulfilling the Netherlands' demand. Although GHG emissions will be higher when compared to European gas production, LNG would nonetheless increase the political power of the Netherlands in front of Russia. Ultimately, the capacity of regasification terminals and storage facilities will determine the amount of LNG that the Netherlands can absorb and further distribute to NWE.

- Ensuring a constant and affordable supply of natural gas requires a **coordinated approach at the EU level**. Applying the **principle of solidarity** in energy policy would mitigate the fragmentation between the strategies of member states. An EU-wide approach would be further strengthened by **combining dossiers** of fossil fuel imports with other relevant topics such as piracy or terrorism, allowing for constructive engagement with Russia.

- The increased emissions resulting from natural gas imports from Russia as well as diversified routes can be mitigated by strengthening the regulatory framework for the **measurement of methane emissions** and for **flaring**. A carbon border tax can be a useful policy instrument in this regard.
- **An accelerated energy transition** would decrease issues associated with gas import dependency. Energy efficiency measures, the large-scale deployment of offshore renewable energy infrastructure as well as continued support and investment in hydrogen would not only allow the Netherlands to decrease natural gas import dependency but would also contribute to achieving emission reduction goals.

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