UiT The Arctic University of Norway

Legal and regulatory barriers to the development of offshore wind farms.
A comparison between Norway and Belgium.

Théry Amelie

Master's thesis in the Joint Nordic Master Programme in Environmental Law (NOMPEL)
JUR-3920 May 2022

Abstract

The purpose of this thesis is to present an insight in Norway's and Belgium's (renewable) energy policy choices through the evaluation of their development of offshore wind farms. This discussion will look how these two differing states are trying to meet the renewable energy targets at national and EU-level through the development of offshore wind farms, how they have made offshore wind power policy choices in this context, what barriers they encounter during this development, and how being part of the EU or not impacts those policy choices.

The first part of this thesis focusses on a short introduction to renewable energy and climate change, and the legal framework surrounding offshore wind power. The overarching framework of the International Law of the Sea is explained in order to understand the authorities at national level. Following, a short overview is given of the relevant EU legislation regarding offshore wind power such as for example the EU Green Deal, the Renewable Energy Directive and the EU Strategy on Offshore Renewable Energy. Next, some short technical considerations in the construction and operation of offshore wind farms are provided. Finally, we stand still at the Nordic perspective and the relation between Norway and the EU.

The following part takes an individual look at Norway's offshore wind farms. This discussion is divided into three subtopics, with first a thorough look at the socio-political context in which the development of offshore power takes place and to give way to the strong hydropower, gas and oil sectors in Norway. Second, the regulatory regime is discussed with a strong focus on the specific legislation regarding offshore energy. And thirdly, a quick overview is handed out of some the general barriers that Norwegian wind farms development at sea is faced with. A similar approach is taken with the individual consideration of Belgium's offshore wind farms. First, the socio-political context in which the development of offshore power takes place in the federal state of Belgium with energy being a shared competence. Second, the regulatory regime is discussed with a focus on the required licenses and permits. Thirdly, a swift overview is given of some the struggles that Belgian wind farms development has encountered. In addition, a brief note is made about cooperation projects in the North Sea.

In the last part, the Norwegian and Belgian situations and development are compared. Both similarities as well as differences are observed and noted as such. In this an overview can be found of what differences states can face in offshore wind power development and how they respond to these dissimilar circumstances. The influence of the harmonizing approach of the EU can be observed in their energy policies and its value is not be underestimated.

This thesis ends with a concise conclusion on the legal and regulatory barriers to the development of offshore wind farms in Norway and Belgium and how they compare.

Key words: offshore wind power, renewable energy, EU, Norway, Belgium, barriers, regulatory regime

Preface

This master's thesis is the culmination of the Joint Nordic Master Programme in Environmental Law (NOMPEL) at Uppsala University, University of Eastern Finland and UiT the Arctic University of Norway. A unique two-year period, not only because of the pandemic, but also the parallel track of my Law studies in Belgium which are now also coming to an end. The experiences and knowledge I have gained these last few years are irreplaceable.

First of all, I would like to thank my supervisor Prof. Dr. Erik Franckx for his willingness to let me work on this topic and guide me through it. In this master's thesis, I was able to delve into a subject and matter that keeps revealing itself to be of the utmost importance. In addition, I would like to thank my father, Luc Théry, very much because without his support, feedback and encouragement, this master's thesis would not have come about.

Finally, I would like to thank my sisters, Eleonore and Zephyrine, and mother, Barbara, for their endless trust in my abilities and their countless encouragements. In addition, my fellow NOMPEL friends, Pauline and Elisabeth, deserve a word of thanks for their support and many laughs.

Amelie Théry
May 2022

Table of contents

Abbreviations

CO_2	Carbon dioxide
CoP	Conference of Parties
CREG	Commission for Electricity and Gas Regulation
CS	Continental Shelf
EEA	European Economic Area
EEAS	European External Action Service
EEZ	Exclusive Economic Zone
EFTA	European Fair Trade Agreement
EIA	Environmental Impact Assessment
EMF	Electromagnetic fields
ETS	Emissions Trading Scheme
EU	European Union
GES	Good Environmental Status
GHG	Green House Gas
GW	Gigawatt
IMP	Integrated Marine Policy
$Km^{(2)}$	(square) kilometres
LCOE	Levelized cost of energy
MOG	Modular Offshore Grid
MSFD	Marine Strategy Framework Directive
MSP	Marine Spatial Plan
MSPD	Marine Spatial Planning Directive
MW	Megawatt
NECP	National Energy and Climate Plan
Nm	Nautical miles
NOK	Norwegian krone
NoX	Nitrogen oxide
NSEC	North Seas Energy Cooperation
NVE	Norwegian Water Resources and Energy Directorate
OED	Ministry of Oil and Energy

RED	Renewable Energy Directive
SEA	Strategic Environmental Assessment
TEN-E	Trans-European Networks for Energy
TS	Territorial Sea
TSO	Transmission System Operators
TWh	Terawatt-hour
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNTS	United Nations Treaty Series

1. Introduction

1.1. Introduction to offshore wind farms in Europe: when, where and how?

1. While there has already been considerable work done concerning the legal, administrative and regulatory framework and requirements for the development of offshore wind farms, the publications all either focus on a specific region and/or state, or they remain on a surface level discussion. As such, a comparison between two states – one a European Union (EU) Member State, one not - having an entirely different perspective and situation regarding energy, energy consumption and maritime position, will give an interesting comprehension. Not only will this provide an insight into how a country's geographical and legal situation influences the development of offshore wind farms, but it will also offer a broader understanding of the countries differing (renewable) energy policies and subsequent policy choices.

2. The objective of this thesis subject and the research questions is to give an insight in two different states' (renewable) energy policy choices and how differences can be addressed at a more global level in order to integrate states policies to have a more harmonized approach to reaching the (energy) targets at EU and international level - among which is the Paris Agreement temperature goal. In short, this research aims to evaluate if the renewable energy targets are being met at the EU-level through the development of offshore wind farms, how two different states make offshore wind power policy choices, what barriers they might encounter during development and how being part of the EU or not impacts those policy choices.

1.2. Research questions

3. The main research question is '*How an EU (Belgium) and a non-EU (Norway) country handle the development of offshore wind farms under the EU renewable energy framework?*'
This question can be divided into three different themes.

4. The first theme is the more general theme of renewable energy, which is guided by the following sub questions that will help frame the relevance of the main discussion of the thesis.
'What is the role of energy in climate change mitigation?'
'Why does renewable energy fulfil a central role in mitigating climate change?'
'How does wind power fit into the development and generation of renewable energy?'

5. The second theme focuses on the individual states and how they develop offshore wind farms. These sub questions aim to guide the approach to identify the hurdles in all phases of developing wind energy at sea in each of the different states.

'How does Norway deal with the factual, socio-political factual and regulatory barriers to the development of offshore wind farms along its coast?'

'What are these barriers?'

'How does Belgium deal with the factual, socio-political factual and regulatory barriers to the development of offshore wind farms along its coast?'

'What are these barriers?'

6. The third and last theme of this thesis is the legal comparison between the states in their policy and legal approach to the development of offshore wind farms.

'What are the similarities and differences between the Norwegian and Belgian approaches to offshore wind farms?'

'Does the difference in status (as EU and non-EU Member State) have an impact on regulation?'

'How do offshore wind farms also present opportunities?'

1.3. Methodology

7. The subject of this master's thesis is a discussion of the legal and regulatory barriers to developing offshore wind farms, comparing the legal situation between Norway, a non-EU EEA (European Economic Area) Member State, and Belgium, a EU Member State. The main focus will be on the internal perspective to identify legal and regulatory barriers. This methodology will be applied to both the Norwegian legal system as the Belgian legal system, within their broader international context.

8. Legal doctrinal research is used in this thesis as the starting point and the basis for systemising the rules into a coherent framework and to evaluate their characteristics.[1] Both descriptive and normative research will be applied, with the normative arising out of the descriptive base work.[2] This needs to be done in order to be able to give an overview of the current state of law as well as to be able to analyse and evaluate the current and proposed based on the current EU legal framework. International instruments will be considered in the evaluation and discussion of the legal systems in place, but the emphasis will be on the European perspective. Based on the normative evaluation of the law, improvements to the different legal systems and their interactions will be recommended. The goal of using a legal doctrinal research method is to

[1] J. M. Smits, "What is Legal Doctrine. On the Aims and Methods of Legal Research", *MEPLI working paper* (2015) vol. 6, https://ssrn.com/abstract=2644088, 17 (last consulted 30 May 2022).
[2] *Ibid.*

influence both national and European legal decision-makers thereby improving the legal systems concerned.

9. The main method used for the legal research in this thesis will be legal hermeneutics, as all materials and sources that will be used are text-based. This method is a starting point for the method of interpretation of legal reasoning used.

10. Other disciplines such as economics or sociology will not be included in the research. It is, however, important to note that they do have a certain - not to be disregarded - influence on the law and policy choices concerned. As such, while the focus of this legal research of environmental law and renewable energy will remain clear, the interaction with other disciplines, such as economics, must be acknowledged in the policy choices and as supporting legal arguments. This will be done in the normative section of the thesis through text-based sources, without diverging too much from the main research question.

2. Energy and climate change

11. In today's day and age, from our phones to medical equipment, every aspect of our lives is fuelled by items that are powered by energy. As such, one of the main and most difficult challenge our society faces are the supply of energy at a reasonable cost. These past few years have been marked by several energy crises due to, inter alia high oil and gas prices. Not only policy makers and international institutions but also the private sector is looking for long- and short-term solutions for the problem of energy supply. Part of the answer could be found in the vast amount of energy that the oceans houses.[3]

12. Energy is in essence regulated at the national level, though national policy and regulation are influenced by international law.[4] What is meant by primary national regulation of energy is that states are free to explore and exploit the energy resources on their territory.[5] However, several energy resources are transboundary or a common resource, which necessitate an international framework to balance and regulate their utilization, ensure cooperation and avoid conflict.[6] Wind energy, for example, is a common-pool resource that is generated from a natural process that is outside the control of any state.[7] Additionally, international law regulates and facilitates the trade and investment into energy and energy resources.[8]

13. Because of the renewed focus on the potential of ocean energy, it is of importance to discuss the energy issue within the framework of international law of the sea and from the viewpoint of the climate change regime. The extensive planning process and the operation of energy projects in marine areas are subject to international law of the sea, which provides the legal framework for all maritime activities.[9] Energy projects such as wind farms or oil extraction are not the only activities taking place at sea. The law of the sea tries to balance these multiple activities taking place within the same maritime zones.[10] Of course, the law of the sea must be

[3] N. Bankes and S. Trevisanut, "Energy from the Sea: Introduction" in N. Bankes and S. Trevisanut (eds.), *Energy from the Sea, Brill Academic Publishers* (2015) 1-12.
[4] H. Tegner Anker, B. Egelund Olsen and A. Rønne, "Wind Energy and the Law: A Comparative Analysis", *JERL* (2009) vol. 27, no 3, 145-178; R. Barnes, "Energy Sovereignty in Marine Spaces", *IJMCL* (2014) vol. 29, no. 4, 573-599 (588).
[5] G. Elian, *The Principle of Sovereignty over Natural Resources*, Brill Nijhoff (1979) 1-10.
[6] L. Del Castillo-Laborde, "Equitable Utilization of Shared Resources", *MPEPIL* (2008) 37-56; R. Barnes, "Energy Sovereignty in Marine Spaces", *IJMCL* (2014) vol. 29, no. 4, 578.
[7] Y. Lifshitz-Goldberg, "Gone with the Wind? The Potential Tragedy of the Common Wind", *UCLA JELP* (2010) vol. 28, 435; R. Barnes, "Energy Sovereignty in Marine Spaces", *IJMCL* (2014) vol. 29, no. 4, 578.
[8] R. Barnes, "Chapter 1 - Energy Sovereignty in Marine Spaces" in N. Bankes and S. Trevisanut (eds.), *Energy from the Sea, Brill Academic Publishers* (2015) 13-39 (27-35).
[9] A.M. O'Hagan, "11. Marine Spatial Planning and Marine Renewable Energy Chapter" in A.E. Copping and L.G. Hemery (eds.), *OES-Environmental 2020 State of the Science Report: Environmental Effects of Marine Renewable Energy Development Around the World* (2020) Report for Ocean Energy Systems, 214-241.
[10] N. Bankes and S. Trevisanut, "Energy from the Sea: Introduction" in N. Bankes and S. Trevisanut (eds.), *Energy from the Sea, Brill Academic Publishers* (2015) 3-4.

seen inside its broader context of international law. The interactions with other relevant international legal regimes must not be forgotten when looking at marine projects.[11]

14. This thesis will shortly address some the main legal challenges that are presented by the development of the ocean energy sector and its impact on the current international normative and institutional framework of the law the sea.

15. The world's oceans energy potential ranges from significant deposits of oil and gas to renewable energy resources such as wind and tidal power. These resources have to be brought to shore and transported via shipping by sea or through undersea pipelines and cables.[12] Other marine activities, such as fishing, tourism or mineral extraction, have been impacted by the exploration, production and supply of energy from the sea. The competition for marine space has increased significantly, as they now play an increasingly crucial role in meeting the world's energy demands.[13] Meeting these demands and balancing them with other ocean uses in an ongoing exercise. Since 2005 there already have been some collaborative projects regarding offshore wind farms in the North Sea, as will be elaborated later on in this thesis.

16. This debate of marine space usage is often framed in the terms of energy sovereignty.[14] This can be defined as a state's claims over energy resources and supplies, depending on the approach being narrow or broad.[15] It concerns itself with questions about to what extent states can and should be able to secure their energy supply needs and the practical implementation of that.[16] With certain energy sources becoming scarcer, growing population and industry with increased energy needs, states claim energy sovereignty more frequently and to an increasing scope. These claims often clash with established international rules and norms about sovereignty and take insufficient account of the specific physical conditions of marine energy resources.[17]

---

[11] *Ibid*., 7.
[12] R. Barnes, "Chapter 1 - Energy Sovereignty in Marine Spaces" in N. Bankes and S. Trevisanut (eds.), *Energy from the Sea, Brill Academic Publishers* (2015) 18-19.
[13] *Ibid*., 32.
[14] H. Tegner Anker, *et al.,* "Wind Energy and the Law: A Comparative Analysis", *JERL* (2009) vol. 27, no 3, 157-163; R. Barnes, "Energy Sovereignty in Marine Spaces", *IJMCL* (2014) vol. 29, no. 4, 586-589.
[15] R. Barnes, "Chapter 1 - Energy Sovereignty in Marine Spaces" in N. Bankes and S. Trevisanut (eds.), *Energy from the Sea, Brill Academic Publishers* (2015) 14-15.
[16] *Ibid*.
[17] *Ibid*., 15-24; P. Thaler and B. Hofmann, "The impossible energy trinity: Energy security, sustainability, and sovereignty in cross-border electricity systems", *Polit. Geogr.* (2022) vol. 94, 11.

17. Energy security and supply is often used as a source of justification for exemptions or derogations from *prima facie* international rules, including EU Energy Law.[18] However, what exactly is understood under energy security? It is by nature a complicated topic due to the different goals and concerns associated with security-related concerns. For example, there is the issue of storage, with certain resources being hard to store such as gas and other relatively easier to store such as oil.[19] Other concerns relate to transportation and infrastructure, the geographic market and the change to renewable resources.[20] States concerned with energy security also look at long-term issues such as access to energy supplies and energy diversification or more general concerns of 'security' such as physical damage to energy supply and/or infrastructure. A key concern is the issue of 'energy security of supply', meaning the assurance of availability of supply and the requirement of affordability.[21] The notion of energy security and supply has a strong hold on policy choices and must not be forgotten in the consideration of economic, environmental, social, foreign policy and technical issues regarding energy.[22]

2.1. Offshore wind power

2.1.1. Overarching framework of the International Law of the Sea

18. When states wish to develop offshore energy, they are required to have the necessary legal offshore powers and need to ensure that they have a legal regime for developing offshore wind energy and transporting the electricity onshore.

19. The overarching legal regime for offshore development of energy projects is the United Nations Convention on the Law of the Sea (UNCLOS).[23] This convention distinguishes different areas or zones in the sea bordering the coast of a state. These zones establish different degrees of coastal state sovereignty and jurisdiction, depending on their spatial ambit.[24] Important zones for the development of offshore wind farms are the Territorial Sea (TS), the Exclusive Economic Zone (EEZ) and Continental Shelf (CS) as most marine activities take place in these areas.

---

[18] A. Johnston and G. Block, "Introduction to Energy Security and Security of Supply" in *EU Energy Law*, Oxford University Press (2012) 233-239; D. K. Jonsson, B. Johansson, A. Månsson, L. J. Nilsson, M. Nilsson and H. Sonnsjö, "Energy security matters in the EU Energy Roadmap", *Energy Strategy Reviews* (2015) vol. 6, 48-56.
[19] T. Oyewunmi, "Energy security and gas supply regulation in the European union's internal market", *Eur. Netw. Law Regul. Q.* (2015) 187-202.
[20] A. Johnston, *et al.*, "Introduction to Energy Security and Security of Supply" in *EU Energy Law*, Oxford University Press (2012) 233-239.
[21] D. K. Jonsson, *et al.*, "Energy security matters in the EU Energy Roadmap", *Energy Strategy Reviews* (2015) vol. 6, 52.
[22] A. Johnston, *et al.*, "Introduction to Energy Security and Security of Supply" in *EU Energy Law*, Oxford University Press (2012) 233-239.
[23] UN General Assembly, United Nations Convention on the Law of the Sea, 10 December 1982, *1833 UNTS 3* (hereinafter 'UNCLOS').
[24] Y. Tanaka, *The International Law of the Sea*, Cambridge University Press (2015) 196 p.

20. UNCLOS makes an essential distinction between the living resources of the EEZ and the energy resources of the CS.[25] The obligations of a state regarding marine living resources are regulated in a relatively comprehensive manner. For example, there is a duty for coastal states to share any surplus with other fishing states.[26] However, with regard to the development, exploration and exploitation of ocean energy the Convention is mostly silent.[27] Most energy sources on the CS fall under the exclusive jurisdiction of the coastal state to whom the Shelf belongs.[28] A coastal state has no obligation to share or conserve these resources. Other international agreements, such as for example the Energy Charter Treaty[29], and regulation at the EU level, concur with this discretionary power of coastal states over their energy resources.[30]

21. The offshore jurisdiction of coastal states is crucial to clarify if one is to understand the policy choices of the actors involved. UNCLOS' regime divides maritime space into zones and assigns the functional jurisdiction. A coastal state's jurisdiction thus differs depending on the zone.

22. In the Territorial Sea a coastal state has territorial sovereignty. The TS is the zone which stretches up to 12 nautical miles (nm) from the baseline and is closest to the shore.[31] According to UNCLOS, a coastal state has full sovereignty, meaning that, just like on land, they are free to set any laws and regulate freely the use of resources.[32] This freedom is not absolute, as a coastal state needs to take into account the sea traffic that passes through its waters.[33] Ships of all states, whether coastal or land-locked, enjoy the right of innocent passage through the territorial sea.[34] This entails that foreign vessels may not be hindered by a coastal state when passing through the TS, except in keeping with UNCLOS. This exception is notable for offshore wind turbines as coastal states are allowed to establish safety zones surrounding installations of

[25] N. Bankes and S. Trevisanut, "Energy from the Sea: Introduction" in N. Bankes and S. Trevisanut (eds.), *Energy from the Sea, Brill Academic Publishers* (2015) 5.
[26] Art. 62 UNCLOS.
[27] E. J. Martínez Pérez, "The Environmental Legal Framework for the Development of Blue Energy in Europe" in G. Andreone (ed.), *The Future of the Law of the Sea: Bridging Gaps between National, Individual and Common Interests*, Springer International Publishing (2017) 129.
[28] N. Bankes and S. Trevisanut, "Energy from the Sea: Introduction" in N. Bankes and S. Trevisanut (eds.), *Energy from the Sea, Brill Academic Publishers* (2015) 5; D. Ong, "Towards and International Law for the Conservation of Offshore Hydrocarbon Resources within the Continental Shelf?" in D. Freestone, R. Barnes and D. Ong (eds.), *Law of the Sea. Progress and Prospects*, Oxford University Press (2006) 93-119.
[29] Energy Charter Treaty, Lisbon (Portugal), 17 December 1994, 2080 *UNTS* 95.
[30] K. Talus, "The Vertical Division of Competences between the European Union and Its Member States in the Energy Sector" in *Introduction to EU Energy Law* (2016) 7-14.
[31] Art. 2 and 3 UNCLOS.
[32] Art. 2 UNCLOS; E. Schachtner, "Marine Protected Areas and Marine Spatial Planning, with Special Reference to the Black Sea" in P. D. Goriup (ed.) *Management of Marine Protected Areas: A Network Perspective*, Wiley (2017) 317-370.
[33] Art. 22 UNCLOS; R. Barnes, "Energy Sovereignty in Marine Spaces", *IJMCL* (2014) vol. 29, no. 4, 591.
[34] Art. 17-19 UNCLOS.

such offshore wind turbines or connection stations.[35] In a safety zone, navigation and fishing are prohibited or restricted, creating a relative favourable environment for marine life.[36]

23. While most often offshore wind farms are located outside the territorial sea, in the EEZ, this zone remains of importance because of the right of coastal states to regulate cables and pipelines entering its territorial sea and territory.[37]

24. In the Exclusive Economic Zone coastal states only have sovereign rights. The EEZ is the area beyond and adjacent to the TS. It stretches to a maximum of 200 nm (or 370 km) from the baseline.[38] A coastal state does not automatically have an EEZ and its associated rights as it does not follow from their sovereignty in the Territorial Sea. In order to enjoy the sovereign rights in that area, a state first needs to define and declare its EEZ.

25. When looking at the legal regime for offshore wind turbines one cannot discuss the EEZ without discussing the Continental Shelf (CS), which often coincides with the EEZ. The CS is comprised of the seabed and subsoil of the submarine areas beyond the territorial sea, stretching a distance of 200 nm (370 km) from the baseline.[39] As in the EEZ, the coastal state has exclusive sovereign rights over the exploration and exploitation of its natural resources.[40] Where this zone differs, is when the land territory of the shelf has a natural prolongation that goes beyond 200 nm. The state to whom the land shelf belongs may claim a CS up to 350 nm, measured from the baseline.[41] The Commission on the Outer Limits of the Continental shelf needs to be informed about the limits of the continental shelf, after which it will make recommendations to coastal states regarding their establishment of the outer limits of their continental shelf, but it is up to the states themselves to determine its final boundary.[42]

26. Within its EEZ a state can exercise its sovereign rights regarding the exploration, exploitation, conservation, and management of the living and non-living natural resources and other economic activities, such as the production of wind or tidal power.[43] In addition, a coastal state has the exclusive right to authorize and regulate offshore drilling for all purposes and the

[35] Art. 24 UNCLOS.
[36] Art. 21, 60(4) and 60(5) UNCLOS.
[37] Art. 79(4) UNCLOS.
[38] Art. 57 UNCLOS.
[39] Art. 76 UNCLOS.
[40] Art. 77 (1) UNCLOS.
[41] Art. 76 (5) UNCLOS
[42] Art. 76 (8) UNCLOS; C. Reichert, "Determination of the Outer Continental Shelf Limits and the Role of the Commission on the Limits of the Continental Shelf", *IJMCL* (2009) 393.
[43] Article 56 (1) UNCLOS; I. Shearer, "The Limits of Maritime Jurisdiction" in C. H. Schofield, S. Lee and M.-S. Kwon (eds.), *The Limits of Maritime Jurisdiction*, Brill Nijhoff (2014) 49-63.

exclusive right to construct, authorize and regulate the construction, operation and use of, *inter alia*, installations and structures for the purposes of exploration and exploitation activities and economic activities in the EEZ and on its CS.[44] UNCLOS does not provide a definition for what constitutes an 'installation' and a 'structure' but it has been generally agreed on by legal scholars that wind turbines and connection stations can be considered as falling under these terms.[45] Despite a lack of explicit provisions regarding energy resources and energy supply, UNCLOS does provide that all states have the right to lay submarine cables and pipelines on the continental shelf for all purposes, including energy supply.[46] Coastal states have jurisdiction over cables and pipelines constructed or used in connection with the economic activities in the EEZ or connected to installations under the jurisdiction of the coastal state.[47] If a cable or pipeline is not linked to such an activity, a coastal state can always fall back onto the general freedom to lay cables and pipelines.[48] Consequently, the EEZ and the CS are the most adequate zones for the development of offshore wind energy activities.

27. However, the freedom to exercise sovereign rights in the EEZ and CS is not unlimited.[49] UNCLOS sets out a number of other freedoms which collide with a coastal state's sovereign rights and of which the states need to take due regard.[50] As such, the Convention tries to strike a balance between the rights and freedoms of states and the interest of coastal states to exploit their own (energy) resources.

28. When a state has to make a decision about the placement, operation and removal of a structure such as a wind turbine, or about the placement of a submarine cable, navigational concerns must be taken into account. Fishing routes, the protection of the marine environment and the freedom of navigation for vessels in EEZ must also be incorporated into these decisions.[51] All states must also take notice of existing submarine cables and pipelines, making sure not to hinder access for repairs.[52]

---

[44] Art. 48(2), 60, 76, 79(4) and 87(1)(c) UNCLOS.
[45] C. Degreef and W. Geldhof, "Offshore energy and the Belgian legal framework: All at Sea?", *TRNI* (2015) vol. 1, 56-72 (57).
[46] Art. 79 UNCLOS.
[47] Art. 77, 79 and 87 (1) (c) UNCLOS; H. K. Müller and M. M. Roggenkamp, "Regulating Offshore Energy Sources in the North Sea-Reinventing the Wheel or a Need for More Coordination?", *IJMCL* (2014) vol. 29, no. 4, 716-737.
[48] Art. 58 (1), 58 (2) and 81 UNCLOS.
[49] Art. 58 (3) UNCLOS.
[50] Art. 60 (3) UNCLOS.
[51] Art. 38 (2) UNCLOS; R. Barnes, "Energy Sovereignty in Marine Spaces", *IJMCL* (2014) vol. 29, no. 4, 590-591; A. Cliquet, "Mariene beschermde gebieden: een druppel in de oceaan?" in A. Cliquet and F. Maes (eds.), *Recht door zee: hedendaags internationaal zee- en maritiem recht: liber amicorum Eddy Somers*, Maklu (2015) 81-113.
[52] Art. 79 UNCLOS; C. Degreef and W. Geldhof, "Offshore energy and the Belgian legal framework: All at Sea?", *TRNI* (2015) vol. 1, 58.

29. Since a coastal state does not have full sovereignty in its EEZ, only sovereign rights, other states are allowed to lay submarine cables and pipelines in another state's EEZ.[53] However, this right of foreign states is limited, for example, the delimitation of a pipeline course is subject to the coastal state's consent.[54] This right may not affect the jurisdiction of a coastal state over cables, pipelines, installations and structures constructed in connection to the exploration and exploitation of its natural resources and continental shelf.

30. As noted, a state has to declare an EEZ in order to enjoy sovereign rights there. In addition, if a state wants to carry out jurisdiction there and enforce laws, it must first explicitly declare it laws applicable in their EEZ. States needed to decide whether to extend their existing laws for offshore wind energy development or to adopt a new legal regime.[55] Offshore wind farms require connections to the onshore energy grid, which entails that states do not only need to have a legal regime in place for wind turbines themselves but also a legal regime for the permit procedure and classification of cables that connect the wind turbines and connection stations to shore.[56] In general, two approaches can be identified in the classification of offshore wind farms.[57] The first approach is that they are seen as an installation that requires a specific construction permit.[58] The second approach is that wind farms are seen as an activity aimed at generating electricity, which need to be treated as such under the respective national electricity legislation.[59]

31. In conclusion, these provisions set out in the Convention ensure that an energy network can be created and maintained in a feasible manner, permitting states to enjoy the exclusive rights on their resources.[60]

2.1.2. Other International Regulation

32. The zonal fragmentation and functional jurisdiction under the 1994 UNCLOS regime were not developed with the current globalisation of resources in mind. This globalisation has later been accompanied by other legal questions such as climate change, protection of marine biodiversity

[53] Art. 58 UNCLOS.
[54] Art. 79 (3) UNCLOS; B. Milligan, "Marine Protected Areas in Antarctic Waters: A Review of Policy Options in the Context of International Law" in C. H. Schofield, S. Lee and M.-S. Kwon (eds.), *The Limits of Maritime Jurisdiction*, Brill Nijhoff (2014) 549-574.
[55] H. K. Müller and M. M. Roggenkamp, "Regulating Offshore Energy Sources in the North Sea-Reinventing the Wheel or a Need for More Coordination?", *IJMCL* (2014) vol. 29, no. 4, 728.
[56] *Ibid*., 728.
[57] *Ibid*., 729.
[58] H. K. Müller and M. M. Roggenkamp, "Regulating Offshore Energy Sources in the North Sea-Reinventing the Wheel or a Need for More Coordination?", *IJMCL* (2014) vol. 29, no. 4, 729.
[59] *Ibid*.
[60] R. Barnes, "Energy Sovereignty in Marine Spaces", *IJMCL* (2014) vol. 29, no. 4, 591.

or sustainable energy.[61] Throughout the years UNCLOS has been complemented by other national, regional and international legal instruments that aim to provide an adequate legal framework to bridge the gap between these obstacles and UNCLOS.

33. While at first sight offshore wind technology seems to be environmentally beneficial, as it helps to reduce greenhouse gas (GHG) emissions (or at least not add to it), they also bring about several disadvantages (*infra 2.1.4.4.*). They are expensive to develop and could have significant impact on the environment. More precisely, the installation of offshore wind farms can considerably affect marine biodiversity, especially during construction and decommissioning.[62]

34. A wind farm will need to obtain some sort of state consent for construction and operation.[63] This consent shall often not be granted if its plan contravenes or violates environmental regulation including those on the protection and conservation of species and habitats.[64] A short discussion of the relevant international environmental instruments, in relation to the protection of the environment in the vicinity of offshore wind farms, is in order.

2.1.2.1. The 1979 Convention on the Conservation of Migratory Species of Wild Animals

35. The Convention on the Conservation of Migratory Species of Wild Animals[65], otherwise known as the Bonn Convention, is a UN environmental treaty that aims to conserve migratory species, including bird and marine species, throughout their ranges.[66] The CoP (Conference of Parties) of the Bonn Convention, has responded to these biodiversity concerns and has adopted a number of resolutions to address the adverse impacts of wind farm development on migratory species.[67] In the EU, additional protection and stricter obligations are imposed on EU Member States by the Habitat - and Bird Directives (*infra 2.1.3.7.*).

---

[61] C. Redgwell, "Mind the Gap in the GAIRS: The Role of Other Instruments in LOSC Regime Implementation in the Offshore Energy Sector", *IJMCL* (2014) vol. 29, 600-621 (602); J. Grote Stoutenburg, "Through the Back Door: The Limits of the UN Law of the Sea Convention's Usefulness as a Tool to Combat Climate Change" in C. H. Schofield, S. Lee and M.-S. Kwon (eds.), *The Limits of Maritime Jurisdiction*, Brill Nijhoff (2014) 679-698.

[62] H. Bailey, K.L. Brookes and P.M. Thompson, "Assessing environmental impacts of offshore wind farms: lessons learned and recommendations for the future" *Aquat. Biosyst.* (2014) vol. 10, no. 8, 13 p.

[63] J. Serrano González and R. Lacal-Arántegui, "The regulatory framework for wind energy in EU Member States. Part 1 of the Study on the social and economic value of wind energy - WindValueEU.*", European Commission, Joint Research Centre, Institute for Energy and Transport* (2015) 64 p.

[64] *Ibid.*

[65] Convention of Bonn on the Conservation of Migratory Species of Wild Animals, 23 June 1979, *1651 UNTS 28395* (hereinafter 'Bonn Convention').

[66] Art. I (1) and II Bonn Convention.

[67] See CoP Bonn Convention, 'Wind Turbines and Migratory Species' (October 2017) *UNEP/CMS/Resolution 7.5* (Rev. COP12), Manila; CoP Bonn Convention, 'Adverse Anthropogenic Marine/Ocean Noise Impacts on Cetaceans and Other Biota' (December 2008) *UNEP/CMS/Resolution 9.19,* Rome; CoP Bonn Convention, 'Further Steps to Abate Underwater Noise Pollution for the Protection of Cetaceans and other Migratory Species' (November 2011) *UNEP/CMS/Resolution 10.24,* Bergen.

2.1.2.2. The 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic

36. The Convention for the Protection of the Marine Environment of the North-East Atlantic[68], also known as the OSPAR Convention, was constructed in accordance with articles 123 and 197 UNCLOS, thus being the appropriate regional organisation for guiding international cooperation on the protection of the marine environment of the North-East Atlantic. The Convention is otherwise relevant in the context of offshore wind farms in three ways. It endorses the ecosystem approach, emphasises the precautionary approach and requires the application of the polluters pays principle.[69]

37. In addition, OSPAR has specifically tried to regulate the installation and maintenance of submarine cables, irrespective of offshore wind power. Cables also have an impact on their marine surroundings, such a temporary disturbance of the seabed or electromagnetic field disturbances.[70] As of 2022, no common programmes or measures have been developed by OSPAR with respect to the placement of sub-sea cables, despite several attempts. In 2012, the Commission has released some Guidelines on Best Environmental Practice (BEP) in Cable Laying and Operation.[71]

2.1.2.3. The 1991 Convention on Transboundary Environmental Impact Assessment

38. The Convention on Transboundary Environmental Impact Assessment[72], also known as the Espoo Convention, is a general environmental instrument that seeks to address the transboundary effects of certain activities. This Convention obliges State Parties to carry out an Environmental Impact Assessment (EIA) at the project-level for certain activities listed in the Appendix, including the construction of offshore wind farms.[73] The coastal states of the North Sea have come to an agreement, as is possible to deviate in such a manner under the Espoo Convention, to carry out EIAs for other projects not listed but that do have a harmful

[68] Convention for the Protection of the Marine Environment of the North-East Atlantic, 22 September 1992, *2354 UNTS 67* (hereinafter 'OSPAR Convention').
[69] Art. 2 (2) (b) of the OSPAR Convention; N. D. Merchant, "Underwater noise abatement: Economic factors and policy options", *Environ. Sci. Policy* (2019) vol. 92, 116-123; R. Tomé, F. Canário, A. Leitão, N. Pires and M. Repas, "Radar Assisted Shutdown on Demand Ensures Zero Soaring Bird Mortality at a Wind Farm Located in a Migratory Flyway" in J. Köppel, *Wind Energy and Wildlife Interactions - Presentations from the CWW 2015 Conference* (2017) 119-133.
[70] T. Merck and R. Wasserthal, "Report: Assessment of the environmental impacts of cables", *OSPAR Commission Biodiversity series* (2009) 19 p.
[71] OSPAR Commission, "Agreement 2012-2: Guidelines on Best Environmental Practice (BEP) in Cable Laying and Operation", *OSPAR Agreement 2012-2, Annex 14* (2012) 18 p.
[72] Convention of Espoo on Environmental Impact Assessment in a Transboundary Context, 25 February 1991, *1989 UNTS 309* (hereinafter 'Espoo Convention').
[73] Art. 2 (3), 2 (7) and Appendix I, point 22 Espoo Convention.

transboundary impact.[74] Additionally, the Convention establishes notification and consultation procedures, via which coastal states such as Belgium and Norway consult each other and their neighbouring states about their offshore wind farms development plans.[75]

39. Other instruments that are relevant for the governance of offshore wind farms are The Energy Charter Treaty, the Convention on Biological Diversity[76], the Bern Convention[77] and the Ramsar Convention[78]. However, they do not necessitate further discussion due to the volume and content restrains of this thesis.

2.1.3. EU Regulation

40. In the 1990s the first offshore wind farms were built in the territorial sea of European coastal states as part of a demonstration project.[79] The concept of a 'Green Europe' was introduced in 1970s and can be found at the basis for these green energy demonstration projects (*infra* no. 43).[80] Since then, the EU has made this green development a normative cornerstone of their policy and kindling wick for the shift towards the use of renewable energy sources.[81]

41. There are several EU Directives that are relevant for the governance of offshore wind farms. Unlike the international law of the sea regime, the EU does take note of broader issue related to offshore wind farms, has an ecosystem viewpoint and relies on the precautionary principle.

2.1.3.1. The EU Green Deal

42. On the 11th of December 2019, the European Commission proposed the EU Green Deal.[82] This deal aims towards a sustainable European economy where climate and environmental challenges are turned into opportunities across all policy areas, while ensuring a fair and

---

[74] Art. 2(5) and Annex III Espoo Convention; E. J. Martínez Pérez, "The Environmental Legal Framework for the Development of Blue Energy in Europe" in G. Andreone (ed.), *The Future of the Law of the Sea: Bridging Gaps between National, Individual and Common Interests*, Springer International Publishing (2017) 127-144 (137); North Seas Countries' Offshore Grid (NSCOGI), *Memorandum of Understanding of the North Seas Countries' Offshore Grid Initiative*, Brussels, 3 December 2010, https://en.kefm.dk/media/7140/political-declaration-on-energy-cooperation-between-the-north-seas-countries.pdf (last consulted 30 May 2022).

[75] Art. 3 and 5 Espoo Convention; F. Maes, "Ruimtelijke planning op zee in België: van plan naar proces en een nieuw plan", *TMR* (2016) no. 4, 425.

[76] Convention of Rio de Janeiro on Biological Diversity, 5 June 1992, *1760 UNTS 79*.

[77] Convention of Bern on the Conservation of European wildlife and natural habitats, 19 September 1979, *1284 UNTS 209*.

[78] Convention of Ramsar on Wetlands of International Importance especially as Waterfowl Habitat, 2 February 1971, *996 UNTS 245*.

[79] The first offshore wind farms, *Vindeby*, was built in 1991 in Denmark's territorial sea; H. K. Müller and M. M. Roggenkamp, "Regulating Offshore Energy Sources in the North Sea-Reinventing the Wheel or a Need for More Coordination?", *IJMCL* (2014) vol. 29, no. 4, 729-730.

[80] I. Solorio and P. Bocquillon, "EU Renewable Energy Policy: A Brief Overview of its History and Evolution" in I. Solorio and H. Jörgens (eds.), *A Guide to EU Renewable Energy Policy Comparing Europeanization and Domestic Policy Change in EU Member States* (2017) Edward Elgar, 23-42.

[81] Art. 194(1)(c) TFEU.

[82] EU Commission, "The European Green Deal", *COM(2019) 640 final*, Brussel, 11 December 2019, 24 p.

inclusive transition for all.[83] This Deal aims to achieve EU climate neutrality by 2050.[84] The European Commission has presented the EU Strategy on Offshore Renewable Energy to help meet this target.[85] "*The Strategy proposes to increase Europe's offshore wind capacity from its current level of 12 GW to at least 60 GW by 2030 and to 300 GW by 2050"*.[86] Some Member States, such as Denmark, the Netherlands and Belgium, have invested heavily in the development of offshore wind energy in order to reach these EU targets. This can also be seen for the future when looking at these Member State's NECPs (National Energy and Climate Plans) for 2021-2030. For example, Belgium foresees the contribution of offshore wind energy to their renewable energy mix to be 4 GW by 2030.[87]

43. The European Commission's proposals should make it possible to emit 55% less greenhouse gases in net terms by 2030 than in 1990. In order to achieve this the Commission has proposed to increase the binding target for renewable energy in the EU energy mix to 40%, from the current 32%.

44. Concerning energy, the EU Green Deal sets out three key requirements for the transition to clean energy. First, energy supply must remain secure and affordable.[88] Second, the EU energy market must be fully integrated, interconnected and digitized.[89] And third, more energy efficient buildings and renewable energy sources are paramount.[90] One of the ways proposed to achieve this is to fully exploit the potential of offshore wind energy in Europe. It is clear that the focus has shifted slightly from onshore to offshore energy generation.[91]

2.1.3.2. The Renewable Energy Directive

45. The Renewable Energy Directive (RED)[92] is a central piece of legislation in the EU energy policy that asserts far-reaching influence over both EU and Member States policy choices both

[83] EU Commission, "Press Release - The European Green Deal sets out how to make Europe the first climate-neutral continent by 2050, boosting the economy, improving people's health and quality of life, caring for nature, and leaving no one behind", 11 December 2019, https://ec.europa.eu/commission/presscorner/detail/en/ip_19_6691 (last consulted 30 May 2022).
[84] EU Commission, *A European Green Deal*, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en (last consulted 30 May 2022).
[85] EU Commission, "An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future", *COM(2020) 741 final*, Brussels, 19 November 2020, 26 p.
[86] EU Commission, "Press release - Boosting Offshore Renewable Energy for a Climate Neutral Europe", 19 November 2020, https://ec.europa.eu/commission/presscorner/detail/en/IP_20_2096 (last consulted 30 May 2022).
[87] EU Commission, "Belgium's NECP 2021-2030", Brussels, 14 October 2020, *SWD(2020) 900 final*, 29 p.
[88] EU Commission, *Energy and the Green Deal*, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/energy-and-green-deal_nl (last consulted 30 May 2022).
[89] *Ibid*.
[90] *Ibid*.
[91] EU Commission, "An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future", *COM(2020) 741 final*, Brussels, 19 November 2020.
[92] EU Parliament and Council Directive no. 2018/2001 of 11 December 2018 on the promotion of the use of energy from renewable sources, *OJ L* 21 December 2018, no. 328, 82 (hereinafter 'RED').

in- and outside the energy sector. It provides a regulatory framework for the promotion of the use renewable energy sources, including offshore wind energy.[93] First adopted in 2009, the RED has been subject to revision and amendments twice and has undergone yet another revision in order to accelerate and better support the development of renewables in the Member States.

46. The 2009 RED established the 20-20-20 targets (20% reduction of GHG emissions compared to the 1990s level, a 20% increase in renewable energy sources share in energy consumption by 2020 and a 20% increase in energy efficiency) and set national mandatory targets for the overall share of energy from renewable sources. According to the European Environment Agency (EEA) the EU has achieved these three targets (partly due to the COVID-19 pandemic and associated reduction in economic life), with a reduction of 31% in GHG emissions compared to 1990s levels, however, not all member states reached their individual targets.[94] The 2016 RED sets a binding overall energy target for the EU for 2030 of ensuring a share of at least 32 % of energy from renewable sources in the Union's gross final energy consumption.[95] This target is part of the broader obligation to reduce net emissions by at least 55% by 2030 compared to 1990 and for being the first climate neutral continent by 2050.[96] As part of the EU Green Deal package the RED has been revised again and the EU Commission has, in July 2021, among other elements, proposed to increase the EU overall target of at least 32% to at least 40% of renewable energy source in the overall mix of energy sources.[97]

47. This Directive provides rules for Members States on how they can implement RED and achieve its targets such as joint energy projects between Member States, guarantees of origin, access to the grid and administrative procedures.[98] In addition, the Member States are encouraged to invest in wind, and more specifically offshore wind energy, to reach the targets set out. As in some EU countries the permitting process can be a long and complex process, the Directive includes provisions on the organisation and maximum duration of the permit-granting process.[99] The RED provides the regulatory framework, stability and coordination needed for the development of offshore wind farms.[100]

---

[93] Preamble (2), art. 1 and 2 (1) RED.
[94] EEA (European Environmental Agency), "Report: Trends and Projections in Europe 2021", *EEA Report no. 13/202*1, 26 October 2021, 46 p.
[95] Art. 3 RED.
[96] EU Commission, "'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality", *COM(2021) 550 final*, Brussels, 14 July 2021, 15 p.
[97] *Ibid*.
[98] Art. 1, 9, 15, 19 and 20 RED.
[99] Preamble (51) and art. 16 RED.
[100] J. Serrano González and R. Lacal-Arántegui, "A review of regulatory framework for wind energy in European Union countries: Current state and expected developments", *Renew. Sust. Energ. Rev.* (2016) no. 56, 588-602 (589).

2.1.3.3. The EU Strategy on Offshore Renewable Energy,

48. In light of the new EU Green Deal the EU has developed a EU Strategy on Offshore Renewable Energy, aimed at boosting its development and the creation of renewable and sustainable energy sources.[101] The strategy aims to have an installed capacity of at least 60 GW of offshore wind and at least 1 GW of ocean energy by 2030, with a view to reach 300 GW, 10 and 40 GW of installed capacity, respectively, by 2050.[102] Recognizing that onshore renewable energy sources face several difficulties, such as NIMBYism[103], topographical issues (hills, roads, buildings, et cetera …), rising cost of raw materials, et cetera, the EU is now looking at offshore technologies to avoid these issues.[104] Additionally, these relatively new technologies of wind, wave and tidal power have the attractive benefit of generating energy without emitting any greenhouse gasses, making them an appealing option for reaching the climate neutrality objective.[105] Despite problems, such as maritime space competition, that arise with moving the focus to offshore power, it is seen as a possible cornerstone in achieving the EU's goals of becoming the first climate neutral continent by 2050.[106] The EU Strategy on Offshore Renewable Energy does not only cover offshore wind power, but it also entails several other sources of powers and technologies.[107]

49. Regional cooperation and integration are addressed as part of the strategy, with recognition of the achievements in the different sea regions as well as their shortcomings.[108] Part of the strategy is to revise the 2013 Trans-European Networks for Energy (TEN-E) Regulation[109], for long-term offshore grid planning by the TSOs (Transmission System Operators), involving regulators and the Member States in each sea basin.[110] On 15 December 2020 the EU Commission adopted a proposal to revise the Regulation, identifying eleven priority corridors and three priority thematic areas to develop and interconnect (see Appendix I).[111] After some

---

[101] EU Commission, "An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future", *COM(2020) 741 final*, Brussels, 19 November 2020.
[102] *Ibid*., 1-2.
[103] NIMBY is an acronym for the phrase 'not in my back yard', meaning opposition to the vicinity of a project, not the project in itself.
[104] EU Commission, *EU strategy on offshore renewable energy*, https://energy.ec.europa.eu/topics/renewable-energy/eu-strategy-offshore-renewable-energy_en (last consulted 30 May 2022).
[105] EU Commission, "An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future", *COM(2020) 741 final*, Brussels, 19 November 2020, 4.
[106] *Ibid*., 1, 10 and 26.
[107] *Ibid*., 2-3.
[108] *Ibid*., 6-9 and 13.
[109] EU Parliament and Council Regulation no. 347/2013 of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009, *OJ L* 25 April 2013, no. 115, 39.
[110] EU Commission, "An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future", *COM(2020) 741 final*, Brussels, 19 November 2020, 13-14.
[111] EU Commission, "Proposal for a Regulation of the European Parliament and of the Council on Guidelines for trans-European energy infrastructure and repealing Regulation (EU) No 347/2013", *COM(2020) 824 final*, Brussels, 15 December 2020, 75 p.

negotiations, the revised TEN-E Regulation has been adopted by the Council and the Parliament.[112]

2.1.3.4. The EU Integrated Marine Policy

50. The EU Integrated Marine Policy (IMP) is part of the larger EU common fisheries policy (CFP). Adopted in 2007, it is a policy framework that is aimed at fostering 'the sustainable development of all sea-based activities and coastal regions by improving the coordination of policies affecting the oceans, seas, islands, coastal and outermost regions and maritime sectors, and by developing cross-cutting tools.' The strategy was presented for the first time, by the EU Commission, on 7 June 2006 in the Green Paper "Towards a Future Maritime Policy for the Union: a European Vision for the Oceans and Seas", which identified cross-sectorial management as one of the main feature through which the growth of the marine economies of the Member States should be promoted.[113] As the name suggests, the IMP integrates the objectives of other EU marine policies and legislation, such as, for example, the development of offshore renewable energy and Marine Spatial Planning (MSP) designation.[114]

51. Part of this framework is the Blue Growth Strategy. Developed in 2012, by the European Commission, it aims at addressing climate change issues of scarce natural resources, planetary vulnerability, increased (coastal) population, increased population density, et cetera. The blue economy is approached as a driver for Europe's welfare and prosperity.[115] As part of the IMP, marine activities are stimulated under this strategy in order to create smart, long-term and sustainable socio-economic growth, while safeguarding the natural resources provided by the sea.[116] Several focus areas are identified, one of which is the most relevant to this thesis, the blue energy focus area. More specifically, it is observed that in 2011 the offshore wind power capacity consisted of 3.8 GW, created around thirty-five thousand jobs and annual investment of around 2.4 billion euros.[117] Projections for the potential for generation capacity and job creation for 2020 and 2030 were also made, indicating the long-term vision of this strategy.[118]

---

[112] EU Commission Delegated Regulation no. 2022/564 of 19 November 2021 amending Regulation (EU) No 347/2013 of the European Parliament and of the Council as regards the Union list of projects of common interest, *OJ L* 8 April 2022, no. 109, 14.
[113] EU Commission, "Green Paper - Towards a future Maritime Policy for the Union : a European vision for the oceans and seas", *COM(2006) 275 final*, Brussels, 7 June 2006, 49 p.
[114] EU Parliament, *Factsheets: the integrated marine policy of the European Policy*, www.europarl.europa.eu/factsheets/en/sheet/121/integrated-maritime-policy-of-the-european-union (last consulted 30 May 2022).
[115] EU Commission, "Blue Growth opportunities for marine and maritime sustainable growth", *COM(2012) 494 final*, Brussels, 13 September 2012, 12 p.; EU Commission - Commission Staff Working Document, "Report on the Blue Growth Strategy: Towards more sustainable growth and jobs in the blue economy", *SWD(2017) 128 final*, Brussels, 31 March 2017, 70 p. (3).
[116] I. Masters, K. Johnson and G. Dalton, "Introduction" in *Building Industries at Sea: 'Blue Growth' and the New Maritime Economy*, River Publishers (2018) 1-7 (2).
[117] EU Commission, "Blue Growth opportunities for marine and maritime sustainable growth", *COM(2012) 494 final*, Brussels, 13 September 2012, 6-7.
[118] *Ibid*., 7.

The strategy mainly emphasizes that the cost for offshore wind technology needs to be reduced in order to accelerate growth in this area.[119] Additionally, other offshore renewable energy technologies, such as tidal and wave power, are also mentioned and promoted but are mainly considered to be new and emerging technologies with a lower potential than offshore wind.[120]

52. There have been comments on the Blue Growth Strategy for being too focussed on a technology-oriented approach while lacking a social innovation perspective, which could hinder its ability to reach its full potential.[121] On the other hand, the Strategy has stimulated the blue growth in the EU, helped to implement the IMP and helped in adopting the Maritime Spatial Planning Directive (MSPD).[122]

2.1.3.5. The Marine Strategy Framework Directive

53. The Marine Strategy Framework Directive (MSFD)[123] is of vital importance to the protection of marine biodiversity and the marine ecosystem when developing offshore wind farms. The MSFD was adopted on 17 June 2008 to establish a framework for the development of marine strategies designed to achieve 'Good Environmental Status' (GES) of the marine areas by 2020 at the latest.[124] This Directive requires each Member states to develop a marine protection strategy by 2020, in which they need to protect and preserve the marine environment, prevent its deterioration or even restore the marine ecosystems in areas where these have been adversely affected.[125]

54. The relevance of this Directive for offshore wind farms can mainly be found in article 14. This article lists circumstances under which a member state can deviate from the obligatory target to achieve good environmental status by 2020. The construction of offshore wind farms can fall under the scope of exception of article 14(d), as they constitute "modifications or alterations to the physical characteristics of marine waters brought about by actions taken for reasons of overriding public interest which outweigh the negative impact on the environment, including

[119] *Ibid*.
[120] *Ibid*.
[121] S.W.K. Burg, K. Soma and T. Selnes, "The significance of social innovation for blue growth in the North Sea", *Rural Areas and Development* (2018) vol. 15, 169-184.
[122] *Ibid*., 174; J.-S. Fritz and J. Hanus, "The European Integrated Maritime Policy: The next five years", *Mar. Policy* (2015) vol. 53, 1-4 (3).
[123] EU Parliament and Council Directive no. 2008/56/EC of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive), *OJ L* 25 June 2008, no. 164, 19 (hereinafter 'MSFD').
[124] Art. 1(1) MSFD.
[125] Art. 1(2)(a) MSFD.

any transboundary impact", due to their potential to contribute to the reduction of GHG emissions being a reason of 'overriding public interest'.[126]

2.1.3.6. The Marine Spatial Planning Directive

55. The Marine Spatial Planning Directive (MSPD) is key to developing offshore wind farms. The Directive defines marine spatial planning as "a process by which the relevant Member State's authorities analyse and organise human activities in marine areas to achieve ecological, economic and social objectives".[127] As mentioned, there is quite some competition for space at sea due to the abundance of maritime activities. Marine spatial planning fulfils three key roles in navigating this issue for offshore wind development. Firstly, it provides a framework for coordination and cooperation between the Member States regarding cabling, pipelines, shipping lanes and, of course, offshore wind farms.[128] Secondly, it gives stability, legal certainty and transparency to investors, as it reduces conflicts and overlaps.[129] Thirdly, as it helps to achieve good site location it reduces the cost of faulty investments and thus also the cost of wind energy in general.[130] It also optimizes the integration of farms into the marine environment, further bringing down capital costs.[131]

56. The EU adopted the MSP Directive in 2014 as part of the implementation of the IMP and to establish a framework for maritime spatial planning.[132] The aim of this Directive is to promote the sustainable growth of maritime economies, the sustainable development of marine areas and the sustainable use of marine resources.[133]

57. The Directive recognizes the increasing competition for space for different maritime purposes as well the pressures on the marine environment and resources. It tries to answer the need

---

[126] T. Markus, S. Schalke and N. Maier, "Legal Implementation of Integrated Ocean Policies: The EU's Marine Strategy Framework Directive", *IJMCL* (2011) vol. 26, 59-90 (83).
[127] Art. 3(2) MSPD.
[128] A. D'Orazi and M. Prezioso, "Surfing Multiple Dimensions: An Integrated Approach in Maritime Spatial Planning" in D. Kitsiou and M. Karydis (eds.), *Marine Spatial Planning: Methodologies, Environmental Issues and Current Trends*, Nova Science Publishers (2017) 115-156; N. Soininen, "Marine spatial planning in the European Union" in D. Hassan, T. Kuokkanen and N. Soininen (eds.), *Transboundary Marine Spatial Planning and International Law*, Routledge (2015) 189-201 (190).
[129] F. M. Platjouw, "Marine Spatial Planning in the North Sea - Are National Policies and Legal Structures Compatible Enough? The Case of Norway and the Netherlands", *IJMCL* (2018) vol. 33, no. 1, 34-78 (55); X., "Ministers meet to discuss North Sea offshore developments", *WindEurope*, 27 October 2021, https://windeurope.org/newsroom/news/ministers-meet-to-discuss-north-sea-offshore-developments/ (last consulted 30 May 2022).
[130] H.S. Hansen, "Obstacles for Wind Energy Development due to EU legislation", *ResearchGate* (2011) 40 p. (19); R. Belu, D. Koračin and L.-I. Cioca, "Spatial Planning of Offshore Wind Farms: Criteria and Methods" in D. Kitsiou and M. Karydis (eds.), *Marine Spatial Planning: Methodologies, Environmental Issues and Current Trends*, Nova Science Publishers (2017) 229-256.
[131] R. Belu, *et al.*, "Spatial Planning of Offshore Wind Farms: Criteria and Methods" in D. Kitsiou and M. Karydis (eds.), *Marine Spatial Planning: Methodologies, Environmental Issues and Current Trends*, Nova Science Publishers (2017) 244-246.
[132] Preamble (2) MSPD.
[133] Art. 1 MSPD.

created by this to provide in an integrated planning and management approach. The focus of the approach is to create transboundary and integrated a spatial planning management system with regard to marine activities and sustainable use of the existing marine and coastal resources.[134] The management is to be based on consistent, transparent, sustainable and evidence-based decision-making.[135] It is mainly the Member States responsibility to ensure an effective marine spatial plan and enforce its implementation.[136] However, these national approaches need broader EU guidance, thus having the MSPD come in to play to create the necessary coherent framework for MSP.[137]

58. This Directive has a restricted geographical scope, applying only to marine waters and not coastal waters, limiting the application mostly to the EEZ of states.[138] Since this is where most offshore wind energy activities take place, the Directive remains of valuable relevance in the analysis of this thesis. The Member States were obliged to create a marine spatial plan, as soon as possible and at the latest by March 31st, 2021.[139] A number of minimum requirements had to be included in the plan, such as land-sea interaction, use of best available data, coherence with other management plans and practices, environmental, economic and social aspects[140] These plans are generally extensive as the subjects that are included in them are numerous and broad. For example, the content can extend to fishing areas, raw material extraction areas, submarine cable and pipeline routes, nature and species conservation sites and protected areas, underwater cultural heritage, maritime transport routes and traffic flows and military training areas.[141]

59. Some drawbacks of the Directive are the lack of provisions on a cooperation mechanism and the lack of insight in harmonising the scale and level of planning.[142] These defaults can undermine competitiveness in the wind energy sector and the benefits identified with MSP, demolishing the potential of offshore wind power as a European resource.[143]

---

[134] Preamble (9) MSPD; R. Long, "Harnessing Offshore Wind Energy: Legal Challenges and Policy Conundrums in the European Union", *IJMCL* (2014) vol. 29, 690-715 (708).
[135] *Ibid*.
[136] EU Commission, "Maritime Spatial Planning in the EU - Achievements and Future Development", *COM(2010) 771 final*, Brussels, 17 December 2010, 10 p.
[137] *Ibid*., 2-3.
[138] Art. 2 MSPD; N. Soininen, "Marine spatial planning in the European Union" in D. Hassan, T. Kuokkanen and N. Soininen (eds.), *Transboundary Marine Spatial Planning and International Law,* Routledge (2015) 191.
[139] Art. 4 and 15(3) MSPD.
[140] Art. 6 MSPD.
[141] Art. 8 (2) MSPD. A. Chircop and P. L'Esperance, "Functional Interactions and Maritime Regulation: The Mutual Accommodation of Offshore Wind Farms and International Navigation and Shipping", *Ocean Yearb.* (2016) vol. 30, 439-487 (455).
[142] R. Long, "Harnessing Offshore Wind Energy: Legal Challenges and Policy Conundrums in the European Union", *IJMCL* (2014) vol. 29, 710-711; F. Maes, "Maritime Spatial Planning: will there still be some space left for nature?", *Presentation in the VVOR Conference - 20 years of Habitats Directive* (13 December 2012) Antwerp.
[143] *Ibid*.; N. Soininen, "Marine spatial planning in the European Union" in D. Hassan, T. Kuokkanen and N. Soininen (eds.), *Transboundary Marine Spatial Planning and International Law,* Routledge (2015) 195-196.

2.1.3.7. The Habitat- and Bird Directive

60. The Birds[144] and Habitats[145] Directives are the foundation stones of the EU's nature and biodiversity policy.[146] They enable EU Member States to work together, under a common legislative structure, to conserve endangered, vulnerable and valuable EU species and habitats, regardless of any political or administrative boundaries. The two Directives apply equally to land and marine territory in the Member States to ensure that the species and habitat types they protect are preserved and/or restored at a favourable conservation status throughout their natural range within the EU. To achieve this objective, the Directives have set out two main types of measures. The first type consists of designating and conserving important sites, which create the Natura 2000 network, for the protection of habitat types and habitats of species, both on land an at sea.[147] The second type of measures consist in creating a strict protection regime for the species listed in Annex IV Habitats Directive and all European bird species covered by the Bird Directive through the entire natural range both within and outside protected sites within the EU.[148]

61. The protection and management of Natura 2000 sites requires Member States to conduct an assessment and permitting procedure for plans or projects likely to have significant negative effects on the sites.[149] In addition, positive conservation measures as well as measures aimed at avoiding deterioration and/or significant disturbances of the habitat types and the species for which the sites have been designated must be taken.[150]

62. Wind energy developers, planners and authorities also have to be aware of the conservation objectives for a Natura 2000 site, for both on- and offshore plans and projects, since potential negative effects have to be assessed against these objectives. The Habitats Directive encourages authorities to draw up, although not obligatory, Natura 2000 management plans, in close cooperation with local stakeholders as they can provide useful and practical information.[151]

---

[144] EU Parliament and Council Directive no. 2009/147/EC of 30 November 2009 on the conservation of wild birds, *OJ L* 26 January 2010, no. 20, 7 (hereinafter 'Birds Directive').
[145] EU Council Directive no. 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, *OJ L* 22 July 1992, no. 207, 7 (hereinafter 'Habitats Directive').
[146] EU Commission - Commission notice, "Guidance document on wind energy developments and EU nature legislation", *C(2020) 7730 final*, Brussels, 18 November 2020, 181 p.; See also A. Freriks, "Gebiedsbescherming op grond van de Vogelrichtlijn en de Habitatrichtlijn: implementatie in Nederland" in F.C.M.A. Michiels and L. Lavrysen (eds.), *Milieurecht in de lage landen. Rechtsvergelijkende studies over de milieuvergunning, emissiehandel, de watertoets, natuurbescherming en bestuurlijke handhaving in Vlaanderen en Nederland*, Boom Juridische uitgevers (2004) 231-254.
[147] As listed in Annex I and II to the Habitats Directive and Annex I to the Birds Directive.
[148] EU Commission - Commission notice, "Guidance document on wind energy developments and EU nature legislation", *C(2020) 7730 final*, Brussels, 18 November 2020, 17-18.
[149] Article 6(3) and 6(4)) Habitats Directive.
[150] Article 6(1) and 6(2) Habitats Directive.
[151] EU Commission - Commission notice, "Guidance document on wind energy developments and EU nature legislation", *C(2020) 7730 final*, Brussels, 18 November 2020, 181 p.

63. In November 2020, the EU Commission published an updated Guidance document on wind energy developments and EU Nature Legislation in view of the expansion of wind energy in the context of tackling climate change on one hand and the growing pressures on biodiversity on the other hand.[152]. Not only the significant development of EU policy and legislation on renewable energy and wind energy technology (especially at sea) but also the expanded knowledge on the impacts of wind energy on biodiversity and good practice for addressing these impacts necessitated the revision and update.[153]

2.1.4. Technical considerations

64. The discussion of the lifecycle and the technical consideration of offshore wind farms is essential in order to understand the different factors that influence policy makers in their choices regarding the development of offshore energy and wind farms.[154] Varying technical and geographical parameters are decisive on the deployment of individual offshore wind turbines. Their proximity to one another adds a layer of complexity as they can interact with each other aerodynamically through their wakes. This could reduce the total output of the farm relative to the sum of the outputs if each turbine had operated in the absence of the other ones.

65. The development of an offshore wind farm consists of several different phases.[155] First, there is the pre-construction phase, arguably the most important one as it directly affects the following phases.[156] Then there is the construction; the operation; the repowering; and finally, the decommissioning phase.[157] While it does merit to note that in each of these phases there are different factors that influence policy-makers choices, a further division of the phases will not be applied, unless where necessary in order to avoid confusion.

2.1.4.1. Siting

66. Turbines are generally installed in a series of rows of individual turbines that are integrated into a wind farm.[158] A farm generally consists of certain number and kind of turbines, some

[152] *Ibid*. 12.
[153] *Ibid*., 13-16.
[154] K. R. Rao, "Wind Energy: Technical Considerations-Contents" in *Wind Energy for Power Generation*, Springer (2019) 426 p.
[155] D. Van-Nguyen and E. Mckeogh, "Offshore Wind Energy: Technology Opportunities and Challenges", *Proceedings of the 1st Vietnam Symposium on Advances in Offshore Engineering* (2019) 3-22.
[156] *Ibid*., 10-12.
[157] *Ibid*.
[158] O. Anaya-Lara, "Offshore wind farm arrays" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 389-418 (389); A. Chircop and P. L'Esperance, "Functional Interactions and Maritime Regulation: The Mutual Accommodation of Offshore Wind Farms and International Navigation and Shipping", *Ocean Yearb.* (2016) vol. 30, 442; K. R. Rao, "Wind Energy: Technical Considerations-Contents" in *Wind Energy for Power Generation,* Springer (2019) 706-711.

switchgear, transformers and an onshore substation to feed the generated electrical power into the grid.[159]

67. Other factors that need to be taken into account when deciding where to place a turbine are the seabed conditions, locations of possible grid connections, area wind resources and hydrography[160].[161] Another component in the decision regarding the site location is the ability of the offshore wind farm to overcome the transmission-to-shore costs.[162] Additionally, competition and conflict with other sectors such as fisheries, shipping or military activity complicate the placement of wind turbines.[163]

2.1.4.2. Turbine construction

68. The main design of a wind turbine consists of three components, a tower, a nacelle (a horizontal axis with three blades) and the rotor (which rotates the nacelle upwind).[164] Furthermore, a turbine requires a substation, cables and a foundation.[165] An offshore wind turbine undergoes harsh environmental conditions that influence its maintainability, reliability and availability.[166] The hostile saline environment, that is characteristic of ocean waters, require a high-grade marine coating to the exteriors in order to minimize corrosion.[167]

---

[159] K. R. Rao, "Wind Energy: Technical Considerations-Contents" in *Wind Energy for Power Generation*, Springer (2019) 56-82 and 704-716.

[160] Meaning the science of the measurement, description, and mapping of the psychical features of bodies of water.

[161] L. Rademakers, H. Braam and T. Obdam, "Chapter 18: Operation and maintenance of offshore wind energy systems" in J. D. Sørensen and J. N. Sørensen (eds.), *Wind Energy Systems: Optimising design and construction for safe and reliable operation*, Woodhead Publishing (2011) 546.

[162] The electrical infrastructure needed consists of an internal distribution network, a transmission network to shore, substations and/or converter stations. The cost for this is generally between 15% to 30% of the total cost of a farm, which is a non-negligible and decisive factor; K. R. Rao, "Wind Energy: Technical Considerations-Contents" in *Wind Energy for Power Generation*, Springer (2019) 270-290; J. Serrano González, M. Burgos Payán and J. Riquelme Santos, "Optimum design of transmissions systems for offshore wind farms including decision making under risk", *Renew. Energy* (2013) vol. 59, 115-127.

[163] This can also be due to conflicts with national, regional or maritime spatial plans that do not envision the placement of offshore wind farms in certain locations; R. A. Mehdi, W. Ostachowicz and M. Luczak, "Introduction" in W. Ostachowicz, M. McGugan, J.-U. Schröder Hinrichs and M. Luczak (eds.), *MARE-WINT: New Materials and Reliability in Offshore Wind Turbine Technology* (2016) Springer, 1-9 (3); K. R. Rao, "Wind Energy: Technical Considerations-Contents" in *Wind Energy for Power Generation*, Springer (2019) 872-981.

[164] K. R. Rao, "Wind Energy: Technical Considerations-Contents" in *Wind Energy for Power Generation*, Springer (2019) 56-82.

[165] M. Asgarpour, "Assembly, transportation, installation and commissioning of offshore wind farms" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation*, Woodhead Publishing (2016) 527-542 (531).

[166] R.R. Damiani, "Design of offshore wind turbine towers" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation*, Woodhead Publishing (2016) 263-358; X. Wang, X. Zeng, J. Li, X. Yang and H. Wang, "A review on recent advancements of substructures for offshore wind turbines", *Energy Convers. Manag.* (2018) vol. 158, 103-119 (104-105).

[167] R. A. Mehdi, W. Ostachowicz and M. Luczak, "Introduction" in W. Ostachowicz, M. McGugan, J.-U. Schröder Hinrichs and M. Luczak (eds.), *MARE-WINT: New Materials and Reliability in Offshore Wind Turbine Technology* (2016) Springer, 2016, 3.

69. One of the main advances of offshore wind turbines is their size. Contrary to onshore turbines, these at sea are not hindered by height and noise restrictions, thus enabling taller and wider turbines that have more generation capacity.[168]

70. The foundations of an offshore wind turbine have an influence on the generated capacity, development cost and environmental impact. A lot of consideration goes into the choice of foundation. Two types of technologies can be identified for the mounting of the foundation of offshore wind turbines. The first type are the bottom-fixed turbines, which are used up to a depth of 60 meters and are moored into the seabed. Most turbines are installed in areas with a depth of 50 m or less, explaining why bottom-fixed turbines are the preferred installation method.[169] Several types of fixed foundations exist, for example, a monopile or a tripod.[170] However, this technology has it limits, for example, they cannot be installed on loose or soft sea bedding.[171]

71. The second technology type are the floating turbines, which are used between a depth of 60 until 2000 metres. This technology is the most recently developed one of the two, less mature and thus does not have yet the same generating capacity as bottom-fixed turbines and is technology and installation wise more complex.[172] Unlike fixed turbines, they can be installed on loose or soft sea bedding.[173] The levelized cost of energy (LCOE)[174] of this technology is twice to three times as high compared to bottom-fixed turbines. [175] Fixed-turbines are the most often installed, though, in 2021 Portugal launched the first floating offshore wind farm with many other Member States having plans or ambitions to expand to floating farms.[176]

---

[168] A. Chircop and P. L'Esperance, "Functional Interactions and Maritime Regulation: The Mutual Accommodation of Offshore Wind Farms and International Navigation and Shipping", *Ocean Yearb.* (2016) vol. 30, 442.
[169] X. Wang, X. Zeng, J. Li, X. Yang and H. Wang, "A review on recent advancements of substructures for offshore wind turbines", *Energy Convers. Manag.* (2018) vol. 158, 106.
[170] B.C. O'Kelly and M. Arshad, "Offshore wind turbine foundations - analysis and design" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation*, Woodhead Publishing (2016) 589-610.
[171] M. Collu and M. Borg, "Design of floating offshore wind turbines" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation*, Woodhead Publishing (2016) 359-386; A. Peiffer and D. Roddier, "Floating Wind Turbines: The New Wave in Offshore Wind Power" in J. H. Lehr, J. Keeley and T. B. Kingery (eds.), *Alternative Energy and Shale Gas Encyclopedia*, Wiley (2016) 69-79.
[172] *Ibid*.
[173] A. Peiffer and D. Roddier, "Floating Wind Turbines: The New Wave in Offshore Wind Power" in J. H. Lehr, J. Keeley and T. B. Kingery (eds.), *Alternative Energy and Shale Gas Encyclopedia*, Wiley (2016) 69-79.
[174] That is the estimated revenue required to build and operate a turbine over a specified cost recovery period.
[175] A. Peiffer and D. Roddier, "Floating Wind Turbines: The New Wave in Offshore Wind Power" in J. H. Lehr, J. Keeley and T. B. Kingery (eds.), *Alternative Energy and Shale Gas Encyclopedia*, Wiley (2016) 69-79.
[176] X. Wang, X. Zeng, J. Li, X. Yang and H. Wang, "A review on recent advancements of substructures for offshore wind turbines", *Energy Convers. Manag.* (2018) vol. 158,106; X., "Floating Offshore Wind Energy - A Policy Blueprint For Europe", *WindEurope*, https://windeurope.org/wp-content/uploads/files/policy/position-papers/Floating-offshore-wind-energy-a-policy-blueprint-for-Europe.pdf (last consulted 30 May 2022); X., "Portuguese Floating Wind Farm Shows Better-Than-Expected Results", *The Maritime Executive*, 27 September 2021, www.maritime-executive.com/article/portuguese-floating-wind-farm-shows-better-than-expected-results (last consulted 30 May 2022).

72. The blade design is also of importance for the technical development of the wind farm. If a blade has an optimal design, it contributes to the overall reliability and efficiency of the generation capacity of a wind farm.[177] What further influences the design and choices for wind turbines are the high loads, materials fatigue and the costs linked to the sheer size of the structures' components.[178]

2.1.4.3. Operations and maintenance

73. In order to operate and maintain the turbines a ladder, lift or sometimes even a landing platform is installed in the turbine to allow service personnel access for maintenance and repair.[179] For their operation offshore wind farms need grid interconnection infrastructure, such as, submarine or array cables, that collect the generated power and transfer it to an offshore substation, which then, via another cable, gets exported to shore.[180] With the exponential expansion of offshore wind farms and increased energy production connection to the grid has become more problematic.

74. Power transformation is required to transport the power to be suitable for high voltage level long-distance transmission and avoidance of electrical losses during power transfer.[181] Substations, which have now become essential to the functionally and reliability of offshore wind farms, influence the lay-out of the farm and placement of cables.[182] An issue that offshore wind farms face is the lack of storage capability.[183] Wind is a highly weather-depended resource, which can lead to a mismatch between wind supply, generated energy and onshore energy demand.[184]

---

[177] R. A. Mehdi, W. Ostachowicz and M. Luczak, "Introduction" in W. Ostachowicz, M. McGugan, J.-U. Schröder Hinrichs and M. Luczak (eds.), *MARE-WINT: New Materials and Reliability in Offshore Wind Turbine Technology* (2016) Springer, 2016, 6-7; P. Greaves, "Design of offshore wind turbine blades" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 105-136.

[178] G. Van Kuik and J. Peinke, "Long-term Research Challenges in Wind Energy - A Research Agenda by the European Academy of Wind Energy", *Wind Energ. Sci*. (2016) vol. 1, 1-39.

[179] P.O. Lloyd, "Health and safety of offshore wind farms" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 573-588 (574).

[180] N. Srinil, "Cabling to connect offshore wind turbines to onshore facilities" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 419-440.

[181] O. Anaya-Lara, "Offshore wind farm arrays" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 395; O.D. Adeuyi and J. Liang, "Integration of power from offshore wind turbines into onshore grids" in *Ibid*., 441-458.

[182] A. Chircop and P. L'Esperance, "Functional Interactions and Maritime Regulation: The Mutual Accommodation of Offshore Wind Farms and International Navigation and Shipping", *Ocean Yearb.* (2016) vol. 30, 445.

[183] See more D.A. Katsaprakakis, "Energy storage for offshore wind farms" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 459-494; X., "Groene stroom slaan we straks op in een superbatterij", *Vattenfal*, www.vattenfall.nl/duurzame-energie/windenergie/opslag-windenergie-in-nieuwe-superbatterij/ (last consulted 30 May 2022).

[184] K. R. Rao, "Wind Energy: Technical Considerations-Contents" in *Wind Energy for Power Generation*, Springer (2019) 16-47.

2.1.4.4. Environmental impacts

75. The development of offshore wind power can have a variety of impacts on the species and habitats protected under the Habitat and Birds Directives (*supra 2.1.3.7.*).[185] These impacts may occur in one or more of the five phases of the development. The effects can either be from the entirety of the plan or project alone or of one aspect of development and can be temporary or permanent.

76. The discussion of the environmental impact of offshore wind power development will be constrained to the main impacts as a detailed and in-depth discussions beyond the purpose of this thesis, which is the discussion and comparison between offshore wind power development of Belgium and Norway. It is of importance to briefly consider the possible impacts and effects that offshore wind power development can have, as they influence a state's policy choices.

77. The impacts and effects can be negative as well as positive on the main groups of receptors, i.e., marine birds, mammals and habitats. For example, the reef effect of offshore wind-farm foundations is a possible effect that can be both negative and positive. The underwater structures may function as artificial reefs, attracting various organisms and commercially significant fish.[186] It could also alter the characteristics of the local biodiversity system.[187] The artificially created reefs may also attract invasive alien species.[188] The significance of impacts can differ depending on the habitat types, but also, for example, on the foundation type. Floating wind foundations' likelihood of significant effects is lower in terms of habitat destruction compared to certain fixed foundations.[189]

78. As for impacts on marine mammals, there are effects, such as noise disturbances or water quality changes (due to sediment displacements), that can travel far distances and have impacts on mammals and habitats located far outside the site location of an offshore wind farm. The

[185] EU Commission - Commission notice, "Guidance document on wind energy developments and EU nature legislation", *C(2020) 7730 final*, Brussels, 18 November 2020, 92.
[186] H.J. Lindeboom, H.J. Kouwenhoven, M.J.N. Bergman, S. Bouma, S. Brasseur, R. Daan, R.C. Fijn, D. de Haan, S. Dirksen, R. van Hal, R. Hille Ris Lambers, R. ter Hofstede, K.L. Krijgsveld, M. Leopold and M. Scheidat, "Short-term ecological effects of an offshore wind farm in the Dutch coastal zone; a compilation", *Environ. Res. Lett.* (2011) vol. 6, 13 p.; S. Vandendriessche, J. Reubens, J. Derweduwen, S. Degraer and M. Vincx, "Offshore wind farms as productive sites for fishes?" in S. Degraer, R. Brabant and B. Rumes (eds.), *Environmental impacts of offshore wind farms in the Belgian part of the North Sea: Learning from the past to optimise future monitoring programmes*, Royal Belgian Institute of Natural Sciences (2013) 152-161.
[187] K.J. Petersen and T. Malm, "Offshore windmill farms: threats or possibilities to the marine environment" *Ambio* (2006) vol. 35, no. 2, 75-80.
[188] EU Commission - Commission notice, "Guidance document on wind energy developments and EU nature legislation", *C(2020) 7730 final*, Brussels, 18 November 2020, 92-93.
[189] S. Horwath, J. Hassrick, R. Grismala, E. Diller, J. Krebs and R. Manhard, "Comparison of Environmental Effects from Different Offshore Wind Turbine Foundations", *U.S. Dept. of the Interior, Bureau of Ocean Energy Management* (2021) OCS Study BOEM 2021-053, 48 p.

same goes for the 'leakage' of electromagnetic fields (EMF) from 'export' cabling.[190] Indirect effects of offshore wind farms on birds are cause for example by collision risk, habitat fragmentation or changes in prey occurrence and abundance.[191]

79. The impact, effect and implications of dismantling turbines (such as environmental damage, costs, waste disposal…) will not be discussed here due the volume restrictions of this thesis and given the 'young' age of the wind turbines concerned.[192]

2.2. Energy and the Nordic Perspective

2.2.1. Norway and the EU

80. In order to properly be able to discuss and analyse Norway's development of offshore wind farms, Norway's relationship with the EU needs to be looked into.

81. Norway is not a member of the European Union, but it is member of a number of European projects such as EFTA (European Free Trade Association) which is a cooperation between Liechtenstein, Norway, Iceland and Switzerland as a counterpart to the European Union, that is only concerned with creating a free trade area.[193] In addition, Norway is also part of the EEA (European Economic Area) which gives Norway access to the Internal Market of the EU making the state bound by principles of free movement of persons, goods, services and capital.[194] As a result, EU legislation relating to the internal market has been incorporated into Norwegian legislation, with some exceptions in areas such as fisheries and agriculture.[195]

82. Environmental cooperation is part of the EEA agreement, and almost all EU environmental legislation has been implemented in Norwegian law.[196] Although Norway is not bound by EU legislation related to nature conservation, natural resource management, agriculture and

---

[190] A.B. Gill, I. Gloyne-Phillips, K.J. Neal and J.A. Kimber, "The potential effects of electromagnetic fields generated by sub-sea power cables associated with offshore wind farm developments on electrically and magnetically sensitive marine organisms - a review", *Report to COWRIE* (2005) 36-40.

[191] EU Commission - Commission notice, "Guidance document on wind energy developments and EU nature legislation", *C(2020) 7730 final*, Brussels, 18 November 2020, 100-104.

[192] See more in W. Ostachowicz, M. McGugan, J.-U. Schröder Hinrichs and M. Luczak (eds.), *MARE-WINT: New Materials and Reliability in Offshore Wind Turbine Technology* (2016) Springer, 401-432.

[193] EFTA, *About EFTA - The European Free Trade Association*, www.efta.int/about-efta/european-free-trade-association (last consulted 30 May 2022); C. Hillion, "Integrating an Outsider: An EU Perspective on Relations with Norway", *Eur. Foreign Aff. Rev.* (2011) vol. 16, no. 4, 489-520.

[194] Art. 126 of the Agreement on the European Economic Area, *OJ L* 3 January 1994, no. 1, 3 (hereinafter 'EEA Agreement')

[195] Whether or not Norway joins the EU has been a polarizing issue in Norwegian politics since the Second World War. Norway has tried to join the European Union four times: twice in the sixties of the twentieth century (1962, 1967), but then France vetoed it. In 1972 and 1994, accession was rejected by the Norwegian people in a referendum. C. Archer, *Norway Outside the European Union - Norway and European Integration from 1994 to 2004* (2004) London (UK), Routledge, 256 p.

[196] Preamble, art. 1 and art. 73 EEA Agreement.

fisheries, the way they are regulated by the EU influences Norway indirectly.[197] The EU is Norway's closest partner in global climate change policy and thus a key factor in the development of Norwegian environmental policy. Both have ratified the Paris Agreement on climate change[198], and, like the EU, Norway has committed to a target of at least 40 percent reduction of greenhouse gas emissions by 2030 compared to 1990 levels.[199] In addition, since 2008, via the EEA Agreement, Norway has been a part of the EU Emission Trading System (EU ETS).[200] Norway is fully integrated into the internal EU energy market and about half of Norway's emissions are included in the EU ETS, making this one of the cornerstones in Norwegian climate policy.[201] As such the EU legislation on renewable energy and offshore wind energy often also applies (though not directly and only via implementation by the Norwegian parliament) to Norway. The country intends to fulfil its 2030 climate commitment jointly with the EU and its Member States.[202]

83. For an EU act to apply to the EEA-EFTA States (Iceland, Liechtenstein and Norway), the EEA Joint Committee must adopt a Decision to incorporate the act into the EEA Agreement. [203] The aim is to incorporate acts as closely as possible to their date of entry into force in the EU in order to ensure that the same rules apply throughout the EEA. Five stages can be distinguished.

84. In first stage the EEA-EFTA States contribute to EU decision shaping. When the European Commission assesses the need for new internal market rules and prepares new legislation, experts from the EEA-EFTA States participate in the process and identify possible issues.[204] The EEA-EFTA States participate but do not have the right to vote. The Norwegian national procedure involves the ministries responsible for the relevant policy area, relevant directorates

[197] I.B. Neumann, "This little piggy stayed at home: why Norway is not a member of the EU" in L. Hansen and O. Waever, *European Integration and National Identity - The Challenge of the Nordic States*, Routledge (2001) 87-129; Norway and the EU, *Mission of Norway to the EU - Climate change and the environment*, www.norway.no/en/missions/eu/values-priorities/climate-env/ (last consulted 30 May 2022).
[198] COP21, Adoption of the Paris Agreement, 12 December 2015, *U.N. Doc. FCCC/CP/2015/L.9/Rev/1*.
[199] UNFCCC, *Norway's long-term low-emission strategy for 2050*, https://unfccc.int/sites/default/files/resource/LTS1_Norway_Oct2020.pdf (last consulted 30 May 2022).
[200] EU Commission - Directorate-General for Climate Action, *The European Union, Iceland and Norway agree to deepen their cooperation in climate action*, 25 October 2019, https://ec.europa.eu/clima/news-your-voice/news/european-union-iceland-and-norway-agree-deepen-their-cooperation-climate-action-2019-10-25_en (last consulted 30 May 2022).
[201] C. Hillion, "Integrating an Outsider: An EU Perspective on Relations with Norway", *Eur. Foreign Aff. Rev.* (2011) vol. 16, no. 4, 489-520; Norway and the EU, *Mission of Norway to the EU - Climate change and the environment*, www.norway.no/en/missions/eu/values-priorities/climate-env/ (last consulted 30 May 2022).
[202] *Ibid.*; UNFCCC, *Norway's long-term low-emission strategy for 2050*, https://unfccc.int/sites/default/files/resource/LTS1_Norway_Oct2020.pdf (last consulted 30 May 2022).
[203] C. Archer, "Norway and the EEA" in *Norway Outside the European Union - Norway and European Integration from 1994 to 2004* (2004) London (UK), Routledge, 64-95; EFTA, *EEA / Relations with the EU - How EU Law becomes EEA Law*, https://eealaw.efta.int/ (last consulted 30 May 2022).
[204] C. Archer, "The EEA in action" in *Norway Outside the European Union - Norway and European Integration from 1994 to 2004*, Routledge (2004) 95-131; EFTA, *EEA / Relations with the EU - How EU Law becomes EEA Law*, https://eealaw.efta.int/ (last consulted 30 May 2022).

and agencies, Ministry of Foreign Affairs and a special Clearing Committee.[205] Twice a year, the Government informs the Norwegian Parliament of key EEA relevant EU initiatives and issues, followed by an early assessment.[206] Throughout the EU's decision-making process, they may voice their support and concerns to the EU institutions.[207] All EEA relevant proposals are registered in the Norwegian EEA Database.[208] The responsible ministry carries out the assessment of the proposal and informs the EFTA Secretariat of the outcome.[209]

85. In the second stage the EEA-EFTA States agree on a draft decision to incorporate an act. When the EU has adopted an EEA-relevant act, the EFTA Secretariat launches the procedure to incorporate it into the EEA Agreement. [210] After discussions with experts in which they assess whether the EEA relevance of the act and if it contains provisions that require adaptations related to specific national circumstances or for the purposes of the EEA Agreement, the EEA-EFTA States agree on a draft decision. [211] Following, the national procedures in the EEA-EFTA States are launched, which vary among the countries and according to the nature of the legal acts.[212] In Norway often only a final check is needed by the responsible ministry before the Ministry of Foreign Affairs can clear the draft.[213]

86. In the third stage, after the approval of the EEA-EFTA States, EFTA Secretariat forwards the draft so that the EU can review and approve the draft decision. [214] The European External Action Service (EEAS) coordinates the EU's part of the EEA process, by launching consultations on the draft with the relevant Directorates-General of the European Commission.[215] If the EU requests changes to the draft, discussions are held with the aim to find a common agreement. If

---

[205] An overview of the Norwegian committees: www.regjeringen.no/no/sub/eos-notatbasen/om-eos-notatbasen/sakstrinn-2/id524226/ (last consulted 30 May 2022); EFTA, *EEA / Relations with the EU - How EU Law becomes EEA Law*, https://eealaw.efta.int/ (last consulted 30 May 2022).

[206] Stortinget, *The Norwegian Parliament and the EEA Agreement*, www.stortinget.no/no/english/International-delegations/the-delegation-to-efta-and-eea-parliamentary-committees/the-norwegian-parliament-and-the-eea-agreement/ (last consulted 30 May 2022).

[207] C. Archer, "Norway and the EEA" in *Norway Outside the European Union - Norway and European Integration from 1994 to 2004* (2004) London (UK), Routledge, 64-95; EFTA, *EEA / Relations with the EU - How EU Law becomes EEA Law*, https://eealaw.efta.int/ (last consulted 30 May 2022).

[208] Norwegian EEA Database, www.regjeringen.no/no/sub/eos-notatbasen/sok/id615429/ (last consulted 30 May 2022).

[209] C. Archer, "Norway and the EEA" in *Norway Outside the European Union - Norway and European Integration from 1994 to 2004* (2004) London (UK), Routledge, 64-95; EFTA, *EEA / Relations with the EU - How EU Law becomes EEA Law*, https://eealaw.efta.int/ (last consulted 30 May 2022).

[210] EFTA, *About EFTA - Managing the EFTA Secretariat*, www.efta.int/About-EFTA/Managing-EFTA-Secretariat-745 (last consulted 30 May 2022).

[211] EFTA, *EEA / Relations with the EU - How EU Law becomes EEA Law*, https://eealaw.efta.int/ (last consulted 30 May 2022.

[212] *Ibid*.

[213] Stortinget, *The Norwegian Parliament and the EEA Agreement*, www.stortinget.no/no/english/International-delegations/the-delegation-to-efta-and-eea-parliamentary-committees/the-norwegian-parliament-and-the-eea-agreement/ (last consulted 30 May 2022).

[214] C. Archer, "Norway and the EEA" in *Norway Outside the European Union - Norway and European Integration from 1994 to 2004* (2004) London (UK), Routledge, 64-95; EFTA, *EEA / Relations with the EU - How EU Law becomes EEA Law*, https://eealaw.efta.int/ (last consulted 30 May 2022).

[215] *Ibid*.

the draft decision contains substantive adaptations or budgetary consequences, the EU Council must give the EEAS the mandate to adopt it, otherwise the EEAS can adopt it on behalf of the EU, ending the review process [216]

87. In the fourth stage, after gaining approval of both sides, the EEA Joint Committee adopts the decision thus incorporating the act.[217] This Joint Committee, responsible for managing the EEA Agreement, 6 to 8 times per year and provides a forum for the EU and the EEA-EFTA States to exchange views as well as take decisions by consensus.[218] The EEA-EFTA States and the EU agree on a list of draft decisions ready for adoption and put on the agenda for the next EEA Joint Committee meeting.[219] Before each Joint Committee meeting, the Minister in charge of EEA matters meets with the European Consultative Committee of the Norwegian Parliament, which provides its opinion on the list, only after which the Norwegian Government can accept to incorporate an act.[220]

88. Finally, the fifth stage concerns the entry into force of the Joint Committee Decision. Normally they enter into force one day after adoption in the EEA Joint Committee unless there are national constitutional requirements.[221] The EEA Agreement annexes and protocols are updated accordingly, and the incorporated acts must be made part of the EEA-EFTA States national legal orders. A decision that entails an amendment of national legislation requires approval of the national parliaments before its entry into force.[222] In Norway, the Parliament approves these in the form of a Parliamentary Resolution, which is submitted to the Parliament along with the Bill to transpose the act into Norwegian law and sanctioned by Royal Resolution.[223] Compliance with the Agreement is monitored by the EFTA Surveillance Authority and infringement cases for failure to fulfil the obligations under the EEA Agreement can be brought to the EFTA Court.[224]

---

[216] *Ibid*.
[217] EFTA, EEA Joint Committee, www.efta.int/eea/eea-institutions/eea-joint-committee (last consulted 30 May 2022).
[218] *Ibid*.
[219] C. Archer, "Norway and the EEA" in *Norway Outside the European Union - Norway and European Integration from 1994 to 2004*, Routledge (2004) 64-95; EFTA, *EEA / Relations with the EU - How EU Law becomes EEA Law*, https://eealaw.efta.int/ (last consulted 30 May 2022).
[220] Stortinget, *The Norwegian Parliament and the EEA Agreement*, www.stortinget.no/no/english/International-delegations/the-delegation-to-efta-and-eea-parliamentary-committees/the-norwegian-parliament-and-the-eea-agreement/ (last consulted 30 May 2022).
[221] C. Archer, "Norway and the EEA" in *Norway Outside the European Union - Norway and European Integration from 1994 to 2004*, Routledge (2004) 64-95; EFTA, *EEA / Relations with the EU - How EU Law becomes EEA Law*, https://eealaw.efta.int/ (last consulted 15 April 2022).
[222] *Ibid*.
[223] Stortinget, *The Norwegian Parliament and the EEA Agreement*, www.stortinget.no/no/english/International-delegations/the-delegation-to-efta-and-eea-parliamentary-committees/the-norwegian-parliament-and-the-eea-agreement/ (last consulted 30 May 2022).
[224] EFTA Surveillance Authority, www.eftasurv.int (last consulted 30 May 2022); EFTA Court, https://eftacourt.int (last consulted 30 May 2022); EFTA, *EEA / Relations with the EU - How EU Law becomes EEA Law*, https://eealaw.efta.int/ (last consulted 30 May 2022).

2.2.2. Norway and wind power

89. Wind power is a relativity new player on the Norwegian energy market, having its introduction in 1998.[225] In past few decades since then the Norwegian energy policies have adjusted and been reformed in conjunction with the global and regional climate policies and the advancement of technologies.[226] Between 2016 and 2021 the installed production capacity of onshore wind turbines in Norway increased from 873 MW to 3.977 MW, representing around 10% of Norwegian electricity production capacity.[227] This increase in wind energy has also caused an increase in public opposition and debate related to socioenvironmental, procedural and distributional concerns.[228] These concerns question the legitimacy of the wind power policy.

90. Hydropower has since the 1960s until today (2022) remained as the main provider of renewable energy and has powered the industrial development in most of Norway.[229] In addition, it still represents 88% of the electricity production capacity and around 70% of the annual Norwegian energy consumption.[230] Oil discoveries in Norwegian territory in the seventies provided a major opportunity for the development of an energy export economy and creation of a new industry connected to the oil supply industry.[231] Additionally, state ownership and taxes in this new sector generated substantial state revenues.[232]

91. Against this background it is clear that Norway's perspective on renewable energy is quite different from other European countries. The high and easy accessibility to a renewable energy source, hydropower, lessened the incentive to invest and develop in other types of renewable energy. In recent years there has been more attention and focus on diversifying energy supply in Norway.

---

[225] M. Vasstrøm and H.K. Lysgård, "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Res. Soc. Sci* (2021) vol. 77, 10 p.
[226] *Ibid*., 2.
[227] *Ibid*., Energy Facts Norway, *Official energy statistics*, https://energifaktanorge.no/, (last consulted 30 May 2022).
[228] P.P. Otte, K. Rønningen and E. Moe, "Contested wind energy: discourses on energy impacts and their significance for energy justice in Fosen" in A. Szolucha (ed.), *Energy, Resource Extraction and Society Impacts and Contested Futures*, Routledge (2018) 140-158.
[229] M. Vasstrøm and H.K. Lysgård, "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Res. Soc. Sci* (2021) vol. 77, 4; S.I. Angell and O.A. Brekke, "Frå kraft versus natur til miljøvenleg energi? Norsk vasskraftpolitikk i eit hundreårsperspektiv", Rapport 3-2011, *Uni Research AS*, Bergen, 2011.
[230] Energy Facts Norway, *Official energy statistics*, https://energifaktanorge.no/, (last consulted 30 May 2022).
[231] M. Vasstrøm and H.K. Lysgård, "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Res. Soc. Sci* (2021) vol. 77, 4.
[232] *Ibid*.; B. Sæther, A. Isaksen and A. Karlsen, "Innovation by co-evolution in natural resource industries: the Norwegian experience", *Geoforum* (2011) vol. 42, no. 3; 373-381.

3. Norway's offshore wind farms: when, where and how?

93. Norway has leading expertise in the petroleum-maritime sector, which provides them with major potential to develop an industry in the international offshore wind power market.[233] The Norwegian green energy potential of offshore wind has been communicated for almost two decades but without any action to capitalise on the investments to create a domestic market for offshore wind energy supply. Despite significant investments in research and development, very few policies have been developed to build a Norwegian offshore wind supply industry.

94. Relatively recently there has been a change in the Norwegian offshore wind policy. In August 2019, the state-owned enterprise Enova[234] has announced that it will invest 2.3 billion NOK (approximately 2.4 million Euro) into the development the world's biggest floating offshore wind farm, *Hywind Tampen*, by the partially state-owned oil company Equinor.[235] In June 2021, the Norwegian minister of Petroleum and Energy revealed the plan that two sea basins off the Norwegian coast would be opened to proposals for concessions for offshore renewable energy production. In addition, offshore energy regulations, containing the details of the licensing process for offshore wind power project owners, were adopted.

95. Equinor first invested in the pilot project *Hywind Demo*, as the first prototype of a floating offshore wind turbine, in 2009. The goal of this demo project was to decarbonize oil and gas production by electrifying platforms.[236] This offshore wind project, a 2.3-MW floating turbine, was installed in 2009 off the shore of Norway, in *Karmøy*, having a rotor diameter of 82,4 meters located at a water depth of about 220 meter.[237] It ran successfully for eight years after which it developed into a fully operational wind farm, *Hywind Scotland*, as the first full-scale commercial floating wind farm.[238] The *Hywind Scotland* finished construction in October 2017 and consists of five 6 MW capacity floating turbines located at depth of 95 to 120 meters.[239]

---

[233] H.E. Normann, "The role of politics in sustainable transitions: The rise and decline of offshore wind in Norway", *Environ. Innov. Soc. Transit.* (2015) vol. 15, 180-193; I. R. Dahl, B.W. Tveiten and E. Cowan, "The Case for Policy in Developing Offshore Wind: Lessons from Norway", *Energies* (2022) vol. 15, 14 p.

[234] Enova is owned by the Norwegian Ministry of Climate and Environment and was established to "promote a shift towards more environmentally friendly energy consumption and production, as well as the development of energy and climate technology", *ENOVA*, www.regjeringen.no/en/dep/kld/organisation/Subordinate-agencies/enova/id2599611/ (last consulted 30 May 2022).

[235] Until 2018 known as 'Statoil'. The Norwegian government is the largest shareholder with 67% of the shares in their possession. See more on: Equinor, *About Us*, www.equinor.com/en/about-us.html (last consulted 30 May 2022).

[236] S. Whitfield, "Offshore Wind: The New Frontier in Powering Platforms?", *J. Pet. Technol.* (2020) vol. 72, 38-40.

[237] T.Q. Pham, S. Im and J. Choung, "Prospects and Economics of Offshore Wind Turbine Systems", *J. Ocean Eng. Technol.* (2021) vol. 35, no. 5, 382-392.

[238] *Ibid*., Equinor, *Hywind Scotland*, www.equinor.com/energy/hywind-scotland (last consulted 30 May 2022).

[239] T.Q. Pham, S. Im and J. Choung, "Prospects and Economics of Offshore Wind Turbine Systems", *J. Ocean Eng. Technol.* (2021) vol. 35, no. 5, 382-392.

3.1. Socio-political context

96. Norway's energy policy is primarily based on the principle of short-term cost-efficiency, meaning that the introduction of any new renewable energy production needs to be profitable in the short-term. Norway enjoys a powerful and profitable hydropower market since the 1950s and 60s, due to substantial investments made by the state. Additionally, Norway has the geographical benefit resulting in abundant and cheap renewable energy generation from hydropower. Consequently, Hydropower, as an institutionalized stakeholder, has served as the backbone of the Norwegian energy supply for decades, providing renewable electricity, tax revenues and industrial development across Norway.[240] Additionally, the petroleum sector exercises its strong influence through the ministry of Petroleum and Energy, also becoming an institutionalized stakeholder.[241]

97. The interest and willingness of the industry and the state to develop offshore wind energy coincides with the price of oil.[242] The higher the price for oil, the higher the willingness of actors to support in the deployment of offshore wind power.[243] This varying attitude has slowed down the creation of an offshore wind power market in Norway and made offshore wind power development vulnerable and dependent on the oil sector.[244]

98. The reach of these sectors is not to be underestimated as their actions and policy choices, directly and indirectly, influence those of the offshore wind power industry. This is evidenced by the close relationship that was noted between the state-owned enterprise Enova and the oil company Equinor. The decision of Equinor to invest more than a 2 billion NOK into the *Hywind Tampen* offshore wind project was preceded by a change of Enova's mandate in 2017 in order to facilitate its support to the project. This first large-scale project supported by the Norwegian government is an 95 MW floating offshore wind farm, to be completed in spring 2022.[245] Equinor's grant is not without its potential benefits for the company. This investment could

---

[240] M. Vasstrøm and H.K. Lysgård, "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Res. Soc. Sci* (2021) vol. 77, 4.
[241] E. Moe, S.T. Hansen and E.H. Kjær, "Why Norway as a Green Battery for Europe Is Still to Happen, and Probably Will Not" in P. Midford and E. Moe (eds.), *New Challenges and Solutions for Renewable Energy: Japan, East Asia and Northern Europe*, Palgrave Macmillan (2021) 281-317.
[242] I.R. Dahl, "Norwegian Offshore Wind Policy: A New Policy Paradigm or Business as Usual? An Analysis of the Policy Area of Norwegian Offshore Wind in the Period 2012–2020", *Norwegian University of Science and Technology* (2021); Export Credit Norway, "Offshore Wind - Opportunities for the Norwegian Industry", *THEMA Report 2020-13* (2020), www.regjeringen.no/contentassets/07635c56b2824103909fab5f31f81469/offshore-wind-opportunities-for-the-norwegian-industry.pdf (last consulted 30 May 2022).
[243] I. R. Dahl, B.W. Tveiten and E. Cowan, "The Case for Policy in Developing Offshore Wind: Lessons from Norway", *Energies* (2022) vol. 15, 8.
[244] Norsk Industri, "Leveransemodeller for Havvind", (2021) www.norskindustri.no/siteassets/dokumenter/rapporter-og-brosjyrer/leveransemodeller-havvind/leveransemodeller-havvind_juni_kartlegging-av-norske-kompetansemiljoer.pdf (last consulted 30 May 2022).
[245] Equinor, *Hywind Tampen*, www.equinor.com/energy/hywind-tampen (last consulted 30 May 2022).

entail a tax reduction of around 78% due of the Norwegian petroleum tax regime.[246] Other possible cost reductions, that coincide with the investment into the offshore wind project, are the costs of reduced CO_2 taxes estimating about 100 million NOK (11 thousand Euro) per year.

99. The large-scale implementation of any other sort of renewable energy is very depended on the rationale of power export.[247] This power export issue is where other hurdles arise. From within Europe the power export from Norway to Europe has gotten quite some support from a climate-political perspective, such as, for example, Norway having an ethical responsibility to help substitute the polluting energy production in Europe.[248] At the political side of this argument there has been a significant reluctance to finance cables and/or more expensive electricity by the taxpayers and energy consumers.[249]

100. The power intensive industries on one hand are motivated by the economic power position that Norway has in the global energy industry, as they have a competitive advantage due to the ample access to existing, low-cost electricity.[250] Consequently, there is a very low incentive to introduce more expensive electricity sources, such as offshore wind power, into the energy system.[251] On the other hand, the export debate has been fuelled by an incentive of potential revenues that could be made.[252] Energy grid companies have thus been motivated to argue in favour of the export debate.[253]

101. Only recently Norway linked to the European power market through two cables, the *NordLink* cable (opened in May 2021) and the *North Sea Link* (opened for trial operation in November 2021).[254] The integration via cables has not been without setbacks and protest, as seen with the

[246] I. R. Dahl, B.W. Tveiten and E. Cowan, "The Case for Policy in Developing Offshore Wind: Lessons from Norway", *Energies* (2022) vol. 15, 8.
[247] I.R. Dahl, "Norwegian Offshore Wind Policy: A New Policy Paradigm or Business as Usual? An Analysis of the Policy Area of Norwegian Offshore Wind in the Period 2012–2020", *Norwegian University of Science and Technology* (2021); Norwegian Ministry of Petroleum and Energy (NMoPE), *Press release: Summit on Offshore Wind* (February 2021) www.regjeringen.no/no/aktuelt/toppmote-om-havvind/id2669248/ (last consulted 30 May 2022).
[248] S. Heidenreich, "Out of sight, out of mind? Controversy over offshore wind energy in Norway's news media" *Sci. Cult.* (2016) vol. 25, 449-472.
[249] E. Moe, S.T. Hansen and E.H. Kjær, "Why Norway as a Green Battery for Europe Is Still to Happen, and Probably Will Not" in P. Midford and E. Moe (eds.), *New Challenges and Solutions for Renewable Energy: Japan, East Asia and Northern Europe*, Palgrave Macmillan (2021) 281-317.
[250] *Ibid*.
[251] I. R. Dahl, B.W. Tveiten and E. Cowan, "The Case for Policy in Developing Offshore Wind: Lessons from Norway", *Energies* (2022) vol. 15, 4.
[252] *Ibid*.
[253] E. Moe, S.T. Hansen and E.H. Kjær, "Why Norway as a Green Battery for Europe Is Still to Happen, and Probably Will Not" in P. Midford and E. Moe (eds.), *New Challenges and Solutions for Renewable Energy: Japan, East Asia and Northern Europe*, Palgrave Macmillan (2021) 281-317.
[254] TenneT, *NordLink*, www.tennet.eu/nl/ons-hoogspanningsnet/internationale-verbindingen/nordlink/ (last consulted 30 May 2022); Stanett, *North Sea Link - New subsea interconnector between Norway and England*, www.statnett.no/en/our-projects/interconnectors/north-sea-link/ (last consulted 30 May 2022N. Skopljak, *Norway-UK Interconnector Begins Trial Operations* (2021) www.offshore-energy.biz/norway-uk-interconnector-begins-trial-operations/ (last consulted 30 May 2022).

halting of the opening of the *NorthConnect* cable in 2020 and reduced capacity operation in 2022 for the *Nord Sea Link* cable due to some technical issues.[255]

102. Several forces can be identified that have influenced the Norwegian wind power policy. With respect to political goals and engagement in Norway the potential of a crisis in the national energy supply paved the way for the emergence of a wind power policy, with a focus on onshore wind power due to the high cost of offshore power.[256]. Though supported by regional and international climate agreements, many actors question the limited inclusion of environmental, cultural and social considerations in wind power policies and licencing procedures.[257] In the last decade, technological innovation and progress combined with international conflicts and agreements have boosted the development pace of wind energy production and competition and has thus also boosted political interest and will.[258] Many Norwegian energy policy document emphasised the value creation and business opportunity of wind energy production, that concomitantly would help to fulfil their international climate obligations.[259] Besides the change in political will due to the changed context, other stabilizing forces in the Norwegian wind energy policy were the establishment of a national framework and "state-funded support schemes for wind power projects and market-based schemes (green certificates) to secure profitability and investment predictability".[260]

103. However, the political instability of wind power as an energy policy left room for contestations, delegitimization and resistance.[261] The technological development entails increased turbine height and blade range that have major negative massive visual and landscape effects.[262] The

---

[255] V. E. Kristensen, *Controversial Norway-UK interconnector project cancelled* (2021) https://energywatch.com/EnergyNews/Utilities/article13601816.ece (last consulted 30 May 2022); N. Skopljak, *North Sea Link to enter 2022 at reduced capacity* (2021) www.offshore-energy.biz/north-sea-link-to-enter-2022-at-reduced-capacity/ (last consulted 30 May 2022).

[256] NMoPE, Report 25 (2015–2016), *Kraft til endring - Energipolitikken mot 2030* (15 April 2016) www.regjeringen.no/no/dokumenter/meld.-st.-25-20152016/id2482952/ (last consulted 30 May 2022); M. Vasstrøm and H.K. Lysgård, "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Res. Soc. Sci* (2021) vol. 77, 5.

[257] Norwegian Ministry of Environment (NMoE), Report 21 (2011-2012) *Norsk Klimapolitikk* (25 April 2012) www.regjeringen.no/no/dokumenter/meld-st-21-2011-2012/id679374/ (last consulted 30 May 2022).

[258] *Ibid*.; Norwegian Ministry of Climate and the Environment (NMoCE), Report 13 (2014-2015) *Ny utslippsforpliktelse for 2030 – en felles løsning med EU* (6 February 2015) www.regjeringen.no/no/dokumenter/meld.-st.-13-2014-2015/id2394579/ (last consulted 30 May 2022); NMoPE, Report 25 (2015–2016), *Kraft til endring - Energipolitikken mot 2030* (15 April 2016) www.regjeringen.no/no/dokumenter/meld.-st.-25-20152016/id2482952/ (last consulted 30 May 2022).

[259] *Ibid*.

[260] NMoPE, Report 25 (2015–2016), *Kraft til endring - Energipolitikken mot 2030* (15 April 2016) www.regjeringen.no/no/dokumenter/meld.-st.-25-20152016/id2482952/ (last consulted 30 May 2022); T.H.J. Inderberg, H. Rognstad, I.-L. Saglie and L.H. Gulbrandsen, "Who influences windpower licensing decisions in Norway? Formal requirements and informal practices", *Energy Res. Soc. Sci*. (2019) vol. 52, 181-191.

[261] NMoPE, Report 28 (2019-2020), *Vindkraft på land - Endringer i konsesjonsbehandlingen* (19 June 2020) www.regjeringen.no/no/dokumenter/meld.-st.-28-20192020/id2714775/ (last consulted 30 May 2022); B. Blindheim, "Gone with the wind? The Norwegian licencing process for wind power: does it support investments and the realisation of political goals?" in*t. J. Sustain. Energy Plan. Manag*. (2015) vol. 5, 15-26.

[262] *Ibid*.

strong Norwegian national identity and cultural citizenship of the outdoor life intensely conflict with this development.[263] In spite of that, it also steered politics towards offshore options as it was recognized that the increasing conflicts in terms of social and environmental interests needed to be addressed in order to ensure development predictability and efficiency.

104. The development of offshore wind power would have an impact on the fishing industry, which is highly profitable in Norway. Concerns such as job loss and tax revenue reduction still pose a barrier to the developing offshore wind.[264] From this it can be concluded that Norway's wind policies have been dictated by prioritizing established industries and jobs rather that the potential ones that offshore wind could generate.[265] The value creation that offshore wind farms could provide has thus been assessed in the short term rather than the long term. Additionally, because of the little to no local energy-political demand and the environmental and socio-economic impacts, both known and uncertain, local communities, state authorities and the Norwegian society in general have argued against offshore wind power development.[266] Only after both the technological and financial success of the large scale offshore wind farm at the Scottish coast (2009), the Norwegian political will increased to invest in offshore wind.[267]

3.2. The regulatory regime

105. In 1998, wind power (at the time being only onshore wind power) was introduced for the first time, as renewable energy source, into the Norwegian energy policy.[268] The initial target that was set at the time was production of 3 TWh per year before 2010.[269] Some considerations made by the Norwegian government for the inclusion of wind in their energy policy was the need to help to support Norway's future energy production and its value creation, given the increasingly internationally oriented power supply industry.[270] The development of onshore wind power was aided by an investment support scheme, with a running time of 10 years, from

[263] S. Batel and P. Devine-Wright, "Populism, identities and responses to energy infrastructures at different scales in the United Kingdom: a post-Brexit reflection", *Energy Res. Soc. Sci*. (2018) vol. 43, 41-47; M. Vasstrøm and H.K. Lysgård, "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Res. Soc. Sci* (2021) vol. 77, 7.
[264] I. R. Dahl, B.W. Tveiten and E. Cowan, "The Case for Policy in Developing Offshore Wind: Lessons from Norway", *Energies* (2022) vol. 15, 7; T. Mäkitie, H. Normann, T. Thune and J. Sraml Gonzalez, "The green flings: Norwegian oil and gas industry's engagement in offshore wind power", *Energy policy* (2019) vol. 127, 269-279.
[265] *Ibid*.
[266] I.-L. Saglie, T.H. Inderberg and H. Rognstad, "What shapes municipalities' perceptions of fairness in windpower developments?", *Local Environ.* (2020) vol. 25, no. 2, 147-161.
[267] *Ibid*.
[268] NMoE, Report 21 (2011-2012) *Norsk Klimapolitikk* (25 April 2012) www.regjeringen.no/no/dokumenter/meld-st-21-2011-2012/id679374/ (last consulted 30 May 2022); M. Vasstrøm and H.K. Lysgård, "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Res. Soc. Sci* (2021) vol. 77, 4.
[269] NMoPE, Report 29 (1998-1999), *Om energipolitikken* (19 March 1999) www.regjeringen.no/no/dokumenter/Stmeld-nr-29-1998-99-/id192287/?ch=1 (last consulted 30 May 2022).
[270] *Ibid*.

2000 until 2011.[271] This resulted in an overwhelming rush of applications for licences, including by a number of inexperienced and unqualified producers and developers.[272] Consequently, a myriad of conflicts arose which led to the establishment of a conflict assessment committee that functioned across national authorities.[273] Additionally, the Ministry of Environment and Ministry of Petroleum and Energy developed guidelines to ensure 'comprehensive and long-term planning in relation to other social and environmental interests'.[274]

106. Under the Energy Act[275] and the Planning and Building Act[276] a two-track licensing process was established for wind power development.[277] This eventually was simplified into a uniform single-track procedure, that was handled by the Norwegian Water Resources and Energy Directorate (NVE). [278] Compared to other European countries development in wind power was slow in Norway, despite the support scheme and increased procedural efficiency measures.[279] To illustrate, the 3 TWh goal was not reached with the mere installation of 442 MW turbines producing only around 1.1 TWh.[280]

107. In the past decade, the knowledge gain and expansion of environmental legislation has strengthened the link between wind power and climate change mitigation and policy goals. This has resulted in the inclusion of the potential of wind power in many international commitments of renewable energy investments and production; and trend and push towards the electrification of society and industry in general.[281]

108. With the adaptation of the 2009 EU Renewable Energy Directive, a change in the Norwegian energy policy was necessary because of the newly imposed obligations under this directive.

---

[271] NMoPE, Report 1998:11, *Energi- og kraftbalansen frem mot 2020* (3 July 1998) www.regjeringen.no/no/dokumenter/NOU-1998-11/id141308/ (last consulted 30 May 2022).
[272] T.H.J. Inderberg, H. Rognstad, I.-L. Saglie and L.H. Gulbrandsen, "Who influences windpower licensing decisions in Norway? Formal requirements and informal practices", *Energy Res. Soc. Sci*. (2019) vol. 52, 181-191.
[273] Norwegian Ministry of Local Government and Regional Development, Report 11 (2004-2005), *Sametingets virksomhet i 2003* (10 December 2004) www.regjeringen.no/no/dokumenter/stmeld-nr-11-2004-2005-/id405798/ (last consulted 30 May 2022).
[274] H. Wiig, A. Tesli, S. Stokstad and G.S. Hanssen, "Intensjoner og praksis for regionale planer for vindkraft", *NIBR* (2019) Report 2019:14, 96 p.
[275] NMoPE, Act of 29 June 1990 No. 50 relating to the generation, conversion, transmission, trading, distribution and use of energy etc. (the Energy Act).
[276] NMoE, Act of 27 June 2008 No. 71 relating to planning and the processing of building applications (the Planning and Building Act).
[277] M. Vasstrøm and H.K. Lysgård, "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Res. Soc. Sci* (2021) vol. 77, 4.
[278] T.H.J. Inderberg, H. Rognstad, I.-L. Saglie and L.H. Gulbrandsen, "Who influences windpower licensing decisions in Norway? Formal requirements and informal practices", *Energy Res. Soc. Sci*. (2019) vol. 52, 181-191.
[279] M. Vasstrøm and H.K. Lysgård, "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Res. Soc. Sci* (2021) vol. 77, 4.
[280] B. Blindheim, "Implementation of wind power in the Norwegian market; the reason why some of the best wind resources in Europe were not utilised by 2010", *Energy Policy* (2013) vol. 58, 337-346.
[281] NMoE, Report 21 (2011-2012) *Norsk Klimapolitikk* (25 April 2012) www.regjeringen.no/no/dokumenter/meld-st-21-2011-2012/id679374/ (last consulted 30 May 2022).

The 2009 RED obliged Norway to increase its renewable energy share to 67,5% by 2020.[282] Wind power was projected and pushed forward as the major potential provider to renewable energy production. To achieve this Norway deployed the Green Certificate Scheme, which required the state to subsidize 13,2 TW renewable energy.[283] That way financial security and predictability for market investments were ensured. While it served its important purpose, the phase out of this scheme has started in 2021.[284] One of the reasons for the phase-out is that several sources pointed to the increasing profitability of wind power, with local communities needing to be able to share in their profit.[285]

109. All onshore wind power licencing procedures were halted in 2019 due to local opposition and a new white paper concerning the licensing process and procedures was to be released.[286] As of April 2022, there has been no resumption yet, but the Norwegian Energy Ministry is set to recommence licensing for new onshore wind farms.[287]

110. Meanwhile two projects have been successful in acquiring state support: both are floating offshore wind power projects, pointing to the sensitivity of the Norwegian energy policy to the prospect of technology development and the reliance on the petro-maritime industry. There has been this greater interest in floating offshore wind power as, contrary to bottom-fixed technologies, Norway could have a comparative advantage.[288] Opposite to bottom-fixed turbines, floating turbines create a more convincing rationale for the deployment of renewable energy production, which is still quite costly in Norway.[289] They provide a middle ground in the Norwegian energy-political paradigm, because it is such a new, not yet fully developed technology that can fulfil the obligations of funding renewable energy projects through, among others, R&D (research and development).[290]

---

[282] NMoCE, Report 13 (2014-2015) *Ny utslippsforpliktelse for 2030 – en felles løsning med EU* (6 February 2015) www.regjeringen.no/no/dokumenter/meld.-st.-13-2014-2015/id2394579/ (last consulted 30 May 2022).
[283] NMoPE, Report 25 (2015–2016), *Kraft til endring - Energipolitikken mot 2030* (15 April 2016) www.regjeringen.no/no/dokumenter/meld.-st.-25-20152016/id2482952/ (last consulted 30 May 2022).
[284] NMoPE, Report 28 (2019-2020), *Vindkraft på land - Endringer i konsesjonsbehandlingen* (19 June 2020) www.regjeringen.no/no/dokumenter/meld.-st.-28-20192020/id2714775/ (last consulted 30 May 2022).
[285] NMoPE, Report 2012:9, *Energiutredningen – verdiskaping, forsyningssikkerhet og miljø* (5 March 2012) www.regjeringen.no/no/dokumenter/nou-2012-9/id674092/ (last consulted 30 May 2022). M. Vasstrøm and H.K. Lysgård, "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Res. Soc. Sci* (2021) vol. 77, 4.
[286] NMoPE, Report 28 (2019–2020), *Vindkraft på land — Endringer i konsesjonsbehandlingen* (19 June 2020) www.regjeringen.no/no/dokumenter/meld.-st.-28-20192020/id2714775/ (last consulted 30 May 2022).
[287] N. Buli, "Norway to resume onshore wind power licensing after 3-year break", *Reuters,* 8 April 2022, www.reuters.com/business/sustainable-business/norway-resume-onshore-wind-power-licensing-after-3-year-break-2022-04-08/ (last consulted 30 May 2022).
[288] I. R. Dahl, B.W. Tveiten and E. Cowan, "The Case for Policy in Developing Offshore Wind: Lessons from Norway", *Energies* (2022) vol. 15, 8.
[289] T. Mäkitie, A. Andersen, J. Hanson, H. Normann and T. Thune, "Established sectors expediting clean technology industries? The Norwegian oil and gas sector's influence on offshore wind power", *J. Clean. Prod.* (2018) vol. 177, 813-823.
[290] I. R. Dahl, B.W. Tveiten and E. Cowan, "The Case for Policy in Developing Offshore Wind: Lessons from Norway", *Energies* (2022) vol. 15, 8.

111. It is not because the public policy has changed and now made room for the development of offshore wind farms, that the prerequisites for creating a domestic offshore wind power market have been fulfilled. Studies have shown that in order for such a market to be viable, at least two offshore wind sites need to be operational and have a production capacity between 500 and 1000 MW. The willingness of the Norwegian government to invest in a project at *Utsira North*, in combination with the new offshore wind policy, does point to a future possibility of having the new public offshore wind policy in line with a domestic market.[291] As offshore wind power is currently still in its infancy, it is unlikely that in the near future a taxation regime of this kind will be considered, though recent offshore wind power developments have made the Norwegian government adopt a more agreeable attitude.[292]

112. On 9 February 2022, during a press conference, the Norwegian Government announced the start of the first phase for the offshore wind projects in the opened area *Sørlige Nordsjø II* (see Appendix II).[293] In parallel with this, the Ministry of Petroleum and Energy proposed to divide the area of *Sørlige Nordsjø II* into three concession areas and *Utsira Nord* into either three or four concession areas.[294] These areas would then be subject to an auction for prequalified entities, around autumn of 2022. The proposal also notes that some areas would be left between each concession area, enabling development in every area without affecting the other areas.

3.2.1. The Offshore Energy Act

113. The Offshore Energy Act No. 21 of 4 June 2010[295], set out the regime under which the construction of offshore wind power and other renewable energy production facilities at sea take place.[296] This Act requires the opening of specific geographical zones for licensing applications in order for offshore renewable energy production activities to take place. When an area is opened this means that for that area it will become possible to apply for a license for renewable energy production.

114. The Norwegian Ministry of Petroleum and Energy, presented in Proposition No. 107 (2008–2009) to the *Storting* (the Norwegian parliament) the adoption of the Act on Offshore Renewable Energy Production (the Offshore Energy Act), as a response to the Report No. 34

---

[291] *Ibid*., 9.
[292] Norwegian Government, *Press release: Major initiative to promote offshore wind power* (12 February 2022) www.regjeringen.no/en/aktuelt/major-initiative-to-promote-offshore-wind-power/id2900436/ (last consulted 30 May 2022).
[293] *Ibid*.
[294] *Ibid*.
[295] NMoPE, Act of 1 July 2010 No. 21 concerning an Act on Offshore Renewable Energy Production (the Offshore Energy Act).
[296] Norwegian Water Resources and Energy Directorate (NVE), Offshore wind power in Norway – Strategic Environmental Assessment (English summary), *NVE-Rapport 47-12*, https://publikasjoner.nve.no/diverse/2013/havvindsummary2013.pdf, 24 p. (last consulted 30 May 2022) (hereinafter 'NVE-Rapport SEA 47-12').

(2006-2007) on Norwegian climate policy.[297] The main goal of this policy is to further develop Norway as an environment- and climate-friendly energy nation, and a leader in developing environment-friendly energy.[298] The decision of the Government to support offshore wind power development also finds its origin and support at the European Union level. The EU support and promotion of renewable energy through several initiatives, includes a strategy on offshore wind power. This strategy is connected to the security of energy supply and the theoretical potential for offshore renewable energy production at a large scale.[299]

115. In this context of required international coordination of infrastructure, spatial planning and so forth, Norway has a special energy position compared to other states. As mentioned, the need and incentive for renewable offshore energy production in Norway is actually low, but the Government recognized the potential of Norway to contribute to competitiveness of offshore-based renewable energy. Four elements are at the foundation for this competitive potential: offshore expertise, renewable energy resources, infrastructure and hydropower balance.[300]

116. With regard to offshore expertise, the Norwegian industry and research teams of offshore oil and gas operations have a considerable level of knowledge "in various aspects of offshore technology, marine operations and other areas of significance for developing and operating renewable energy sources and infrastructure at sea."[301] The offshore renewable energy resources potential that has been identified is very large, requiring appropriate action to realise that potential in an efficient and effective manner. The legal framework to achieve this is largely based on Norway's long experience of administering hydropower and petroleum resources and electricity and gas infrastructures.[302] The Government has recognized the crucial role for good infrastructure for electricity transmission and shows considerable interest in the development of a possible power grid in the North Sea.[303] In addition, the developments in the Baltics were not overlooked and have been included in the considerations of infrastructure and grid development.[304] Lastly, in the proposal the issue of the intermittent nature of wind is mentioned,

[297] NMoPE, *Proposition No. 107 (2008–2009) to the Storting - Concerning an Act on Offshore Renewable Energy Production* (English summary), 7 p. (3).
[298] *Ibid*., 4.
[299] U. Khalid, "Norway opens areas for offshore wind power development", *SNL Energy Power Daily* (2020).
[300] NMoPE, *Proposition No. 107 (2008–2009) to the Storting - Concerning an Act on Offshore Renewable Energy Production* (English summary), 4.
[301] *Ibid*., 4-5.
[302] T. Mäkitie, *et. al*, "The green flings: Norwegian oil and gas industry's engagement in offshore wind power", *Energy policy* (2019) vol. 127, 269-279.
[303] NMoPE, *Proposition No. 107 (2008–2009) to the Storting - Concerning an Act on Offshore Renewable Energy Production* (English summary), 5-6.
[304] *Ibid*.; K. Pronińska and K. Księżopolski, "Baltic Offshore Wind Energy Development - Poland's Public Policy Tools Analysis and the Geostrategic Implications", *Energies* (2021) vol. 14, no. 16, 4883.

but a solution is provided that makes use of the balancing potential with the hydropower system (though still aspiring to be within environmentally acceptable limits).[305]

117. In order to open a zone a strategic environmental assessment (SEA) has to be carried out.[306] In 2013 the Norwegian Government carried out such an assessment for fifteen zones that were considered suitable for offshore wind power development.[307] These zones were divided into three categories based on the results of the SEA: A, B and C (see Appendix II), with category A representing those areas that are considered to be technically and economically the best feasible zones for wind power development.[308] Category B zones are considered to be zones with either technical challenges or conflicts of interest, that the NVE (Norwegian Water Resources and Energy Directorate) considers feasible to open only after technology matures or the area usage changes.[309] Category C represent zones incompatible for wind power development due to strong conflicts of interest and unacceptable negative impacts.[310]

118. It is the Ministry of Oil and Energy (OED) that decides which zones are opened. The total amount of areas considered under this assessment covered around 9000 $km^{2,}$ which equals around 1% of the Norwegian EEZ.[311] The zones are located in the North Sea for the south, the Norwegian Sea in the middle and the Barents Sea in the north. All of them are located within the Norwegian EEZ. Four of them were recommended by the NVE to be opened. Out of these four recommended zones, two have been proclaimed opened for offshore renewables: *Utsira Nord* and *Sørlige Nordsjø II* (both located in the south of Norway) (*infra* no. 122-124).

119. The Offshore Energy Act has a wider scope than just offshore wind power, it aims at any offshore renewable energy generation or utilization project that is not part of an offshore petroleum production project. The Act has adopted an area management concessionary approach.[312] The concessions are to be based on auctions or on other objective non-discriminatory conditions, which differs from Petroleum production licences, that are awarded based on detailed applications.[313]

---

[305] *Ibid*., 6.
[306] § 2-2 Offshore Energy Act.
[307] The assessments were carried out by the NVE and presented to the OED on 4 January 2013. See more: NVE-Rapport SEA 47-12.
[308] NVE-Rapport SEA 47-12, 8-23.
[309] *Ibid*., 8.
[310] *Ibid*.
[311] *Ibid*., 3.
[312] Chapter 3 on concessions and concessionaires of the Offshore Energy Act.
[313] Note that the new - now Labor-party led - government (2022) has expressed its intention to follow the proposals in the consultation document circulated by the previous Government. See more: B.-E. Leerberg, "Norway's answer to the energy transition", *Simonsen Vogt Wiig*, 17 February 2022, https://svw.no/en/insights/norways-answer-to-the-energy-transition#_ftn4 (last consulted 30 May 2022).

3.2.2. The Offshore Energy Regulations

120. In the 2017-2018 Proposition No. 1 to the Storting the Government's Strategy for floating offshore wind power was outlined and distributed by the Norwegian Ministry of Petroleum and Energy for consultation.[314] Subsequently, a proposal to open two areas for offshore renewable energy production in Norwegian waters, was released, accompanied by a draft set of regulations.[315] The Offshore Energy Regulations supplement the existing provisions of the Offshore Energy Act. These regulations were adopted with the aim of further regulating such activities in a more detailed manner and provide guidance and clarification for the actors involved in the development of offshore energy production.[316]

121. The Regulations entered into force on January 1st, 2021, together with the opening of the areas for offshore renewable energy generation.

3.2.2.1. Royal Decree concerning the opening of the Areas

122. As stipulated in paragraph 2-2 of the Offshore Energy Act, the King in Council may decide that an area may be opened for offshore renewable energy production. On 12 June 2020, the areas *Utsira Nord* and *Sørlige Nordsjø II* have been opened by royal decree for offshore renewable energy projects, from January 1st, 2021. In the two areas combined a maximum development of 4,500 MW is possible.

123. *Utsira Nord*, an area of 1010 km^2, is a special area as it is considered to be suitable for floating wind power development.[317] From the Norwegian perspective, this technology is the most interesting to explore.[318] A generation capacity of 1.500 MW is allocated to this area.

124. *Sørlige Nordsjø II*, an area of 2591 km^2, located near the Danish sector in North Sea, has it relevance in direct electricity export to Europe.[319] The ministry envisions the development of develop bottom-fixed wind power here but also provide rooms for floating wind power development.[320] A generation capacity of 3.500 MW is allocated to this area.

---

[314] X., "Floating offshore wind - Norway's next offshore boom?", *ABB* and *ZERO* (2018) 12 p.
[315] NMoPE, Royal Decree of 12 June 2020 concerning the Opening of the areas Utsira Nord and Sørlige Nordsjø II for processing of applications for licences for renewable energy production pursuant to the Offshore Energy Act (the Royal Decree concerning the opening of the Areas); NMoPE, Regulations of 12 June 2020 for the Offshore Energy Act (the Offshore Energy Regulations).
[316] NMoPE, Royal Decree of 12 June 2020 concerning Adoption of Regulations to the Offshore Energy Act (unofficial English translation), *ref. no. 20/88*, 32 p., www.regjeringen.no/contentassets/aaac5c76aec242f09112ffdceabd6c64/royal-decree-offshore-energy-regulation-june-2020.pdf (last consulted 30 May 2022).
[317] Royal Decree concerning the opening of the Areas.
[318] Norwegian Government, *Press release: Major initiative to promote offshore wind power* (12 February 2022) www.regjeringen.no/en/aktuelt/major-initiative-to-promote-offshore-wind-power/id2900436/ (last consulted 30 May 2022).
[319] Royal Decree concerning the opening of the Areas.
[320] Norwegian Government, *Press release: Major initiative to promote offshore wind power* (12 February 2022) www.regjeringen.no/en/aktuelt/major-initiative-to-promote-offshore-wind-power/id2900436/ (last consulted 30 May 2022).

3.2.2.2. Royal Decree concerning offshore energy regulation

125. On 12 June 2020, the King in Council adopted the Royal Decree concerning offshore energy regulation, entering into force on January 1st, 2021. The provisions contained in this regulation are in line with the proposal that was sent out on a public hearing on 18 June 2019.

126. In the proposal for this regulation, the consideration is that the licensing process for offshore wind power is to be similar to that of onshore power, though the distinctive characteristics of an offshore project should also be taken into account.[321] Other differences that are noted between onshore and offshore wind farms are technical distinctions and no equivalent to private land ownership.[322] Unlike onshore where agreements are made between landowners and developers, it is the State who decides on the purpose of marine areas and who considers the question of licensing.[323] As mentioned, and different with onshore development, a strategic impact assessment needs to be conducted in order to open areas for licensing.[324]

127. The licensing process starts with a project developer submitting a notification with a proposal for a project-specific impact assessment programme, which is then distributed for consultation and sent for assessment to a hearing committee.[325] It is up to the Ministry to adopt such a programme. When it does, it will apply the programme to a specified part of an opened area. Once the programme is adopted, the developer must submit a license application within two years.[326] There is no obligation for the Ministry to adopt a programme, even if the notification or programme are without any issues, as this part of their management prerogative. When submitted within the two year deadline, the Ministry will process the application and decide whether or not to award a license.[327] Within two years, after a license has been awarded, a detailed plan must be submitted.[328] Once the plan has been approved, the developer has a time limit of three years to build the installation.[329]

128. The Ministry can impose conditions in connection with the awarding of a license and approval of detailed plans.[330] A breach of the time limitations may lead to termination of the license. However, extensions of the deadlines can be allowed for a maximum of two years at a time.[331]

---

[321] §§ 3 – 11 Offshore Energy Regulations.
[322] The Offshore Energy Regulations (unofficial English translation) - *Further information about the proposal: The licensing process*.
[323] § 1-3 Offshore Energy Act, § 8 Offshore Energy Regulations.
[324] § 2-2 Offshore Energy Act; § 6 Offshore Energy Regulations.
[325] § 3 Offshore Energy Regulations.
[326] § 7 Offshore Energy Regulations.
[327] § 8 Offshore Energy Regulations.
[328] § 9 Offshore Energy Regulations
[329] § 10 Offshore Energy Regulations.
[330] § 3-4 Offshore Energy Act; § 18 Offshore Energy Regulations.
[331] § 11 Offshore Energy Regulations.

A license can be granted with a duration up to thirty years, which corresponds with the lifecycle of a wind farms (25 to 30 years).[332] The continued operation of a farm will require considerable investments, and require a new license based in a new licensing procedure and new impact assessments.[333]

129. Certain constraints were included in the opening of *Nordlige Nordsjø II* and *Utsira Nord*. For example, a *Sørlige Nordsjø II* offshore energy concession may not comprise the area over which there is a production licence or in *Utsira Nord*, an area will not be awarded to those areas that overlap with the Norwegian armed forces offshore live-firing training area.[334]

130. The Regulation states that it shall not fully apply the above mentioned process to certain projects, thus establishing a simplified procedure for pilot projects. For these projects it is not necessary to submit a notification with a draft programme when applying for a pilot project permit. In addition, for such a permit can be applied outside formally opened areas.

131. Because a licence for offshore renewable energy production grants an exclusive right to operate within the defined area, a processing fee is required.[335] The aim of the fee is to cover some of the administrative cost is the notifications process and to help identify applicants with genuine development plans.[336] A processing fee of NOK 100.000 (around 9.730 Euro) is considered suitable.

132. A clear priority is awarded to petroleum production. Some of the arguments given are the seniority of petroleum activities, which have been active since the 1960s on the Norwegian continental shelf; the fact that they are a location-specific resource that must be found and recovered where it is, unlike wind power farms that are more adaptable to other interest and activities, including petroleum, in an area.[337] These considerations are reflected in the licensing procedure, for example, a notification is required that an area is defined a project area for wind power development when a new petroleum production license is awarded, under the Petroleum Activities Act, in that area.[338]

---

[332] § 8 Offshore Energy Regulations.
[333] The Offshore Energy Regulations (unofficial English translation) - *Further information about the proposal: The licensing process*.
[334] B.-E. Leerberg, "Norway's answer to the energy transition", *Simonsen Vogt Wiig*, 17 February 2022, https://svw.no/en/insights/norways-answer-to-the-energy-transition#_ftn4 (last consulted 30 May 2022).
[335] § 5 Offshore Energy Regulations.
[336] *Ibid*.; The Offshore Energy Regulations (unofficial English translation) - *Further information about the proposal: The licensing process*.
[337] The Offshore Energy Regulations (unofficial English translation) - *Further information about the proposal: The licensing process.*
[338] NMoPE, Act of 29 November 1996 No. 72 relating to petroleum activities (The Petroleum Act).

133. Besides establishing new and detailed rules in the licensing process, the new regulations expand the jurisdiction of the Energy Offshore Act to internal Norwegian waters. Some remarks on this new regulation are the lack of provisions on collaterals in offshore wind assets. The Ministry has acknowledged the need for this, but as of April 2022, has not yet foreseen in adaptions, recommendations or guidelines on this issue.

3.2.3. Submarine cables

134. Norway does not have a specific act or legislation concerning the positioning of submarine cables. Instead, the rules on submarine cable laying and onshore connection are spread out over other legislative acts.[339]

135. For the export cables to a foreign EEZ one must look at the Ocean Energy law to find the applicable regime, to see which conditions must be satisfied and which permits and/or licenses need to be obtained.[340] A distinction is made between a facility for energy production[341], which would be an offshore wind farm and the electrical grid infrastructure[342], of which an export cable is a component. Thus, to lay an export cable a permit is needed, which requires, among others, an EIA (separate for the EIA needed for offshore wind farms) and a detailed project plan.[343] A cable permit has the duration of 30 years, with a possibility for extension.[344]

136. For export cables to offshore platform and/or offshore wind farms connected to offshore platforms as well export cables from offshore wind farms the discussion will be short as the volume of this thesis does not allow a more in-depth look at the legal provisions. These types of submarine cables are at the moment of lesser relevance. For export cables to offshore platform and/or offshore wind farms connected to offshore platforms § 8-1 of the Ocean Energy Law regulates the exchange of electricity out of Norwegian territory. In case of transboundary impacts other states should be contacted in light of the (scope of the) EIA.[345]

137. The regime for export cables in connection with offshore installations is a bit more complicated. If a wind farm provides an offshore installation with electricity, the project falls under the

[339] § 1 Offshore Energy Regulations.
[340] NMoPE, Act of 4 June 2010 No. 21 on Renewable Energy Production at Sea (The Ocean Energy Act).
[341] § 3-1 Ocean Energy Act.
[342] § 3-2 Ocean Energy Act.
[343] § 2-2 Ocean Energy Act.
[344] § 3-5 Ocean Energy Act.
[345] § 4-2 Ocean Energy Act.

Petroleum Law. However, any import or export outside Norwegian baseline - this being in the Norwegian TS and EEZ - is subject to the Ocean Energy Law (*supra* no. 135-136).[346]

138. For export cables from offshore wind farms to the Norwegian mainland no support mechanisms are in place given the high availability of renewable energy and lower electricity prices than the cost of offshore wind farms.[347] Outside of the Norwegian baseline the Ocean Energy Law applies, for inside the baseline and connection point on shore to the Norwegian grid, the Energy Act and the Planning and Building Act including a dispensation from the municipality of use of the land areas, and landowner agreements are relevant.[348]

3.3. Barriers to the development of offshore wind farms

139. Despite the value creation of offshore energy activities, they will have an impact on other businesses and public interests.[349] These will form barriers to their development and will need to be addressed accordingly.

140. First there is a conflict of interest between the petroleum industry and offshore wind development (*supra* no. 96-100 and 102). The potential petroleum resources in Norwegian waters are a concern. However, the Norwegian Petroleum Directorate presumes that the co-existence of wind power and petroleum installations remains possible.[350]

141. A second barrier is the shipping industry, that, due to the location of wind farms, established shipping lanes and lead can be adversely affected. While, as for all maritime activities, co-existence is being pursued but that might require changes to the existing lanes and leads in some areas. The Norwegian Coastal Administration has to this end proposed to establish new boundaries for certain zones to avoid conflicts.[351]

142. Third, are conflicts and competition with the profitable fishing industry. Unlike other industries, coexistence between these two sectors in the same zone will not be possible, according to the Norwegian Directorate for Fisheries. Around half the areas that were analysed for their

[346] Planning & Permitting study for North Sea Windpower Hub - concerning the Norwegian sector, *North Sea Wind Power Hub consortium* (22 May 2019) 63 p. (9-10), https://northseawindpowerhub.eu/sites/northseawindpowerhub.eu/files/media/document/Permitting-Study-Norway-1.pdf (last consulted 30 May 2022).
[347] *Ibid*.
[348] *Ibid*.
[349] NVE-Rapport SEA 47-12, 5.
[350] *Ibid*.
[351] M. Steen and G.H. Hansen, "Barriers to path creation: the case of offshore wind power in Norway", *Econ. Geogr.* (2018) vol. 94, no. 2, 188-210.

suitability and potential for offshore wind farms development, were not recommended to open for license application for such purposes.[352]

143. Fourth, as with onshore wind turbines, the aesthetic and visual impacts of farms have negative impacts. Zones closer to shore are less desirable for offshore wind farm development. It is of note to mention that in the fifteen considered zones the visual intrusion was not considered to be unacceptable in any of them.[353] In a few zones the visual intrusion could extend to some cultural heritage sites.[354] Otherwise, no historical monuments and cultural heritage sites will be impacted.

144. Fifth, which is connected to the fourth barrier, is the impact on leisure yachting, fishing and the tourism sector because of their visual intrusion in combination with restricted access and complicated navigation that these farms would create.[355]

145. Lastly, in two zones there is an overlap with areas used by the Norwegian Air Force and Norwegian Navy. These practice areas directly conflict offshore wind power development. It is noted that a conflict of interest can be avoided in these zones by not developing in the overlapping areas. Other interests that could be impacted but have not shown potential conflict of interest, are meteorological or civil aviation radars, as well as seabed pipelines and subsea power cables.[356]

[352] J. Hanson and H. Endresen Normann (eds.), *Conditions For Growth In The Norwegian Offshore Wind Industry*, CenSES (2019) 44 p.
[353] NVE-Rapport SEA 47-12, 5.
[354] *Ibid*.
[355] D. Nilsson and A. Westin, "Floating wind power in Norway - Analysis of future opportunities and challenges", *CODEN:LUTEDX/TEIE EIE920 20141* (2014) Lund University, 30-34.
[356] NVE-Rapport SEA 47-12, 5.

4. Belgium's offshore wind farms: when, where and how?

4.1. Socio-political and factual context

146. Belgium is a densely populated country, that does not have much space or resources to produce renewable energy, especially compared to other European countries. Due to this it is structurally dependent on electricity imports outside Belgium and even the EU for its security of supply. As such what happens on the EU level has an impact on the capability of neighbouring countries to export or import electricity to/from Belgium and thus on the supply security of the country.[357]

147. In Belgium's National Energy and Climate Plan (NECP) several renewable energy targets for 2030 are mentioned.[358] More specifically the government aims to reach a 17.5% share of renewable energy for gross final energy consumption and a 37.4% share for electricity generation.[359] In addition, Belgium supports the EU 2050 carbon neutrality goal by adopting its own long-term strategy for energy and climate, that was criticized for not having clear national climate neutrality targets.[360] Because of its central location in Europe, Belgium also has one of the highest interconnection capacities shared with neighbours.[361]

148. The regulation of energy in Belgium is not a straightforward matter. As Belgium has a federal system, some competences are divided between the regions while other competences remain at the federal level. The competence concerning energy is a shared competence between the three regions, Flanders, Wallonia and Brussels. Each region has jurisdiction over its own energy policy, except for nuclear plants and the transmission network regulation which are a federal competence.[362] The federal state has jurisdiction over the territorial sea and the EEZ, despite the regions having jurisdiction over their own territories.[363] On that basis, offshore activities are regulated by the federal state, more specifically for offshore wind farms the legal framework is established under the federal Electricity Act. [364]

---

[357] Elia, *Adequacy and Flexibility Study for Belgium 2022-2032*, 156 p., www.elia.be/-/media/project/elia/shared/documents/elia-group/publications/studies-and-reports/20210701_adequacy-flexibility-study-2021_en_v2.pdf (last consulted 30 May 2022).
[358] EU Commission, "Belgium's NECP 2021-2030", Brussels, 14 October 2020, *SWD(2020) 900 final*, 29 p
[359] International Energy Agency (IEA), *Report Belgium 2022 - Executive summary*, www.iea.org/reports/belgium-2022/executive-summary (last consulted 30 May 2022).
[360] *Ibid*.
[361] Elia, *Adequacy and Flexibility Study for Belgium 2022-2032*.
[362] Art. 6, §1, VII Special Act of 8 August 1980 reforming the institutions, *BSG* 15 August 1980, 9434.; F. Vandendriessche, T. Van Der Straeten, W. Geldhof, C. Degreef, T. Deruytter and P. Claeys, *Energierecht in België en Vlaanderen*, Intersentia (2020) 392 p.
[363] Const. Court [9 July 2013] Judgement No. 98/2013, www.const-court.be/public/n/2013/2013-098n.pdf (last consulted 30 May 2022); B. Delvaux and W. Geldhof, "Openbare gasdistributie op een gesloten distributienet - het land van Magritte?", note under GwH Const. Court Judgement No. 98/2013, *MER* (2014) 143-144; F. Vandendriessche, T. Van Der Straeten, W. Geldhof, C. Degreef, T. Deruytter and P. Claeys, *Energierecht in België en Vlaanderen*, Intersentia (2020) 15-50.
[364] F. Vandendriessche, "Hoofdstuk II. De bevoegde regelgevers voor het energierecht" in F. Vandendriessche (ed.), *Energierecht in België en Vlaanderen 2021*, Intersentia (2021) 15-50.

149. The Belgian federal government had determined in 2015 to phase out nuclear energy by 2025, responsible for 52.4% of generated energy in 2021.[365] However, when recently faced with the changing geopolitical situation in the world, decision was made to extend the life of two nuclear power plants by another 10 years. The war in Ukraine ruled otherwise about the way Belgium has to look at energy. The federal government has reached an agreement in March 2022 on keeping the nuclear power plants open longer. The last two nuclear power plants would remain open for ten more years, until 2035. In order to guarantee security supply, two new gas-fired power stations will be added.[366] However, the first nuclear lifecycle extension was not in accordance with EU law which lead to the annulment of the Law of 5 March 2015 because it was lacking a preceding Environmental Impact Assessment (EIA) and adopted without consulting the public.[367] The Belgian Constitutional Court did decide to maintain the consequences of the old law under the conditions that, before the deadline of 31 December 2022, public and transboundary consultation and participation are held and an EIA is to be conducted as well.

150. The logical step towards offshore wind energy production was made in the early 2000s with the initial delineation concession area for the construction and operation of facilities for the production of electricity from water, currents and wind in 2004 and finally included in the 2011 Royal Decree on marine planning.[368] The Belgian energy mix is one of the most diverse in Europe and has a high percentage of wind energy (8%), with only Denmark (18%) and the UK (14%) having a higher share.[369] These early investments into offshore wind power make Belgium a pioneer in this regard, with more than 2 GW installed capacity in their EEZ. Currently, Belgium is the tenth highest country in the world in terms of installed capacity per

[365] Law 28 June 2015 amending the Law of 31 January 2003 on the gradual exit from nuclear energy for industrial electricity production with a view to ensuring security of supply in the field of energy, *BSG* 6 July 2015, 44423; M. Vanhecke, "Belgium's 2021 electricity mix", *ELIA*, 7 January 2022, www.elia.be/en/news/press-releases/2022/01/20220107_belgium-2021-electricity-mix (last consulted 30 May 2022);

[366] News.Belgium, *Verlenging levensduur kerncentrales Doel 4 en Tihange 3* (18 March 2022) https://news.belgium.be/nl/verlenging-levensduur-kerncentrales-doel-4-en-tihange-3 (last consulted 30 May 2022).

[367] ECJ, C-411/17 (29 July 2019) *Inter-Environnement Wallonie ASBL, Bond Beter Leefmilieu ASBL v Council of Ministers*, ECLI:EU:C:2019:622; Const. Court [5 March 2020] Judgement No. 34/2020, **Error! Hyperlink reference not valid.**www.const-court.be/public/n/2020/2020-034n.pdf (last consulted 30 May 2022); E. Kiehl, "Centrales nucléaires – prolongation - étude préalable des incidences environnementales: l'arrêt de la Cour constitutionnelle n° 34/2020 du 5 mars 2020", *JLMB* (2020), 1004-1013.

[368] Royal Decree of 3 February 2011 amending the Royal Decree of 20 December 2000 on the conditions and procedure for granting domain concessions for the construction and operation of facilities for generating electricity using water, currents or wind, in sea areas where Belgium can exercise jurisdiction in accordance with the international law of the sea, *BSG* 17 February 2011, 11741; F. Maes, "Ruimtelijke planning op zee in België: van plan naar proces en een nieuw plan", *TMR* (2016) no. 4, 415-439 (433).

[369] Elia, Adequacy and Flexibility Study for Belgium 2022-32; P. Sertyn, "Wind in 2021 was niet meer dan een zuchtje", *De Standaard*, 4 April 2022.

capita of offshore wind power and is planning for a major expansion of offshore wind deployment.[370]

151. Besides the potential environmental and climate benefits, offshore wind power development is also seen as an economical interesting opportunity.[371] The offshore wind value chain creates additional jobs across all aspects, varying from research to installation and maintenance.[372] This in turn increases the added value, jobs and trade balance.

152. The Belgian Part of the North Sea, meaning its TS and EEZ, is quite small (0.5 % of the surface of the North Sea) but also one the busiest spots in terms of marine activities.[373] As such offshore space is scarce, competition is high and marine spatial planning is essential. The early and high intensity of Belgian marine spatial planning have made an example for other states, though MSP remains an often highly political and informal process.[374] Because of the scarce space wind farm developers are obliged to use their lots as intensively as possible, resulting in a high capacity density ranging from 12 to 15 MW/km².[375] Turbine spacing is a difficult exercise in the Belgian part of the North Sea due to the limited space and wake effect that cause wind turbines placed within the wake of a neighbouring turbine to produce less power.

153. The Belgian offshore wind farms that currently have been developed are located near the border to the Netherlands, ranging from the Thornton bank to the Bligh Bank (see Appendix III). The newly opened area for offshore power is located near the border to France, located partly in the Natura 2000 area (*de Vlaamse Banken*) which will require environmental permit following an Appropriate Assessment.[376]

---

[370] S. Breyer, M. Cornet, J. Pestiaux and P. Vermeulen, "The Socio-Economic Impact of the Belgian Offshore Wind Industry", *BOP (Belgian Offshore Platform)*, March 2017, 17 p., www.belgianoffshoreplatform.be/app/uploads/The-socio-economic-impact-of-the-belgian-offshore-wind-industry.pdf (last consulted 30 May 2022).
[371] *Ibid*., 4.
[372] *Ibid*.
[373] F. Maes, "Ruimtelijke planning op zee in België: van plan naar proces en een nieuw plan", *TMR* (2016) no. 4, 415-439.
[374] *Ibid*.; C. N. Ehler, "Two decades of progress in Marine Spatial Planning", *Mar. Policy* (2021) vol. 132, 2021, 104134, 16 p.
[375] Art 14 Royal Decree of 12 December 2020 on the conditions and procedure for granting domain concessions for the construction and operation of facilities for the production of electricity from water, currents or winds, in sea areas where Belgium can exercise jurisdiction in accordance with the international law of the sea, *BSG* 12 December 2000, 43557 (hereinafter 'Decree on Concessions); R. Borrmann, K. Rehfeldt, A.-K. Wallasch and S. Lüers, "Capacity Densities of European Offshore Wind Farms", *Deutsche Windguard* (2018) 77 p. (16-17).
[376] M. Cecchinato and I. Pineda, "Multiple uses of offshore wind areas in the Belgian North Sea", *WindEurope* (2018) 68 p. (14-15), https://windeurope.org/intelligence-platform/product/multiple-uses-of-offshore-wind-areas-in-the-belgian-north-sea/ (last consulted 30 May 2022).

4.2. The regulatory regime

154. The Royal Decree of 17 May 2004 specifies which marine zones are reserved for offshore wind energy development (see Appendix III). [377] The areas designated for offshore wind power cover 270 km^2 and represent a total capacity of 2000 MW. As of 2022, 225 km^2 and 399 turbines have been developed.[378] So far, nine offshore wind farms (*C-Power, Northwind, Belwind, Nobelwind, Rentel, Norther, Seastar, Mermaid and Northwester 2*) are operational with a total capacity of 2.26 GW. All wind turbines have monopiles foundations, except those in *C-Power* which have gravity based and jacket foundations.[379] The first wind farm (*C-Power*), with a production capacity of 325,5 MW, was built in 2009 and the last wind farm (*Northwester 2*), with a production capacity of 218,5 MW, in the eastern zone near the Netherlands was completed at the end of 2020.[380]

155. The amending law of 12 May 2019[381] has delimited a second zone of 285 km² for the construction and the exploitation of installations for the production of electricity from renewable energy sources, the storage of renewable energy and the transmission of electricity (see Appendix III). This zone, called the '*Princess Elisabeth zone*', has a planned capacity of minimum 3.15 GW and maximum 3.5 GW and aims to achieve the assumed 5.4 to 5.8 GW total offshore wind capacity by 2030 at the latest.[382] Additionally, the new marine spatial plan for the period 2020-2026 is set out with the objective of achieving an additional renewable energy capacity of at least 1.75 GW. Though the primary objective was to provide space for new wind farms, the legal framework covers all renewable sources, including solar and wave

---

[377] Royal Decree of 17 May 2004 amending the Royal Decree of 20 December 2000 on the conditions and procedure for granting domain concessions for the construction and operation of facilities for generating electricity from water, currents or winds, in marine areas where Belgium can exercise jurisdiction in accordance with international law, *BSG* 29 June 2004, 52775 (hereinafter 'Royal Decree of 17 May 2004').; R. Brabant, S. Degraer and B. Rumes, "Chapter 2. Offshore wind energy development in the Belgian part of the North Sea and anticipated impacts: an update" in S. Degraer, R. Brabant and B. Rumes (ed.), *Offshore wind farms in the Belgian part of the North Sea: Heading for an understanding of environmental impacts*, Brussels, Royal Belgian Institute of Natural Sciences (RBINS) - Management Unit of the North Sea Mathematical Models (MUMM) (2012) 10-16 (10-11).

[378] J. Serrano González and R. Lacal-Arántegui, "The regulatory framework for wind energy in EU Member States. Part 1 of the Study on the social and economic value of wind energy - WindValueEU.*", European Commission, Joint Research Centre, Institute for Energy and Transport* (2015) 39; FOD Economy, *Belgian offshore wind energy - 5.4-5.8 GW by 2030*, https://economie.fgov.be/en/themes/energy/belgian-offshore-wind-energy (last consulted 30 May 2022).

[379] FOD Economy, *Ontwikkeling van de exploitatie van hernieuwbare energiebronnen in de Noordzee*, https://economie.fgov.be/nl/themas/energie/energiebronnen/hernieuwbare-energieen/ontwikkeling-van-de (last consulted 30 May 2022).

[380] *Ibid*.

[381] Law of 12 May 2019 amending the Law of 29 April 1999 on the organisation of the electricity market with a view to introducing a competitive bidding procedure for the construction and operation of generating facilities in the sea areas under Belgium's jurisdiction and ratifying the Royal Decree of 11 February 2019 amending the Royal Decree of 16 July 2002 on the establishment of mechanisms for the promotion of electricity generated from renewable energy sources *BSG*, 24 May 2019, 50115 (hereinafter 'Law of 12 May 2019')

[382] Federal Coalition Agreement of 30 September 2020, Federal Government, Brussels, 97 p. (59-69); Parliamentary Preparation, House of Representatives, Papers: 54-3581 (2018/2019), 4, www.dekamer.be/FLWB/PDF/54/3581/54K3581001.pdf (last consulted 30 May 2022).

power and/or energy storage projects.[383] The *Princess Elisabeth* zone, consists of three zones: *Hinder North* (Zone 2), *Hinder South* (Zone 3), and *Fairybank* (Zone 4) (see Appendix III).

156. Via Ministerial Decree, that awards the domain concession, safety zones surrounding the offshore wind farms are established in order to avoid conflicts with the shipping sector.[384] The Royal Decree of 11 April 2012 provides a general framework for the establishment safety zones around artificial islands, installations and facilities for generating energy from water, currents and winds in the Belgian Part of the North Sea. [385]

4.2.1. The Act on the Protection of the Marine Environment of 20 January 1999

157. The Belgian marine spatial plan was established in the Law on the Protection of the Marine Environment of 20 January 1999 (hereafter the Marine Environment Law)[386] (*infra 4.2.2.2.*), changed by the Act of 20 July 2012.[387] The MSP covers the Belgian TS, CS and EEZ, that was declared and established in the Law concerning the protection of the marine environment which also covers the MSP. [388] The Royal Decrees concerning the establishment of the marine spatial plans and their annexes contain a detailed delineation of the designated areas and their specific activities as well as the explicitly forbidden activities.[389]

158. The Act establishing the Belgian MSP also contains a number of principles that need to be taken into consideration by offshore wind farm developers during their activities at sea.[390] The principles are, for example, the restoration principle, preventive principle and precautionary principle, which serve as guidelines or are to be assessed on a case-by-case basis.[391]

---

[383] N. Wouters, "The way towards a competitive bidding process for new offshore wind farms in Belgium", *Dentons* (2019), www.dentons.com/en/insights/articles/2019/september/16/the-way-towards-a-competitive-bidding-process-for-new-offshore-wind-farms-in-belgium (last consulted 30 May 2022).
[384] Royal Decree of 20 March 2014 establishing the marine spatial plan, *BSG* 28 March 2014, 24098; F. Maes, "Ruimtelijke planning op zee in België: van plan naar proces en een nieuw plan", *TMR* (2016) no. 4, 425.
[385] Royal Decree of 11 April 2011 establishing a safety zone around artificial islands, installations and facilities for generating energy from water, currents and winds in sea areas under Belgian jurisdiction, *BSG* 1 June 2012, 31377.
[386] Law of 20 January 1999 on the protection of the marine environment in sea areas under Belgian jurisdiction as regards the organisation of marine spatial planning, *BSG* 12 March 1999, 8033 (hereinafter 'Marine Environment Law').
[387] Law of 20 July 2012 amending the Law of 20 January 1999 on the protection of the marine environment in sea areas under Belgian jurisdiction as regards the organisation of marine spatial planning, *BSG* 11 September 2012, 24308; A. Cliquet, "Mariene beschermde gebieden: een druppel in de oceaan?" in A. Cliquet and F. Maes (eds.*), Recht door zee: hedendaags internationaal zee- en maritiem recht: liber amicorum Eddy Somers*, Maklu (2015) 109.
[388] M. Platteeuw, J. Bakker, I. Van Den Bosch, A. Erkman, M. Graafland, S. Lubbe and M. Warnas, "A Framework for Assessing Ecological and Cumulative Effects (FAECE) of Offshore Wind Farms on Birds, Bats and Marine Mammals in the Southern North Sea" in J. Köppel (ed.), *Wind Energy and Wildlife Interactions*, Springer (2017) 219-237 (224).
[389] F. Maes, "Het nieuw Belgisch marien ruimtelijk plan voor de periode 2020-2026", *TMR* (2020) no. 4, 416-439.
[390] Art. 4 Marine Environment Law.
[391] F. Maes, "Ruimtelijke planning op zee in België: van plan naar proces en een nieuw plan", *TMR* (2016) no. 4, 420.

159. The MSP is evaluated and revised every six years for complying with certain obligations. For example, the plan needs to undergo a public inquiry and has to be subjected to a SEA.[392] If within the six year period new developments emerge that require an amendment to the plan, the government does not need to wait and can via an intermediated amendment procedure respond to the needed changes.[393]

160. The content of the spatial plan itself needs to contain several aspects necessary for the development of a sound plan.[394] The plan requires to be structured according to a spatial analysis and long-term vision concerning the spatial use of the Belgian maritime areas.[395] In addition, clear economic, social, environmental and safety objectives need to be pursued by the plan, that also indicates the implementation measures, instruments and actions.[396]

161. The marine spatial plan is binding.[397] When an activity breaches the plan the decision that allowed the activity can be nullified by the competent authority.[398]The Royal Decree of 22 May 2019 established the new Marine Spatial Plan (MSP) for 2020-2026 and grants three new concession zones.[399]

4.2.2. Concession, permits and licences

162. According to the Electricity Act and the Royal Decree of 20 December 2000 three permits and licenses are required in order to develop an offshore wind activity.[400] More specifically, a domain concession, a marine protection permit, and a cable permit are required. Moreover, within three months after the last concession, permit or license has been granted the Federal Minister of Energy needs to authorize the development of the offshore wind farms.[401] In addition, a developer can only shut down a significant part of a farm for more than one year in case of *force majeure* or for technical reasons.[402]

[392] Art. 5bis, §1 Marine Environment Law.
[393] Art. 5bis, §2 Marine Environment Law.
[394] F. Maes, "Ruimtelijke planning op zee in België: van plan naar proces en een nieuw plan", *TMR* (2016) no. 4, 420.
[395] Art. 5bis, §2, 1°-2° Marine Environment Law.
[396] Art. 5bis, §2, 3°-4° Marine Environment Law.
[397] Art. 5bis, §2 Marine Environment Law.
[398] Art. 59 Marine Environment Law.
[399] Royal Decree of 22 May 2019 establishing the marine spatial plan for the period from 2020 to 2026 in the Belgian marine areas, *BSG* 2 July 2019, 66980. The old plan for 2014-2020 can be found in the Royal Decree of 20 March 2014 establishing the marine spatial plan, *BSG* 28 March 2014, 24098; F. Maes, "Het nieuw Belgisch marien ruimtelijk plan voor de periode 2020-2026", *TMR* (2020) no. 4, 416-439.
[400] Law of 29 April 1999 on the organisation of the electricity market, *BSG* 11 May 1999, 16264 (hereinafter 'Electricity Act'); F. Maes, "Het nieuw Belgisch marien ruimtelijk plan voor de periode 2020-2026", *TMR* (2020) no. 4, 416-439.
[401] Art. 14, 4° Decree on Concessions.
[402] Art. 14, 5° Decree on Concessions.

4.2.2.1. Domain concession

163. On 4 April 2019, the Belgian Parliament adopted a new law that introduces a competitive tender procedure to award domain concessions for new offshore wind farms, replacing the previous procedure.[403] In addition, this law aims to further reduce subsidies granted to offshore wind electricity production while recognising that new wind farms are essential to achieving Belgium's renewable energy targets under its EU and international commitments.[404] The previous award system, with financial support mechanisms based on a subsidy for each MWh produced, became challengeable under European legislation, due to the EU Guidelines on State aid for Environmental Protection and Energy requiring a competitive bid process as of 1 January 2017.[405]

164. As such, as all current wind farms were developed under the 'old' concession regime, both regimes will be discussed.

165. According to the Electricity Act an offshore wind power developer needs to acquire a domain concession from the federal Minister of Energy. This can only be obtained after getting advice from the CREG (the Belgian Federal Commission for Electricity and Gas Regulation)[406]on the construction and operation of the power plant in the designated marine areas. A domain concession grants a developer the right to occupy a piece in the zone designated for wind development and renders that area inaccessible to the public. In addition, the concession grants the developer permission to develop and operate the offshore wind farm. However, the laying of offshore cables is not covered by the concession.

166. The Royal Decree of 20 December 2000 elaborates on the old procedure and conditions for the application and award of the concession. When applying for a permit the applicant needs to fulfil certain conditions before permission can be granted as set out in article 2, 1° to 8° of the Royal Decree of 20 December 2000. For example, an adapted functional and financial structure, sufficient financial means and certain technical capacities are required.[407] There are no

[403] FOD Economy, *Belgian offshore wind energy - 5.4-5.8 GW by 2030*, https://economie.fgov.be/en/themes/energy/belgian-offshore-wind-energy (last consulted 30 May 2022).
[404] Parliamentary Preparation, House of Representatives, Papers: 54-3581 (2018/2019), 4, www.dekamer.be/FLWB/PDF/54/3581/54K3581001.pdf (last consulted 30 May 2022); T. Schoors, "Belgium adopts legal framework on tenders for new offshore electricity production installations", *Allen&Overy*, 1 May 2019, www.allenovery.com/en-gb/global/news-and-insights/publications/belgium-adopts-legal-framework-on-tenders-for-new-offshore-electricity-production-installations (last consulted 30 May 2022).
[405] 3.3.2.1. in EU Commission Communication, Guidelines on state aid for environmental protection and energy 2014-2020, *OJ C* 28 June 2014, 200, 1-55 (25-26).
[406] An autonomous organisation granted with legal personality acting completely independently from governments, the energy industry and other stakeholders, set up by the Electricity and Gas Laws, see CREG, *Presentation of CREG*, www.creg.be/en/presentation-creg (last consulted 30 May 2022).
[407] Art. 3 Decree on Concessions.

restrictions on who can hand in an application for trying to obtain a concession for the same location.[408] Article 4 of the Royal Decree of 20 December 2000 set out the detailed conditions under which the submission of applications have to take place. The applicant needs to address his application to the CREG by registered letter with acknowledgement of receipt and needs to include certain information. Several personal details, as well as a summary of the project and its operations, a technical note describing the characteristics of the installations of electricity production, et cetera.[409] Following, the concerned ministries and the CREG will, within a certain timeframe, evaluate the application and give their advice which can contain proposals for imposing technical conditions.[410] The transmission grid manager is also given the opportunity to consult.[411] Finally, the Minister of Energy will propose to either award or refuse the domain concession.[412] The decision to grant the domain concession shall be notified to the applicant and the committee.[413]

167. The domain concession to build and operate the plants is granted for a fixed term, which is limited to a maximum of twenty years and may be renewed without exceeding a total duration of thirty years.[414] The concession may be granted prior to additional permits but will only come into effect after these are in place.[415] If any of the additionally required licenses or authorizations are refused, the concession expires on the day of notification of such refusal.[416]

168. In article 7 of the Electricity Act the different financial support measures for offshore wind development are stipulated. Since the adoption of the new law concerning offshore wind power concessions in 2019, this article has been amended. In the past, domain concessions were granted after and without regard to the level of subsidy required, placing the burden of the cost on the final consumer. Now different financial support measures are specified for different concessions based on when they were granted and when their financial close took place. In addition, articles *7bis* till *7terdecies* were added to provide in a strategic reserve and financial support mechanisms, such a capacity reimbursement mechanism and targeted auctions. The duration of the support in accordance with article 7 may not exceed 15 years.[417]

[408] Art. 7 Decree on Concessions.
[409] Art. 4, 1°, 3° and 8° Decree on Concessions.
[410] Chapter IV- Processing of applications Decree on Concessions.
[411] Art. 10 Decree on Concessions.
[412] *Ibid*.
[413] Art. 11 Decree on Concessions.
[414] Art. 13 Decree on Concessions.
[415] Art. 12 Decree on Concessions.
[416] Art. 12 Decree on Concessions.
[417] Art 6/3, para. 3, 10° Decree on Concessions.

169. Under the new competitive bidding procedure, the winning bidder to whom the domain concession is granted, will automatically and immediately obtain all other permits needed.[418] He is entitled to use the lots concerned for the construction and the private operation of offshore electricity production installations.[419]

170. The Law of 12 May 2019 established the general principles of the competitive bidding procedure and requires a Ministerial and Royal Decree to further develop the process of the tender procedure, the conditions and procedure for awarding domain concessions and the general conditions for the use of lots concerned.[420] A Ministerial Decree will determine the competitive bidding procedure, in which the location, the size and the number of lots will be decided. A Royal Decree defines, among other things, the conditions and the criteria for the admissibility and awarding of the domain concession by the end of the preliminary studies at the latest, which are planned to be finalised by the beginning of 2023.[421] The development of a regulatory framework will also require a notification to the European Commission under the terms of the European state aid rules of the grant scheme, in light and in case a new aid scheme.[422]

171. Part of the strategy of this law is to reduce the cost of support to the development of the future offshore electricity production, partly by organising preliminary studies (carried out in 2020-2023) paid for by the administration, of which the results are made available to potential bidders.[423] It will be the Marine Environmental Service, the Royal Belgian Institute of Natural Sciences (RBINS) (*infra* no. 175) that will carry out the studies that examine the impact of wind farms on the marine environment.[424] Natura 2000 studies also need to be carried to assess the impact of future projects on the Natura 2000 zones, as well as the fact that the environmental

---

[418] Parliamentary Preparation, House of Representatives, Papers: 54-3581 (2018/2019), 4, www.dekamer.be/FLWB/PDF/54/3581/54K3581001.pdf (last consulted 30 May 2022); FOD Economy, *Belgian offshore wind energy - 5.4-5.8 GW by 2030*, https://economie.fgov.be/en/themes/energy/belgian-offshore-wind-energy (last consulted 30 May 2022).

[419] Parliamentary Preparation, House of Representatives, Papers: 54-3581 (2018/2019), 1, www.dekamer.be/FLWB/PDF/54/3581/54K3581001.pdf (last consulted 30 May 2022).

[420] Art. 5 Law of 12 May 2019.

[421] Royal Decree of 11 February 2019 amending the Royal Decree of 16 July 2002 on the establishment of mechanisms for the promotion of electricity generated from renewable energy sources, *BSG* 21 February 2019, 17792.

[422] Parliamentary Preparation, House of Representatives, Papers: 54-3581 (2018/2019), 3, www.dekamer.be/FLWB/PDF/54/3581/54K3581001.pdf (last consulted 30 May 2022); FOD Economy, *Belgian offshore wind energy - 5.4-5.8 GW by 2030*, https://economie.fgov.be/en/themes/energy/belgian-offshore-wind-energy (last consulted 30 May 2022).

[423] *Ibid*.

[424] Management of the marine environment by the MUMM Scientific Service, *Windfarms in the North Sea*, https://odnature.naturalsciences.be/mumm/en/windfarms/ (last consulted 30 May 2022); FOD Economy, *Belgian offshore wind energy - 5.4-5.8 GW by 2030*, https://economie.fgov.be/en/themes/energy/belgian-offshore-wind-energy (last consulted 30 May 2022).

permits and the Natura 2000 allowances could possibly contain conditions or measures that have to be taken into account when making a bid.[425]

172. The current schedule is to publicize the 'first' call for competition in the fourth quarter of 2023 with the aim of having the first new offshore installations into service in the "Princess Elisabeth Zone" in 2027-2028.[426]

4.2.2.2. Marine protection permit

173. An offshore wind farm in Belgium needs an environmental permit, also known as a marine protection permit, that grants the holder a right to construct the installation and a license to operate it.[427]

174. The legal framework for this permit is spread out over three instruments. First, the Law on the Protection of the Marine Environment of 20 January 1999 (*supra 4.2.1.*) which requires the protection the marine environment. Second, the Royal Decree of 7 September 2003 concerning the procedure for licensing and authorising the activity (hereafter the Licensing and Authorisation Decree) which describes the process of and application for a marine protection permit.[428] Third, Royal Decree of 9 September 2003 concerning rules on the assessment of the environmental impact (hereafter the EIA-Decree) which prescribes that all maritime areas under Belgian jurisdiction fall under its regime, thus making no distinction between the development of wind farms in the TS, EEZ or CS.[429]

175. Two procedures can be followed in order to obtain a marine protection permit.[430] First, a procedure can start via a public hearing.[431] Depending on the impact, the public inquiry can cross borders and will be held within 45 days.[432] The application will need to provide certain mandatory information such as the identity of the applications as well as the financial resources for the project.[433] In addition, an environmental impact study needs to be submitted to the

[425] *Ibid.*
[426] *Ibid.*
[427] Art. 25 Marine Environment Law.; C. Degreef and W. Geldhof, "Offshore energy and the Belgian legal framework: All at Sea?", *TRNI* (2015) vol. 1, 71.
[428] Royal Decree of 7 September 2003 on the procedure for licensing and authorising certain activities in sea areas under Belgian jurisdiction, *BSG* 17 September 2003, 46101 (hereinafter 'Licensing and Authorisation Decree').
[429] Royal Decree of 9 September 2003 containing the rules on environmental impact assessment in application of the Act of 20 January 1999 on the protection of the marine environment in sea areas under Belgian jurisdiction, *BSG* 17 September 2003, 46111 (hereinafter 'EIA-Decree).
[430] Art. 9 Licensing and Authorisation Decree.
[431] Art. 18 Licensing and Authorisation Decree.
[432] Art. 18, § 2 Licensing and Authorisation Decree.
[433] Art. 13 Licensing and Authorisation Decree.

MUMM of the Operational Directorate Natural Environment.[434] The MUMM then carries out an EIA and can conduct further studies, all in order to assess the acceptability of the impacts of the project.[435] Afterwards it provides its report to the Federal Minister for the Marine Environment, who will decides on whether or not the grant the permit, which he will only do if the holder of the permit takes environmental compensation measures.[436] Second, a simplified procedure can be followed, as set out in articles 35 until 38, but this will not be discussed further due to volume limitations.

176. The operating license is granted for a period of 20 years, while the authorisation period for construction is limited to five years.[437] The construction authorisation is granted by the Ministry of the Environment for the period needed to construct the installations falling under the scope of the application and under specified conditions.[438] The five-year period can be extended once for another five years and starts from the day on which the application is notified that the authorisation has been granted.[439]

177. After the marine protection permit is granted, the effects of the project on the marine environment need to be assessed under a monitoring programme which is the responsibility of the federal government.[440] However, it is the permit holder that must bear the costs of the programme.[441]

178. The operation permit will only enter into force when, within four years after issuance, after all other required permits and licences have been obtained[442]. If the other required permits and licensed have not been obtained within the time limit or have been refused, the environmental permit will expire.[443]

---

[434] Art. 28 §1 of the Marine Environment Law; art. 7 of the EIA-Decree.
[435] T. Deruytter, "Hoofdstuk IX. Hernieuwbare energiebronnen" in F. Vandendriessche (ed.), *Energierecht in België en Vlaanderen 2021*, Intersentia (2021) 335-370; Management of the marine environment by the MUMM Scientific Service, *Windfarms in the North Sea*, https://odnature.naturalsciences.be/mumm/en/windfarms/ (last consulted 30 May 2022).
[436] Art. 38, §1 and 42 Licensing and Authorisation Decree.
[437] Art. 41, §1 Licensing and Authorisation Decree.
[438] C. Degreef and W. Geldhof, "Offshore energy and the Belgian legal framework: All at Sea?", *TRNI* (2015) vol. 1, 62.
[439] Art. 41, §1 Licensing and Authorisation Decree.
[440] Arts. 16 and 24 EIA-Decree; R. Brabant, S. Degraer and B. Rumes, "Chapter 2. Offshore wind energy development in the Belgian part of the North Sea and anticipated impacts: an update" in S. Degraer, R. Brabant and B. Rumes (ed.), *Offshore wind farms in the Belgian part of the North Sea: Heading for an understanding of environmental impacts*, Brussels, RBINS - MUMM (2012) 10.
[441] Art. 24 EIA-Decree.
[442] Art. 42 Licensing and Authorisation Decree.
[443] Art. 41, §2 Licensing and Authorisation Decree.

4.2.2.3. License to lay submarine cables

179. The power generated by the offshore wind farm needs to be brought to shore, which is done via submarine electricity cables. The installation of such a cable requires a license in Belgian waters.[444] The Royal Decree of 17 May 2004 sets out the license application procedure and stipulates that a cable must be laid as close as possible to existing installations and in such a way as to minimise the impact on the sea floor and protected areas.[445]

180. Before a license can be granted several criteria must be met, as set out in article 5 of the Royal Decree of 17 May 2004. These criteria are similar to those under the concession and marine protection permit, for example, the financial and technical capacity of the applicant needs to be proven, and an environmental impact assessment needs to be conducted.[446]

181. Contrary to the other permits, a submarine cable license is not granted for a fixed period. However, it can expire if the licensee fails to start activities within three years after the date on which he has been notified of the granting.[447] This three year limit can be extended for two years at the request of the licensee.[448]

4.2.3. Cooperation in the North Sea

182. While there are lot of cooperation and integration initiatives in the North Sea regarding energy, the volume and subject of this thesis do not allow to discuss them all. As such, the focus will be on the most recent developed and most relevant cooperation initiative for Belgium: the modular offshore grid (MOG).[449]

183. As the North Sea has a considerable amount of wind farms there is the prevalent question on what the most efficient method is to connect the generated wind energy to the shore.[450] Typically, a wind farm at sea is connected to a transmission station via several unbundled but

[444] Art. 4 Law of 3 June 1969 on the exploration and exploitation of non-living resources of the territorial sea and the continental shelf, *BSG* 8 October 1969, 9479.
[445] Art. 2 Royal Decree of 17 May 2004.
[446] Art. 6, §2, 5° and 12° Royal Decree of 17 May 2004.
[447] Art. 14 Royal Decree of 17 May 2004.
[448] *Ibid*.
[449] Elia, *High voltage off the Belgian coast - Elia's grid in the North Sea*, 14 p., www.eliagroup.eu/-/media/project/elia/shared/documents/elia-group/publications/brochures/20190828_elia_offshore-projects_brochure_en.pdf (last consulted 30 May 2022).
[450] M. Jansen, C. Duffy, T. Green and I. Staffell, "Island in the Sea: The prospects and impacts of an offshore wind power hub in the North Sea", *Appl. Energy* (2022) vol. 6, 100090.

dedicated cables.[451] An individual connection contract, that includes a capacity reservation on the Belgian transmission grid, with TSO, is needed to bring the energy to shore.[452]

184. Elia, the Belgian TSO, has invested approximately 400 million euro into the MOG in the North Sea that connects four farms (*Rentel, Northwester 2, Mermaid* and *Seastar*) to the Belgian onshore grid.[453] In addition, this MOG provides opportunities for future development and interconnections with neighbouring countries.[454] The Law of 12 May 2019 has incorporated the MOG into its rules regarding the new domain concessions.[455] For example, the amended Electricity Act now stipulates that wind farms subject to a new domain concession is to be connected to the MOG.[456]

185. In this context, a regional agreement was signed end of 2021 by Belgium, Denmark, France, Germany, Ireland, Luxembourg, Sweden, the Netherlands, Norway and the European Commission on behalf of the EU.[457] These states of the North Seas Energy Cooperation (NSEC), have brought together representatives of the public, private and non-governmental sectors to discuss the challenges and opportunities for regional cooperation in energy topics, and specifically for offshore wind energy.[458] So far the creation of a cross-border integrated offshore grid remains solely on paper, despite its potential benefits of increasing flexibility of power flows, enhancing energy supply security and network resilience.[459] It would also improve the cross-border trade capacity through the connections between wind farms. The investment cost could also be lowered due to fewer installations of assets.[460] The large investments and long-term planning required to provide legal certainty, as well as the uncertain status of

[451] T. Chellingsworth and D. Vanherck, "De Noordzee en de ontwikkeling van een offshore grid" in K. Deketelaere and B. Delvaux (eds.), *Jaarboek Energierecht*, Intersentia (2015) 101-136 (102).
[452] C. Degreef and W. Geldhof, "Offshore energy and the Belgian legal framework: All at Sea?", *TRNI* (2015) vol. 1, 68.
[453] Elia, *High voltage off the Belgian coast - Elia's grid in the North Sea*, 14 p., www.eliagroup.eu/-/media/project/elia/shared/documents/elia-group/publications/brochures/20190828_elia_offshore-projects_brochure_en.pdf (last consulted 30 May 2022); M. Vanhecke, *Press release: Last offshore wind farm successfully connected to North Sea power hub*, ELIA, 29 May 2020.
[454] *Ibid*.
[455] Art 6/3, para 4, 6/4 and 6/5 Electricity Act.
[456] Ar. 6/5 Electricity Act.
[457] Political Declaration on energy cooperation between the North Seas Countries and the European Commission on behalf of the EU ("The North Seas Energy Cooperation"), 2 December 2021.
[458] *Ibid*.; X., "Position Paper: Offshore wind energy in the North Sea", *WindEurope* (29 November 2017) 24 p. (6), https://windeurope.org/policy/position-papers/offshore-wind-energy-in-the-north-sea/ (last consulted 30 May 2022).
[459] ENTSO-E, *Offshore Grid Development in the North Seas*, 6 p. (3-5), https://eepublicdownloads.entsoe.eu/clean-documents/pre2015/position_papers/110202_NSOG_ENTSO-E_Views.pdf (last consulted 30 May 2022).
[460] M. Koivisto, J. Gea-Bermúdez and P. Sørensen "North Sea offshore grid development: combined optimisation of grid and generation investments towards 2050", *IET Renew. Power Gener.* (2020) vol. 14, no. 8, 1259-1267.

submarine cables connected to offshore wind farms and need for third-party access form significant hurdles to the development of a North Sea offshore grid.[461]

186. Smaller cooperation between the North Sea states have proven to be more feasible. A first example, on 23 February 2022 the Belgian and Norwegian Ministers of Energy signed an energy cooperation agreement in which they agreed to have a better exchange of knowledge and technology.[462] Additionally, both states wish to be better connected in terms of energy. The possibility of a cable or link between the states, such as the one between Belgium and the U.K. and the planned cable between Belgium and Denmark, was discussed.[463]

187. Most recently, on the 18th of May 2022, Belgium, Germany, the Netherlands and Denmark announced and signed a declaration that they will work together to develop an offshore renewable energy system connecting all four states and possibly other North Sea partners, including the members of the NSEC.[464] They have set an ambitious target of expanding offshore wind energy production to at least 65 GW by 2030 and at least 150 GW by 2050.[465] The past thirty years these four states combined have installed 15 GW of offshore wind power.[466] As part of creating one big energy grid, the planned cable between Belgium and Denmark (*Triton Link*) will be essential.[467]

4.3. Barriers

188. In Belgium the development of offshore wind farms is also confronted by several barriers.

189. First, the domain concession is granted to the applicant and thus not those that are involved with wind turbine installation *per se*. When transferring power to shore this can generate some

---

[461] H. K. Müller and M. M. Roggenkamp, "Regulating Offshore Energy Sources in the North Sea-Reinventing the Wheel or a Need for More Coordination?", *IJMCL* (2014) vol. 29, no. 4, 735 T. Chellingsworth and D. Vanherck, "De Noordzee en de ontwikkeling van een offshore grid" in K. Deketelaere and B. Delvaux (eds.), *Jaarboek Energierecht*, Intersentia (2015) 107.

[462] Alexander De Croo (Prime Minister of Belgium), *Belgium and Norway sign energy cooperation: "Important step in forging North Sea coalition"*, 23 February 2022, www.premier.be/en/belgium-and-norway-sign-energy-cooperation (last consulted 30 May 2022).

[463] *Ibid.*

[464] The Esbjerg Declaration of 18 May 2022 on The North Sea as a Green Power Plant of Europe (hereinafter 'The Esbjerg Declaration'); News.Belgium, *North Sea coalition joins hands to quadruple offshore wind power capacity*, 18 may 2022, https://news.belgium.be/nl/noordzee-coalitie-slaat-handen-mekaar-voor-verviervoudiging-windenergie-op-zee (last consulted 30 May 2022); W. De Maeseneer, "België, Nederland, Duitsland en Denemarken willen grootste groene energiecentrale bouwen in Noordzee", *VRT*, 18 May 2022, www.vrt.be/vrtnws/nl/2022/05/18/noordzee-moet-een-grote-groene-energiecentrale-worden/ (last consulted 30 May 2022).

[465] The Esbjerg Declaration.

[466] W. De Maeseneer, "België, Nederland, Duitsland en Denemarken willen grootste groene energiecentrale bouwen in Noordzee", *VRT*, 18 May 2022, www.vrt.be/vrtnws/nl/2022/05/18/noordzee-moet-een-grote-groene-energiecentrale-worden/ (last consulted 30 May 2022).

[467] Elia, *Press Release - Elia and Energinet's collaboration is advanced following preliminary study on hybrid interconnector between Belgium and Denmark*, 23 November 2021, www.elia.be/en/news/press-releases/2021/11/20211123_preliminary-study-on-hybrid-interconnector (last consulted 30 May 2022).

difficulties, for example the Federal Minister of Energy needs to be informed about any enquiry to fully or partially sell, divide or rent the concession.[468]

190. Second, as in most states there is the issue of NIMBY. Especially, in a densely populated Belgium and a crowded coast-line none are too happy with the visual impacts of wind turbines.[469] As such in order to avoid visibility problems, most of the offshore energy zones were located outside the 12-mile TS and in the Belgian EEZ.[470]

191. Third, the North Sea, as one of the busiest navigational routes in the world with several international shipping hubs such as Rotterdam and Antwerp, inevitably faces some conflicts with respect to navigation. Offshore energy development stands in competition with the shipping routes and sector. Offshore wind farms are also usually constructed near ports.[471]

192. Fourth, there are some legal uncertainties which hinder investments and long-term planning.[472] The main uncertainty is the question of the qualification of submarine cables, which can be classified as part of the installation or as a transmission line.[473] Depending on the location and destination of the cable, their classification differs as stipulated in article 79(4) UNCLOS.[474] In Belgium, other states need to obtain a federal authorization from the Belgian government in order to construct cables and pipelines within the Belgian EEZ. In addition, the three separate license and permit procedures hamper a fluent process and create further uncertainties due to possible delays and/or refusals.[475]

193. Fifth, like all things is the energy market and the offshore wind market vulnerable to the volatile market and stock exchange. The past year, 2021, was a very difficult year for the wind industry due to an unfortunate combination of factors such as slow wind speeds, high steel prices,

---

[468] Art. 20 Decree on Concessions; F. Vandendriessche, "Hoofdstuk II. De bevoegde regelgevers voor het energierecht" in F. Vandendriessche (ed.), *Energierecht in België en Vlaanderen 2021*, Intersentia (2021) 15-50.
[469] E. Raspoet, "Ecopower: 'In Vlaanderen is het nagenoeg onmogelijk om nog een windturbine op land vergund te krijgen'", *Knack*, 2 May 2022.
[470] FOD Economy, *Ontwikkeling van de exploitatie van hernieuwbare energiebronnen in de Noordzee*, https://economie.fgov.be/nl/themas/energie/energiebronnen/hernieuwbare-energieen/ontwikkeling-van-de (last consulted 30 May 2022).
[471] A. Chircop and P. L'Esperance, "Functional Interactions and Maritime Regulation: The Mutual Accommodation of Offshore Wind Farms and International Navigation and Shipping", *Ocean Yearb.* (2016) vol. 30, 448.
[472] C. Degreef and W. Geldhof, "Offshore energy and the Belgian legal framework: All at Sea?", *TRNI* (2015) vol. 1, 71.
[473] H. K. Müller and M. M. Roggenkamp, "Regulating Offshore Energy Sources in the North Sea-Reinventing the Wheel or a Need for More Coordination?", *IJMCL* (2014) vol. 29, no. 4, 735.
[474] M. Koivisto, J. Gea-Bermúdez and P. Sørensen "North Sea offshore grid development: combined optimisation of grid and generation investments towards 2050", *IET Renew. Power Gener.* (2020), vol. 14, no. 8, 1259-1267.
[475] C. Degreef and W. Geldhof, "Offshore energy and the Belgian legal framework: All at Sea?", *TRNI* (2015) vol. 1, 72.

construction delays, the pandemic, et cetera.[476] While this has and could still delay the deployment of offshore farms, it should not hinder the much needed energy transition too much as this is mainly a conjunctural problem and not a structural one.[477] These are uncertainties and a volatility inherent in a transition period.

194. Sixth, there is the issue of bringing the generated offshore energy to shore and distribute it further on land. The current and future wind farms' generated electricity needs to be brought inland, increase the stability of the electricity grid and strengthen the power grid in West Flanders. The discussion and issue now are how to transport that electricity on land, via high-voltage lines or underground cables? Both have pros and cons, such as for example, the high cost of underground cables and the negative health effects of magnetic fields overhead lines.[478] In February 2021 the Flemish Minister of Energy was forced to appoint an intendant who has to create support for the high-voltage lines that are planned in West Flanders. These are needed to bring electricity from the offshore wind turbines onshore. But in the meantime, there has been a lot of protest and unrest about the so-called '*Ventilus project'* of grid operator Elia.[479] This discussion could end as a political ball game causing unnecessary delays while the EU deadline of 2030 creeps closer. This while the IEA (International Energy Agency) has just praised Belgium for its successes with offshore wind energy and criticized its slow decision-making around permits.[480]

[476] J.-L. Vandevoorde, "Oostende vreest voor sputterende offshoremotor", *Flows*, 8 May 2017; P. Sertyn, "Wind in 2021 was niet meer dan een zuchtje", *De Standaard*, 4 April 2022; R. Mooijman, "Windindustrie verkeert in 'perfecte storm'", De *Standaard*, 7 March 2022

[477] R. Mooijman, "Windindustrie verkeert in 'perfecte storm'", *De Standaard*, 7 March 2022.

[478] W. Winckelmans, "Demir heeft de keuze: de actiegroepen trotseren of een extra gascentrale riskeren", *De Standaard*, 21 April 2022.

[479] Ventilus project, www.ventilus.be/ (last consulted 30 May 2022); K. Flameygh, "Intendant moet draagvlak creëren voor het Ventilus-project: "De klemtoon ligt op het informeren"", *VRT*, 26 February 2021, https://www.vrt.be/vrtnws/nl/2021/02/26/intendant-moet-draagvlak-creeren-voor-het-ventilus-project/ (last consulted 30 May 2022).

[480] IEA, *Report Belgium 2022 - Energy Policy Review*, www.iea.org/reports/belgium-2022 (last consulted 30 May 2022).

5. Norway versus Belgium: a comparison

195. In order to structure the comparison between the Norwegian and Belgian offshore wind power development, the discussion will be divided into two themes: socio-political and legislation (see Appendix IV for a schematic comparison).

196. First, the socio-political theme. Norway has a coastline of 28.953 km (excluding island, which would bring the total length to 100.915 km) and topography that is perfect for hydropower. Belgium on the other hand has a coastline of 66,5 km and topography that is not particularly suited for offshore renewable energy generation especially in combination with its dense population and high degree of building. While Norway has 5.391.369 inhabitants and a vast supply of oil, gas and hydropower, Belgium has 11.521.238 inhabitants (2021) and largely relies on imported gas and nuclear power. As of 2021, Norway has a production 98% of renewable energy (of which 92% comes from hydropower). Belgium on the other hand has 18% renewable energy production (of which 7% is produced by offshore wind) in their energy mix.

197. Belgium built its first wind farm in 2009 and has since opened eight other farms in its EEZ which are fully operational with plans to open several more in three new zones. Norway on the other hand has not had the need to construct offshore wind power due to easy availability of hydropower and conflicts at sea with their strong fisheries and gas and oils groups.

198. Belgium has designated areas for offshore wind power covering 555 (270 + 285) km^2 and representing a total capacity of 5.4 to 5.8 (2.25 + 3.15 to 3.5) GW. As of 2022, 225 km^2 and 399 bottom fixed turbines spread over nine offshore wind farms with total capacity of 2.26 GW have been developed. Norway has designated areas for offshore wind power covering 3601 (1010 + 2591) km^2 and representing a total capacity of 4.5 (1.5 + 3.5) GW. So far, no wind farms have been developed yet, but both designated areas are considered to be suitable for floating wind power development (one of the areas, *Sørlige Nordsjø II*, is also considered suitable for the development of bottom-fixed wind power).

199. On the political level, Norway and Belgium differ quite a lot. Norway has strong hydropower, oil and gas stakeholders that have far reaches. Consequently, offshore wind power development has been quite slow. Despite quite a few investments, both technological as economical in offshore projects outside of Norwegian waters, within their EEZ no wind farms have been developed (yet). Driven by economic gains, Norway is for a large part looking at developing

floating offshore wind power. The knowledge of gas and oil extraction at sea along the Norwegian coast proves to be an advantage that they wish to apply to developing floating offshore wind in order to gain a competitive advantage, as Norway does not have a competitive gain compared to other European states that are much further along in terms of fixed offshore wind power. So far, Norway has given its approval for two projects both of which are floating offshore wind power projects, given their comparative advantage and they provide a middle ground in the Norwegian energy-political paradigm. The slow development of offshore wind power and focus on floating technology points to the sensitivity of the Norwegian energy policy to the prospect of technology development and the reliance on the petro-maritime industry. Though initially very cautious and reluctant towards offshore renewable energy generation the willingness of the Norwegian government to invest in projects, in combination with the new offshore wind policy, point to a future possibility of having the Norwegian public offshore wind policy in line with the international market. Belgium on the other hand is in an entirely different situation. That is not to say that they do not experience pressure from fishing or maritime transportation sectors as the North Sea, especially the area surrounding the Belgian coast and EEZ is one of the busiest marine spaces in Europe. However, in order to make the energy transition to renewable energy, decrease GHG emissions and become more energy secure, combined with limited onshore space and resources, offshore power development weighs more heavily in the energy related decision-making.

200. Both states do share some similarities on the socio-economic front. They made the decisions to delimit and open marine zones for offshore energy production not in their TS but in their EEZ. As can be observed Norway has chosen to start their wind power development in and close to the North Sea where the first offshore wind farms were developed and where the concentration and development rate of offshore wind power development in Europe is the greatest. From this the prudent conclusion can be made that the reasoning behind this is the possibility and potential of future cooperation, integration and interconnection with other power hubs from the North Sea states. This is further corroborated for example by the Memorandum of Understanding between Belgium and Norway (*supra* no. 186).

201. Secondly, on the regulation level there is both similarities as well as differences between Norway and Belgium related to the level of offshore wind power development.

202. Norway's legislation regarding offshore wind power is very recent and not yet fully developed. Three acts are central, the Offshore Energy Act No. 21 of 4 June 2010 and the Offshore Energy Regulations of 12 June 2020, being the Royal Decree concerning the opening of the Areas and

the Royal Decree concerning offshore energy regulation. The Offshore Energy Act No. 21 set out the regime under which the construction of offshore wind power and other renewable energy production facilities at sea take place. This Act requires the opening of specific geographical zones for licensing applications in order for offshore renewable energy production activities to take place, which has been done through the Royal Decree concerning the opening of the Areas (*supra 3.2.2.2*.). Paragraph 2-2 of the Offshore Energy Act requires a SEA to be carried out in order to open a zone. This SEA was completed in 2015 (*supra* no. 117). When an area is opened this means that for that area it will become possible to apply for a license for renewable energy production, according to the procedure set out in the Royal Decree concerning offshore energy regulations (*supra 3.2.2.1*.). Unlike in Belgium, a processing fee is required when applying for a licence for offshore renewable energy production (*supra* 4.2.).

203. Belgium's legislation on offshore wind power development is more advanced and detailed in comparison. As the first wind farm in Belgium was completed in 2009 the concerned legislation is also more than a decade older then the Norwegian and has been reviewed several times, most recently in 2019. As mentioned, the regulation of energy in Belgium is not a straightforward matter (*supra* no. 148). With offshore activities regulated by the federal state, despite energy being a shared competence between the three regions, due the federal state having jurisdiction over the territorial sea and the EEZ.

204. Several acts are important for the development and operation of offshore wind farms in Belgium. The general provisions can be found in the 1999 Electricity Act. But like the Norwegian legislation, other regulations were needed to further develop the rules on offshore wind energy generation. As such the Royal Decree of 17 May 2004 together with amending law of 12 May 2019, specify which marine zones are designated for offshore wind energy development. The Electricity Act and the Royal Decree of 20 December 2000 further requires three permits and licenses (a domain concession, a marine protection permit, and a cable permit) in order to develop an offshore wind activity.

205. The procedure for acquiring a domain concession is set out in the Royal Decree of 20 December 2000, the Law of 14 April 2019 and the Royal Decree of 22 May 2019 (*supra 4.2.2.1*.). The law of April 2019 amends the procedure and introduces a competitive tender procedure to award domain concessions. Additionally, the financial support schemes were amended to be in line with the EU Guidelines on State aid for Environmental Protection and Energy which requires a competitive bid process as of 1 January 2017. Next, the legal framework for the environmental permit is spread out over three instruments: the 1999 Marine Environment Law,

the 2003 Licensing and Authorisation Decree and the 2003 EIA-Decree. The Licensing and Authorisation Decree describes the process of and application for a marine protection permit. After the marine protection permit is granted, the effects of the project on the marine environment need to be assessed under a monitoring programme which in the responsibility of the federal government. Norway lacks a similar kind of legislation. Continuing, the installation of a submarine electricity cable requires a license as set out in Royal Decree of 17 May 2004. As part of the requirements of obtaining such a license the cable must be laid in such a way as to minimise the impact on the sea floor and protected areas and an EIA needs to be conducted. Norwegian legislation on this matter is more spread out over the Ocean Energy Law, the Energy Act and the Planning and Building Act, with among other things, the requirement of an EIA.

206. Finally, contrary to Norway, Belgium has a general regulation on the establishment of marine spatial plans, namely the Act on the Protection of the Marine Environment of 20 January 1999 (*supra 4.2.2.2.*). While Norway does designate in an act which maritime zones are reserved for offshore wind power activity, it lacks general provisions on marine spatial planning.

207. Both the Belgian and Norwegian general provisions on energy and offshore power generation have a wider scope than just offshore wind power, aiming at any offshore renewable energy generation or utilization project. These general provisions are supplemented by more detailed acts aimed at further regulating the activities in a more detailed manner and provide guidance and clarification for the actors involved in the development of offshore energy production. Other similarities between these states are the adoption of an area management concessionary approach. Acquiring a concession used to be different between the two states, but with the adoption of the Law of 14 April 2019 by Belgium, both countries now have tender based concessions. The procedures for applying for a concession are quite similar with the project developer needing providing certain detailed personal information, as well as financial information and detailed plans of the planned project. In both states it is the responsible minster of energy that holds the final decision in whether to award an offshore wind concession. During the application, in both countries, conditions may be imposed when awarding the necessary licenses and permits.

6. Conclusion

208. The goal of the thesis was to give an insight in two different states' renewable energy policy choices. This insight aims to help address differences at a more global level in order to integrate energy policies for a more harmonized approach to reaching the energy and climate targets at all levels.

209. In advance it is important to note some constraints on the research in this thesis. Due to the volume limit, there were restrictions on the in-depth level and specificity of research for each state individually. Only a global overview of offshore wind power development and legislation could be given. As such this discussion lacks insight into influence of and on other sectors as well as practical implications related the construction, operation and decommissioning of wind turbines at sea. Still, while these would give a better understanding of policy choices, they were not imperative for a general comparison.

210. Additionally, this thesis has not covered much about the submarine cables (and pipelines) issue related to making farms operational. This could be a subject on its own for further research in a thesis or doctorate due the legal uncertainty and international disagreement on their status. That lack of coverage here does not mean that the issue of bringing power to shore and connecting wind farms and powers hub at sea, as well as sharing power between countries via submarine cables, lacks vital importance as proven by the recent agreement between certain North Sea states. The importance of the submarine cables for the international community is not to be underestimated.

211. Norway's regulations on offshore wind power are more centralized in a few acts and thus clear to find what obligations rest on projects developers and what procedures need to be followed in order to successfully apply for licenses and develop offshore wind farms. Belgium on the other hand, has a more complicated legal framework for offshore wind power development. Different license and permits are needed, each with their own collection of laws and decrees, making it a complicated and administrative procedure that slows down development. This was also a criticism of the IEA.

212. Norway as EEA and EFTA state has felt the influence of EU legislation but due to their advantageous position on the energy front the pressure to comply with EU law is not felt as greatly as by EU Member State Belgium. Despite this the Norwegian national legislation follows European legislation closely. With the changes in the international environment, such

as the adoption of the Paris Climate Agreement, recent droughts, environmental protest, et cetera stakeholders are changing their view on the energy mix and export in Norway. In addition, the potential value creation of offshore energy activities has tipped the political will more in favour of actually developing offshore wind farms, starting with the creation of a sound legal framework. However, with still a clear priority for petroleum and hydropower production the path for offshore wind power development is not yet clear, as evidenced in the offshore wind farm license procedure. Perhaps this will change with the heavily shifted focus of the EU and her Member States due to the war between Ukraine and Russia, which has made Europe take the first big steps towards independence from Russia's gas and other fossil fuels and gain energy independence. This provides a unique opportunity for Norway not only for providing their oil and gas supply but to share their renewable energy from hydropower and exploit their vast potential of offshore wind energy.

213. Both states have similar challenges to the development of offshore wind farms such as NIMBY, competition with other marine activities such as fishing, the shipping industry, leisure activities or military activities. A legal solution for these issues has not been found by either countries, nor at the regional or international level. However, international and regional law are emphasising the need for a green energy transition in order to mitigate and adapt to climate change. This legal trend has guided policy choices in making a balance between these competing interests and giving offshore wind power development a heavier weight in these considerations.

214. The issue of bringing the generated offshore energy to shore and distribute it further on land in Belgium remains a hindrance block and point of controversy. Norway, which has just started their development of offshore wind farms and has not yet started any construction, will perhaps - with their also strongly develop legal front against petro-maritime and gas sectors - face less issues with distribution to shore and on land as well as export outside the country. The knowledge, experience and legal framework already in place might serve as inspiration and/or an advantage when Norway comes to this point in the development of offshore wind farms.

215. Norway and Belgium complement each other very well in the energy field. Belgium is well advanced in the development of offshore wind capacity, while Norway still has enormous potential to exploit in terms of wind. Though there is not yet a legal framework that facilitates knowledge exchange so that the wheel does not have to be reinvented every time, both states can learn and adopt from each other. Fluctuations in wind power are problem that can be

drastically reduced by aligning the construction of wind farms EU-wide and distributing wind farms across EU, including Norway.

216. In short, this research shows that these two states have many factual differences such as topography and EU Membership, that influence their energy policy choices and their ability to meet renewable energy targets. Belgium decided to heavily invest in the development of offshore wind farms to diversify the countries energy mix, become more energy secure and meet the renewable energy goals. Norway on the other hand has a significant supply of renewable energy in hydropower resource and merely invested in, mostly floating, offshore wind power due to their comparative advantage and its value creation potential. Belgium has approached the barriers faced at sea by developing detailed and deliberate marine spatial plans. Barriers on land remain a hindrance and a game between the political powers. Norway does not have such deliberate marine spatial plans, remains (politically) influenced by other established and powerful sectors, and thus still struggles with factual, political and legal barriers.

217. This thesis is only a starting point that gives a general overview of the current factual, political and legal situation in Belgium and Norway. Further research could focus on a more in-depth analysis and comparison or might involve a comparison between more states, both inside as outside the EU and Europe. Moreover, in Europe a lot has changed since the invasion of Ukraine by Russian armed forces, a few months ago. The European Commission wants to accelerate its independence from fossil fuels from Russia before the end of 2022 and take additional measures to mitigate energy prices and accelerate the energy transition. The plan, named *REPowerEU*, aims to attract more liquefied gas (LNG), but in addition a lot is expected of wind and solar energy. Opportunity knocks for offshore wind energy?

Bibliography

Legislation

International

UN General Assembly, United Nations Convention on the Law of the Sea, 10 December 1982, *1833 UNTS 3.*

Energy Charter Treaty, Lisbon (Portugal), 17 December 1994, 2080 *UNTS* 95.

COP21, Adoption of the Paris Agreement, 12 December 2015, *U.N. Doc. FCCC/CP/2015/L.9/Rev/1*.

Convention of Bonn on the Conservation of Migratory Species of Wild Animals, 23 June 1979, *1651 UNTS 28395*.

Convention for the Protection of the Marine Environment of the North-East Atlantic, 22 September 1992, *2354 UNTS 67*.

Convention of Espoo on Environmental Impact Assessment in a Transboundary Context, 25 February 1991, *1989 UNTS 309*.

Convention of Rio de Janeiro on Biological Diversity, 5 June 1992, *1760 UNTS 79*.

Convention of Bern on the Conservation of European wildlife and natural habitats, 19 September 1979, *1284 UNTS 209*.

Convention of Ramsar on Wetlands of International Importance especially as Waterfowl Habitat, 2 February 1971, *996 UNTS 245.*

European

EU Parliament and Council Directive no. 2018/2001 of 11 December 2018 on the promotion of the use of energy from renewable sources, *OJ L* 21 December 2018, no. 328, 82.

EU Parliament and Council Directive no. 2008/56/EC of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive), *OJ L* 25 June 2008, no. 164, 19.

EU Parliament and Council Directive no. 2009/147/EC of 30 November 2009 on the conservation of wild birds, *OJ L* 26 January 2010, no. 20, 7.

EU Council Directive no. 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, *OJ L* 22 July 1992, no. 207, 7.

EU Parliament and Council Regulation no. 347/2013 of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009, *OJ L* 25 April 2013, no. 115, 39.

EU Commission Delegated Regulation no. 2022/564 of 19 November 2021 amending Regulation (EU) No 347/2013 of the European Parliament and of the Council as regards the Union list of projects of common interest, *OJ L* 8 April 2022, no. 109, 14.

Agreement on the European Economic Area, *OJ L* 3 January 1994, no. 1, 3.

National

Norway

NMoPE, Act of 29 June 1990 No. 50 relating to the generation, conversion, transmission, trading, distribution and use of energy etc. (the Energy Act).

NMoE, Act of 27 June 2008 No. 71 relating to planning and the processing of building applications (the Planning and Building Act).

NMoPE, Act of 1 July 2010 No. 21 concerning an Act on Offshore Renewable Energy Production (the Offshore Energy Act).

NMoPE, Act of 29 November 1996 No. 72 relating to petroleum activities (The Petroleum Act).

NMoPE, Act of 4 June 2010 No. 21 on Renewable Energy Production at Sea (The Ocean Energy Act).

NMoPE, Regulations of 12 June 2020 for the Offshore Energy Act (the Offshore Energy Regulations).

NMoPE, Royal Decree of 12 June 2020 concerning Adoption of Regulations to the Offshore Energy Act (unofficial English translation), *ref. no. 20/88*, 32 p., www.regjeringen.no/contentassets/aaac5c76aec242f09112ffdceabd6c64/royal-decree-offshore-energy-regulation-june-2020.pdf.

NMoPE, Royal Decree of 12 June 2020 concerning the Opening of the areas Utsira Nord and Sørlige Nordsjø II for processing of applications for licences for renewable energy production pursuant to the Offshore Energy Act (the Royal Decree concerning the opening of the Areas).

Belgium

Special Act of 8 August 1980 reforming the institutions, *BSG* 15 August 1980, 9434.

Law of 3 June 1969 on the exploration and exploitation of non-living resources of the territorial sea and the continental shelf, *BSG* 8 October 1969, 9479.

Law of 20 January 1999 on the protection of the marine environment in sea areas under Belgian jurisdiction as regards the organisation of marine spatial planning, *BSG* 12 March 1999, 8033.

Law of 29 April 1999 on the organisation of the electricity market, *BSG* 11 May 1999, 16264.

Law of 20 July 2012 amending the Law of 20 January 1999 on the protection of the marine environment in sea areas under Belgian jurisdiction as regards the organisation of marine spatial planning, *BSG* 11 September 2012, 24308.

Law 28 June 2015 amending the Law of 31 January 2003 on the gradual exit from nuclear energy for industrial electricity production with a view to ensuring security of supply in the field of energy, *BSG* 6 July 2015, 44423.

Law of 12 May 2019 amending the Law of 29 April 1999 on the organisation of the electricity market with a view to introducing a competitive bidding procedure for the construction and operation of generating facilities in the sea areas under Belgium's jurisdiction and ratifying the Royal Decree of 11 February 2019 amending the Royal Decree of 16 July 2002 on the establishment of mechanisms for the promotion of electricity generated from renewable energy sources *BSG*, 24 May 2019, 50115.

Royal Decree of 7 September 2003 on the procedure for licensing and authorising certain activities in sea areas under Belgian jurisdiction, *BSG* 17 September 2003, 46101.

Royal Decree of 9 September 2003 containing the rules on environmental impact assessment in application of the Act of 20 January 1999 on the protection of the marine environment in sea areas under Belgian jurisdiction, *BSG* 17 September 2003, 46111.

Royal Decree of 17 May 2004 amending the Royal Decree of 20 December 2000 on the conditions and procedure for granting domain concessions for the construction and operation of facilities for generating electricity from water, currents or winds, in marine areas where Belgium can exercise jurisdiction in accordance with international law, *BSG* 29 June 2004, 52775.

Royal Decree of 3 February 2011 amending the Royal Decree of 20 December 2000 on the conditions and procedure for granting domain concessions for the construction and operation of facilities for generating electricity using water, currents or wind, in sea areas where Belgium can exercise jurisdiction in accordance with the international law of the sea, *BSG* 17 February 2011, 11741.

Royal Decree of 11 April 2011 establishing a safety zone around artificial islands, installations and facilities for generating energy from water, currents and winds in sea areas under Belgian jurisdiction, *BSG* 1 June 2012, 31377.

Royal Decree of 20 March 2014 establishing the marine spatial plan, *BSG* 28 March 2014, 24098.

Royal Decree of 11 February 2019 amending the Royal Decree of 16 July 2002 on the establishment of mechanisms for the promotion of electricity generated from renewable energy sources, *BSG* 21 February 2019, 17792.

Royal Decree of 22 May 2019 establishing the marine spatial plan for the period from 2020 to 2026 in the Belgian marine areas, *BSG* 2 July 2019, 66980.

Royal Decree of 12 December 2020 on the conditions and procedure for granting domain concessions for the construction and operation of facilities for the production of electricity from

water, currents or winds, in sea areas where Belgium can exercise jurisdiction in accordance with the international law of the sea, *BSG* 12 December 2000, 43557.

Federal Coalition Agreement of 30 September 2020, Federal Government, Brussels, 97 p.

Parliamentary Preparation, House of Representatives, Papers: 54-3581 (2018/2019), www.dekamer.be/FLWB/PDF/54/3581/54K3581001.pdf.

Other documents – International

CoP Bonn Convention, 'Wind Turbines and Migratory Species' (October 2017) *UNEP/CMS/Resolution 7.5* (Rev. COP12), Manila.

CoP Bonn Convention, 'Adverse Anthropogenic Marine/Ocean Noise Impacts on Cetaceans and Other Biota' (December 2008) *UNEP/CMS/Resolution 9.19,* Rome.

CoP Bonn Convention, 'Further Steps to Abate Underwater Noise Pollution for the Protection of Cetaceans and other Migratory Species' (November 2011) *UNEP/CMS/Resolution 10.24*, Bergen.

OSPAR Commission, "Agreement 2012-2: Guidelines on Best Environmental Practice (BEP) in Cable Laying and Operation", *OSPAR Agreement 2012-2, Annex 14* (2012) 18 p.

North Seas Countries' Offshore Grid (NSCOGI), *Memorandum of Understanding of the North Seas Countries' Offshore Grid Initiative*, Brussels, 3 December 2010, https://en.kefm.dk/media/7140/political-declaration-on-energy-cooperation-between-the-north-seas-countries.pdf.

Political Declaration on energy cooperation between the North Seas Countries and the European Commission on behalf of the EU ("The North Seas Energy Cooperation"), 2 December 2021.

The Esbjerg Declaration of 18 May 2022 on The North Sea as a Green Power Plant of Europe.

UNFCCC, *Norway's long-term low-emission strategy for 2050*, https://unfccc.int/sites/default/files/resource/LTS1_Norway_Oct2020.pdf.

Other documents – EU

EU Commission Communication, Guidelines on state aid for environmental protection and energy 2014-2020, *OJ C* 28 June 2014, 200, 1-55.

EU Commission, "Belgium's NECP 2021-2030", Brussels, 14 October 2020, *SWD(2020) 900 final*, 29 p.

EU Commission - Commission notice, "Guidance document on wind energy developments and EU nature legislation", *C(2020) 7730 final*, Brussels, 18 November 2020, 181 p.

EU Commission, "Green Paper - Towards a future Maritime Policy for the Union : a European vision for the oceans and seas", *COM(2006) 275 final*, Brussels, 7 June 2006, 49 p.

EU Commission, "Maritime Spatial Planning in the EU - Achievements and Future Development", *COM(2010) 771 final*, Brussels, 17 December 2010, 10 p.

EU Commission, "Blue Growth opportunities for marine and maritime sustainable growth", *COM(2012) 494 final*, Brussels, 13 September 2012, 12 p.

EU Commission, "The European Green Deal", *COM(2019) 640 final*, Brussel, 11 December 2019, 24 p.

EU Commission, "An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future", *COM(2020) 741 final*, Brussels, 19 November 2020, 26 p.

EU Commission, "Proposal for a Regulation of the European Parliament and of the Council on Guidelines for trans-European energy infrastructure and repealing Regulation (EU) No 347/2013", *COM(2020) 824 final*, Brussels, 15 December 2020, 75 p.

EU Commission, "'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality", *COM(2021) 550 final*, Brussels, 14 July 2021, 15 p.

EU Commission - Commission Staff Working Document, "Report on the Blue Growth Strategy: Towards more sustainable growth and jobs in the blue economy", *SWD(2017) 128 final*, Brussels, 31 March 2017, 70 p.

EU Commission - Directorate-General for Climate Action, *The European Union, Iceland and Norway agree to deepen their cooperation in climate action*, 25 October 2019, https://ec.europa.eu/clima/news-your-voice/news/european-union-iceland-and-norway-agree-deepen-their-cooperation-climate-action-2019-10-25_en.

EU Commission, "Press Release - The European Green Deal sets out how to make Europe the first climate-neutral continent by 2050, boosting the economy, improving people's health and quality of life, caring for nature, and leaving no one behind", 11 December 2019, https://ec.europa.eu/commission/presscorner/detail/en/ip_19_6691.

EU Commission, "Press release - Boosting Offshore Renewable Energy for a Climate Neutral Europe", 19 November 2020, https://ec.europa.eu/commission/presscorner/detail/en/IP_20_2096.

EU Commission, *A European Green Deal*, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

EU Commission, *EU strategy on offshore renewable energy*, https://energy.ec.europa.eu/topics/renewable-energy/eu-strategy-offshore-renewable-energy_en.

EU Commission, *ENSPRESO - WIND - ONSHORE and OFFSHORE*, Joint Research Centre (JRC) (2019) http://data.europa.eu/89h/6d0774ec-4fe5-4ca3-8564-626f4927744e.

Case Law

ECJ, C-411/17 (29 July 2019) *Inter-Environnement Wallonie ASBL, Bond Beter Leefmilieu ASBL v Council of Ministers*, ECLI:EU:C:2019:622.

Const. Court [9 July 2013] Judgement No. 98/2013, www.const-court.be/public/n/2013/2013-098n.pdf.

Const. Court [5 March 2020] Judgement No. 34/2020, **Error! Hyperlink reference not valid.**www.const-court.be/public/n/2020/2020-034n.pdf.

Official government sites

Norway

NMoCE, Report 13 (2014-2015) *Ny utslippsforpliktelse for 2030 – en felles løsning med EU* (6 February 2015) www.regjeringen.no/no/dokumenter/meld.-st.-13-2014-2015/id2394579/.

NMoE, Report 21 (2011-2012) *Norsk Klimapolitikk* (25 April 2012) www.regjeringen.no/no/dokumenter/meld-st-21-2011-2012/id679374/.

NMoPE, *Press release: Summit on Offshore Wind* (February 2021) www.regjeringen.no/no/aktuelt/toppmote-om-havvind/id2669248/.

NMoPE, *Proposition No. 107 (2008–2009) to the Storting - Concerning an Act on Offshore Renewable Energy Production* (English summary), 7 p.

NMoPE, Report 1998:11, *Energi- og kraftbalansen frem mot 2020* (3 July 1998) www.regjeringen.no/no/dokumenter/NOU-1998-11/id141308/.

NMoPE, Report 2012:9, *Energiutredningen – verdiskaping, forsyningssikkerhet og miljø* (5 March 2012) www.regjeringen.no/no/dokumenter/nou-2012-9/id674092/.

NMoPE, Report 25 (2015–2016), *Kraft til endring - Energipolitikken mot 2030* (15 April 2016) www.regjeringen.no/no/dokumenter/meld.-st.-25-20152016/id2482952/.

NMoPE, Report 28 (2019-2020), *Vindkraft på land - Endringer i konsesjonsbehandlingen* (19 June 2020) www.regjeringen.no/no/dokumenter/meld.-st.-28-20192020/id2714775/.

NMoPE, Report 29 (1998-1999), *Om energipolitikken* (19 March 1999) www.regjeringen.no/no/dokumenter/Stmeld-nr-29-1998-99-/id192287/?ch=1.

Norwegian Government, *Press release: Major initiative to promote offshore wind power* (12 February 2022) www.regjeringen.no/en/aktuelt/major-initiative-to-promote-offshore-wind-power/id2900436/.

Norwegian Ministry of Local Government and Regional Development, Report 11 (2004-2005), *Sametingets virksomhet i 2003* (10 December 2004) www.regjeringen.no/no/dokumenter/stmeld-nr-11-2004-2005-/id405798/.

NVE, Offshore wind power in Norway – Strategic Environmental Assessment (English summary), *NVE-Rapport 47-12*, https://publikasjoner.nve.no/diverse/2013/havvindsummary2013.pdf, 24 p.

Stortinget, *The Norwegian Parliament and the EEA Agreement*, www.stortinget.no/no/english/International-delegations/the-delegation-to-efta-and-eea-parliamentary-committees/the-norwegian-parliament-and-the-eea-agreement/.

Belgium

Alexander De Croo (Prime Minister of Belgium), *Belgium and Norway sign energy cooperation: "Important step in forging North Sea coalition"*, 23 February 2022, www.premier.be/en/belgium-and-norway-sign-energy-cooperation.

FOD Economy, *Belgian offshore wind energy - 5.4-5.8 GW by 2030*, https://economie.fgov.be/en/themes/energy/belgian-offshore-wind-energy.

FOD Economy, *Ontwikkeling van de exploitatie van hernieuwbare energiebronnen in de Noordzee*, https://economie.fgov.be/nl/themas/energie/energiebronnen/hernieuwbare-energieen/ontwikkeling-van-de.

News.Belgium, *North Sea coalition joins hands to quadruple offshore wind power capacity*, 18 May 2022, https://news.belgium.be/nl/noordzee-coalitie-slaat-handen-mekaar-voor-verviervoudiging-windenergie-op-zee.

News.Belgium, *Verlenging levensduur kerncentrales Doel 4 en Tihange 3* (18 March 2022) https://news.belgium.be/nl/verlenging-levensduur-kerncentrales-doel-4-en-tihange-3.

Literature

Books

Archer, C., *Norway Outside the European Union - Norway and European Integration from 1994 to 2004*, Routledge (2004) 256 p.

Elian, G., *The Principle of Sovereignty over Natural Resources*, Brill Nijhoff (1979) 238 p.

Ostachowicz, W., McGugan, M., Schröder Hinrichs, J.-U. and Luczak, M. (eds.), *MARE-WINT: New Materials and Reliability in Offshore Wind Turbine Technology*, Springer (2016) 432 p.

Tanaka, Y., *The International Law of the Sea*, Cambridge University Press (2015) 196 p.

Vandendriessche, F., Van Der Straeten, T., Geldhof, W., Degreef, C., Deruytter, T. and Claeys, P., *Energierecht in België en Vlaanderen*, Intersentia (2020) 392 p.

Book chapters

Adeuyi, O.D. and Liang, J., "Integration of power from offshore wind turbines into onshore grids" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 441-458.

Anaya-Lara, O., "Offshore wind farm arrays" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 389-418.

Archer, C., "Norway and the EEA" in *Norway Outside the European Union - Norway and European Integration from 1994 to* 2004, Routledge (2004) 64-95.

Archer, C., "The EEA in action" in *Norway Outside the European Union - Norway and European Integration from 1994 to 2004*, Routledge (2004) 95-131.

Asgarpour, M., "Assembly, transportation, installation and commissioning of offshore wind farms" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 527-542.

Bankes, N. and Trevisanut, S., "Energy from the Sea: Introduction" in N. Bankes and S. Trevisanut (eds.), *Energy from the Sea, Brill Academic Publishers* (2015) 1-12.

Barnes, R., "Chapter 1 - Energy Sovereignty in Marine Spaces" in N. Bankes and S. Trevisanut (eds.), *Energy from the Sea, Brill Academic Publishers* (2015) 13-39.

Belu, R., Koračin D. and Cioca, L.-I., "Spatial Planning of Offshore Wind Farms: Criteria and Methods" in D. Kitsiou and M. Karydis (eds.), *Marine Spatial Planning: Methodologies, Environmental Issues and Current Trends*, Nova Science Publishers (2017) 229-256.

Chellingsworth, T. and Vanherck, D., "De Noordzee en de ontwikkeling van een offshore grid" in K. Deketelaere and B. Delvaux (eds.), *Jaarboek Energierecht*, Intersentia (2015) 101-136.

Cliquet, A., "Mariene beschermde gebieden: een druppel in de oceaan?" in A. Cliquet and F. Maes (eds.), *Recht door zee: hedendaags internationaal zee- en maritiem recht: liber amicorum Eddy Somers*, Maklu (2015) 81-113.

Collu, M. and Borg, M., "Design of floating offshore wind turbines" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation*, Woodhead Publishing (2016) 359-386.

D'Orazi A. and Prezioso, M., "Surfing Multiple Dimensions: An Integrated Approach in Maritime Spatial Planning" in D. Kitsiou and M. Karydis (eds.), *Marine Spatial Planning: Methodologies, Environmental Issues and Current Trends*, Nova Science Publishers (2017) 115-156.

Damiani, R.R., "Design of offshore wind turbine towers" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation*, Woodhead Publishing (2016) 263-358.

Deruytter, T., "Hoofdstuk IX. Hernieuwbare energiebronnen" in F. Vandendriessche (ed.), *Energierecht in België en Vlaanderen 2021*, Intersentia (2021) 335-370.

Freriks, A., "Gebiedsbescherming op grond van de Vogelrichtlijn en de Habitatrichtlijn: implementatie in Nederland" in F.C.M.A. Michiels and L. Lavrysen (eds.), *Milieurecht in de lage landen. Rechtsvergelijkende studies over de milieuvergunning, emissiehandel, de watertoets, natuurbescherming en bestuurlijke handhaving in Vlaanderen en Nederland*, Boom Juridische uitgevers (2004) 231-254.

Greaves, P., "Design of offshore wind turbine blades" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation*, Woodhead Publishing (2016) 105-136.

Grote Stoutenburg, J., "Through the Back Door: The Limits of the UN Law of the Sea Convention's Usefulness as a Tool to Combat Climate Change" in C. H. Schofield, S. Lee and M.-S. Kwon (eds.), *The Limits of Maritime Jurisdiction*, Brill Nijhoff (2014) 679-698.

Johnston, A. and Block, G., “Introduction to Energy Security and Security of Supply” in *EU Energy Law,* Oxford University Press (2012) 233-239.

Katsaprakakis, D.A., “Energy storage for offshore wind farms” in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 459-494.

Lloyd, P.O., “Health and safety of offshore wind farms” in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 573-588.

Martínez Pérez, E. J., “The Environmental Legal Framework for the Development of Blue Energy in Europe” in G. Andreone (ed.) *The Future of the Law of the Sea: Bridging Gaps between National, Individual and Common Interests,* Springer International Publishing (2017) 127-144.

Masters, I., Johnson, K. and Dalton, G., “Introduction” in *Building Industries at Sea: ‘Blue Growth’ and the New Maritime Economy,* River Publishers (2018) 1-7.

Milligan, B., “Marine Protected Areas in Antarctic Waters: A Review of Policy Options in the Context of International Law” in C. H. Schofield, S. Lee and M.-S. Kwon (eds.), *The Limits of Maritime Jurisdiction,* Brill Nijhoff (2014) 549-574.

Moe, E., Hansen, S.T. and Kjær, E.H., “Why Norway as a Green Battery for Europe Is Still to Happen, and Probably Will Not” in P. Midford and E. Moe (eds.), *New Challenges and Solutions for Renewable Energy: Japan, East Asia and Northern Europe,* Palgrave Macmillan (2021) 281-317.

Neumann, I.B., “This little piggy stayed at home: why Norway is not a member of the EU” in L. Hansen and O. Waever, *European Integration and National Identity - The Challenge of the Nordic States,* Routledge (2001) 87-129.

O’Kelly, B.C. and Arshad, M., “Offshore wind turbine foundations - analysis and design” in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 589-610.

Ong, D., “Towards and International Law for the Conservation of Offshore Hydrocarbon Resources within the Continental Shelf?” in D. Freestone, R. Barnes and D. Ong (eds.), *Law of the Sea. Progress and Prospects*, Oxford University Press (2006), 93-119.

Otte, P.P., Rønningen, K. and Moe, E., “Contested wind energy: discourses on energy impacts and their significance for energy justice in Fosen” in A. Szolucha (ed.), *Energy, Resource Extraction and Society Impacts and Contested Futures*, Routledge (2018) 140-158.

Peiffer, A. and Roddier, D., “Floating Wind Turbines: The New Wave in Offshore Wind Power” in J. H. Lehr, J. Keeley and T. B. Kingery (eds.), *Alternative Energy and Shale Gas Encyclopedia*, Wiley (2016) 69-79.

Platteeuw, M., Bakker, J., Van Den Bosch, I., Erkman, A., Graafland, M., Lubbe, S. and Warnas, M., “A Framework for Assessing Ecological and Cumulative Effects (FAECE) of Offshore Wind Farms on Birds, Bats and Marine Mammals in the Southern North Sea” in J. Köppel (ed.), *Wind Energy and Wildlife Interactions*, Springer (2017) 219-237.

Rademakers, L., Braam, H. and Obdam, T., “Chapter 18: Operation and maintenance of offshore wind energy systems” in J. D. Sørensen and J. N. Sørensen (eds.), *Wind Energy Systems: Optimising design and construction for safe and reliable operation*, Woodhead Publishing (2011) 616 p.

Rao, K. R., “Wind Energy: Technical Considerations-Contents” in *Wind Energy for Power Generation*, Springer (2019) 1-426.

Schachtner, E., “Marine Protected Areas and Marine Spatial Planning, with Special Reference to the Black Sea” in P. D. Goriup (ed.) *Management of Marine Protected Areas: A Network Perspective*, Wiley (2017) 317-370.

Shearer, I., “The Limits of Maritime Jurisdiction” in C. H. Schofield, S. Lee and M.-S. Kwon (eds.), *The Limits of Maritime Jurisdiction*, Brill Nijhoff (2014) 49-63.

Soininen, N., “Marine spatial planning in the European Union” in D. Hassan, T. Kuokkanen and N. Soininen (eds.), *Transboundary Marine Spatial Planning and International Law*, Routledge (2015) 189-201.

Solorio, I. and Bocquillon, P., "EU Renewable Energy Policy: A Brief Overview of its History and Evolution" in I. Solorio and H. Jörgens (eds.), *A Guide to EU Renewable Energy Policy Comparing Europeanization and Domestic Policy Change in EU Member States* (2017) Edward Elgar, 23-42.

Srinil, N., "Cabling to connect offshore wind turbines to onshore facilities" in C. Ng and L. Ran (eds.), *Offshore Wind Farms: Technologies, Design and Operation,* Woodhead Publishing (2016) 419-440.

Talus, K., "The Vertical Division of Competences between the European Union and Its Member States in the Energy Sector" in *Introduction to EU Energy Law* (2016) 7-14.

Vandendriessche, F., "Hoofdstuk II. De bevoegde regelgevers voor het energierecht" in F. Vandendriessche (ed.), *Energierecht in België en Vlaanderen 2021*, Intersentia (2021) 15-50.

Vandendriessche, S., Reubens, J., Derweduwen, J., Degraer, S. and Vincx, M., "Offshore wind farms as productive sites for fishes?" in S. Degraer, R. Brabant and B. Rumes (eds.), *Environmental impacts of offshore wind farms in the Belgian part of the North Sea: Learning from the past to optimise future monitoring programmes*, Royal Belgian Institute of Natural Sciences (2013) 152-161.

Articles

Bailey, H., Brookes, K.L. and Thompson, P.M., "Assessing environmental impacts of offshore wind farms: lessons learned and recommendations for the future" *Aquatic Biosystems* (2014) vol. 10, no. 8, 13 p.

Barnes, R., "Energy Sovereignty in Marine Spaces", *The International Journal of Marine and Coastal Law* (2014) vol. 29, no. 4, 573-599.

Batel, S. and Devine-Wright, P., "Populism, identities and responses to energy infrastructures at different scales in the United Kingdom: a post-Brexit reflection", *Energy Research & Social Science* (2018) vol. 43, 41-47.

Blindheim, B., "Gone with the wind? The Norwegian licencing process for wind power: does it support investments and the realisation of political goals?" in*ternational Journal of Sustainable Energy Planning and Management* (2015) vol. 5, 15-26.

Blindheim, B., “Implementation of wind power in the Norwegian market; the reason why some of the best wind resources in Europe were not utilised by 2010”, *Energy Policy* (2013) vol. 58, 337-346.

Burg, S.W.K., Soma, K. and Selnes, T., “The significance of social innovation for blue growth in the North Sea”, *Rural Areas and Development* (2018) vol. 15, 169-184.

Chircop, A. and L’Esperance, P., “Functional Interactions and Maritime Regulation: The Mutual Accommodation of Offshore Wind Farms and International Navigation and Shipping”, *Ocean Yearbook* (2016) vol. 30, 439-487.

Dahl, I. R., Tveiten, B.W. and Cowan, E., “The Case for Policy in Developing Offshore Wind: Lessons from Norway”, *Energies* (2022) vol. 15, 14 p.

Degreef, C. and Geldhof, W., “Offshore energy and the Belgian legal framework: All at Sea?”, *Tijdschrift voor het recht van netwerkindustrieën* (2015) vol. 1, 56-72.

Del Castillo-Laborde, L., “Equitable Utilization of Shared Resources”, *Max Planck Encyclopedia of Public International Law* (2008) 37-56.

Delvaux, B. and Geldhof, W., “Openbare gasdistributie op een gesloten distributienet - het land van Magritte?”, note under GwH Const. Court Judgement No. 98/2013, *Milieu- en Energierecht* (2014) 143-144.

Ehler, C. N., “Two decades of progress in Marine Spatial Planning”, *Marine Policy* (2021) vol. 132, 2021, 104134, 16 p.

Fritz, J.-S. and Hanus, J., “The European Integrated Maritime Policy: The next five years”, *Marine Policy* (2015) vol. 53, 1-4.

Hansen, H.S., “Obstacles for Wind Energy Development due to EU legislation”, *ResearchGate* (2011) 40 p.

Heidenreich, S., “Out of sight, out of mind? Controversy over offshore wind energy in Norway’s news media” *Science and Culture* (2016) vol. 25, 449-472.

Hillion, C., “Integrating an Outsider: An EU Perspective on Relations with Norway”, *European Foreign Affairs Review* (2011) vol. 16, no. 4, 489-520.

Inderberg, T.H.J., Rognstad, H., Saglie, I.-L. and Gulbrandsen, L.H., “Who influences windpower licensing decisions in Norway? Formal requirements and informal practices”, *Energy Research & Social Science* (2019) vol. 52, 181-191.

Jansen, M., Duffy, C., Green, T. and Staffell, I., “Island in the Sea: The prospects and impacts of an offshore wind power hub in the North Sea”, *Advances in Applied Energy* (2022) vol. 6, 100090.

Jonsson, D. K., Johansson, B., Månsson, A, Nilsson, L.J., Nilsson, M. and Sonnsjö, H., “Energy security matters in the EU Energy Roadmap”, *Energy Strategy Reviews* (2015) vol. 6, 48-56.

Kiehl, E., “Centrales nucléaires – prolongation - étude préalable des incidences environnementales: l’arrêt de la Cour constitutionnelle n° 34/2020 du 5 mars 2020”, *Revue de Jurisprudence de Liège, Mons et Bruxelles* (2020), 1004-1013.

Koivisto, M., Gea-Bermúdez, J. and Sørensen, P., “North Sea offshore grid development: combined optimisation of grid and generation investments towards 2050”, *IET Renewable Power Generation* (2020) vol. 14, no. 8, 1259-1267.

Lifshitz-Goldberg, Y., “Gone with the Wind? The Potential Tragedy of the Common Wind”, *UCLA Journal of Environmental Law and Policy* (2010) vol. 28, 435.

Lindeboom, H.J., Kouwenhoven, H.J., Bergman, M.J.N., Bouma, S., Brasseur, S., Daan, R., Fijn, R.C., de Haan, D., Dirksen, S., van Hal, R., Hille Ris Lambers, R., ter Hofstede, R., Krijgsveld, K.L., Leopold, M. and Scheidat, M., “Short-term ecological effects of an offshore wind farm in the Dutch coastal zone; a compilation”, *Environmental Research Letters* (2011) vol. 6, 13 p.

Long, R., “Harnessing Offshore Wind Energy: Legal Challenges and Policy Conundrums in the European Union”, *The International Journal of Marine and Coastal Law* (2014) vol. 29, 690-715.

Maes, F., “Ruimtelijke planning op zee in België: van plan naar proces en een nieuw plan”, *Tijdschrift voor milieurecht* (2016) no. 4, 415-439.

Mäkitie, T., Andersen, A., Hanson, J., Normann, H. and Thune, T., “Established sectors expediting clean technology industries? The Norwegian oil and gas sector's influence on offshore wind power”, *Journal of Cleaner Production* (2018) vol. 177, 813-823.

Mäkitie, T., Normann, H., Thune, T. and Sraml Gonzalez, J., “The green flings: Norwegian oil and gas industry’s engagement in offshore wind power”, *Energy policy* (2019) vol. 127, 269-279.

Markus, T., Schalke, S. and Maier, N., “Legal Implementation of Integrated Ocean Policies: The EU’s Marine Strategy Framework Directive”, *The International Journal of Marine and Coastal Law* (2011) vol. 26, 59-90.

Merchant, N. D., “Underwater noise abatement: Economic factors and policy options”, *Environmental Science & Policy* (2019) vol. 92, 116-123.

Müller, H. K. and Roggenkamp, M. M., “Regulating Offshore Energy Sources in the North Sea-Reinventing the Wheel or a Need for More Coordination?”, *The International Journal of Marine and Coastal Law* (2014) vol. 29, no. 4, 716-737.

Normann, H.E., “The role of politics in sustainable transitions: The rise and decline of offshore wind in Norway”, *Environmental Innovation and Societal Transitions* (2015) vol. 15, 180-193.

Oyewunmi, T., “Energy security and gas supply regulation in the European union's internal market”, *European Networks Law and Regulation Quarterly* (2015) 187-202.

Petersen, K.J. and Malm, T., “Offshore windmill farms: threats or possibilities to the marine environment” *Ambio* (2006) vol. 35, no. 2, 75-80.

Pham, T.Q., Im, S. and Choung, J., “Prospects and Economics of Offshore Wind Turbine Systems”, *Journal of Ocean Engineering and Technology* (2021) vol. 35, no. 5, 382-392.

Platjouw, M., “Marine Spatial Planning in the North Sea - Are National Policies and Legal Structures Compatible Enough? The Case of Norway and the Netherlands”, *The International Journal of Marine and Coastal Law* (2018) vol. 33, no. 1, 34-78.

Pronińska, K. and Księżopolski, K., “Baltic Offshore Wind Energy Development - Poland’s Public Policy Tools Analysis and the Geostrategic Implications”, *Energies* (2021) vol. 14, no. 16, 4883.

Redgwell, C., “Mind the Gap in the GAIRS: The Role of Other Instruments in LOSC Regime Implementation in the Offshore Energy Sector”, *The International Journal of Marine and Coastal Law* (2014) vol. 29, 600-621.

Reichert, C., “Determination of the Outer Continental Shelf Limits and the Role of the Commission on the Limits of the Continental Shelf”, *The International Journal of Marine and Coastal Law* (2009) 393.

Sæther, B., Isaksen, A. and Karlsen, A., “Innovation by co-evolution in natural resource industries: the Norwegian experience”, *Geoforum* (2011) vol. 42, no. 3, 373-381.

Saglie, I.-L., Inderberg, T.H. and Rognstad, H., “What shapes municipalities’ perceptions of fairness in windpower developments?”, *Local Environment: The International Journal of Justice and Sustainability* (2020) vol. 25, no. 2, 147-161.

Serrano González, J. and Lacal-Arántegui, R., “A review of regulatory framework for wind energy in European Union countries: Current state and expected developments”, *Renewable and Sustainable Energy Reviews* (2016) no. 56, 588-602.

Serrano González, J., Burgos Payán, M. and Riquelme Santos, J., “Optimum design of transmissions systems for offshore wind farms including decision making under risk”, *Renewable Energy* (2013) vol. 59, 115-127.

Smits, J.M., “What is Legal Doctrine. On the Aims and Methods of Legal Research”, *MEPLI working paper* (2015) vol. 6, https://ssrn.com/abstract=2644088, 17.

Steen, M. and Hansen, G.H.; “Barriers to path creation: the case of offshore wind power in Norway”, *Economic Geography* (2018) vol. 94, no. 2, 188-210.

Tegner Anker, H., Egelund Olsen, B. and Rønne, A., "Wind Energy and the Law: A Comparative Analysis", *Journal of Energy & Natural Resources Law* (2009) vol. 27, no 3, 145-178.

Thaler, P. and Hofmann, B., "The impossible energy trinity: Energy security, sustainability, and sovereignty in cross-border electricity systems", *Political Geography* (2022) vol. 94, 11.

Van Kuik, G. and Peinke, J., "Long-term Research Challenges in Wind Energy - A Research Agenda by the European Academy of Wind Energy", *Wind Energy Science* (2016) vol. 1, 1-39.

Vasstrøm, M. and Lysgård, H.K., "What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice", *Energy Research & Social Science* (2021) vol. 77, 10 p.

Wang, X., Zeng, X., Li, J., Yang, X. and Wang, H., "A review on recent advancements of substructures for offshore wind turbines", *Energy Conversion and Management* (2018) vol. 158,103-119.

Whitfield, S., "Offshore Wind: The New Frontier in Powering Platforms?", *Journal of Petroleum Technology* (2020) vol. 72, 38-40.

News articles and blogs

Buli, N., "Norway to resume onshore wind power licensing after 3-year break", *Reuters,* 8 April 2022, www.reuters.com/business/sustainable-business/norway-resume-onshore-wind-power-licensing-after-3-year-break-2022-04-08/.

De Maeseneer, W., "België, Nederland, Duitsland en Denemarken willen grootste groene energiecentrale bouwen in Noordzee", *VRT*, 18 May 2022, www.vrt.be/vrtnws/nl/2022/05/18/noordzee-moet-een-grote-groene-energiecentrale-worden/.

Flameygh, K., "Intendant moet draagvlak creëren voor het Ventilus-project: "De klemtoon ligt op het informeren"", *VRT*, 26 February 2021, www.vrt.be/vrtnws/nl/2021/02/26/intendant-moet-draagvlak-creeren-voor-het-ventilus-project/.

Khalid, U., “Norway opens areas for offshore wind power development”, *SNL Energy Power Daily* (2020).

Kristensen, V. E., *Controversial Norway-UK interconnector project cancelled* (2021) https://energywatch.com/EnergyNews/Utilities/article13601816.ece.

Leerberg, B.-E., “Norway's answer to the energy transition”, *Simonsen Vogt Wiig*, 17 February 2022, https://svw.no/en/insights/norways-answer-to-the-energy-transition#_ftn4.

Mooijman, R., “Windindustrie verkeert in ‘perfecte storm’”, De *Standaard*, 7 March 2022

Raspoet, E., “Ecopower: ‘In Vlaanderen is het nagenoeg onmogelijk om nog een windturbine op land vergund te krijgen’”, *Knack*, 2 May 2022.

Schoors, T., “Belgium adopts legal framework on tenders for new offshore electricity production installations”, *Allen&Overy*, 1 May 2019 www.allenovery.com/en-gb/global/news-and-insights/publications/belgium-adopts-legal-framework-on-tenders-for-new-offshore-electricity-production-installations.

Sertyn, P., “Wind in 2021 was niet meer dan een zuchtje”, *De Standaard*, 4 April 2022.

Skopljak, N., *North Sea Link to enter 2022 at reduced capacity* (2021) www.offshore-energy.biz/north-sea-link-to-enter-2022-at-reduced-capacity/.

Skopljak, N., *Norway-UK Interconnector Begins Trial Operations* (2021) www.offshore-energy.biz/norway-uk-interconnector-begins-trial-operations/.

Vandevoorde, J.-L., “Oostende vreest voor sputterende offshoremotor”, *Flows*, 8 May 2017.

Winckelmans, W., “Demir heeft de keuze: de actiegroepen trotseren of een extra gascentrale riskeren”, *De Standaard*, 21 April 2022.

Wouters, N., “The way towards a competitive bidding process for new offshore wind farms in Belgium”, *Dentons* (2019), www.dentons.com/en/insights/articles/2019/september/16/the-way-towards-a-competitive-bidding-process-for-new-offshore-wind-farms-in-belgium.

X., “Groene stroom slaan we straks op in een superbatterij”, *Vattenfal*, www.vattenfall.nl/duurzame-energie/windenergie/opslag-windenergie-in-nieuwe-superbatterij/.

X., “Floating offshore wind - Norway’s next offshore boom?”, *ABB* and *ZERO* (2018) 12 p.

X., “Floating Offshore Wind Energy - A Policy Blueprint For Europe”, *WindEurope*, https://windeurope.org/wp-content/uploads/files/policy/position-papers/Floating-offshore-wind-energy-a-policy-blueprint-for-Europe.pdf.

X., “Ministers meet to discuss North Sea offshore developments”, *WindEurope*, 27 October 2021, https://windeurope.org/newsroom/news/ministers-meet-to-discuss-north-sea-offshore-developments/.

X., “Portuguese Floating Wind Farm Shows Better-Than-Expected Results”, *The Maritime Executive*, 27 September 2021, www.maritime-executive.com/article/portuguese-floating-wind-farm-shows-better-than-expected-results.

Online sources

CREG, www.creg.be/en.

EFTA Court, https://eftacourt.int.

EFTA Surveillance Authority, www.eftasurv.int.

EFTA, www.efta.int/.

Elia, *Adequacy and Flexibility Study for Belgium 2022-2032*, 156 p., www.elia.be/-/media/project/elia/shared/documents/elia-group/publications/studies-and-reports/20210701_adequacy-flexibility-study-2021_en_v2.pdf.

Energy Facts Norway, *Official energy statistics*, https://energifaktanorge.no/.

ENOVA, www.enova.no/.

Equinor, www.equinor.com/.

IEA, *Report Belgium 2022 - Executive summary*, www.iea.org/reports/belgium-2022/executive-summary.

IEA, *Report Belgium 2022 - Energy Policy Review*, www.iea.org/reports/belgium-2022.

Norsk Industri, "Leveransemodeller for Havvind", (2021) www.norskindustri.no/siteassets/dokumenter/rapporter-og-brosjyrer/leveransemodeller-havvind/leveransemodeller-havvind_juni_kartlegging-av-norske-kompetansemiljoer.pdf.

Norway and the EU, *Mission of Norway to the EU - Climate change and the environment*, www.norway.no/en/missions/eu/values-priorities/climate-env/.

Norwegian EEA Database, www.regjeringen.no/no/sub/eos-notatbasen/sok/id615429/.

Overview of the Norwegian committees, www.regjeringen.no/no/sub/eos-notatbasen/om-eos-notatbasen/sakstrinn-2/id524226/.

Stanett, *North Sea Link - New subsea interconnector between Norway and England*, www.statnett.no/en/our-projects/interconnectors/north-sea-link/.

TenneT, *NordLink*, www.tennet.eu/nl/ons-hoogspanningsnet/internationale-verbindingen/nordlink/.

Ventilus project, www.ventilus.be/.

Other documents

Angell, S.I. and Brekke, O.A., "Frå kraft versus natur til miljøvenleg energi? Norsk vasskraftpolitikk i eit hundreårsperspektiv", Rapport 3-2011, *Uni Research AS,* Bergen, 2011.

Borrmann, R., Rehfeldt, K., Wallasch, A.-K. and Lüers, S., "Capacity Densities of European Offshore Wind Farms", *Deutsche Windguard* (2018) 77 p.

Brabant, R., Degraer, S. and Rumes, B., "Chapter 2. Offshore wind energy development in the Belgian part of the North Sea and anticipated impacts: an update" in S. Degraer, R. Brabant and B. Rumes (ed.), *Offshore wind farms in the Belgian part of the North Sea: Heading for an understanding of environmental impacts*, Brussels, RBINS-MUMM (2012) 10-16.

Breyer, S., Cornet, M., Pestiaux, J. and Vermeulen, P., "The Socio-Economic Impact of the Belgian Offshore Wind Industry", *BOP (Belgian Offshore Platform),* March 2017, 17 p., www.belgianoffshoreplatform.be/app/uploads/The-socio-economic-impact-of-the-belgian-offshore-wind-industry.pdf.

Cecchinato, M. and Pineda, I., "Multiple uses of offshore wind areas in the Belgian North Sea", *WindEurope* (2018) 68 p., https://windeurope.org/intelligence-platform/product/multiple-uses-of-offshore-wind-areas-in-the-belgian-north-sea/.

Dahl, I.R., "Norwegian Offshore Wind Policy: A New Policy Paradigm or Business as Usual? An Analysis of the Policy Area of Norwegian Offshore Wind in the Period 2012–2020", *Norwegian University of Science and Technology* (2021).

EEA, "Report: Trends and Projections in Europe 2021", *EEA Report no. 13/202*1, 26 October 2021, 46 p.

Elia, *High voltage off the Belgian coast - Elia's grid in the North Sea*, 14 p., www.eliagroup.eu/-/media/project/elia/shared/documents/elia-group/publications/brochures/20190828_elia_offshore-projects_brochure_en.pdf.

Elia, *Press Release - Elia and Energinet's collaboration is advanced following preliminary study on hybrid interconnector between Belgium 07 January 2022and Denmark*, 23 November 2021, www.elia.be/en/news/press-releases/2021/11/20211123_preliminary-study-on-hybrid-interconnector.

ENTSO-E, *Offshore Grid Development in the North Seas*, 6 p., https://eepublicdownloads.entsoe.eu/clean-documents/pre2015/position_papers/110202_NSOG_ENTSO-E_Views.pdf.

EU Parliament, *Factsheets: the integrated marine policy of the European Policy*, www.europarl.europa.eu/factsheets/en/sheet/121/integrated-maritime-policy-of-the-european-union.

Export Credit Norway, "Offshore Wind - Opportunities for the Norwegian Industry", *THEMA Report 2020-13* (2020),

www.regjeringen.no/contentassets/07635c56b2824103909fab5f31f81469/offshore-wind-opportunities-for-the-norwegian-industry.pdf.

Gill, A.B., Gloyne-Phillips, I., Neal, K.J. and Kimber, J.A., "The potential effects of electromagnetic fields generated by sub-sea power cables associated with offshore wind farm developments on electrically and magnetically sensitive marine organisms - a review", *Report to COWRIE* (2005) 36-40.

Hanson, J. and Endresen Normann, H. (eds.), *Conditions For Growth In The Norwegian Offshore Wind Industry*, CenSES (2019) 44 p.

Horwath, S., Hassrick, J., Grismala, R., Diller, E., Krebs, J. and Manhard, R., "Comparison of Environmental Effects from Different Offshore Wind Turbine Foundations", *U.S. Dept. of the Interior, Bureau of Ocean Energy Management* (2021) OCS Study BOEM 2021-053, 48 p.

Maes, F., "Maritime Spatial Planning: will there still be some space left for nature?", *Presentation in the VVOR Conference - 20 years of Habitats Directive* (13 December 2012), Antwerp.

Management of the marine environment by the MUMM Scientific Service, *Windfarms in the North Sea*, https://odnature.naturalsciences.be/mumm/en/windfarms/.

Merck, T. and Wasserthal, R., "Report: Assessment of the environmental impacts of cables", *OSPAR Commission Biodiversity series* (2009) 19 p.

Nilsson, D. and Westin, A., "Floating wind power in Norway - Analysis of future opportunities and challenges", *CODEN:LUTEDX/TEIE EIE920 20141* (2014) Lund University, 30-34.

O'Hagan, A.M., "11. Marine Spatial Planning and Marine Renewable Energy Chapter" in A.E. Copping and L.G. Hemery (eds.), *OES-Environmental 2020 State of the Science Report: Environmental Effects of Marine Renewable Energy Development Around the World* (2020) Report for Ocean Energy Systems, 214-241.

Planning & Permitting study for North Sea Windpower Hub - concerning the Norwegian sector, *North Sea Wind Power Hub consortium* (22 May 2019) 63 p.,

https://northseawindpowerhub.eu/sites/northseawindpowerhub.eu/files/media/document/Permitting-Study-Norway-1.pdf.

Serrano González, J. and Lacal-Arántegui, R., "The regulatory framework for wind energy in EU Member States. Part 1 of the Study on the social and economic value of wind energy - WindValueEU.*", European Commission, Joint Research Centre, Institute for Energy and Transport* (2015), 64 p.

Tomé, R., Canário, F., Leitão, A., Pires, N. and Repas, M., "Radar Assisted Shutdown on Demand Ensures Zero Soaring Bird Mortality at a Wind Farm Located in a Migratory Flyway" in J. Köppel, *Wind Energy and Wildlife Interactions - Presentations from the CWW 2015 Conference* (2017) 119-133.

Van-Nguyen, D. and Mckeogh, E., "Offshore Wind Energy: Technology Opportunities and Challenges", *Proceedings of the 1st Vietnam Symposium on Advances in Offshore Engineering* (2019) 3-22.

Vanhecke, M., "Belgium's 2021 electricity mix", *ELIA*, 7 January 2022, www.elia.be/en/news/press-releases/2022/01/20220107_belgium-2021-electricity-mix.

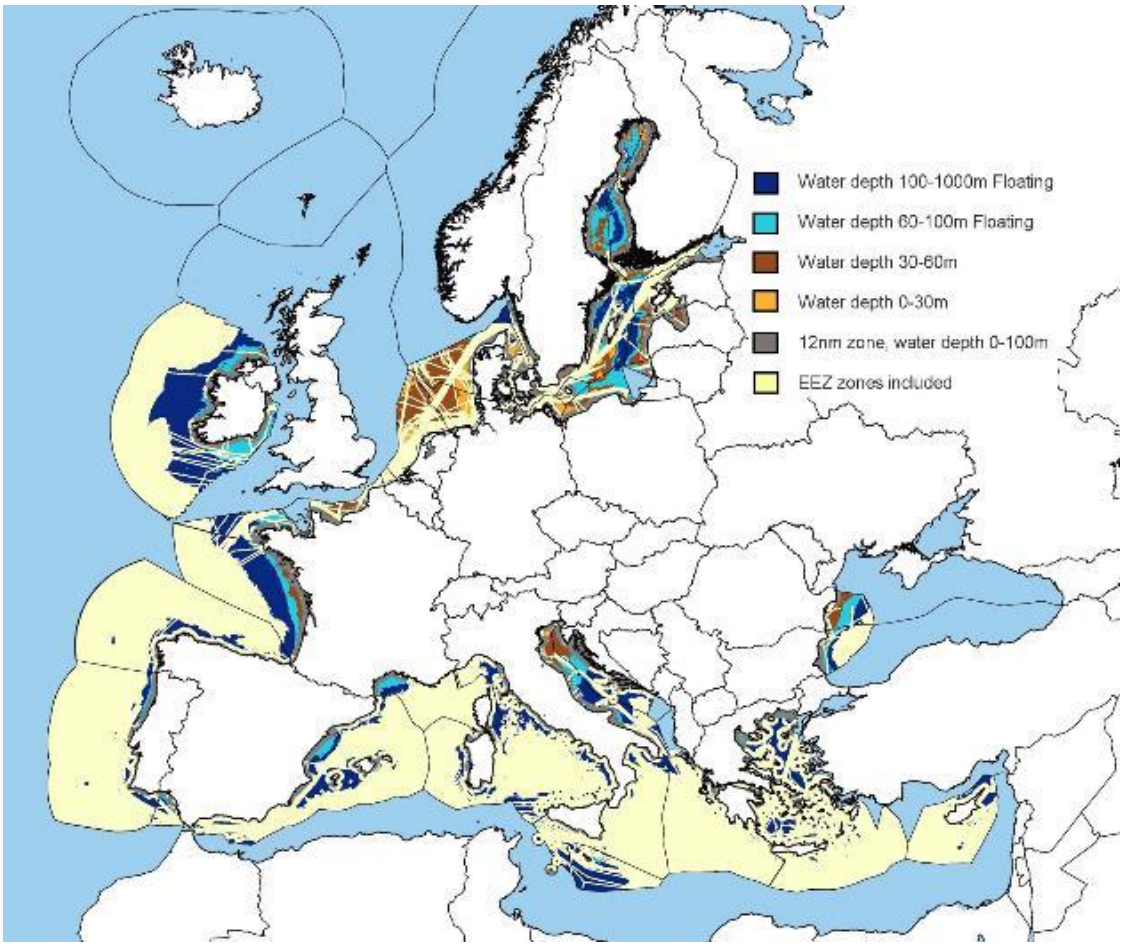
Vanhecke, M., *Press release: Last offshore wind farm successfully connected to North Sea power hub*, ELIA, 29 May 2020.

Wiig, H., Tesli, A., Stokstad, S. and Hanssen, G.S., "Intensjoner og praksis for regionale planer for vindkraft", *NIBR* (2019) Report 2019:14, 96 p.

X., "Position Paper: Offshore wind energy in the North Sea", *WindEurope* (29 November 2017) 24 p., https://windeurope.org/policy/position-papers/offshore-wind-energy-in-the-north-sea/.

Appendix

Appendix I - Offshore wind technical potential in sea basins accessible to EU27 countries[481]

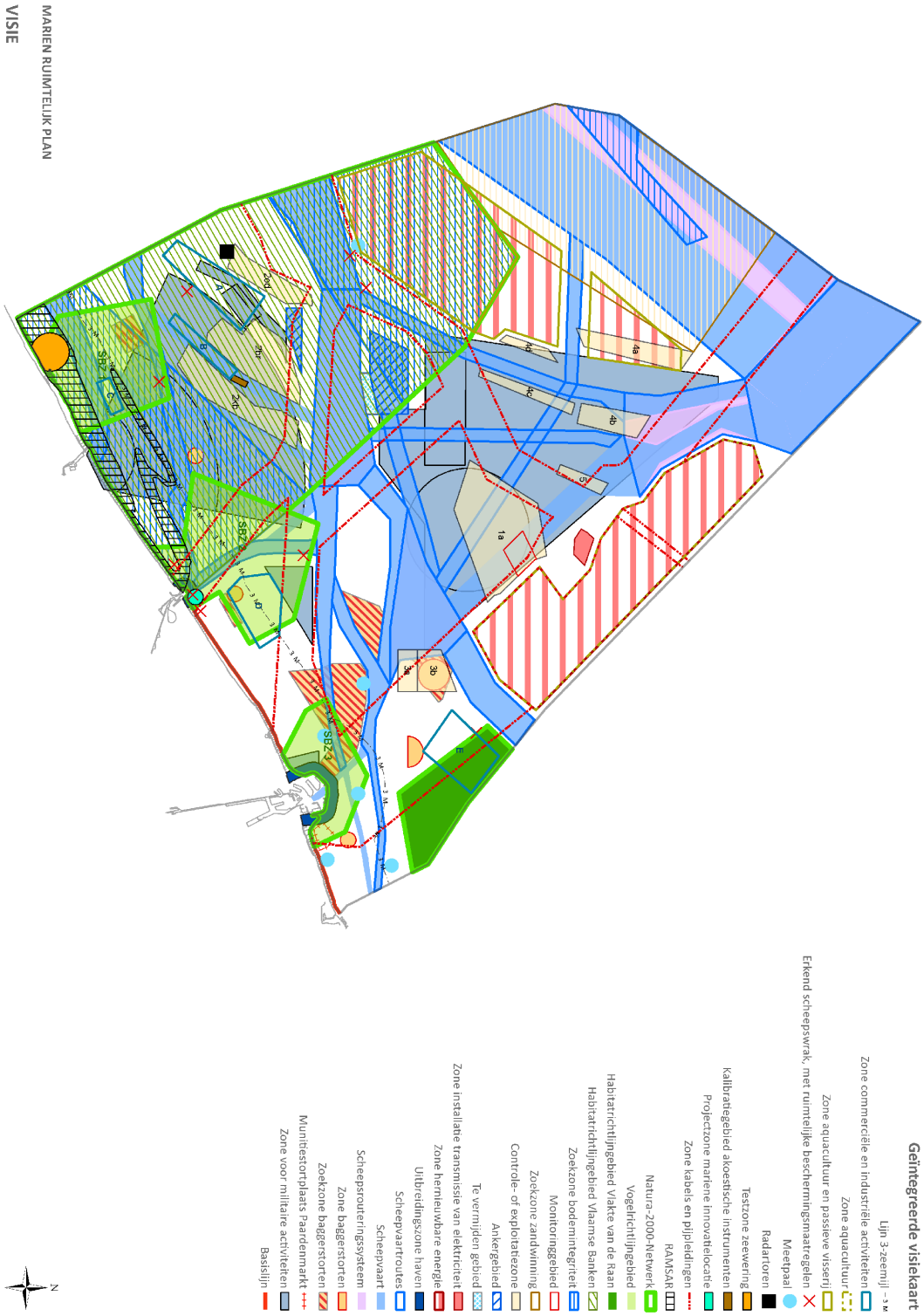


[481] EU Commission, *ENSPRESO - WIND - ONSHORE and OFFSHORE*, Joint Research Centre (JRC) (2019) http://data.europa.eu/89h/6d0774ec-4fe5-4ca3-8564-626f4927744e (last consulted 30 May 2022).

Appendix II – Zones considered for offshore wind power in Norway[482]

[482] NVE, Offshore wind power in Norway – Strategic Environmental Assessment (English summary), *NVE-Rapport 47-12*, https://publikasjoner.nve.no/diverse/2013/havvindsummary2013.pdf, 24 p. (last consulted 30 May 2022).

Appendix III – Belgian Marine Spatial Plan 2020-2026[483]



[483] Royal Decree of 22 May 2019 establishing the marine spatial plan for the period from 2020 to 2026 in the Belgian marine areas, *BSG* 2 July 2019, 66980; See more www.marineatlas.be/nl/data (last consulted 30 May 2022).

Appendix IV – Norway v. Belgium

	Norway	**Belgium**
Facts		
Coastline (km)	28.953	66,5
Inhabitants	5.391.369	11.521.238
Energy mix – renewable energy	98%	18%
Energy mix – offshore wind energy	0%	7%
Offshore wind power		
Installed (km^2)	0	225
Installed capacity (GW)	0	2.25
Planned (km^2)	3601	285
Planned capacity (GW)	4.5	3.15 - 3.5
Total		
Km^2	3601	555
Capacity (GW)	4.5	5.4 - 5.8
Legal framework	Offshore Energy Act No. 21 (4 June 2010)	Electricity Act (29 April 1999)
MSP	/	Act on the Protection of the Marine Environment of 20 January 1999
Area designation	Royal Decree concerning the opening of the Areas (12 June 2020)	- Royal Decree of 17 May 2004 - Law of 12 May 2019
Concession	Royal Decree concerning offshore energy regulation (12 June 2020)	- Royal Decree of 20 December 2000 - Law of 12 May 2019 - Royal Decree of 11 February 2019
Environmental permit	/	- Marine Environment Law (1999) - Licensing and Authorisation Decree (2003) - EIA-Decree (2003)
Cable permit	- Ocean Energy Law - Energy Act - Planning and Building Act	- Royal Decree of 17 May 2004