# LITERATURE REVIEW ON THE DUTCH ENERGY SECURITY

**5 December 2022**


**Research Division**

Melle R. And van der Zee S.



**Website** | **Newsletter** | **Instagram** | **Linkedin**

# LITERATURE REVIEW ON THE DUTCH ENERGY SECURITY

## 5 December 2022

de Ridder Melle

van der Zee Sophie


# Abstract

The North Sea has long provided the Netherlands with a stable and profitable source of energy, with the extraction of gas beginning in the 1960s. However, the Paris Climate Agreement prompted a shift in Dutch energy policy, leading to a move away from gas drilling and towards investment in offshore wind parks. The North Sea also offers opportunities for exporting electricity or hydrogen, further benefiting the national economy. Achieving these goals will require investment in energy hubs and the conversion of oil and gas pipelines for hydrogen transportation. The Dutch government's policies so far have been significant in securing the country's energy supply, but success will depend on continued development and improvement.

## Contents

## 1. Introduction

The North Sea has been of considerable importance in European and Dutch contemporary history. It has been used for trading within Europe and between the Netherlands and the rest of the world (Chirosca & Rusu, 2021). The Rotterdam harbour is one of the most famous examples in this regard, with an annual trade of 469.4 million tons in 2019 (Port of Rotterdam, 2019). Besides trade, the North Sea is also vital due to its rich nature in oil and gas (Chirosca & Rusu, 2021). With the signing of the 2015 Paris Climate Agreement, the Netherlands agreed to substantially decrease its reliance on fossil fuels. This left the question of how to find a reliable, sustainable, and long-term energy source, and what this should be. This paper will analyse the relationship between the Dutch part of the North Sea and energy security. In doing so, firstly, the main focus will be on the extraction of fossil fuels from the Dutch EEZ since 1968 (Larminie, 1987). The second part will be on the renewable energy transition and possible challenges in the future. Lastly, a conclusion will be drawn by answering to what extent the North Sea is capable of providing the Netherlands with energy security.

## 2. Literature Review

### 2.1.Theorical Framework

The realist policy evaluation will be used to analyse the EU's response to its energy security policy in the North Sea. This theory was first used by Dawson and Tiley in 1997. The respective theory is especially used whenever one is keen on finding out how certain implementations are linked to specific outcomes, in other words, causality (Dawson & Tilley, 1997). Its success can be measured by asking the following questions: "What works? For whom? In which circumstances? And how and why?" (INTRAC, 2017). Therefore, in this research paper, the important question raised is whether the measures taken by the EU and its member states have had the wanted effect, namely guaranteeing energy security both now as well as in the future.

### 2.2. Oil and Gaz Sector

For the Netherlands, the North Sea has a considerable economic value since oil, gas, and wind energy are extracted from it. In 1958, the Convention on the Continental Shelf divided the North Sea into Exclusive Economic Zones (EEZ), which provided each surrounding country with an EEZ, in which they could extract resources. Since then, the Netherlands has found over 499 proven accumulations of natural gas, based on numbers up to 1 January 2022 (Ministry of Economic Affairs and Climate Policy, 2021). The first Dutch gas reserve was founded in 1965 and the first oil reserve in 1969 (Larminie, 1987). For the Netherlands, the first offshore gas discovery was in 1968 and oil in 1970 (De Jager et al., 2007). Combined with findings in the Groningen gas field, the Netherlands has been self-sufficient with regard to gas from 1959 until 2018 (Van Geuns et al., 2017).

Gas is the primary energy source for the Netherlands. The main production of gas, since the sharp reduction of gas extracted from the Groningen field in 2018, takes place in the North Sea (Bekkers et al., 2021). This gas is important to Dutch energy security since it reduces the dependency on imports. At the same time, it is considered a 'green gas', meaning that its carbon dioxide footprint is lower than gas that is imported from Russia or Qatar for example. Due to the Russian invasion of Ukraine, gas prices have skyrocketed, and it is more feasible to conduct new gas drillings in the North Sea. In addition, to reduce the dependence on Russian gas, the Netherlands must actively seek new gas reserves in its EEZ, which it has started since 1 January 2022 (Ministry of Economic Affairs and Climate Policy, 2021).

A report from consultant TNO showed that in the Dutch EEZ, reservoirs contain up to 78.2 billion cubic meters (bcm) of gas (Koster, 2022). In 2019, the amount of gas produced in the North Sea was approximately 10 bcm (Bekkers et al., 2021). This means that

following the production of 2019, the reserves in the North Sea should be able to provide gas until at least 2030. However, the average Dutch annual usage of gas is 40 bcm (Koster, 2022). Therefore, the current production of gas in the North Sea only provides for a quarter of the Dutch gas demand. It is also important to note that gas production in the North Sea must decline due to the targets of the Paris Climate Agreement (Bekkers et al., 2021). To ensure that the Netherlands can provide for its annual 40 bcm need, it must rely on gas drillings onshore, which is an extremely sensitive topic due to earthquakes, and import (Koster, 2022).

Due to the decline of gas production in the Netherlands, more import of gas was needed. This resulted in the Netherlands becoming a net importer of gas in 2018, with an import value of almost 12 billion euros and an export value of 9.8 billion euros (Dutch Central Bureau of Statistics, 2019). It was the first time that the Netherlands was a net importer of gas since 1963 (Schwartz, 2019). As a result, the Netherlands became reliant on gas, primarily from Russia and Norway, but also by importing LNG from America and Qatar (Bekkers et al., 2021). The amount of gas retrieved from the North Sea has steadily declined and, according to the Dutch National Climate Agreement, will further decline in the coming decades. It will be traded in for renewable energy production of wind and hydrogen, which has significantly lower emissions (Bekkers et al., 2021). Furthermore, the European Commission adopted the European Climate Law in 2021, intending to become climate-neutral by 2050 and reduce net greenhouse gas emissions by 55 percent by 2030 (European Commission, 2021).

However, the Russian invasion of Ukraine and the following energy crisis might have caused a shift in this policy. The invasion has left the EU and the Netherlands in a need to seek for other gas and energy supplies (Horowitz, 2022). An answer was found in the import of LNG and an increase in gas drilling in the North Sea. An example is in the Dutch Waddenzee. One day after Gazprom declared the supply suspension to the Netherlands, Euronews, 2022 revealed that the Netherlands made plans to conduct new gas drillings in the North Sea. In the past years, ironically, the same project had been declined due to climate concerns. There is a high need for a rapid alternative source of gas now that the import of Russian gas has ultimately halted. However, the new gas fields begin delivering gas in 2024 (Horowitz, 2022). This again raises the debate about whether it is necessary to start this since it is contrary to the climate goals of Paris. Environmentalists have already expressed their critique since they rather see the EU, and thus the Netherlands, invest in renewable energy sources.

To ensure the EU will become independent of Russian gas before 2030, the European Commission presented the REPowerEU plan in May 2022. In the short term, the EU wants to reduce its dependency on Russian Gas, mainly by speeding up the transition to

renewable energy sources (European Commission, 2022). According to the Dutch minister of Climate and Energy, the extra drillings for gas in the North Sea are indeed meant as a temporary resolution to the energy crisis. Ultimately, the aim is to transition to long-term renewable energy sources (Waterweg, 2022). It is also important to note that the gas- and oil fields on the North Sea are not infinite. As stated previously, the reservoirs contain 78.2 bcm and the annual usage of exploitation is around 10 bcm. Therefore, the North Sea will not be able to provide the Netherlands with gas in the long run. That means that even though the quick response to the Russian invasion entailed drilling for more gas, gas will ultimately become an irrelevant energy source to Dutch energy security.

### 2.3. The Future of Energy Security in the North Sea

Fossil energy reserves will over time lose their importance in the North Sea for both Dutch as well as European energy security. This is mainly caused due to the lack of gas and oil still present in the seabed and the rapid energy transition. The Dutch government has set crucial future deadlines for itself, in which offshore wind energy plays an important role. These include several international agreements such as the Paris Climate Agreement in 2015 and the Esbjerg Declaration in 2019. In the latter, energy ministers of all North Sea countries signed a joint declaration, aiming for a quicker offshore energy transition. Together, 150 gigawatts (GW) will be generated by 2030, of which 21 GW by the Netherlands. By 2050, 70 GW should be retrieved from windmills in the Dutch EEZ (North Sea Energy, 2022). To put into comparison, the Netherlands is expected to need around 2500 petajoules (PJ) per year by 2050 to fulfil its basic energy consumption. When converted to PJ, the expected 70 GW per year equals 2209 PJ. As such, the energy generated from offshore windmills nearly covers the annual basic consumption of the Netherlands (Visser, 2022).

The North Sea is not just important for the Netherlands, but also the EU. In the Offshore Renewable Energy Strategy, the EU has set the ambition to create at least 300 GW of offshore wind energy by 2050. The importance of the North Sea is crucial in this regard. To illustrate: nearly 87 percent of all EU offshore wind energy will come from the North Sea by 2050. The Dutch part is responsible for 26.9 percent of the total energy generated in the North Sea region and for 23.3 percent of suppliers of all offshore wind energy in the EU (European Commission, 2020). It can therefore be said that the Netherlands plays a considerable role in guaranteeing clean wind energy security in the future both for its citizens and neighbouring countries.

Generating clean wind energy at sea has economic advantages as well. In the EU, the most polluting businesses are obliged to pay a so-called CO2 tax. Mainly energy generating

companies fall under this taxation of which several Dutch companies. The Dutch Central Planning Bureau analysed that by 2030, the price per ton of CO2 will equal around 100 to 500 euros. By 2050, this could skyrocket up to 1000 euros per ton (Matthijsen et al., 2021). There is thus a considerable economic incentive to generate electricity in such a way that CO2 is either brought to an absolute minimum or completely removed. Another benefit of offshore windmills is that the maintenance costs are relatively low compared to power plants that run on fossil fuels. This is mainly due to their more simplistic building structure and reduced exposure to heat and damaging smoke (Bekkers et al., 2021).

To ensure that the disadvantages of offshore windmill energy are limited, several measures must be taken. Firstly, the generated electricity loses potential over time. The energy that is ready to be sent to the mainland experiences resistance and heat losses when transported via underwater cables. In addition, not all electricity can be consumed at the moment of delivery. A solution to this problem lies in hydrogen gas. This is an energy-storing substance that is relatively easy to construct. This conversion process is also referred to as power-to-gas. It encompasses high volumes of energy and can be stored and transported with relative ease. In fact, the already present gas pipelines in the North Sea are perfect for transporting this gas (Bekkers et al., 2021; Matthijsen et al., 2021). Hydrogen, in contrast to current, is able to be used in high energy-required industries such as the aviation, steel, and transport sectors (NKZG, 2022).

To accommodate hydrogen transformations, several physical energy islands will have to be built in the North Sea. The North Sea Energy (2020) organisation has calculated that three islands are necessary to effectively convert and transport hydrogen. Onshore landing sites, in which offshore current arrives, have also begun to be constructed. The power-to-gas method is still in its early stages. It is a relatively new way of converting and storing energy for longer durations. As such, several reports state that hydrogen-producing factories will not open before at least 2027. By 2030, around 4 GW of offshore wind energy could be used to generate green hydrogen (Bekkers et al., 2021). Connections with other North Sea countries, such as England and Denmark, will have to be laid as well. These are vital in ensuring a stable and secure energy supply. With this, unused energy can either be exported and sold to neighbouring countries or energy can be imported in times of less wind activity (Waverijn, 2020).

## 3. Conclusion

The North Sea has always been a substantial means to Dutch energy security. At the end of the sixties, the first gas was extracted from the North Sea. This has positively impacted the Netherlands as it generated a stable, cheap, and safe energy supply. In addition, billions of euros have been earned with the export of fossil fuels. The Paris Climate Agreement became the first real change in the Dutch policy towards energy security, in particular in the North Sea (Koster, 2022). Numerous policies of the Ministry of Economic Affairs and Climate Policy, 2021 moved away from gas drilling and, instead, invested heavily in offshore wind parks. The aim is to have 70 GW by 2050, which would fulfil up to 88 percent of the Dutch basic energy consumption (Visser, 2022). As such, the North Sea is vital in securing a future, non-hydrocarbon, and long-term energy supply. It provides the Netherlands with chances to export electricity or hydrogen as well, which has a positive impact on the national treasury. There are a few hurdles towards 2050, however. The Netherlands must invest in energy hubs in the North Sea, transform oil- and gas pipes for the transportation of hydrogen, and keep investing in more and better wind turbines. The policies made by the Dutch government so far are substantive in securing the national energy consumption of the Netherlands. It is now a matter of designing, building, and improving (Bekkers et al., 2021; Ministry of Economic Affairs and Climate Policy, 2021). Only so, the Netherlands can resecure its long-obtained energy security, again in the North Sea.

## 4. References


Bekkers, F., Teer, J., Kool, D., Geuns, L. v., Bolder, P., Patrahau, I., & Sarel, M. (2021). *The High Value of The North Sea*.

Chirosca, A.-M., & Rusu, L. L. (2021). The characteristics of the North Sea and its importance for maritime transport. *Acta Universitatis Danubius. Œconomica*, *17*(6).

Dawson, R., & Tilley, N. (1997). Scientific Realist Evaluation. *Evaluation for the 21st century: A handbook*, 405.

De Jager, J., Geluk, M., Wong, T. E., Batjes, D., & de Jager, J. (2007). Geology of the Netherlands. *Petroleum Geology. Royal Netherlands Academy of Arts and Sciences, Amsterdam, The Netherlands*, *241*, 264.

Dutch Central Bureau of Statistics. (2019). *Natural gas trade deficit for the first time in 2018*. https:
//www.cbs.nl/en-gb/news/2019/11/natural-gas-trade-deficit-for-the-first-time-in-2018

Euronews. (2022). UK and Dutch governments approve new separate North Sea gas projects. https: //www.euronews.com/2022/06/02/uk-and-dutch-governments-approve-new-separate-northsea-gas-projects

European Commission. (2020). An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020: 741:FIN%5C&qid=1605792629666

European Commission. (2021). European Green Deal: Commission proposes transformation of EU economy and society to meet climate ambitions. https://ec.europa.eu/commission/presscorner/ detail/en/ip _21 3541

European Commission. (2022). REPowerEU Plan. https://eur-lex.europa.eu/legal-content/EN/TXT/
?uri=COM%5C%3A2022%5C%3A230%5C%3AFIN%5C&qid=1653033742483

Horowitz, J. (2022). 'Drill, baby, drill' is back in Europe as gas crisis looms. https://edition.cnn.com/ 2022/08/01/energy/gas-fields-europe-energy-crisis-russia/index.html

INTRAC. (2017). *Realist Evaluation*. INTRAC. https://www.intrac.org/wpcms/wp-content/uploads/ 2017/01/Realist-evaluation.pdf

Koster, R. (2022). Nederlandse deel Noordzee heeft meer gas dan gedacht [Dutch part of the North Sea contains more gas than expected]. https://nos.nl/artikel/2439204-nederlandse-deel-noordzeeheeft-meer-gas-dan-gedacht

Larminie, F. (1987). The history and future of North Sea oil and gas: an environmental perspective. *Philosophical Transactions of the Royal Society of London. B, Biological Sciences*, *316*(1181), 487–493.

Matthijsen, J., Dammers, E., & Elzenga, H. (2021). *De toekomst van de Noordzee: de Noordzee in 2030 en 2050: een scenariostudie*. Planbureau voor de Leefomgeving. https://www.noordzeeloket.nl/ beleid/noordzee-2030/

Ministry of Economic Affairs and Climate Policy. (2021). *Natural resources and geothermal energy in the Netherlands*. Ministry of Economic Affairs and Climate Policy. https://www.nlog.nl/sites/ default/files/2022-07/annual report 2021 natural resources and geothermal energy.pdf

NKZG. (2022). *Cluster Energiestrategie Noordzeekanaalgebied [Cluster Energy Strategy Noordzee canal area]*. https://www.noordzeekanaalgebied.nl/wp-content/uploads/2022/09/CES-NZKG-2022spreads-DEF-1.pdf

North Sea Energy. (2022). North Sea Energy 2020-2022: Energy Hubs & Transport Infrastructure. %7Bhttps://north-sea-energy.eu/static/2fd1407691ef2b058666b7f5e5c93d05/NSE-2020-2022-1.1-Energy-Hubs-and-Transport-Infrastructure-v2.pdf%7D

Port of Rotterdam. (2019). *Blijvend Werken aan de Toekomst. Make it Happen [Continually Working on the Future. Make it Happen]*. Port of Rotterdam. https://reporting.portofrotterdam. com/FbContent.ashx/pub 1006/downloads/v220223105828/Jaarverslag-2019-Havenbedrijf-Rotterdam.pdf

Schwartz, K. (2019). Nooit eerder had Nederland meer gas nodig dan het zelf produceert [Never before did the Netherlands need more gas than it produces].

Van Geuns, L., Juez-Larr´e, J., & de Jong, S. (2017). *Van exporteur naar importeur: de verander (en) de rol van aardgas in Nederland [From exporter to importer: the changing role of gas in the Netherlands]*. (Hague Centre for Strategic Studies.

Visser, M. (2022). Hoeveel energie heeft Nederland in 2050 nodig? [How much energy does the Netherlands need in 2050?] *EnergiePodium*. https://www.energiepodium.nl/artikel/hoeveel-energie-heeftnederland-in-2050-nodig

Waterweg, M. (2022). Minister Rob Jetten: kabinet gaat extra gas winnen uit de Noordzee om klappen energiecrisis op te vangen [Minister Rob Jetten: Cabinet will extract more gas from the North Sea to ease the energycrisis].

Waverijn, J. J. (2020). Navigating Legal Barriers to Mortgaging Energy Installations at Sea–the Case of the North Sea and the Netherlands. *The Law of the Seabed*, 503–524.