Regulating Offshore Electricity Infrastructure in the North Sea

Nieuwenhout, C.T.

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Regulating Offshore Electricity Infrastructure in the North Sea

Towards a New Legal Framework

Ceciel Nieuwenhout, LLM.

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Regulating Offshore Electricity Infrastructure in the North Sea

Towards a New Legal Framework

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by

Cecilia Tara Nieuwenhout

born on 7 November 1991
in Alkmaar

Supervisors
Prof. M.M. Roggenkamp
Prof. E. Woerdman

Assessment Committee
Prof. F.A. Nelissen
Prof. I.L. Hancher
Prof. R.A. Wessel

Paranymphs

Gijs Kreeft, LL.M

Peter van de Waerdt, LL.M

Voor Gerco en Minke

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Thesis Structure

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List of Abbreviations

AC	Alternating Current
ACER	Agency on the Cooperation of Energy Regulators
ACM	Autoriteit Consument en Markt (Dutch NRA)
BNetzA	BundesNetzAgentur (German NRA)
BSH	Bundesamt für Seeschifffahrt und Hydrographie (German maritime authority)
CAPEX	Capital Expenditures
CBA	Cost Benefit Analysis
CBCA	Cross-Border Cost Allocation
CEER	Council of European Energy Regulators
CEF	Connecting Europe Facility
CENELEC	European Committee for Electrotechnical Standardisation
CETA	Comprehensive Economic and Trade Agreement
CFC	Chlorofluorocarbons (ozone-depleting chemicals)
CfD	Contract for Difference
CJEU	Court of Justice of the European Union
CRE	Commission Régulation de l'Energie (French NRA)
CREG	Commission for the Regulation of Electricity and Gas (Belgian NRA)
DC	Direct Current
ECT	Energy Charter Treaty
EEA	European Economic Area
EEC	European Economic Community
EEZ	Exclusive Economic Zone
EC	European Community
EIA	Environmental Impact Assessment
ENTSO-E	European Network of Transmission System Operators for Electricity
ESO	Electricity System Operator (UK separates functions of TSO)
EU	European Union
FCA	Forward Capacity Allocation
G-charges	Generator Charges
GW	Gigawatt
HVDC	High Voltage Direct Current
ICPR	International Commission for the Protection of the Rhine
ILO	International Labour Organisation
IMO	International Maritime Organisation
ISO	International Standardisation Organisation
kW	kiloWatt
MARPOL	International Convention for the Prevention of Pollution from Ships
MOG	Meshed Offshore Grid
MoU	Memorandum of Understanding
MSP	Maritime Spatial Planning
MWh	MegaWatthour
NGO	Non-Governmental Organisation

NRA	National Regulatory Authority
NSCOGI	North Seas' Countries Offshore Grid Initiative
NSEC	North Sea Energy Cooperation
NVE	Norwegian Water and Energy Directorate
OECD	Organisation for Economic Co-operation and Development
OFTO	Offshore Transmission Owner
Ofgem	Office of Gas and Electricity Markets (UK NRA)
OLP	Ordinary Legislative Procedure
OPEX	Operational Expenditures
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
OWF	Offshore Wind Farm
PCI	Project of Common European Interest
PROMOTioN	Progress on Meshed HVDC Offshore Transmission Networks (Horizon2020 research project)
REZ	Renewable Energy Zone
RVO	Rijksdienst voor Ondernemend Nederland (one-stop-shop for Dutch offshore wind tenders)
SEA	Strategic Environmental Assessment
SO	System Operator
TEN-E	Trans-European Networks for Energy
TEU	Treaty on European Union
TFEU	Treaty on the Functioning of the European Union
TSO	Transmission System Operator
TYNDP	Ten-Year Network Development Plan
VAT	Value Added Tax
VoLL	Value of Lost Load
UK	United Kingdom
UNCLOS	United Nations Convention on the Law of the Sea
USSR	Union of Soviet Socialist Republics

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CHAPTER 1

Introduction

1 Introduction

1.1 Background

Increasing renewable electricity generation is a priority for the states surrounding the North Sea. These states rely on offshore wind energy to provide a large amount of renewable energy. The North Sea is a vast space, with good conditions for offshore wind: it is relatively shallow, and the wind blows harder, more often and more predictably than onshore.[1] Recent reports predict a cumulative installed capacity of 40-59 gigawatts (GW) of offshore wind capacity by 2030 and 86-127 GW by 2040.[2]

Over the last few decades, the offshore wind farms (OWFs) constructed in the North Sea have increased in size and are located further from shore.[3] The cost of the grid connection rises significantly when the distance to shore increases. This highlights the need for strategic investments in electricity transmission infrastructure to bring the electricity generated offshore to the onshore grid in a reliable and cost-effective way. This has motivated some North Sea coastal states to adopt a clustered approach for the connection of OWFs rather than a separate cable connection for each OWF.[4]

At the same time, the EU aims to increase interconnection between the electricity markets of the Member States.[5] The availability of interconnection capacity enables electricity to be traded and increases the reliability of the electricity system. However, this is only possible if physical links between the electricity systems of different Member States, named 'interconnectors', are constructed. Most of the 82 interconnectors between EU states are located on land,[6] but in some cases they are also located offshore, for instance to link electricity markets across the North Sea.[7] Following the EU's aim to increase interconnection, more subsea interconnections will also be built within the coming decades.

As a result of these two factors, more cables will have to be constructed in the North Sea over the coming years. It is possible to combine different functions - interconnection and transmission of offshore-generated electricity - in so-called 'hybrid assets', which are cable

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[1] E. Hau, *Wind Turbines: Fundamentals, Technologies, Application, Economics* (Springer, Heidelberg 2013, 3rd ed.), p. 677

[2] The numbers reflect the outcomes of different scenarios, and they are based on the combined predictions of the coastal states. ENTSO-E, 'TYNDP 2018 Regional Insight Report – North Seas Offshore Grid, Final Version,' (Brussels, 2019).

[3] WindEurope and its predecessor EWEA provide yearly offshore wind trends and statistics. In these yearly reports, the reported average distance to shore of all wind farms installed in a year has increased from 10,5 km in 2008 to 33 km in 2018. The maximum average distance was reached in 2016, with 43,5 km on average.

[4] See chapter 4.3 below.

[5] The EU has set a target of 5% interconnection in 2020 and 10% in 2030, in the Council Conclusions of 23 and 24 October 2014: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf. See also below, chapter 3.4.1.

[6] Commission Expert Group on electricity interconnection targets, 'Electricity interconnections with neighbouring countries', p. 7.

[7] The ENTSO-E grid map gives an overview of all existing electricity infrastructure, including interconnectors: https://www.entsoe.eu/data/map/.

connections that have a dual function. Eventually hybrid assets could be combined in a meshed offshore grid (MOG). A MOG is defined as *all the electricity transmission assets that connect offshore generation from renewable energy sources to onshore connection points in two or more national electricity systems*.[8] In order to develop offshore electricity infrastructure more cost-effectively in the long term, North Sea coastal states are exploring the possibility of working together on offshore electricity infrastructure development and coordinating their regulatory efforts.[9] The EU has named the 'North Seas offshore grid'[10] as a priority corridor in the trans-European energy network.[11]

1.2 Aim and Research Question

An important factor in the development of offshore electricity infrastructure in general, and a meshed offshore grid (MOG) in particular, is the legal and regulatory framework. At the moment, the multitude of rules in the national legal frameworks (on spatial planning, permitting procedures, grid connection, operational issues and decommissioning) makes it difficult to develop cross-border connections. At an EU law level, several rules in the current legal framework hold back the development of a MOG, as the legislation is not equipped to facilitate the combination of interconnection and transmission of offshore generated electricity. At an international law level, there is uncertainty about the jurisdiction over hybrid assets and MOG components. These legal barriers need to be addressed, as they currently hold back the development of offshore electricity infrastructure.[12]

Without addressing these barriers, offshore electricity transmission will be developed in a less cost-effective way. There are multiple reasons for this. First, the costs are higher if more cables need to be constructed to separately cater for interconnection and connection of offshore wind farms, rather than integrating both functions in hybrid assets and eventually in a MOG. Secondly, if the legal framework differs between countries and thus makes the framework for cross-border assets unclear, the investments bear more risk, leading to higher capital costs. The administrative costs and risks associated with the development of offshore electricity infrastructure are also higher when permitting procedures are not streamlined. Finally, possible synergies from cooperation between coastal states, such as joint development of

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[8] Author's own definition.
[9] To this end, the states have signed a Memorandum of Understanding in 2010 and a Political Declaration in 2016. North Seas Countries´ Offshore Grid Initiative Memorandum of Understanding, signed by Belgium, Denmark, France, Germany, Ireland, Luxembourg, The Netherlands and Sweden and the United Kingdom on 7 December 2009 and by Norway on 2 February 2010; Political Declaration on energy cooperation between the North Seas Countries, agreed on 6 June 2016.
[10] The North Seas (plural), as used in the EU's communication, comprises the North Sea as well as the Irish Sea. This dissertation has a more narrow focus, namely only the North Sea. This is why, except in citations and references, North Sea (singular) is used throughout the dissertation.
[11] Commission Delegated Regulation (EU) 2018/540 of 23 November 2017 amending Regulation (EU) No 347/2013 as regards the Union list of projects of common interest, OJ L 90, 6.4.2018, Annex VII, B(1).
[12] O. Woolley, 'Overcoming Legal Challenges for Offshore Electricity Grid Development', in M.M. Roggenkamp, O. Woolley (Eds), *European Energy Law Report IX* (Intersentia, 2012) p. 173.

OWF zones in the areas with the highest wind resources, are not delivered if cross-border cooperation is not facilitated by the legal framework.

Therefore, the aim of this dissertation is to analyse how the legal framework should be adjusted to facilitate the cost-effective development of an offshore grid in the North Sea. **The main research question to be answered in this dissertation is: what legal framework should be implemented in order to facilitate the cost-effective development of an offshore electricity grid in the North Sea?** This main research question is answered through six sub-questions, divided in three parts. The sub-questions and the overall structure of the dissertation will be covered in section 1.5.

The word 'should' in the main research question indicates a normative approach, which requires a normative framework.[13] From a legal perspective, the normative framework could be internal (testing the proposed solutions against the norms of the current legal framework) or external (testing the proposed solutions against external norms, such as cost-effectiveness).[14] In this dissertation, the normative framework is inspired by the work of O.E. Williamson, economist and Nobel prize winner. The specific aspect of his work that is relevant for this dissertation is his theory of 'remediableness'. This theory entails, in short, that when different options are compared, not only the socio-economic benefits should be considered, but also the feasibility of the options and whether they can be implemented in practice.[15] Thus, he adds an extra criterion next to whether the option delivers net benefits. As he puts it, "[t]he remediableness criterion holds that an extant condition for which no *feasible* superior alternative can be described and *implemented* with expected net gains is *presumed* to be efficient."[16] In this dissertation, this is translated into an analysis which is based not purely on the economic perspective, but also on the legal, socio-political, financial and environmental perspective.[17] Together, these perspectives give a good insight into whether the compared options are feasible and implementable. This is especially relevant for the legal framework for the MOG, as options that are not feasible or implementable in practice are not useful when trying to create a stable legal framework that facilitates the development of a MOG.

1.3 Relevance in Relation to Previous Research Projects

This dissertation is based on research performed in the context of EU-funded research project PROMOTioN (Progress on Meshed HVDC Offshore Transmission Networks).[18] In this project,

[13] S. Taekema, 'Theoretical and Normative Frameworks for Legal Research: Putting Theory into Practice' *Law and Method* [2018, February].
[14] Ibid.
[15] O.E. Williamson, 'Strategy Research: Governance and Competence Perspectives' *Strategic Management Journal* [1999 vol 20], p. 1092
[16] Ibid.
[17] These criteria are elaborated in section 7.2.2.
[18] The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691714. All information on PROMOTioN, including the research results, are available at www.promotion-offshore.net.

the technical and regulatory barriers to HVDC networks in the North Sea were addressed. The research on the regulatory framework consisted of three aspects, namely the legal, economic and financial frameworks. The University of Groningen worked together with the Florence School of Regulation (European University Institute) and Deutsche WindGuard, and delivered the research on the legal aspects of meshed offshore transmission networks.

However, this dissertation also builds on other previous research projects which address either the technical characteristics and feasibility of different varieties of a MOG, [19] or the legal and regulatory framework needed for the development of such a grid.[20] These studies on the legal and regulatory framework assess the legal barriers and provide several possible solutions to mitigate specific issues related to the current legal framework. This dissertation adds an extra layer compared to previous research projects by developing recommendations for policy-makers at international, EU and national levels, on the adoption of a concrete legal framework.

The legal theoretical interest of this dissertation lies in two aspects. First, a strategy is developed to analyse multi-level legal frameworks, and specifically to compare and combine different possible legal instruments, i.e. an international law agreement in combination with EU law and amendments of national law. Secondly, an assessment framework is made in order to choose between different alternatives to address a certain issue, based on a qualitative informal Cost Benefit Analysis (CBA). In this dissertation, this type of assessment is used to address barriers in the legal framework of an offshore grid. However, it can be used more generally for other legislative questions where multiple alternative ways to address an issue exist.

1.4 Scope

The scope of this dissertation can be defined in different ways, namely geographically, temporally and based on subject matter. The aim of this dissertation is to analyse how the legal framework should be adjusted to facilitate the cost-effective development of an offshore grid *in the North Sea*. Therefore, the geographic scope of the legal research is the law applicable to the North Sea area and its coastal states: Belgium, Denmark, France (regarding the Channel), Germany, the Netherlands, Norway, Sweden and the United Kingdom.[21] As

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[19] An elaborate overview of all studies addressing the technical characteristics and economic feasibility of an offshore grid is given in P. Henneux, 'Deliverable 1.3: Synthesis of available studies on offshore meshed HVDC grids' (PROMOTioN, 2016). All PROMOTioN deliverables are available at https://www.promotion-offshore.net/results/deliverables/. Specific studies that deserve attention in this context are the WindSpeed, OffshoreGrid, NorthSeaGrid, Twenties and E-Highway 2050 projects.

[20] H.K. Müller, *A Legal Framework for a Transnational Offshore Grid in the North Seas* (Intersentia, 2016); O. Woolley (2012); PwC, Tractebel Engineering, Ecofys, Study on regulatory matters concerning the development of the North Sea offshore energy potential, January 2016.

[21] Sometimes, Iceland is also mentioned in the context of North Sea offshore electricity infrastructure, see for example the IceLink project: https://www.landsvirkjun.com/researchdevelopment/submarinecabletoeurope. However, it is likely that this remains a point-to-point interconnector, rather than that Iceland is incorporated in a meshed offshore grid. This is because the distance to Iceland is much greater than between the other North Sea coastal states.

mentioned above, international law and EU law are also included in this research; they are treated as far as needed based on the subject matter, and where solutions are formulated with the North Sea area in mind. The recommendations of this dissertation could also be used to a certain extent for the legal framework of offshore electricity grid developments in the Baltic Sea, as this is also a relatively shallow sea with offshore wind developments and where the coastal states have an ambition to increase the interconnection capacity. Nevertheless, it obviously reaches beyond the scope of this dissertation to also examine the national legal systems of the Baltic Sea coastal states in detail.[22]

From a temporal perspective, the starting point of this dissertation is the legal framework applicable as of 2019. However, this dissertation aims to make recommendations on the *future* legal framework that needs to develop in the long term in order to facilitate the development of a MOG. Therefore, the temporal scope of this dissertation reaches out to between 2040 and 2050. This is, on the one hand, quite a long timeframe, but on the other hand, not too far ahead either: developments in the offshore energy sector are planned with a long time horizon, which means that the more complicated grid connections, for which the legal framework needs to be amended, will be constructed from 2030 onwards with the full complexity of the MOG perhaps only reached by 2040-2050. However, at the same time, it is difficult to predict developments too far ahead, as there are too many variables and unknown developments. Therefore, recommendations for a legal framework beyond 2050 will not be made. Hybrid assets can be considered as an intermediate step in this regard: they are already developing,[23] and will continue to do so during the coming decade. In the conclusion of this dissertation, the timeframe for implementing each recommendation (short term or long term) is indicated.

Finally, in terms of subject matter, the scope of the dissertation is offshore electricity infrastructure, developing towards a MOG. Important features of the MOG are that it is located mainly offshore and that it connects offshore generated electricity to the onshore networks of at least two countries. Although the main focus is the electricity transmission infrastructure, the legislative framework for offshore wind farms is also included where relevant, as the grid and the wind farms connected to it depend on each other to a large extent.

1.5 Structure of the Dissertation

The dissertation consists of three parts. Part I analyses the status quo, the current legal frameworks at an international, EU and national level. The second part focuses on how the

[22] Instead, the Baltic InteGrid project provides an excellent overview of the legal framework and legal barriers for an offshore grid in the Baltic Sea: I. Bergmann et al., Establishing a meshed offshore grid: policy and regulatory aspects and barriers. July 2018. See also: C. Bergaentzlé, B. Egelund Olsen, A. Hoffrichter, P. Isojärvi, F. Marco, B. Martin, L.L. Pade and H. Veinla, Paving the way to a meshed offshore grid: Recommendations for an efficient policy and regulatory framework (Baltic Integrid 2019).

[23] The project 'Kriegers Flak Combined Grid Solution' is the first hybrid project. See section 3.5.2 for a description of this project.

new legal framework for offshore electricity infrastructure should be formed, i.e. which legal instruments can be used for this. The third part 'fills in' the legal instruments that are recommended in part II with proposals for concrete measures.

The main research question ('what legal framework should be implemented in order to facilitate the cost-effective development of an offshore electricity grid in the North Sea?') is thus answered through several sub-questions, divided between the three parts. The chapter structure of the dissertation reflects these sub-questions: in each chapter, one sub-question is addressed. The different parts of the dissertation and the chapter structure with the sub-questions are detailed below.

Part I – The Current Legal Framework for Offshore Electricity Infrastructure in the North Sea
A comparative overview of international, European and national law

In the first part, the current legal frameworks on the international, EU and national levels are analysed. The aim of this part is to 'set the scene' for the rest of the dissertation, and to assess what parts of the current legal framework are currently holding back the development of an offshore grid. The sub-questions of this part are:

Chapter 2	What is the legal basis for a legal framework for an offshore grid under international law and what legal barriers at international law level are holding back the development of an offshore grid?
Chapter 3	What is the legal basis for legislation on the North Sea offshore grid under EU law and what legal barriers at EU law level are holding back the development of an offshore grid?
Chapter 4	What are the current legal frameworks applicable in the different North Sea coastal states, namely Belgium, Denmark, France, Germany, the Netherlands, Norway, Sweden and the United Kingdom?

Part II – A New Legal Framework for Offshore Electricity Infrastructure in the North Sea
Proposals for a Multi-level Legal Framework under a Framework Treaty
The second part assesses what legal instruments should be used to address the legal barriers identified in the first part. The choice of legal instruments is an important strategic choice in the legal framework, because each type of legal instrument has its advantages and disadvantages. The sub-questions of this part are:

Chapter 5	How should we decide which level of law and legal instrument is most suitable (based on the principles mentioned below) to address a certain issue? Which instruments should be used for the legal framework for a MOG?
Chapter 6	How could a mixed partial agreement serve as a framework treaty for the North Sea?

The suitability of legal instruments for a certain topic is based on whether they fit within the legal-dogmatic framework, related to, for example, subsidiarity and proportionality, pre-emption of EU law and practical considerations such as whether enforcement of the instrument is important and whether it is important that all North Sea states participate.

In chapter 6, the mixed partial agreement, which is, on the basis of the assessment in chapter 5, proposed as a backbone for the legal framework, is explored in more detail. Examples of how a mixed partial agreement can be used both in the environmental and economic sphere are elaborated upon, and different elements of these agreements are applied to the case of a North Sea MOG.

Part III – Substantiating the Rules: Concrete Proposals for the Development of an Offshore Grid
Analysis of the Efficiency and Effectiveness of Measures to be Adopted to Facilitate the Offshore Grid

In the third part, the legal backbone structure proposed in Part II is 'filled in' with concrete measures. Different alternative concrete measures are weighed against each other and assessed on the basis of a qualitative informal CBA. The sub-questions in this part are:

Chapter 7	Which concrete measures to address the barriers identified in Part I are feasible and lead to the cost-effective development of a MOG in the North Sea?
Chapter 8	What legal framework should be implemented in order to facilitate the cost-effective development of an offshore electricity grid in the North Sea?

In chapter 8, the conclusion, the main research question of this dissertation is answered. This chapter lists the conclusions and recommendations based on the different parts of this dissertation and presents the full picture: the recommendations for a legal framework that facilitates the development of a MOG in the North Sea. Since Part II and III both deliver recommendations on the way in which a legal framework can be developed that facilitates the cost-effective development of an offshore grid, the approach in this concluding chapter is normative. The chapter concludes with a future outlook to possible new developments (such as offshore energy storage and conversion) and with recommendations for further research.

1.6 Methodology

As a preliminary remark, it is important to keep in mind that the legal framework does not stand alone: it is part of a more complex system that also involves other regulatory matters, such as the economic regulation and financing options for an offshore grid, as well as the technical feasibility of different grid options. This unavoidably gives the dissertation an interdisciplinary element, which is visible mostly in parts II and III.

In Part I, the international, EU and national legal frameworks are analysed. The methodology for chapters 2 and 3 is legal-dogmatic research. Legal-dogmatic research asks, "what the law is in a particular area",[24] which in the context of this dissertation is the currently applicable legal framework for offshore wind and offshore grid activities, at an international and EU law level. Chapter 2 and 3 are thus mainly descriptive, although chapter 2 includes a part where the existing law is applied to several elements of an offshore grid, and in both chapters, it is analysed where the current legal framework may cause barriers to the development of a MOG.

Chapter 4 presents a comparative approach of the national legal frameworks. For this chapter, the 'functional method' of comparative law is used.[25] In this case, the substantive law of the eight North Sea states is analysed in relation to the topics that are relevant for the development of the MOG: maritime spatial planning, permitting procedures, connection responsibilities, support schemes, offshore grid operation and decommissioning obligations. How these topics are dealt with in the different legal systems is assessed, and these are compared to each other so as to find out whether they facilitate the development towards a MOG.

In chapter 5, first, several main theories of (political) decision-making are used to explain the development of a legal framework for the offshore grid. Then, on the basis of these decision-making theories and the legal-dogmatic boundaries to certain instruments, a decision tree is developed in order to decide which level of legislation to use in order to address a certain issue in a multi-level context. This method is then applied to the issues identified in the Part I of this dissertation.

Chapter 6 uses a legal-dogmatic approach to the legal instrument 'mixed partial agreement'. This is based on how EU Member-States can engage in agreements with third states on topics for which they have transferred competence to the EU, which is an important topic in EU external relations law. Then, a comparison between different types of mixed partial agreements is made. Finally, an analysis is added of how such an instrument could be used as a framework treaty that serves as a backbone for the legal framework for a meshed offshore grid.

In chapter 7, a qualitative law-and-economics approach is used to evaluate the different alternatives for measures to address the barriers in Part I of the dissertation, and to come to recommendations on which options should be recommended for the legal framework. The instrument used for this assessment is the 'informal qualitative CBA',[26] in which the different alternatives for each policy issue are assessed based on different perspectives, namely the

[24] I .Dobinson, F. Johns, 'Legal Research as Qualitative Research' in M. McConville, WH. Chui (Eds) *Research Methods for Law* (Edinburgh University Press 2017) 18-47, p. 21.
[25] M. Van Hoecke, 'Methodology of Comparative Legal Research', *Law and Method* [2015, December] para 4.1.
[26] A. Sinden, 'Formality and Informality in Cost Benefit Analysis', *Utah Law Review* [2015, 93], 95-171.

economic, legal, political, financial and environmental perspective. Through this normative approach, both the cost-effectiveness and the feasibility of the options are compared.[27] The full methodology for this chapter is described in section 7.2 of this dissertation.

As mentioned in section 1.3, a large part of the research in this dissertation is based on earlier research within the context of Horizon2020 research project PROMOTioN. Within the context of this project, the findings on the legal framework for the MOG have been regularly presented to a large group of stakeholders. The group of stakeholders included representatives from the relevant ministries of the North Sea coastal states, the transmission system operators and national regulatory authorities of these states and representatives of the offshore wind energy industry.[28] In the presentations on the ongoing research, the reactions of the stakeholders, both in the form of questions and in the form of suggestions, were noted and used to improve the research. In order to make sure that the research was not influenced by one group of stakeholders in particular, the research was presented to a large group of stakeholders, at different locations and on different occasions, namely at closed meetings such as the meetings of the North Sea Energy Cooperation (NSEC), in which the European Commission, the relevant ministries, TSOs (Transmission System Operators) and NRAs (National Regulatory Authorities) of the coastal states are represented, and at open meetings such as side events to the WindEurope (Offshore) Wind summits and conferences (2017; 2018; 2019) and at conferences organised by neighbouring projects (Baltic InteGrid; NorthSee; Baltic Lines).[29]

1.7 Introduction to Offshore Transmission Infrastructure

This dissertation focuses on the legal framework for offshore electricity infrastructure. Nevertheless, without an understanding of the technical basis of offshore electricity grids, it is difficult to understand the legal framework. Therefore, in this section, the difference between onshore and offshore grids is explained, different components of offshore electricity transmission infrastructure are introduced, the difference between alternating current (AC) and direct current (DC) technology is explained and different possible scenarios for how the grid could develop are shown.

1.7.1 Differences between Onshore and Offshore Grids

An important first question in the context of this dissertation is whether there is a difference between onshore and offshore grids, and if so, whether this difference justifies a distinction in the legal framework between onshore and offshore grids.

A first main difference is that the onshore electricity grids connect both electricity consumers and electricity producers. As the reliance of electricity consumers on the electricity network is large, high investments are made in the reliability of all elements of the onshore network. In

[27] O.E. Williamson, 'Public and Private Bureaucracies: A Transaction Cost Economics Perspective', *Journal of Law, Economics, & Organization* [1999, Vol. 15, No. 1], 306-342.
[28] S. Menze, A. Wagner, 'Deliverable 7.10 on Stakeholder Interaction', *PROMOTioN* (forthcoming).
[29] A full list of stakeholder interaction moments is available in Menze, Wagner (forthcoming).

other words, the 'Loss of Load Probability' should be as low as possible, as the 'value of lost load' (VoLL), a monetary indicator expressing the costs associated with an interruption of electricity supply,[30] is very high onshore. For the offshore grid, this is different. The main purpose of a MOG is the connection of offshore wind farms to coastal states. With (almost) no load (electricity demand) connected to the offshore HVDC system, the requirements with regard to grid reliability can be lower than for an onshore system to which (household) consumers and critical systems for society, such as the railways and telecommunications system, are connected.

The only two possibilities for offshore electricity *consumption* (load) that are currently being investigated, are offshore oil and gas platforms that could electrify their systems and compressors,[31] and conversion of electricity to another energy carrier, such as hydrogen (H_2) or methane (CH_4).[32] However, platforms will often keep generators as backup electricity supply, and short interruptions of these processes, in the case of an emergency, will not lead to large operational consequences for the platforms. It must be noted, however, that a sudden drop in offshore electricity production can still lead to severe consequences for society,[33] if the onshore grid (including the fast response facilities such as thermal power plants, especially gas-fired power plants) does not have sufficient capacity to react to this drop of production offshore. This requires a high level of coordination between offshore (HVDC) and onshore (AC) electricity system on how outages are treated and on the maximum amount of lost infeed from the offshore grid that the onshore (AC) system is able to handle.

Thus, due to the lower amount of connections and the different nature of the connections, the reliability standards for a MOG can be lower than for an onshore grid - but it must be noted that a MOG must still fulfil certain requirements with regard to grid reliability, as the onshore networks will experience a shortage when the infeed from the offshore grid is suddenly lost, and this may cause problems in the onshore grid.

A second difference between the offshore and onshore grids is that for the onshore grid, there is a market presumption that the grid acts as a copper plate. This means that within a bidding zone, electricity can be transmitted freely from A to B, without any grid constraints.[34] In an

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[30] T. Schröder, W. Kuckshinrichs, 'Value of Lost Load: An Efficient Economic Indicator for Power Supply Security? A Literature Review', *Frontiers in Energy Res*earch [Dec 2015].

[31] They currently mostly use fossil fuels for their systems and compressors. The possibility to connect offshore platforms to an offshore electricity grid is investigated in the research project North Sea Energy System Integration, https://www.north-sea-energy.eu/.

[32] See for example H. Blanco, A. Faaij, 'A review at the role of storage in energy systems with a focus on Power to Gas and long-term storage', *Renewable and Sustainable Energy Reviews* [2018, Volume 81(1)] 1049-1086.

[33] See for an example of what happens when a large power loss occurs the technical report with regard to the outage of a gas fired power plant and an offshore wind farm, which led to a cumulation of different events and eventually to a black-out for more than 1 million people in the UK. National Grid, 'Technical Report on the events of 9 August 2019', 6 September 2019.

[34] In the EU Electricity Market Regulation (Regulation (EU) 2019/943, art. 2(65)), bidding zones are defined as 'the largest geographical area within which market participants are able to exchange energy without capacity allocation'. The delineation of bidding zones is important for the functioning of the electricity market: "An

offshore grid, the capacity is more limited than onshore, which means that more grid constraints exist and that the offshore grid does not work like a copper plate. It must be noted that, in reality, the copper plate presumption does not always work for the onshore grid either, as there may also be grid constraints on the onshore grid. However, these constraints are not the responsibility of the market participants but of the TSO(s). When there are grid constraints in the onshore grid, these grid constraints are addressed by the relevant TSO by means of redispatch,[35] which means that market participants do not have to take into account possible grid constraints, as this is the responsibility of the TSO.

A third difference relates to the historical development of the network. Whereas the onshore electricity grid has developed gradually over the past century, the MOG can be considered as a greenfield network that is planned and developed in a much shorter timeframe.[36] The time pressure for the development of a MOG is also high, since the coastal states' ambitions on the development of offshore wind energy on the North Sea in the context of the energy transition are also high.

Then, the question arises as to whether these differences justify the introduction of a different regulatory treatment for the offshore grid compared to the already existing rules for the onshore grid. There are various arguments for why the differences justify a different legislative and regulatory treatment. First, the risks and responsibilities are different for the offshore grid, due to the fact that there are no (or hardly any) electricity consumers connected to the offshore grid. This justifies different regulatory standards. Secondly, the absence of a 'copper plate' at sea justifies different market rules for the offshore grid. Thirdly, from a technical perspective, some of the operational rules, designed for onshore systems, do not work for subsea systems.[37] Finally, the historical development of the onshore grid was first local, then national and finally cross-border, whereas the development of a MOG in the North Sea is inherently cross-border.[38] This justifies a cross-border approach to the regulatory framework.

A counter-argument against having separate legislative treatment for offshore grids compared to the onshore grid is that it complicates the legal framework for the electricity sector and that it decreases the unity and coherence of the current legal framework. However, this can

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optimal delineation of bidding zones should promote robust price signals for efficient short-term utilisation and long-term development of the power system, whilst at the same time limiting system costs, including balancing costs and redispatch actions undertaken by TSOs." Ofgem, 'Bidding Zones Literature Review, 2014, p. 2.

[35] See https://www.next-kraftwerke.com/knowledge/dispatch for an explanation and visualization of this process.

[36] M. Walser, F. Wagner (UCTE), 'The 50 Year Success Story – Evolution of a European Interconnected Grid', Secretariat of UCTE 2009.

[37] This relates to the technology choice, going from Alternating Current (AC) to High Voltage Direct Current (HVDC). See chapter 1.7.3, 3.4.6 and 7.3.6.

[38] The value added by a *meshed* offshore grid rather than in separate offshore wind connections lies in the ability to connect multiple countries. This is why an offshore grid in the North Sea is inherently cross-border. In the U.S.A., there are plans to construct an 'offshore backbone' along the East Coast, which connects OWFs and which fortifies the onshore grid. In that specific situation, there is no cross-border aspect as the entire grid would be located off the coast of the U.S.A. without connections to other states. However, in the North Sea, this is not the case and the MOG will be inherently cross-border.

be mitigated as most of the electricity sector's legal framework, and the principles on which it is based, can be preserved and used for the offshore grid as well, except for the specific issues mentioned above. In the author's opinion, this counter-argument is not strong enough to offset the arguments for why separate rules for the offshore grid are justified, which is why a separate legal framework for the offshore grid is investigated in this dissertation.

1.7.2 Offshore Grid Components

The different components of a typical offshore wind farm with connection to the onshore grid are as follows. An offshore wind farm consists of many individual wind turbines, which consist of a foundation and a turbine. The foundation can be a 'monopile', a jacket, tripod or a floating foundation – in the North Sea, the monopile is used most frequently.[39]

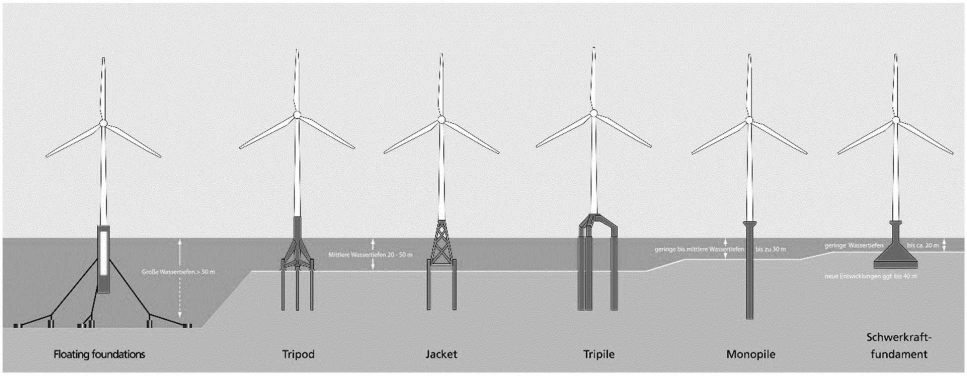

Image 1: Wind Turbine Foundations. Source: Stiftung OFFSHORE-WINDENERGIE

Different turbines inside an OWF are linked together by submarine cables. These cables are usually called 'inter-array cables.'[40] These cables collect the electricity and lead it to a converter station, a technical installation where the voltage is increased.[41] This is necessary for transmission over longer distances, because the higher the voltage, the lower the losses of energy during transmission. Moreover, the electronic equipment of a converter station can filter out voltage fluctuations of the wind farm. In this way, it delivers a more constant output of electricity.

From the converter station, long transmission cables lead to the nearest onshore connection point. Here, again, a converter station is placed, in order to convert the electricity to the right

[39] WindEurope, 'Key Trends and Statistics 2018', p. 29.
[40] In this context, the word 'array' refers to the ordered series/arrangement of wind turbines. 'Array' (noun) in Oxford Dictionary, second meaning 'an ordered series or arrangement'. Examples of usage of 'inter-array cable(s)' in practice: http://www.nordseeone.com/engineering-construction/inter-array-cable.html, https://www.prysmiangroup.com/en/products-and-solutions/power-grids/offhsore-wind-farm/inter-array-cable-systems.
[41] There is one exception to this, and that is small near-coast OWFs, such as the OWFs developed in the early development stages of offshore wind. Nearshore OWFs generally do not have an offshore converter station but rather have cables leading directly to the shore, with a converter station onshore. As the public opinion about OWFs close to shore is generally negative, this situation does not occur often any more.

quality to be connected to the onshore electricity grid. In a radial connection,[42] as in the image below, the cable to the shore is called an 'export cable'. Below, a schematic overview of the radial connection of an OWF is given, with wind turbines, an offshore converter station, inter-array cables between the turbines and the converter station and an export cable between the offshore converter station and the onshore grid.

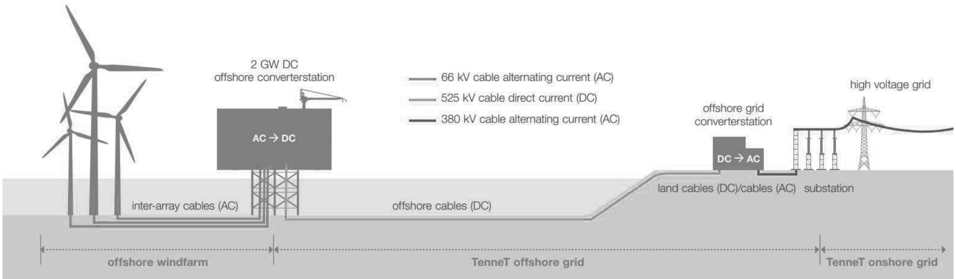

Image 2: Radial Connection of Offshore Wind Farm. Source: TenneT

For a meshed offshore grid, roughly the same components will be needed as for a radial connection: an offshore grid connects multiple offshore wind farms, via multiple converters, to at least two coastal states. Therefore, the electricity can flow in at least two directions (or more, if more states are connected). The cables in a *meshed* offshore grid are not considered 'export cables' any more, as the cables are used for different electricity flows as well, and not solely for the 'export' of the electricity of the OWF.[43] How they are named instead is still subject to discussion – it depends on the function and the complexity of the grid. In this dissertation, the cables in a connection between at least one OWF and at least two coastal states are called 'hybrid assets', as they serve the dual purpose of connecting OWFs and interconnection. This type of cable is also called a 'Windconnector',[44] or a 'Combined Grid Solution'.[45] For more complicated grid connections,[46] no specific names have been developed for specific cables. The general name 'meshed offshore grid' (MOG) can be used for all cables and other grid assets, such as converter stations, that together form such a grid.

1.7.3 AC or DC Technology

The goal of transmission grids is to transport electricity over long distances. Electricity transport can take place with two types of current, namely alternating and direct current.

[42] In a radial connection, an OWF is connected by a single connection directly to the onshore grid. The cable can only be used by the OWF as there no other entities connected to the cable.
[43] As an exception, it must be noted that in the Netherlands, the radial connections to the OWFs are considered part of the "offshore grid". However, as there is only one direction of the electricity, from the OWFs towards the onshore grid, and no connections between different OWFs, this is different than a *meshed* offshore grid. The cables part of the Dutch "offshore grid" are thus still considered 'export cables'.
[44] See for example: https://www.tennet.eu/news/detail/study-suggests-a-windconnector-linking-dutch-and-gb-electricity-markets-and-offshore-wind-farms-coul/.
[45] By Energinet and 50Hertz, for the project Kriegers Flak Combined Grid Solution. See section 3.5.2 below.
[46] See section 1.7.4 below for an explanation of possible offshore grid development scenarios.

Alternating current (AC) has a continually changing voltage and direction of the current. The onshore electricity grids throughout Europe change the direction of the current 50 times per second; a stable frequency of 50 Hertz. If the frequency deviates substantially from 50 Hertz, this may lead to serious issues and eventually blackouts.[47]

With direct current (DC), the electricity current keeps the same direction and the voltage also stays the same. DC is used in appliances with batteries and most electronic circuits (via an adapter). In addition, DC can also be used for long-distance bulk transmission of energy: over long distances, high voltage direct current (HVDC) have lower electricity losses than high voltage AC current.[48] Therefore, for offshore cables from approx. 40-100 km onwards, it is more efficient to use HVDC.[49] Another reason to use HVDC current for an offshore grid in the North Sea is that the various AC transmission grids around the North Sea are not synchronous with each other.[50] With DC, asynchronous zones can be connected to each other.

1.7.4 Grid Development Scenarios

An offshore electricity grid in the North Sea can be designed in different ways, for example through a hub-based approach or a decentralised approach.[51] These different ways are analysed in various studies in order to find the most cost-effective grid design.[52] It is clear that such a grid will not be constructed overnight, but that this is a long process in which different connections are added at different moments.[53] This makes it difficult to predict which scenario resembles most closely the way in which the grid is going to be developed. The legislative

[47] See for example National Grid, 'Technical Report on the events of 9 August 2019', 6 September 2019.
[48] M.M. Roggenkamp, R.L. Hendriks, B.C. Ummels, W.L. Kling, 'Market and regulatory aspects of trans-national offshore electricity networks for wind power interconnection' *Wind Energy* [2010 vol. 13], p. 484.
[49] D. van Hertem, 'Drivers for the Development of HVDC Grids', in D. van Hertem, O. Gomis-Bellmunt, J. Liang, *HVDC Grids* (Wiley/IEEE Press 2016) p. 19.
[50] There are three synchronous zones around the North Sea: Continental Europe; Nordic and United Kingdom. HVDC cables link these zones to each other.
[51] In a hub-based approach, several OWFs are connected to a 'hub'. The second step is that different hubs are connected to each other and to several coastal states. A decentralised approach connects OWFs directly to each other and to several coastal chains. A decentralised approach is more logical in the case of a "chain" of OWFs between two coastal states, whereas the hub-based approach is more logical when OWFs are located in circles around central converter stations. See image 3.
[52] In the PROMOTioN project, these development scenarios are referred to as 'topologies'. Topology is defined as 'the way in which constituent parts are interrelated or arranged' in the Oxford Dictionary. For the offshore grid, it refers to the way in which wind farms and converter stations are linked to each other and to the onshore grids of the coastal states. In earlier studies, the different ways in which the grid could develop have simply been called 'scenarios', but this term may lead to confusion as there are also other types of scenarios, such as ENTSO-E scenarios of the development of load and generation that are used as input for grid modelling. In this dissertation, the different ways an offshore grid could develop are referred to as 'offshore grid development scenarios'.
[53] Müller 2016, p. 327.

framework for an offshore grid should be adaptable to different offshore grid development scenarios. This makes it robust for future grid developments.

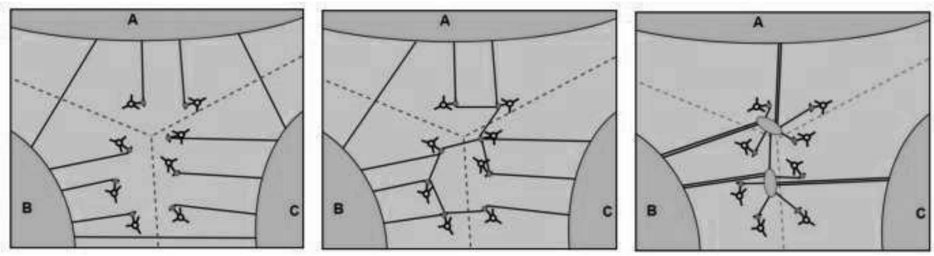

Image 3: Offshore grid development scenarios. Source: J. van Uden (TenneT)

In image 3 above, different offshore grid development scenarios used in the PROMOTiON project are shown.[54] The left image is the 'business-as-usual' scenario in which OWFs are connected radially and separate interconnectors exist to connect coastal states and to exchange electricity. The middle image is a decentralised approach in which meshes (additional connections) are created between OWFs that are close to each other within the same coastal state's Exclusive Economic Zone (EEZ),[55] and with some additional cross-border links. The image on the right shows a hub-based approach (in which two artificial islands are visible), which involves OWFs that are connected to 'hubs' that are then connected to each other. Which of these scenarios resembles the actual development of the MOG depends on many factors, including technological and economic factors but also the legal and regulatory framework in which the grid is developed. It must be noted that these three scenarios should be considered as extremes; the actual development of the grid may also lie between different scenarios.

1.8 Design Principles for a Legal Framework

Section 1.7 makes clear that there are various technical aspects to take into account, even in a dissertation that is written from a legal and regulatory perspective. These technical aspects can be translated into an important design principle for the legal framework. As the exact technical characteristics of the offshore grid are not yet known, because the underlying technologies are still developing and as the grid could still develop towards different offshore grid development scenarios, it is important that the legal framework for offshore electricity infrastructure is able to cope with uncertainty around the abovementioned issues and around other, currently still unknown, future developments. By taking uncertainty into account, the proposed new legal framework will not be outdated by the time it is implemented. This

[54] Earlier research projects have similar scenarios (radial; meshed; hub-based). See for example S. Cole, P. Martinot, S. Rapoport (Tractebel Engineering), G. Papaefthymiou (ECOFYS) V. Gori (PwC), 'Study of the Benefits of a Meshed Offshore Grid in Northern Seas Region', July 2014, p. 52 and further; NSCOGI, Working Group 2 Market and Regulatory Issues, 'Integrated Offshore Networks and the Electricity Target Model*,* Final Report' 2014, p. 2.

[55] See chapter 2.2.1 for an explanation of the different maritime zones.

increases the value of the recommendations for the legal framework, as they will keep their relevance for a longer period.

Another important design principle is that the legal framework needs to take into account the multi-level and multi-actor character of the topic of offshore electricity grids. As will be shown in the following chapters, the legal framework for offshore electricity infrastructure has several layers, as it is affected by international law, EU law and national law (which is sometimes even divided again between national and sub-national level). Moreover, what makes the legal framework for offshore electricity infrastructure very interesting, is the many different actors and interests that exist in this sector. This creates several tensions that are reflected in the current legal framework.

For example, there is a tension between governments, regulated network operators and market-based OWF owners on the question of which entity should be responsible for which part of the grid, and how responsibilities should be rewarded via grid tariffs, taxes or electricity prices. This tension leads to a different balance and division of responsibilities in different North Sea coastal states. This is reflected in the currently divergent national legal frameworks on the connection responsibility for OWFs. Also, there is a tension between focusing on short term developments (reaching for the low-hanging fruits first) versus focusing on what will be needed in order to reach the targets set for 2050. Finally, there is a tension between the environmental interest of adhering to the greenhouse gas reductions laid down in the Paris Agreement,[56] which requires large scale OWFs and a correspondingly large offshore electricity grid, and the protection of the maritime environment in general and certain species affected by the construction or operation of OWFs. This tension is reflected in (maritime) spatial planning law and the procedures for permitting and licensing. These tensions, the actors and interests behind the tensions, and the inevitable complexity of multi-level legislation, should be taken into account in the design of a future legal framework for the MOG.

Throughout this dissertation, these design principles are reflected. The multiple layers come back in chapters 2, 3 and 4. The different actors and the decision-making needed for this are explained in chapter 5, and the uncertainty surrounding the future offshore grid development scenarios and technologies is reflected in the many choices presented in chapter 7. In chapter 8, both design principles are reflected in the recommendations for a future legal framework for a MOG.

[56] Paris Agreement, Paris, 12 December 2015, U.N.T.S. I-54113, art. 2.

PART I

Current Legal Framework for Offshore Electricity Infrastructure in the North Sea

A comparative overview of international, European and national law

2

CHAPTER 2

Offshore Electricity Infrastructure under International Law

2 Offshore Electricity Infrastructure under International Law

When discussing the legal aspects of the construction and operation of an electricity grid, one needs to distinguish between onshore and offshore grids. States' competences to make rules and to enforce them onshore differ from offshore. Onshore, the competence to make rules and to enforce them derives from the territorial jurisdiction, which entails that states have the competence to rule over all activities that take place on their territory.[57] However, for offshore activities, the competence to make rules and enforce them is based on the law of the sea and depends on the location and the nature of the activity that needs to be regulated. The question therefore arises, to what extent do the North Sea coastal states have the competence to regulate different components of an offshore grid? It is essential to investigate to what extent states have this competence, as it determines whether they can declare their laws applicable to an offshore grid. Moreover, as will be explained in more detail in the next chapter, the applicability of EU law on the grid also depends on whether states themselves have competence to regulate the grid.

In this chapter, the question of legislative competence of coastal states will be answered on the basis of the applicable law of the sea. An important source of law of the sea is the United Nations Convention on the Law of the Sea (UNCLOS).[58] The development of UNCLOS will be addressed below. This convention distinguishes between different maritime zones, which will be treated afterwards. Then, the provisions of UNCLOS regarding competence in the different maritime zones will be applied to the different components of an offshore grid. In this chapter, it becomes clear that legal uncertainty over the extent of competence persists, especially in the case of a more complex offshore grid. Therefore, different strategies to mitigate this legal uncertainty will be discussed. The chapter ends by answering the research question: What is the legal basis for a legal framework for an offshore grid under international law and what legal barriers at an international law level are holding back the development of an offshore grid?

2.1 History of the United Nations Convention on the Law of the Sea

The rules on jurisdiction over different activities at sea can be found in the law of the sea. The history of the law of the sea goes back many centuries. It was most famously advanced by Hugo Grotius who elaborated the doctrine of *mare liberum.* Under this doctrine, the seas could not be claimed by one nation but instead were accessible to all nations.[59] As international law of the sea developed, one clear exception to the freedom of the seas was a zone close to the shore which was treated as part of the coastal state's territory, stretching as far as the coastal state could defend itself, which was, based on the military technology of a few hundred years ago, only a limited number of nautical miles.[60]

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[57] M.N. Shaw, *International Law* (Cambridge University Press, 2008, sixth edition), p. 490.

[58] Third United Nations Conference on the Law of the Sea: United Nations Convention of the Law of the Sea, Montego Bay, 1982, U.N.T.S I-31363 (hereinafter: UNCLOS).

[59] H. Grotius, *Mare Liberum* (Elzevier, 1609); Shaw 2008*,* p. 553-554.

[60] Shaw 2008, p. 554.

In the 20th century, as nautical defence technologies developed and the interest in the natural resources in the sea and seabed rapidly increased,[61] the legal regime applicable to activities in the sea has developed in parallel.[62] In 1958, this led to a series of conventions which aimed at codifying the then applicable customary international law relating to the sea.[63] Soon after, the concept of exclusive economic rights was developed when states unilaterally started claiming such rights.[64] After several failed attempts to codify the concept of exclusive rights, the third Law of the Sea Conference, which held 11 sessions between 1973 and 1982, produced the 'United Nations Convention on the Law of the Sea' (UNCLOS). This convention repeated many rules from earlier legal documents, but also included new provisions, for example with regard to the Exclusive Economic Zone (EEZ).[65] UNCLOS entered into force in 1994 and is signed and ratified by most states in the world, including the coastal states of the North Sea, as well as by the EU, via its predecessor, the European Economic Community (EEC).[66]

2.2 Substantive Law under UNCLOS relevant to an Offshore Grid

2.2.1 Competences of Coastal States in Different Maritime Zones

UNCLOS defines several different maritime zones and stipulates which rights coastal States and other states have in these zones. These will be explained below, starting with the zone closest to the shore, the territorial zone.

2.2.1.1 Territorial Zone

The first zone as seen from the coast is the territorial zone. It extends to 12 nautical miles (22.2 kilometres) from the low water baseline.[67] The seabed and the subsoil are also part of this zone.[68] The territorial zone is considered an extension of the land territory. Thus, the full territorial sovereignty that states have on their land territory is extended to the territorial waters as well.[69] Therefore, in principle, national laws can also apply to this zone. The coastal state has the competence to regulate all activities that take place in this zone.

[61] Ibid.
[62] A. Oude Elferink, 'Artificial Islands, Installations and Structures', *Max Planck Encyclopedia of International Law* (2013), para 8.
[63] First United Nations Conference on the Law of the Sea: Convention on the Territorial Sea and the Contiguous Zone, Convention on the High Seas, Convention on Fishing and Conservation of the Living Resources of the High Seas and the Convention on the Continental Shelf, Geneva, 1958. Except for the Convention on the High Seas, which was circumscribed as being 'generally declaratory of established principles of international law', these conventions contained both codification of existing rules and new rules. M.N. Shaw, *International Law,* p. 555.
[64] W.C. Extavour, *The Exclusive Economic Zone* (Institut universitaire de hautes études internationales, 1979), p. 171. The concept was introduced, albeit indirectly, at the Second Law of the Sea Conference in 1960.
[65] UNCLOS Part V.
[66] United Nations Division for Ocean Affairs and the Law of the Sea: http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm.
[67] UNCLOS, art. 3. For a definition, see: G. K. Walker (Ed.), *Definitions for the Law of the Sea: Terms Not Defined by the 1982 Convention* (Martinus Nijhoff Publishers, 2012), p. 239.
[68] UNCLOS, art. 2 (2).
[69] UNCLOS, art. 2 (1), although there is a limitation in art. 2(3): the sovereignty over this zone is exercised subject to this Convention and to other rules of international law.

One important limitation to the coastal state's sovereignty is the right of innocent passage, which is part of the freedom of navigation. A coastal state cannot construct obstacles in such a way that it hampers the other states' innocent passage. However, coastal states may regulate innocent passage of ships for (amongst others) the protection of cables and pipelines.[70] This is done, for example, by having shipping lanes in place to guide the main shipping traffic. It is important to note that the laying of cables or pipelines by other states is *not* an activity of innocent passage. Therefore, as soon as any cable enters the territorial zone of a coastal state, it falls under the coastal state's jurisdiction.

2.2.1.2 Continental Shelf

The next zone described in UNCLOS is the continental shelf. The continental shelf is defined as the seabed and subsoil beyond the territorial zone that can nonetheless be considered a 'natural prolongation of [the state's] land territory'.[71] The continental shelf is mostly relevant for the extraction of resources in the seabed or subsoil, such as oil and gas. Coastal states have 'sovereign rights' over these resources,[72] as far as that does not limit the rights of all other states, such as the freedom of navigation.[73]

It is important to note that 'sovereign rights', as a concept, differs from 'sovereignty'. Sovereignty in the law of the sea is related only to the territorial sea, it "implies that the territorial sea is the extension of the continental territory."[74] 'Sovereign rights' relate to both the continental shelf and to the Exclusive Economic Zone and entail a right to the exploration and exploitation of the natural resources and living resources, such as fish stocks, located there.[75] The difference is that sovereign rights give states jurisdiction only over the activities related to the economic exploration and exploitation of the natural resources, and not to all other activities. States also enjoy jurisdiction in this area, although this jurisdiction is not full jurisdiction, as onshore, but jurisdiction limited to the exploration and exploitation of resources. Therefore, this type of jurisdiction is often called 'functional jurisdiction'.[76]

In the continental shelf, states enjoy both sovereign rights and functional jurisdiction.[77] However, it is important to understand the difference between these two concepts. In the literature, it is argued that sovereign rights, although less than full sovereignty, supersede jurisdictional claims of other states since they are considered to be *exclusive* rights, whereas claims of jurisdiction are on the basis of equality.[78] Thus, claims of jurisdiction may be

[70] UNCLOS, art. 21 (1) c.
[71] UNCLOS, art. 76.
[72] UNCLOS, art. 77 (1).
[73] UNCLOS, art. 78 (2); Müller 2016, p. 30.
[74] Extavour 1979, pp. 22 and 221.
[75] Ibid.
[76] Müller 2016, p. 33.
[77] UNCLOS, art. 56(1)a and (1)b; Müller 2016, p. 33.
[78] Ibid., p. 33. M. Gavouneli, *Functional Jurisdiction in the Law of the Sea* (Brill 2007) p. 64.

concurrent with other states' claims of jurisdiction to the same object or activity,[79] whereas this is not possible with exclusive rights, as they are exclusive to one state.[80]

The continental shelf zone is delimited either by the geographical end of the shelf or to 200 nautical miles from the shore, if the outer edge of the continental shelf does not extend to that distance.[81] However, the North Sea lies on one geographical continental shelf, which is why the area is divided according to delimitations based on bilateral treaties between the coastal states.[82]

2.2.1.3 Exclusive Economic Zone

The Exclusive Economic Zone (EEZ) is a development in the law of the sea that was officially introduced by UNCLOS in 1982.[83] As codified in UNCLOS art. 55 and 57, coastal states may declare an Exclusive Economic Zone (EEZ) in the maritime area stretching up to 200 nautical miles from their coastline. This zone does not exist automatically; it has to be actively claimed by the coastal state. The states within the North Sea area all claimed an EEZ.[84] Claiming an Exclusive Economic Zone gives coastal states the right to exclusive economic exploration and exploitation of the natural resources in the waters, seabed and subsoil of that area.[85]

As with the continental shelf, claiming an EEZ does not lead to full sovereignty over this area but only to functional jurisdiction over the activities related to economic exploration and exploitation of the natural resources. Thus, to mention an example from (EU) case law, a coastal state will be able to regulate fisheries in the EEZ but cannot impose Value Added Tax (VAT) on (telecommunication) cables that are not related to economic exploitation of that zone.[86] In UNCLOS, the production of energy from the waves, currents and winds is explicitly mentioned as falling under economic exploration and exploitation.[87] Moreover, states are allowed to construct artificial islands, installations and structures for the purpose of activities of economic exploration and exploitation and other economic purposes.[88] This article is applicable to the continental shelf as well.[89] It must be noted that the right to construct

[79] Müller (2016), p. 33-34.
[80] It must be noted that states may still have competing claims of jurisdiction over certain areas, especially where it concerns areas with natural resources in the sea bottom. In that case, states may still be convinced that they have exclusive rights to the resources in that area.
[81] UNCLOS, art. 76 (1).
[82] The delimitation of the continental shelf in the North Sea between the Netherlands, (Federal Republic of) Germany and Denmark gave rise to proceedings before the International Court of Justice, concerning the delimitation method to be used. International Court of Justice, *North Sea Continental Shelf Cases,* 1969 ICJ Reports 3.
[83] Although the idea of exclusive rights in a certain area was already developed earlier. See *supra* footnote 64.
[84] M. Lando, *Maritime Delimitation as a Judicial Process* (Cambridge University Press, 2019), Appendix I contains a list of all EEZ declarations and the national acts they are based on (as of 2019).
[85] UNCLOS, art. 56 (1) a, art. 57.
[86] CJEU, Case C-111/05 *Aktiebolaget v. Skatteverket*, [2007] ECR I-2697, para 43.
[87] UNCLOS, art. 56(1)a and (1)b.
[88] Ibid., art. 56(1)b(i) and 60.
[89] Ibid., art. 80

installations and structures in the EEZ and on the continental shelf comes with the obligation to remove these installations and structures after use.[90]

2.2.1.4 The High Seas

All waters beyond the territorial zone and, when a state has declared it, beyond the EEZ are part of the high seas.[91] As the North Sea is divided into territorial waters and EEZs of the coastal states, there is no high seas area in the North Sea.[92] However, it must be noted that the freedoms of the high seas, namely the freedoms of navigation, overflight, construction of cables, pipelines and artificial islands, fisheries and scientific research,[93] are also (partially) applicable in other maritime zones. As this dissertation focuses on the construction of a MOG, the freedom to lay submarine cables and pipelines is elaborated upon in more detail below.

2.2.2 Freedom to Lay Submarine Cables and Pipelines

Next to the rights of coastal states, based on the maritime zones explained above, there are also general rights applicable to all states. Although limited by the territorial waters and the sovereign rights states enjoy in the EEZ, the principle of *mare liberum,* literally translated as ‘the free sea’, spans across different zones. This freedom of the sea includes the freedom of navigation and overflight, but also the freedom to lay submarine cables and pipelines.[94]

Under UNCLOS, all states are entitled to lay submarine cables and pipelines in the area beyond the territorial zones of coastal states, although this right is not unconditional but designed in such a way that other states’ rights are also preserved.[95] Thus, the freedom to lay cables and pipelines is limited as follows: on the high seas, states only have to take into account that they should not damage already existing cables or pipelines.[96] For the continental shelf, UNCLOS has dedicated a specific article to the laying of submarine cables and pipelines: the coastal state has to accept the laying of cables and pipelines, or, in other words: “the coastal State may not impede the laying or maintenance of such cables or pipelines”.[97] However, the coastal state retains the right “to take reasonable measures for the exploration of the continental shelf, the exploitation of its natural resources and the prevention, reduction and control of pollution from pipelines.”[98] What is meant by ‘reasonable measures’ in this context remains unclear from the text of UNCLOS, although some states are criticised in literature for taking measures that cannot be considered reasonable.[99]

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[90] Ibid., art. 60(3).
[91] Ibid., art. 86.
[92] The closest areas of high seas to Europe are the Arctic Sea and the middle part of the Atlantic Ocean. Therefore, the provisions in UNCLOS regarding the high seas will not be elaborated upon further in this dissertation.
[93] UNCLOS art. 87.
[94] C. Redgwell, ‘International Regulation of Energy Activities’ in M. Roggenkamp, C. Redgwell, A. Ronne and I. del Guayo (Eds), *Energy Law in Europe*, Oxford University Press 2016, 3rd Edition, p. 67.
[95] UNCLOS, art. 79 (1), see also art. 87 (1) c.
[96] UNCLOS, art. 87(1)c and (2).
[97] UNCLOS, art. 79 (2).
[98] UNCLOS, art. 79(2).
[99] R. Beckman, T. Davenport, ‘The EEZ Regime: Reflections after 30 years’ *LOSI Conference Papers* 2012, p. 23.

Interestingly, a difference between cables and pipelines exists with regard to consent for the delineation of the object.[100] According to UNCLOS art. 79(3), the delineation of submarine *pipelines* is subject to consent from the coastal state, whereas submarine *cables* are not mentioned in this clause. This difference can be explained by cables being “relatively benign” to the maritime environment, whereas pipelines may carry substances that can cause severe pollution.[101]

The freedom to lay cables and pipelines exists on the high seas and in the continental shelf area. For the territorial waters, there is no such freedom. Thus, coastal states have jurisdiction over cables constructed in their territorial waters.

2.2.3 Environmental Protection

UNCLOS does not only create rights for states, but also duties. Under UNCLOS, states have a duty to protect the environment.[102] This is irrespective of the maritime zones and whether the state in question is a coastal state or a third state in the particular area. It entails duties for states to prevent and control pollution, to protect and preserve rare or fragile ecosystems and habitats, to prevent damage by pollution from other states.[103] UNCLOS creates a legal framework for the monitoring, enforcement and safeguards of this duty as well.[104] Additionally, UNCLOS refers to other conventions for the protection and preservation of the maritime environment, concluded both before and after UNCLOS itself.[105]

In this regard, the states around the North Sea are all parties to one of the most important conventions of the International Maritime Organisation (IMO) in the context of environmental protection, the International Convention for the Prevention of Pollution from Ships (MARPOL).[106] Moreover, the North Sea coastal states are also all part of the Convention for the Protection of the Marine Environment in the North-East Atlantic (OSPAR), [107] which is also applicable to the North Sea.[108] The provisions of MARPOL and various guidelines of OSPAR are relevant for the construction and the operation of the offshore grid, and the IMO and OSPAR have created guidelines on the decommissioning or abandonment of installations and structures, which are also relevant for offshore grid converter stations.[109]

[100] Beckman, Davenport 2012, p. 22.
[101] Beckman, Davenport 2012, p. 22.
[102] UNCLOS, art. 192.
[103] Redgwell 2016, p. 68.
[104] UNCLOS, Part XII, sections 4, 6 and 7.
[105] UNCLOS, art. 237.
[106] Convention on the Prevention of Maritime Pollution, London, 2 November 1973.
[107] Convention for the Protection of the Marine Environment in the North-East Atlantic, Paris, 22 September 1992 (hereinafter: OSPAR)
[108] OSPAR, art. 1(a).
[109] Redgwell 2016, p. 68-69 and 77; For example the non-binding IMO Resolution A.672 (16) ‘Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone’ (1989) and OSPAR Annex III art. 5. See section 2.3.1.5.

2.3 UNCLOS applied to an Offshore Grid

The relevance and effects of the law of the sea to an offshore grid are best explained when applied to the future components of an offshore grid and to possible practical cable configurations. UNCLOS does not mention these different components. It only mentions 'cables and pipelines', 'artificial islands' and 'installations and structures'. However, UNCLOS does differentiate on the basis of the function of the asset, namely whether or not the asset is used for the exploitation of natural resources (in the EEZ).

This section (2.3) is divided in three parts. The first part treats offshore electricity generation, with a focus on offshore wind farms, converter stations and 'hubs', groups of offshore wind farms connected to the same converter station. The second part focuses on the submarine cable, which can be subdivided into inter-array cables, export cables and interconnector cables.[110] It is important to differentiate these cables on the basis of their function, as this changes the legal regime applicable under UNCLOS. The third part focuses on new developments. For example, with recent technological progress, it becomes possible to combine different cable functions to create so-called 'hybrid cable infrastructure'.[111] Hybrid assets give rise to various questions concerning the law of the sea, which will be examined extensively below. Hybrid assets are said to be the first building blocks of a meshed offshore electricity grid in the North Sea.[112] A meshed offshore grid will entail connections with offshore windfarms as well as with several coastal states, although the exact configuration is not yet known. Therefore, the legal status of an offshore grid under UNCLOS is also explored. Finally, in some scenarios of development of the offshore grid, artificial islands are mentioned as a place to locate key components of the offshore grid, such as large converters or even power-to-gas facilities. Therefore, the rights and duties of coastal states towards artificial islands are also analysed.

2.3.1 Offshore Electricity Generation

2.3.1.1 Offshore Wind Farms

A first component that should be treated in the context of the offshore grid is the offshore windfarm, as one of the main reasons to construct an offshore grid is to connect offshore windfarms. Other sources of offshore generated renewable energy, such as wave and tidal energy, are subject to the same regime, as they are also forms of exploitation of the energy generated by the 'water, currents and winds' and they could also be connected to a MOG. However, as offshore wind energy has the greatest potential in the North Sea,[113] and offshore wind is currently used much more than tidal and wave energy in the North Sea, this dissertation will refer only to offshore wind farms.

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[110] The legal differences between these different cables will be explained below, in 2.3.2. The technical differences are explained above, in chapter 1.7.
[111] 3E, DWG, DNV GL, ECN, CEPS, 'NorthSeaGrid, Final Report' (2015), p. 59. NSCOGI, Working Group 2 Market and Regulatory Issues, 'Integrated Offshore Networks and the Electricity Target Model*,* Final Report' 2014, p. 3.
[112] O. Woolley, 'Governing the North Sea Grid – the need for a regional framework treaty', *Competition and Regulation in Network Industries* [2013, 14], p. 75.
[113] WindEurope, 'Key Trends and Statistics 2016', p. 24. Compare with: H. Sorensen, J. Fernandez Chozas, 'The Potential for Wave Energy in the North Sea'*,* 3rd International Conference on Ocean Energy, p. 5.

Under UNCLOS, producing renewable energy at sea is considered an activity of exploitation of the natural resources in the EEZ.[114] Therefore, the coastal state has sovereign (exclusive) rights over this activity.[115] In a coastal state's exercise of these rights, it can be concluded that offshore windfarms fall under the regime of functional jurisdiction, allowing states to regulate the production of electricity from offshore windfarms.[116]

In the exercise of their sovereign rights, states are limited by the boundaries of UNCLOS. They "shall have due regard to the rights and duties of other states" and "shall act in a manner compatible with the provisions of this convention".[117] Therefore, although states are allowed to construct offshore windfarms as they wish, there should still be sufficient room for other activities, such as the free navigation of ships or the laying of cables.[118]

In art. 60(1)b, UNCLOS gives coastal states the right to construct, and to authorise and regulate the construction, operation and use of, amongst other things, "installations and structures for the purposes provided for in article 56 and other economic purposes". Although the terms 'installation' and 'structure' are not defined in UNCLOS,[119] it is clear that a broad range of different edifices is targeted under this article. As wind turbines are used for the purposes provided for in article 56, it is consistent with the structure of UNCLOS that wind turbines therefore also fall under art. 60(1)b.

Article 60 also sets out the rights and obligations of coastal states with regard to, amongst others, installations and structures. Coastal states have to ensure that the position of the installation is properly indicated, as "permanent means for giving warning of their presence must be maintained".[120] It is also necessary that other states and other users of the sea are aware of the construction of artificial islands, installations and structures. Therefore, UNCLOS requires that coastal states give due notice of the construction thereof.[121] Coastal states are also obliged to remove the installations when they are not used any more.[122] Coastal states may establish a 'reasonable' safety zone, which should generally not be more than 500 metres around the installation or structure.[123] This is to ensure the safety of both vessels navigating

[114] In this case, the natural resource at stake could be the water, currents and winds. UNCLOS, art. 65(1)a.
[115] Müller 2016, p. 33.
[116] Ibid., p. 37.
[117] Müller 2016, p. 32, UNCLOS, art. 56(2).
[118] Müller 2016, p. 30. UNCLOS, art. 78(2).
[119] G. Walker *Definitions for the Law of the Sea, Terms Not Defined by the 1982 Convention* (Martinus Nijhoff, 2012) gives some guidance on the definition of 'installations', placing them in the same category as artificial islands, as "(…) a human-made edifice (…) which is usually employed to explore or exploit marine resources." p. 104. Interestingly, "structures" are not even addressed in this book that aims to address terms not defined in UNCLOS. It therefore remains a guess, what exactly is meant by 'structures'. See also A. Oude Elferink 2013, para 1-7.
[120] UNCLOS, art. 60(3).
[121] Ibid.
[122] Ibid.
[123] UNCLOS, art. 60(4) and (5). The safety zone may only extend beyond 500 metres if authorized by generally accepted international standards or if recommended by the competent international organization, the IMO.

the area and of the installations and structures themselves. The addition of *reasonable* is to ensure that a balance is struck between the rights of the coastal state and the rights of other users of the sea, specifically with regards to the freedom of navigation. With regard to this balance, UNCLOS makes clear that the construction of artificial islands, installations and structures in internationally recognised sea lanes and areas where interference with international navigation may be expected, is not permitted.[124] In these areas, the impact on the freedom of navigation is disproportionate, and sufficient sea space remains to construct converter stations in other areas.

2.3.1.2 Fixed or Floating Wind Turbines

Currently, offshore windfarms are mostly constructed as fixed structures, with foundations that are drilled deep into the seabed.[125] However, in deeper waters, or waters with a rocky sea bottom, drilling foundations into the seabed is more difficult. Therefore, states are also experimenting with floating offshore windfarms.[126] It may be questioned whether these floating installations or structures fall under the same regime as fixed installations or structures, or whether there are different rules applicable. A parallel can be drawn here with the legal situation of ships and floating oil or gas production platforms.[127]

A main question in this regard is whether floating wind turbines should be categorised as ‘ships’ or as ‘installations’. In international law, the definition of ‘ship’ depends on the instrument, and more specifically on the purpose of the instrument. For example, in the International Convention for the Prevention of Pollution of the Sea by Oil, the term ship is defined as any seagoing vessel, which is a very broad definition which would also include any floating device.[128] This is in line with the goal of the Convention, namely to prevent pollution from any seagoing device. However, in the 1920 ILO Convention Concerning Unemployment Indemnity in Case of Loss or Foundering of the Ship,[129] the term is limited to vessels used for maritime navigation, which would exclude floating wind turbines. This is because this Convention is specifically aimed at people employed on ships used for navigation. Thus, it depends on the context of the legal instrument, how the term ‘ship’ is defined.

As there is no definition of ‘ship’ in UNCLOS nor a general understanding in various instruments that are part of the body of law of the sea, one could look at whether the general

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[124] UNCLOS, art. 60(7).

[125] WindEurope, ‘Key Trends and Statistics 2016’, p. 7. Another form of foundation is the gravity-based foundation, which is placed *on* rather than *in* the seabed. This type of foundation is used in 7.5% of offshore wind turbines in Europe. See also chapter 1.7.2.

[126] For example, the Hywind Scotland Pilot Park is being developed 25km off the coast of Scotland: J.S. Hill, ‘Hywind Scotland, World’s First Floating Wind Farm, Performing Better Than Expected’ *CleanTechnica* [16 February 2018].

[127] Although that does not clarify the legal situation of either floating wind or floating oil or gas installations or structures. See for example R.K. Richards, ‘Deepwater Mobile Oil Rigs in the Exclusive Economic Zone and the Uncertainty of Coastal State Jurisdiction’ *Journal of International Business and Law* [2011, 2].

[128] H. Esmaeili*, The Legal Regime of Offshore Oil Rigs in International Law*, PhD thesis at the University of New South Wales, 1999, p. 46.

[129] ILO Convention Concerning Unemployment Indemnity in Case of Loss or Foundering of the Ship, Geneva, 24 June 1926, 38 U.N.T.S. 295.

understanding or the definitions from various national jurisdictions of the word ‘ship’ would fit with the concept of a floating wind turbine. Through this method, one arrives at criteria such as: ships are ‘able to transport goods or persons’ and ‘can be used for navigation’.[130] Under some jurisdictions, it is not necessary for ships to have an independent propulsion system; a vessel can also be called a ship when it is designed to be towed.[131] In the oil and gas sector, some platforms are designed to be able to navigate to the location where they will be used, either independently or towed by another vessel. This type of platform is classified as a ship, rather than as an installation, due to its design.[132] Thus, similarly to the oil and gas sector, the legal classification of floating installations depends on their characteristics and on the national jurisdiction in which the floating installation is located.

Floating wind turbines are also not designed to transport persons or goods. Moreover, their shape is unsuitable for navigation, and floating wind turbines spend most of their lifetime anchored in the same position, which means that they also do not navigate in practice. Therefore, unless there are specific limitations in national law, it is reasonable to classify floating wind turbines as ‘installations’ rather than as ‘ships’. This means, in practice, that coastal states will also have functional jurisdiction over floating wind farms in their EEZ.

2.3.1.3 Converter Stations

Essential to the production of electricity offshore is the converter station. It collects the electricity generated by the different individual installations and converts it to a higher voltage and to the appropriate quality, as well as, in some cases, changing the current from AC to DC.[133] Converter stations are usually located close to the offshore windfarm(s) they connect. They are necessary to collect the electricity from the different turbines, and convert it to the appropriate voltage and quality. Therefore, although converter stations do not produce electricity themselves, they are essential for successful transport of electricity to the onshore grid. Therefore, it can be argued that they contribute to the economic exploitation of the natural resources in the EEZ, and that the coastal state’s competence to regulate an offshore windfarm also stretches to the converter station, which then falls under functional jurisdiction. Again, the limitation of coastal states’ rights in this regard is that the converter stations do not obstruct other states’ use of their right to free navigation,[134] and that the installation is properly marked.[135]

Different states’ practice concerning converter stations varies: in some states, the converter station (as well as the electricity cable between the converter station and the onshore grid) is considered a part of the offshore windfarm, owned by one entity, whereas in other countries,

[130] Esmaeili 1999, p. 29-31.
[131] Ibid.
[132] Ibid.
[133] See section 1.5.2 above.
[134] Müller 2016 concludes the same, p. 42/43. However, other states have to take into account the rights and duties of the coastal state as well, UNCLOS, art. 58(3). See also Beckman, Davenport 2012, p. 10.
[135] UNCLOS, art. 60(3), similarly as described for OWFs above in section 2.3.1.1.

the converter station is seen as a separate installation.[136] Regardless of this difference, converter stations remain necessary to facilitate transport of the electricity over longer distances, without which the successful exploitation of wind energy is not possible.

Even if the converter station is not part of the economic exploitation of the natural resources, UNCLOS allows the construction of installations and structures for the purposes of economic exploitation of the EEZ *and other economic purposes*.[137] The latter part serves as a secondary basis of jurisdiction for the coastal state in case the converter station cannot fall under the legal regime applicable to the offshore windfarm.

UNCLOS provides various rules with regard to artificial islands, installations and structures and the freedom of navigation and the safety thereof. The rules for converter stations are the same as the rules for wind turbines that are explained above.

2.3.1.4 Offshore Wind Farm Hubs

When offshore windfarms are located closely together, they can be connected to the same converter station and use the same export cable. Such a group of offshore wind farms is often referred to as a 'hub'.[138] It has yet to be seen whether hub-based connection leads to legal differences compared to radial connection, in which an offshore windfarm is connected directly with the onshore grid. Therefore, hubs are treated separately here.

Currently, most offshore windfarms are connected through single radial connections, from one windfarm, mostly via a converter station, to the shore. However, several states now have adopted a hub-based approach for the connection of new windfarms. One example is Germany, where Dolwin, Helwin, Sylwin and Borwin are examples of hub-connected windfarms.[139] The Netherlands also recently switched to a hub-based approach.[140] A characteristic of a hub-based approach is that multiple windfarms are connected to the same converter station. The question arises as to whether such a shared converter station also falls under the functional jurisdiction regime that is applicable to the offshore windfarms themselves.

As converter stations are necessary for the efficient connection of the offshore windfarms to the onshore electricity grid, regardless of whether one or multiple windfarms are connected

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[136] This depends on the connection responsibilities for OWFs. See section 4.3.

[137] UNCLOS, art. 60 (1) b [emphasis added by author]. Judging from the *travaux préparatoires*, the reason why it was formulated in this way was to exclude military structures. However, other structures that serve some economic purpose should be allowed. M.H. Nordquist, S.N. Nandan, J. Kraska, UNCLOS 1982 Commentary, (Martinus Nijhof Publishers, 2012 part 2), p. 584.

[138] Müller 2016, p. 16. See also: J. DeDecker, P. Kreutzkamp, OffshoreGrid – Offshore Electricity Grid Infrastructure in Europe, Final Report (2011), p. 35. NSCOGI, Final Report – WG1 (2012), p. 6.

[139] TenneT, Grid Map Germany (July 2018). The map shows how the German converter stations connect different offshore wind farms.

[140] With the Dutch approach, four OWFs, tendered in pairs, are connected to two converter stations. These converter stations serve as hubs to collect the electricity from the different OWFs and to bring it to the right voltage to transport it to the onshore grid.

to it, it can be argued that hub-connected converter stations will fall under the functional jurisdiction of the coastal state as well.[141] There are several arguments supporting this. First, the reduction in the number of converter stations and submarine cables by using a hub-based approach fits within the spirit of UNCLOS as it decreases the barriers to free navigation on the sea, as there are fewer converter stations and cables with safety zones. Secondly, as coastal states have jurisdiction over the exploitation of natural resources in the EEZ and for the construction and use of installations for this purpose, they should be able to connect their wind farms in the most efficient way, which may be with a hub-based approach.[142] Based on these arguments, it can be concluded that the legal framework of hub-connected offshore wind farms does not differ significantly from that of single connection windfarms.

Alternative approaches, such as one where the hub and the cables from the hub to the onshore grid fall under the general freedom to lay cables, are less in line with UNCLOS. As converter stations are needed for the exploitation of offshore wind energy, they already fall under the exclusive jurisdiction of coastal states.[143] Moreover, substations are not essential to the freedom to lay submarine cables: the long-distance submarine cables in the North Sea do not have substations at sea.[144] Therefore, the cable infrastructure for hub-based connections should also be considered as falling under the same legal regime as that of cable infrastructure for radial connections.

In principle, hubs of offshore windfarms fall under the functional jurisdiction of the state in whose EEZ the construction is located. However, when a hub is located near a maritime border and connects offshore windfarms in multiple states, it is possible that multiple states claim jurisdiction over certain shared (intra-hub) cables, structures or installations. If this is the case, there is a situation of concurrent jurisdiction, giving rise to legal uncertainty for windfarm and offshore infrastructure developers, which should be avoided in the legal framework for a MOG. Concurrent jurisdiction can be avoided by concluding bilateral or multilateral agreements with the states concerned, as will be explained further in section 2.4.

2.3.1.5 Decommissioning of Installations

Both OWFs and converter stations are considered ‘installations and structures’ under UNCLOS, which means that the right of state to construct these assets comes with the obligation to remove them at the end of their lifetime, “taking into account any generally accepted international standards established in this regard by the competent international organization.”[145] The competent international organisation in this regard is the IMO, and Guidelines adopted in Resolution A.672(16) of the IMO, adopted in 1989,[146] is the

[141] Müller 2016, p. 42.
[142] Ibid.
[143] Ibid., p. 42.
[144] ENTSO-E, https://www.entsoe.eu/data/map/. Also Müller 2016, p. 43. See chapter 2.3.2 for a full explanation of the legal regime of offshore electricity cables.
[145] UNCLOS, art. 60(3).
[146] IMO Resolution A.672(16), adopted 19 October 1989 ‘IMO Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and the Exclusive Economic Zone’.

international standard referred to. The IMO Guidelines were originally drafted with the offshore hydrocarbons sector in mind – offshore wind energy or converter stations did not play any relevant role in 1989 yet. The IMO Guidelines nuance the general removal obligation with exceptions for when partial removal or non-removal are allowed.[147] After 1998, all installations in shallow waters (less than 100 meters) and all installations weighing less than 4000 tonnes in air should be entirely removed.[148] Individual offshore wind turbines will not weigh more than 4000 tonnes, so they should be removed in any case. Converter stations may weigh more than 4000 tonnes, but since the North Sea is a shallow sea (except the Norwegian trench), they will also have to be removed. Coastal states may determine that the installation may be left wholly or partially in place where they serve a new use, including the enhancement of a living resource.[149] This can become very relevant as there are signs that the foundations of offshore wind turbines and converters serve as 'artificial reefs' for various types of marine species.[150] In that case, removal of the foundations may actually cause more environmental damage than leaving the foundations in place – whether this is the case depends on the circumstances and is an ongoing discussion.[151] If the foundations are left in place, it should be clear which entity is responsible for their maintenance.[152] Moreover, no artificial reefs should be kept in place close to customary traffic lanes, in order to protect maritime safety.[153]

Next to the IMO Guidelines, which have a global geographic scope, there are also specific Guidelines on the North-East Atlantic (including the North Sea), adopted in the context of OSPAR in 1998.[154] This Decision followed the 'Brent Spar Incident'[155] in 1995 and shows a changing opinion of the OSPAR contracting parties compared to the IMO Guidelines of nine years earlier. Whereas the IMO Guidelines stay silent on what should happen after removal of the installation, the OSPAR Decision makes clear that dumping of the installation is not permitted.[156] In the OSPAR Decision, leaving an installation wholly or partially in place is also not allowed unless there are "significant reasons" why alternative disposal than bringing the

[147] IMO Resolution, art. 1.1.
[148] Ibid., art. 3.2.
[149] Ibid., art. 3.4.
[150] Artificial reefs produce hard substrate for certain species to grow on. This attracts other species again and eventually, larger species may also use wind farms as hunting grounds. See D.J.F. Russell et al., 'Marine mammals trace anthropogenic structures at sea', *Current Biology* [2014 Vol 24 No 14]; O. Langhamer, 'Artificial reef effect in relation to offshore renewable energy conversion: state of the art' *The Scientific World Journal* [2012] p. 386713.
[151] K. Smyth, N. Christie, D. Burdon, J.P. Atkins, R. Barnes, M. Elliott, 'Renewables-to-reefs? – Decommissioning options for the offshore wind', *Marine Pollution Bulletin* [2015 90] pp. 247–258. See also A. Fowler, 'Renewables-to-reefs: Participatory multicriteria decision analysis is required to optimize wind farm decommissioning power industry', *Marine Pollution Bulletin* [2015 98] pp. 368–371 and the following correspondence in the same issue.
[152] IMO Resolution, art. 3.11.
[153] Ibid., art. 3.12.
[154] OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations.
[155] For the history of the Brent Spar Incident, on the decommissioning of the Brent Spar oil structure off the coast of the UK: V. Bakir, 'Policy Agenda Setting and Risk Communication - Greenpeace, Shell, and Issues of Trust', *Harvard International Journal of Press/Politics* [2006:3] pp. 67-88.
[156] OSPAR Decision 98/3, art. 2.

installation or structure to land should be allowed, in consultation with the other contracting parties.[157] The OSPAR Decision also considers that installations and structures that serve another legitimate purpose are not 'disused offshore installations'.[158] This also makes it possible to keep foundations of OWFs and converter stations in place if they serve as artificial reefs.

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An interesting difference between the IMO Guidelines and the OSPAR Decision is that in the text of the IMO Guidelines, no differentiation is made between the part above the seabed and the part below the seabed. In the OSPAR Decision, the part below the seabed is explicitly excluded from being a disused offshore installation,[159] which entails that the rule that installations and structures cannot be left wholly or partially in place does not hold for the parts below the seabed. As most offshore wind turbines in the North Sea are drilled deep into the seabed using a monopile foundation,[160] this differentiation is relevant.

Both the IMO Guidelines and the OSPAR Decision rely on the coastal states' implementation of the rules; especially where it concerns exceptions to the general removal obligation, for example when there is a new, legitimate use of the installation. This may lead to a diversity of rules in the different North Sea coastal states on how the foundations of converter stations should be treated at the end of their lifetime.

2.3.2 Submarine Cables

Several types of submarine cables can be defined. First, a difference can be made between submarine electricity cables and submarine communication cables.[161] Secondly, within the category of submarine electricity cables there are several different functions that are relevant for this dissertation, namely inter-array cables, export cables and interconnector cables. These will be treated in more detail below as the law applicable to them under UNCLOS can vary considerably.

In general, it is important to know that in UNCLOS itself there is no definition of 'submarine cable'.[162] However, in the Consolidated Glossary 96 to the Manual on Technical Aspects of the United Nations Convention on the Law of the Sea, 'submarine cable' is defined as an "insulated, waterproof wire or bundle of wires or fibre optics for carrying electric current or a message under water".[163] It is evident that as the concept of a submarine cable is not even defined in UNCLOS, the differentiation between different submarine cables also cannot be found explicitly in the text of the convention. Nevertheless, differentiation on the basis of the function of the asset is necessary as it influences the legal regime applicable to the cable,

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[157] Ibid., art. 2 to 4.
[158] Ibid., art. 1.
[159] Ibid., art. 1(c).
[160] See section 1.7.2.
[161] D. Burnett, R. Beckman, T. Davenport, 'Why Submarine Cables?' in D. Burnett, R. Beckman, T. Davenport, *Submarine Cables, The Handbook of Law and Policy*, Martinus Nijhoff Publishers 2014, p. 2-4.
[162] Walker 2012, p. 310-311.
[163] International Hydrographic Bureau, 'A Manual on Technical Aspects of the United Nations Convention on the Law of the Sea', Special Publication No. 51, March 2006, 4th Edition, Appendix I - 26, No. 96.

which can be deduced from UNCLOS articles 56(1)a and 79(1), the exclusive right to exploit resources in the EEZ versus the freedom to lay cables and pipelines.

As a general rule, the legal regime applicable to submarine cables depends first on their location and secondly on their function.[164] In the territorial waters, submarine cables fall under the territorial jurisdiction of the coastal states.[165] However, in the following zone (continental shelf/EEZ) it is dependent on the function of the cable, specifically whether the cable is used in the context of the exploitation of natural resources (including wind energy) or not – in the following sections it will be explained what legal regime is applicable for each type of cable.

Regardless of the function and legal status of a specific cable, the coastal state retains certain rights, including the right to take reasonable measures for the exploration and exploitation of its resources.[166] Moreover, the coastal state also retains certain duties, for example related to pollution prevention and environmental protection.[167] Another general remark concerning all subsea cables is that whereas there is a removal obligation with regard to installations and structures,[168] UNCLOS does not have such an obligation for cables.[169] The reason for this may be that the removal obligation for installations and structures was originally linked to maritime safety and to the freedom of navigation,[170] to which installations and structures (and the safety zone around them) form an impediment. Subsea cables generally do not form an impediment to the freedom of navigation, which is why there is less need for removal. However, UNCLOS was not drafted with a large offshore grid in mind. It might thus be a point of discussion in the future legal framework of a MOG whether removal guidelines for subsea cables should be introduced, for example because a large amount of subsea cables may lead to a 'spaghetti scenario' in the seabed,[171] especially close to cable landing points, and because there may be hazardous materials such as lead inside subsea cables.[172]

[164] Burnett, Beckman, Davenport 2014, p. 75.
[165] UNCLOS, art. 79(4).
[166] Redgwell 2016, p. 66.
[167] UNCLOS, art. 192 and further.
[168] UNCLOS, art. 60(3).
[169] There is no mention in UNCLOS of a removal obligation in the relevant articles on subsea cables. D. R. Burnett, R. Beckman, T. M. Davenport, *Submarine Cables: The Handbook of Law and Policy*, Martinus Nijhoff, Leiden 2014, p. 217. Moreover, Müller (2016) argues that cables are not intended to fall under the provisions on installations and structures, as they are clearly regulated elsewhere, and therefore, the removal obligation for installations and structures does not hold for cables. Müller (2016), p. 37.
[170] Over time, next to navigation and safety concerns, environmental concerns were also voiced in the context of removal and abandonment of hydrocarbons production installations at sea.
[171] The "spaghetti scenario" is a term coined in several studies to depict a large uncoordinated amount of cables in the seabed. The term has been coined already in 2013 and possibly already before. See for example: http://www.elia.be/~/media/files/Elia/PressReleases/2013/EN/20131112_BOG-permits_ENG.pdf.
[172] Subsea electricity cables generally contain lead for insulation purposes. However, alternative materials are being investigated. See B. Sonerud, F. Eggertsen, S. Nilsson, K. M. Furuheim, G. Evenset, 'Material considerations for submarine high voltage XLPE cables for dynamic applications', Conference Paper (Conference on Electrical Insulation and Solid Dielectrics (CEIDP, 2012).

Next to these general considerations that are valid for all subsea cables, the legal status of different cables based on their function is as follows.

2.3.2.1 Inter-Array Cables

The cables between different turbines of an offshore wind farm, 'inter-array cables', collect the electricity from the individual turbines and transport it to the converter station. As these cables are part of the structure of an offshore windfarm, and as they are essential for the operation of the windfarm, they are deemed to be part of the offshore windfarm installation. In practice, the offshore wind turbines and inter-array cables cannot be separated from each other.[173] Therefore, the functional jurisdiction regime applicable to OWFs and following from the right to exploit the natural resources, also applies to inter-array cables.

2.3.2.2 Export Cables (Park-to-Shore Cables)

The cables connecting the offshore windfarm to the onshore electricity grid, 'export cables',[174] or 'park-to-shore cables' bring the electricity from the edge of the windfarm to a larger electricity grid. Throughout this dissertation, the cables used exclusively to connect an OWF to the onshore electricity grid will be referred to as export cables.[175] In future grid configurations, export cables can be replaced by hybrid assets or by connections to the offshore grid.[176]

It is unclear whether export cables can be considered 'structures' for the economic exploitation of the EEZ.[177] It is argued that cables were not intended to fall under the regime of 'installations and structures' in the functional jurisdiction created by UNCLOS art. 56(1)b jo. art. 60, as they are already regulated elsewhere in UNCLOS, namely in art. 79 (*Submarine Cables and Pipelines on the Continental Shelf*).[178] An argument supporting this view is that art. 79 mentions cables and pipelines specifically, whereas art. 60 only relates to 'installations and structures' in general. Nevertheless, following UNCLOS art. 55, it could also be argued that the functional jurisdiction regime created in the EEZ is the *lex specialis* to the general regime in which all states can lay cables, creating an extra right for coastal states to regulate installations and structures in their EEZ.

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[173] This is visible for example in the ownership structure of offshore windfarms in all North Sea coastal states: whereas export cables and interconnectors may be owned by different parties, inter-array cables are always owned by the windfarm owner.

[174] Used in this sense, export does not refer to the sale of goods in another country, but to the activity to bring something away from one place to another place. From Latin 'exportare', to bring away ('ex' out and 'portare' to take/carry), *cf.* export of data in ICT applications. For usage of the term 'export cable', see for example: NorthSeaGrid, Final Report (2015), p. 8; http://www.offshorewind.biz/tag/export-cable/; Offshore Wind Project Board ORE, Overview of the offshore transmission cable installation process in the UK, September 2015, p. 6.

[175] As opposed to 'hybrid cables' and 'Meshed Offshore Grid' which hav

[176] See chapter 1.7.2 and 1.7.4.

[177] Müller 2016, p. 37

[178] Ibid. For example in UNCLOS, art. 79(4).

Nonetheless, there are other provisions in UNCLOS which can serve as the basis of coastal states' jurisdiction over export cables. Müller (2016) concludes that, as they are essential for the exploitation of the offshore windfarms, the functional jurisdiction regime can be stretched to include export cables. They can be regulated under the provisions granting jurisdiction for the *use* of installations and structures and for other economic purposes.[179] In practice, some states treat export cables as an inseparable part of the installations for the production of electricity, thus extending the functional jurisdiction over the installations to these cables via alternative means.[180]

2.3.2.3 Interconnectors

Interconnectors are electric cables or gas pipelines that facilitate transport of energy from one state to another. In this dissertation, the scope is limited to electricity infrastructure, and therefore, only electricity interconnectors are considered here. The term 'interconnector' comes from EU law,[181] and also encompasses onshore connections between two states, although the onshore connections are not explored further here. Although the term comes from EU law, it is also used with regard to the law of the sea, where 'interconnector' can be described as a submarine electricity cable which is not used for the purposes of economic exploration or exploitation of the EEZ or continental shelf. For brevity's sake, in this subchapter, the term interconnector will be used to refer to this type of cable.

There are already several interconnectors in the North Sea.[182] They are constructed for the sole purpose of connecting two states with each other in order to facilitate electricity trade. As such, they are not part of an activity that is associated with the economic exploration or exploitation of the natural resources in the EEZ or continental shelf.[183] Thus, the regime of functional jurisdiction does not apply to this type of submarine cable. Instead, interconnectors are governed by the provisions that allow each state to lay cables on the continental shelf.[184] The jurisdiction of the coastal state is limited to the part of the cable in the territorial sea.[185]

Although all states enjoy the freedom to lay submarine cables, coastal states still have some jurisdiction related to the protection of their sovereign rights in the EEZ: they can legislate over safety and environmental criteria. When the interconnector crosses the border between the continental shelves of two different states, the legal situation remains the same, limited, but with rights for the other coastal state to regulate environment and safety. Only at the point where the interconnector reaches the territorial zone of the other state, does it fall

[179] Müller 2016, p. 38-39. UNCLOS, art. 60(1)b.
[180] Ibid., this is the case for example in Sweden and Norway and used to be the case in the Netherlands and Belgium as well, see chapter 4.3.1.
[181] See chapter 3.5.1.
[182] For example: IFA (France-United Kingdom) (http://www2.nationalgrid.com/About-us/European-business-development/Interconnectors/france/), BritNed (United Kingdom – Netherlands) (http://www.britned.com/), NorNed (Norway – Netherlands) (http://www.tennet.eu/our-grid/international-connections/norned/), Denmark-Sweden
[183] Müller 2016, p. 58.
[184] UNCLOS, art. 79(1).
[185] UNCLOS, art. 79(4).

under the full jurisdiction of the other state. As mentioned in section 2.2.2, whereas the delineation of a submarine pipeline is subject to approval of the coastal state, this is not the case for submarine cables. Therefore, in principle, states are free to choose the delineation of their cable, although they do have to respect existing cables, pipelines, installations and structures.

2.3.3 New Developments

2.3.3.1 Hybrid Infrastructure

With technological progress, it becomes possible to connect energy generated offshore to several coastal states at the same time. This is relevant for example with a tee-in approach, in which an offshore windfarm is connected to an already existing interconnector,[186] or with a hub-to-hub approach, in which two hubs of wind farms are connected with an extra cable between them. The latter is the case in the Kriegers Flak Combined Grid Solution between Denmark and Germany.[187]

The cables in such a hybrid configuration are used to transport electricity to shore. However, when the electricity production is not at its maximum capacity, and consequentially, when there is spare capacity on the cables, these cables can function to transport electricity between two (or more) states, functioning as a regular interconnector cable. Therefore, such a construction is an ever-changing combination of transmission of offshore generated electricity with interconnection between states, depending on the amount of wind energy generated.

The legal situation concerning jurisdiction over such infrastructure is much more complicated than the separate grid components mentioned before, the interconnector cable and export cable. It is a fact that the coastal state has jurisdiction over environmental and safety requirements of all cables. It is also clear that as soon as the cable enters the territorial waters and land territory of this state, the cable will fall under the jurisdiction of that state. However, alongside that, there is a clear difference in legal regimes for interconnectors and for connection of offshore windfarms. Combining these two functions of cables leads to uncertainty about the extent to which states have jurisdiction over the assets.[188]

Temporal changes in the use of the cable also need to be taken into account. For example, when offshore windfarms are tee-ed in to an existing interconnector, the interesting legal situation is that a cable that at first did not fall under the functional jurisdiction of either state, may become subject to the functional jurisdiction of the state in whose EEZ the connected offshore windfarm is located. The consequences of such a change in jurisdiction will differ by coastal state, as in each state, different laws are applicable to different types of cables.

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[186] Müller 2016, p. 59. This was originally planned for the 'Cobra Cable' between Denmark and the Netherlands. However, at the moment it does not seem likely that these plans will materialise.
[187] C.T. Nieuwenhout, 'Offshore Hybrid Grid Developments: The Kriegers Flak Combined Grid Solution', in Roggenkamp, M. & Banet, C. (eds.) *European Energy Law Report 2018*, Intersentia, Vol. XII, p. 95-112.
[188] Müller 2016, p. 59.

Another type of hybrid infrastructure is an OWF hub connected to two states instead of one. In this situation, one could argue that the cable from the hub in one state's EEZ to the shore of another state is part of the functional jurisdiction of the first state, but one could also argue that the cable does not fall under the coastal state's functional jurisdiction and instead falls under the freedom to lay cables, which is the same regime as for regular interconnectors. This needs to be clarified in the legal framework for an offshore grid in order to avoid a lack of jurisdiction or competing jurisdiction from different coastal states.

It is also possible that a windfarm in one state's EEZ is connected to a hub in another state. The cable that runs from that hub to the shore of the state in whose EEZ the windfarm is located, could then fall either under the freedom to lay cables, or under the functional jurisdiction of that state. This could lead to the perverse situation in which every state would require a hub to be constructed in their EEZ, even if this is less efficient from a technical or economic point of view, solely to gain jurisdiction over the cable.

Another possible hybrid step is the connection of the offshore windfarm hubs of two different states.[189] In such a situation, two countries have hubs with cables to their respective shores, and they connect the two hubs to each other by means of an extra cable. In that case, both states will be engaged in exploitation of their EEZ and will thus have functional jurisdiction over the cables reaching from hub to shore. However, the cable between the two hubs could be seen either as a variety of the hub-to-shore cable (over which the state would have functional jurisdiction), or as an interconnector, over which states normally have very limited jurisdiction. This situation would also require the states involved to agree on the extent and division of jurisdiction.

Thus, there are various types of hybrid infrastructure leading to legal uncertainty. This legal uncertainty is a major impediment to the development of such hybrid infrastructure, even if it is more beneficial from an economic and technical point of view to combine different cable functions into one infrastructure.[190] Therefore, it should be clarified whether the cables in a hybrid construction fall under the functional jurisdiction of the coastal state or under the freedom to lay cables of all states. As both options are possible under UNCLOS, a definitive solution cannot be deduced based on the current provisions.

2.3.3.2 Meshed Offshore Grid

A further possible future development is a meshed offshore grid.[191] A meshed offshore grid combines hybrid infrastructure and connects it with several countries, thus creating a network of submarine cables in the North Sea.[192] From a legal point of view, the difficulties that arise

[189] See for example the Kriegers Flak Combined Grid Solution, section 3.5.2.

[190] Müller 2016, p. 58; NorthSeaGrid, Final Report (2015), p. 61 ff.

[191] 'Meshed' in this sense means a network in which multiple countries and offshore windfarms are connected to each other.

[192] Müller 2016, p. 60.

with combined solutions persist with offshore grids. Again, different functions of the cables come together which makes answering the question of whether the cable falls under the jurisdiction of a state or whether multiple states could have concurrent jurisdiction, more difficult. The fact that the different offshore hubs are connected to each other, and to multiple states, does not make a difference to this question. However, the more states that are connected to the meshed offshore grid, the more impact the lack of clarity over the jurisdiction of states over certain cables starts to have.[193]

2.3.3.3 Artificial Islands

In some scenarios for the offshore grid, it is proposed that artificial islands are constructed.[194] In these scenarios, artificial islands are deemed necessary for the purpose of hosting the large converters needed for the operation of a MOG.[195] The artificial islands themselves are not part of the MOG, but the converter stations and other infrastructure installed on them, is essential to the MOG. However, such large converter stations as needed for the MOG do need a large surface (such as an artificial island) to be installed, and thus, it can be argued that artificial islands will become necessary for the MOG once larger types of converters are needed. This is why it is still relevant to treat the legal status of artificial islands in the context of the MOG, even though the islands themselves do not form part of the MOG.

The legal status of artificial islands under the law of the sea is similar to that of other installations, such as converter stations and wind turbines, although there are a few specific and significant differences.[196] The legal regime for artificial islands is described in the same article as that of installations and structures, art. 60. In the first part of the article, a differentiation is made between artificial islands on the one hand and installations and structures on the other hand. Whereas for installations and structures, the purpose needs to be related to the exploration or exploitation of resources in the EEZ or other economic purposes, this is not the case for artificial islands.[197] The rules on nautical safety (safety zone,

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[193] Müller 2016, p. 58.
[194] See for example the 'North Sea Wind Power Hub', https://northseawindpowerhub.eu/; and E. Pernot, Legal assessment of the development of a sand-based offshore energy island, North Sea Energy III Deliverable 3.8 – Appendix (2020). See also J. Moore (TenneT), 'Deliverable 12.3 – Draft Deployment Plan' *PROMOTioN* (2020), p. 34 and further.
[195] It must be noted that next to hosting converters, artificial islands can fulfil other purposes as well, such as supporting the construction and maintenance of offshore wind farms, both for transferring crew to the wind farms, and as a hub for construction materials and spare parts. Cost savings can be achieved when construction vessels only have to go to the artificial island to obtain new materials or spare parts, rather than that they have to sail back to the coast to fetch new materials, which is the status quo. Lastly, artificial islands can also be used for energy storage and conversion – for example, to host power-to-gas installations. Power-to-gas is a process whereby electricity is used to produce certain gases, such as H2 (hydrogen) or NH3 (ammonia). These gases can then be used in the chemical industry, or mixed with CH4 (methane) to be injected in the natural gas networks, to be used again in other purposes, such as heating and electricity production in gas-fired power plants. See respectively: S. Krishna Swamy, N. Saraswati, P. Warnaar (TNO), 'North Sea Wind Power Hub (NSWPH): Benefit study for (1+3) potential locations of an offshore hub-island' TNO report, 2019; Blanco, Faaij 2018, pp. 1049-1086.
[196] A. Oude Elferink 2013, para 5.
[197] UNCLOS, art. 60(1).

proper indication of the position of the object and due notice with regard to the construction are the same for artificial islands, installations and structures) as explained in paragraph 2.3.1.3 (Converter Stations) are also applicable to artificial islands. Additionally, UNCLOS mentions that artificial islands, installations and structures do not possess the status of islands, and thus, that they do not enjoy the same rights as natural islands. As UNCLOS puts it, "they have no territorial sea of their own, and their presence does not affect the delimitation of the territorial sea, the exclusive economic zone or the continental shelf."[198]

A significant difference between artificial islands and installations and structures is that the provision on removal after abandonment or end of usage only mentions installations and structures– artificial islands are left out in the text. This omission is very relevant, as this would imply that removal of artificial islands after their usage is not intended in UNCLOS. There are several possible explanations of this. First, it might be that, at the time of drafting UNCLOS, states expected artificial islands to be of permanent usage. This line of thought is logical when the artificial island is used for the construction of an airport or for a new residential area or business centre.[199] However, a relevant question in this regard is whether artificial islands always keep their purpose or not, and if not, whether a removal obligation for disused artificial islands should be adopted. This question lies beyond the scope of this dissertation, but might be an interesting topic of further research.

As the legal regime for artificial islands differs from that of installations and structures, it is important to know where the difference between these objects lies.[200] As mentioned above, there is no definition in UNCLOS of installations or structures. Neither is there a definition of 'artificial island'. An island is defined in UNCLOS as "a naturally formed area of land, surrounded by water, which is above water at high tide."[201] In line with this definition, using a systematic interpretation of UNCLOS, an artificial island should be defined as 'a man-made area of land, surrounded by water, which is above water at high tide.' Whereas being above water at high tide is also mentioned as a criterion for artificial islands in literature,[202] this criterion alone cannot make the difference, as there are also many oil and gas platforms, maritime weather stations and offshore converter stations which are permanently above water, but which are not considered to be (artificial) islands.

Using a grammatical interpretation of UNCLOS, the word 'land' in the definition of island and the derived definition of artificial island is crucial, as the question whether an object is considered land or not may be the difference between (artificial) islands on the one hand and installations and structures on the other hand. This can be based on the material the object is

[198] UNCLOS, art. 60(8).
[199] See for example E. Graham-Harrison, Hong Kong to build one of world's largest artificial island projects, *The Guardian* 20-3-2019; Y. Arai , K. Oikawa , S. Suzuki , and K. Hayashi, Construction of an artificial island for Kansai International Airport, *Coastal Systems and Breakwaters,* The Institution of Civil Engineers, 1992; The Pearl Man-made island in Qatar: https://earthobservatory.nasa.gov/images/91941/the-pearl-qatar.
[200] E. Pernot 2020, paragraph 3.3.
[201] UNCLOS, art. 121(1).
[202] A. Oude Elferink 2013, paras 3 and 5.

made of: ‘land’ is commonly understood to be made of sand, rocks and/or other types of solid ground, or a combination thereof. Offshore platforms, whether used for the exploitation of offshore oil and gas resources, converter stations or any other purpose, are generally made of steel and/or concrete. Another difference, related to the use of materials, is that for islands, there is a more or less solid column of land from the sea bottom to the part above the water, or “man-made or natural materials that are piled on the seabed to form an area of land.”[203] The different types of materials and construction also have consequences for the ease of decommissioning and removal: an installation based on a foundation and a topside is easier to remove than an artificial island that consists of many cubic metres of sand, rocks and other types of solid ground. This could perhaps also explain the difference in legal approaches to removal obligations for artificial islands on the one hand and installations and structures on the other.

As the scenarios, including artificial islands, have come up only recently, this part has been included in the research for this dissertation only at a later stage. Therefore, although the jurisdiction over artificial islands is relatively clear compared to other parts of a MOG, many legal questions with regard to artificial islands remain, for example with regard to environmental law aspects and applicability of laws and regulations of the coastal state to activities taking place on artificial islands. These questions may be considered in future research projects on this topic.

2.4 Legal Certainty for an Offshore Grid

In the previous section, it appears that, whereas the rules for certain grid components are clear, there is uncertainty about the legal status of hybrid cables and meshed offshore grids. These assets are between two categories of jurisdiction: functional jurisdiction as used for the connection of OWFs, and limited jurisdiction through the doctrine of the free seas for interconnector cables. It is important that states, project developers and investors know to what extent a coastal state has jurisdiction over a certain offshore electricity cable, as this influences which laws are applicable to the assets. Moreover, as will be explained in section 3.1, it influences the applicability of EU law as well.

In general international law, states exercise jurisdiction as far as there is a genuine link to the object.[204] However, the meaning of the concept of ‘genuine link’ itself is still under discussion.[205] In literature, the ‘genuine link’ doctrine is also applied to cable and pipeline infrastructure.[206] In principle, this is based on the doctrine of ‘balance of interests’, whereby all possible interests are weighed and if the balance of interests turns out positive for the state

[203] Ibid., para 5. See also E. Pernot (2020), section 3.3.
[204] In the case of the link between a state and a person: ICJ, *Nottebohm Case*, ICJ Reports, 1955, p. 23. Shaw 2008, p. 258. For the link between a state and a flag ship, see: UNCLOS, art. 91(1); Shaw 2008, pp. 611-613. For application of this doctrine to offshore pipelines: M.M. Roggenkamp, Petroleum Pipelines in the North Sea: Questions of Jurisdiction and Practical Solutions, *Journal of Energy and National Resources Law* [1998], p. 98.
[205] Walker 2012, p. 69 ff. See also Shaw 2008, p. 612. Currently, the only article in UNCLOS in which the term is used, is with regard to the nationality of ships (art. 91).
[206] Roggenkamp 1998, p. 98

involved, its jurisdiction is just and reasonable.[207] However, this alone cannot solve the legal uncertainty around offshore electricity cables, as it leaves the possibility of multiple states having a claim to jurisdiction over the same object (concurrent jurisdiction). Therefore, the legal uncertainty cannot be solved on the basis of these doctrines of international law.

2.4.1 Active or Passive Approach

As the scope of the jurisdiction between states cannot be concluded decisively based on UNCLOS, solutions on another basis need to be sought. Both active and passive solutions to concurrent jurisdiction have been proposed in literature.[208] The passive solution to concurrent jurisdiction is self-restraint of the states involved. In that case, states that could claim jurisdiction over a certain activity or asset refrain from doing so. A positive aspect of the passive approach is that it does not require much effort to implement. However, a negative aspect is that this approach avoids the problem rather than solving it definitively. As states' governments and interests can change over time, this option still leaves legal uncertainty for future developments. It is important to provide sufficient legal certainty to developers, especially when the infrastructure becomes more advanced and investments become higher. Therefore, the passive approach is not advisable for the development of an offshore HVDC grid. Similarly, waiting until states' practice regarding this issue develops into customary international law is a passive approach that is not advisable as it will not provide upfront legal certainty. Therefore, an active approach is required. The rest of this chapter explores different options under this approach.

2.4.2 Amendment of Existing Treaties

If the source of the uncertainty is the text of UNCLOS, the most direct way to remove uncertainty is to amend UNCLOS itself, in order to adopt specific rules on the new types of assets. Amendment of existing treaties is possible, and the rules on this are adopted in the Vienna Convention on the Law of Treaties.[209] Treaty amendment processes vary. In general, treaty amendment is possible by agreement of the parties, unless the treaty provides for a specific procedure.[210] After states reach agreement on the text, treaty amendments have to be accepted by government and parliament in the same way as new treaties do. Nevertheless, the drafting process may be easier when it builds on previous agreements.

The Vienna Convention on the Law of Treaties provides for a simplified amendment procedure and a normal amendment procedure.[211] The simplified procedure is used for small amendments to which no state sends objections within one year of communication of the proposed amendment.[212] However, as provisions concerning jurisdiction are normally controversial, an amendment in this field would probably not be possible via the simplified procedure. For the normal procedure, at least half of the States Parties have to react positively

[207] Ibid.
[208] Müller 2016, p. 63 and the literature cited there.
[209] As described in the Vienna Convention on the Law of Treaties, Vienna, 1969, U.N.T.S. I-18232, part IV.
[210] Vienna Convention on the Law of Treaties, art. 39 and 40.
[211] UNCLOS, art. 313 and 312 respectively.
[212] UNCLOS, art. 313.

to the proposed amendment within one year of the communication, before a new conference will be convened.[213] Given the number of parties involved and the long process of drafting both UNCLOS and the preceding conventions, it is unlikely that states will have the appetite to enter into an amendment conference again. Moreover, such an amendment process will probably last for several years. During the negotiation process, legal certainty is decreased compared to maintaining the current status of the treaty, as the content and effect of the treaty provisions after amendment are unknown. This makes it an unsuitable option to solve the problem of legal uncertainty concerning jurisdiction over different cables.

Naturally, the amendment process of a treaty with two parties is more straightforward than the amendment process of a multilateral treaty. Bilateral treaties that could address issues of competence related to installations and structures constructed at sea are the maritime delimitation treaties. In the North Sea, maritime delimitation treaties have been concluded between all states that share maritime borders. However, some of these treaties were concluded several decades ago, even with states that do not exist anymore.[214] Therefore, re-opening the negotiation process over such treaties may also lead to a long and burdensome discussion. Therefore, even the amendment of bilateral treaties might lead to a long period of legal uncertainty.

2.4.3 Broad Interpretation of UNCLOS

As described in paragraph 2.3, the position of hybrid assets and the MOG is difficult to decide on the basis of the text of UNCLOS itself. Therefore, a common *interpretation* of the rules laid down in UNCLOS may be needed.[215] With a common interpretation, the states around the North Sea can adopt the same approach towards jurisdiction for hybrid assets and MOG components, and provide legal certainty at least for the North Sea basin. Based on UNCLOS, hybrid assets, and offshore grids alike, can be looked at from three different angles.[216]

One angle is that the legal regime changes as the function of the asset changes: when the wind does not blow, the function of the asset is limited to interconnection, with very limited jurisdiction of the coastal state. When there is offshore electricity generation again, the asset falls under the functional jurisdiction regime again. This option creates a legally untenable situation in which the legal status of the asset and the jurisdiction over it can change almost per second. Therefore, this option cannot be used as a basis for the legal framework for a MOG.

A second option is to divide the transmission infrastructure into three (or more) parts, namely, the part from country A to converter station A (part 1; see Image 4 below); secondly converter

[213] UNCLOS, art. 312.
[214] This is the case with the Federal Republic of Germany and the USSR. Germany and the Russian Federation respectively were successors in these treaties.
[215] Interpretation of international law is based on the rules of interpretation as laid down in the Vienna Convention on the Law of Treaties, art. 31.
[216] Nieuwenhout 2018, pp. 102-104.

station A to converter station B (part 2), which is the cross-border element, and finally from converter station B to the onshore grid of country B (part 3). If these parts are seen as separate elements, one can argue that only part 2 falls under the freedom to lay cables, as this part is not necessary to enjoy the exploitation of the natural resources in the EEZ, whereas parts 1 and 3 do fall under the functional jurisdiction regime. However, this is also undesirable, as states and developers will want legal certainty and clear regulation over the middle part, between convertor stations A and B, as well. Moreover, in a MOG, regardless of the grid development scenario, there will be many cables that would fall in the same category as 'Part 2', in which case jurisdiction is limited.

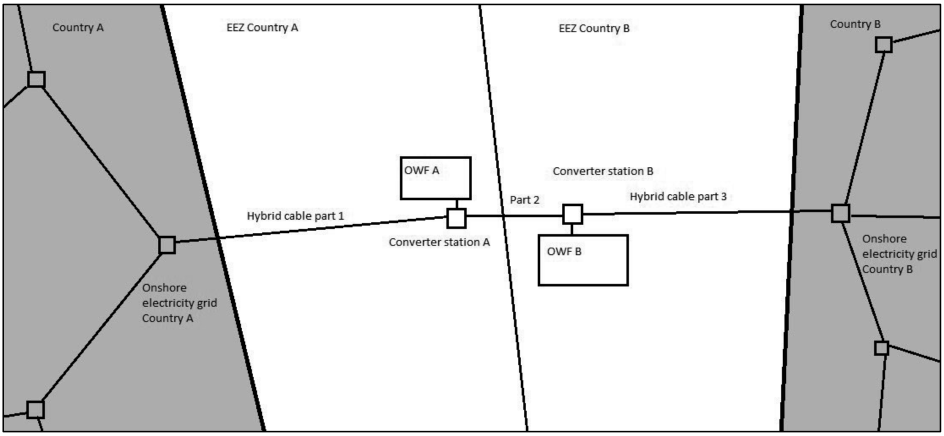

Image 4: Schematic Overview of Hybrid Electricity Cable. Source: author's own production.

A third option is to use a broad interpretation of UNCLOS' terminology. There is some room in UNCLOS for this; according to article 60 *sub* 1, the coastal state has exclusive rights over the construction, operation and use of installations constructed for the purposes of article 56 (the exploration and exploitation of resources in the EEZ) 'and for other economic purposes'. In this approach, the focal point is the (two or more) converter stations, installations which are essential for the successful transmission of electricity over long distances. One could argue that regulation of a cable between the two offshore converter stations is necessary for the use of these installations. With this reasoning, it does not matter that the cables are not solely used for the transmission of offshore-generated electricity, but also for interconnection between states. This is because interconnection, with the purpose of electricity exchange, falls under 'other economic purposes' as mentioned in UNCLOS art. 60. This is the reason why this approach focuses on the converter stations rather than on the wind turbines as installations: the use of wind farms as installations can already be served by single cables from the wind farm to shore, but for converter stations, interconnection as 'other economic purpose' can be included. With this interpretation based on article 60 UNCLOS, the cable between different converter stations can indeed be seen as falling under the functional jurisdiction of the coastal state. This does *not* change the legal status of existing interconnectors, as the interconnectors that have been constructed so far do not have offshore converter stations.

One may wonder whether this broad interpretation of UNCLOS is sufficient in order to reach the desired amount of jurisdiction over the entire hybrid asset, or eventually of the MOG; some activities concerning the middle part of the hybrid asset will still not fall under the jurisdiction of the coastal state. An example of this is that it is difficult to conclude that the coastal state has jurisdiction over the construction process of the cable or even the delineation of the cable part between the two converter stations based on the regulation of the use of the converter stations. If states do regulate this, the coastal state's jurisdiction goes further than what UNCLOS provides. Nevertheless, this interpretation does allow for more jurisdiction for hybrid assets and eventually for the MOG. In the interest of legal certainty, it is recommended that the North Sea coastal states adopt a common interpretation of the law of the sea regarding converter stations, hybrid assets and the MOG. This will allow for greater legal certainty concerning jurisdiction of hybrid assets, without having to amend UNCLOS.[217]

In the interest of legal certainty, this common interpretation should be adopted in, or form an attachment to, a relevant instrument of international law. There are multiple options that could be used, which are described below. Adopting an extra instrument to interpret an earlier instrument is possible according to the Vienna Convention on the Law of Treaties. Art. 31(3) of this Convention describes what the rights and duties of states are with regard to subsequent agreements.

2.4.4 Conclusion of Bilateral Agreements

One possible solution is to conclude bilateral agreements between the states involved that addresses the conflict of jurisdiction directly. This is similar to the approach used in the offshore oil and gas industry since the early 1970s. There, this approach is used for pipelines that connect the production facility in one state's continental shelf to the shore of another state. In the North Sea area, Norway has concluded many treaties and Memoranda of Understanding (MoUs) with other states concerning pipelines that run from production facilities on the Norwegian continental shelf to onshore landing stations in other states. It is observed that the first of these agreements, the Ekofisk agreement, served as a model for later agreements.[218] These agreements can be specific to one pipeline, which was a typical approach in earlier agreements, or apply to any existing or future pipeline between the countries involved. This latter approach is more common in recent agreements.[219]

Such agreements could also be useful for electricity cables in the North Sea. However, one should be aware of the differences between the situations. In the (early) Norwegian pipeline agreements, there is a clear 'sending' state, namely Norway, and a 'receiving' state. The gas

[217] Amendment of UNCLOS is possible but difficult. This is elaborated in chapter 2.4.2.
[218] Roggenkamp 1998, p. 100.
[219] Ibid.

that is produced in the EEZ will only be transported to the shore, and not vice versa. This had a clear impact on the pipeline agreements, which gave much more power to the sending state.[220] The sending/receiving dichotomy is in some way similar to an offshore windfarm that is connected only to one state, which is another state than the state in whose EEZ the windfarm is located. However, in offshore grid scenarios, windfarms are connected to multiple states' shores, or to multiple offshore hubs. In such cases, there is no longer one clear 'sending' and 'receiving' state.

Therefore, with a grid that encompasses offshore windfarm hubs in multiple states' EEZs, all states involved can have a genuine link and interests in jurisdiction. This makes it is more difficult to see a natural division of jurisdiction for one state on the basis of a balance-of-interests approach. However, if multiple states have concurrent jurisdiction, they also have the power to negotiate together and make agreements on how legal issues, such as the choice of forum for disputes, or the nationality for tax purposes, should be solved. This is a grey area between public international law (law between states) and private international law (the complete body of conventions, national law, case law, customary law related to legal conflicts between individuals in international context) because often, the activities in states' EEZ are heavily regulated. Moreover, the network operators (TSOs or other parties) responsible for offshore connections are sometimes also (partially) owned by the state. In any case, having a treaty that makes clear which states' laws are applicable to which part of the grid will greatly improve the legal certainty of these cables under international law.

2.4.5 Adoption of a Multilateral Treaty

A third option is to adopt one multilateral treaty for all states bordering the North Sea. The drafting process for multilateral treaties is often more difficult than for bilateral treaties, as multiple parties are involved and might have different, contradicting opinions. However, it prevents a scenario in which there is a different legal situation in every different combination of states, according to the specific treaty that was signed between these states. Concluding a multilateral treaty would increase the coherence of the legal system.

An approach that goes a step further than an international agreement, but in the same direction of 'active' solutions under an already multilateral treaty, is to harmonise substantive national law applicable to electricity cables via European law. This solution will help to avoid possible legal conflicts because the legal framework of one state would no longer differ from the other state. However, it is highly questionable whether full harmonisation of national laws

[220] Norway is the 'sending' state, the state on whose initiative the gas field is exploited. In the Pipeline Agreements, it is stated that the pipelines shall be owned by a Norwegian pipeline company, under Norwegian law, with its central place of business in Norway, being Norwegian resident for tax purposes. This suggests that, as the legal person owning the pipeline has Norwegian nationality, the pipeline itself also has Norwegian nationality. This fortifies the genuine link Norway has with the pipeline. Moreover, as it is Norway's EEZ that is economically exploited and Norway has a larger interest in how this is done as sending state, the balance of interests approach would be in favour of Norway having jurisdiction over the pipeline. This balance of interests is typically more clear in the case of a 'sending' and 'receiving' state. Roggenkamp 1998, p. 103; See also 1973 Ekofisk Pipeline Agreement, U.N.T.S. I-12678, art. 3.

regarding offshore wind energy generation is allowed when taking into consideration the principles of proportionality and subsidiarity under European law.[221]

Nevertheless, some topics are already harmonised or are relatively easy to harmonise, in the interest of all states involved. Examples are technical requirements and safety standards. Other substantive law is much harder to harmonise, especially where it concerns fundamental differences between countries and their legal systems. One example is the rules on who can own such cables and substations or how they are financed in the different countries. And even if all rules are harmonised, there can still be complicated issues, such as which state can impose taxes on which activity. Moreover, this would also require harmonisation of all possible future laws relating to these cables. In any case, the harmonisation of substantive national law is a very ambitious approach to the problem of jurisdiction, which will take many years to complete.

2.4.6 Weighing up the Different Options

Legal certainty is necessary in order to attract the large investments needed for the development of hybrid and meshed offshore electricity infrastructure. Therefore, solutions need to be sought to increase legal certainty related to jurisdiction. Although both passive and active solutions to the problem are proposed above, the passive solutions do not do enough to diminish the legal uncertainty. Therefore, only the active solutions were researched further.

Active options are the adoption of international treaties that specifically address the question of jurisdiction or the harmonisation of substantive laws. The latter option will take a very long time to implement, and is dependent on strong political will, which is often difficult to reach in all countries involved.

That leaves the option of concluding (an) international treaty(ies) to clarify the legal situation under international law and to avoid the situation of concurrent jurisdiction. This practice is used in the offshore oil and gas sector for pipelines running from a production facility in one state's EEZ to the onshore system of another state, which has similar legal complications as offshore electricity cables. The experience states have with this practice in the offshore oil and gas sector can serve as an additional benefit to reduce legal uncertainty. International treaties could come in the form of multiple bi- or trilateral treaties or one multilateral treaty. One multilateral treaty will have a longer and more complex negotiation process, but the overall end result will be more uniform. On the other hand, different bilateral treaties will be easier to negotiate, but the end result will be more complex, with a different legal regime between each combination of states. However, having one model agreement that will be re-used for the next agreements could mitigate that. Alternatively, states can also choose to amend existing treaties, such as the maritime delimitation treaties or even UNCLOS. However, this

[221] TEU, art. 5. This will be explained in more detail in chapter 3.2 and 5.1.2.2. It must be noted as well that after the transition period, the UK will no longer be required to harmonise its legislation based on EU law. If the largest market for offshore wind would no longer be required to participate, harmonization efforts in the North Sea area based on EU law would be much less effective.

could open up discussions on other aspects of these treaties as well, which might in fact take longer than concluding separate treaties.

Table 1: Amendment of Existing Treaties vs. Conclusion of New Treaties

	Advantages	**Disadvantages**
Conclusion of bilateral treaties	Experience from the offshore oil and gas sector should reduce negotiation time required.[222]	Lack of coherence between different bilateral treaties could impede further development from hybrid infrastructure towards an offshore electricity grid.
Conclusion of multilateral treaty	Coherent solution for uncertainties around jurisdiction. Treaty can also be used to regulate other topics and to create institutional structure.	The more parties, the longer and more complex the drafting process can be.
Amendment of bilateral treaties	Structure is already given. Potentially less politically sensitive than a new treaty.	The amendment process may open political sensitivities about other topics, such as fisheries, border delineation and naval rights.
Amendment of multilateral treaties	Direct solution to jurisdiction problem. Institutional structure is already given. Could also be used in fields other than offshore wind.	Difficult amendment processes, requiring agreement of majority of parties (including those not bordering the North Sea) – example: the drafting process of UNCLOS itself.

2.5 Interim Conclusion

On the basis of UNCLOS, the competences of coastal states differ per maritime zone and per activity. Until 12 nautical miles from the shore a coastal state has full territorial jurisdiction, irrespective of the type of cable. Beyond that distance, there is only functional jurisdiction, meaning that a coastal state has the right to legislate over activities that are related to the economic exploitation of that zone but not over other activities. Cables used for the production of electricity fall under functional jurisdiction. Regarding other cables, states can only legislate as far as safety and environmental requirements are concerned. This also includes interconnection cables, as they do not serve the economic exploitation of the EEZ.

[222] A good example in this regard is the Norwegian-UK framework agreements for gas pipelines (1998, 2005). See H. Musaeus, 'Introduction to the Framework Agreement entered into between Norway and the United Kingdom Concerning Cross-Boundary Cooperation' in U. Hammer, M.M. Roggenkamp (Eds) *European Energy Law Report III* (Intersentia 2006).

Based on the differentiation between assets that fall under the functional jurisdiction of coastal states and assets that fall under the freedom to lay submarine cables, different components of a future offshore grid can each have a different legal regime under the law of the sea, depending on whether their function is related to the production of electricity from offshore wind energy or not. When the functions of 'electricity production with transport to shore' and 'electricity transport between countries' are separated, the legal situation under the law of the sea seems clear. However, when functions are mixed, for example when hybrid electricity transmission infrastructure or eventually an offshore electricity grid is created, uncertainty over the legal status of various grid components persists. This increases with the complexity of the grid, and forms a major impediment to the development of a meshed offshore electricity grid, as regulatory uncertainty reduces the willingness to invest in hybrid or meshed offshore grid infrastructure,[223] even though for the high planned capacity of offshore wind in the North Sea, it is economically more sensible to invest in hybrid or meshed infrastructure rather than in radial connections of windfarms.[224] Therefore, a solution to the problem of concurrent jurisdiction and other problems related to jurisdiction over the cables at sea should be considered in the legal framework for the meshed offshore grid.

As the scope of the jurisdiction between states cannot be concluded decisively based on UNCLOS, another basis for a solution needs to be sought. Both active and passive solutions to concurrent jurisdiction have been proposed in literature.[225] The passive solution to concurrent jurisdiction is self-restraint of the states involved. In that case, states that could claim jurisdiction over a certain activity or asset refrain from doing this. However, this option avoids the problem rather than solving it definitively. A positive aspect is that it does not require much effort to implement. Nevertheless, as states' governments and interests can change over time, this option still leaves legal uncertainty for future developments. It is important to provide sufficient legal certainty to developers, especially when the infrastructure becomes more advanced and investments become higher. Therefore, this option is not advisable for the development of an offshore HVDC grid. Similarly, waiting until states' practice regarding this issue develops into customary international law is a passive approach that is not advisable from the perspective of upfront legal certainty.

Therefore, active solutions that address the conflict of jurisdictions directly should be developed. There are several options, including the conclusion of bilateral treaties, the amendment of existing treaties (such as bilateral treaties on border delineation) or the conclusion of a multilateral treaty. Which option should be recommended for the legal framework of the MOG is explored further in Part II of this dissertation.

[223] The regulatory treatment of a cable is based on whether the coastal state has jurisdiction over it, which is uncertain. Willingness to invest depends amongst others on the question whether there is a stable regulatory framework for the entire lifetime of a project. PwC, Tractebel Engineering, Ecofys, Study on regulatory matters concerning the development of the North Sea offshore energy potential, January 2016, p. 86. See also A. Armeni, Intermediate Report: Financing Framework for meshed offshore grid investments, June 2017, p. 13.
[224] See for example calculations in A. Flament, P. Joseph, G. Gerdes, L. Rehfeldt, A. Behrens, A. Dimitrova, F. Genoese, I. Gajic, M. Jafar, N. Tidemand, Y. Yang, J. Jansen, F.D.J. Nieuwenhout, K. Veum, I. Konstantelos, D. Pudjianto, G. Strbac, NorthSeaGrid Study Final Report, p. 27.
[225] Müller 2016, p. 63 and the literature cited there.

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CHAPTER 3

Offshore Electricity Infrastructure under European Union Law

3 Offshore Electricity Infrastructure under European Union Law

Many States surrounding the North Sea are Member States of the European Union or of the European Economic Area (EEA). In their legal frameworks, EU law plays an important role. A large part of the legislation they have in place originates from EU law, either directly via Regulations or indirectly via transposition of Directives into national law.[226] This is also the case for the electricity sector, where legislative efforts to create a single energy market date back to the 1990s and where a detailed system of EU legislation determines how the sector is organised and regulated. Therefore, it is important to dedicate attention to the role of EU law in the regulation of offshore electricity infrastructure.

The aim of this chapter is twofold. First, this chapter aims to analyse the legal basis for the development of a legal framework for offshore electricity infrastructure as far as EU law is concerned. Secondly, the chapter aims to expose which current EU legislation, or lack thereof, influences the development of offshore electricity infrastructure, which forms a basis for later chapters proposing a new regulatory framework for offshore electricity infrastructure.

Before analysing substantive EU law, it is first of all important to see to what extent the body of EU law is applicable at sea. As shown in the previous chapter, coastal states' jurisdiction beyond the territorial waters is limited to certain activities. This chapter first analyses the consequences of this limited jurisdiction for the applicability of EU law at sea (section 3.1). Thereafter, another limitation of EU law will be discussed: that the EU can only act if the Member States have conferred upon it the competence to act, by means of the founding treaties (section 3.2).[227] The rights and competences of North Sea coastal states that are not part of the EU, namely Norway and the United Kingdom, will also be scrutinised (section 3.3). The last part of this chapter describes the substantive law that is currently applicable to offshore electricity infrastructure (section 3.4), and the gaps in this legislation with regard to the development of such offshore electricity infrastructure (section 3.5).

3.1 Applicability of EU law at Sea[228]

States' jurisdiction over activities at sea is codified in UNCLOS and depends on the location and nature of the activity concerned, as explained in chapter 2. However, UNCLOS is directed mostly at states and the EU is not a state. Therefore, the extent to which the EU has jurisdiction at sea cannot be derived solely on the basis of the substantive rules of UNCLOS; alternative reasoning must be found.

[226] These acts and their legal force are based on Treaty on the Functioning of the EU (TFEU), as amended by the Treaty of Lisbon, U.N.T.S. I-47938, art. 288.
[227] Treaty on European Union (TEU), as amended by the Treaty of Lisbon, U.N.T.S. I-47938, art. 5(2).
[228] This subchapter is based on research in the context of the article J.J.A. Waverijn, C.T. Nieuwenhout, 'Swimming in ECJ case law: The rocky journey to EU law applicability in the continental shelf and Exclusive Economic Zone' *Common Market Law Review* [2019) 56 6], pp. 1623–1648.

A logical place to start is the EU's founding treaties.[229] The Treaty on European Union (TEU) and the Treaty on the Functioning of the European Union (TFEU) lay down the EU's competences and the scope of its jurisdiction. According to the Treaty on European Union, EU law is applicable to the Member States of the European Union.[230] This provision does not specify further whether this provision only includes the states' territories,[231] or whether the states' entire spectre of jurisdiction is covered.[232] Therefore, these provisions from the founding treaties do not provide a sufficient legal basis to establish general EU jurisdiction at sea.

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An alternative reasoning, based on the founding treaties of the EU, is linked to the conferral of competences. According to the principle of the conferral of competences, the EU shall only act in so far as the Member States have conferred competences in the Treaties.[233] When this is the case, the EU may act, adopt measures and assert a form of jurisdiction.[234] One may conclude that the EU gains jurisdiction over activities at sea as well, to the extent that the Member States conferred this competence to the EU. How far this works in practice depends on the activity, as explained further below in section 3.2.

The view that EU competence over activities at sea depends on the conferral of competences is supported by the declaration made by the European Communities, predecessor of the European Union, at the time of ratification of UNCLOS, 1 April 1998:

> *(…) By depositing [this instrument], the Community has the honour of declaring its acceptance, in respect of matters for which competence has been transferred to it by those of its Member States which are parties to the Convention, of the rights and obligations laid down for States in the Convention and the Agreement. The declaration concerning competence provided for in Article 5(1) of Annex IX to the Convention [follows]. (…)*[235]

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[229] Ibid., pp. 1630-1631.
[230] TEU art. 52.
[231] TFEU art. 355 specifies the territorial applicability further with a list of territories, indicating whether or not EU law is applicable there. Nevertheless, the territories mentioned are only overseas islands and territories. Therefore, this article is of no further assistance for determining the applicability of EU law at sea.
[232] Jurisdiction can also be based on the nationality of persons, the place of registration of companies, the flag state of ships and airplanes, and, as explained in the previous chapter, on sovereign rights state enjoy in their EEZ and on their continental shelf.
[233] TEU art. 5(2).
[234] The conferral of competences in concrete legislative areas (i.e. internal market, environment, energy) is based on art. 5(2) TEU jo. art. 2-4 TFEU.
[235] Declaration of the European Communities upon formal confirmation (1 April 1998) of ratification of UNCLOS: Declaration concerning the competence of the European Community with regard to matters governed by the United Nations Convention on the Law of the Sea of 10 December 1982 and the Agreement of 28 July 1994 relating to the implementation of Part XI of the Convention.

In this declaration, the link between the transferral of competences and the rights and obligations Member States have according to UNCLOS is made clear. However, even with this declaration, several questions remain with regard to the application of EU law at sea.

These questions related to the extent to which EU primary and secondary law is applicable at sea have given rise to a number of cases before the Court of Justice of the European Union (CJEU).[236] The line of case law stretches back several decades and has resulted in the development of a general rule. In principle, when a coastal State has (functional) jurisdiction over a certain area or certain activity, EU law also applies to this area or activity, even when the legislation in question refers specifically to 'territory'.[237] The term 'territory' is thus interpreted extensively in order to include offshore activities even beyond the territorial waters.

In a case that is very relevant to the development of the MOG,[238] the CJEU passed judgement on whether the Habitats Directive would be applicable to the activities of the UK in the EEZ.[239] Article 2(1) of this Directive states that, "the aim of the directive is to contribute towards ensuring biodiversity (…) in the European *territory* of the Member States to which the EC Treaty applies". According to the European Commission, the UK had unlawfully limited the scope of the Habitats Directive to the territorial zone. The Commission argued that as the UK exercises its sovereign powers beyond the territorial zone, the Habitats Directive should also apply there. The Court agreed with this reasoning and thus confirmed its earlier stance that EU law 'follows' national sovereignty. Thus, the Habitats Directive was applicable to the maritime zones of the UK in so far as the UK exercised its jurisdiction there.[240]

With the extensive interpretation of 'territory' in the cases above, the question arises as to what extent the application of EU law can be stretched with regard to activities taking place at sea. The Court answered this question in the *Aktiebolaget NN* case.[241] This case concerned the question whether the Sixth VAT Directive was applicable to the construction of an offshore fibre-optics telecommunications cable between Sweden and another Member State.[242] The Court considered that this activity was not covered by art. 56 and 60 UNCLOS (sovereign rights) but rather by art. 79 (the freedom to lay submarine cables and pipelines).[243] However, art. 79

[236] Joined Cases 3/76, 4/76 and 6/76 *Cornelis Kramer and others*, ECLI:EU:C:1976:114; Case 61/77 *Commission v. Ireland* ECLI:EU:C:1978:29; C-37/00 *Weber* ECLI:EU:C:2002:122; C-6/04 *Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland* (*Habitats Directive*) ECLI:EU:C:2005:626; C-111/05 *Aktiebolaget NN v Skatteverket,* ECLI:EU:C:2007:195; C-347/10 *Salemink v. Raad van bestuur van het Uitvoeringsinstituut werknemersverzekeringen* ECLI:EU:C:2012:17; C-266/13 *L. Kik v. Staatssecretaris van Financiën*, ECLI:EU:C:2015:188.
[237] C-37/00 *Weber*, para 32 and 34; C-6/04 *Commission v. United Kingdom* (Habitats*)*, para 115, 117. See also C-347/10 Salemink v. Raad van bestuur van het Uitvoeringsinstituut werknemersverzekeringen.
[238] CJEU, Case C-6/04 *Commission v. United Kingdom* (Habitats*)*.
[239] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive). The Habitats Directive is explained in more detail in section 3.4.4.3.
[240] C-6/04 *Commission v. United Kingdom* (Habitats*)*, para 115, 117.
[241] C-111/05 *Aktiebolaget NN v Skatteverket*; Waverijn, Nieuwenhout 2019, pp. 1634-1635.
[242] C-111/05 *Aktiebolaget NN v Skatteverket*, para 12.
[243] Iibd., para 59.

does not grant coastal states jurisdiction, which is why EU law also does not apply.[244] This reasoning has been confirmed in subsequent CJEU case *Kik v Staatssecretaris van Financiën*.[245] With *Aktiebolaget* and *Kik,* the focus on sovereign rights to establish jurisdiction for the EU resulted in reverse reasoning: when there is no exclusive sovereign right for the coastal state, such as in the case of the laying of transport pipelines and interconnector cables, the EU also does not have jurisdiction.

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The difference between this case and the earliest case on offshore jurisdiction for the EU, *Kramer and others,*[246] is striking. In this combination of cases, which concerned fishermen who breached provisions in EEC law at the high seas, the question was whether the EEC had the competence to regulate fishing on the high seas. In the reasoning of the Court at that time (before UNCLOS was adopted) it became clear that jurisdiction of the EEC is dependent on the fact that states have similar authority under public international law – to fishing on the high seas. Fishing on the high seas, like the construction of cables and pipelines, does not fall under coastal states' exclusive rights, it is a right for all states. However, as the *Kramer* cases were judged in very different legal and factual circumstances, before the adoption of UNCLOS and thus before legal recognition of 'Exclusive Economic Zones', the author pleads that these cases should be treated as 'outliers', with the much more recent *Aktiebolaget* case as new standard, which has been confirmed in subsequent cases.

Following from the judgments of the CJEU in favour of establishing EU jurisdiction for activities that fall within national jurisdiction, as well as judgments against establishing EU jurisdiction for activities that fall outside national jurisdiction, the general rule that can be derived from current case law is that the applicability of EU law follows the extent of national jurisdiction. As explained in the previous chapter, this may give rise to difficulties with regard to hybrid assets for which the extent of jurisdiction of coastal states is unclear at the moment.

3.2 EU Competences to Regulate Offshore Electricity Infrastructure

As mentioned above, the EU can only act when and as far as the Member States conferred competences upon it in the founding treaties.[247] This is important as the competences, as laid down in the founding treaties, form the basis for the current EU legal framework as well as for the future legal framework for offshore electricity infrastructure. First, the TFEU provides a general enumeration of competences conferred upon the EU, either exclusively for the EU or shared, meaning that Member States have competence as long and far as the EU has not made use of the competence.[248] Then, there are specific competences for specific policy fields,

[244] Ibid., para 59-61.
[245] C-266/13, L. Kik v. Staatssecretaris van Financiën;. See also Waverijn, Nieuwenhout 2019, p. 1635.
[246] Joined cases 3, 4 and 6-76, *Cornelis Kramer and others*.
[247] TEU art. 5(2) and TFEU art. 2-4. For a general history on the development of the founding Treaties and the historical development of the place of the energy sector in these treaties, see H. Vedder, A. Ronne, M. Roggenkamp, I. del Guayo, 'EU Energy Law' in M. Roggenkamp, C. Redgwell, A. Ronne and I. del Guayo (Eds), *Energy Law in Europe*, Oxford University Press 2016, 3rd Edition, p. 193 and further.
[248] TFEU, art. 2-4.

elaborated in dedicated Treaty articles in which the exact aims and limitations of the competences are mentioned.

With the introduction of the Treaty of Lisbon, there is a specific article dedicated to energy.[249] It provides that EU energy policy shall aim to ensure the functioning of the energy market; ensure security of energy supply in the Union; promote energy efficiency and energy saving and the development of new and renewable forms of energy; and promote the interconnection of energy networks.[250] The EU, using the Ordinary Legislative Procedure (OLP),[251] shall take the necessary measures to achieve these objectives.[252] Nevertheless, the Member States retain the right to determine the conditions for exploiting their energy resources, the choice between different sources as well as the general structure of their energy supply.[253] It must be noted that this right may be limited somewhat again by obligations of the Member States towards renewable energy,[254] and climate law, for example through the measures to reduce greenhouse gas emissions. However, within the targets set by the EU (and the Member States combined), the choice of which type of low-carbon energy sources are used lies with the Member States.

Apart from the energy competence in Article 194 TFEU, there are several other competences that are also relevant for offshore electricity infrastructure. For example, the competence for environmental issues, laid down in Articles 191-193 TFEU, enables the adoption of legislation with the goal to preserve, protect and improve the quality of the environment.[255] There is a link with the promotion of renewable energy, such as offshore wind energy, to achieve climate targets by reducing greenhouse gas emissions. Moreover, there is a link with (offshore) spatial planning due to environmental protection of the areas in which offshore electricity infrastructure is constructed.

Another relevant competence is the competence on trans-European networks, enshrined in art. 171 TFEU. It provides a basis for the EU to adopt legislation with the aim of promoting the interconnection and interoperability of national networks as well as access to these networks. Cross-border electricity infrastructure and essential parts of national grid infrastructure also fall under trans-European networks, although art. 194(1)d gives competence for the interconnection of energy networks specifically and may thus be considered a *lex specialis* to the trans-European networks competence. Finally, there is a competence on harmonisation of the internal market.[256] This competence is used for measures with the aim of establishing

[249] The Treaty of Lisbon entered into force in December 2009. The specific article is art. 194 TFEU
[250] TFEU art. 194.
[251] The 'Ordinary Legislative Procedure', previously referred to as 'co-decision procedure', is described in detail in art. 294 TFEU. This procedure is used for most legislative processes in the EU.
[252] TFEU art. 194(2).
[253] Ibid.
[254] This is elaborated further in section 3.4.2.
[255] TFEU art. 191-193.
[256] TFEU art. 114.

or ensuring the functioning of the internal market.[257] The competence on the internal market is used as a general competence, a safety net for if no specific competences are available. The integration of the EU energy market fell under this competence until 2009, when the specific competence on energy was introduced in the Treaties. As the competence on the internal market is no longer used for energy-related policy, it will not be elaborated upon further in this chapter.

Overlap between competences may exist where the exact borders of the competences are not clear. In general, the main reason why choosing the right competence in case of overlapping policy fields is important, is procedural. For each competence, it is stated in the founding treaties which legislative procedure has to be used. Basing legislative action on the wrong competence may lead to a wrong procedure, which may result in nullity of the legislative act.[258] As the competences that are relevant for the offshore electricity grid are all based on the Ordinary Legislative Procedure,[259] there is no risk that the wrong procedure is used.

Some competences are 'exclusive competences' for the EU, and some are 'shared competences' between the EU and the Member-States. For the latter, "the Union and the Member States may legislate and adopt legally binding acts in that area. The Member States shall exercise their competence to the extent that the Union has not exercised its competence. The Member States shall again exercise their competence to the extent that the Union has decided to cease exercising its competence."[260] This means that Member States can only legislate as far as the EU has not already exercised its competence in that area. The competences of energy, trans-European networks and the internal market are all shared competences.[261]

3.3 Connection to EEA and Third States

Although most North Sea coastal states are Member States of the EU, this paragraph explains the rights and competences of the North Sea coastal states that are not Member States of the EU, namely Norway and the UK.

3.3.1 EEA Agreement

Although Norway is not a member of the EU, it does form part of the internal market via the European Economic Area-Agreement (EEA-Agreement).[262] The EEA Agreement forms the bridge for the adoption of EU legislation in the EU. Legal instruments adopted by the EU which are relevant to the EEA, mostly related to the internal market, will have to be transposed into

[257] As laid down in TFEU art. 26(1) and 114 TFEU.
[258] Müller 2016, p. 88. See for example C-300/89 *Commission v. Council* (Titanium Dioxide) ECLI:EU:C:1991:244.
[259] See footnote 251 above for an explanation of the OLP.
[260] TFEU, art. 2(2).
[261] TFEU, art. 4.
[262] Agreement on the European Economic Area (EEA Agreement), OJ No L 1, 3.1.1994, U.N.T.S. I-31121, p. 3; and EFTA States' official gazettes). The Member States to this agreement are Norway, Iceland, Liechtenstein and all EU Member States.

Norwegian law once adopted by the EEA.[263] Whereas EU instruments are automatically binding to EU states, they are only applicable to EEA states after their adoption in the Annexes to the EEA Agreement. The procedure is that for legal instruments marked 'with relevance to the EEA', the Joint Committee, which consists of the ambassadors of Iceland, Norway and Liechtenstein as well as representatives from the European External Action Service, have to make a decision on whether to officially incorporate it into the EEA Agreement, either integrally or with adaptations.[264] This procedure is time-consuming, which results in a legislative 'lag', sometime of several years. Nevertheless, EEA States are involved in the legislative process at an early stage: the EEA Agreement requires that the European Commission seeks advice from the EEA Members when it drafts new legislative proposals.[265]

Energy as a general topic is incorporated in the EEA Agreement.[266] In a separate annex (Annex IV), all relevant energy-related acts adopted by the Joint Committee are listed. The legislative lag is also clearly visible here: the legal instruments of the Third Energy Package, adopted by the EU in 2009, were finally adopted in the EEA Agreement in 2017,[267] after which implementation in the national legislative systems of the EEA states took place. This created an interesting situation in that, until recently, the EEA states still worked with the previous relevant Directive and Regulations, from 2003.[268] The EEA did adopt other instruments such as the Renewable Energy Directive and the Regulation on the Connecting Europe Facility (CEF) in this period,[269] but the legislative instruments of the Third Energy Package proved more difficult to accept.[270] Although the aim behind adoption of EU legislation in the EEA Agreement is legislative uniformity, the legislative lag in certain instruments may distort this.

3.3.2 Status of the UK

The status of the UK in the future offshore grid is difficult to predict at the moment, due to the fast-changing developments of Brexit. However, after the election result of 12 December 2019, in which the pro-Brexit Conservative party was returned to power with a significantly

[263] EEA Agreement, art. 7.
[264] EEA Agreement, art. 102.
[265] EEA Agreement, art. 99.
[266] EEA Agreement, art. 24 jo. Annex IV. For a detailed account of Energy Law within the EEA, see: D. Busschle, B. Jourdan-Andersen, 'Energy Law' in C. Baudenbacher (ed), *The Handbook of EEA Law* (Springer 2016) p. 773ff.
[267] Decision of the EEA Joint Committee No 93/2017 of 5 May 2017 amending Annex IV (Energy) to the EEA Agreement [2019/205], OJ L 36/44.
[268] Directive 2003/54/EC concerning common rules for the internal market in electricity, OJ L 176, 15/07/2003; Regulation (EC) No 1228/2003 on conditions for access to the network for cross-border exchanges in electricity, OJ L-176/1, 15/07/2003.
[269] An interesting detail in this regard is that, whereas Regulation (EU) No 1316/2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010,OJ L-348/129 20-12-2013 (CEF Regulation) is adopted by the EEA, the Regulation on which it is based, Regulation 347/2013 on guidelines for trans-European energy infrastructure (TEN-E Regulation), is not adopted by the EEA. It was deemed to be of relevance to the EEA by the EU legislator, but the EEA states considered it not relevant to implement into the EEA Agreement.
[270] Decision of the EEA Joint Committee No 162/2011 of 19 December 2011 amending Annex IV (Energy) to the EEA Agreement (Renewable Energy Directive); Decision of the EEA Joint Committee No 157/2014 of 9 July 2014 amending Protocol 31 to the EEA Agreement, on cooperation in specific fields outside the four freedoms.

increased majority, the political mandate for the UK Government to leave the EU was reconfirmed. As the UK has now officially left the EU, and the transitional period is not expected to be extended, a period of legislative uncertainty will begin, which will have an effect the energy market. As will be shown in more detail below, cross-border electricity flows between EU Member States are highly influenced by EU law. Cross-border flows between EU Member States and third states inside the EEA or with (potential) candidate Member States are also often based on EU law.[271] Cross-border flows with Switzerland are based the complex bilateral relations between Switzerland and the EU.[272] However, with Brexit, it is not yet clear what the legal status of cross-border electricity trade will be between the UK and any other European country, nor how this legal status will be developed.

One possible way to address the situation is by excluding the UK from the MOG, as exclusion of the UK would make it much simpler to adopt a legal framework on the basis of EU law. However, this greatly reduces the societal benefits of the MOG, for two reasons. First, the UK is a major player in the offshore wind industry, with 44% of the installed capacity of offshore wind energy in the North Sea and many projects in the pipeline.[273] Therefore, there are large societal benefits from the cost-effective connections of OWFs in the UK EEZ. Second, the MOG will deliver more interconnection capacity to the UK. Calculations have proven that interconnectors to the UK deliver a particularly large societal benefit,[274] as the price differences between the continental electricity markets and the UK electricity market often diverge, and because extra interconnection increases the robustness of the system.

For these reasons, it is important to design the legal framework for the MOG in such a way that the UK can also participate in it, even though this means that the legal framework becomes more complicated. This means that the legal framework cannot be based exclusively on EU law.

3.4 Substantive EU Law applicable to offshore electricity infrastructure

A broad range of EU law is applicable to offshore electricity infrastructure. EU legislation and policy plays a large role in the general organisation of the electricity sector of its Member States. In addition, there is EU legislation regarding different topics that are relevant for the planning and construction of OWFs and the MOG itself: promotion of renewable energy, compatibility with state aid provisions, environmental law, maritime spatial planning, trans-

[271] This is based on the Treaty establishing the Energy Community, Athens, 25-10-2005. In article 10 of this Treaty, it is stipulated that “Each Contracting Party shall implement the *acquis communautaire* on energy (…)”.
[272] P.A. van Baal, M. Finger, ‘The Effect of European Integration on Swiss Energy Policy and Governance’, *Politics and Governance* [2019 Vol 7(1)] pp 6–16.
[273] WindEurope, ‘Offshore Wind Key Trends and Statistics 2018’, p. 18.
[274] The societal benefits are derived from the differences in electricity prices, which are higher between continental coastal states and the UK than between continental coastal states amongst each other. Moreover, the peaks in electricity consumption lie differently than in the continental states, due to the time difference. Finally, differences in market structures (i.e. reliance on certain sources of energy) make interconnection more beneficial. These arguments also explain why so many interconnector projects to the UK are planned: A. Vaughan, ‘With Brexit looming, energy sector builds new links to Europe’ *the Guardian,* 18 Aug 2018 https://www.theguardian.com/business/2018/aug/18/brexit-looming-energy-sector-builds-new-links-europe.

European energy networks and (offshore) grid operation. These topics are addressed in this section.

In order to understand which parts of the current legal framework form barriers to the development of a MOG, a two-step approach is used. First, an overview of the applicable EU law is given in this section. In section 3.5, the legal barriers resulting from these legal instruments are elaborated upon.

3.4.1 General Organisation of the Electricity Sector

A short history of EU regulation of the electricity sector shows various key developments. As the electricity sector used to be characterised by large nationally-oriented, vertically-integrated companies, legislative efforts to achieve a common European energy market were difficult.[275] One key effort to advance the internal energy market was to liberalise the electricity sector with a separation of the commercial part of the supply chain, namely the generation and supply of electricity, from the transmission and distribution of electricity.[276] This process is called 'unbundling'. The process of unbundling and liberalisation started in the mid-1990s with administrative separation of the network elements from the commercial elements.[277] It was furthered with the 2003 Directive concerning common rules for the internal market in electricity, in which transmission and distribution activities had to be unbundled in legal, organisational and decision-making terms from other activities.[278] This entailed that, in as far as transmission systems were still owned by vertically integrated companies, they had to be separated at least in legal form from the rest of the company, as well as that the organisation and decision-making structure of the companies had to be separate. In 2009, with the 'Third Energy Package', unbundling was taken even further with extra criteria in order to further eliminate influence between commercial activities and transmission activities.[279]

Currently, there are three forms of unbundling.[280] The first form is ownership unbundling, in which the transmission system is completely separated from generation and supply activities, as the owner of a transmission system is not allowed to directly or indirectly exercise control

[275] The Commission dedicated a working paper to it: European Commission, '*The Internal Energy Market'* COM (88) 238 Final. It identified several obstacles to achieving an internal market in electricity, p. 70 and further.
[276] Directive 96/92/EC concerning common rules for the internal market in electricity, OJ L 027, 30/01/1997, art. 7 (for transmission). This separation entails that at least on management terms, the transmission system operator is independent from other activities.
[277] For the history and development of the concept 'unbundling' in EU energy law, see T.M. Dralle, 'The Unbundling and Unbundling-Related Measures in the EU Energy Sector' *European Yearbook of International Economic Law* [2018 5], p. 21.
[278] Directive 2003/54/EC concerning common rules for the internal market in electricity, art. 10 and 15.
[279] Directive 2009/72/EC concerning common rules for the internal market in electricity, OJ L 211, 14.8.2009, art. 9, 13, 14, 17-23.
[280] For a general overview of the current unbundling rules, see H. Vedder, A. Ronne, M. Roggenkamp, I. del Guayo, 'EU Energy Law' in M. Roggenkamp, C. Redgwell, A. Ronne and I. del Guayo (Eds), *Energy Law in Europe*, Oxford University Press 2016, 3rd Edition, p. 269 and further.

over the functions of generation and supply.[281] The second form is designed for transmission systems that belong to vertically integrated companies. For these systems, an 'independent system operator' needs to be designated, which manages the non-discriminatory access to the networks (third party access), the collection of network charges and which operates, maintains and develops the transmission network.[282] This form is in a phase-out process, only networks that used to be part of a vertically integrated company in 2009 can use this form; this is not possible for newer transmission networks.[283] The third form is the 'independent transmission owner'. If this model is used, the owner of the transmission system needs to fulfil a long list of requirements with regard to personnel, funding and information sharing.[284] The different forms of unbundling show that it is possible to separate the ownership of a transmission network from its daily operation and management. This may be useful for the offshore grid as well, depending on the preferences of the Member-States in this regard.

Another key development was the establishment of regulatory authorities. Already by 1996, national regulatory authorities were established to settle disputes over contracts and negotiations in the newly liberalised energy market.[285] They gradually obtained more powers with the 2003 and 2009 Directives.[286] In 2000, the regulatory authorities of 10 countries voluntarily founded the Council of European Energy Regulators (CEER), to cooperate and address cross-border issues.[287] In addition to CEER, an official EU Agency on the Cooperation of Energy Regulators (ACER) was established in 2009.[288] ACER has many roles with regard to the supervision of the electricity and gas sectors. The roles that are relevant for the construction of a MOG are ACER's participation in the development and implementation of network codes,[289] and making decisions regarding the regulation of cross-border electricity transmission projects, in cases where either the National Regulatory Authorities cannot reach a decision together or have conferred the competence to make decisions on an issue to ACER.[290]

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[281] Directive (EU) 2019/944 on common rules for the internal market for electricity, art. 43 and recitals (68) to (77).
[282] Ibid., art. 44.
[283] Ibid., art. 44.
[284] Ibid., art. 46.
[285] Directive 96/92/EC concerning common rules for the internal market in electricity, art. 20.
[286] Directive 2003/54/EC, art. 23, Directive 2009/72/EC concerning common rules for the internal market in electricity, art. 7(3), 10(2), 11(8).
[287] https://www.ceer.eu/eer_about.
[288] ACER was created by means of Regulation (EC) No 713/2009 establishing an Agency for the Cooperation of Energy Regulators, OJ L 211, 14.8.2009.
[289] The role of EU network codes is explained further in chapter 3.4.6. ACER has a role in submitting framework guidelines, reasoned opinions on draft network codes and reasoned opinions where ENTSO-E has failed to implement a Network Code. Regulation 2019/942 establishing a European Union Agency for the Cooperation of Energy Regulators (ACER), OJ L 158/22, 14.6.2019., art. 5.
[290] Ibid., art. 6(10).

A third important development is the facilitation of cross-border electricity exchanges. This is facilitated by increased (physical) interconnection,[291] standardisation and market integration. There is a European aim for 10% interconnectivity in 2020,[292] based on the European Council conclusions of March 2002.[293] In 2014, the 10% electricity interconnection target was extended to 15% by 2030 "while taking into account the cost aspects and the potential of commercial exchanges in the relevant regions."[294] The increase in interconnectivity projected by the Commission and Council is facilitated by the Trans-European Energy Networks for Electricity (TEN-E) Regulation, which identifies so-called Projects of Common Interest (PCIs) for the electricity network and facilitates the timely construction thereof,[295] for example by streamlining the permitting process.[296] Market integration is also facilitated through the adoption of common rules in the European Network Codes, which are legal instruments that contain the technical specifications for a safe and reliable operation of the electricity system.[297]

In the context of cross-border cooperation, another development is the establishment of ENTSO-E, the European association for TSOs in electricity. ENTSO-E was founded in 2009,[298] and its primary roles are supporting the implementation of EU energy policy, facilitating cooperation between TSOs, and providing information on the electricity markets and cross-border flows. Whereas ENTSO-E is founded through an EU legal instrument, the organisation also has TSOs from non-EU countries among its members. Examples are the Balkan states which are part of the synchronous continental electricity grid, and the Norwegian and Icelandic TSOs, which are part of the EEA.[299] However, participation of the UK after Brexit is not certain.

3.4.2 Promotion of Renewable Energy

Since 2009, the promotion of renewable energy has been one of the goals of EU energy policy. This is visible from the Directive on the Promotion of Renewable Energy, adopted in April 2009.

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[291] Commission Expert Group on electricity interconnection targets, 'Towards a sustainable and integrated Europe', 11-2017, p. 10-11.

[292] Interconnectivity is defined as import capacity over installed generation capacity in a Member State.

[293] The European Council of March 2002 encouraged Member-States to work towards an interconnection target of at least 10%. The October 2014 European Council called on States again with the same message, but with a deadline of 2020. See, for the Council conclusions: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf

[294] Commission Proposal: COM(2014) 330 final; Council Conclusions of 23 and 24 October 2014: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf

[295] Regulation (EU) 347/2013 of the European Parliament and of the Council of 17 April 2013 on Guidelines for Trans-European Energy Infrastructure (TEN-E Regulation), art. 1 and Annex 1(1)1.

[296] National authorities should give 'the most rapid treatment legally possible' to these projects, create a one-stop-shop and adhere to maximum terms for responding to the. TEN-E Regulation, art. 7(2)

[297] Regulation (EU) 714/2009, art. 6. Network Codes exist for connection (Requirements for Generators, HVDC Connections), Operations (System Operations, Emergency and Restoration) and Market (Capacity Allocation & Congestion Management, Forward Capacity Allocation and Electricity Balancing). The relevant network codes are elaborated in more detail in chapter 3.4.6.

[298] Regulation 714/2009 on conditions for access to the network for cross-border exchanges in electricity, art. 4 and 5.

[299] https://www.entsoe.eu/about/inside-entsoe/members/.

This directive sets national targets for renewable energy and provides for other rules to promote the use of renewable energy, for example through changing the market rules for renewable energy.[300] A few months later, the Lisbon Treaty was adopted, which introduced a special 'energy competence' in the Treaty on the Functioning of the European Union.[301] This competence, adopted in art. 194 TFEU, includes energy efficiency and the promotion of renewable energy.[302]

Since then, the Juncker Commission (2014-2019) has introduced the 'Energy Union'. One of the goals of the Energy Union, which now forms the umbrella for most EU energy policy, is to stimulate 'sustainable' energy.[303] In the documents in which this term is used, it becomes clear that sustainable means low-carbon and climate-friendly.[304] This increases the importance of the promotion of renewable energy within the energy policy of the European Union.

With the adoption of the Clean Energy Package in 2018-2019, the introduction of large amounts of renewable energy became central to EU energy policy. As part of the Clean Energy Package, the Directive on the Promotion of Renewable Energy was also recast. Instead of the earlier national renewable energy targets,[305] the recast Directive focuses on a European-wide, collective target of 32% renewable energy in the gross final energy consumption by 2030.[306] Collective rather than individual targets are introduced, to increase cooperation between the states, and to reflect the collective responsibility states have towards climate change.

The (recast) Directive provides common rules and objectives for support schemes for renewable energy,[307] which can be considered as a *lex specialis* to the general rules on state aid, which are explained below. The (recast) Directive also facilitates EU Member-States to open their support schemes for renewable energy to participants from other Member-States, which is an extra measure on top of the cooperation mechanisms that already existed under the 2009 Directive and that are also adopted in the (recast) Directive.[308] These mechanisms could provide a legal basis for cooperation between coastal states on the support for

[300] With priority access and priority dispatch, adopted in art. 16 of the Directive, the principle of non-discrimination in the energy sector is set aside in order to stimulate energy from renewable sources rather than energy from other sources.
[301] Earlier legislation on energy policy was based on the internal market competence or, in the case of the promotion of renewable energy, on the environmental competence.
[302] TFEU, art. 194(1)c.
[303] In full, the goals of the Energy Union are "to give EU consumers - households and businesses - secure, sustainable, competitive and affordable energy": European Commission, Energy Union Package, COM(2015) 80 final, 25.2.2015.
[304] Ibid., p. 2
[305] Directive 2009/28/EC on the promotion of the use of energy from renewable sources (Renewable Energy Directive, RED), OJ L 140/16, Annex I, the individual targets per Member-State differ, according to the base scenario and the RES potential of that Member State. However, the combination of all national targets should lead to at least 20% share of renewable energy in the total energy consumption.
[306] Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (recast), OJ L 328/82, 21-12-2018, art. 3.
[307] Ibid., art. 4.
[308] Ibid., art. 5, art. 8-14. H. Klinge Jacobsen, L-L Pade, S.T. Schröder, L. Kitzing, 'Cooperation Mechanisms To Achieve EU Renewable Targets', *Renewable Energy* [2014 63] 345-352.

renewable energy, notably offshore wind, connected to a meshed offshore grid.[309] Examples of cooperation mechanisms are 'joint projects', which are limited to a specific project or group of projects, and 'joint support schemes' which offer a general support scheme between two (or more) Member-States. Both joint projects and joint support schemes could be envisaged as a way to bridge national incompatibilities between support schemes.

A heavily debated issue for renewable energy in general is the provision of priority access and priority and/or guaranteed dispatch for renewable energy.[310] An important change to the 2009 Directive is that priority access and dispatch of renewable *electricity* are removed from the Directive with the legislative changes of 2019. Currently, only access for renewable gases to the gas transmission and distribution networks is still in the Renewable Energy Directive.[311] Priority access and dispatch for renewable electricity are not deleted completely, rather they are moved to the Regulation on the Internal Market for Electricity and limited significantly. Only small installations (less than 400 kW) and demonstration projects for innovative technologies are eligible.[312] Therefore, priority dispatch will generally not be applicable to the offshore wind sector, except for demonstration projects. Priority access is not as relevant for offshore wind farms as for onshore renewable electricity projects, as in most countries, access to the grid is already diligently planned and adjusted to the commissioning date of the OWF.[313] It must be noted that, even though diligently planned and adjusted, onshore integration of the offshore generated electricity may become problematic in the future, as the volumes of offshore generated electricity increase significantly. Therefore, adjustment of the (onshore) market rules will become necessary again in the future (see section 3.5.6).

Another new element added by the (recast) Directive of 2018 is that the European Union expects Member States to gradually open their renewable energy support systems to renewable energy projects in other Member States. This is an interesting development regarding earlier case law of the CJEU in the 'Ålands Vindkraft' case.[314] This case was about a wind farm located on the Åland islands, which are Finnish territory but connected to the Swedish electricity grid with a much stronger link than to the Finnish electricity grid. Although in this case, the wind farm was located on an island, the situation is comparable to an offshore wind farm that is connected to two coastal states in a MOG. In the Åland case, the wind farm operator objected to refusal from the Swedish authorities to grant green energy certificates to the energy produced by his wind farm on Åland. The Swedish authorities limited the certificate system (the Swedish renewable energy support system) to energy produced on the

[309] S.T. Schröder, L. Kitzing, H.K. Jacobsen, L.L. Pade, 'Joint Support and Efficient Offshore Investment: Market and Transmission Connection Barriers and Solutions', *Renewable Energy Law and Policy Review* [2012 2] pp. 112-120.
[310] Directive 2009/28/EC on the promotion of the use of energy from renewable energy, art. 16.
[311] Directive 2018/2001 on the promotion of the use of energy from renewable sources (recast), art. 20.
[312] Regulation 2019/943 on the internal market for electricity, OJ L 158, 14.6.2019, art. 11.
[313] For example, in Germany and in the Netherlands, the commissioning date of the OWF and the grid connection are stipulated in the tender conditions. There are penalty payments for delays, both on the side of the OWF developer and on the side of the TSO regarding the grid connection.
[314] Case C-573/12, *Ålands Vindkraft AB vs Energimyndigheten,* ECLI:EU:C:2014:2037.

territory of Sweden, but the wind farm operator on Åland deemed this to be discriminatory in light of art. 34 TFEU (free movement of goods).[315] The Court decided that the restriction of the Swedish renewable energy support system to electricity generated in Sweden was indeed a barrier to cross-border trade in goods, or, in the words of the Court, "constitutes a measure having equivalent effect to quantitative restrictions on imports, in principle incompatible with the obligations under EU law resulting from Article 34 TFEU, unless that legislation can be objectively justified (…)."[316] As a next step, the Court judged that in this case, the refusal to grant green energy certificates to this wind farm was objectively justified in light of the promotion of renewable energy in Sweden and specifically the discretion of the Member-State to organise the scheme in such a way that it could justify the costs of the scheme.[317] Having to open up its support scheme to electricity produced elsewhere would increase the costs significantly, and this could not be forced upon a Member-State.

This case dates from 2014, and the factual circumstances of the case even date back to 2009. At that time, Member-States were not ready to open their support schemes to renewable energy from other Member-States, except in specific cooperation agreements.[318] However, since then, Member-States have significantly developed their support schemes for renewable energy. One could wonder whether territorial limitations of support schemes should still be justified in the current factual circumstances. The recast Directive of the Clean Energy Package presented an opportunity for the EU legislature to make this clear. However, it appears that forced opening of territorially limited support schemes was still a bridge too far: with the new rules introduced by the Clean Energy Package, Member States "have the right" to open their support schemes: indicative targets ranging from 5% in 2023-2026 to 10% in 2027-2030 are mentioned.[319] However, in the future this may be less voluntary; an evaluation of the implementation of this article is planned in 2023, and if this evaluation shows that the national support schemes are not opened for at least 5% in 2025 and 10% in 2030 to bids from other EU Member States, an obligation to open up support schemes to these percentages may be introduced.[320] Offshore wind energy in the North Sea, connected to a MOG, may be an interesting opportunity to open up specific support schemes of the North Sea coastal states, especially when OWFs are physically connected to multiple coastal states. However, this depends on political willingness and on the degree of cooperation between the North Sea states.

Finally, the (recast) Directive on the promotion of renewable energy provides for various other topics, such as a framework for the administrative accounting of renewable energy, for local

[315] Electricity is considered a good according to case law of the CJEU: C-393/92, *Gemeente Almelo and Others v Energiebedrijf IJsselmij,* ECLI:EU:C:1994:171, para 28.
[316] Case C-573/12, *Ålands Vindkraft AB vs Energimyndigheten,* ECLI:EU:C:2014:2037, para 75.
[317] Ibid., para 103 ff.
[318] For example, via the cooperation mechamisms mentioned above. It must be noted that since 2012, so three years after the Alands Vindkraft case, Norway and Sweden have had a joint support scheme. However, there was no such agreement with Finland.
[319] Directive 2018/2001 on the promotion of the use of energy from renewable sources (recast), art. 5.
[320] Ibid., art. 5(5).

energy communities, renewable heating and cooling and for self-consumption of renewable energy. These topics are not relevant for the construction or operation of an offshore electricity grid and will therefore not be elaborated upon further.

3.4.3 Compatibility of State Aid with the Internal Market

Next to dedicated energy law, the energy sector also has to abide by the general rules of EU law, enshrined in the founding treaties, complemented with secondary EU law and case law by the Court of Justice of the EU (CJEU). These general rules of EU law are for example the rules on free movement of goods and services, as well as the rules on competition law and state aid.[321] It reaches beyond the scope of this chapter to treat all the general rules of free movement, competition law and state aid in detail,[322] but some attention must be paid to the rules on state aid because it (still) plays a large role in the renewable energy sector and in energy infrastructure investments, and will also impact the construction of a MOG and the OWFs connected to it.

In general, the founding Treaties of the EU prohibit Member States to give certain undertakings or activities an economic advantage (aid) over others if this distorts the internal market.[323] Nevertheless, there may be exemptions for certain products or activities,[324] including some forms of electricity generation and transmission activities. In order to inform the sector about which activities are allowed to receive state aid and which are not, the European Commission issued a guidance document specifically for energy and environmental protection.[325] These Guidelines, albeit non-binding, indicate the Commission's position on the conditions under which the aid is deemed compatible with the internal market. When the Commission finds aid to be incompatible with the internal market, it decides that the State is to abolish the aid or to alter it in order to make it compatible again.[326] Therefore, the Guidelines form an important source of information on how state aid legislation should be interpreted in the context of the energy sector. It must be noted that it is still necessary to notify the Commission of an intention to give state aid and to wait for approval (notification obligation).[327] During this period, states are not yet allowed to put the proposed measures to effect (standstill procedure).[328]

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[321] TFEU Title II (Free Movement of Goods, TFEU artt. 101,102,106, 107 and 108 (Competition law and state aid regulation).
[322] One can refer to the following literature instead: H. Vedder, A. Ronne, M. Roggenkamp, I. del Guayo, 'EU Energy Law' in M. Roggenkamp, C. Redgwell, A. Ronne and I. del Guayo (Eds), *Energy Law in Europe*, Oxford University Press 2016, 3rd Edition, chapter 4; Chr. Jones (Ed.), *EU Energy Law Vol. II: EU Competition Law and Energy Markets* [Claeys&Casteels 2016]; L. Hancher, A. de Hauteclocque , F. Salerno, *State Aid and the Energy Sector* [Hart Publishing 2018].
[323] TFEU art. 107(1).
[324] TFEU art. 107(3).
[325] Communication from the Commission, Guidelines on State aid for environmental protection and energy 2014-2020 (2014/C 200/01).
[326] TFEU art. 108.
[327] TFEU art. 108(3).
[328] Ibid.

For renewable energy, including offshore wind energy, financial support should be based on a market premium rather than a fixed amount.[329] In addition, the entity receiving the aid should participate in the balancing market,[330] and there should be measures in place to prevent negative pricing.[331] Moreover, aid should be granted following a competitive bidding process.[332] Regarding energy infrastructure aid, the Commission performs a case-by-case analysis, which takes into account whether there are any market failures; whether the project adheres to the principles of Third Party Access and tariff regulation and to what extent the project contributes to the security of supply.[333]

3.4.4 Environmental Law and Maritime Spatial Planning

Offshore electricity generation and transmission infrastructure has an impact on the area around it, both in terms of the use of public space in general, and in terms of environmental impact. Therefore, it is important for coastal states to determine which areas are the most suitable for offshore wind energy (maritime spatial planning). This depends, amongst other things, on environmental law. In this chapter, environmental law and maritime spatial planning are combined as there is a large overlap between the two areas of law where it concerns offshore wind and offshore grid developments. Offshore wind and offshore grid projects may be located in or near protected nature areas, such as Natura 2000 areas, and are likely to have an environmental impact. By choosing locations strategically, the environmental impact of offshore wind and offshore grid projects can be reduced.

Environmental policy has been addressed at European level since the 1970s, with various measures related to the internal market.[334] From 1987 onwards, the objective of environmental protection was also adopted in the founding Treaties.[335] In terms of substantive law, the relevant instruments for offshore electricity infrastructure are the Environmental Impact Assessment (EIA) Directive,[336] the Strategic Environmental Assessment

[329] Communication from the Commission, Guidelines on State aid for environmental protection and energy 2014-2020 (2014/C 200/01), para 124a
[330] Ibid., para 124b
[331] Ibid., para 124c.
[332] Ibid., para 126.
[333] Ibid., para 207.
[334] J. Jans, H. Vedder, *European Environmental Law* [Europa Law Publishing 2012, 4th ed] pp. 3-4.
[335] With the entry into force of the Single European Act on 1 July 1987.
[336] Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment, OJ L-124/1 25-4-2014 (hereinafter EIA Directive).

(SEA) Directive,[337] the Habitats Directive,[338] the Birds Directive,[339] the Marine Strategy Framework Directive[340] and the Maritime Spatial Planning Directive.[341]

3.4.4.1 Environmental Impact Assessment Directive

The Environmental Impact Assessment (EIA) Directive states that for activities which are expected to have an impact on the environment, an Environmental Impact Assessment (EIA) has to be provided.[342] The scope of the Directive is relatively wide, as it also covers cumulative effects of different projects. Moreover, positive environmental effects, such as the increase of biodiversity, also fall within the scope.[343] Projects for which an EIA is required are listed in its Annexes I and II; Annex I for the activities for which an EIA is compulsory and Annex II for activities for which the national authorities decide whether an EIA is necessary.[344]

The construction of offshore windfarms is mentioned in Annex II: 'installations for the harnessing of wind power for energy production (wind farms)'. There is no differentiation between onshore and offshore, but as explained in paragraph [3.2], the EIA Directive is presumed to be applicable to offshore wind farms as well. Concerning electricity transmission infrastructure, however, Annex I mentions overhead electrical lines with a voltage of 220 kV or higher and a length of 15 km or more. This can be relevant for the onshore grid reinforcements necessary to facilitate the connection to an offshore grid. However, offshore electricity cables are buried into the seabed. The EIA Directive makes no mention of underground cables.[345] Interestingly, underground cables are mentioned in a Commission working document on the application and effectiveness of the EIA Directive as a possible point that needs to be amended.[346] However, in the latest revision of the EIA Directive, this has not been addressed, although the construction and operation of subsea cables may also impact the environment.[347] Therefore, it is interesting that the question whether or not an EIA obligation exists for the offshore electricity cables is not addressed in the last revision of the EIA Directive. A comment in this regard is that Member States have a margin of discretion to

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[337] Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, OJ L197/30 21-7-2001.

[338] Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, OJ L206/7 22-7-1992 (Habitats Directive).

[339] Directive 2009/147/EC on the conservation of wild birds, OJ L20/7 26-1-2010.

[340] Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive), OJ L-164/19 25-6-2008.

[341] Directive 2014/89/EU establishing a framework for maritime spatial planning, OJ L-257/135 28-8-2014.

[342] Directive 2014/52/EU (EIA Directive), art. 4.

[343] Jans, Vedder 2012, p. 346/347. CJEU C-142/07, *Ecologistas en Accion-CODA* ECLI:EU:C:2008:445, para 41.

[344] Jans, Vedder 2012, 349.

[345] Neither onshore nor offshore underground cables. It must be noted in this regard that onshore underground high voltage cables are also subject of discussion. See for example, H. Kamp, Kamerbrief 380 kV hoogspanningsverbinding Eemshaven-Vierverlaten, DGETM-EO / 16188366 (in Dutch).

[346] Report from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on the application and effectiveness of the EIA Directive (Directive 85/337/EEC, as amended by Directives 97/11/EC and 2003/35/EC), COM(2009) 378 final, 23.07.2009, p. 3.

[347] NIRAS, 'Subsea Cable Interactions with the Marine Environment, Expert Review and Recommendations Report', 12-2015.

require an EIA to be performed for activities that have a significant impact on the environment based on art. 2(1) of the EIA Directive,[348] which means that states could also demand an EIA based on their national law rather than on EU law. As the MOG requires the construction of a large amount of submarine cables, the obligations with regard to submarine electricity cables could be clarified in the next revision of the Directive.

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Some projects have cross-border environmental impact, either in the construction phase or in the operational phase. This can also be the case for offshore wind energy and transmission infrastructure. If this is to be expected, neighbouring countries have to be informed about the project and about its possible transboundary impact. Moreover, within reasonable time, they should be able to indicate whether they wish to participate in the EIA procedure.[349] This is based on the Espoo Convention on Environmental Impact Assessment in Transboundary Context, and the implementation thereof in the EIA Directive.[350]

3.4.4.2 Strategic Environmental Assessment Directive

In the context of a MOG, it is relevant to assess not only the impact of a single extra OWF or offshore electricity transmission project but also the cumulative environmental impact of the many wind farms and electricity infrastructure projects planned in the North Sea. Whereas the EIA Directive targets individual projects, the Strategic Environmental Assessment (SEA) Directive targets plans and programmes. Thus, in this instrument, the cumulative impact of a range of projects in the same area can be taken into account.

The Directive obliges policy-makers to develop an SEA for public plans and programmes at a national, regional and local level. Public plans for all activities covered under the EIA Directive or under the Habitats Directive fall under the scope of this Directive.[351] Thus, as OWFs and offshore grid developments are likely to have an impact on the environment, the policies and plans on these topics are also under the scope of the Directive. The SEA Directive bears several similarities to the EIA Directive: the SEA should also be performed before the adoption of the plan or programme, in order for it to be taken into account in the decision-making procedure.[352] Moreover, there is also a special provision for transboundary consultations with a view to give neighbouring Member States influence over the drafting of the SEA and the ability to participate in the consultation process.[353]

3.4.4.3 Habitats and Birds Directive

The Habitats Directive, which aims to protect wild flora and fauna in general, and the Birds Directive, which is specifically aimed at the protection of wild birds have a large influence on

[348] In combination with their national laws, based on EIA Directive art. 2(2).
[349] Jans, Vedder 2012, p. 353.
[350] Convention on Environmental Impact Assessment in Transboundary Context, Espoo, 1991, U.N.T.S. I-34028; Directive 2014/52/EU (EIA Directive), art. 7.
[351] Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive), OJ L197, 21-7-2001, art. 3(1) and (2).
[352] Ibid., art. 4(1).
[353] Ibid., art. 7.

nature conservation, also offshore. Both Directives are relevant for offshore wind energy as well as offshore electricity infrastructure, as they designate specific protected areas, such as Natura2000 areas,[354] which may overlap with strategic areas for offshore wind energy or electricity transmission infrastructure. For example, many coastal areas are Natura2000 areas and there are some protected areas further offshore as well, such as the Dogger Bank.[355] The CJEU judged explicitly that the Habitats Directive also applies at sea as far as states exercise sovereign rights there.[356]

The main risks regarding offshore wind and grid developments in or near protected areas are the danger of collisions between birds and bats and offshore wind farms and the underwater construction and maintenance of the foundations of wind turbines and converter stations.[357] Nevertheless, whether these risks materialise depends to a large extent on the project siting and design.[358] With regard to the project design, EIAs for OWF projects often include mitigation measures to lower the impact on certain species.[359]

Member States have to take the appropriate measures to minimise pollution, deterioration of habitats and disturbance of animals in the protected areas.[360] Concerning offshore electricity infrastructure, this depends very much on strategic siting of OWFs. Nevertheless, it is not prohibited per se to construct offshore electricity infrastructure in Natura2000 areas: in the specific situation that there is an overriding public interest,[361] and if the procedural safeguards have been followed, it is possible to place an OWF or converter station in a Natura2000 area or in an area affecting the Natura2000 area.[362] These interests and safeguards, including the assessment of alternative solutions and compensatory measures to mitigate the adverse effects to the affected area, are described in a guidance document on art. 6(4) of the Habitats Directive.[363]

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[354] An overview of Natura 2000 areas can be found on http://natura2000.eea.europa.eu/#.

[355] The United Kingdom has provided licenses and support for the construction of three offshore wind farms at the Dogger Bank, they are supposed to be completed by 2024-2025. UK Government, Department of Business, Energy and Industrial Strategy (BEIS), Contracts for Difference Allocation Round 3 Results, published 20 September 2019, Revised on 11 October 2019. In the meantime, the Netherlands and Denmark are considering the construction of an artificial island on the Dogger Bank: https://northseawindpowerhub.eu/.

[356] See above, chapter 3.2.

[357] European Commission, Guidance Document 'Wind energy developments and Natura 2000', 2011, p. 33, 37 and 39.

[358] Ibid., p. 5.

[359] M. Dähne, J. Tougaard, J. Carstensen, A. Rose, J. Nabe-Nielsen, 'Bubble curtains attenuate noise from offshore wind farm construction and reduce temporary habitat loss for harbour porpoises', *Marine Ecology Progress Series* [2017 vol 580]; R.C. Fijn, K.C. Krijgsveld, M.J.M. Poot, S. Dirksen, 'Bird movements at rotor heights measured continuously with vertical radar at a Dutch offshore wind farm', *International Journal of Avian Science* [2015].

[360] Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, OJ L206/7 22-7-1992 (Habitats Directive), art. 6; Directive 2009/147/EC on the conservation of wild birds, art. 4.

[361] What is an 'overriding public interest' is elaborated by the European Commission: European Commission, 'Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC' (January 2007).

[362] European Commission, Guidance Document 'Wind energy developments and Natura 2000', 2011, p. 5, 63ff.

[363] Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC, January 2007

3.4.4.4 Marine Strategy Framework Directive

The Marine Strategy Framework Directive forms the link between environmental law, spatial planning and offshore activities. It aims for the adoption of effective environmental policy for the marine areas of the European Union, including the North Sea.[364] There is a strong link between the requirements of this Directive and the obligations coastal States have under international law following OSPAR.[365] The responsible Directorate-General of the European Commission mentions that the OSPAR secretariat is willing to facilitate the implementation of the Marine Strategy Framework Directive by the relevant Member States.[366]

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3.4.4.5 Maritime Spatial Planning Directive

Another relevant directive is the Maritime Spatial Planning Directive. This Directive requires all Member States with a coastline to install a Maritime Authority and to implement Maritime Spatial Planning, via a Maritime Spatial Plan.[367] The Directive had to be transposed by 2016, and the first maritime plans have to be ready by 2021, in order to give the Maritime Spatial Planning Authorities sufficient time to draft the plans.[368] Nevertheless, many Member States installed such an authority before the deadline and have even drafted such plans already.[369]

Maritime Spatial Planning is important for efficient planning of the limited space available at sea. The maritime spatial plans should therefore take into account 'economic, social and environmental aspects to support sustainable development and growth in the maritime sector'. Especially for offshore wind and offshore electricity infrastructure, structures and installations that will remain in the sea for several decades before being decommissioned and that have a large impact on the area, it is important that they are planned in such a way that, depending on the policy objectives of the coastal state, other interests are considered as well.[370] One could think of navigation, nature protection, extraction of natural resources such as oil, gas and minerals, defence areas and fisheries. As these activities may have cross-border impact, it is important that coastal states communicate with each other already in the planning phase. The Directive provides for this cross-border cooperation and data sharing, which should ensure coherence and coordination of the plans, especially where it concerns transnational issues.[371] Nevertheless, cross-border maritime spatial planning appears to be a

[364] The 'North East Atlantic Ocean' includes the Greater North Sea, the Channel, the Kattegat and the Celtic Seas. Marine Strategy Framework Directive, art. 4(1)b and 4(2)a.
[365] OSPAR: Convention for the Protection of the Marine Environment in the North-East Atlantic, Paris 1992, U.N.T.S. I-42279. All North Sea coastal states have signed and ratified OSPAR.
[366] http://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/ospar/index_en.htm.
[367] Directive 2014/89/EU establishing a framework for maritime spatial planning, art. 4, 8 and 13.
[368] Ibid., art. 15.
[369] Netherlands: Noordzeeloket, Nationaal Waterplan (in Dutch); Belgium: Minister van Noordzee, Marien Ruimtelijk Plan voor de Noordzee (in Dutch); Germany: Bundesamt für Seeschiffahrt und hydrographie, Raumordnungsplan Nordsee (Textteil) (in German).
[370] In practice, however, it appears that the Maritime Spatial Planning process is often designed around a specific sectoral objective, such as energy. P. Jones, L. Lieberknecht, W. Qiu, 'Marine spatial planning in reality: Introduction to case studies and discussion of findings' in *Marine Policy* [2016 71] 256–264, p. 259.
[371] Directive 2014/89/EU establishing a framework for maritime spatial planning, art. 11.

process with several practical difficulties, such as that monitoring and evaluation take place in different cycles in different countries, making it more difficult to take into account monitoring results in maritime spatial planning.[372]

3.4.5 Trans-European Electricity Infrastructure

There are several Regulations related to the investment in, and the construction of, trans-European electricity infrastructure. First and foremost, the Regulation on Guidelines for Trans-European Energy Infrastructure (TEN-E) has as its main aim to identify projects that significantly contribute to the interconnectivity of the trans-European Energy Infrastructure.[373] These projects are called Projects of Common Interest (PCIs). The Regulation streamlines the planning and permitting phase for these projects and provides rules for cross-border cost allocation when states cannot agree on this by themselves.[374] Moreover, a financial instrument (the Connecting Europe Facility; CEF) was created to provide financial assistance to these PCIs under certain conditions.[375] Financial assistance is only possible when a cost-benefit analysis and a cross-border cost allocation procedure have been performed and when, after these procedures, the project would still not be commercially viable without an extra financial incentive.[376]

In practice, every two years, a list of PCIs is drawn up. Project developers (TSOs or other parties) can ask for a certain project to be added to the PCI list. Individual projects should fall within the 'priority corridors' defined by the Regulation. The North Sea Offshore Grid is one of these priority corridors.[377] The fourth PCI list (2019) includes several interconnectors in the North Sea area, as well as the following: "One or more hubs in the North Sea with interconnectors to bordering North Sea countries (Denmark, Germany, the Netherlands), currently known as the "North Sea Wind Power Hub"."[378]

Projects which are adopted in the list of PCIs profit from priority status in the treatment of the permit applications by national authorities, which means that these files should get 'the most rapid treatment legally possible'.[379] There are also deadlines for the lengthy process of planning and permitting. The pre-application procedure may not last longer than two years, and the time between the application and permit granting may not exceed 18 months.[380] Combined, the procedures should not take longer than 3.5 years, which may be prolonged once by nine months.[381] However, administrative appeals and judicial remedies are not

[372] S. Hommes *et al.,* 'Deliverable 1.2: Report on cross-border Maritime Spatial Planning in two case studies', (MASPNOSE project, 2012) p. 61.
[373] Regulation (EU) No 347/2013 on guidelines for trans-European energy infrastructure (hereinafter: TEN-E Regulation).
[374] Regulation (EU) No 347/2013 (TEN-E Regulation), art. 12.
[375] Regulation (EU) No 1316/2013 establishing the Connecting Europe Facility, OJ L-348/129 20-12-2013, art. 7.
[376] Regulation (EU) No 347/2013 (TEN-E Regulation), art. 14(2).
[377] Ibid., Annex VII B1.
[378] European Commission, C(2019) 7772 final, 31 October 2019 (forthcoming).
[379] Regulation (EU) No 347/2013 (TEN-E Regulation), art. 7(2).
[380] Ibid., art. 10(1).
[381] Ibid., art. 10(2).

counted as part of these time limits, whereas these procedures may significantly lengthen the permitting process. Therefore, PCIs may still have lengthy permitting processes even though the TEN-E Regulation aims to shorten this procedure.

Next to the TEN-E Regulation and CEF Regulation, there is also a Council Regulation on Notification of Investment Projects in Energy Infrastructure.[382] The aim of this regulation is data collection on investment in the development of new energy sources, the transformation of existing infrastructure and decommissioning of energy infrastructure. Member States have to send this information bi-annually. The data are used to monitor the development of the production capacity as well as the security of supply in different Member States. Relevant for offshore electricity infrastructure is that the notification obligation is also applicable to wind farms of 20MW and more, submarine transmission cables with a capacity of 150 kV or more and to PCI projects.[383] This makes it likely that the notification obligation is applicable to all offshore grid developments in the North Sea.

3.4.6 Offshore Grid Operation – the Role of EU Network Codes

The electricity grid is operated by the TSOs of different countries. In order to maintain the grid's safety and reliability, network codes are drafted.[384] Both the hardware (the physical connections) and the software need to be operated with great precision, and the EU Network Codes that lay down how the network should be operated, are therefore invaluable. Without network codes, it is not possible to safely operate such a complex network. The same goes for a future MOG, without detailed rules on how the MOG is to be operated, the MOG will not function.

These network codes have been developed over a long time, via cooperation between national entities.[385] However, the formal start of the EU Network Codes was Regulation 714/2009,[386] which asked TSOs to draft Grid Codes that lay down the rules and parameters that every connected party should adhere to. The grid codes codify existing rules and technical standards, and add extra rules on how the grid should be operated. In addition, the Grid Codes codify arrangements about grid costs and access to the network. EU Network Codes are drafted by the TSOs, working together as ENTSO-E. Following advice from ACER, these codes are adopted by the European Commission via comitology.[387]

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[382] Regulation (EU) No 256/2014 concerning the notification to the Commission of investment projects in energy infrastructure within the European Union, OJ L-84/61 20-3-2014.
[383] Ibid., Annex 3.1; 3.2.
[384] For an overview of the drafting process of EU network codes, see L. Hancher, A.M. Kehoe, J. Rumpf, 'The EU Electricity Network Codes and Guidelines: A Legal Perspective', FSR Research Report, March 2020, p. 16 ff.
[385] M. Walser, F. Wagner, 'The 50 Year Success Story – Evolution of a European Interconnected Grid', Secretariat of UCTE 2009.
[386] Regulation (EC) No 714/2009 on conditions for access to the network for cross-border exchanges in electricity, art. 6. In its successor, Regulation (EU) 2019/943, chapter VII is entirely dedicated to network codes.
[387] Regulation 714/2009, art. 6(6)-(11), 8(1) and 23(1) provide the legal basis for this procedure. Currently, all European Network Codes are adopted and are in the implementation phase. Hancher, Kehoe, Rumpf (2020) provide a detailed overview of this procedure.

The network codes are highly complex and often technical documents, but they provide essential information on grid connections,[388] system operation[389] and market rules. These rules are applicable to the current AC networks in Europe as well as to DC networks. Next to the general network codes, there is a network code specifically for HVDC grid connections, which is also highly relevant for offshore grids.[390] The HVDC Network Code refers to the rules of the general Network Codes on Requirements for Generators and adds some specific provisions on HVDC connections.[391]

There are several Network Codes on market rules concerning capacity allocation on cross-border electricity transmission networks, on the day-ahead and intraday electricity markets, as well as concerning long-term transmission rights.[392] The main market principles laid down in the Electricity Market Regulation, non-discriminatory market access and market-based allocation of capacity, are also reflected in these Network Codes. Furthermore, the network codes facilitate the cross-border exchange of energy by providing 'the minimum degree of harmonisation required to achieve the aims of [the] Regulation [on the internal market for electricity]'.[393]

There is also a specific network code for the balancing of the electricity networks.[394] Electricity networks must be balanced to maintain a stable frequency. Fluctuations in frequency may disturb or damage the entities connected to the electricity grid, both on the generation and on the consumption side. Excessive deviations in frequency may even lead to blackouts. An HVDC network does not have a frequency, but in an HVDC network, the voltage can fluctuate when the generation and load (electricity consumption) are not balanced. Moreover, the HVDC network can support the frequency of the onshore AC system at its converter stations. Therefore, the Electricity Balancing grid code is also relevant for an offshore HVDC grid in the North Sea, at least when the network code adopts specific rules about the balancing of the HVDC grid as well.

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[388] Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators, OJ L-112/1 27-4-2016.

[389] Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation, OJ L 220, 25.8.2017.

[390] Commission Regulation (EU) 2016/1447 of 26 August 2016 establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules, OJ L-241/1 8-9-2016.

[391] Commission Regulation (EU) 2016/631 (Requirements for Generators) refers to 'offshore power park modules' in articles 13-22. Commission Regulation (EU) 2016/1447 (HVDC Connections) refers to these requirements for HVDC connections, art. 38.

[392] Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management, OJ L-197/24 25-7-2015; Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation, OJ L-259/42 27-9-2016; Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing, OJ L-312/6 28-11-2017.

[393] Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity, art. 58(2)a.

[394] Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing, L-312/6 28-11-2017.

Examining the Network Codes is not an integral part of this dissertation, as they include many technical details which are not relevant for a dissertation on the legal framework. Nevertheless, it is important to state the function of the Network Codes in the legal framework for an offshore grid. The Network Codes aim to standardise technical rules across Europe, which is particularly useful for cross-border electricity flows and for companies that have grid connections in several countries, both of which are relevant for an offshore grid.

It must be noted however, that the Network Codes do not aim for complete harmonisation. Several issues are not standardised but left to the Member States to decide. On these issues, named 'non-exhaustive requirements', Member States are free to decide on these requirements within certain boundaries.[395] This leads to a different implementation of the Network Codes in the national electricity systems, which may still hamper cross-border electricity trade, which is why the European Network Codes were created in the first place.

Next to the relatively new European Network Codes, another relevant instrument for offshore grid operation is the Regulation on the Inter-TSO Compensation Mechanism.[396] The mechanism aims to compensate TSOs for the losses (the decrease of transmission capacity) they incur as a result of cross-border flows through their networks and the extra costs incurred by infrastructure reinforcement in order to accommodate these flows.[397] It started as a voluntary scheme for TSOs but was codified officially with the 2003 Package.[398] The inter-TSO compensation mechanism may be relevant for the offshore meshed grid as there will be cross-border flows over this grid. Nevertheless, it depends on the physical characteristics of the grid as well as on the governance structure as to whether such a mechanism is needed or whether another solution can be found.[399] It appears that this compensation mechanism is only a small part of the total costs of electricity infrastructure,[400] and that this compensation mechanism is not able to correct the currently existing issues of congestion at borders between bidding zones.

[395] ENTSO-E, 'Parameters of Non-Exhaustive Requirements: ENTSO-E Guidance document for national implementation for network codes on grid connection', p. 7-29.

[396] Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity, art. 49 currently sets the legal basis for this mechanism. The details are elaborated in a separate regulation: Commission Regulation (EU) No 838/2010 on laying down guidelines relating to the inter-transmission system operator compensation mechanism and a common regulatory approach to transmission charging, OJ L-250/5 24-9-2010.

[397] Commission Regulation (EU) No 838/2010 on laying down guidelines relating to the inter-transmission system operator compensation mechanism and a common regulatory approach to transmission charging.

[398] Regulation 1228/2003, art. 3 and 8.

[399] A different bidding zone configuration could change the flows through the network.

[400] S. Hadush, C. de Jonge, R. Belmans, 'The Implication of the European inter-TSO compensation mechanism for cross-border transmission investments', *International Journal of Electrical Power and Energy Systems* [2015 vol. 73] p. 682.

3.5 An Offshore Grid in the Current EU Legal Framework?

The paragraphs above give an overview of the EU legislation applicable to offshore electricity cables. The next step is to investigate whether the current legislative framework also works for new developments, such as hybrid assets and a meshed offshore grid.

The categorisation of hybrid and MOG assets under EU law influences how the assets are regulated in terms of conditions for access, income (tariffs) and ownership. Categorisation of 'new' assets such as hybrid cables and cables that are part of the MOG according to current EU law is the least invasive option as it maintains the status quo. However, this may lead to undesirable consequences, for example to a hybrid asset not being constructed, or being constructed only as a radial connection,[401] or only as an interconnector.[402]

The difficulty with the current legal framework is that various characteristics of hybrid cables are not well reflected in the current regulatory regime. The current EU legal framework only differentiates between 'transmission networks' and 'interconnectors', whereas hybrid assets and cables that form part of the MOG have characteristics from both 'categories'. In section 3.5.1., it is explained which rules are problematic for hybrid assets and for the MOG. The newly developed project 'Kriegers Flak Combined Grid Solution' is an example of how this is approached in practice. The approach for Kriegers Flak Combined Grid Solution is elaborated in section 3.5.2. This approach, however, cannot be copied to other hybrid or MOG projects. As such, a solution with another approach might be needed. This other solution could be designed in several ways, developed in the following sections. In section 3.5.3, the fundamental question of whether it is necessary to regulate the offshore grid in the way the onshore grid is regulated, is asked. Then, in section 3.5.4, the potential of recital 66 of the recast Electricity Market Regulation in addressing regulatory difficulties for hybrid assets and the MOG under EU law is discussed. Finally, in section 3.5.5, an alternative solution, based on a different market model, that could circumvent the legal issues described in this subchapter is presented.

3.5.1 Hybrid Asset Regulation in the Current EU Legal Framework

In this section, the different problematic aspects of EU law with regard to hybrid assets (and, in the future, also with regard to the MOG) are elaborated: the specific rules on interconnectors (which are, in principle, also applicable to hybrid assets), the principle of non-discrimination and the existing market rules.

3.5.1.1 Interconnectors

Interconnectors are defined in the Electricity Market Directive as 'equipment used to link electricity systems' and in the Electricity Market Regulation as 'a transmission line which

[401] This has become clear from stakeholder interaction in the context of the PROMOTioN project, see Menze, Wagner (forthcoming).
[402] The 'COBRAcable' interconnector between Denmark and the Netherlands was designed to be able to connect OWFs in Germany. However, due to regulatory difficulties, it remained only an interconnector.

crosses or spans a border between Member States and which connects the national transmission systems of the Member States'.[403] With the current definition for 'interconnector', hybrid connections or cross-border cables that are part of the MOG automatically fall under both definitions, which means that these cables also have to adhere to the rules applicable to interconnectors as described in EU law.

First of all, this means that the requirement for Member States to have at least 70% of the interconnector transmission capacity available to the market, respecting operational security limits of internal and cross-zonal critical network elements, is also applicable to hybrid assets and the MOG.[404] This rule, called the 70% rule, was added to the Clean Energy Package in order to make clear which capacity TSOs should keep available at the borders of their bidding zones. This was done in order to promote unrestricted cross-border trade in electricity, and to prevent the phenomenon of 'exporting congestion to the border of the bidding zone' or 'congestion displacement', in which TSOs limit the amount of cross-border capacity in order to address internal congestion issues.[405] Congestion is a natural phenomenon in electricity grids: if no congestion ever occurs, this could be a sign that the electricity grid is overdimensioned compared to the electricity flows it is used for. However, structural congestion limits the possibilities for electricity trade and should thus be addressed by the grid owner. EU energy law provides several options for TSOs to combat congestion, both on the long term (grid reinforcement; bidding zone reconfiguration) and on the short term (redispatch).[406] On borders between bidding zones, TSOs should coordinate actions to alleviate (internal) congestion, in order to prevent adverse effects on each other's networks. However, it seems that in practice, TSOs avoid congestion within their networks by limiting the capacity of interconnectors at their borders, thereby limiting electricity flows within their system. This is the 'congestion displacement' mentioned earlier in this paragraph, which has a negative impact on the integration of the internal market for electricity. The 70% rule, and its predecessor in the 2009 Regulation, aim to limit this phenomenon, although not always successfully, leading to several cases in which the European Commission intervened in the operational practice of TSOs.[407]

The question is whether the tools and rules for congestion management will also work for offshore electricity infrastructure and eventually for a MOG. There are two important differences between congestion management in neighbouring onshore networks and offshore

[403] Directive 2019/944 on common rules for the internal market for electricity, OJ L 158, 14.6.2019, art. 2(39), Regulation (EU) 2019/943 on the internal market for electricity, art. 2(1).
[404] Regulation (EU) 2019/943 on the internal market for electricity, art. 16(8).
[405] J. Rumpf, 'Congestion displacement in European electricity transmission systems – finally getting a grip on it? Revised safeguards in the Clean Energy Package and the European network codes' *Journal of Energy and Natural Resources Law* [2020], p. 3.
[406] Rumpf (2020), p. 6.
[407] Ibid., p. 11 ff. Notable cases are the 'Swedish Interconnectors Case' (Case COMP/39.351; Commission Decision 2010/C 142/08 [2010] OJ C142/28), the 'DE/DK border Case' (Case AT.40461; Commission Decision 2019/C 58/09 [2019] OJ C58/7) and the 'Baltic Cable Case' (Case C- 454/18 *Baltic Cable AB v Energimarknadsinspektionen*, ECLI:EU:C:2020:189).

electricity cables such as envisaged for the MOG: first of all, it is much more difficult to control electricity flows in a cross-border AC network, such as the onshore electricity networks, than in a DC network – where electricity needs to pass through a converter station first. This makes it possible to steer electricity flows in much more detail. Secondly, as the circumstances for constructing offshore transmission infrastructure are often more difficult than for onshore transmission infrastructure, the total interconnection capacity between two bidding zones is often more limited than for onshore neighbouring bidding zones, which means that price differences and (structural) congestion persist.

For regular subsea interconnectors (without any OWFs connected to them), the 70% rule can be fulfilled without major hurdles, as the purpose of these interconnectors is to offer interconnection capacity to the market. However, the story is different for hybrid assets and for the meshed offshore grid, in which the capacity has to be shared between OWFs and other market parties that wish to use the capacity on the cables. The 70% rule is difficult to apply to hybrid assets and for the MOG, as this means that OWFs connected to cross-border lines cannot always get full access to the offshore grid, for example when other market parties, such as other renewable energy sources, take the available capacity. For these OWFs, the alternative, a radial connection, would guarantee that they could transmit the full output of the OWF to the onshore network. For windfarms and other parties connected onshore, the situation is also different as the capacity of their connection is also more or less guaranteed due to the copper plate presumption.[408] Thus, the playing field between OWFs connected to a hybrid asset or a MOG is not levelled with other (radially connected) OWFs and with other types of electricity generators, connected to the onshore grid. As a level playing field and fair competition is another goal of the EU's work towards an internal electricity market, this issue requires attention: the current rules hold back investments in hybrid assets.

A second rule applicable to interconnectors is that congestion income[409] is ring-fenced for specific purposes, namely guaranteeing the actual availability of cross-border connections and maintaining or increasing the cross-zonal capacity.[410] This means that, according to the Regulation, in principle, unless these goals have been adequately fulfilled, interconnector owners cannot use the revenues for another purpose. This rule is adopted in order to avoid creating perverse incentives for the network operator: without such a rule, the network operator would have a financial incentive to keep the transmission capacity small, as this increases congestion revenues.[411] With this rule, the network operator cannot profit from

[408] See section 1.7.1 for a detailed explanation on the copper plate presumption.
[409] Congestion income is the revenue that an interconnector owner receives when the capacity on an interconnector is auctioned (implictly or explicitly). These auction revenues are thus based on the price differential between the two electricity markets that are connected by the interconnector. For a theoretical explanation of congestion management and auctioning processes, see H.P.A. Knops, L.J. de Vries, R.A. Hakvoort, 'Congestion Management in the European Electricity System: An Evaluation of the Alternatives', *Journal of Network Industries* [2001 2].
[410] Regulation (EU) 2019/943 on the internal market for electricity, art. 19(3). The predecessor of this article is art. 16(6) of Regulation (EU) 714/2009.
[411] Knops, de Vries, Hakvoort (2001), p. 332, 343.

these revenues, which takes away the incentive to keep transmission capacity low. However, it must be noted that compared to the earlier requirement (2009 Regulation) that congestion income had to be used for the construction of new interconnectors,[412] the rule is softened in the 2019 Regulation.

Interestingly, the requirement regarding the ring-fencing of congestion income from the 2009 Regulation, has been nuanced by a recent judgment of the CJEU.[413] In this case, the CJEU had to judge how art. 16(6) of Regulation 714/2009 should apply to an exempted interconnector,[414] i.e. an interconnector owned by a company specifically for that purpose (without any other grid activities than owning and operating that specific interconnector). Correct application of art. 16(6) would entail that the interconnector owner would be practically deprived of its income, as congestion income is the sole source of income of an exempted interconnector and as it would only be allowed to spend the congestion income on the construction of new interconnectors or on the improvement of existing infrastructure. The Court concluded that even if a company only operates one interconnector, it is still considered a TSO in the context of the Regulation, which means that art. 16(6) also applies to such companies.[415] However, the Court was forced to conclude that the NRA was allowed to authorise the company in question to use part of the congestion income to cover expenses with regard to the interconnector, including making an appropriate profit.[416] This derogation from art. 16(6) was necessary in order to make sure that 'TSOs merely operating one interconnector' were not discriminated against compared to other TSOs. The repercussions of this recent case, for example with regard to the appetite of market parties to own and operate merely one interconnector, remains to be seen.

3.5.1.2 Non-Discriminatory Access for all Market Participants

One way to address the issue addressed above, the division of capacity of an interconnector between OWFs and other market participants, is by giving OWFs precedence over other market flows.[417] An important norm in EU energy law is non-discriminatory access for all market participants.[418] A main question to be asked in this context is whether it is necessary to give a special status to OWFs connected to a hybrid asset, especially regarding the conditions for access.[419] This implies a deviation of the general EU rules on non-discriminatory

[412] Regulation (EC) No 714/2009 on conditions for access to the network for cross-border exchanges in electricity, article 16(6).
[413] Case C-454/18 *Baltic Cable AB v Energimarknadsinspektionen*, 11 March 2020, ECLI:EU:C:2020:189.
[414] An interconnector can receive an exemption from several rules regarding ownership, third party access and income, based on Regulation (EU) 2019/943, art. 63 or on its predecessor Regulation 714/2009, art. 17 (New Interconnectors), if it fulfils the conditions of this article.
[415] Case C-454/18 (Baltic Cable), para 51/52.
[416] Ibid., para 79.
[417] See section 3.5.2 for an example of where this has happened.
[418] H.T. Kruimer, 'Non-discriminatory Energy System Operation: What Does it Mean?' *Competition and Regulation in Network Industries* [2011 Vol 12 No. 3] 268-269.
[419] Kruimer (2011) elaborates under what conditions different treatment of certain network users can be justified. This is based on case law of the CJEU, mainly C-439/06 *Citiworks,* ECLI:EU:C:2008:298 and C-213/96 *Outokompu* ECLI:EU:C:1998:155.

access and a level playing field, as other parties will also be interested in reserving the capacity of the cable. Non-discriminatory access is a useful principle for the onshore grid under the assumption of a copper plate, but for an offshore situation in which the OWFs are of the same capacity as the cable connecting them, the situation is different than for onshore connected parties.[420]

A possible argument in favour of a special regulatory treatment of hybrid assets is of a political and economic nature: why would the state, through general public funds from taxes or through levies on the electricity bill, finance the development of offshore wind energy, while limiting the access of the OWF to the electricity network? If the goal of the support schemes is to stimulate the production of renewable energy, it will be counterintuitive to limit the access of this electricity to the grid.

Nevertheless, there are alternative ways for ensuring sufficient access of OWFs to the grid, such as by over-dimensioning the capacity on the hybrid asset, in order to make sure there is always sufficient capacity. However, this is not beneficial from a societal point of view, as this will make the connection of OWFs much more expensive, while the length of time when the capacity is really necessary is limited. In other words, by over-dimensioning the grid, the costs are increased much more than the benefits are.

Considering the level playing field, which ensures fair competition between different market players, it is important to consider between whom the playing field should be levelled: between offshore wind and onshore wind, or between radially connected offshore wind and hybrid connected offshore wind. This makes a big difference, because for the former case, one should not provide special access and dispatch conditions to OWFs, whereas in the second, special access and dispatch conditions for the OWFs connected to a hybrid asset levels the playing field with radially connected OWFs. The rules on access and dispatch cannot be seen in isolation from the general market rules, i.e. whether an OWF, located in the EEZ of country A but connected to a hybrid asset between country A and country B is only allowed to bid into the electricity market of country A, or whether it can also participate directly in the electricity market of country B.[421] The exact formulation and scope of such rules is a topic of economic optimisation. It falls outside the scope of this research to develop these rules, but it is clear that the rules need to be adapted to the specific situation of hybrid assets, which means that a separate legislative category of hybrid assets is necessary to apply these rules to.

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[420] The onshore grid is over-dimensioned for the purposes of grid safety and reliability, and this is less relevant for the offshore grid, to which generally no load (electricity users) is connected. See chapter 1.7.1.

[421] The status quo with a radial connection is that an OWF in the EEZ of country A is only allowed and physically able to bid into the electricity market of country A. However, when an OWF is connected to an offshore grid with connections to both country A and B, different arrangements are possible. See NSCOGI, Working Group 2 Market and Regulatory Issues, 'Integrated Offshore Networks and the Electricity Target Model*, Final Report*' 2014.

3.5.1.3 Forward Capacity Allocation

With the current rules on Forward Capacity Allocation (FCA), it is possible to reserve capacity on a certain cross-border connection a month or even a year in advance. In the EU Network Code on FCA, "promoting effective long-term cross-zonal trade with long-term cross-zonal hedging opportunities for market participants;" is mentioned as a first objective.[422] However, a main function of the MOG is to connect OWFs, and the output of OWFs is difficult to predict more than a few days in advance, when reliable weather models become available.[423] Therefore, the rules on forward capacity allocation, enshrined in the EU Network Code on Forward Capacity Allocation, need to be amended where it concerns offshore grid assets. The market rules on the other time scales, i.e. day-ahead and intraday, are not problematic for the MOG, as it is possible to predict OWF output relatively reliably on these time scales. Therefore, the market rules on these time scales do not have to be amended.

In conclusion, there are several parts of the current regulation of cross-border electricity networks that are problematic in the light of hybrid assets and the MOG and the connection of OWFs thereto. In the first hybrid project, Kriegers Flak Combined Grid Solutions, these issues were addressed in practice.

3.5.2 Current EU Law in Practice: Kriegers Flak Combined Grid Solution

The offshore wind farm Kriegers Flak, under Danish jurisdiction, is connected both to the Danish onshore grid and to two German offshore wind farms, Baltic 1 and Baltic 2, which have already been connected to the German coast for several years. Thus, an electrical connection with the name *Kriegers Flak Combined Grid Solution* is constructed between Denmark and Germany with three offshore wind farms in the middle.

Kriegers Flak Combined Grid Solution is a hybrid project which also falls under the definition of interconnector as described above. However, the OWFs in this project also benefit from the rules on priority dispatch which existed under the 2009 Renewable Energy Directive.[424] The rules on interconnectors were difficult to reconcile with the rules on priority dispatch for electricity from renewable sources, which meant that a special exemption had to be made for this project: the available capacity (which is required to be offered to the market) is only the capacity of the interconnector after the capacity used by the OWFs is deducted: the market model of the project entails that, in principle, transport of electricity from the offshore wind farms to shore has priority on the cable.[425]

[422] Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation, art. 3(a).
[423] In wind forecasting for OWFs, a few days ahead is already called 'long-term' forecasting. See X. Wang, P. Guo, X. Huang, 'A Review of Wind Power Forecasting Models', *Energy Procedia* [2011 12] pp. 770 – 778.
[424] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (Renewable Energy Directive), article 16(2)b.
[425] Energitilsynet, 'Metodegodkendelse af markedsmodel for Kriegers Flak havvindmøllepark – elforsyningslovens § 73 a', 15-01-2014, § 30.

The OWF in the Danish EEZ sells its electricity on the East-Danish spot market, and the OWFs in the German EEZ sell their electricity on the German side.[426] The TSOs forecast the available capacity on the cable by deducting the electricity production on an hourly basis in the day-ahead time spectre.[427] This determines which capacity will be reserved for the OWFs. The remainder of capacity will be made available to the market. Kriegers Flak offshore wind farm thus has the same conditions as other offshore wind farms in East-Denmark.[428] The German offshore wind farms (Baltic 1 and 2), already constructed several years ago, will keep operating according to the same conditions as before the construction of the hybrid connection. The interconnection capacity is then calculated on the basis of what capacity is left after the transport to the shores of Denmark (for Kriegers Flak) and Germany (for Baltic 1 and 2) and based on 'netting' of the electricity flows in the two directions.[429]

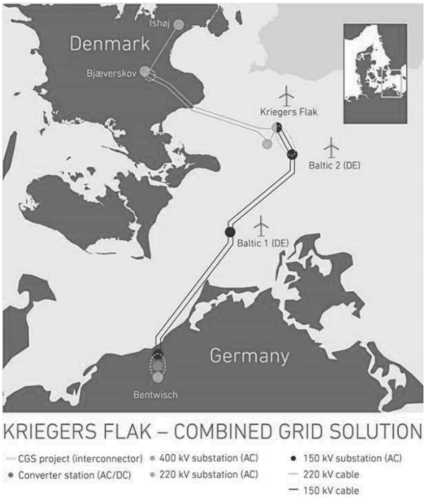

Image 5: Schematic Overview of the Kriegers Flak Project. Source: Energinet.dk

A particular difficulty for hybrid assets, and thus for Kriegers Flak Combined Grid Solution, is the requirement for interconnectors to make all capacity available to the market (which is now replaced by the 70% requirement, see section 3.5.1.1.). It is not possible to make the capacity of the interconnector available to all market participants, as required by EU law, while also ensuring the level playing field of the OWFs connected to it. The OWFs connected to a hybrid asset would then need to compete with other market participants for capacity on their grid connection (the interconnector), whereas other (onshore) connected parties and radially connected OWFs do not have to compete in such a way: the grid connection they have is

[426] Ibid., § 29 and 31.
[427] Ibid., § 30.
[428] Ibid., § 31.
[429] Ibid., 'Figure 2' on p. 7 and § 37. 'Netting' in this context means that the available export capacity of a country is calculated by adding the cable capacity between that country and the offshore wind farm(s) to the current production at the offshore wind farm(s).

guaranteed and they are presumed to be part of a copper plate. This is a fundamentally different market situation.

For Kriegers Flak Combined Grid Solution, deviation from the general rule (which, at the time of regulatory approval was not yet specified to 70% but rather “the maximum capacity” of the interconnector should be available to market participants)[430] was logical due to the historical development of the project, as the German OWFs already existed for several years when the extra connection was made and their situation needed to be preserved. However, this will not be the case for future hybrid assets or for the MOG as a whole, and therefore, this solution cannot be copied to other hybrid assets. In addition, this solution, which is based on agreement between the involved TSOs, NRAs and the European Commission, could be challenged at the CJEU as it is not clear whether it is compatible with current EU law, specifically with the rule that the available capacity on interconnectors should be offered to all market participants, which is based on the principle of non-discriminatory access to electricity networks. This leads to legal uncertainty for hybrid assets with regard to the application of EU law, specifically with the rule on the available capacity. This needs to be addressed in the legal framework for future hybrid assets and for the MOG.

3.5.3 To Regulate or Not To Regulate

Before going into detail on how future hybrid assets, or the offshore grid as a whole, should be regulated, a fundamental choice is to what extent the offshore grid needs to be regulated in the first place.[431] Following from economic theory, transmission of electricity is deemed to be a natural monopoly.[432] The construction of electricity cables in general and in particular at sea entails large upfront investments. These investments are ‘sunk costs’, costs that have to be made before the first electron is transported. However, once the cable is there, there is only a low marginal cost to transport electricity over it, which gives the first supplier a large economic advantage.[433] It is not economically opportune to have multiple cables next to each other in the same area, as the costs of constructing a second cable are just as high, while the returns will be lower for both cables. This is an extra barrier to entry. The high investment costs and the impossibility of creating two parallel electricity networks mean that electricity transmission qualifies as a natural monopoly.

A risk of natural monopolies is that, without the competitive pressure of other market participants, they may demand prices which are too high or unfair conditions for access, or otherwise deliver insufficient service to the grid users. In order to prevent this, regulation simulates competitive pressure through income regulation of the grid owner, and rules on

[430] Under the legislation applicable at the time when Kriegers Flak CGS gained regulatory approval, this was Regulation 714/2009, art. 16(3).
[431] Regulation exists to overcome market failures. However, over-regulation may lead to inefficiencies in the market, creating so-called regulatory failure or government failure. See B. Orbach, ‘What is government failure?’ *Yale Journal on Regulation Online* [2013 44] p. 45.
[432] J. Perloff, *Microeconomics* (Pearson, 2009 5th ed.) p. 369/370.
[433] W. Kip Viscusi, *Economics of Regulation and Antitrust* (MIT Press, 2005, 4th Ed.) p. 402.

access and quality norms ensure that those connected to the system will get fair treatment. Therefore, in many countries, electricity transmission (and distribution) is a regulated economic activity.

In some situations, a lower level of regulation is possible: some interconnector projects can be (partially) exempted from the regulatory framework applicable to interconnectors.[434] These projects, the so-called exempted or merchant interconnectors, can, under specific circumstances, be exempted from the rules on their income, unbundling or third-party access.[435] However, this is only done in a limited number of cases and only when it is not possible to develop the project under the general regulatory framework.[436] As mentioned in section 3.5.1.1, the CJEU has recently judged that the current regulatory framework does not always take into account the specific conditions of such exempted interconnectors, which justifies specific derogations from the general EU energy law rules applicable to interconnectors.[437]

Several OWF developers also state that they are able to own and operate an offshore grid,[438] and that this does not have to be a regulated activity. A parallel can be drawn to the offshore gas sector in the North Sea, where an extensive (upstream) pipeline system exists between different gas fields. The parallel with the upstream offshore gas system is that in both cases, different locations of generation (of electricity) or production (of gas) are connected to each other. In both cases, this is done in order to prevent the situation in which each gas field (or wind farm) has a separate pipeline (or cable) to the onshore network, especially when there are multiple gas fields (or OWFs) close to each other. However, a difference is that shared

[434] The general legal framework applicable to interconnectors is explained in section 3.5.1.1. An exemption from this framework is possible in certain cases, when it is not possible to develop an interconnector under the general regulatory framework, for example because the investment is too risky.

[435] Regulation (EU) 2019/943 on the internal market for electricity, art. 63.

[436] This is only possible if the following six criteria (from Regulation 2019/943, art. 63, are met: the investment enhances competition in electricity supply; the level of risk attached to the investment is such that the investment would not take place unless an exemption is granted; the interconnector is owned by a natural or legal person which is separate, at least in terms of its legal form, from the system operators in whose systems that interconnector is to be built; charges are levied on users of that interconnector; since the partial market opening referred to in Article 19 of Directive 96/92/EC of the European Parliament and of the Council (24), no part of the capital or operating costs of the interconnector has been recovered from any component of charges made for the use of transmission or distribution systems linked by the interconnector; and an exemption would not be to the detriment of competition or the effective functioning of the internal market for electricity, or the efficient functioning of the regulated system to which the interconnector is linked.

[437] This is based on the 'Baltic Cable Case', see footnote 407 above.

[438] A distinction must be made here between owning a single radial connection from the OWF to the onshore grid, which is common in several countries (see section 4.3), and owning an electricity grid. The difference is that for the former, there is only one user, namely the OWF, and only one type of usage, namely from the OWF to the shore. For an electricity grid, multiple users and multiple directions are possible. This distinction is relevant in the light of the access rights of different market participants, which is not relevant for a radial connection but which is relevant for a meshed grid with several competing users.

upstream infrastructure is a common practice in the gas sector, whereas it is not common to the electricity sector, at least in Europe.

An advantage of having OWF developers in charge of a shared cable system (in parallel to the upstream pipeline system that exists in the gas sector), is that this will limit the interface risk between windfarm and cable connection. This is especially valuable during the construction phase. The advantage of this system, according to major European OWF owners, is that OWF owners can make the connection in a more reliable, technologically consistent, and less costly way.[439] However, a downside is that OWF developers may have an interest in limiting the availability of the transmission capacity to electricity generated by their OWFs, which means that third party access will be more difficult,[440] which is a barrier to entry for potential new competitors in the electricity generation sector. This may reduce competition in electricity generation. This was one of the reasons for introduction of the unbundling regime for the electricity and gas grid.[441]

In a way, making OWF developers responsible for the construction of the assets, or, taking things a step further, categorisation of the grid as an upstream grid, such as done in the offshore gas sector, entails a decision to reduce the amount of regulation applicable to the assets. If countries decide that, contrary to the normal unbundling rules,[442] OWF developers should be able to own and operate the offshore grid, regulation is necessary to ensure the level playing field between different OWF developers and other market players (competing for interconnection capacity) as the grid owners in this situation will have a competitive advantage over OWF developers that do not own a grid and over other market players. Therefore, regardless of whether the grid is owned by a TSO, by various third parties or by OWF developers, regulation of the transmission activities is necessary.

3.5.4 The Role of Recital 66 of the Electricity Market Regulation

In the Electricity Market Regulation, recital 66 on facilitating investments in major new electricity infrastructure, is amended to include a special provision about hybrid assets:[443]

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[439] This is a finding of stakeholder dialogue in the context of research for the PROMOTioN project. See Menze, Wagner (forthcoming).

[440] There is a link with the 'essential facilities doctrine' in EU competition law. This doctrine entails that when companies have certain 'essential facilities', bottlenecks such as distribution networks, they should grant access to these facilities to other market parties (competitors) at a reasonable price. Transmission grids can be regarded as essential facilities to which competitors will want to have access in order to be able to reach their market. There have not been cases in which the essential facilities doctrine is explicitly mentioned, but there are many legislative acts in the energy sector which are inspired by this doctrine. A. de Hautecloque, 'Article 102 TFEU Abuse of a dominant position' in C. Jones (Ed.) *EU Competition Law and Energy Markets* (Claeys & Casteels 2016) p. 303.

[441] The Commission dedicated a working paper to it: COM (88) 238 Final, '*The Internal Energy Market'.* It identified several obstacles to achieving an internal market in electricity, p. 70 and further.

[442] See section 3.4.1 for an explanation of the separation of transmission and distribution activities from generation and supply activities.

[443] Regulation (EU) 2019/943 on the internal market for electricity, recital (66).

> (…) Offshore electricity infrastructure with dual functionality (so-called 'offshore hybrid assets') combining transport of offshore wind energy to shore and interconnectors, should also be eligible for exemption such as under the rules applicable to new direct current interconnectors. Where necessary, the regulatory framework should duly consider the specific situation of these assets to overcome barriers to the realisation of societally cost-efficient offshore hybrid assets.

In other words, developers of hybrid assets are able to apply for an 'exemption for new interconnectors'. Such an exemption allows developers to deviate, in specific situations, from the common rules on unbundling, financial regulation and third party access.[444] Such exemptions are used more often in the case of interconnectors that could not otherwise be developed,[445] but with this new recital, the road to exemptions is opened to hybrid assets as well. This is not ideal, as the wording does not yet provide sufficient certainty to developers of hybrid projects as to whether an exemption would be possible for their projects specifically, and more generally, what the conditions for exemptions for hybrid assets are.

Moreover, as owners of hybrid assets will often find themselves in the same situation, i.e. with conflicting interests between the connected OWFs and those who wish to make use of the interconnector capacity, many hybrid projects will apply for an exemption. This is suboptimal from a legal doctrinal perspective, as it means that the exception becomes the norm when it comes to hybrid assets, which makes one wonder about the value of the norm. The norms, at least with regard to interconnectors, are created with specific interests in mind as well. The exemption regime is created for the purpose of weighing the interest of protection of the internal electricity market (third party access, unbundling, increased interconnection through reinvestment of congestion rents) with the interest of constructing the asset in the first place, for example when the project risk is too high, meaning that the asset would otherwise not be constructed at all.

In the development of hybrid assets, there is a cycle of waiting: the project developers bring projects forward only when they are positive about the Cost Benefit Analysis (CBA) and about whether they are allowed to construct the assets. However, the CBA is based on the regulatory framework for hybrid assets, which needs to be clarified by the NRA. The NRA is bound by the

[444] Ibid., recital 66 and Exemption for new interconnectors, art. 63.

[445] An exemption can only be granted under the following conditions: (a) the investment must enhance competition in electricity supply; (b) the level of risk attached to the investment is such that the investment would not take place unless an exemption is granted; (c) the interconnector must be owned by a natural or legal person which is separate at least in terms of its legal form from the system operators in whose systems that interconnector will be built; (d) charges are levied on users of that interconnector; (e) since the partial market opening referred to in Article 19 of Directive 96/92/EC of the European Parliament and of the Council 1, no part of the capital or operating costs of the interconnector has been recovered from any component of charges made for the use of transmission or distribution systems linked by the interconnector; and (f) the exemption must not be to the detriment of competition or the effective functioning of the internal market in electricity, or the efficient functioning of the regulated system to which the interconnector is linked. Regulation 2019/943 on the internal market for electricity, art. 63.

law, in which currently no clear rules are stated. This means that the NRA cannot give sufficient clarity to the TSO, which, in turn, will not be able to develop the project further. Without hybrid assets being built, there is no urgency for the legislature to amend the law regarding hybrid assets. Kriegers Flak Combined Grid Solution is an interesting project, as it breaks this cycle and goes ahead with a pragmatic interpretation of the law. However, the regulatory situation for Kriegers Flak is very specific, especially because the OWFs were there first. This put the NRAs and project developers in the position to interpret EU energy law in a very specific way. However, with the legislative amendments of the Clean Energy Package, an interpretation based on the variable maximum capacity of the interconnector would probably not be possible.

Recital 66 could be of use here, as it provides for the possibility of an exemption. The exemption regime is often used to deviate from the rules on how congestion income can be used.[446] However, for hybrid assets, it could be that the exemption is not (only) about congestion income, but rather about the provisions on third party access or the full availability to the market of the interconnection capacity,[447] in order to allow for a special status for the OWFs connected to hybrid assets.

In order to provide more legal certainty and to create a level playing field between different hybrid assets, it is advised to adopt a clear definition as well as substantive provisions on this matter in the operative part of the Regulation. However, even though adoption in the operative part of the Regulation would have provided more legal certainty, adoption of the recital is a first step to help approach hybrid assets. A next step would be to adopt a definition and substantive provisions on hybrid assets in the Regulation.

3.5.5 Alternative Solution: Bidding Zone Configuration

Alongside the possibility of amending EU law in order to regulate hybrid and MOG assets as presented above, it is also possible to construct hybrid or MOG assets while keeping the current EU law on interconnectors by using an alternative solution, which circumvents legal issues on the definitions of interconnectors and hybrid assets by changing the market model.

In essence, this alternative solution comes down to introducing small offshore bidding zones (or 'nodes') rather than having the OWFs in the EEZ of one coastal state bid into the electricity market of that same coastal state. With this system, OWFs bid in to small bidding zones, which could consist of one OWF or a cluster of OWFs (in a 'hub'). Whereas the electricity price in a normal electricity market is based on the combination of supply and demand, there is no, or

[446] The general rule is described in paragraph 3.5.1.1. However, for certain project developers, specifically for the ones that do not own and operate an onshore grid as well, these rules are not relevant as they are only interested in owning and operating one interconnector. For these parties, an exemption to the rules on how the congestion income can be used, is necessary.

[447] Regulation 2019/943 on the internal market for electricity, art. 63(1) specifies the articles from which an exemption is possible: Article 19(2) and (3) of this Regulation and Articles 6 and 43, Article 59(7) and Article 60(1) of Directive (EU) 2019/944.

hardly any, demand in an offshore bidding zone (as no (or hardly any, in exceptional cases) electricity consumers are connected to the offshore bidding zone.[448] Therefore, the electricity price in the small bidding zone is determined by the electricity price in the highest priced neighbouring market to which interconnection capacity is still available.[449] If no capacity remains, the price of the small bidding zone will be zero.[450] This is a market risk for OWF owners, who need to receive a price for their electricity in order to recoup their investment. This can be mitigated by introducing a different support system for OWFs in a small bidding zone, which includes a contract for difference to the nearest price zone(s) and a financial transmission right for a predetermined capacity, which could be awarded on the basis of the principle 'use it or lose it'. Remaining capacity can then still be marketed to other parties. With this support scheme, OWF owners will not have an incentive to produce more than the capacity for which they have a financial transmission right, as this will cause the price to drop to zero.[451] This gives OWFs an incentive to optimise their electricity output and to stop production when there is no capacity left to transmit the electricity to consumers. Moreover, this provides a locational price signal which could also stimulate the development of electricity storage and conversion.[452]

The introduction of a 'small bidding zones' model does not require changes to the main Directives and Regulations of EU energy law, as it is currently already possible to define bidding zones that do not adhere to country borders.[453] Even more so, according to the current formulation in the Electricity Market Regulation, bidding zones should reflect areas in which there is no structural, long-term congestion.[454] Offshore, between different OWFs or OWF hubs, transmission capacity is limited by the line capacity of the cables, which means that (structural) congestion is likely to occur in some places.[455] In this sense, it fits 'naturally' to use a small bidding zones model for OWFs. It must be noted that the introduction of this model, although it does not require major amendments to EU law, does require a different support system for OWFs, which requires time to implement into the national jurisdictions of the participating coastal states. Moreover, another important presumption is that there is a level playing field between the OWFs connected to the same network. This is the case in

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[448] See section 1.7.1.
[449] J. Moore (TenneT), 'Deliverable 12.3 – Draft Deployment Plan' *PROMOTioN* (2020), Appendix V.
[450] Ibid.
[451] Ibid.
[452] Ibid.
[453] This is the case for example in Norway and Italy, which have respectively five and six bidding zones within their country borders. The split in multiple bidding zones can be justified by a lack of internal transmission capacity in the electricity grid of the country. If there is not sufficient internal transmission capacity, the country can no longer be considered as one large 'copper plate' (see section 1.7.1). The smaller bidding zones reflect the structural congestion between the different areas: inside one bidding zone, there should be no structural internal congestion. The reverse (bidding zones crossing a country border) is also possible: the Republic of Ireland and Northern Ireland share one bidding zone on the island of Ireland, the so-called 'Single Electricity Market'
[454] Regulation (EU) 2019/943 on the internal market for electricity, art. 14.
[455] The offshore grid cannot be considered a copper plate like the onshore grid. See section 1.7.1.

theory, following EU law, but in practice, the differences in network charges for generators[456] may cause onshore wind energy of a state without these charges to have priority over OWFs connected directly to the offshore grid and thus disturb this market model in practice. Moreover, some amendments to the EU Network Codes may have to be made in order to make the new market model run smoothly.

3.5.6 Remaining Issue: Onshore Integration of Offshore Generated Electricity

This chapter analysed the EU law applicable to *offshore* electricity infrastructure. However, there is a large interdependency between offshore electricity infrastructure and the onshore electricity grids it connects. As the generation capacity offshore is projected to grow significantly, an important issue is the integration of the offshore generated electricity in the *onshore* electricity networks. The enormous influx of electricity in the onshore networks will pose new challenges with regard to congestion management and market rules in the *onshore* networks. For example, maximum infeed limits may have to be adjusted, the security of the system needs to be reassessed, and the possibilities of energy storage and conversion may need to be stimulated through regulatory adjustments.

In this regard, it must be noted that introducing small bidding zones for the offshore grid will optimise the electricity flows offshore, and influences the conditions for bringing the electricity to shore (i.e. bringing the price to zero when the output from the OWFs in a bidding zone exceeds the line capacity on the connections from that bidding zone to the different onshore grids). However, the small bidding zones model should not be considered a panacea that solves onshore congestion issues.

It lies beyond the scope of this dissertation to discuss the necessary changes regarding the onshore electricity network rules needed to incorporate the large influx of offshore generated electricity in detail. However, this topic should be covered in future research projects, covering both the technical perspective and the regulatory perspective.

3.6 Interim Conclusion

The European electricity sector is to a large extent regulated by EU law. The substantive EU law described in this chapter forms the regulatory foundation for the electricity sector. On this foundation, more specific regulation on Member State level is added. As a consequence, the regulatory structure of EU law also forms the basis for the regulation of offshore electricity transmission infrastructure. Nevertheless, there are several provisions in current EU energy law that hinder the development of offshore electricity infrastructure.

Considering the fact that offshore electricity infrastructure is located to a large extent outside the territory (and territorial waters) of coastal States, an important question is to what extent EU law is applicable beyond the territory of the Member States. In doctrine, the competence that the EU has to legislate activities at sea and to enforce these rules is derived from the

[456] See below, chapter 4.3.3 for an elaboration on what these charges are and how they differ per state.

(functional) jurisdiction its Member States have, in combination with the conferral of competences to the EU. This is also confirmed by the CJEU in case law stretching several decades. The conferral of competences itself takes place via the founding treaties. At the moment, the EU has competences in the areas of energy, trans-European networks, environmental policy and the internal market. The construction and operation of offshore electricity infrastructure is covered by the competences on energy and trans-European networks.

Although this chapter is dedicated to EU law, special attention needs to be paid to the rights and competences of neighbouring states which are outside the EU, such as Norway and the UK. Norway is part of the internal market via the EEA. With a special procedure, all legislative documents deemed applicable to the EEA will be adopted in the EEA Agreement and transposed into national law in the EEA countries. However, there is a legislative lag of several years. For the UK, the situation is more difficult, as a legal framework entirely based on EU law is probably not acceptable to the UK in the current political climate. This is important to take into account when drafting the legal framework for a MOG.

Then, when it comes to substantive EU law, many definitions and categories in the Electricity Market Regulation currently applicable to offshore electricity infrastructure do not do justice to the characteristics of hybrid assets and MOG infrastructure. One can argue that it is against the idea of the level playing field to adopt a new category of assets and to make special access rules for these assets, but there are economic arguments against this as well. Eventually, adopting a new category of assets and making clear what the rules and obligations with regard to this new category are will provide the required legal certainty to grid developers. An alternative solution is to change the bidding zones model offshore, which does not require direct changes of EU law but which requires an overhaul of the market system and support scheme for OWFs. In practice, both options can be pursued in parallel in the legal framework for a MOG.

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CHAPTER 4

Comparative Analysis of National Legal Frameworks for Offshore Electricity Infrastructure

4 Comparative Analysis of National Legal Frameworks for Offshore Electricity Infrastructure

The coastal states around the North Sea all have their own approach to regulating offshore wind energy and the related grid infrastructure. Although many choices in the national legal frameworks of the coastal states are based on European and international law, there is still a large diversity of approaches in national law. As coastal states develop their own legal approach towards offshore activities based on what they see as a successful approach in other North Sea coastal states, a dynamic system of best practices and legal innovation emerges.

The aim of this chapter is twofold. First, it is to provide an overview of the variety of different legal approaches with regard to offshore wind and offshore electricity infrastructure. Second, the chapter aims to highlight which options are available to regulate the development of offshore wind and offshore electricity transmission infrastructure. The identification of these options forms an important step in deciding which legal arrangements should be recommended for the development of an offshore grid. The information of this chapter will therefore feed directly into chapter 7 as possible options for concrete proposals to stimulate the development of offshore infrastructure in light of a future offshore grid.

The chapter provides a comparative analysis of the national legal frameworks relevant for offshore wind and offshore electricity transmission infrastructure, based on a functional approach. The analysis includes eight countries around the North Sea (including the Channel): Belgium, Denmark, France, Germany, the Netherlands, Norway, Sweden and the United Kingdom.[457] The topics analysed in this chapter follow the lifetime of the assets in an offshore grid in a chronological fashion, with respectively: maritime spatial planning; licensing and permitting procedures; connection responsibilities; (operational) support for offshore wind energy; offshore grid operation; and finally, decommissioning obligations. For each of these topics, the eight countries' policies are discussed and compared. Where possible barriers for the development of an offshore grid exist, they are marked as elements to be addressed in the future legal framework of the MOG.

The comparative approach used in this chapter is based on the 'functional method' of comparative law.[458] In this case, the substantive law of the eight North Sea states is analysed in relation to the topics that are relevant for the development of the MOG. How these topics are dealt with in the different legal systems is assessed, and these are compared to each other so as to find out whether they facilitate the development towards a MOG. The 'functional method' is chosen above other methods of comparative legal research, because the

[457] For an overview of the legislative framework for offshore wind and offshore cable infrastructure organized per country rather than per subject, see C.T. Nieuwenhout (2017), PROMOTioN Deliverable 7.1: Legal Framework and Legal Barriers to an Offshore HVDC Electricity Grid in the North Sea: Intermediate Report for Stakeholder Review, July 2017, chapter 5.

[458] M. Van Hoecke, 'Methodology of Comparative Legal Research', *Law and Method* [2015, December] para 4.1.

methodology for comparative research should follow the research aim.[459] In this case, historical comparison is not relevant as the legal framework on this matter has only developed in the last decade. Structural comparison of the legal systems is not helpful to answer the research question either, as structural comparison focuses more on the legal systems as such (for example in a comparison between common law and civil law), and for this dissertation, the *content* rather than the *structure* of the legal frameworks of the different coastal states is relevant.

4.1 Maritime Spatial Planning

4.1.1 History of Maritime Spatial Planning

For a long time, the North Sea has only been used for marine transport and for fishing, which did not conflict with each other very much.[460] However, over the last century, the North Sea has been used for many different activities, such as shipping, defence purposes, fishing, recreation, mineral extraction, nature conservation and transmission of gas via submarine pipelines. These activities all require an amount of space, either temporarily, in the case of ships that pass by, or (semi-)permanently in the case of installations for aquaculture[461] or extraction of oil or gas. Over the last few decades, renewable energy production and transmission of the generated electrical energy via cables have been added to the activities at sea which require a large amount of space on a (semi-)permanent basis. Coastal states have been struggling to find sufficient space for the different activities that sometimes exclude other activities in the same areas. For example, fishing in areas that are heavily used for navigation, or the construction of OWFs in defence practice areas, is not accepted.

The struggle that coastal states experience with regard to the combination of different activities at sea builds on the underlying power of states to regulate certain activities at sea: to decide, whether, where and when they can take place.[462] The regulation of offshore activities can be decided on an ad-hoc basis, but as the amount and (spatial) impact of activities at sea increases, ad-hoc decision-making might lead to sub-optimal results with regard to the use of space at sea. This in turn may limit the amount of activities that can take place in a state's EEZ and continental shelf or increase the environmental impact of certain activities more than necessary. Maritime spatial planning is a process which leads coastal states to weigh the interests and impacts of different activities and possible synergies between activities to come to an optimal use of the (sometimes scarce) space available at sea. Maritime Spatial Planning (MSP) is a neutral instrument that can be used to improve decision-making on the spatial planning of nautical areas, with attention to different human activities at sea,

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[459] Ibid.

[460] C.N. Ehler, 'Marine Spatial Planning, an Idea Whose Time Has Come' in K.L. Yates, C.J.A. Bradshaw (Eds), *Offshore Energy and Marine Spatial Planning* (Routledge 2018) p. 6.

[461] Aquaculture is described as "the rearing of aquatic animals or the cultivation of aquatic plants for food" in the Oxford Dictionary. In the future, algae cultivation for the purpose of bioplastics or biofuels may be added to this.

[462] This is based on jurisdiction at sea, elaborated further in chapter 2.3.

as well as the impact of these activities on the maritime environment.[463] It can also facilitate cross-border cooperation as it makes the impacts of different activities visible, although this only works if the states on both sides of a border have a similar or comparable approach to maritime spatial planning.[464]

Some coastal states started maritime spatial planning several decades ago. Belgium and Denmark were the first to do so. Denmark, in the context of the search for optimal offshore wind energy locations, started maritime spatial planning specifically aimed at offshore wind farms as early as 1997.[465] Belgium already had a practice of maritime spatial planning dating back to 2003.[466] There, the need for a maritime spatial plan originated from the demand for suitable locations for offshore wind energy.[467] However, the first plan drafted only applied for two years, without a clear vision for the future. Moreover, both in Denmark and in Belgium, the drafting process was much less organised than contemporary maritime spatial plans.[468]

4.1.2 Contemporary Maritime Spatial Planning

Since the introduction of the EU Maritime Spatial Planning Directive in 2014,[469] maritime spatial planning has become compulsory for all coastal states investigated in this chapter, except for Norway. The Directive was declared 'not relevant for the EEA' and was therefore not adopted in the EEA agreement. Therefore, in practice, Norway does not have maritime spatial planning to the same extent as the other coastal states. Nevertheless, Norway did make a strategic assessment of offshore wind energy locations in 2012.[470] This document can be seen as a first step towards a Maritime Spatial Plan (MSP). However, it is not binding and it only takes into account one activity, offshore wind energy.

The introduction of the EU Maritime Spatial Planning Directive, and its development and drafting process already,[471] has led to a formalisation of maritime spatial planning law in the countries it applies to, although it focuses on minimum harmonisation and thus only prescribes the minimum standards.[472] In the implementation of the Directive, the states had

[463] N. Schaefer, V. Barale, 'Marine Spatial Planning: Opportunities & Challenges in the Framework of the EU Integrated Maritime Policy', *Journal of Coastal Conservation* [2011 15] 237-245, p. 238.
[464] 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', *the International Journal of Marine and Coastal Law* [2018 33] pp. 34-78, p. 77/78.
[465] Danish Energy Agency, 'Danish Experiences from Offshore Wind Development', 2015, p. 16/17.
[466] F. Maes, A. Vanhulle, A.K. Lescrauwaet, 'Mariene Ruimtelijke Planning' in A.K. Lescrauwaet, H. Pirlet, T. Verleye, J. Mees, R. Herman, (Eds.), *Compendium voor Kust en Zee 2013: Een geïntegreerd kennisdocument over de socioeconomische, ecologische en institutionele aspecten van de kust en zee in Vlaanderen en België* (VLIZ 2013), p. 274.
[467] Ibid.
[468] Ibid.
[469] Directive 2014/89/EU establishing a framework for maritime spatial planning, OJ L 257, 28.8.2014.
[470] Norges Vassdrags- og Energidirektorat, Havvind - Strategisk konsekvensutredning (2012), available at http://publikasjoner.nve.no/rapport/2012/rapport2012_47.pdf.
[471] E. van Doorn, S.F. Gahlen, 'Legal Aspects of Marine Spatial Planning', in K.L. Yates, C.J.A. Bradshaw (Eds), *Offshore Energy and Marine Spatial Planning* (Routledge 2018) p. 80-82.
[472] Ibid., p. 83.

to make clear which authorities are to draft maritime spatial plans, what timespan they cover and what their legal status is. Moreover, the adoption of procedures for cooperation with neighbouring states is also required by the Directive.[473]

The Directive was implemented in different Acts across the analysed countries. For example, in Belgium, the Act on the Marine Environment was amended in 2012 to allow for official spatial planning.[474] Denmark has implemented the Directive with the adoption of a new Maritime Spatial Planning Act.[475] The Act codifies the practice that already existed before and adds more specific information on the procedure and on which interests are taken into account.[476] In France, (onshore) spatial planning is codified in the Urban Planning Code (*Code de l'Urbanisme),* but offshore wind energy and offshore electricity cables, as well as all other constructions at sea, are explicitly excluded from this Act.[477] Instead, the French Environmental Code (*Code de l'Environnement)* requires 'integral management of the sea and coastal areas', and a 'strategic document'.[478] This forms the basis of maritime spatial planning in France. In Germany, from 2009 onwards, maritime spatial planning is based on the general Spatial Planning Act (*Raumordnungsgesetz)*, which designates '*Vorrangsgebiete'.* In these areas, certain activities, such as offshore wind energy, have priority over all other activities, within certain margins set by the same Act.[479] In the Netherlands, maritime spatial planning is part of the Water Act (*Waterwet),* in which it is provided that the government drafts a National Water Plan.[480] This Water Plan encompasses both internal waters and the sea – the part on the North Sea is to be considered a Maritime Spatial Plan in the sense of the Directive. As mentioned before, Norway does not have any maritime spatial planning law in place, although a strategic assessment of the siting of offshore wind areas was published in 2012.[481] In Sweden, maritime spatial planning has its basis in the Environmental Act.[482] It is elaborated upon further in an Ordinance dedicated to maritime spatial planning.[483] Lastly, the United Kingdom implemented the Directive in the Marine and Coastal Access Act 2009.[484]

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473 Directive 2014/89/EU establishing a framework for maritime spatial planning, art. 11.

474 Act on the Maritime Environment (*Wet Marien Milieu*), art. 7, changing art. 5(bis) of the original act. The first Maritime Spatial Plan was adopted with a Royal Decree: Koninklijk Besluit van 20 maart 2014 tot vaststelling van het marien ruimtelijk plan, Nr. 2014-03-20/03.

475 Act on Maritime Spatial Planning (*Lov om maritim fysisk planlægning*) LBK 615, 8-6-2016.

476 Ibid., kap. 5.

477 Urban Planning Code (*Code de l'urbanisme*) R-421-8-1, L421-5(e).

478 Environmental Code (*Code de l'environnement*) art. L-219-1 and L-219-3.

479 Spatial Planning Act (*Raumordnungsgesetz vom 22. Dezember 2008 (BGBl. I S. 2986), das zuletzt durch Artikel 124 der Verordnung vom 31. August 2015 (BGBl. I S. 1474) geändert worden ist),* art. 17.

480 Water Act (*Wet van 29 januari 2009, houdende regels met betrekking tot het beheer en gebruik van watersystemen (Waterwet 2009))*, art. 4.1. The most recent version (2016-2021) can be found here: https://www.noordzeeloket.nl/images/Nationaal-waterplan-2016-2021%20H_4776.pdf. See also L. de Vrees, 'Adaptive marine spatial planning in the Netherlands sector of the North Sea', *Marine Policy* [corrected/in press 14 February 2019] p. 103418.

481 NVE (Norwegian Water and Energy Directorate), *Havvind – Strategisk konsekvens utvredning*, december 2012.

482 Environmental Act (*Miljöbalk*), 1998:808, kap. 4 para 10.

483 Maritime Spatial Planning Ordinance (*Havsplaneringsförordning*) (2015:400).

484 Marine and Coastal Access Act 2009 (c 23).

4.1.3 Preparation and Adoption of Maritime Spatial Plans

Maritime spatial planning documents are often prepared by the national or regional maritime authorities,[485] and officially adopted by the relevant Minister in the form of an official government decision or decree. In all investigated countries except for Norway, the maritime plan is binding through its legal form as decree or government decision. Additionally, Denmark and the United Kingdom state explicitly that spatial planning decisions have to be taken in accordance with the maritime plan, with Denmark making an exception for urgent cases in which the Minister cannot wait until the maritime spatial plan is changed, or when it is necessary in order to comply with international or European law, or when it is necessary for maritime safety.[486] In Danish law, this is made explicit, but in other countries, this might also be the case in practice.

The authorities responsible for the Maritime Spatial Plans can take different shapes and functions. For example, France, Sweden and the United Kingdom have different maritime authorities for different regions,[487] whereas the Belgium, Denmark, Germany and the Netherlands only have one maritime authority.[488] Sometimes, even if there is only one authority, multiple plans can be drafted. This is the case in Germany, where the *Bundesamt für Seeschiffahrt und Hydrographie* (BSH) develops plans for both the North Sea and the Baltic Sea.[489]

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485 In the Directive, only the term 'the relevant authorities' is used. See for example MSP Directive, art. 3(2). Which authority is the relevant authority differs per coastal state, but most states have specialized authorities for maritime affairs. An example is the German Bundesamt für Seeschifffahrt und Hydrographie (BSH). Another possibility is that the state has several 'relevant authorities'. For example, in the UK, the relevant authorities are the Secretary of State for the English inshore and offshore regions, Scottish Ministers for the Scottish inshore and offshore regions, Welsh Ministers for the Welsh inshore and offshore regions and the Department of the Environment in Northern Ireland for the Northern Ireland inshore and offshore regions.

486 Denmark: Act on Maritime Spatial Planning, kapitel 5. United Kingdom: Marine and Coastal Access Act 2009, sec. 58(1) and (2).

487 For France, four regions are used: the Channel (East)/North Sea; North Atlantic/Channel (West); South Atlantic; the Mediterranean sea. Environmental Code (*Code de l'Environnement),* art. R-219-1-7 (I). For Sweden, the regions are the Baltic Sea, Skagerrak/Kattegat and the Gulf of Bothnia, Environment Act (*Miliöbalk)*, kap. 4 para 10, Maritime Planning Regulation (*Havsplaneringsförordning)*, para 2. For the United Kingdom, there are separate maritime planning authorities for England, Scotland, Northern Ireland and Wales (Marine and Coastal Access Act 2009, sec. 50). Officially, there are eight marine planning areas according to sec. 49 Marine and Coastal Access Act 2009, but England has subdivided its maritime area in 11 different subareas, which will all have separate plans: https://www.gov.uk/government /uploads/system/uploads/attachment_data/file/325688/marine_plan_areas.pdf.

488 Respectively Federal DG Environment, Federal Public Service Public Health, Food Chain Safety and Environment - Marine Environment Unit (BE), the Danish Maritime Authority (*Soefartsstyrelsen*, DK)*,* Bundesamt für Seeschiffahrt und Hydrographie (BSH, DE), Interdepartmental Directors North Sea Consultative Body (IDON, NL) represented to the public by a separate entity 'Noordzeeloket' which provides information to the public.

489 Spatial Planning Act (*Raumordnungsgesetz des Bundes),* art. 17 jo. *Verordnung über die Raumordnung in der deutschen ausschließlichen Wirtschaftszone in der Nordsee* (2009) including *Raumordnungsplan Nordsee 2009* and *Verordnung über die Raumordnung in der deutschen ausschließlichen Wirtschaftszone in der Ostsee (2009)* including *Raumordnungsplan Ostsee* 2009. http://www.bsh.de/de/Meeresnutzung/Raumordnung_in_der_AWZ/index.jsp

4.1.4 Scope of Maritime Spatial Plans

Legal and political differences also become visible when comparing the substantive scope of maritime spatial plans. This reveals how diverse the plans are in terms of the scope of interests taken into account. These interests include offshore wind energy, minerals extraction, sand extraction, fisheries and aquaculture, military purposes, nature protection and recreation. The interests that are taken into account in different North Sea coastal states depend on the specific available resources, and on political choices on which activities have priority over other activities. A sensitive topic in this regard is military purposes. A comparison between the North Sea coastal states on this point reveals interesting differences: in France, a clear division is made between economic and ecological development of the sea on the one hand and military usage of the sea on the other hand. Military usage of the sea is explicitly excluded in maritime spatial planning documents.[490] Contrary to this, the Netherlands explicitly includes military areas in the maritime spatial planning document. It is mentioned specifically that military areas can also be used for other purposes when the military is not using the area, although (semi-)permanent constructions such as wind farms and gas or oil exploitation platforms are not allowed.[491]

4.1.5 Flexibility of Maritime Spatial Plans

On the one hand, with the rapid emergence of new activities at sea, such as wave and tidal power, energy islands, floating wind energy,[492] and currently unforeseen technologies that will be developed in the future, it is important that there is some flexibility in the maritime spatial planning of coastal states, in order to take new technological or market developments into account. On the other hand, for many activities, such as ecological improvement and (semi-)permanent installations, long-term stability of maritime spatial planning is also important. This tension between flexibility and stability has to be addressed in how maritime plans are made. There are two variables which influence the flexibility and stability of maritime spatial planning: the renewal time for maritime spatial plans and the possibility to amend an already adopted plan. Belgium, France, the Netherlands and the United Kingdom renew their maritime spatial plans every six years, [493] Sweden updates its plans at least once every eight years,[494] and Denmark and Germany every ten years.[495] Concerning the possibility

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[490] Environmental Code (*Code de l'Environnement),* art. L219-5-1.
[491] Policy Document for the North Sea 2016-2021, connected to the National Water Plan *(Beleidsnota Noordzee 2016-2021)*, p. 54.
[492] Cf. D.S.Coles, L.S.Blunden, A.S.Bahaj, 'Assessment of the energy extraction potential at tidal sites around the Channel Islands' in *Energy* [2017 Vol 124], pp. 171-186; H.C. Sørensen, J. Fernández Chozas, 'The Potential for Wave Energy in the North Sea' conference paper for the 3rd International Conference on Ocean Energy, 6 October 2010, Bilbao; O.C. Spro, R.E. Torres-Olguin, M. Korpås, 'North Sea offshore network and energy storage for large scale integration of renewables', *Sustainable Energy Technologies and Assessments* [2015 Vol 11] pp. 142-147.
[493] Belgium: Marine Environment Act (*Wet Marien Milieu),* art. 5bis para 2; France: Environmental Act (*Code de l'Environnement)*, art. L-219-2; Netherlands: Water Act (*Waterwet)*, art. 4.8(1), the United Kingdom: Marine and Coastal Access Act, sec. 61(12).
[494] Sweden: Maritime Spatial Planning Regulation (*Havsplaneringsförordning),* para 21.
[495] Denmark: Maritime Spatial Planning Act (*Lov om maritim fysisk planlægning),* kap. 4 para 10; Germany: Spatial Planning Act (*Raumordnungsgesetz des Bundes)*, art. 7(8).

to amend the maritime plan once it is adopted, all countries have provisions in place for periodic review and amendment of the maritime plans. When neighbouring countries renew their spatial plan around the same time, they can take into account developments at the other side of the border and seek synergies. However, the North Sea coastal states have adopted their first spatial plans at different moments and they currently have different intervals for when they review and renew their maritime spatial plan. This means that in practice, the maritime spatial planning processes of the coastal states are not synchronous.

4.2 Permitting Procedures

Permitting procedures are often considered as a legal risk or a barrier in the development of large and complex projects, including large electricity infrastructure projects.[496] These procedures may take several years, depending on the extent to which the procedure is streamlined between different permitting authorities, the maximum reaction time for authorities and whether there are any appeals or legal challenges of permit granting decisions. The delay itself may already be costly due to missed benefits or extra expenses. Moreover, the possibility of delays entails an extra risk for project developers, namely the risk that there are legislative changes or changing market circumstances influencing the business case for the wind farm or the electricity transmission infrastructure during the (often already long-lasting) permitting phase. In that case, the project developer may want to adjust the project taking into account the latest legislative or technological changes, whereas, if the project would be changed, the permitting process needs to start over again. Although legislative changes are often foreseeable in the short term, they are hardly foreseeable over the time scale that is normally needed for electricity infrastructure projects, which generally need several years from the planning and business case development phase until the phase where the final permits and investment decisions are obtained. Therefore, project developers have an interest in a permitting phase that is organised as smoothly as possible. This partially lies in the hands of project developers, who have to deliver the right information at the right time, but it is mainly influenced by the permitting authorities and the way the permitting process is organised according to national law.

For electricity infrastructure projects situated within one state, the permitting process is already a barrier. For cross-border infrastructure projects, this is even more the case. The authorities in both countries need to agree to the proposals, preferably within the same time period. When all permits in one country are ready but there is a delay in the other country, the infrastructure still cannot be constructed in time. Whereas wind farms themselves are normally located in only one state, many cross-border electricity cables will be needed in a meshed grid. Nevertheless, the connections and the installations they connect depend on each other to such an extent, that the permitting processes for the OWF and for the cable

[496] PwC, Tractebel, Ecofys, 'Study on regulatory matters concerning the development of the North Sea offshore energy potential', Report for the European Commission, Jan. 2016, p. 84/85.

connection often run in parallel. Therefore, the permitting procedures of both OWFs and of submarine electricity cables will be considered here.

Before elaborating on the legislative practice of the North Sea coastal states, some attention needs to be paid to terminology. There are several different terms used for the permission with which a coastal state gives a certain entity the right to construct and exploit an OWF at a certain location. This can be called a 'concession', 'license' or 'permit' depending on the exact legal situation. It has to be borne in mind that this chapter translates the specific terms of Belgian, Danish, French, German, Dutch, Norwegian and Swedish national law in English, which undeniably changes the specific wording.[497] Words sounding similar, i.e. Belgian *'domeinconcessie'* and Norwegian *'konsesjon'* may have slightly different legal meanings in different countries: in Norway, a *konsesjon* is needed for the construction of an offshore wind farm and for cables between offshore wind farms and the onshore grid, whereas in Belgium, *domeinconcessies* are related to the use of a specific good in the public domain (such as an area for the production of wind energy).[498] Both words refer to the usage of public space, but as explained above, the scope of the term is slightly different in both countries. Therefore, in this chapter, the words 'concession', 'license' and 'permit' are used in a broad sense, to encompass the variety of different formulations in different legislations.

The investigated countries require several permits for the construction of offshore wind farms and for offshore electricity transmission infrastructure. The structure and amount of permits needed per country differs significantly. Although the topic of this dissertation is electricity transmission infrastructure, the procedures for OWFs are also relevant. This is because the construction of transmission infrastructure normally follows the construction of OWFs. Therefore, both topics are covered in the following two subchapters. The last subchapter is dedicated to innovation in the permitting procedures over the last years.

4.2.1 Permitting Procedures for Offshore Wind Farms

For offshore wind farms, the two most commonly required licenses are construction licenses and concessions for the exploitation of the wind energy over the lifetime of the OWF. The construction license is often linked to environmental law considerations and regularly includes

[497] The various words that are used in this context are: *domeinconcessie* and *vergunning* (BE), *tilladelse* (DK), *concession* and *autorisation* (FR)*, Zuschlag, Planfeststellung* and *Genehmigung* (DE), *vergunning* (NL), *konsesjon* (NO), tillstånd (SE).

[498] Even within one jurisdiction, there might be difficulties with regard to the interpretation of the word concession. In Belgium, the Court of Ghent discussed the legal difference between 'concessie van openbare dienst' and 'domeinconcessie'. It found that the former relates to the government giving an individual (private or company) the right to perform a certain public service, whereas 'domeinconcessie' relates to the government granting an individual the *exclusive* right to exploit resources in a certain domain, without performing a public service. D. Dekeuster, 'Het onderscheid tussen een concessie van openbare dienst en een domeinconcessie', 30-9-2016, available at https://www.dkc-law.be/Actualiteit/ArtMID/549/ArticleID/96/Het-onderscheid-tussen-een-concessie-van-openbare-dienst-en-een-domeinconcessie.

a requirement for an EIA to be performed.[499] This is due to the fact that the development of wind farms normally has a significant impact on the environment. In Denmark, next to the construction license, another license is needed for preliminary investigations as a separate activity.[500] Sweden also requires two environmentally-oriented permits both connected to the construction of wind farms in the territorial waters: a permit for performing environmentally hazardous activities and a permit for water operations;[501] in the EEZ, only one permit, based on the Act on the Swedish EEZ, is needed.[502]

The other commonly required license is the exploitation permit or concession for the exploitation of wind energy. This license, permit or concession is required in Belgium,[503] Denmark,[504] France as far as the wind farm is located in territorial waters,[505] Germany,[506] the Netherlands,[507] Norway,[508] Sweden beyond the territorial waters,[509] and the United Kingdom.[510] This exploitation permit is often granted for a certain time. In Belgium, it is specified in the royal decree that forms the basis of the concession, that the concession is valid for 20 years, with the possibility of extension to, at most, 30 years.[511] In other countries, the maximum duration of the concession is not specified in the legal basis, but it is specified in the permit itself. In the Netherlands, the permit duration depends on the wind farm itself and on

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[499] In Belgium, an Environmental Permit is needed for the construction of OWFs as well as for other activities at sea, Protection of the Maritime Environment (*Wet Bescherming Marien Milieu*), art. 25(1). In Denmark, this is necessary when the OWF is deemed to have a significant impact on the environment (which was the case for all OWFs so far). This obligation is based on the Promotion of Renewable Energy Act, art. 26(1). France has incorporated an EIA obligation in the Code de L'Environnement, L-122-1(II); Norway in the Offshore Wind Energy Act, kapittel 4; Sweden in the Miljobalk, kap. 9 para 6. In the United Kingdom, a 'Marine License' is required for the construction of offshore wind farms, based on Marine and Coastal Access Act, sec. 66. Through the Marine Works (Environmental Impact Assessment) Regulations 2007 no. 1518, amended by the Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2017 no. 588, sec. 2 combined with sec. 8 and schedule A2.

[500] Denmark, Promotion of Renewable Energy Act (L*ov om fremme af vedvarende energy*), LBK nr 356 af 04/04/2019, art. 22.

[501] P. Söderholm, M. Pettersson, 'Offshore Wind Power Policy and Planning in Sweden', *Energy Policy* [2011 39(2)] p. 523.

[502] Act on the Swedish EEZ (*Lag (1992:114) om Sveriges ekonomiska zon*), art. 5. With this Act, several of the principles and criteria from the Environmental Code are also applied to activities beyond the Swedish territorial waters, art. 2. The Act also requires an EIA for the permit application, art. 6.

[503] Act on the Organisation of the Electricity Market (*Wet betreffende de Organisatie van de Elektriciteitsmarkt*) 1999-04-29/42, art. 6, with details provided in *Koninklijk besluit betreffende de voorwaarden en de procedure voor de toekenning van domeinconcessies voor de bouw en de exploitatie van installaties voor de productie van elektriciteit uit water, stromen of winden, in de zeegebieden waarin België rechtsmacht kan uitoefenen overeenkomstig het internationaal zeerecht*, BS 30.12.2000, p. 43557.

[504] Danish Promotion of renewable energy act, art. 29.

[505] According to French law, the State can only give out concessions for the use of the public property that it owns. A. Monaco, P. Prouzet, *Governance of Seas and Oceans* (Wiley, 2015) p. 191.

[506] This is the "Zuschlag" for a certain area, based on Act on offshore wind energy, art. 46(1).

[507] The Wind License (*Windvergunning*) is based on the Offshore Wind Energy Act (*Wet Windenergie op Zee*), art. 12.

[508] Konsesjon, Offshore Wind Energy Act (*Lov om fornybar energiproduksjon til havs (Havenergiloven)*), art. 3-1.

[509] Act on the Swedish EEZ (*Lag om Sveriges Ekonomiska Zon*), para 5.

[510] For the United Kingdom, the concession is a lease from the Crown Estate. This organisation manages the assets owned by the Sovereign, including the seabed.

[511] Royal Decree 30.12.2000, art. 13.

the local circumstances, but is limited by law to at most 30 years.[512] In the United Kingdom, applicants first receive a 5-year lease from the Crown Estate; a final lease is granted after all other consents and permits are obtained.[513] The Crown Estate is the entity responsible for these licenses, as it holds the exclusive rights to exploit the 'Renewable Energy Zone'.[514] This REZ is similar to an EEZ.[515]

In the Netherlands, since the legislative changes of 2016, the construction- and exploitation permits are combined into one license (*Windvergunning)*.[516] This license to produce wind energy (*Windvergunning*) replaces the 'Water Licence' (*Watervergunning)* which is usually required for operations that take place in the water or at sea.[517] At the same time, the Wind Licence gives the selected project developer the right to construct and operate a wind farm within the designated area, which makes the Wind Licence a construction licence and an operation licence, similar to a concession, at the same time.

The Dutch procedure provides that the EIA is prepared by the government institution, RVO, which organises the entire license process. The EIA is prepared in the context of the Wind Farm Zone Decision (Kavelbesluit), and it serves as an EIA for the entire project, including the construction.[518] As the EIA takes place before it is clear which party is going to construct the wind farm and what the project design is going to be, a 'bandwidth approach' is used in the Dutch offshore wind farm EIAs. With this approach, different alternatives concerning for example the minimum capacity per turbine and the total number of turbines are investigated within a certain range, i.e. environmental impact is measured for 50 large turbines and for 100 smaller turbines.[519] The project developer of the wind farm is allowed to plan and construct the wind farm within the bandwidth indicated in the EIA.

The procedure for obtaining an exploitation permit can be 'open-door'[520] or coupled to a certain area. Norway and Sweden have an open-door procedure. Belgium has an open-door

[512] Offshore Wind Energy Act (*Wet Windenergie op Zee*), art. 15.
[513] Müller 2016, p. 179.
[514] Energy Act 2004, sec. 84(1).
[515] The Renewable Energy Zone was originally designated by Renewable Energy Zone (designation of area) order 2004, no. 2668. However, this order has been revoked by Exclusive Economic Zone Order 2013/3161 art.1(2) (March 31, 2014). Nevertheless, the Renewable Energy Zone is also described in the Energy Act 2004, art. 84. For Scotland, there is a separate Renewable Energy Zone Order, based on Energy Act 2004 art 84(5), which is not revoked and thus still applicable: Renewable Energy Zone (Designation of Area) (Scottish Ministers) Order 2005/3153.
[516] E.M.N. Noordover, A. Drahmann, 'Tailormade Regelgeving voor windturbineparken op de Noordzee', *Tijdschrift voor Omgevingsrecht* [2014 3/4] p. 111.
[517] Water Act (*Waterwet*), art. 6.5a.
[518] Noordover, Drahmann 2014, p. 114.
[519] For example, the complete EIA for Borssele 1 (in Dutch, English summary available): Grontmij, Pondera, 'Milieueffectrapport kavelbesluit I windenergiegebied Borssele, Addendum bij het MER, Passende Beoordeling, GM-0165241, revisie D01.
[520] An 'open-door' procedure allows any interested party to apply for a permit to construct and operate an offshore wind farm at a certain location. Often, this application is followed by a procedure in which the application is published and other potentially interested parties are invited to react and to place a counter-

procedure within the confines of the planned offshore wind areas.[521] Whereas Germany and the Netherlands have a centrally planned procedure now, they both had open-door systems before legislative revisions in 2015 and 2016 respectively. A compromise between open-door procedures and permitting per specific area is a zonal approach. With this approach, OWF developers can make their own OWF plans within predetermined OWF zones. This provides liberty to the developers to choose their location whilst also enabling the coastal state to organise the usage of the sea efficiently. A zonal approach is used in the United Kingdom, where the Crown Estate makes development zones available in different 'leasing rounds'.[522]

It is also possible to combine approaches: Denmark has a hybrid system. Open-door applications are allowed next to the centrally-planned system in which the TSO performs preliminary investigations and constructs and operates the export cable. It must be noted that in practice, the Danish open-door procedure is rarely used. Factors potentially contributing to this are the favourable conditions for the centralised tender, namely the preliminary investigations and export cable provided by the TSO, and the fact that financial support for open-door projects is the same as for onshore wind projects, which is generally lower than for centrally-planned offshore wind projects.[523]

Next to the permits specific to the offshore wind farms, Denmark and France require companies producing electricity to obtain a general license to produce electricity and to feed it into the electricity grid. In France, the license, provided by the national regulatory authority CRE, is a permit for the exploitation of an installation for the production of electricity.[524] CRE has to take into account the balance between demand and supply of electricity; the nature and source of the primary energy source; the energy efficiency of the installation compared to the best available technology; the technical and financial capacities of the applicant and the impact of the installation on the climate targets.[525] The installation has to be compatible with the multiannual programme for energy,[526] which gives the long term directions for development of the energy sector. For Denmark, the license is bound to the company as a

proposal. Eventually, the relevant authority takes the decision whether or not an offshore wind farm as applied for may be constructed. The difference with centrally planned procedures is that an open-door procedure leaves the initiative to project developers to decide if, and where, they want to construct an offshore wind farm.

[521] *Koninklijk besluit betreffende de voorwaarden en de procedure voor de toekenning van domeinconcessies voor de bouw en de exploitatie van installaties voor de productie van elektriciteit uit water, stromen of winden, in de zeegebieden waarin België rechtsmacht kan uitoefenen overeenkomstig het internationaal zeerecht,* BS 30.12.2000, p. 43557, art. 5(2) and 7.

[522] See for example The Crown Estate, Information Memorandum: Introducing Offshore Wind Leasing Round 4, September 2019, p. 17.

[523] Danish Renewable Energy Act, art. 36(2).

[524] Energy Code (*Code de l'énergie*), art. L311-5.

[525] Ibid.

[526] French Ministry of the Environment, 'French Strategy for Energy and Climate – Multi-annual Energy Plan, 2019-2023, 2024-2028', English translation of the '*Programmations pluriannuelles de l'énergie* (PPE)'.

whole and not to a specific plant.[527] Therefore, if the company that operates the offshore wind farm already has the permit, it does not need to obtain this permit for the next installation. In the other countries, there are no such licenses for the *production* of electricity although licenses are sometimes required for the *supply* of electricity. As this chapter focuses on production and (offshore) transmission, licenses for the supply of electricity fall outside the scope of this chapter.

4.2.2 Permitting Procedures for Offshore Electricity Transmission Infrastructure

For offshore electricity transmission, different permits are needed. Again, some countries require separate permits (and EIAs) for the construction of the export cables of wind farms, whereas in other countries, this is covered already in the permit for the offshore wind farm, as it is considered to be one installation. This also depends on whether the export cable is regulated as part of the offshore wind farm or whether it is regulated as a separate asset.[528] For interconnectors, the situation is interesting considering the limits of jurisdiction under international law: Denmark and France explicitly differentiate between transit cables and cables that reach the coastline.[529] The other countries have not adopted specific provisions on transit interconnectors, but the UK does differentiate between different parts of the interconnector, namely the "inshore stretch" and the "offshore stretch".[530] Both strategies (differentiation between different kinds of interconnectors or one regime for all) are in line with international law. In the context of the development of a MOG, it is important that the permitting procedures for offshore electricity transmission infrastructure are streamlined as much as possible, in order to decrease the administrative burden and costs of developing numerous cable projects, and that it is clear under which permitting regime hub-to-hub cables in a MOG fall.

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[527] Denmark: Electricity Supply Act (*Lov om elforsyning*) LBK nr. 418, art. 10. See also: A. Ronne, 'Energy Law in Denmark' in M. Roggenkamp, C. Redgwell, A. Ronne and I. del Guayo (Eds), *Energy Law in Europe*, Oxford University Press 2016, 3rd Edition, p. 446.
[528] See chapter 4.3 below.
[529] Denmark: Electricity Supply Act, art. 21(5). France, *Décret no. 2013-611 du 10 juillet 2013 relatif à la réglementation applicable aux îles artificielles, aux installations, aux ouvrages et à leurs installations connexes sur le plateau continental et dans la zone économique et la zone de protection écologique ainsi qu'au tracé des câbles et pipelines sous-marins*, JORF no 0160 du 12 juillet 2013 page 11622, art. 19 "*qui atterrisent sur le territoire français.*
[530] The requirements of the Marine and Coastal Access Act 2009 relating to a Marine License (necessary for, amongst others, the construction of offshore cables) are not applicable to the 'offshore stretch' of exempt submarine cables. 'Exempt' in this context means a cable that is not used for the exploration or exploitation of natural resources or the operation of artificial islands or installations under the jurisdiction of the United Kingdom. This exemption thus relates to interconnectors and not to OFTO-cables. With regard to the 'inshore stretch' of exempt cables, a Marine License is needed, but the relevant authority must grant the license for any application. With regard to both parts of the cable (inshore and offshore), the authority can impose conditions, related for example to safety or environmental considerations. Marine and Coastal Access Act 2009, sec. 81(4) and (5).

In practice, in Belgium, a permit is needed for the construction of offshore electricity or telecommunications cables, as well as for offshore pipelines.[531] In Denmark, a permit awarded by the Energy and Climate Minister is necessary for the construction of all offshore electricity cables except for inter-array cables and for transit-interconnectors.[532] Thus, a differentiation is made in the function of the cables.

In France, concerning the area beyond the territorial waters, there is one decree applicable to artificial islands, structures, installations as well as offshore cables and pipelines.[533] According to this decree, a notification procedure exists for the construction of offshore cables.[534] For the electricity transmission infrastructure located in the territorial waters, the Environmental Code requires an *authorisation* or *declaration*, the same as with the offshore wind farms.[535]

In Germany, for all offshore cables, a planning approval awarded by the BSH is needed. Next to this, for the construction of interconnectors, a specific permit is needed for underwater cables and pipelines, based on the Mining Act,[536] and awarded by the *Landesamt für Bergbau, Energie und Geologie.*[537]

The Netherlands has a complicated permission system for the construction of electricity cables with five different permits, whereas other North Sea coastal states have one or two permits. However, the Netherlands has made a considerable effort to streamline the permission process, not only for offshore electricity transmission infrastructure but also for other large projects. Considering offshore infrastructure, first of all, for the onshore leg of the cable, the spatial plans *(bestemmingsplan*) of certain areas and municipalities have to be amended, until one kilometre into the sea: this is the border of the area of Dutch municipalities and provinces.[538] For this area (until 1 km into the sea) the Minister of Economic Affairs and the

[531] Belgian Royal Decision on the laying of cables (…), *Koninklijk besluit betreffende de nadere regels voor het leggen van kabels die in de territoriale zee of het nationaal grondgebied binnenkomen of die geplaatst of gebruikt worden in het kader van de exploratie van het continentaal plat, de exploitatie van de minerale rijkdommen en andere niet-levende rijkdommen daarvan of van de werkzaamheden van kunstmatige eilanden, installaties of inrichtingen die onder Belgische rechtsmacht vallen*, BS 09-05-2002, p. 19339, art. 5-6.

[532] Danish Electricity Supply Act, art. 22a.

[533] *Décret no. 2013-611 du 10 juillet 2013 relatif à la réglementation applicable aux îles artificielles, aux installations, aux ouvrages et à leurs installations connexes sur le plateau continental et dans la zone économique et la zone de protection écologique ainsi qu'au tracé des câbles et pipelines sous-marins,* JORF no 0160 du 12 juillet 2013 page 11622.

[534] Ibid., art. 19.

[535] Environmental Code (*Code de l'environnement*), art. L-214-3(I) and (II).

[536] Federal Mining Act (*Bundesberggesetz (BBergG)*), art. 133(1). The article refers only to pipelines, but in the last clause, it declares the article also applicable to submarine cables. BBergG, art. 133(4).

[537] Müller 2016, p. 206.

[538] Act on the Coastal Boundaries (*Wet van 2 november 1990, houdende regeling provincie- en gemeentegrenzen langs de Noordzeekust van de gemeente Den Helder tot en met de gemeente Sluis en wijziging van de Financiële-Verhoudingswet 1984 (Stb. 1990, 553)*, Act on the Provincial Division of the Wadden Sea (*Wet van 8 december 1980, tot provinciale indeling van de Waddenzee (Stb. 1980, 670)*), Act on the Municipal Division of the Wadden Sea (*Wet van 12 december 1985, tot gemeentelijke indeling van de Waddenzee (Stb. 1985, 648*)). Electricity Act *(Electriciteitswet),* art. 20ca also mentions that several of the articles in that Act relating to grid extension (20a-20c) are also applicable to the offshore grid, except that there is no *Rijksinpassingsplan* for the area at sea beyond the municipality/provincial boundaries of 1 km.

Minister of Infrastructure and the Environment can amend all spatial plans at once with a *Rijksinpassingsplan*.[539] Next to this, administrative decisions are needed for at least five different permits, namely a permit on the basis of the Water Act, one on the basis of the Nature Protection Act, one on the basis of the Environmental Act, one on the basis of the Flora and Fauna Act, and one permit for discharging materials in the sea, on the basis of the Water Act.[540] Moreover, a provincial permit may also be necessary, depending on the project. In order to prevent a burdensome and long process, all permits are prepared in one coordinated procedure, the *Rijkscoordinatieregeling*, under the responsibility of the Minister of Economic Affairs.[541] For the part of the cable located in the EEZ, only a Water Permit is needed.[542]

In Norway, next to the concession for the OWF, a separate concession is necessary for the construction of a submarine electricity cable.[543] Moreover, for the onshore part of offshore cables, an EIA is necessary.[544] This should be sent together with the concession application, subject to the approval of the Norwegian Water Resources and Energy Directorate (NVE).[545]

In Sweden, the Act on the Continental Shelf provides that permission is needed for all activities of exploration and exploitation of the continental shelf,[546] including the laying of cables and pipelines.[547] This rule is interesting as not all cables and pipelines are used for the exploitation of the continental shelf, i.e. cables to connect OWFs are for the exploitation of the EEZ rather than the continental shelf. Moreover, it is written in the Swedish Act on the Continental Shelf that when the cables continue into Swedish territory, which is the case for cables connecting OWFs to the onshore grid, the article that requires a permit for submarine cables and pipelines is not applicable,[548] as the cable will already be covered by the abovementioned permits. Next to this rule, the general rules from the Environmental Code are applicable, which entails that

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[539] See K.J. de Graaf, D.A. Lubach, 'Offshore Windenergie: Optimaal Omgevingsrecht op Zee?' in K.J. de Graaf, *Regulering van offshore windenergie* (preadvies Nederlandse Vereniging voor Energierecht) (Intersentia, 2008), p. 71. As an example, the plan for the cables to connect the Borssele OWFs can be found here: https://www.rvo.nl/sites/default/files/2016/03/Inpassingsplan%20noz%20Borssele_ontwerp_def.pdf.

[540] In Dutch the respective permits and licenses are the *Watervergunning, Vergunning op basis van de Natuurbeschermingswet, Omgevingsvergunning, Ontheffing Flora- en faunawet* and *Watervergunning – lozen*.

[541] This coordinated procedure, used for projects of 'national interest' is based on the Dutch Spatial Planning Act (*Wet Ruimtelijke Ordening),* article 3.28. See for example: Decision on the application of the rijkscoordinatieregeling to the cables for the Borssele OWFs: https://www.rijksoverheid.nl/documenten/besluiten/2014/12/04/besluit-tot-toepassing-van-rijkscoordinatieregeling-voor-project-transmissiesysteem-op-zee-borssele. Similar decision for Hollandse Kust Zuid: https://www.rvo.nl/sites/default/files/2016/01/Besluit%20toepassing%20RCR%20vjyzomw2m48z.pdf.

[542] Under the Water Act (*Waterwet),* a permit is needed for placing substances in any water body, including the sea and the sea bottom: art. 6.2 combined with art. 1.1(3).

[543] Offshore Wind Energy Act (*Lov om fornybar energiproduksjon til havs (Havenergiloven)*), art. 3-2.

[544] F. Arnesen, U. Hammer, P. Hakon Hoisveen, K. Kaasen, D. Nygaard, 'Energy Law in Norway' in M. Roggenkamp, C. Redgwell, A. Ronne and I. del Guayo (Eds), *Energy Law in Europe*, Oxford University Press 2016, 3rd Edition, p. 871.

[545] Ibid.

[546] Swedish Act on the Continental Shelf (*Lag (1966:314) om kontinentalsockeln*), para 2b and 3.

[547] Ibid., art. 15a.

[548] Ibid., art. 15b.

an EIA is needed as well.[549] For the onshore leg of cables in Sweden, developers also need a concession from the Energy Markets Inspectorate.[550] The application should include the required voltage, the environmental impact and proof that the cable construction can be economically motivated.[551] This seems more logical for regular extensions of the electricity grid than for the onshore leg of export cables. However, the connection of offshore wind farms takes place onshore, as will be explained in section 4.3 below. Therefore, the cable between the landing point at the shore and the grid connection point would still require a separate concession under the Electricity Act.

In the United Kingdom, a distinction is made between export cables and interconnectors. For export cables, offshore transmission licenses are required.[552] Moreover, the Crown Estate may require another lease for the transmission infrastructure if the cables are not yet covered by the offshore wind farm lease itself.[553] Then, considering all submarine cables (i.e. export cables and interconnectors), Marine Licenses might be needed, dependent on the function and the location of the cable. Different regimes are in place for the 'inshore stretch' and the 'offshore stretch' of submarine cables. The 'inshore stretch' is the part of the cable that is located in the territorial waters, the 'offshore stretch' is the part beyond the territorial waters.[554] Moreover, a differentiation exists between exempt cables and other submarine cables. In this context, 'exempt' relates to cables that are *not* used for the exploration or exploitation of natural resources or the operation of artificial islands or installations under the jurisdiction of the United Kingdom, i.e. regular interconnectors. A Marine License is not required for the offshore stretch of exempt interconnectors.[555] For the inshore stretch, a Marine License is needed but must be granted for any application.[556] Lastly, for all interconnector cables, an 'interconnection license' under the Electricity Act 1989 is required.[557]

4.2.3 Innovation in the Permitting Process

Over the last few years, several countries have updated their legal framework for offshore wind.[558] It is clear that countries redesigning their legal framework have looked at developments in neighbouring states. This has led to some legislative convergence and adoption of systems which proved to work well in neighbouring states, such as the centralised

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549 Ibid., para 2a and 3a.
550 Swedish Electricity Act (*Ellag)*, 1997:857, kap. 2 para 1 and 1a.
551 Ibid., kap. 2 para 2.
552 Electricity Act 1989, sec. 6C(5) and (6). The reasons for this will be elaborated further in paragraph 4.4.
553 https://www.thecrownestate.co.uk/media/5518/guideline_for_leasing_of_export_cable_routes.pdf, p. 7.
554 Marine and Coastal Access Act 2009, sec. 81(4).
555 Marine and Coastal Access Act 2009, sec. 81(1).
556 Ibid., sec. 81(2)a.
557 Electricity Act 1989, sec. 6(1)e.
558 Germany in 2016/2017 with large amendments of the Renewable Energy Act (EEG) and the introduction of the Offshore Wind Energy Act (*Windenergie auf See Gesetz*) in October 2016; the Netherlands with the Offshore Wind Energy Act (*Wet Windenergie op Zee*) adopted in June 2015; Belgium with the introduction of the Modular Offshore Grid in 2017: *Wet tot wijziging van de wet van 29 april 1999 betreffende de organisatie van de elektriciteitsmarkt, met het oog op het instellen van een wettelijk kader voor het Modular Offshore Grid*, No. 2017-07-13/07.

tender approach first used in Denmark and later in the Netherlands and Germany. At the same time, while developing their own legal system, countries could also learn from legislative mistakes and inefficiencies in the permitting process of neighbouring countries, which led them to adopt improved or innovative regulatory approaches. This is an enhanced form of 'legal transplant',[559] in which a legal solution is not only 'transplanted' from one legal system to another, but also improved compared to the 'donor' legal system. An example of this is that tender procedures in the Netherlands have clear provisions on the connection obligations of the TSO, and the timing thereof, based on realistic expectations about the amount of connections that the TSO has to produce in a certain timeframe. This is because earlier, in Germany, there were large delays in the connection of offshore wind farms by the TSO.[560] The legislative development and innovation is visible in the permitting process as well as in other topics, such as connection responsibilities (chapter 4.3) and support schemes for offshore wind (chapter 4.4). This finding is interesting, as it is generally considered that regulatory 'competition' leads to a race to the bottom,[561] whereas in this case, the regulatory competition leads to efficiency improvements.

In permitting procedures, a first clearly visible development is the appointment of one organisation as a 'one-stop-shop' for potential OWF developers. This organisation prepares a central tender for specific offshore wind sites and also provides information on, for example, seabed conditions and wind resources. The one-stop-shop approach is used in Denmark, the Netherlands and Germany. The idea behind this approach is to smoothen the permitting process for the entity interested in constructing an offshore wind farm and to de-risk the tender application beforehand. Through the TEN-E Regulation, the electricity transmission projects which are awarded a PCI-status have to benefit from a one-stop-shop approach.[562] Next to this, countries may introduce the same one-stop-shop system for other activities, such as the development of offshore wind farms. This is the case in Denmark, Germany and the Netherlands.[563]

[559] A. Watson introduced this term to indicate the transfer of a rule from one legal system to another. He claimed that "borrowing is the most fruitful source of legal change" A. Watson, *Legal Transplants: An Approach to Comparative Law* (Scottish Academic Press, 1974) p. 335.
[560] Nieuwenhout 2017, p. 86.
[561] This can be observed for example in corporate law and taxes. See for example A. Berle, G. Means, *The Modern Corporation and Private Property* (Transaction Publishers 1932).
[562] Regulation (EU) 347/2013 of the European Parliament and of the Council of 17 April 2013 on Guidelines for Trans-European Energy Infrastructure, art. 8(1).
[563] In Denmark, DEA (Danish Energy Agency) is the one-stop-shop. M. Cramer Buch, E. Kjaer (DEA), 'Report: Danish Experiences from Offshore Wind Development', May 2015, p. 21. In Germany, the *Bundesamt für Seeschifffahrt und Hydrographie* (BSH) functions as one-stop-shop for all wind farms beyond the territorial waters (in territorial waters, wind farms are regulated by the *Bundesländer*). In the Netherlands, the *Rijksdienst voor Ondernemend Nederland* (RVO) serves as a one-stop-shop for offshore wind developers in the Netherlands: it provides preliminary information such as seabed surveys, organises workshops, prepares the EIA and organises the tender process. For example, the website for the first offshore wind farm after the legislative changes of 2016 shows all information provided by RVO: https://offshorewind.rvo.nl/generalborssele.

A second development is the amount of preparation of OWF tenders carried out by the authorities. The more preparation that is done already by the relevant authorities, the less need for repeating the same examinations multiple times, for each tender participant. Thus, in some coastal states, all necessary information, for example data on wind resources, sea-bed surveys and even EIAs, are provided to all (potential) tender participants. This lowers the costs of participating in the tender for the participants, as they do not have to gather the information themselves. The Netherlands has the most extensive preparation for OWF developers, as even the EIA is already prepared by the tendering agency: the EIA is already incorporated in the Wind Farm Zone Decision (*Kavelbesluit*), which also lays down the conditions under which the OWF may be constructed. As it is important that tender participants have some room to develop their own plans with the OWF, the EIA is performed following a bandwidth-approach, where multiple different alternatives, such as the minimum and maximum capacity per turbine, the minimum and maximum height of the rotor blades etc. are investigated.[564] It must be noted that a separate EIA is made for export cables.[565]

Another legislative development is the coupling of the wind farm site permit or concession with offshore wind support schemes. In the Netherlands for example, before 2016, there were many parties with a license to construct an offshore wind farm at certain sites, but as these parties did not manage to acquire support for the construction of the wind farms, they did not use their license to construct a wind farm.[566] Now, applicants participate in one tender procedure for the construction and exploitation permit as well as for access to the support scheme, with the required level of financial support as central tender criterion. This system is used in Denmark and Germany as well as in the Netherlands.

Other innovations worth mentioning but not adopted by other countries (yet) are the standardisation of wind farm capacities. In the Netherlands, this is done to achieve a cost reduction in the connection costs, as cable and converter station design can be optimised for the predetermined capacity and then used several times. This is only possible when it is already clear in the planning phase that sufficient wind farms are going to have the same capacity. This requires a centralised planning approach and sufficient wind farms in the planning phase, which is not the case in all countries. Another innovation in the permitting process which is not (yet) followed by other countries is the *Rijkscoordinatieregeling* used by the Dutch to coordinate the permit application and granting process for large and complex projects including the construction of cables for the connection of OWFs, which requires at least five different permits. Another interesting innovation is that Belgium adopted the possibility to apply for a concession for offshore (hydro) electricity storage, next to the regular

[564] For example, the complete EIA for Borssele 1 (in Dutch, English summary available) can be found here: https://www.rvo.nl/sites/default/files/2015/07/MER%20kavel%20I%20Borssele%20compleet%203.pdf. For an example of the bandwidth approach, see chapter 13.
[565] http://offshorewind.rvo.nl/file/download/44029202 , p. 29.
[566] Noordover, Drahmann 2014, p. 111.

concessions for offshore wind.[567] Given the rapid developments in energy storage, it is interesting that Belgium provides in the regulatory framework for offshore energy storage before the technology is available for large-scale installations offshore.

With the introduction of hybrid projects and offshore grid developments, more legislative innovation can be expected. This is because the current legislative frameworks are not always well adapted to the transition to an offshore grid, especially regarding the permits and connection responsibilities for offshore electricity transmission infrastructure. Streamlining and simplification of the permitting procedures in the coastal states will contribute to cost-effective development of a MOG.

4.3 Connection Responsibilities and Ownership of Transmission Infrastructure

For the development of a MOG, it is important to understand which actors are involved in the (economic) ownership and operation of offshore electricity transmission infrastructure. This is determined by how the assets are categorised in national law, which translates into which actor(s) bear(s) the responsibility to connect offshore wind farms to the onshore electricity grid, and which actor(s) may construct interconnectors.

This subchapter addresses which entity has the responsibility to connect offshore wind farms and which entity may own and operate offshore electricity transmission infrastructure in the different coastal states. Concerning terminology, it is important to bear in mind that the term ‘ownership’, when used in the context of ownership of offshore assets, refers to economic ownership rather than to the notion of ownership in national civil (or common) law of the analysed countries. This is because property law of the countries involved does not always apply to the area beyond the territorial waters.[568]

4.3.1 Connection of OWFs – Status Quo

In the current legal frameworks of the coastal states, three options are available for the connection of offshore wind farms to the onshore electricity grid. The first option is that the developer of the wind farm is responsible for the connection to the onshore grid. This is the case in Sweden,[569] in Denmark for new OWFs constructed after 2020,[570] and used to be the

[567] Royal Decision on the conditions and procedures for the construction and exploitation of installations for hydro-electric energy storage in Belgian sea areas (…), *Koninklijk besluit betreffende de voorwaarden en de procedure voor de toekenning van domeinconcessies voor de bouw en de exploitatie van installaties voor hydro-elektrische energie-opslag in de zeegebieden waarin België rechtsmacht kan uitoefenen overeenkomstig het internationaal zeerecht*, BS 06-06-2014, p. 43599.

[568] See for an example of Dutch legislation J.J.A. Waverijn, 'Navigating Legal Barriers to Mortgaging Energy Installations at Sea – the Case of the North Sea and the Netherlands', in C. Banet (ed) *The Law of the Seabed* (Brill 2020). It reaches beyond the scope of this dissertation to treat the applicability of civil law/property law of the North Sea coastal states in the EEZ in detail.

[569] See for example Energimyndighet, ‘Havsbaserad Vindkraft – potential och kostnader’, p. 56.

[570] Danish Energy Agency, New Danish calls for offshore wind farm tenders - Information on the Thor offshore wind farm tendering procedure, October 2019, p. 14/15. This policy change requires changes to the Danish Renewable Energy Act, which are currently in progress.

case in the Netherlands and Belgium.[571] In the Netherlands, the export cable was considered part of the offshore wind farm installation in the Dutch Electricity Act.[572] However, with the introduction of art. 24Aa of the Dutch Electricity Act in combination with art. 15a, art. 1(1)b, 1(1)ba and 1(4), the responsibility has been shifted to the TSO. In Norway, the legal system does not specify which party is supposed to connect the offshore wind farms.[573] Therefore, it is assumed that the developer of the wind farm will also develop the export cable. An advantage of this approach is that there is no interface risk offshore (between the OWF and the export cable), as the same company is responsible for the cable connection and the wind farm itself.[574] However, hybrid connections and offshore grid developments are more difficult with this connection option: the infrastructure which first connects only one wind farm might in the future be used to connect several wind farms and an interconnector. Then, the usage of the infrastructure changes from exclusively for the original wind farm owner to a situation in which other wind farms, potential competitors to the transmission owner also require access (third party access). Sharing essential infrastructure with your competitors brings competition law concerns, which have in the past led to several cases at the European Commission and the CJEU,[575] and to the unbundling process to prevent direct influence from the electricity producer over assets which are used by competing grid users.[576]

The second option for the connection of OWFs is to make the (onshore) TSO responsible for connecting offshore wind farms to the onshore grid. In that case, the OWF developer makes the connection from the OWF to the converter station, which is located close to the OWF. Then, from the converter station to the onshore grid, the assets are developed and owned by the TSO. This option is currently used in Germany and the Netherlands,[577] and used to be the case in Denmark.[578] In this case, the offshore converter station and export cables are also considered to be regulated assets, for which the TSO receives an income via the tariffs for electricity users, just as for the onshore electricity grid. France has a similar system, but

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[571] The Netherlands has changed its system in 2016 with the Offshore Wind Energy Act (*Wet Windenergie op Zee)*. However, the OWFs Prinses Amalia, Luchterduinen, OWEZ and Gemini were connected according to the previous system. For these wind farms, the export cable is constructed and owned by the wind farm developer. In Belgium, the system is changed for offshore wind farms that had their financial close after 31 December 2016: these wind farms are connected to the 'Modular Offshore Grid'. Wind farms with a financial close before this date have their own connection to the shore.

[572] Müller 2016, p. 153.

[573] This is not specified in the Offshore Renewable Energy Act, nor in the Energy Act, the two relevant legal instruments for this topic.

[574] Instead, the interface risk is moved to the connection between the export cable and the onshore grid.

[575] A. de Hautecloque, 'Article 102 TFEU – Abuse of a dominant position' in C. Jones (Ed). *EU Energy Law Volume II: EU Competition Law and Energy Markets* (Claeys&Casteels 2016, 4th Ed.), pp. 299-302, pp. 330-332.

[576] This topic is elaborated further in chapter 3.4.1 above.

[577] With regard to the Netherlands, it must be noted that, although the same company as onshore is responsible for offshore connections, the company (TenneT) operates under a different license for the offshore grid. This license is limited to 10 years, after which it is still open which party will own and operate the grid.

[578] Müller 2016, p. 172. The legal framework is currently being changed, for the announcement thereof, see Danish Energy Agency, New Danish calls for offshore wind farm tenders - Information on the Thor offshore wind farm tendering procedure, October 2019, p. 14/15. This policy change requires changes to the Danish Renewable Energy Act, which are currently in progress.

contrary to the aforementioned countries, in France the wind farm developer is still responsible for the offshore converter station, whereas the TSO is responsible for the export cable from the offshore converter station to the onshore grid.[579]

An extra development in TSO-based connections is the hub-based-approach used in Germany, in which multiple wind farms are connected to one converter station.[580] The clustering regime started with a publication of the German NRA.[581] According to this publication, clustering decreases the environmental impact of cable construction in sensitive areas such as the Wadden Sea, while also decreasing the costs of (HVDC) grid connection of offshore wind farms when they are increasingly far off the coast.

The third connection and ownership option is that a third party is responsible for the connection to the onshore grid. This is the case in the United Kingdom, where, between 2005 and 2009, a system was developed in which offshore transmission lines have to be tendered.[582] With this system, a third party, mostly a private party that is interested in long-term stable investments, owns and operates the link between the wind farm and the onshore electricity grid. This party is called the 'Offshore Transmission Owner' (OFTO). Every cable connecting a wind farm to the onshore electricity grid is classified as an offshore transmission system, which requires an 'Offshore Transmission License'.[583] Each operator of such a link is a TSO in legal terms. With regard to the construction of the cable, there are two possibilities.[584] The first possibility is that the wind farm owner constructs the cable when it also constructs the wind farm, transferring the property when the wind farm becomes operational (generator build).[585] The second option is that a third party constructs the cable directly and operates it afterwards (OFTO build).[586] Due to the unbundling obligations that exist under European law, the OFTO cannot be the same entity as the entity that owns and operates the wind farm, nor can an OFTO own other generation activities.[587]

It is important to note that (economic) ownership and operation do not necessarily have to belong to the same entity, especially when the transmission assets become more complex and more expensive.[588] Another option is to have several owners, for example in a joint venture,

[579] http://www.rte-france.com/sites/default/files/rte2015-raccordementemr-web.pdf?profil=32, p. 4.
[580] Examples of hub-based converter stations include BorWin, DolWin, HelWin and SylWin.
[581] BNetzA, 'Positionspapier zur Netzanbindungsverpfllichtung' (2009).
[582] Müller 2016, p. 182-183. J.C.W. Gazendam, 'Het Britse regime voor elektriciteitsnetten op zee: veilen voor efficiency' in *NTE* [2018 3] pp. 64-72.
[583] Electricity Act 1989, Sec. 6C-6D.
[584] For projects that qualified for tenders before March 2012, a transitional regime existed. In that regime, there was only one choice: export cables were constructed by the generator and then transferred to an OFTO, Müller 2016, p. 185.
[585] The Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations 2015, no. 1555 2015, sec. 3 and Part 2.
[586] Ibid., sec. 3 and Part 3.
[587] Müller 2016, p. 184.
[588] This is generally the case with longer distances, change from AC to DC networks and the connection of several wind farms to one asset, for example in the case of offshore grid developments.

and to appoint one entity as operating partner,[589] in which case the operating partner could act as an independent system operator (ISO).[590] Moreover, it is also possible to have several owners of specific cable connections, such as OFTOs in the United Kingdom, but to place system operation in the hands of the entity responsible for onshore electricity system operation, the TSO or, in the case of the UK, the ESO.[591]

The question of connection responsibility is connected to the economic approach of 'deep', 'shallow' and 'super-shallow' connection costs.[592] In the economic approach, the spectrum of deep to super-shallow refers to the extent to which the OWF developer has to finance the connection to the grid. 'Deep connection costs' means that the OWF developer has to finance the export cable as well as any onshore grid reinforcements necessary to connect the OWF, 'shallow connection costs' entails the costs from the OWF to the onshore converter station and 'super-shallow connection costs' means that the OWF developer only has to finance the connection from the OWF to the offshore converter station.[593] Thus, the first option, in which the OWF owner is responsible for connection to the onshore grid, leads to deep or shallow connection costs, whereas the second option, where the TSO is responsible for grid connection, leads to (super)shallow connection costs for the OWF, unless the costs are redistributed again after construction. In order to reach a level playing field for OWFs in the North Sea, it would be advisable that the coastal states strive to adopt a connection regime that is compatible with long term grid developments in the North Sea area, and that they strive for convergence of the costs related to the connection of OWFs (corrected for the distance to shore, depth and complexity of the connection). This levels the playing field between OWFs located in different jurisdictions. It must be noted though, that full convergence or harmonisation of the connection responsibility is not necessary for the future development of a MOG, as long as the connection responsibilities do not exclude offshore grid developments. The next section elaborates the possibilities for ownership for offshore grid developments.

4.3.2 Ownership of the MOG

It is a large step from the connection obligations and ownership specifications of specific OWF export cables to the ownership of future components of a MOG. However, two intermediate steps are the clustering of offshore wind farms in hubs with a joint converter station,[594] and

[589] This type of cooperation is also used in the oil and gas production industry, where risks are shared by several owners in a joint operating agreement (JOA). For more information, see E.G. Pereira, *Joint Operating Agreements – Risk Control for the Non-operator* (Globe Publishing Business 2013) p. 30 *ff.*
[590] Following Directive (EU) 2019/944 on common rules for the internal market for electricity, art. 44.
[591] Müller 2016, p. 187.
[592] P. Bhagwat, Deliverable 7.4, Economic framework for a meshed offshore grid, 2019, PROMOTioN, p. 63 ff.
[593] Ibid.
[594] Müller (2016), p. 214 ff. This approach is currently followed in Germany and the Netherlands. In Germany, this strategy is developed since 2009, starting with the publication of a position paper on the matter: BNetzA, 'Positionspapier zur Netzanbindungsverpfllichtung' (2009). BorWin, DolWin, HelWin and SylWin are examples of converter stations that serve clusters of OWFs. In the Netherlands, the clustering approach takes place since the legislative changes of 2016. The Development Framework for OWFs shows that they are tendered in clusters of two, that are connected together. Development Framework: Dutch Ministry of the Economy and

hybrid electricity links such as the Kriegers Flak Combined Grid Solution.[595] There, infrastructure is shared by several actors and the question of ownership and responsibility becomes more important. These types of projects make clear what legal framework is necessary when it comes to the ownership of a MOG.

As the MOG is made up of connections that are used for multiple purposes, the owner of the grid must also be able to facilitate this. For the systems in which the OWF developer is also responsible for the export cable, it is difficult if this cable is also used as an electricity grid to which third parties have the right to access. There is a possible conflict with the rules on unbundling, if the OWF developer is also in charge of part of the MOG.[596] For the third option, the OFTO based connection responsibility, the OWF developer, who constructs the export cable, will not have a direct interest in incorporating the long term perspective in their projects, for example in the form of heavier or more complex converter stations in a current project in order to allow for a more cost-effective connection in future grid enlargements (anticipatory investments). Neither will the third-party owner, to which the grid asset is transferred before the operational phase, have an interest in this, unless there is a clear requirement from the regulator that the connection must be developed in a certain way, and compensation for the extra costs incurred by the anticipatory investment. Therefore, the coastal states in which the TSO is responsible for the connection of OWFs will have fewer legal barriers in the shift from single (radial) OWF connections to a MOG than coastal states that have an OWF developer-based system or an OFTO-based system.

Next to the more fundamental concerns mentioned above, there may also be more practical barriers. For example, in the UK OFTO system, if the same asset is used for interconnection as well as for the export of offshore generated electricity, there is uncertainty on the licensing obligations of OFTO owners and interconnector owners. Interconnector owners are not allowed to own a transmission license at the same time,[597] whereas offshore transmission licenses (required for every OFTO) are defined as 'a transmission licence authorising anything that forms part of a transmission system to be used for purposes connected with offshore transmission'.[598] However, this type of concern can be addressed by relatively small amendments of the relevant Acts.

4.3.3 Network Charges

The entity that constructs the connection of an OWF to the electricity grid will incur the costs of doing so. However, these costs may be transferred to other entities or even to consumers. For example, when the TSO is responsible for the export cables, these costs may be added to

Climate, 'Ontwikkelkader Wind op Zee' (in Dutch), https://www.rvo.nl/sites/default/files/2016/10/Ontwikkelkader%20windenergie%20op%20zee.pdf.

[595] See section 3.5.2 for an elaboration on Kriegers Flak Combined Grid Solution. See also Nieuwenhout 2018.

[596] See section 3.5.3.

[597] Electricity Act 1989, sec. 6(2A).

[598] Sec. 6C(5) Electricity Act 1989. See also G. Gordon, A. McHarg, J. Paterson, 'Energy Law in the United Kingdom' in M. Roggenkamp, C. Redgwell, A. Ronne and I. del Guayo (Eds), *Energy Law in Europe*, Oxford University Press 2016, 3rd Edition, p. 1101. Nieuwenhout 2017, p.118.

the general network costs, which are calculated in the electricity tariffs consumers bear (which can be subdivided in connection tariffs and transport tariffs). In each coastal state, different rules exist on the division of network charges between consumers and producers. In some states, the network charges (subdivided in connection tariffs and transport tariffs) are borne entirely by the consumers. In other states, these charges are borne partially by consumers and partially by generators, as generators also benefit from the existence of the grid. Concerning the latter, electricity generators are most likely to pass these charges on to consumers via the electricity price. Therefore, it could be questioned whether charges for electricity generators (also called 'Generator charges' or 'G-charges') are necessary, or whether they only complicate the already difficult tariff system.[599] Some plead for maintaining these 'G-charges' as they can send a locational signal for siting new capacity close to where it is used.[600] However, this argument does not work for OWFs, as their location is often already determined by the government via the tender specifications or via the predetermined 'Wind Farm Zones'.[601]

Regardless of whether G-charges should be maintained or not, differences in G-charges between different coastal states distort the electricity flows and dispatch in the MOG. As explained in 3.5.5, when OWFs of different states are in direct competition with each other and with onshore sources of renewable energy, these charges may distort the market for generators with otherwise very similar cost structures (which is the case for OWFs). The table below shows the large differences between coastal states in the division between network charges for consumers and for generators. A convergence of the division of charges between consumers and generators is necessary for the MOG.

Table 2: Division of Network Charges between Consumers and Generators[602]

Coastal State	Consumers	Generators
Belgium	93%	7%
Denmark	97%	3%
France	98%	2%
Germany	100%	0%
Great Britain	77%	23%
Netherlands	100%	0%
Norway	62%	38%
Sweden	59%	41%

4.4 Support Schemes

For several decades, offshore wind energy was an 'emerging technology', which used to be more expensive than conventional energy sources and other renewable energy sources such

[599] Bhagwat 2019, p. 130.
[600] Ibid.
[601] See chapter 4.2 and 4.4.
[602] Bhagwat 2019, pp. 133-138.

as onshore wind energy and solar energy. In order to allow for the development of this sector, state support was needed to cover the difference between the costs for the developer (the OPEX and CAPEX) and the revenues from the sale of the renewable electricity. In recent years, however, the amount of financial support needed to develop offshore wind farms has fallen significantly.[603] Therefore, the relevance of support schemes, and the discussion thereof in a dissertation on the future legal framework for offshore electricity infrastructure, may have decreased in importance, especially when wind farms are constructed without financial support altogether.[604] Nevertheless, support schemes are not abolished yet – on the contrary, some say that the current low bids on support scheme tenders for offshore wind are due to temporary factors such as low interest rates and a low steel price, which could rise again in the future.[605] The differences between coastal states regarding support schemes between the North Sea coastal states are related to the scope of the support scheme, how the aid is awarded, the duration of the aid, the procedure for awarding the aid and the flexibility to adjust the aid scheme to respond to market developments. In this paragraph, the differences are elaborated upon and the relation to the development of the MOG is explained.

4.4.1 Types of Support Schemes

Two major types of support are tradable certificates schemes and schemes based on a compensation per MWh of renewable energy fed into the electricity grid. The latter type, which includes feed-in premiums, feed-in tariffs and Contracts for Difference (CfDs), are a *direct* compensation per MWh from a budget that is usually funded through a supplement on consumers' electricity bills. The amount of the compensation per MWh can be fixed or flexible, based for example on the (long-term or actual) electricity price or on a combination of factors (such as the market price and the value of Guarantees of Origin).[606] The formulas used for the calculation of the compensation per MWh can be quite complicated.[607] Belgium, Denmark, France, Germany, the Netherlands and the United Kingdom have a system in place which is based on a compensation per MWh.[608]

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603 TenneT, 'Market Review 2017 - Electricity market insights' (2018), p. 33.

604 Official statement by the Dutch government upon announcing the first Dutch offshore wind farm which is going to be constructed without financial support: https://www.government.nl/latest/news/2018/03/19/nuon-wins-permit-for-dutch-offshore-wind-farm-without-subsidy. A year earlier, in Germany, subsidy-free tender results were announced for DONG: Pilita Clark for the Financial Times, 'Dong Energy breaks subsidy link with new offshore wind farms', 14 April 2017.

605 This is based on stakeholder conversations in the context of PROMOTiON; Menze, Wagner (forthcoming).

606 Guarantees of origin are electronic evidence that a certain amount of electricity was produced from renewable sources. These guarantees can be traded, and they represent a market value. Directive 2018/2001, art. 2(12) and art. 19.

607 For example, in Belgium, the height of the financial support is based on the formula: The compensation = Levelised cost of electricity (LCOE) – ((electricity reference price x (1 – correction factor) + value of the Guarantee of Origin) x (1 – grid loss factor). This is laid down in *Koninklijk besluit betreffende de instelling van mechanismen voor de bevordering van elektriciteit opgewekt uit hernieuwbare energiebronnen* 16-7-2002, art. 14(1).

608 Belgium: see *infra* footnote 593. Denmark has a centralized tender system. The bidding price in the tender determines the height of the financial support: Danish Renewable Energy Act ((L*ov om fremme af vedvarende*

The tradable certificates system provides *indirect* compensation: a market for certificates per MWh of renewable energy is created by obliging electricity supply companies to buy certificates for a certain percentage of the electricity they sell. The height of the percentage and the total quantity of supplied electricity determine the demand for the certificates. Then, as with any market, the balance between demand and supply of the certificates determines the price at a given moment. The supply of the certificates comes from the production of renewable energy by installations that are eligible for the certificates. This is often counted per MWh fed into the electricity grid. The United Kingdom, albeit in a phase-out process, [609] as well as Norway and Sweden, have a tradable certificates system.[610]

4.4.2 Scope and Duration

The scope of support could either be specifically for offshore wind energy (technology-specific) or for all types of renewable energy (technology neutral). Tradable certificate schemes are technology-neutral, whereas feed-in premiums and feed-in tariffs are usually technology-specific, but not always. For example, the Dutch feed-in scheme is in principle technology-neutral (applications from all types of renewable energy are allowed) but there is an important exception for offshore wind, for which separate tenders are organised, outside the general tender round for renewable energy that is organised biannually.[611] The advantage of technology-neutrality is that renewable energy installations that cost the least per MWh will be constructed first, either until the market is satisfied (with a tradable certificates market), or until the support budget is exhausted (in the Netherlands). A disadvantage is that an emerging technology will not be able to develop as it will always be more expensive than

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energy), art. 22(7). France has a system in which the supply company (EDF) has an obligation to buy renewable energy at a certain contract price. The height of this price is determined by a competitive dialogue. Germany and the Netherlands have a tender-based system in which the height of the feed-in premium is determined by the tender bidding outcome. The United Kingdom recently introduced a Contracts for Difference based support scheme. Contracts for Difference (CfDs) are contracts under private law between the project developer and the 'Low Carbon Contracts Company' (LCCC). Project developers get a refund for the difference between an estimate of the market price and an estimate of the long-term price needed to bring forward investment in a given technology (the strike price). The legal basis is provided in Energy Act 2013, part 2 chapter 2, and The Contracts for Difference (Allocation) Regulations 2014, 2014 No. 2011, amended by The Contracts for Difference (Allocation) (Amendment) Regulations 2015, 2015 No. 981, and by The Contracts for Difference (Allocation) (Amendment) Regulations 2016, 2016 No. 1053.

[609] The tradable certificates system will run until 2037 for projects that were accredited under the old system before March 2017. Renewables Obligation Order 2015 (England and Wales), 2015 No. 0000, Renewables Obligation (Scotland) Order 2009, 2009 No. 140, Renewables Obligation Order (Northern Ireland) 2009, 2009 No. 154. *Cf.* Department of Energy and Climate Change, RO Transition Consultation Document, 17 July 2013, p. 8. See also: Ofgem, 'Final guidance on the transition period and closure of the RO', 16 Oct. 2014.

[610] This scheme is based on an international agreement, namely the 'Agreement between the Government of the Kingdom of Norway and the Government of the Kingdom of Sweden on a Common Market for Electricity Certificates', Stockholm 29-6-2011. The Agreement has been implemented by national implementation acts in the two countries: the Norwegian Electricity Certificate Act 2011 (Lov om elsertifikater, Elsertifikatloven), LOV-2011-06-24-39; and the Swedish Electricity Certificate Act (Lag (2003:113) om elcertificat).

[611] Decision on the Stimulation of Renewable Energy Production (*Besluit stimulering duurzame energieproductie*) BWBR0022735, 21-10-2017, art. 2(6)

the established technologies, even though it might be cost-effective in the long term due to technological innovation, learning effects in the industry and economies of scale.

Concerning the duration, there is a difference between tradable certificates-based systems and direct compensation schemes. For the latter, most countries provide support for a certain number of years from the moment an installation is producing electricity. This is usually 15-20 years.[612] In Denmark, the term 'full-load hours' is used, which reflects the production over a certain amount of years, but which is dependent on weather conditions and technical availability of the installation.[613] On the other hand, for tradable certificates systems, an absolute term of the scheme is mentioned. The scheme in the United Kingdom is in a phase-out process until 2037,[614] and the Norwegian-Swedish system is currently planned to last until 2035, but this could be extended.[615]

4.4.3 Flexibility of Support Schemes

As the market circumstances in the electricity market often change, it is important that some flexibility is incorporated in the support scheme in order to adjust the level or conditions of support to changing market circumstances. There are two options: in some states, there are specific formulas, which also include a long-term average market price and the value of guarantees of origin (which is deducted from the support). Belgium has the most elaborate formula,[616] but this did not prove to lead to competitive prices.[617] In other countries, the support is fixed for the entire period. This is the case in France for example. Tradable certificates are flexible in the sense that the value depends on the number of certificates available in the market and to what extent the government creates demand for these certificates by obliging companies to buy these certificates.

Next to this, some flexibility in the design of the support scheme itself may lead to more competitive tender outcomes. Tender outcomes depend on many factors, but the design of the support scheme itself and the type of tender in which the support per MWh is determined

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[612] In the Netherlands, the support lasts for 15 years: Ordinance Wind Energy at Sea (*Regeling windenergie op zee 2016*) art. 10. In Belgium, it is 19 or 20 years, based on the date of the financial close: a financial close before May 2016 led to support for 20 years; after this moment, only 19 years of support are granted: *Koninklijk besluit betreffende de instelling van mechanismen voor de bevordering van elektriciteit opgewekt uit hernieuwbare energiebronnen*, 16-7-2002, art. 14 para 3(1) and (2). Denmark, France and Germany all have a maximum duration of support of 20 years, Danish Renewable Energy Act (*Lov om fremme ad vedvarende energy)*, art. 37(4); in France, this is indicated in the *Cahier des Charges* in which the details of the tender are specified: *'Cahier des charges de l'appel d'offres portant sur des installations éoliennes de production d'électricité en mer en France métropolitaine'*, p. 12. In Germany, this is regulated by the Renewable Energy Act (*Erneuerbare Energien Gesetz)* art. 25.

[613] Renewable Energy Act (*Erneuerbare Energien Gesetz)*, art. 37(2) jo. (4). This was 10 TWh for the earlier wind farms and 20 TWh for Horns Rev 3 and Anholt.

[614] See *supra* footnote 595.

[615] Norwegian Act on elcertificates, art. 4. Agreement between the Government of the Kingdom of Norway and the Government of the Kingdom of Sweden on a Common Market for Electricity Certificates', Stockholm 29-6-2011, art. 2(2) and art. 3(2).

[616] Royal Decree 16-7-2002, art. 14.

[617] CREG, 'Studie over de analyse van ondersteuning van offshore windenergie met inbegrip van het jaarlijks verslag over de doeltreffendheid van de minimumprijs voor offshore windenergie', (F)1568, 19 december 2016.

plays a role. It is possible to discern best practices in the context of (operational) support. A successful approach is shown by the Danish, German and Dutch support schemes in which competitive tenders are organised. Compared to the Belgian fixed formula and the French competitive dialogue, the cost reductions are much larger, leading the Belgian and French authorities to reconsider their support scheme.[618] Another important factor is stability and predictability, which leads to reduced costs of capital and insurance costs.[619] Furthermore, providing seabed surveys and wind resource reports for the specific sites which are tendered reduces the upfront investment developers have to make before applying for a license to exploit an offshore wind farm. All potential competitors need the same information, and in this way, the information can be provided once instead of all competitors having to perform their own site investigations.

4.4.4 Cross-border Aspects

The support for offshore wind energy (and sometimes for the connection infrastructure) falls under the European rules on state aid. Therefore, the Guidelines on State Aid for Energy and Environmental Protection are applicable.[620] In these Guidelines, it is specified that the aid has to be competitively determined, and that operational aid for generation at times when prices are below zero should be prevented.[621] This is implemented in the Member States with a feed-in scheme in the respective laws and tender conditions. In North Sea coastal states with a tradable certificates system, this is not necessary, as the tradable certificates compensation is based on a market price, not on an extra compensation on top of the spot electricity price.

Most of the support schemes for offshore wind are nationally-oriented. Nevertheless, the EU Renewable Energy Directive provides for so-called cooperation mechanisms with which Member-States can cooperate in their support for renewable energy.[622] The Directive offers three possibilities: statistical transfers, joint projects and joint support schemes.[623] Although the Directive is in place for years already, the cooperation mechanisms have not often been made use of: some statistical transfers have occurred;[624] there was a joint tender for solar

[618] This has led the Belgian and French authorities to reconsider their support systems. The Belgian NRA CREG has published a report about this: CREG, ‘Studie over de analyse van ondersteuning van offshore windenergie met inbegrip van het jaarlijks verslag over de doeltreffendheid van de minimumprijs voor offshore windenergie’, (F)1568, 19-12-2016. The French Court of Audit (Cour des Comptes) has also produced a heavy report criticising the inefficiencies of the support scheme for offshore wind: Cour des Comptes, ‘Le Soutien aux Énergies Renouvelables’, Mars 2018.

[619] TKI Wind op Zee, ‘Offshore wind cost reduction progress assessment’, 20-2-2017, p. 12-13.

[620] Communication from the Commission, ‘Guidelines on State aid for environmental protection and energy 2014-2020’, 28.6.2014, OJ C 200/01.

[621] Ibid., para 124 and 126.

[622] The Directive is discussed in more detail in chapter 3.4.2.

[623] Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (recast), articles 5, 8-14.

[624] Luxembourg made use of statistical transfers with both Lithuania and Estonia, both in 2017. <https://ec.europa.eu/info/news/agreement-statistical-transfers-renewable-energy-amounts-between-lithuania-and-luxembourg-2017-oct-26_en> and https://ec.europa.eu/info/news/second-agreement-statistical-transfers-renewable-energy-amounts-between-estonia-and-luxembourg-2017-nov-13_en

photovoltaic renewable energy projects between Denmark and Germany;[625] and Norway and Sweden have a joint support scheme for the tradable green certificates.[626]

Cooperation mechanisms could be used for offshore wind in hybrid or meshed electricity grids as well,[627] when the electricity generated at OWFs does not flow only to one state (which is the case with radial connections) but to any state connected to the MOG. In this case, it might be considered politically difficult if a state supports the OWFs in its EEZ financially, while the electricity flows predominantly to other states. With cooperation mechanisms, a 'fairer' support scheme could be designed.[628]

4.4.5 Link between Support Schemes and the MOG

There are two important links between the topic of support schemes and the development of the MOG. First, as shown above, the differences in the support schemes between coastal states lead to a large diversity in the conditions for, and level of support, that OWF developers receive. It would be advisable for the coastal states to strive for more convergence, as this levels the playing field between the different states. Otherwise, when an OWF is developed, it might be that OWFs are developed mostly in the locations with the most favourable regulatory conditions, relating for example to support schemes and the costs of the connection, as explained in chapter 4.3, and not in the areas that are most logical from the point of view of wind resources or stability of the grid. This happened already on a small scale in the solar photovoltaic experiment between Denmark and Germany, where, surprisingly, most installations were placed in Denmark - whereas the solar resources were larger in Germany.[629]

Another link between the nationally organised support schemes and the development of a MOG is whether there is a condition in the rules of the support scheme that support is limited to OWFs that are connected exclusively to the onshore grid of the state in which the OWF is located. This is problematic as it limits the OWF developer's willingness to connect to a hybrid connection or to the MOG, as it will lose its entitlement to support in that case. However, this type of problem can be amended relatively easily by changing the formulation of the rules. For example, in the Netherlands, this used to be problematic when the legislation limited

[625] This is based on the Danish Act on a pilot tender for solar PV construction *(Lov om pilotudbud af pristillaeg for elektricitet fremstillet pa solcelleanlaeg*), lov nr. 261 of 16 March 2016; and on the German Renewable Energy Act (*Erneuerbare Energien Gesetz)*, para 5 jo 88a. See also P. Crossley, *Renewable Energy Law, An International Assessment* (Cambridge University Press 2019) p. 239.
[626] This support scheme is based on an international agreement: the Agreement between the Government of Norway and the government of the Kingdom of Sweden on a Common Market for Electricity Certificates, Stockholm 29-6-2011. See also O. Boge, 'The Norwegian-Swedisch Electricity Certificates Market' in M.M. Roggenkamp, H. Bjornebye (Eds) *European Energy Law Report X* (Intersentia 2014).
[627] S.T. Schröder, L. Kitzing, H.K. Jacobsen, L.L. Pade, 'Joint Support and Efficient Offshore Investment: Market and Transmission Connection Barriers and Solutions', *Renewable Energy Law and Policy Review* [2012 2] pp. 112-120.
[628] This is elaborated further in chapter 7.3.4.
[629] See for an elaborated overview: D. Dmitruk, 'Danish – German Cooperation on the First Cross-Border Tenders for Renewable Energy: A Blueprint for Future Cross-Border RES Projects?' in M.M. Roggenkamp, C. Banet (Eds) *European Energy Law Report XII* (Intersentia 2019), p. 113-132.

support to installations connected to the Dutch onshore electricity grid, but the current rules state that the electricity fed into *an* electricity grid is entitled to support.[630] It is specified in the same document that *an* electricity grid means the onshore electricity grid or an offshore grid in the Dutch EEZ.[631] Thus, this also includes cable connections to an offshore grid that is not exclusively linked to the Netherlands but also to neighbouring countries. In Belgium, the formulation is that support is available for "electricity supplied to the transmission or distribution network or to a direct line".[632] When it turns out that the offshore grid is not included in this formulation, it can be amended in the Royal Decree itself – which is a lower threshold than changing the Electricity Act itself.

4.5 Offshore Grid Operation

The safe and secure operation of offshore electricity infrastructure is an emerging issue, which will become very important when a MOG is developed. First, it is important to consider whether specific rules for *offshore* grid operation are needed, compared to the rules that already exist for onshore grid operation. Next to the European network codes, there are (technical) rules on the operation of the grid in national network codes. The non-exhaustive requirements of the European network codes are also filled in further in the national network codes. Thus, (offshore) grid operation is also partially regulated at national level. As with the discussion of the network codes at EU level,[633] most rules can also be applied to the offshore grid, although some specific amendments need to be made for the adaptation of the rules to HVDC technology. It goes beyond the scope of this research to analyse the (often very technical) network codes integrally. Nevertheless, some issues that are relevant for the development of a MOG are elaborated.

First, the responsibility for offshore grid operation needs to be clear. Currently, for the onshore electricity networks, the responsibility for safe and reliable operation of the grid lies with the TSOs. They are supervised by the NRA, which may start an investigation when incidents happen, and may also apply financial penalties when the TSO has not adequately fulfilled its role. For the MOG, this may be more difficult, especially when the ownership of the grid lies in the hands of different entities. It needs to be made clear in the legal framework, either in the EU Network Codes or in the national implementation thereof, which entity bears final responsibility for the operation of the MOG.

A second issue is the diversity in rules on balancing. Electricity networks needs to be in balance at all times.[634] Therefore, states have different systems in place to describe how TSOs and

[630] Emphasis added by the author. Decision on the Stimulation of Renewable Energy Production (*Besluit stimulering duurzame energieproductie*), art. 15(1)a.
[631] Ibid., art. 1(1)j.
[632] Royal Decree, 16-7-2002, art. 7.
[633] See chapter 3.4.6.
[634] In AC networks, the balance is reflected in a stable frequency of AC networks within the agreed bandwidth around 50 Hz. Balance is maintained by feeding as much energy to the grid as what is taken from it by consumption and conversion and transmission losses. In DC networks, the balance is reflected in the voltage level, and maintained in the same way, by balancing consumption, grid losses and infeed.

connected parties are required to act when an imbalance occurs and to prevent imbalances in the first place. Often, the system is that all connected parties above a certain capacity are balancing responsible parties. They have to indicate what they expect to provide to the grid or take from the grid. If they consume or produce more or less than what they stated beforehand, they will have to reimburse the TSO for the costs the latter makes to correct the imbalance caused by the balancing responsible party. Previously, depending on the coastal state, renewable energy generators were sometimes exempted from balancing requirements. However, with the European Guidelines on State Aid for Environmental Protection and Energy 2014-2020, this exemption has to be phased out and is no longer allowed for new generators that receive financial support.[635] Therefore, legal differences between the countries on whether or not a balancing requirement exists for renewables is diminishing. Nevertheless, practical differences between countries still exist,[636] as balancing rules and costs vary greatly between countries, which may lead to different strategies and different volumes on the imbalance market.[637] These practical differences in the balancing rules may become a barrier to the operation of a MOG, as it is difficult to operate a grid in which connected parties adhere to different rules according to the EEZ they are located in. As the balancing rules have to be adjusted in light of the MOG anyway to accommodate for HVDC technology, this is an opportunity to strive for a more coherent system between the North Sea coastal states.

Third, there are some practical issues concerning grid operation, for example the planning of outages for maintenance on cables or other grid components. For TSO-based connections of OWFs, it is logical that the TSO plans outages related to maintenance in a way that it is most convenient for the electrical system. However, this may be more challenging for systems in which many different grid operators exist, such as in the United Kingdom. However, the United Kingdom presents an interesting approach: although the many different third parties are responsible for the connections they own and the maintenance of these connections, the practical operation of offshore transmission cables is performed by National Grid, the (onshore) TSO in its capacity of system operator.[638] In this way, coherence of the system can be ensured whilst the numerous owners retain responsibility for asset maintenance. In a simple example, the OFTO determines *whether* maintenance has to take place, whereas the system operator National Grid ESO agrees *when* maintenance can take place.

4.6 Decommissioning Obligations

Under international law, coastal states have an obligation to remove installations which are no longer used.[639] This is a relevant requirement for the legal framework for offshore

[635] Communication from the Commission, ‘Guidelines on State aid for environmental protection and energy 2014-2020’, C 200/1, para 108 and 124(b).
[636] Bhagwat 2019, p. 197.
[637] R. A. C. van der Veen, A. Abbasy, and R. A. Hakvoort, ‘A comparison of imbalance settlement designs and results of Germany and the Netherlands’, project paper for the project, ‘Balance Management in Multinational Power Markets’ (2010).
[638] Müller 2016, p. 184, p. 187.
[639] UNCLOS, art. 60(3). See section 2.3.1.5.

electricity grids, as this means converter stations and other installations necessary for the grid will have to be removed after the end of their lifetime. What exactly needs to happen at the end of the lifetime of converter stations changes the total lifetime costs of the installations, and thus changes the CBA of (parts of) the grid. Next to this, there is also a link between the removal obligation of OWFs and the offshore grid: rules on what happens at the end of the lifetime of OWFs may change the grid configuration. For example, if the area has to be restored in its original state, the grid connection becomes redundant, whereas if the same area can be used again for new OWFs, the same grid connection can be used again.

Although originating from the same source (UNCLOS, IMO and OSPAR guidelines), the decommissioning obligation for installations and structures is implemented differently among the analysed countries. The IMO Guidelines and OSPAR Decision also leave a margin of discretion to the coastal states to decide under which conditions installations can be left in place, for example when they serve a legitimate purpose (which can also be an ecological purpose).[640] Moreover, although there is no obligation to remove subsea cables based on international law,[641] coastal states may include a removal obligation for subsea cables based on their national legal framework.[642]

Looking at decommissioning from the perspective of the MOG, an important topic is the approach towards the varying lifetimes of the assets. OWFs typically have a lifetime of approximately 25 years, whereas offshore grid infrastructure may be used for 45 years or more. When an OWF is at the end of its lifetime, while the transmission infrastructure connected to it is still operational for another two decades, coastal states have to choose whether the OWF should be repowered, perhaps with reuse of the foundations,[643] or whether the installation is going to be removed altogether, with a cable connection becoming redundant. A third option is that coastal states demand that both the wind farm itself and the export cables are removed. This is the case in the Netherlands.[644] There is no mention on the removal of interconnector cables at the end of their lifetime in any of the researched national legal frameworks.[645]

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[640] See section 2.3.1.5.
[641] See section 2.3.2.
[642] This is the case in the Netherlands, see Water Decision (*Waterbesluit*), art. 6.16l.
[643] This is currently not yet commonplace, but is discussed as a future possibility, in light of the overdimensioning of the foundations. However, this is only possible if the turbines do not increase in size, which is to be expected regarding the increase in turbine size over the past years.
[644] Water Decision (*Waterbesluit*), art. 6.16l. This can be explained by the fact that export cables used to be considered part of the OWF in the Netherlands. Article 6.16l mentions both OWFs and export cables in the same sentence, in a section of the Water Decision that is specifically about OWFs, not about an offshore grid.
[645] One could argue that it is difficult to say when an interconnector reaches the end of its lifetime. An interconnector can be replaced if it does not function anymore from a technical perspective. However, if replacement is more expensive than the economic value of the cable over its renewed lifetime, then it reaches the end of its economic lifetime. This could be the case if there is already a large amount of transmission capacity and if the price difference between the bidding zones it connects is relatively small.

Another issue is the financing of decommissioning costs of grid components. For OWFs, there are often specific provisions on the amount of money that needs to be secured for this purpose, and how these funds should be protected, for example through a bank guarantee.[646] However, in national law, such provisions for converter stations and other grid components that need to be removed are missing. This might be due to the fact that OWFs are often developed commercially whereas the grids are regulated, which means that states have more influence over the income and obligations of grid owners. Another reason might be that only relatively few converter stations are needed compared to the amount of offshore wind turbines, which makes removal less costly.

Thus, whereas the decommissioning requirements for OWFs are often clear, the requirements with regard to the offshore grid are less clear. There is a need for more clarity on this issue in the legal framework of a MOG, in order to make sure that cost estimates regarding the MOG can also properly take into account decommissioning costs for offshore grid components, and in order to make sure that grid components are not treated differently with regard to decommissioning depending on the jurisdiction in which they are located. Moreover, for the future grid configuration, it is important that coastal states provide clarity on whether offshore wind turbine foundations remain in place, fulfilling a new function but blocking the construction of a new OWF in the same area, or whether they are to be removed. As countries' experience with decommissioning grows when large-scale decommissioning of OWFs has to take place,[647] their new insights might also spill over into more detailed decommissioning rules for converter stations and other offshore grid components.

4.7 Interim Conclusion

The coastal states around the North Sea have made many different choices in shaping their national policies with regard to offshore wind energy and transmission infrastructure. This is

[646] In France, the required funds are named specifically in law, namely EUR 50,000 per MW of installed capacity. Ministère de l'Ecologie, du développement durable et de l'énergie, *Cahier des charges de l'appèl d'offres portant sur des installations éoliennes de production d'électricité en mer en France métropolitaine,* p. 38. In other countries, the sum and conditions are specified in the construction permit or the tender conditions. This is the case for example in Denmark and the Netherlands. For Denmark, for the older OWFs, the decommissioning obligation was stated directly in the letter granting a construction permit: Letter from the Traffic Ministry dated 20 November 1989, quoted directly in the Approval for Decommissioning, Danish Energy Agency (*Energistyrelsen)*, J-2017-176, 7/8, 10 January 2017, available at https://ens.dk/sites/ens.dk/files/Vindenergi/tilladelse_til_nedtagning_af_vindeby_havvindmoellepark.pdf [accessed 9/1/2020]. The amount of funds to be reserved for decommissioning was not specified. For newer OWFs, this is stated in the tender conditions already: Cf. Danish Energy Agency (*Energistyrelsen*), Tender Conditions for Kriegers Flak Offshore Wind Farm (Final Draft, 8 July 2016), p. 13. In the Netherlands, this is stipulated in the Wind Farm Zone Decision. See for a recent example: *Kavelbesluit IV windenergiegebied Hollandse Kust (zuid), BWBR0040532,* Voorschrift 6 and 7 (in Dutch). In this decision, the OWF needs to be removed at latest 2 years after the end of exploitation, but within the term of the license. The required bank guarantee is €120.000 per installed MW, which needs to be guaranteed at latest when the OWF has received Guarantees of Origin for the produced electricity.

[647] E. Topham and D. McMillan, 'Sustainable decommissioning of an offshore wind farm' *Renewable Energy* [2017 102] p. 471; R. Fleming, H. Mas and C.T. Nieuwenhout, 'Wind Farm Waste – Emerging Issues with Decommissioning and Waste Regulation in the EU, Denmark and the United Kingdom' *Oil Gas and Eenergy Law* [2018 2].

reflected in a variety of legal frameworks, each of which may be more or less successful than the other in stimulating offshore wind and offshore grid developments. Two main topics in this chapter are the diversity of the legal frameworks and the convergence of coastal states' systems on some specific aspects, such as permitting and connection responsibility.

The diversity between the rules in different states sometimes leads to large variation in how OWF developers or grid developers are treated. This leads to direct legal barriers to the development of an offshore grid, such as the complicated permitting procedures for cross-border electricity cables. It also forms an indirect impediment to the cost-effective development of offshore wind energy and of the MOG itself, as there isn't a level playing field between developers in different states. Convergence of the legislative and regulatory system for OWFs is beneficial for the cost-effective development of offshore wind energy in the North Sea and the MOG itself. With a level playing field, the choice of location for OWFs will then not be based mainly on the support scheme or connection costs of a particular coastal state, but rather on where the optimal wind resources exist or where optimal connection possibilities to the MOG exist. Issues where more coordination is needed between coastal states are maritime spatial planning and permitting procedures, and issues where the level playing field could be improved are connection responsibilities, support schemes and offshore grid operation, for example with regard to balancing obligations.

Interestingly, while greater convergence is required on several topics, some 'natural' convergence of the legislative systems of certain states can already be discerned on the basis of learning-by-doing. Coastal states look at the successes and failures of each other's policies regarding OWFs and the way they are connected to the electricity grid. They sometimes copy the successful elements while improving the negative elements, for example in the licensing and permitting procedures and the support scheme tenders of Denmark, Germany and the Netherlands. While natural convergence is happening on some issues, there is a need for more proactive convergence, as mentioned in the previous paragraph. This is because the process of natural convergence is rather slow and encompasses only a few states, whereas the MOG is supposed to connect many states around the North Sea. Therefore, the convergence process of learning from other states and adopting the successful parts should be actively pursued on more issues and in more states, for example by increasing information exchange between government representatives and by initiating joint (cross-border) projects.

The issues for which more convergence is required, are the permitting procedures for cross-border assets, rules on support schemes, rules on network charges (specifically on the issue of charges for generators), and decommissioning obligations. These topics will be addressed in the proposed future legal framework for the MOG.

4

PART II

A New Legal Framework for Offshore Electricity Infrastructure in the North Sea

Proposals for a Multi-level Legal Framework under a North Sea Agreement

5

CHAPTER 5

The Choice of Instruments in a Multi-Level Legal Framework

5 The Choice of Instruments in a Multi-Level Legal Framework

In the previous chapters, it has been made clear that the current legal framework for offshore electricity infrastructure has to be improved, in order to facilitate the development of a MOG and the connection of the many offshore wind farms that are to be constructed in the coming decades. The framework should be specifically amended to accommodate hybrid and meshed offshore grid developments. This requires legislative action on various levels through different legal instruments. In this chapter, the decision-making structure for choosing legal instruments to address the identified challenges is made clear.

The legal framework for offshore electricity infrastructure can be characterised as multi-level and multi-actor. The different levels addressed in this chapter are national, EU and international law; the latter also includes regional legislative instruments. The actors addressed in this chapter are national governments, local governments, regulatory authorities, TSOs, windfarm developers, various interest groups (related to for example nature conservation, fisheries, tourism), the European Commission and other European institutions, and international organisations such as the IMO and the OSPAR secretariat.

The structure of the chapter is as follows. To accommodate the complexity of multi-level and multi-actor policymaking, this chapter will first go into general decision-making theories that are relevant for the decision-making processes for the legal framework for the MOG. This serves as a basis for the second part, in which specific criteria are developed for the choice between multiple levels of legislation for offshore electricity infrastructure in the North Sea, namely the national, European and international level, the latter also including regional agreements governed by international law. Additionally, the choice between hard and soft law is elaborated in this part. The choices between different legal instruments are formulated in the form of questions, leading to a 'decision tree' which can be used to decide which legal instrument to adopt for which legal issue. In the third part of the chapter, the decision tree (and the choices and principles behind it) are applied to the legal barriers to the construction of an offshore grid, as identified in the previous chapters.

The analysis shows that there is no one-size-fits-all legal instrument for all current legal barriers. Instead, the legal framework for a MOG in the North Sea should be based on several legal instruments. On the basis of this multi-level assessment based on several decision-making theories, this chapter concludes with an overview of which legal instruments should form the legal framework for a meshed offshore grid in the North Sea. Its substantive rules will be further elaborated upon in chapter 6 and 7.

5.1 The Choice of Legal Instruments

5.1.1 Decision-making Models for the Choice of Legal Instruments

Before elaborating on how the choice of legal instruments in the context of the development of the legal framework for a MOG needs to take place, it is important to understand how decision-making processes work in the first place, and how decision-making would work for legislative processes with regard to a MOG in the North Sea. This is important as it shapes the decision criteria that are detailed in the next paragraph.

In both economic and social sciences, several decision-making models have been developed. Some of these models refer specifically towards decision-making for individuals or for companies as market participants. Nevertheless, some decision-making theories can be applied to the specific context of law- and policy making, and even specifically to policy making for the design of a legal framework for the offshore grid in the North Sea, for which the EU and coastal states need to make decisions on how to address the construction and operation of such an offshore grid in their current legal frameworks.

Many decision-making models have been developed over previous decades,[648] and it is beyond the scope of this dissertation to discuss them all in detail. Therefore, a selection has been made based on two criteria: first, the models used in this chapter are generally known and established models, and second, the models are able to explain part of the decision-making process concerning the offshore electricity grid in the North Sea which makes them relevant for the specific context of this dissertation. The models that meet the criteria are the rational actor model, the incremental policymaking model, the policy windows or 'window of opportunity' model and 'adaptive governance'. Finally, the 'garbage can model' is added as an alternative theory, as some elements of the policy making process concerning the offshore grid show that the decision-making model is not always as rationally organised as is presumed.

The rational *actor* model, developed by G.T. Allison in the context of an explanation of states' behaviour in the Cuba crisis,[649] is a model to explain states' choices, derived from the rational *choice* model that was developed earlier by economists, and applied to administrative processes by Herbert Simon.[650] Both models were initially derived from the utilitarian principle in ethics that individuals should act in such a way to maximise pleasure (good) and to minimise pain (bad).[651] This principle was translated from ethics to (neoclassical) economics to explain that individuals choose the option that will deliver them most utility and that this can be calculated mathematically.[652] However, whereas the rational *choice* theory takes individuals as subjects and models human decision-making, the rational *actor* model specifically takes states as its principal agents. The theory leans heavily on the utilitarian principles that it is possible for states to oversee all alternatives, to quantify social welfare for all alternatives (based on their costs and benefits), to have this information available to (all) parties involved

[648] M. Hill, *The Policy Process in the Modern State* (Prentice Hall/Pearson Education Ltd, 1997 3rd ed.), p. 98 ff.
[649] G.T. Allison, *Essence of Decision: Explaining the Cuban Missile Crisis* (Little, Brown 1971, 1st ed.).
[650] H. Simon, *Administrative Behaviour* (The Macmillan Company, 1974). See also M. Hill 1997, p. 99-101.
[651] This principle was developed first by Jeremy Bentham in *An Introduction to the Principles of Morals and Legislation* (1789).
[652] The utility theory in economics was developed by William Stanley Jevons, see for example W.S. Jevons, *The Theory of Political Economy* (1871) p. 38/39.

in the decision-making process and to make decisions according to the principle that the social welfare should be maximised.[653]

The *incremental* policymaking model, also called 'muddling through'[654] is based on the theory of Charles Lindblom who argues that in complex decision-making, it is not possible for policymakers to list all the possible policy outcomes and to rank them according to all predetermined values, as would be the case in rational decision-making.[655] Instead, Lindblom describes that policymakers set a principal objective, with only a few immediately relevant secondary objectives, and then limit their evaluation to a few policy alternatives that occur to them.[656] Then, the policymaker will discover that different alternatives are linked to various objectives in different ways,. As a last step, the policymaker will select a combination of the choice in values with the choice in instruments.[657] As the policymaker's goals will only be partially met, this sequence will repeat itself when conditions change and when adequacy of prediction improves.[658] The model is therefore based on 'successive limited comparisons', which is what Lindblom calls 'muddling through'.[659]

From an economic perspective, incremental decision-making can be explained by 'institutional path dependence': the government can be considered to 'produce' regulation or policy, and the 'production costs' are the administrative costs of adding more regulation or policy.[660] The additional administrative costs of a policy or regulation will reduce as the instrument is broadened, to encompass an extra target group (such as, in the context of this dissertation: adding HVDC networks to the existing rules on AC networks), or deepened, by incrementally adding another element to the existing rules.[661] However, this may at some point lead to a lock-in,[662] in which an instrument is not replaced when a more efficient alternative arises. In this case, another mode of decision-making may be necessary to make a step to another system.

[653] These assumptions are criticized by many. A notable criticism, relevant also to decision-making for an offshore grid, is the theory of bounded rationality, developed by Herbert Simon. H. Simon, *Models of man: social and rational: mathematical essays on rational human behavior in a social setting* (Wiley & Son, 1957).
[654] C. Lindblom, 'The Science of "Muddling Through"', *Public Administration Review* [1959 Vol. 19, No. 2] pp. 79-88. C. Lindblom, 'Still Muddling, Not Yet Through', *Public Administration Review* [1979 Vol. 39, No. 6] pp. 517-526. See also M. Hill 1997, p. 102 and further.
[655] This is quite similar to the conclusion of Herbert Simon concerning individual persons. With his theory on 'bounded rationality', Herbert Simon remarks that individuals do not seek to evaluate all alternatives and all information, they are not able to process all this information. Therefore, they only seek a solution that is good enough, hence satisfactory. The bounded rationality model criticizes the rational *choice* model in the same way as the incremental policy making model criticizes the rational *actor* model. H. Simon, *Models of man: social and rational: mathematical essays on rational human behavior in a social setting* (Wiley & Son, 1957).
[656] Lindblom 1959, p. 79-80.
[657] Ibid.
[658] Ibid., p. 80.
[659] Ibid., p. 81.
[660] E. Woerdman, 'Path-Dependent Climate Policy: the History and Future of Emissions Trading in Europe' *European Environment* [2004 14], 261–275, p. 264.
[661] Ibid.
[662] Ibid., p. 265.

The *'window of opportunity'* model is based on the policy windows theory developed by J.W. Kingdon.[663] According to Kingdon, for each issue, in order to have policy action, three things must come together: a problem, a solution and political will to solve the problem. When one of these three is missing, there will be no change. When the three come together, a policy window exists. This window will only be opened for a limited time. Also, more generally, one can say that some issues with a large impact can only be addressed when certain windows of opportunity open.

A good example of a window of opportunity is cooperation between parties after a crisis or disaster. An example of this is the financial crisis in 2008, after which a window of opportunity opened to increase banking supervision, leading for example to the Basel III accord on banking supervision internationally and many measures in the EU to preserve the stability of the Euro.[664] Another example of a disaster that created a window of opportunity in policymaking is the large Dutch flood of 1953 (*Watersnoodramp*), which made it possible to create large-scale flood protection infrastructure (Delta works).[665] From a legal perspective, the floods of 1953 made it possible to adopt a far-reaching Act on this topic, the Delta Act (*Deltawet 1958*). The urgent need for flood protection measures had been investigated and discussed since the 1930s, so there was a problem, and a solution as well, but only after the disaster of 1953 was there the political will to adopt far-reaching measures;[666] this formed the window of opportunity for definite action.[667] A window of opportunity could also exist because of the *threat* of a disaster, or when major societal changes happen. The *threat* of a disaster provided a window of opportunity for example in the case of the observed ozone depletion in the 1970s, which led to worldwide chlorofluorocarbons (CFC) regulation and the adoption of the Vienna Convention for the Protection of the Ozone Layer, as well as the Montreal Protocol on Substances that Deplete the Ozone Layer.[668] Major societal changes also provide a window of opportunity, for example the fall of the Berlin Wall and the dissolution of the USSR in 1991, prompted many large economic and societal reforms.

Adaptive governance differs from the models treated above as it is less known in general decision-making theory. However, it is applied in the context of environmental decision-making. Adaptive governance deals with the "the holistic management of complex

[663] J.W. Kingdon, *Agendas, alternatives and public policies* (Little, Brown & Co., 1984).
[664] J. Welch, 'The Financial Crisis in the European Union: An Impact Assessment and Response Critique', *European Journal of Risk Regulation* [2011 Vol 2 (4)] pp. 481-490.
[665] It must be noted that the necessity to improve the flood protection system had been recognized since 1946, but this first led to relatively small (incremental) changes. The large flood of 1953 made it possible to reach a higher state of urgency and allowed for more far-reaching measures.
[666] The political discourse on coastal protection before and after the flooding are discussed in C.C. van Baalen, 'Gods water over Gods akker. Het parlement en de watersnoodramp (1948-1953)', *Radboud Universiteit Politiek(E) Opstellen* [1989 vol. 9], pp. 11-28.
[667] S. Meijerink, 'Understanding policy stability and change. The interplay of advocacy coalition and epistemic communities, windows of opportunity, and Dutch coastal flooding policy 1945-2003', *Journal of European Public Policy* [2005 12:6], 1060-1077, p. 1072.
[668] Vienna Convention for the Protection of the Ozone Layer, Vienna, 22-3-1985, U.N.T.S. I-26164. Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal 16-9-1989, U.N.T.S. I-26369.

environmental problems",[669] such as climate change or the governance of natural resources.[670] Science has a large role in this: "adaptive governance integrates scientific and other types of knowledge into policies to advance the common interest in particular contexts through open decision-making structures."[671] Moreover, adaptive governance is based on adapting the policy once new insights have occurred into the effects of the existing policy. In that sense, adaptive governance can be considered a form of 'trial and error', as a pattern occurs wherein policy that seems to have acceptable consequences is continued, whereas when unacceptable consequences appear, the policy is adapted to the new reality. However, the picture can be more complex in reality:

> "Complex dynamics and stochastic elements can also distort the causal links (…), creating a pattern of ''one step forward, two steps back, then maybe a couple of steps sideways.'' In fact, the only certainty is that the system will always be in flux, and that for every action there will be a reaction— sometimes equal, sometimes amplified by feedbacks, and sometimes nullified by exogenous forces."[672]

The adaptive governance model thus does not treat how the initial policy decision is made, but rather that these decisions are revisited and adapted from time to time in order to account for new insights in the effects of the policy.

Finally, the 'garbage can model' describes decision-making in organised anarchies, which can be characterised by "problematic preferences, unclear technology and fluid participation".[673] 'Problematic preferences' means that the organisation does not have one set of consistent preferences, but rather a variety of ill-defined preferences. The lack of clarity on technology refers to the fact that the actors do not fully understand the processes, instead, the process is often based on trial-and-error. The 'fluid participation' refers to the fact that participants vary in the time and involvement they commit to the policy process, and their participation may vary from one time to another, which means that the boundaries of the organisation are unclear and continually changing.[674] The theory states that there are four 'streams', namely continuous streams of problems, solutions, participants and choice opportunities. These four streams flow together into a 'garbage can'. The outcome of the policy process depends on the combination of the four streams that are combined in the garbage can.

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[669] L. Sharma-Wallace, S. J. Velarde, A.Wreford, 'Adaptive governance good practice: Show me the evidence!', *Journal of Environmental Management* [2018 Vol 222] 174-184, p. 174.
[670] On adaptative governance for the governance of natural resources, see R. Brunner, T.A. Steelman, L. Coe-Juell, C.M. Cromley, C.M. Edwards, D.W. Tucker, *Adaptive Governance - Integrating Science, Policy, and Decision Making* (Columbia University Press, 2005).
[671] Ibid., p. viii.
[672] D.G. Webster, *Adaptive Governance : The Dynamics of Atlantic Fisheries Management* (MIT Press, 2008), p. 3.
[673] M.D. Cohen, J.G. March, J.P. Olsen, 'A Garbage Can Model of Organisational Choice', *Administrative Science Quarterly,* [1972 Vol. 17, No. 1], pp. 1-25.
[674] Ibid., p. 1.

In practice, multiple models can be applicable at the same time, for different types of legislative action. For the offshore grid as well, all four theories mentioned above explain part of the decision-making processes. The examples below make clear which different decision-making processes can be employed for different parts of the legal framework for the MOG.

Technical decisions and policy concerning the grid configuration and operational rules are typically based on (societal) cost-benefit analyses, sometimes directly or indirectly prescribed by EU law.[675] If a cost-benefit analysis shows that it is more beneficial to construct the offshore grid in a certain way, policymaking is likely to be directed towards that way.[676] This points to the rational actor model. Also, when choosing between different instruments, the instrument which costs the least to develop and to adopt, compared to the benefits it is expected to deliver, will probably be chosen.

At the same time, governance and regulation of the offshore grid is not entirely 'greenfield', as many existing patterns of the onshore grid are simply translated to the offshore grid, even when the situations are not comparable.[677] Adopting the same governance and regulations for the offshore grid as for the onshore grid could be seen as incremental policymaking, or as "muddling through". This happens for example with the adaptation of the EU Network Codes to HVDC grids.

The enormous development of offshore wind in the coming decades and the large grid investments associated with this could create a 'window of opportunity' for the adoption of new, potentially daring, legal instruments. If there is no political will to address a certain issue, the window of opportunity remains closed, even if there is a problem and a solution at hand.

Adaptive governance could be used in the context of decision-making regarding long-term monitoring and decision-making on the effects of the presence of a MOG. Moreover, it could

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[675] An example of an indirect reference is that, according to Regulation 2019/943 on the internal market of electricity, art. 18, only the costs that correspond with an efficient and structurally comparable network operator can be taken into account in the tariffs for the usage of the electricity grid. This implies that TSOs should only make 'efficient' investment decisions. This is also tested by the national regulatory authorities through tariff regulation which leaves out 'inefficient' investments. A direct reference can be found in Regulation 347/2013 on Trans-European Networks in Energy, art. 11 and 13(2), where energy system wide cost-benefit analyses are required for the development of PCI projects, and the results of this (including the project-wide positive externalities) should be taken into account by the national regulator.
[676] Although the general rule is that decision-making in this context is based on rational decision-making based on cost-benefit analysis, the following situation can be considered an exception: the investment in the 'Celtic Interconnector', which links Ireland with France, receives a large amount of funds from the Connecting Europe Facility (€530m out of €550m in total for electricity projects): https://ec.europa.eu/inea/en/news-events/newsroom/eu-invests-556-million-priority-energy-infrastructure. One can wonder whether the cost-benefit analysis of this project compared to other electricity projects is able to justify such a large investment from EU public funds, or whether this can rather be considered a political move to support Ireland's position in light of the UK leaving the EU.
[677] For example, copying market rules from the onshore electricity network that is deemed to be a 'copper plate' to an offshore electricity network in which transmission capacity is significantly lower will lead to suboptimal results, as will be explained below, in section 5.2.3. See also section 1.7.1 for an explanation of the copper plate presumption.

be used to decide on the cumulative amount of OWFs to be installed in a certain area, on the requirements for multiple use of the space between wind turbines inside an OWF and on decommissioning requirements.

Finally, when observing the North Sea Countries' Offshore Grid Initiative (NSCOGI) and its successor, the North Sea Energy Cooperation (NSEC),[678] it becomes clear that these cooperation platforms include several elements of the garbage can model. The participating states differ in the amount of time and effort they invest in the cooperation, depending on the political priorities in the states (fluid participation). The participating states have differing interests and preferences, for example with regard to what should be the priorities of the cooperation. Moreover, these preferences also change over time. Additionally, the technology and possible grid development scenarios were not always clear in advance – as the discussion often covers future grid developments in a medium or long-term time range (2030 and beyond). There is a stream of problems, identified by the working groups of the cooperation platforms, and a stream of solutions, developed by various research projects on the topic of offshore grids and presented at the meetings of the support groups.[679] Whether the streams of participants, problems and solutions lead to actual policy developments, depends on whether, at a given moment, the combination of problem, solution and participants for a certain issue works. This process bears resemblance to the 'window of opportunity model' described above, as in both models, the right combination of factors at the right moment leads to legislative/policy action, although the fluidity of participation in the decision-making process is added in the 'garbage can model'.

As will be shown in the paragraph below, all models described above are relevant for the choice of legal instruments regarding the different legal barriers for the offshore grid.

5.1.2 Criteria for the Choice of Legal Instruments

The general policymaking theories mentioned above describe different ways in which policymakers come to a certain preferred policy choice. The next step is to implement the preferred policy choice into legislation. For the implementation into legislation, it is important that a certain policy choice is based on the right (level of) legal instrument.[680] For example, the lack of certainty on the jurisdiction for hybrid assets and the MOG cannot be addressed at national law level, because it is a cross-border issue by nature – addressing it at national law

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[678] These observations were made during an internship at NSCOGI (Benelux Secretariat) from October 2013 to March 2014 and while attending various NSEC meetings in the period 2017-2019.

[679] Projects presented and discussed at support groups of NSCOGI and NSEC include the OffshoreGrid study; NorthSeaGrid; PwC, Tractebel, Ecofys, 'Study on regulatory matters concerning the development of the North Sea offshore energy potential', Report for the European Commission, Jan. 2016, and the PROMOTioN project.

[680] In this section, the level of legislation entails both the geographical level, i.e. national, EU or international level and whether a 'hard' or 'soft' law instrument should be used. See, in parallel, Heldeweg & Wessel, who use a similar division for the appropriateness of enforcement in multilevel regulation: they define appropriateness as a combination of the 'strength' of the enforcement (i.e. hard or soft) and the 'location' (i.e. national, regional, international). M.A. Heldeweg, R.A. Wessel, 'The Appropriate Level of Enforcement in Multilevel Regulation - Mapping Issues in Avoidance of Regulatory Overstretch', *International Law Research* [2016, Vol. 5, No. 1], p. 17.

level will not solve the issue. On the other hand, an issue related to the permitting procedures in one coastal state can often be solved at the national level, as this is the source of the problem. In this section, specific criteria are developed for the choice between different levels of legislation and between hard and soft law.

What is the appropriate level of legislation for a certain issue depends on different criteria: for the choice between national and EU law, this choice is laid out in the well-elaborated principles of proportionality and subsidiarity. However, for other choices between legal instruments, there are competing criteria and interests which need to be taken into account, such as the interest of including all relevant parties vs. the interest of having a binding and enforceable agreement.

Since there is no offshore transmission infrastructure regulation at sub-national level in the coastal states researched for this dissertation, the choice of legal instruments starts with the question whether national law is the appropriate level or whether a larger-than-national law instrument needs to be sought. If the answer is the latter, the question is whether this larger than-national level should be EU level or international (regional/North Sea) level.[681] Finally, on all levels of legislation, there is a choice between instruments of hard law and soft law, which is important to consider as well, as soft law may help to reach a goal when it is not possible to adopt hard law.

It is important to note that the approach explained above is the reverse of the 'traditional' hierarchy of laws, which dictates that international law goes above EU law, and EU law goes above national law.[682] This is justified by a focus on the principle of subsidiarity, which entails that the lowest level at which a measure is still effective, should be used.[683] The principle of subsidiarity, a central principle of EU law,[684] makes sure that the legal framework for the MOG is not based on more complex legal processes than necessary, which lowers the costs and time needed to adopt a legal framework for the MOG.[685]

[681] "Regional" in this sense means multiple countries within the same geographical region, not regional as a sublevel under "national".

[682] EU law is bound by international law, as confirmed in CJEU case law: See for example C-111/05, *Aktiebolaget NN. v. Skatteverket*, EU:C:2007:195; C-308/06, *The Queen, on the Application of International Association of Independent Tanker Owners (Intertanko) and Others v. Secretary of State for Transport*, EU:C:2008:312, para 51; C-286/90, *Anklagemyndigheden v. Peter Michael Poulsen and Diva Navigation Corp.*, EU:C:1992:453, paras. 9 and 10; C-405/92, *Etablissements Armand Mondiet SA v. Armement Islais SARL*, EU:C:1993:906, paras. 13–15; C-162/96, *A.Racke GmbH&Co. v. Hauptzollamt Mainz*, EU:C:1998:293, para 45; C-366/10, *Air Transport Association of America and Others v. Secretary of State for Energy and Climate Change* (ATAA), EU:C:2011:864, para 101. The primacy (precedence) of EU law over national law was first described in Case 6/64 *Costa v. ENEL* ECLI:EU:C:1964:66.

[683] Heldeweg, Wessel (2016) use a similar approach for the appropriateness of enforcement of regulation: smart regulation entails choosing the 'least invasive' option, in order to avoid regulatory overstretch.

[684] TEU, art. 5(1) and (3).

[685] It is assumed that the higher the level of law, the more different states are involved, and the larger the chance of differing opinions, which makes the negotiation process more complex and costly in terms of time and resources.

5.1.2.1 The Choice between 'Old' and 'New' Instruments

In the choice between legislative instruments to address a certain issue, the first step should be to check whether some legislation already exists on the issue. It could be that the issue exists because there is no legislation yet, but it could also be that the current legislation is confusing to stakeholders, for example because it does not fit existing circumstances, as technological progress requires adaptation of the legal framework. It could also be that the current legislation does not deliver the desired results, for example because it gives the wrong incentives to stakeholders, leading to suboptimal investment decisions.[686] In that case, the existing legislation should be amended rather than that new legislation is introduced.

When legislation on the issue already exists, amending the existing legislation will generally be a more efficient solution than incurring the transaction costs of drafting new legislation on a higher level to overrule the old legislation. It is also usually a faster option than starting the drafting process of a new legal instrument. When the existing legislation actually forms the problem (as a regulatory failure),[687] amending the existing legislation will be most efficient, as this will solve the issue at the source, rather than targeting only the symptoms or consequences. This approach fits very well with the incremental decision-making model of 'muddling through' as described in section 5.1.1. However, when there is no legislation yet, the criteria below can be used to decide the appropriate level of legislation for a certain issue.

5.1.2.2 The Choice between National and Larger-than-national Law

In the choice between national and larger-than-national law, it is first important to filter out issues that are only a problem in one country and not in others, as these should be solved on a (sub-)national level rather than at EU or international level. Moreover, when an issue has no cross-border impact at all, even though it exists in several countries, the costs of trying to reach consensus among countries may be higher than the benefit of having the same solution for all countries, given their different preferences and circumstances. If this is the case, states behaving like rational actors would refrain from using a larger-than-national solution.

However, many issues regarding the MOG do have a cross-border impact, which makes it important to develop criteria for the choice between addressing an issue on a national level or on a larger-than-national level. For the choice between national law and EU law, three important criteria are developed, namely the conferral of competences, subsidiarity and proportionality.[688] These principles, anchored in the founding Treaties of the EU, aim at containing the EU's power with respect to the powers of its Member States.

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686 This type of issues is called 'government failure' as opposed to 'market failure'. The term was developed by Ronald Coase, in R. H. Coase, 'The Regulated Industries: Discussion' *The American Economic Review* [1964 54(3)] p. 195. See also B. Orbach, 'What is government failure?' *Yale Journal on Regulation Online* [2013 Vol 30:44]. In this case, the government intervention (legislation) is deemed to be imperfect, which leads to suboptimal results.

687 Ibid.

688 See above, chapter 3.2. See also TFEU, Protocol No 2 on the Application of the Principles of Subsidiarity and Proportionality, OJ C 202, 7.6.2016.

The first principle, conferral of competences, entails that the EU can only act in so far as the Member-States have conferred competences for this area to the EU via the founding treaties.[689] If the Member-States have not conferred competence to the EU on a certain issue, it can only be addressed through national law or through an international agreement. The competences are formulated in a broad way, which is why almost all issues related to the MOG fall within the EU competences in some way.[690] Therefore, this criterion alone is not distinctive enough to make the choice between national and larger-than-national level.

The second requirement relates to subsidiarity, aiming to regulate issues at the national level where possible. The concrete question to be asked is: 'is it not, or not sufficiently, possible to achieve the objective at national level?'[691] The subsidiarity principle does not only exist in the limitation of EU law, but it can also be more generally seen as the principle that issues should in general be addressed at the lowest level possible.[692] The benefits of adopting a principle of subsidiarity can also be explained by focusing on the economic efficiency of a decentralised approach for those issues for which there are no explicit benefits from a centralised approach,[693] which could be for example when (cross-border) negative externalities exist that can only be internalised when a centralised approach is used. Formulated in a question for the decision tree, the criterion for addressing an issue at a national level rather than at larger-than-national level, is 'Is it possible to adequately address an issue at a national level?'

The third requirement in this regard is proportionality, which entails that if a measure is not necessary to achieve the objectives mentioned in the Treaties, it should not be implemented.[694] The aim of this rule is to make sure that the EU does not produce more rules than necessary to achieve its targets. The proportionality principle is applied by the CJEU as a 'rationality check', to check whether the targeted measure is suitable and necessary to fulfil the objective it claims to serve.[695]

5.1.2.3 The Choice between European and International Law

The choice between international law and EU law[696] to address a certain issue is less clear-cut than the choice between national and larger-than-national law. A first boundary criterion is

[689] TEU, art. 5(1), (2) and the topic-specific articles of the TFEU, see chapter 3.2.
[690] See section 3.2 above.
[691] Treaty on European Union (TEU), art. 5(3).
[692] See Oxford Dictionary: 'Subsidiarity'.
[693] A. Portuese, 'The Principle of Subsidiarity as a Principle of Economic Efficiency' *Colombia Journal of European Law* [2011, 17-2], p. 235 ff.
[694] TEU, art. 5(4). The Treaties mention both general objectives and specific objectives, coupled to the competences mentioned above.
[695] T. Harbo, 'The Function of the Proportionality Principle in EU Law' *European Law Journal*, [2010 Vol. 16, No. 2] pp. 158–185, p. 165.
[696] Some argue that EU law is a form of international law. See for example K.S. Ziegler, 'The Relationship between EU Law and International Law' in D. Patterson, A. Soderston (eds.), *A Companion to EU and International Law* (Wiley-Blackwell, 2016) pp. 42-61. However, the CJEU made clear in its landmark judgment 'Van Gend en Loos' that the EEC (the predecessor of the EU) forms a new, separate, legal order. CJEU Case 26/62 *N.V. Algemene TRANSPORT— en Expeditie Onderneming Van Gend & Loos v. Nederlandse administratie*

whether the EU has competences on the issue. If this is not the case, then only solutions under international law are possible.

However, for many topics, both EU-based and international law-based solutions are possible. For this choice, instead of specific requirements, such as above in the choice between national and larger-than-national law, this choice is based on criteria that make explicit which interests could be taken into account and influence a decision either towards international (regional) law or towards EU law.

Two criteria point towards addressing an issue at an international level, for example through a regional agreement between the North Sea coastal states. The first is the importance of having one solution for all North Sea coastal states, and the second is the relevance of the issue for other EU Member States that are not connected to the North Sea.

(i) The importance of having one solution for all North Sea coastal states, including EU- and third states

This criterion relates to the desired amount of involvement of the non-EU states that are expected to be part of the MOG, namely Norway and the UK. For Norway, EU-based solutions will be possible for most issues, as they are also adopted via the EEA Agreement, albeit with a legislative lag.[697] However, for the UK, the situation is more difficult, especially in light of the current developments related to Brexit.[698] An EU-based solution would exclude the United Kingdom and may not be acceptable to UK policymakers. Depending on the issue, non-participation of the UK might lead to suboptimal grid development from a socio-economic perspective, as the UK has a large proportion of the installed wind capacity and the main societal benefits of interconnection lie in the connection of the UK electricity market to the continental electricity market. Therefore, for issues in which it is important to only have one solution and in which participation of the UK is desirable, a solution under international law is preferred.[699]

(ii) Is it an issue that only has relevance to North Sea coastal states?

Including 27 states in the decision-making process, while there are only a small number of states for whom the issue is relevant, slows down decision-making procedures under EU law, as the political will of the states for which the issue is not relevant is probably small. Thus, for

der belastingen, ECLI:EU:C:1963:1. In this chapter, EU is treated as different from general public international law, in the spirit of the Van Gend en Loos judgment. Still, there are plenty of overlaps and interdependencies between international and EU law, see R.A. Wessel, 'Studying International and European Law: Confronting Perspectives and Combining Interests' in I. Govaere, S. Garben (Eds), *The interface between EU and international law : contemporary reflections* (Hart Publishing, 2019), p. 73-74.

[697] See section 3.3.1.

[698] See section 3.3.2.

[699] See also: B. De Witte, A. Thies, 'Why Choose Europe? : the place of the European Union in the architecture of international legal cooperation' in B. van Vooren, S. Blockmans and J. Wouters (eds), *The EU's role in global governance : the legal dimension* (Oxford University Press 2013) p. 28

these issues, there might not be sufficient political willingness, and thus no 'window of opportunity' to address the issue. Instead, regional specialisation for the relevant countries is possible via an international agreement. This type of international agreement is called a 'partial agreement'.[700]

Next to criteria (i) and (ii) as explained above, there are also two different criteria that point towards an EU-law based solution. These are, first, whether the EU already made use of its competence to regulate the issue, and secondly, whether it is important that the rule is binding and enforceable.

(iii) Did the EU already make use of its competence to regulate the issue?

Many issues related to the energy sector and cross-border networks fall under 'shared competences'.[701] In this case, Member States can only act as far as the EU has not acted yet, based on the principle of pre-emption.[702] This blocks states from adopting their own legislation on the issue (internal action) but it also blocks action from Member States at an international level (external action).[703] So, when the EU already made use of its competence to regulate the issue, it is not possible for states to autonomously conclude an international agreement on the matter without the EU participating as well.

(iv) Is it important that the rule is binding and enforceable?

When a binding, enforceable solution is important, for example when there is a risk of free-riding, it is more logical to choose for a solution under EU law. Agreements under international law are less enforceable than EU law instruments. The European Commission supports the enforcement of EU law and the Court of Justice of the EU (CJEU) judges cases on a binding basis.[704] In international law, enforcement is often difficult.[705] In this context, the procedure for decision-making is also relevant, as supranational agreements in which a hierarchy of institutions exists are more effective than the intergovernmental agreements typically concluded under international law. This is because intergovernmental agreements often require unanimity for decision-making, whereas supranational agreements often have a form

[700] B. De Witte, 'Chameleonic Member States: Differentiation by means of partial and parallel agreements' in B. De Witte, D. Hanf, E. Vos (eds), *The Many Faces of Differentiation in EU law*, Intersentia 2001.
[701] See above, section 3.2.
[702] De Witte 2001, p. 241.
[703] Internal action refers to the adoption of laws inside the 'own' legal order, whereas external action refers to the conclusion of agreements with other states.
[704] TFEU, art. 280 and 299.
[705] Whereas countries have a police and judicial power to enforce laws, this does not exist in the same form on the level of international law. The UN Security Council has a role in enforcement, as has the ICJ and courts of arbitration, but this is not comparable to enforcement on national and European level as the power is much less binding. Countries can decide to bring an issue to an arbitral court, but this is also based on voluntary participation.

of majority voting. Under European law, decision-making on the competences relevant for the offshore grid is based on qualified majority voting.[706]

5.1.2.4 The Choice between Hard and Soft Law

In the choice of legal instruments, next to the geographical scope of the instrument, another possible distinction is the distinction between hard and soft law. The distinction between hard and soft law stems from international law, where hard law is always binding[707] and soft law relates to all forms of non-binding law, such as guidelines, interpretation documents etc. In international law, soft law is defined as "a variety of non-legally binding instruments used in contemporary international relations", such as declarations, interpretative guidance, codes of conduct, guidelines and recommendations.[708] However, the concept of soft law also exists at lower levels, i.e. the guidelines and communications by the European Commission.[709] In this subchapter, the concept of soft law and its advantages and disadvantages are explained. Then, criteria for the choice between soft and hard law are developed.

The capacities and practical relevance of soft law are sometimes underestimated, as soft law is not always considered a 'real' type of law.[710] Soft law, however, proves to be particularly effective for certain purposes,[711] because it can help develop solutions for politically sensitive issues.[712] First, it may be easier to reach agreement when the form is non-binding, because consequences of non-compliance are limited.[713] For the same reason, states can use more detailed and precise provisions compared to vague but binding norms.[714] Secondly, soft law is easier for states to adhere to, as no domestic ratification processes are needed.[715] However, this does reduce the democratic legitimacy of soft law instruments, because the ratification process normally involves a vote in one or more democratically elected chambers. Thirdly, soft law is more flexible, as it is easier to amend than treaties. This is also due to the fact that no ratification procedure is needed for amendments. Lastly, some authors say that soft law can serve as more immediate evidence of international support and consensus than a treaty, as

[706] For these competences, according to art. 194(2) first paragraph, and art. 172, the 'ordinary legislative procedure' (OLP) is applicable. This procedure, described in TFEU art. 294, requires a decision from the Council. TEU art. 16(3) prescribes that this is done by qualified majority voting, which entails, according to TEU art. 16(4) 'at least 55 % of the members of the Council, comprising at least fifteen of them and representing Member States comprising at least 65 % of the population of the Union'. The threshold for a qualified majority is much lower than for unanimity, which makes it easier to reach a decision.
[707] A. Boyle, C. Chinkin, *The Making of International Law* (Oxford University Press 2007), p. 213.
[708] Ibid., p. 212/213.
[709] European Commission, Communication: 'Guidelines on State Aid for Environmental Protection and Energy 2014-2020', C-200/1 28-6-2014.
[710] A. Boyle 'Soft Law in International Law-Making' in M.D. Evans (ed) *International Law,* OUP 2014, 4th ed., p. 118-119.
[711] Ibid.
[712] K.W. Abbott, D. Snidal, 'Hard and Soft Law in International Governance', *International Organization* [2000 Vol. 54, No. 3, Legalization and World Politics], p. 423.
[713] Boyle, Chinkin 2007, p. 214.
[714] Ibid.
[715] Ibid.

there are no reservations,[716] and no long waiting times for domestic ratification in the participating states.[717] Soft law can also be an intermediate step in the process towards the creation of new hard law: when a document of soft law is afterwards combined with states' practice, it will start to constitute customary international law, which is a form of hard law.[718]

Although there are many different names for legal instruments (of both hard and soft law),[719] the name of the instrument does not matter so much for the legal form. What is more important is to distinguish between the number of countries bound by it, the extent to which the provisions in it are binding and the enforceability of these provisions. Abbott and Snidal refer to three parameters; 'obligation', 'precision' and 'delegation' (the possibility to delegate further decision-making power in the context of the contract to a lower body).[720] In either approach, international agreements can be put on a sliding scale from hard law to soft law. The same goes for instruments adopted under EU law.[721]

Sometimes it is not the form (i.e. covenant or treaty) which determines whether something is hard or soft law, it can also be the content of the text: does it contain only principles or real rules and obligations?[722] This can mean that an instrument that is considered 'soft law' actually contains rules that function as hard law. An example of this is the Guidelines on State Aid for Environmental Protection and Energy.[723] These guidelines, formulated by the European Commission, set out in detail which forms of support schemes do or do not fall under the prohibition of state aid in EU law according to the European Commission.[724] As the European Commission is the body that enforces state aid law, it decides whether a support scheme for energy complies with the (binding) norm. As the rules are very concrete and enforced, via a notification and standstill procedure,[725] this instrument is actually a lot less 'soft' than many other guidelines. The reverse can also happen: a hard law instrument can contain 'soft' norms that are broad and difficult to enforce. This is the case for example Regulation (EU) 2019/943 art. 4, where Member-States are supported to adopt a national strategy for a "just transition" in coal and fossil fuel intensive regions.[726] There are no hard requirements in this article, only

[716] With a reservation, a state may voice agreement with most of the treaty but disagreement with a specific part of it (for which a reservation is made). However, if many states have reservations, this reduces the force of the agreement.
[717] Boyle, Chinkin 2007, p. 214.
[718] ICJ, Federal Republic of Germany v. Denmark and v. the Netherlands, The North Sea Continental Shelf Cases, ICJ rep. 1969, p. 4, para 77. See also Boyle, Chinkin 2007, p. 212.
[719] Convention, treaty, agreement, memorandum of understanding, and the declarations, interpretative guidances etc.
[720] Abbott, Snidal 2000, p. 424.
[721] L. Senden, S. Prechal, 'Differentiation in and through Community Soft Law', in B. De Witte, D. Hanf, E. Vos (Eds) *The Many Faces of Differentiation in EU Law* (Intersentia 2001), p. 187.
[722] Boyle 2014, p. 126.
[723] Communication from the Commission, 'Guidelines on State aid for environmental protection and energy 2014-2020', 28.6.2014, OJ C 200/01.
[724] See section 3.4.3 above.
[725] TFEU art. 108(3). See section 3.4.3 above.
[726] Directive (EU) 2019/944, art. 4.

suggestions to Member-States on financial support, exchange of good practices and discussions on roadmaps.[727]

From the above, the criteria for the choice between hard and soft law are:

- Is it important that the agreement is enforceable?
- Is it (too) difficult to reach a binding agreement (hard law)?

These criteria oppose each other somewhat. When enforceability of the agreement is important, this points towards hard law. However, when it is difficult to reach a binding (and thus enforceable) agreement, this points towards a solution under soft law. Therefore, if enforceability is not of crucial importance and if it is too difficult to reach a binding agreement, a soft law instrument may be a viable alternative.

5.1.3 Decision Tree

For each issue that needs to be addressed for the offshore grid, it needs to be assessed which legal instrument is the most suitable. 'Suitable' depends on which decision-making model is used, as with an incremental approach of 'muddling through', existing instruments will be used and expanded to address new issues, whereas a 'window of opportunity' approach would allow for new legal instruments to be adopted. In concrete terms, on the basis of the principles and criteria elaborated above, a decision tree can be formulated to facilitate the choice between different levels of legislation:

1. Is there already legislation on the issue?

If the issue exists because there is no legislation at the moment, the approach should be different than if the issue exists because currently existing legislation is outdated or does not lead to the desired result. In the latter case, the transaction costs of replacing current legislation by entirely new legislation can be avoided by amending the existing legislation (incremental approach). When there is no legislation yet, the rest of the decision tree can be used to find the right level of legislation.

2. Choice between national and larger-than-national law:
   - Is it possible to adequately (effectively) address an issue on national level? (subsidiarity)
   - Is it possible to adequately (effectively) address an issue with a less invasive instrument? (proportionality)

If the first question can be answered positively, this indicates a choice of national law rather than EU- or international law. If the second question can be answered positively, this indicates that another legal instrument should be used.

[727] Ibid.

3. Choice between EU law and international law:
   - Is it important to have one solution for all states?
   - Is the issue only relevant to North Sea coastal states (not to other EU Member States)?
   - Did the EU already make use of its competence to legislate on the issue?
   - Is enforceability of the agreement and the rules contained therein considered important by the stakeholders involved (for example due to the risk of free-riding)?

If the first two questions are answered affirmatively, this points towards a solution under international law. If answered negatively, this points towards a solution under EU law. If the third and fourth question are answered affirmatively, this points towards a solution under EU law. If they are answered negatively, this points towards a solution under international law. If there are as many criteria in favour of international law as there are in favour of EU law, the relative importance of the criteria needs to be weighed.

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4. Choice between different instruments at one level:
   - Is enforceability of the agreement and the rules contained therein considered important by the stakeholders involved (for example due to the risk of free-riding)?
   - Is it (too) difficult to reach a binding agreement?

If enforceability is important, this points in the direction of (binding) hard law. If it is too difficult to reach a binding agreement, a soft law instrument may be a viable alternative.

5.2 The Choice of Legal Instruments for the Governance of the Offshore Grid

Based on the criteria for the choice between different legal instruments developed above, it is now possible to apply this method to the legal issues identified as barriers to the development of the MOG, in order to decide which legal instrument is most fitting for which legal issue in the context of the MOG in the North Sea. Based on the preceding chapters, the following issues need to be addressed in the legal framework: jurisdiction over hybrid assets and MOG components, the governance of the MOG, operational rules for the MOG, various inconsistencies in national law, support schemes for OWFs connected to a MOG and decommissioning of OWFs and grid assets. For every issue, the status quo is shortly stated, after which the decision-making model and principles are used to assess the most appropriate legal instrument per issue.

5.2.1 Jurisdiction over Offshore Electricity Cables under the Law of the Sea

Currently, the jurisdiction of coastal states and other states in different parts of the sea is addressed in UNCLOS. However, as explained in chapter 2, the lack of clarity in this instrument with regard to hybrid assets and the MOG itself poses a barrier to the development of such assets.[728]

Applying the decision tree described above to this issue, the first step is to analyse existing law. UNCLOS provides some information on the jurisdiction coastal states have with regard to offshore electricity cables and installations in the EEZ, but it is not specific enough to provide the legal certainty needed by grid developers. Whereas it is possible to amend national law and European law, a treaty revision process in international law takes years to complete.[729] Considering that the drafting of UNCLOS took 9 years, from 1973 to 1982, and only entered into force in 1994 (12 months after the 60th ratification), a long amendment drafting process can also be expected. The amendment procedure for UNCLOS differentiates between a simplified procedure and a full procedure.[730] As the jurisdiction over subsea cables can be deemed controversial by UNCLOS' signatories, it is unlikely that the simplified procedure can be used for this issue. Therefore, the incremental approach of amending the existing instrument directly is not a workable option.

Secondly, this issue cannot be addressed at a national law level. The issue does not concern only one state but all coastal states interested in offshore electricity infrastructure. Conflicting jurisdiction cannot be 'solved' unilaterally by one of the countries involved, as this would not be accepted by neighbouring countries in an offshore grid and by the international community, as it might create a precedent of unilateral changes to the law of the sea. An additional argument in this specific context is that national solutions would create differences in the legal status of cables from one country to another, which is especially problematic for cross-border electricity infrastructure.

Therefore, the choice is between international and European law. This an issue that lies outside the competence of the EU and therefore, only one option remains: a solution based on international law. Within the field of international law, it could be considered whether the solution should be based on soft law or hard law, and whether the issue should be addressed by the North Sea coastal states only, or by a wider group of states. Reaching a binding agreement on this issue with a large group of states might prove difficult from the point of view of political will, as the issue will only be relevant for a small group of states, namely the states for which an offshore electricity grid is of interest, which currently is only the states around the North Sea and the Baltic Sea. As a large-scale agreement will probably not be feasible, a joint statement of the coastal states interested in the MOG on the interpretation of UNCLOS with regard to hybrid and meshed cables will probably be the highest attainable agreement.

[728] See section 2.3.3 and 2.4 above. See also: Woolley 2012, p. 173; and Nieuwenhout 2018, p. 95-112.
[729] Vienna Convention on the Law of Treaties, art. 39 and 40 provide the general procedure: it requires agreement from the parties to amend a treaty. Specific rules may be adopted in the treaty itself.
[730] UNCLOS art. 312 (simplified procedure) and 313 (full procedure).

5.2.2 The Governance of an Offshore Grid

The governance of an offshore grid is currently not addressed in any legal instrument specifically. In soft law, there is a Memorandum of Understanding (MoU) for the North Seas Countries Offshore Grid Initiative (NSCOGI), a regional initiative to increase cooperation between coastal states around the North Sea and to discuss specifically common plans and approaches to an offshore grid in the North Sea.[731] It was terminated in 2016, but followed by a 'Political Declaration on energy cooperation between the North Seas Countries',[732] with North Sea Energy Cooperation (NSEC) as abbreviation. Although the MoU and Political Declaration do facilitate meetings and cooperation between the coastal states around the North Sea, these agreements do not aim to address the governance of an offshore electricity grid. Therefore, on the first step of the assessment, it can be concluded that there is no existing instrument on the governance of an offshore grid.

Following the decision tree in section 5.1.2, the governance of an offshore grid should clearly not be addressed on a national level, as the issue does not lend itself to national solutions by its nature. Therefore, a solution on a larger-than-national level should be sought. The next step is the choice between an instrument of EU law or of international law. Considering the above-mentioned four questions for this choice, it is important to have one solution for all North Sea coastal states, including Norway and the United Kingdom.[733] Having different governance frameworks next to each other will lead to several difficulties, such as inefficient spatial planning and interoperability issues of different technologies used. There may be a lack of political willingness from the UK's side to participate in an offshore grid for which the governance framework is based on EU law, given the recent political developments around Brexit. Therefore, referring back to section 5.1.1, if the coastal states aim to act as rational actors, they will strive for a solution under international law. However, the right 'window of opportunity' is necessary to reach an international law agreement.

Considering the other questions for the choice between international law and EU law: it is preferable to not include all EU states, as this will slow down decision-making concerning the offshore grid by states for whom the issue is not of relevance. The EU did not yet make use of its competence to create a specific governance framework for the offshore grid, although there are already many issues related to the governance of grids which are regulated in EU

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[731] North Seas Countries Offshore Grid Initiative (NSCOGI), Memorandum of Understanding, Brussels, signed on 3-12-2010.

[732] Political Declaration on energy cooperation between the North Seas Countries, available at http://www.benelux.int/files /9014/6519/7677/Political_Declaration_on_Energy_Cooperation_between_the_North_Seas_Countries.pdf.

[733] The socio-economic benefits of an offshore electricity grid including the UK are much larger than that of a grid without the UK. PROMOTioN CBA report (forthcoming.). The added value of including Norway in the MOG is mainly to be able to benefit from the Norwegian hydro power. This could however also be reached by the construction of 'normal' interconnectors, as Norway does not have many concrete plans for OWF development in its EEZ.

law. The closest would be the 'governance of the Energy Union' programme by the EU,[734] but the effect of the governance of the Energy Union is criticised,[735] and the type of governance in the Energy Union is more abstract than the type of governance needed for the MOG.

An important point is the enforceability of the agreement. An agreement on the governance of the offshore grid should be binding, stable and enforceable, as this gives developers certainty that they retain their investments. Decisions on grid extension, ownership and regulation of the grid, typically part of the governance framework, should be taken by the coastal states together. If states do not agree on these issues and decide on an individual basis, the offshore grid will not work as one meshed grid but rather as a collection of separate mini-grids. The added value of a MOG becomes much smaller when the grids are not governed as one grid but only as separate connections. Therefore, it is important to have an agreement that binds all states that are willing to participate in a MOG.

The agreement on governance should also include the EU as a signatory (making it a so-called mixed partial agreement), first of all because the energy sectors of the EU Member States around the North Sea are to a large extent based on EU law, which makes it impossible for EU Member-States to conclude another agreement on the same topics,[736] and secondly because the EU can also help to support the offshore grid, for example through the Connecting Europe Facility (CEF) or through administrative support. The instrument that is able to incorporate both EU Member States and non-Member States as well as the EU itself is called the mixed partial agreement. As this type of agreement is relatively unknown, it will be explained further in the next chapter.

5.2.3 Operational Rules for Offshore Electricity Infrastructure

Currently, operational rules for cross-border electricity grids in Europe are laid out in the European network codes.[737] However, as several key characteristics differ between the offshore grid and the onshore grid,[738] there is a need for specific rules on the operation of a MOG. The HVDC network code that was developed specifically for HVDC connections is helpful, but still, several specific issues need to be addressed, especially concerning pure HVDC systems, rather than point-to-point HVDC interconnectors for which the rules focus mainly on how the HVDC asset can be integrated in the AC network. For *meshed* cross-border electricity infrastructure, it is important that there are clear rules on capacity allocation and dispatch. These issues need to be addressed on the same scale as the network itself. Otherwise, the grid cannot operate as a meshed grid but only as a collection of point-to-point lines with different rules per line.

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[734] See Regulation 2018/1999 on the Governance of the Energy Union and Climate Action, OJ L-328/1, 21-12-2018.
[735] L. Ammannati, 'The Governance of the Energy Union: An 'Intricate System' Unable to Achieve the European Union Common Goals', *Oil, Gas and Energy Law Journal (OGEL)* [2019-3].
[736] This is due to the principle of pre-emption, see section 5.1.2.
[737] See section 3.4.6.
[738] See section 1.5.1.

Following the decision tree of the previous paragraph, there is already legislation on the operational rules. Therefore, it is not necessary to go through the rest of the criteria in principle. However, an important point to keep in mind is that the current grid codes, even when amended to address the concerns mentioned above, are based on EU law and are amended through an EU law procedure.[739] This might be difficult from a political perspective for the UK after Brexit. Therefore, the rest of the decision tree is followed as well.

The operation of a cross-border network cannot be addressed at national level, as this goes against the nature of the issue, which is compatibility between the parts of the network in different states. Therefore, a solution at a larger-than-national level needs to be sought.

The strong argument for keeping the solution at the current level (EU law) is path dependency: the current grid codes are all adopted under European law, and they have been developed over the course of the last decade. Rather than adopting new grid codes, which entails large administrative efforts and thus costs, the existing grid codes could be amended, in an incremental approach. However, when the UK leaves the EU, the EU Network Codes will not apply to the UK part of the offshore grid.[740] The importance of having one set of operational rules rather than two pleads for a solution under international law, specifically an agreement between the countries involved in the North Sea grid. However, especially for operational rules, it is also important that they are binding and enforceable, as all grid operators and connected parties need to be able to rely on the safety of the network, which is safeguarded by the operational rules. The need for enforceable, binding rules points in the direction of keeping the network codes under EU law. Finally, the process of drafting or amending agreements under international law may take a very long time,[741] especially given the generally supranational character of these agreements. The drafting procedure under EU law, although also lengthy at times, does allow for pushing through a decision with a qualified majority rather than unanimity.

A possible solution which integrates both sides is to incorporate in an international agreement, such as the mixed partial agreement proposed in the paragraph above, a reference to the European network codes. In this way, the UK would also be bound by the Network codes but not by all other rules, if this is politically acceptable to the UK. An extra clause could also be adopted in the intergovernmental agreement mentioned above, to specifically adopt the most important provisions of electricity market legislation for the offshore grid.

Alternatively, a similar solution as for Switzerland could be sought. Switzerland is located in the middle of the synchronous continental electricity network and cooperates with the EU via

[739] See section 3.4.6.
[740] Norway will probably adopt the Network Codes via the EEA Agreement. The current status (December 2019) is that they are under consideration as Draft Joint Committee Decision (JCD).
[741] The possibility of amendment of the operational rules is important as technological developments might require changes in the rules. Especially for operational rules, an efficient amendment procedure is important.

specific intergovernmental agreements. Switzerland is not bound by the network codes directly, but several network codes include a specific clause on Switzerland. For example, in the Network Code on Capacity Allocation and Congestion Management,[742] specific demands are mentioned in article 1(4):

> *The Union single day-ahead and intraday coupling may be opened to market operators and TSOs operating in Switzerland on the condition that the national law in that country implements the main provisions of Union electricity market legislation and that there is an intergovernmental agreement on electricity cooperation between the Union and Switzerland.*

However, this clause has caused several problems in practice, as it excluded Switzerland from the EU energy market, with a resulting loss of opportunities and loop flows (unplanned flows of electricity between different bidding zones).[743] This should be prevented for the MOG, by making sure that the technical rules are politically accepted by all connected states.

Furthermore, it must be noted that operational compatibility of the MOG is not possible without technological standardisation, for example on the voltage levels that will be commonly used in a MOG, the requirements for information exchange between converters of different manufacturers and the requirements with regard to faults and other unforeseen events. Technological standardisation helps to make electrical equipment from one manufacturer compatible with equipment of another manufacturer, which is of vital importance in a MOG that is developed by different states, owners and manufacturers and over the course of several years. Therefore, next to the Network Codes, which provide the operational rules, an important role exists for European and international standardisation bodies such as respectively CENELEC (the European Committee for Electrotechnical Standardisation) and ISO (the International Organisation for Standardisation).[744] These standardisation bodies provide for codes and norms that ensure the interoperability of different parts and network elements. Unlike the norms mentioned in the sections above, these standardisation norms are not based on the typical 'hierarchical' regulation of (government) regulator and (private) regulatee, but rather on a different regulatory strategy: a design-based strategy in which different entities together describe functional requirements of the system that needs to be regulated.[745]

5.2.4 Inconsistencies and Administrative Hurdles in National Law

As described in section 4.7, there is a group of issues that arise at the national level of different coastal states. These are issues that exist because the law of the coastal states was originally not designed for offshore wind or for meshed offshore grids. Issues include connection

[742] Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management, OJ L 197, 25.7.2015.
[743] van Baal, Finger (2019), p. 11.
[744] PROMOTioN WP11 recommendations (forthcoming).
[745] Helwegen, Wessel (2016), p. 18.

responsibilities, licensing regimes, different national implementation of EU law, planning and permitting rules and regulatory oversight.

Following the structure of section 5.1.2, the most logical approach is to address these issues at a national level, via the legal instruments that already exist. This will make sure that the legal barriers are addressed at the source. This is an incremental approach, which can be considered 'muddling through'. It will solve immediate barriers to MOG developments, such as adjustment of a specific rule, but without making large steps forward, such as for example the introduction of joint permitting procedures for cross-border projects, which would significantly reduce the administrative burden on MOG developers. Such joint permitting procedures would have to be based on EU law, as EU law provides sufficient procedural guarantees for project developers and third parties, such as OWF developers and NGOs. However, in line with the principle of subsidiarity, intense, EU-based cooperation is not necessary at the moment, as it is possible to reach the intended result (development of the MOG) with measures of national law instead.

5.2.5 Market Access and Support Schemes

Market access and support schemes for OWFs connected to a MOG should be part of the legal framework for the MOG, as the rules on market access and support schemes determine the willingness of OWF developers to be connected to the MOG. Moreover, stakeholders from the OWF industry have indicated that the conditions for market access and support schemes are very important for them, but currently different per country. The two topics are treated together, as the conditions for market access for OWFs determine the need for support schemes.

Concerning market access, as mentioned in section 3.5, the current rules existing at EU level are a barrier to development of hybrid grid assets and eventually to the development of an offshore grid. Following the structure of section 5.1.2, the barrier is caused by the existing rules at EU level. Thus, in the future legal framework, the issue should be addressed at the level that is causing the problem, namely EU law. However, as also discussed in section 3.5.5, an alternative solution could be to change the bidding zone configuration from a zonal system (based on the EEZs) to a small bidding zones system. The EU Electricity Regulation would not have to be changed, but this would require changes to the support schemes of the coastal states. Furthermore, it must be noted that even with the introduction of the small bidding zones model, some other provisions in EU law need to be changed, for example in the EU Network Codes.

Concerning the support schemes, one may wonder whether the issue of support schemes needs to be part of the future legal framework for the MOG as there have been several tenders for the construction of windfarms without (operational) aid.[746] However, it may well be that

[746] WindEurope, 'Wind energy in Europe in 2018 – Trends and Statistics' (2019), p. 21. It must be noted that these windfarms do receive a form of support as the connection is financed through the TSO and not by the connected party. For offshore wind energy, the export cable is a large cost component.

support will be required again in the future, due to higher construction costs for windfarms that lie further away from the shore, and due to changing market conditions, such as the steel price and the oil price. Moreover, with the small bidding zones market system, the price at the bidding zone will converge towards the coastal states with the lowest market price to which spare capacity exists (and if there is no capacity left at all, the price will become zero). Thus, with the introduction of the small zones market model, the support scheme system will have to be changed.

Moreover, another main issue with the current support schemes for offshore wind is that they are, in some countries, limited to OWFs that are connected exclusively to the coastal state of that EEZ. This means that if OWFs are connected to a hybrid or meshed grid that connects two or more countries, the OWF developer may lose its right to receive financial support.[747] This is detrimental to the construction of an offshore meshed grid, as wind farm developers do not want their OWF to be connected to a grid that would lose them the right to financial support that they would otherwise, in the case of a radial connection, be entitled to.

Support schemes are currently organised at national level. Following the structure of section 5.1.2, as one of the issues with support schemes is the limitation for OWFs that are connected to a hybrid asset, the logical level to address the issue is national law, where the issue originates. However, where the small bidding zones model is introduced, it might be worthwhile to develop a support system that is regionally oriented rather than nationally oriented, as this may simplify the system for OWFs connected to hybrid or meshed grid assets in a small bidding zone and reduce any perverse financial incentives. Thus, which level of law should be used to address support schemes depends on whether the small bidding zones system is introduced or not.

Going back to the decision-making theories introduced in section 5.1, the two options presented above also reflect two different decision-making theories. Amending EU law regarding market access and making small changes to national law regarding support schemes can be considered “muddling through” whereas the introduction of a new bidding zone system and market model, which also requires a thorough revision of the support schemes and perhaps bringing the issue of support schemes from the national level to EU level is much more political and bold, and requires a “window of opportunity”.

5.2.6 Decommissioning of Offshore Wind Turbines and Offshore Grid Infrastructure

As explained in section 4.6, whereas the international law on decommissioning of installations and structures is clear, there are some issues with regard to decommissioning of offshore wind turbine foundations and offshore grid components, such as converter stations and cables, at the end of their lifetime. Wind turbine foundations and converter station foundations in general have to be removed but may be left in place when they serve a legitimate purpose,

[747] See section 4.4.5.

which could also be an ecological purpose. However, this is up to the coastal states to decide. Moreover, although there is no removal obligation for cables based on international law, coastal states may adopt rules on this topic in their national legal framework. This may cause a diversity of rules on what happens at the end of the lifetime of offshore grid components, based on under which coastal state's jurisdiction they fall. Additionally, for the future grid configuration, it is important that coastal states provide clarity on whether offshore wind turbine foundations remain in place, fulfilling a new function but blocking the construction of a new OWF in the same area, or whether they are to be removed. There is currently not sufficient clarity on this.

Following the structure of the preceding section, the first step is to check whether legislation already exists. This is partially the case, in the form of the guidelines of the IMO and OSPAR Decision 98/3. However, they do not provide sufficient clarity at the moment, resulting in a variety of national rules.

Many countries around the world have constructed or are considering constructing offshore wind farms and the related cable infrastructure.[748] Moreover, regarding the offshore grid, the diversity in national rules is part of the problem. Therefore, it is more logical to use a larger-than-national level instrument than to solve this on national level. Moreover, as the issue of decommissioning is not limited to EU Member-States, an international law instrument to which all states can participate would be preferred over an EU-based solution. Therefore, an instrument of international law for the specific topic of decommissioning of offshore wind turbines and offshore grid components is most logical. Currently, there is a hard decommissioning obligation in UNCLOS, which is expanded upon further via soft law instruments, namely the IMO and OSPAR Guidelines. For offshore wind and offshore grid components, a similar structure can be envisaged, which means that it is not necessary to create hard and binding law on this – regarding decision-making theories, a form of "muddling through" will suffice. The recommendations are generally observed by the companies and countries, if not for the willingness to protect the environment, then at least for the need to preserve the company's public image.[749] Therefore, it is to be expected that (soft) industry standards to protect the environment are sufficient for those states and companies that take the environment into consideration. Also, if a few countries do not adhere to the standards, it is not directly problematic, as long as, in general, most countries do adhere to the standards.

[748] Global Wind Energy Council (2017): http://gwec.net/wp-content/uploads/2018/04/6_Global-cumulative-Offshore-Wind-capacity-in-2017-1.jpg. See also for other parts of the world: A.M. Gao, J. Fan, *The development of a comprehensive legal framework for the promotion of offshore wind power: the lessons from Europe and Pacific Asia* (Wolters Kluwer, 2017); C.T. Nieuwenhout, Chapter 56: Offshore Grids, in M.M. Roggenkamp, K.J. de Graaf, R. Fleming (Eds), *Encyclopedia of Environmental Law*: *Energy Law and the Environment,* (Edward Elgar (forthcoming)).

[749] See, in parallel, the history of the Brent Spar Incident, on the decommissioning of the Brent Spar oil structure off the coast of the UK. V. Bakir, 'Policy Agenda Setting and Risk Communication - Greenpeace, Shell, and Issues of Trust', *Harvard International Journal of Press/Politics* [2006:3] pp. 67-88.

Finally, the norms of UNCLOS, removal of installations that are no longer in use, form a minimum requirement to which all UNCLOS signatories are bound.

5.3 Interim Conclusion

The main legislative issues identified earlier in chapters 2, 3 and 4 are subjected to the analytical framework constructed in this chapter. The outcome of this analysis is that there is no 'one size fits all' solution; the legal framework should consist of different legal instruments. The issues treated above all require different legal instruments, depending on (a) whether the existing law can be expanded or whether new instruments need to be created; and on (b) the importance of the different principles and criteria. The following table gives an overview of the outcomes for the different legal issues treated above.

Table 3: Preferred Legal Instrument per Issue

Issue	Preferred Instrument
Jurisdiction over hybrid/meshed infrastructure	Joint declaration on the interpretation of UNCLOS (international law; soft), possibly adopted as part of the mixed partial agreement
Governance offshore grid	Mixed partial agreement (international law; hard)
Operational rules	Network Codes (EU law; hard); adoption in mixed partial agreement in order to include UK part of the grid
Inconsistencies national law	Amendment of national law (national law; hard)
Market Access and Support schemes OWFs	Amendment of EU law (EU law; hard); amendment of national law (national law; hard) depending on decision on bidding zones
Decommissioning standards	Decision under IMO or OSPAR or other appropriate venue (international; soft)

Different decision-making approaches based on the theories set out in section 5.1 should be used to implement these instruments, based on the desired result (of an altogether new instrument or the amendment of existing law). The amendments of national law, prescribed for addressing support schemes and various inconsistencies in national law, will probably be based on an incremental approach, with a resemblance to the 'muddling through' style of decision-making. The adoption of a new agreement based on international law, on the other hand, can only succeed when there is a 'window of opportunity', or when the right combination of actors, problems and solutions is pulled out of the 'garbage can'. Repeated decision-making with developing insights in the consequences of the existing policy (for example with regard to siting OWFs and offshore grid components) could be based on adaptive governance. It is important to be aware of this when drafting the legal framework for the MOG, as the expectations of participants towards the decision-making process have to be clear in advance: for example, if participants expect a ‘muddling through’ decision-making process, they will not be open to radically new legal instruments. Vice versa, frustrations may arise when a muddling through approach is used whereas stakeholders expect the development of a new approach.

As visible in the table above, the legal framework for the offshore grid should be based on the adoption of a mixed partial agreement, a new instrument based on international law in which both EU Member States and third states, as well as the European Union itself, participate. This type of agreement already exists in various contexts, although it is not widely known. As this instrument will form the main backbone of the legal framework for the MOG, its form and contents are elaborated upon further in the next chapter.

Then, in Chapter 7, whereas this chapter has mainly focused on the form of the legal framework and the instruments that should be used, the substantive decisions to fill in the legal framework for the MOG are detailed.

6

CHAPTER 6

A Framework Treaty for North Sea Energy Infrastructure

6 A Framework Treaty for North Sea Energy Infrastructure

The previous chapter makes clear that it is beneficial from a socio-economic perspective to include the United Kingdom and Norway in the offshore grid, even if this means that the legislative framework will need to be adapted to include non-EU Member States. This makes it necessary to find an overarching legal framework that binds both the coastal states that are part of the EU and those that are not part of the EU. An international agreement must be sought.

As EU energy law plays a large role in the regulation of an offshore network, it is beneficial to include the EU in such an agreement as well.[750] The EU could also provide expertise, assistance and funds (through the Connecting Europe Facility for example) for constructing and governing an offshore electricity grid. In order to involve the EU, it is necessary to come to a so-called ‘mixed’ agreement, which binds both the EU and Member States. The next step is that it is not necessary to bind the EU Member States that are not geographically close to the North Sea region in this Agreement. The regulation of a North Sea offshore grid will not be a priority to these states and, therefore, it is not necessary to incorporate states in a legislative framework that is not relevant to them. The legal instrument that incorporates these three requirements is the so-called ‘mixed partial agreement’.

The instrument recommended in this part is the ‘mixed partial agreement’, an agreement under international law that also incorporates the EU as a member. This type of agreement can fulfil an essential function in the governance of an offshore grid as a backbone in which different rules and common goals between the states are adopted. However, the instrument is relatively unknown and can be designed in different ways. In this chapter, the legal basis behind mixed partial agreements is elaborated. Examples of this type of agreement in the environmental and economic context are added. Finally, the chapter zooms in on the sub-question ‘How could a mixed partial agreement serve as a framework treaty for the North Sea?’ Here, the chapter elaborates on what the contents and scope of such an agreement could be specifically for an offshore grid.

6.1 Legal Basis of Mixed Partial Agreements

Mixed Partial Agreements are agreements that are ‘mixed’ and ‘partial’. These terms stem from EU External Relations Law. In this context, ‘mixed’ means that the agreement is between Member States on the one hand and the EU on the other hand.[751] ‘Partial’ means that some of the EU Member States are signatories of the Agreement, but not all.[752] Equally, other (non-

[750] EU Membership of an agreement can also resolve issues when part of the envisaged content lies within the competence of the EU and part of it lies with the Member States. De Witte 2001, p. 241.
[751] P.J. Kuijper, J. Wouters, F. Hoffmeister, G. De Baere, T. Ramopoulos, *The Law of EU External Relations,* (Oxford University Press 2013) p. 405; p. 952-953. See also R.A. Wessel, J. Larik, *EU External Relations Law – Text, Cases and Materials* (Hart Publishing 2020).
[752] Partial agreements can be contrasted with ‘parallel agreements’ which are also concluded outside the EU-law framework but which bind all Member States. See De Witte 2001, p. 241.

EU) states can also participate in a 'mixed partial agreement'. One could wonder whether the agreement should really be mixed, as for some topics an agreement between only the EU and the third states would suffice, when the EU has made use of its (exclusive) competence to regulate a certain issue. However, in the case of the North Sea offshore grid, some issues fall in the sphere of competences of the EU (where the EU has made use of its shared competence, for example with regard to the regulation of cross-border electricity exchange) whereas other issues are under the competence of the individual states (such as the geographic and time-wise planning of the construction of offshore wind farms). Thus, in order to cover all issues that are relevant for the construction and operation of an offshore grid, it is important to include both the EU and the relevant Member-States.

Mixed partial agreements exist in various spheres, for example in the environmental protection of a specific geographical area (Rhine Convention; Alpine Convention), when part of the agreement is covered by EU-law and part of the agreement falls under national law (trade agreements), or when not all EU Member States are willing to cooperate in the agreement (Schengen agreement). These examples will be elaborated upon in the next paragraph, to provide context for when mixed partial agreements can be used.

It must be nuanced that mixed partial agreements cannot solve every problem, as they are also limited by the system of EU law. A clear theoretical limit to the treaty-making competences of the Member States and the EU is that due to the primacy of EU law, there should be substantive compatibility between a newly drafted partial agreement and the already existing body of EU law.[753] This is because, in general, international law on treaty interpretation dictates that in case of conflict between EU law and the partial agreement, the latter treaty prevails between states that are a member of both treaties.[754] This is an undesirable situation as the CJEU has always stressed the importance of uniformity of EU law and thus defended the absolute supremacy of EU law.[755] Therefore, different interpretation due to various partial agreements should be avoided. In the Schengen Convention (1990), this is solved by adding the following provisions:

> Article 134
>
> The provisions of this Convention shall apply only insofar as they are compatible with Community law.
>
> Article 142(1)
>
> (…) Provisions which are in breach of those agreed between the Member States of the European Communities shall in any case be adapted in any circumstances.

[753] De Witte 2001, p. 243.
[754] Vienna Convention on the Law of Treaties, art. 30.
[755] De Witte 2001, p. 244.

6

The tension between partial agreements and EU law is also shown by case law: in 2006, the European Court of Justice judged on the compatibility of a provision of the Schengen Convention with EU law, particularly free movement law.[756] Another question is what happens when there is a legal conflict over the convention between an EU Member State and a non-Member State. According to international law,[757] EU law is not supposed to affect the rights of third states. As long as there is close cooperation and coordination between the states involved in the agreement and the EU, this can be prevented. This is also the case in the examples of mixed partial agreements described below.

6.2 Examples of Mixed Partial Agreements in Practice

Mixed partial agreements exist in many forms and for many different topics. In this section, several examples of mixed partial agreements are brought forward. Elements from these examples can be used as a blueprint for a North Sea Agreement. In order to show that mixed partial agreements are used in different sectors, both examples from an environmental context and from an economic context are presented.

6.2.1 Mixed Partial Agreements in an Environmental Context

6.2.1.1 Alpine Convention

The Alpine Convention aims to protect the environment in the Alpine region.[758] As the Alpine region stretches over different country borders and the environmental issues existing in the Alpine region (pollution, changes in biodiversity, preservation of the landscape) do not stop at the country borders, an international approach was deemed necessary. The Convention has prevention, polluter pays and trans-border cooperation as its main principles. All countries in the Alpine region; France, Germany, Italy as well as third states Switzerland, Liechtenstein and Monaco, and Slovenia, which was not yet an EU Member State at the moment of signing and ratifying this Convention but who has joined the Union since then, are represented. Moreover, the European Economic Community, now the EU, is also a member to the Convention.

The legislative framework for sustainable development in the Alpine region exists of a framework convention (the Alpine Convention) and subsequent protocols and declarations. The aim of the convention is to protect and conserve the Alps, for example through pollution control, soil quality control, rational spatial planning, nature protection and specific policy for economic sectors in the Alps, such as farming, forestry, tourism and transport.[759]

In terms of governance, the Convention provides for a ‘Conference of the Contracting Parties’ (Alpine Conference), which meets regularly (every two years) in order to discuss common concerns between the Contracting parties, adopt amendments and protocols to the

[756] CJEU C-503/03 Commission v Spain ECLI:EU:C:2006:74, particularly paras 33–35. The conclusion was that conduct in compliance with the Schengen agreement was only admissible in as far as this was also in compliance with Community law.
[757] Vienna Convention on the Law of Treaties, art. 34.
[758] Convention on the Protection of the Alps (Alpine Convention), Salzburg, 7 November 1991 U.N.T.S. I-32724.
[759] Alpine Convention, art. 2.

Convention and to approve the creation of working groups.[760] Next to this, there is a standing committee, consisting of delegates of the contracting parties, which acts as an executive body.[761] This body has a large role in the preparation of the meetings of the Conference and in collecting and assessing all relevant documents and information with regard to the Convention. In practice, the standing committee also appoints working groups for specific purposes. It also proposes measures and recommendations for the objectives mentioned in the Convention and its protocols.[762]

6.2.1.2 Rhine Convention

The Rhine Convention is a convention between France, Germany, Luxembourg, the Netherlands, Switzerland and the European Union. It aims for sustainable development of the Rhine ecosystem, production of drinking water from the Rhine, improvement of sediments quality, flood protection and prevention, and the general restoration of the North Sea (in cooperation with other actions taken to protect it, such as the 'OSPAR Convention').[763] The Rhine Convention is oriented towards environmental issues that need to be regulated through an international agreement rather than only national law, as there is a cross-border impact of environmental issues, especially in a shared river basin. Other transnational issues with regard to the Rhine are regulated either through bilateral agreements,[764] or in the case of navigation and transportation, through another treaty.[765]

This Convention is an example of a mixed partial agreement with a specific geographical scope. Some of the signatories to the Rhine Convention are inside the EU, but Switzerland is not. Equally, several Member States that are linked to the Rhine Basin are not signatories to the Rhine Convention.[766] At the same time, the EU itself, originally its predecessor the European Community, is also part of the Convention.

The governance structure of the Rhine Convention is intergovernmental. In order to implement the Rhine convention, the International Commission for the Protection of the Rhine (ICPR) is founded.[767] It consists of a yearly 'plenary assembly' in which decisions are made. It is presided over by one of the Member States on a three-yearly rotating basis.[768] Technical issues are delegated to working groups. Their recommendations are passed on to the strategy group that prepares the Plenary Assembly. The working groups are supported

[760] Ibid., art. 5 and 6.
[761] Ibid., art. 8.
[762] Ibid.
[763] Convention on the Protection of the Rhine (hereinafter Rhine Convention), Bern, 12 April 1999, U.N.T.S. I-23469, art. 3.
[764] For example, the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN), Geneva, 26-5-2000, U.N.T.S. I-44730; Agreement on the social security of the Rhine boatmen (Accord rhénan), Geneva, 30-11-1979, U.N.T.S. I-25584.
[765] Convention for Rhine Navigation, Mannheim, 17 October 1868, revised on 20 November 1963.
[766] These are Austria, Belgium, Liechtenstein and Italy.
[767] Rhine Convention, art. 1(2), 6-11.
[768] https://www.iksr.org/en/international-cooperation/about-us/organisation/

again by expert groups.[769] Moreover, the working groups are prepared nationally by national committees.[770] The Conference of Rhine Ministers decides on important political issues, which are binding on a political level. The entire organisation is supported by a secretariat.[771]

There are several elements of this governance structure that are potentially interesting for the governance of an offshore grid. For the governance of an offshore grid, it is also important that there is a decision-making body in which the states can decide on specific issues regarding the offshore grid, such as directions for grid extension or guidelines on issues such as decommissioning. At the same time, there are also many technical issues, such as standardisation of technical requirements, which could be addressed by working groups and expert groups.

6.2.2 Mixed Partial Agreements in an Economic and Social Context

Mixed partial agreements do not only exist in the environmental context, they are also used for other issues, for example in the economic context, for topics on which Member States' opinions vary significantly. In this paragraph, the Schengen Agreement, as a mixed partial agreement from the beginning, and the Energy Charter Treaty, that started as a mixed agreement but that became a mixed partial agreement after the withdrawal of Italy, are analysed more closely.

6.2.2.1 Schengen Agreement

Signed in 1985, the Schengen Agreement allowed for the gradual abolition of border controls for the citizens of its Member States. As the Member States of the EEC at the time[772] could not agree on this issue, the agreement was designed as a separate agreement, originally signed between only five states.[773] In 1990, the Schengen Agreement was followed by the Schengen Convention,[774] which was aimed at implementing the Schengen Agreement. It proposed a common visa policy next to the abolition of internal border controls that was one of the original aims of the 1985 Schengen Agreement. The Agreement and Convention entered into force in 1995 for the five original Member States.

With the negotiations for the Amsterdam Treaty (1999), the Member States of the EC agreed to adopt the Schengen Acquis (consisting of the Agreement and the implementing Convention) in the EC *acquis,* although the United Kingdom and Ireland opted out of this. For

[769] Ibid.
[770] Ibid.
[771] Rhine Convention, art. 12.
[772] Belgium, Denmark, France, Luxembourg, Greece, Ireland, Italy, the Netherlands, West-Germany and the United Kingdom.
[773] Belgium, France, Luxembourg, the Netherlands and West-Germany.
[774] Convention implementing the Schengen Agreement of 14 June 1985 between the Governments of the States of the Benelux Economic Union, the Federal Republic of Germany and the French Republic on the gradual abolition of checks at their common borders, Schengen, 19-6-1990, U.N.T.S. A-52750.

the other Member States and for future Member States, the Schengen Acquis has to be implemented in national law.[775]

Several non-EU Member-States signed association agreements with the Schengen Member States to become part of the Schengen area, as associated states (not EU Member States): at the moment, this is the case for Norway, Iceland, Liechtenstein and Switzerland.[776] Moreover, the microstates Monaco, San Marino and Vatican City are *de facto* members of Schengen without an official agreement.[777]

The Schengen Acquis started as a 'partial agreement' with only half of the Member States of the EEC participating at first. Still, as explained above, not all EU Member States are Schengen states. It is technically not a 'mixed agreement' as the agreement has become part of the EU Acquis, not because the EU signed and ratified the agreement, but because it is directly adopted in the Acquis through an amendment of the founding treaties. In a mixed agreement, the EU signs and ratifies an agreement and thus becomes a member to the agreement as well. Nevertheless, the Schengen Acquis is an interesting example of regulation that is first adopted in a limited geographical area and then extended to a larger scale. This is relevant for the regulation of an offshore grid in the North Sea as well. The capacity to be extended over time could, for example, allow the Baltic states to enter the agreement in order to allow for a Baltic offshore grid as well.[778] The current Schengen construction works for non-EU Member States as well, although in practice, as the Schengen acquis is amended through EU legislative procedures, non-EU Member States officially cannot vote on changes to the legislation.

6.2.2.2 Energy Charter Treaty

The Energy Charter Treaty (ECT) is the only sector-specific, large-scale trade and investment agreement, which gives it a special place in international investment law. Also, it is the investment treaty with the largest geographical coverage. It was originally aimed at bringing together the Eurasian continent after the Cold War, and it was signed and ratified by all EU Member States, third states (mostly former Soviet states and Balkan states) and the European Communities (predecessor of the EU) as a non-state member.[779] This made the ECT a mixed agreement (not a partial agreement since all EU Member States signed and ratified it), until Italy withdrew from the ECT – making it a mixed partial agreement again

The ECT is included here because it is an example of how a mixed agreement in the energy sector can function. In essence, it covers investments associated with economic activity in the

[775] For Romania, Bulgaria, Croatia, and Cyprus, there are still concerns with regard to corruption or border issues. However, these states are expected to join the Schengen area as soon as these concerns have been adequately addressed.
[776] https://www.schengenvisainfo.com/schengen-visa-countries-list/
[777] Ibid.
[778] See below, chapter 6.3.1.
[779] A current overview of the signatories of the ECT is available at https://www.energycharter.org/process/energy-charter-treaty-1994/energy-charter-treaty/signatories-contracting-parties/

energy sector, including several energy materials and products.[780] However, it must be noted that the treaty is drafted for the specific purpose of facilitating investments in the energy sector, which is more limited than the type of agreement necessary for the MOG. The structure of the ECT is interesting compared to the environmental sector mixed partial agreements described above. In the environmental agreements only limited substantive law was adopted in the agreement, with a focus rather on general principles of environmental protection in the respective regions and on the governance structure created by the agreement. This is contrary to the ECT, which has as its main body the substantive rules on investment stimulation and protection, and only limited provisions with regard to the governance structure. Still, the governance structure itself is similar to that of the environmental agreements, with periodic meetings between the contracting parties ("the Energy Charter Conference"),[781] and a secretariat to support the daily governance of the treaty.[782] The ECT lacks a committee structure, which is present in the Alpine and Rhine Agreements. For a North Sea Agreement, a committee structure would be a valuable addition, as it allows the more technical subjects to be handled by specialised committees. The dispute resolution part of the ECT, however, is much more detailed than in the environmental agreements, both in the contents of the treaty,[783] and also in practice.[784] For the MOG, considering the large and long-term investments that need to be made, it is important that dispute resolution is adequately addressed. However, unlike the ECT, the main topic of an agreement concerning the MOG is not investment protection – therefore, it should not be expected that a dispute resolution clause in a North Sea Agreement will be used as much as the dispute resolution clauses of the ECT.

6.3 North Sea Agreement: Backbone for the Regulation of an Offshore Grid

As concluded in chapter 5, it is important for the development of a MOG that all states around the North Sea that plan to participate in a MOG share the same goals and principles with regard to the development of the MOG and that they commit to a certain structure in order to facilitate cooperation and compatibility of different parts of the MOG as well as to increase the legal certainty of investors in a MOG. To this end, it is proposed that a mixed partial agreement is developed. The scope, aim and suggested contents of such an agreement are detailed below.

6.3.1 Scope

In order to be effective, the geographical scope of the agreement should at least cover the EEZs of the coastal states participating in the North Sea offshore grid. However, next to limiting

[780] Energy Charter Secretariat, 'The Energy Charter Treaty: a Reader's Guide' (Energy Charter Secretariat, 2002) p. 20
[781] Energy Charter Treaty, Lisbon, 17-12-1994, U.N.T.S. I-36116, art. 34.
[782] Ibid., art. 35.
[783] Ibid., art. 26 and 27.
[784] Energy Charter Secretariat, 'Conflict Prevention and Dispute Resolution: Main Provisions and Instruments', (2016). See also C.G. Verburg, *Modernizing the Energy Charter Treaty,* dissertation 2019, chapter 5 for a large range of examples of disputes in the context of investment protection, Part III of the Energy Charter Treaty.

the scope to only the North Sea coastal states, the scope could also be designed in such a way that it is also possible to include other areas, such as the Baltic Sea or the Mediterranean.

On the one hand, it takes large efforts from the Member States of such an agreement to design and adopt a legislative framework for an offshore electricity grid. It would not be efficient if these efforts are doubled to adopt a similar agreement in which the same issues are addressed, for another sea. Instead, it is more efficient to draft the framework in such a way that, in the future, other states can join the framework when they are developing a meshed offshore grid.

On the other hand, it might take more time and it might make the agreement more complex if the possibility of future accessions to the treaty needs to be incorporated. If the extra time and complexity of adding extra states outweigh the benefits and the chances of these states actually acceding to the agreement, the scope should exclude these states.

This is different for the Baltic Sea than for the Mediterranean Sea. In the Baltic Sea, there is an overlap of states between the North Sea and the Baltic Sea, namely Germany, Denmark and Sweden. The sea is also relatively comparable from a geographical perspective: relatively shallow, with sandy or muddy seabed in which it is well possible to construct offshore windfarms.[785] In the Baltic Region, extra interconnection is also beneficial in the future.[786] As there is potential for large-scale OWF development and as there is a demand for extra interconnection, the construction of a MOG is also beneficial from a socio-economic perspective.[787] This is a strong argument for the inclusion of the Baltic Sea area in the envisaged agreement. Moreover, the Baltic Sea area is further advanced than the North Sea area in taking the first steps towards a MOG, as the only realised offshore grid project at this moment is the Kriegers Flak Combined Grid Solution, which is located in the Baltic Sea.[788] From a political perspective, it is relatively easy to reach agreement with the Baltic Sea states that are EU states, but it is expected to be more difficult to reach agreement with the Russian Federation.[789] In order to avoid any political sensitivity, it could also be envisaged that an offshore grid in the Baltic Sea is located in the Gulf of Bothnia (between Sweden and Finland) but not in the Gulf of Finland (leading to St. Petersburg).

The Mediterranean sea is a different story: there is much less offshore wind energy development due to different geographical circumstances,[790] there is less appetite for

[785] OSPAR Commission, 'Region II – Greater North Sea', available at https://www.ospar.org/convention/the-north-east-atlantic/ii; Encyclopaedia Britannica, 'North Sea', https://www.britannica.com/place/North-Sea.
[786] The construction of extra interconnection capacity is necessary in order for the Baltic states to adapt to the synchronous continental electricity system, which was decided in the context of the BEMIP project.
[787] Bergaentzlé et al, 2019.
[788] See Nieuwenhout 2018, p. 95-112, and section 3.5.2 above.
[789] This is expected on the basis of previous negotiations with the Russian Federation on previous large energy infrastructure projects such as North Stream II, which led to tensions between several of the Baltic Sea states.
[790] The sea is much deeper than the North Sea, and the seabed is rocky. This makes it more difficult and more expensive to construct fixed offshore wind turbines. There are some developments with regard to floating wind

cooperation in a meshed offshore grid with unstable states on the North African coast,[791] and the distances are much larger in the Mediterranean sea, which makes it more difficult to reach an economic business case.[792] Thus, if the scope should be larger than the North Sea, it is most logical to design the framework in such a way that Baltic States can enter the agreement, as the extra complexity and time for adjusting the agreement in such a way that the Baltic States can join is relatively limited. There is no need to expand the agreement to incorporate the Mediterranean Sea at this moment, as the chance that provisions on an offshore grid become relevant in the foreseeable future is small.

6.3.2 Aim

'Mixed partial agreement' is only the form of the agreement. What is even more important, is the aim, scope and contents of the agreement. The aim of a mixed partial agreement is to agree on the issues that cannot be addressed at a lower level, following section 5.3. For the meshed offshore grid, this would be to create a solid legal framework for the governance of a future offshore grid, to adopt a common interpretation of UNCLOS with regard to hybrid cables and to set common principles for how the grid should be governed. Moreover, this agreement can also include reference to which operational rules are used. Instead of adopting several different agreements for each of these issues, the issues could all be addressed in the same, comprehensive agreement.

The main aim of concluding an international agreement such as the agreement proposed here is to guarantee that it is possible for all North Sea coastal states to participate in the MOG, not only the EU Member-States. However, in the light of the political developments around Brexit, one can wonder whether the UK is willing to engage in an agreement of this kind, even if it is not based on EU law. This depends on many different factors, and it is impossible to give a definite answer to this question at the moment of writing this dissertation. However, there are several strong arguments that plead for participation of the UK in the agreement: from a cost-benefit perspective, it is favourable for the UK to participate in the offshore grid. This will give the UK the possibility to export large quantities of wind energy at the moments when this is plentily available, while also providing access to other sources of electricity, in other coastal states, when the amount of wind energy is low. This increases the security of supply and lowers the wholesale price of electricity. The chances of the UK being able to participate in the grid without participating in the legislative framework governing it, are slim as this would lead to massive legislative uncertainties. Another argument is that, although there have been

farms (Hywind Scotland, and several projects in France: https://www.offshorewind.biz/2019/02/25/eu-nods-to-four-french-floating-wind-farms/. In any case, in this region, onshore solar energy is more beneficial from a socio-economic perspective than offshore wind energy, as the levelized cost of energy (LCOE) are much lower for onshore solar energy than for offshore wind in this area.

[791] An example is the 'Desertec' proposal, which included large scale solar PV in North African states which would be transported to Europe. This proposal was initially welcomed as a promising new source of renewable energy, but received far less attention since various political occurrences in the North African states, notably since the Arab Spring.

[792] Longer distances require longer, more expensive cables, which influences the business case for meshed offshore grids in the Mediterranean Sea.

many political tensions over the past four years, the MOG is developed for a much longer time span, at least several decades. Therefore, decisions about cooperation should not be based on the political developments from month to month, but rather on what is best for society on a much longer time scale.[793] Finally, as many issues need to be renegotiated on the basis of other legal instruments now, the development of a mixed partial agreement for the purpose of the MOG may actually provide an opportunity for the UK to negotiate on which terms they would like participate in an offshore grid that connects their large installed capacity of offshore wind, and their onshore electricity grid, to the continental and Scandinavian electricity grids.

6.3.3 Contents

As mentioned above, the aim of the North Sea Agreement is to provide a stable legal framework for the construction of an offshore grid and the cooperation of the North Sea coastal states to this end. The contents of the agreement should support this aim. Translated into concrete topics, its contents should aspire to:

- Make clear what the aim and guiding principles of the MOG are
- Clarify interpretation of UNCLOS, and thereby prevent double jurisdiction and lack of jurisdiction for certain cable configurations
- Address governance of the offshore grid and create a governance structure, including
    - How should (long term) decisions regarding the grid be taken?
    - How should the grid be governed on a day-to-day basis?
    - Is there a need for a common ownership structure of the MOG? And if so, which party(ies) should own the offshore grid?
    - How is the grid regulated (in terms of grid access, financial (income) regulation? According to the same principles as codified in EU energy law, or with additional provisions?
    - Which entity is responsible for regulatory supervision?
    - How should operational (technical- and market-) rules concerning the grid be developed, adopted and enforced?

[793] An inspiring example in this regard is that engineers from France were already pleading for more cooperation and interconnection between European neighbouring countries in 1929 (Walser, Wagner (2009), p. 8). That, already before the second world war and before stable cooperation between neighbouring countries in the context of the European Union or its predecessors, it was proposed to construct a European 400 kV grid “to exchange electricity on a seasonal basis and for emergency assistance” shows that the development of grids should not be based on short-term political developments but rather on the long-term benefits for society.

- Conflict resolution: how should conflicts between different entities concerning the MOG be addressed?

The possible contents of a North Sea Agreement are elaborated further in chapter 7. In the appendices, a Model Agreement is added, based on chapters 6 and 7.

An important issue is to what extent the *acquis* of EU energy law is 'transplanted' into the agreement. It is not possible for EU Member States to conclude agreements that go against EU law, but at the same time, the agreement needs to provide sufficient space for the UK to be able to keep their own principles as well. It could be solved by making the MOG only subject to the Agreement and no longer to EU energy law, if it is considered a greenfield development that is clearly separate from the existing networks which are purely AC with some point-to-point HVDC interconnectors, but no meshed HVDC network. However, a practical problem is that not only EU energy law is applicable to the MOG, but also other types of law, such as spatial planning law and environmental law. Another solution is to adopt provisions in the agreement that are fully or at least to a large extent in line with EU law, while leaving some room for manoeuvre for the UK and Norway. The European Commission and possibly even the CJEU[794] will have to play a pivotal role in the negotiations if this option is chosen, by indicating to what extent provisions in the agreement are still in line with EU law.

The governance structure could follow the governance structure of the agreements mentioned above, namely the Rhine and Alpine Conventions. In those cases, the main issues are addressed high-level in a conference of parties, which convenes on a regular basis (for example biannually). As a starting point, such an agreement would have an intergovernmental character, which means that voting in this conference of parties would typically be on the basis of unanimity. However, the signatories to the agreement can decide on a different voting procedure, which could make it easier to adopt decisions, specifically concerning more technical issues, such as harmonisation or operational rules on the grid. These issues can be addressed in working groups attended by national experts, similar to the Alpine and Rhine Conventions.

In order to guarantee continuity of the cooperation and assistance to the committee structure, the founding of a secretariat through the agreement could also be considered. If the parties agree, it might be valuable to include a secretariat that will support the states in their cooperation and assist in increasing the continuity of the Agreement. This could be a newly founded secretariat, or alternatively, an existing body might serve as secretariat for the

[794] The CJEU can advise on the legality of agreements with third states regarding EU law, in a so-called 'Opinion', based on TFEU art. 218(11). This can be requested by a Member State, the European Parliament, the Council or the Commission. This happened in many instances, famous cases are Opinion 1/17, ECLI:EU:C:2019:341 (on CETA), Opinion 2/13, ECLI:EU:C:2014:2454 and 2/94 ECLI:EU:C:1996:140 (on the accession of the EU to the ECHR) and Opinion 1/91 ECLI:EU:C:1991:490 (on the creation of the EEA).

Agreement. This could be for example the Benelux Secretariat General, which has already served as a secretariat for the North Sea cooperation in NSCOGI and NSEC.[795]

6.4 Interim Conclusion

This chapter elaborates on the mixed partial agreement that is recommended to be used as a backbone of the legal framework for a MOG. The legal basis of a mixed partial agreement lies in the fact that for some issues EU Member States are not allowed to accede to international agreements – instead, this competence lies with the EU. Throughout the history of the EU and its predecessors, mixed partial agreements have been used for various topics. Four examples, both with an environmental and economic background, have been elaborated upon in this chapter. These examples show how mixed partial agreements can be used in practice.

The North Sea Agreement itself should incorporate the provisions that are necessary to create a governance structure for the MOG, following the structure of the agreements mentioned above, with a regular conference of the parties for the main decisions, as well as a commission structure and possibly a secretariat (or a standing committee) to take care of daily administration, preparation of meetings and continuity of the governance structure.

[795] See above, chapter 5.2.2.

PART III

Substantiating the Legal Framework: Proposals for Offshore Grid Regulation

Qualitative Analysis of Proposals for Offshore Grid Regulation

7

CHAPTER 7

Qualitative Analysis of Proposals for Offshore Grid Regulation

7 Qualitative Analysis of Proposals for Offshore Grid Regulation

7.1 Introduction

The substantive legal framework for the Meshed Offshore Grid (MOG) requires concrete, detailed proposals on many topics, such as the financial regulation of the assets, support for offshore wind connected to the MOG, regulatory supervision as well as decommissioning of OWFs and transmission infrastructure after their lifetime.[796] In chapters 5 and 6, the legislative instruments of which the legal framework should be comprised were set out. The next step is to "fill in" the legal framework with concrete, feasible and effective legislative measures on the topics identified in Part I.

The topics that are part of the legal and regulatory framework for the MOG can be addressed in different ways, as is made clear by the diversity of national legal and regulatory systems in chapter 4. The same goes for future policy choices for the MOG: there is more than one way to address the barriers identified in this dissertation. The way a topic is addressed may have significant consequences for how the MOG is developed and regulated. Specifically, there may be impacts on the cost-effectiveness of the MOG, the time required to implement the proposals in legislation, the acceptance of the MOG by different stakeholders and the risk assessment of the MOG made by investors. This requires a multidisciplinary approach that takes into account these different aspects. This chapter explores the different options to regulate the MOG and evaluates them against fixed criteria, which will bring together the economic, legal, socio-political and financial perspectives.

The chapter starts with a short explanation of the methodology and the selection criteria that are used to assess which options to regulate the MOG should be recommended. Then, for every topic that should be included in the regulatory framework of the MOG on the basis of Part I of this dissertation, different options are analysed on the basis of the selection criteria. The options that "score the highest"[797] compared to other solutions are recommended to be adopted in the legal framework for the MOG.

7.2 Methodology and Selection Criteria

7.2.1 Qualitative Informal CBA

In order to construct the regulatory framework that leads to the most cost-effective implementation of the offshore grid, an analysis is made of the different options. Each of the options is assessed on the basis of five criteria, reflecting the economic, legal, socio-political, financial and environmental perspective. The type of analysis is a qualitative analysis, since quantification is not possible for all parameters (legal and socio-political), and since the quantification of the economic and financial perspective depends on many variables, some of

[796] The topic of decommissioning of OWFs is relevant for a dissertation on the legal framework for an offshore grid as the offshore grid loses a significant part of its function when the OWFs connected to it are decommissioned. The question then arises to what extent the grid can remain in place after the decommissioning of the OWFs.

[797] Having the most positive and/or the least negative impact on the different aspects assessed in this chapter.

which are unknown or not public at the moment.[798] At this stage, a quantitative analysis of different legislative options would thus give a false sense of certainty.

Listing the advantages and disadvantages of different options on different aspects can be considered a form of CBA. However, it is debated whether CBAs can be used for government regulation.[799] The key seems to be that not all CBAs are the same, as a spectrum of different CBAs can be discerned, with on the one side 'traditional' formal CBAs which are highly technical and fully quantified, and on the other side the 'informal' CBA, in which advantages and disadvantages of different options are compared to each other.[800] An early example of the informal CBA is described by Benjamin Franklin in 1772:

> "[M]y way is to divide half a sheet of paper by a line into two columns; writing over the one Pro, and over the other Con. Then, during three or four days consideration, I put down under the different heads short hints of the different motives, that at different times occur to me, for or against the measure. When I have thus got them all together in one view, I endeavor to estimate their respective weights… And, though the weight of reasons cannot be taken with the precision of algebraic quantities, yet when each is thus considered, separately and comparatively, and the whole lies before me, I think I can judge better, and am less liable to take a rash step, and in fact I have found great advantage from this kind of equation, in what may be called moral or prudential algebra."[801]

From this quote, it becomes clear that although the outcome of this type of analysis does not have "the precision of algebraic quantities", it is still a valuable exercise to weigh different options against each other to come to a policy decision. The different types of CBA (the informal "Benjamin Franklin style" CBA and the more generally known formal economic CBA, and the spectre in between these extremes) have been explored further by Amy Sinden. She also assessed their use for different types of regulatory decisions. Sinden used different axis to assess which type of CBA fits with the available data and options. The three axis are (1) the availability of data and possibility to monetize the parameters, (2) the required level of precision and (3) the number of alternatives.[802] These three axis are interrelated, as a higher level of precision requires more monetization of the parameters, and the more alternatives

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798 For example, the costs of certain technologies, such as DC circuit breakers are currently still unknown, whereas they are necessary for the development of a MOG. Another factor is the grid development scenario – the costs and benefits of different offshore grid development scenarios vary, and it is not yet known which scenario will be developed in the end.

799 A. Sinden, 'Formality and Informality in Cost Benefit Analysis', *Utah Law Review* [2015 93] 95-171, p. 95. See also R.C. Zinke, 'Cost-Benefit Analysis and Administrative Legitimation', *Policy Studies Journal* [1987 16(1)], p. 63-88.

800 Sinden 2015, p. 96.

801 Quote from a letter from Benjamin Franklin to Joseph Priestley (Sept. 19, 1772), E.M. Gramlich, *A Guide to Benefit-Cost Analysis* (Prentice Hall, 1990, 2nd Ed.).

802 Sinden 2015, pp. 108-110.

are available, the more precision is needed to differentiate the alternatives from each other.[803] The relations between the different axis are made visible in the image below.

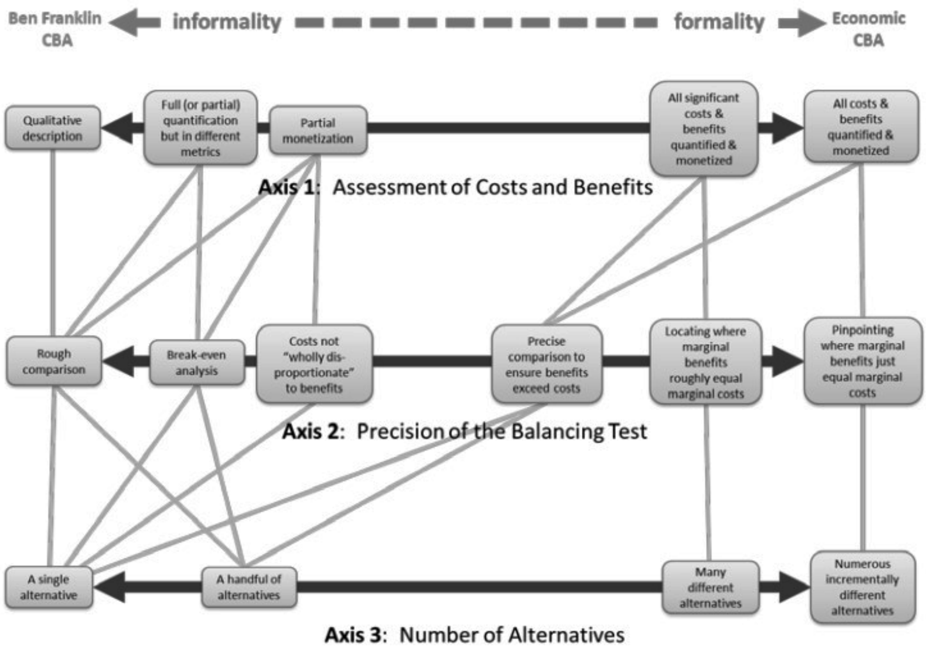

Image 6: Relations between the Different Axis. Source: A. Sinden.

In this chapter, the analysis of the different alternatives tends towards the left side of this image. For each topic, a handful of alternatives (bottom line, second left in the table) is available. A rough comparison (middle line, extreme left) is made of the advantages and disadvantages of the different alternatives. This is done on the basis of a qualitative description (top line, extreme left). Thus, the type of CBA used in this chapter can be characterised as 'Benjamin Franklin CBA'. Although the outcomes cannot be compared with algebraic precision, the alternatives can be weighed against each other with this method. A next step in (future) legal and regulatory research on this topic would be to perform an additional sensitivity analysis on the outcomes of the analysis by sending surveys to policy-makers and stakeholders, and to ask in such surveys whether they consider the weight of different interests as equal or whether they weigh the different interests differently.

7.2.2 Choice of Parameters

Whereas CBA analyses generally focus on economic aspects, the analysis in this chapter also includes the legal, socio-political, financial and environmental aspect. By focusing not only on

[803] Ibid., p. 111 and 117.

the cost-effectiveness of the solutions but also on the legal and political perspective, the analysis incorporates the likeliness of implementation of the different options. This reflects the theory of efficiency in institutional economics, developed by Williamson: he describes efficient as 'comparatively well-suited',[804] but he adds that a governance arrangement is only efficient if no superior *feasible* alternative can be described *and implemented*.[805] By including feasibility and implementation to the assessment in this chapter, ambitious reforms are weighed against a 'reality check' which filters out unrealistic options and thus leaves the options on the table that have a realistic chance of being implemented.

Thus, the legal and socio-political aspects are assessed to show whether options deviate significantly from the existing legal frameworks and/or whether they would lead to socio-political difficulties, which reduces the chances of the option being implemented in practice, reflecting the criterion of remediableness.

The financial aspect is added to the parameters to reflect the fact that the development of an offshore grid is very costly, and that without sufficient provision of capital, the MOG will not be developed. The financial aspect includes the ability to attract capital in different scenarios, which is based on the stability and predictability of a certain option compared to other options. Finally, the environmental aspect is added to reflect the local environmental impact of different grid options.

The criteria, method of assessment and sensitivity analysis are elaborated upon in the sub-sections below.

7.2.2.1 Economic perspective

The offshore grid will be costly to develop, as expensive technologies (such as HVDC cables, control systems and converter stations) will have to be implemented in rough conditions (the North Sea). However, the MOG will deliver societal benefits, as the development of offshore wind energy will be made possible and electricity trade between countries is facilitated.[806] Moreover, the MOG may deliver additional benefits compared to separate interconnectors, as it may facilitate connections between states which would not have been constructed if no OWFs had to be connected in that area. Vice versa, OWFs located further away from the coast may be connected more cost-effectively when the connection can also be used for interconnection.

The absolute costs and benefits of different alternative options are difficult to assess and subject to many variables,[807] but the relative costs and benefits of the different options can at

[804] O.E. Williamson, 'Public and Private Bureaucracies: A Transaction Cost Economics Perspective', *Journal of Law, Economics, & Organization* [1999, Vol. 15, No. 1] pp. 306-342.
[805] Ibid., p. 316. Italics are from the original text. Williamson calls this criterion 'remediableness'.
[806] J. Moore (TenneT), 'Deliverable 12.3 – Draft Deployment Plan' *PROMOTioN* (2020), chapter 2. See also 3E, DWG, DNV GL, ECN, CEPS, NorthSeaGrid Study, Final Report, 24-3-2015, p. 18 ff.
[807] 3E, DWG, DNV GL, ECN, CEPS, NorthSeaGrid Study, Final Report, 24-3-2015, p. 27 and further; and PROMOTioN CBA (forthcoming) have made an effort to assess the absolute costs and benefits of different grid configurations. It lies beyond the scope of this work to repeat this exercise.

least be estimated and weighed against each other. Thus, this parameter boils down to a relative, societal cost-benefit analysis. Options that have lower costs or higher benefits than the other options will score highest (++), whereas options with relatively high costs and/or low benefits score lowest (--), with (+), (0) and (-) as intermediate steps between these extremes. Costs taken into account are costs related to the grid itself (cable length, number of converters needed) but also transaction costs (e.g. administrative costs), and the use of scarce commodities (e.g. space). Benefits include the benefits from electricity trade as well as the increased security of supply and the reduction of CO_2 emissions.[808]

An important assumption regarding the economic perspective is that a coordinated grid development approach leads to fewer 'stranded assets', with cables to nowhere – which is a waste of resources and space. Therefore, options that lead to more coordinated grid development score higher than other options from an economic perspective. Options that entail a large administrative burden score lower than options with a light administrative burden. Finally, options that require more costs to implement score lower: for example, full removal of cable infrastructure at the end of their lifetime is more costly than partial removal, as it requires more dredging activity in potentially difficult circumstances.

7.2.2.2 Legal perspective

The proposed alternatives each have different relations to the existing legal framework. Some options fit very well in the existing legal framework, whereas for other options, a complete overhaul of the legal framework is needed. This affects the time and effort it costs to implement the proposal in legislation.

As long as legal certainty is problematic for hybrid projects and innovative grid connections, connections will be realised as business-as-usual radial connections.[809] As the offshore wind and grid sector keeps developing at a fast pace, there is no time to lose with regard to the development of a legal framework for the implementation of the offshore grid. Thus, options that are ready to implement within two years score higher from a legal perspective than options that take more than five years to implement. How long it takes exactly to implement a measure in the legal framework depends on two variables: first, it depends on the political willingness and urgency to adopt a measure. This is treated under the next parameter (socio-political perspective). Secondly, the implementation in the legal framework depends on how different it is from the existing legal framework. Alternatives that can be realized with no changes to the legal framework score very positively (++), options that can be implemented with minor changes to the existing legal framework score positively (+), options that require some changes score neutrally (0), and that require many changes score negatively (-). Options for which a complete overhaul of the legal system is necessary score very negatively (--).

[808] J. Gorenstein Dedecca, *Expansion Governance of the Integrated North Seas Offshore Grid* (Dissertation, TU Delft 2018) p. 16-17.
[809] See above, section 1.7.

The legal frameworks of the coastal states currently differ significantly.[810] Where a choice between different options that are currently being used is presented, the assessment favours options that are implemented in a larger number of countries above options that are implemented in a small number of countries, because the latter requires legislative changes in more countries than the former.

7.2.2.3 Socio-Political Perspective

If willingness to implement a certain option is missing, adoption and implementation of that option will take longer or might not happen at all.[811] Therefore, in order to allow for smooth implementation of the options in the legislative framework, it is important that they are acceptable from a socio-political perspective. The main actors analysed here are governments, as they will have to implement the options. Nevertheless, other stakeholders are also taken into account. This is because if an option is not acceptable for certain groups in society, protest and litigation will also make implementation more difficult. It is difficult to test the socio-political appetite for an option beforehand. To come as close as possible, this criterion is assessed based on stakeholders' earlier public statements concerning similar topics and on an assessment of the controversy of the option. Moreover, input from stakeholder feedback in the context of the PROMOTioN project is considered in this criterion.[812] The less controversy an option generates, the higher the option will score.

An important assumption in the socio-political perspective is that at the moment, the transfer of power from the state to a higher authority (such as the EU or a regional North Sea authority) is deemed to be more controversial (--) than keeping the power with the state (++). This is based on the premise that sovereign states prefer to keep the power to themselves.[813] A perspective supporting this assumption in the context of European (dis)integration is the post-functionalist theory that "mass politicization and the growth of identity politics are likely to create 'downward pressure on the level and scope of integration'."[814] From a more practical perspective, the willingness of the UK to participate in an option is an important component of the assessment on this theme. This means that options that rely on EU law or EU institutions score lower than other options.

7.2.2.4 Financial Perspective

Whereas the economic perspective focuses on overall costs and benefits, the financial perspective is narrower and only focuses on the probability of attracting (private) capital.

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[810] The legal frameworks of the coastal states and the differences between them are described in detail in chapter 4 of this dissertation.

[811] See chapter 5: one of the requirements of a 'window of opportunity' in decision-making theory is political willingness. Without this willingness, it is difficult to implement a new policy, even if there is a problem and a solution available to it.

[812] See Menze, Wagner (forthcoming).

[813] See e.g. S. Besson, 'Sovereignty, international law and democracy', *European Journal of International Law* [2011, 22(2)] pp. 373–387.

[814] L. Hooghe, G. Marks, 'A Postfunctionalist Theory of European Integration: From Permissive Consensus to Constraining Dissensus', *British Journal of Political Science* [2008 39] p. 22.

Currently, in the first instance, the costs for network expansion are often borne by TSOs, who gain their income via regulated tariffs.[815] The construction of a meshed offshore grid entails significant costs, which are generally financed partially through debt and partially through equity.[816] With the large investments needed, this will place a high burden on TSOs balance sheets, which may influence their credit rating significantly.[817] The provision of private capital will allow TSOs to share the financial burden and risk, which makes it easier to finance the significant investments needed for an offshore grid. Therefore, the financial criterion is whether the option will facilitate the provision of private capital, or rather make it more difficult. This is assessed by checking how much legal and financial certainty an option provides: the more legal and financial certainty, the less risk for investors and therefore the higher an option scores. Predictability of an option also increases the score of an option compared to other options. Thus, options that make investments more stable and predictable are scored with (++) whereas options that make investments in the grid less stable or predictable score negatively (--).

7.2.2.5 Environmental Perspective

The environmental perspective can be looked at from a broad or narrow (global or local) perspective. In this dissertation, the focus is on local environmental impact. Large scale (global) impact, such as the ability of large-scale deployment of offshore wind energy to reduce CO_2 emissions in the energy sector and thereby contribute to the fight against the harmful effects of climate change, is not considered in this assessment as the installed capacity of offshore wind energy is assumed to stay the same regardless of the chosen option.

Analysis on the environmental perspective is thus based on the local impact, measured by the amount of local disturbance and the loss or creation of habitats. Where no effect is expected, the option scores zero (0). Increasing the local biodiversity by increasing or protecting certain habitats is regarded as a positive effect (+). The disturbance of the seabed and sea area for the construction of OWFs and submarine cables is considered a negative effect (-). Options that reduce the area in which the local marine life is disturbed score higher than options that spread the disturbance over a large area. It must be noted that the analysis on this topic should be substantiated through further research on the (long term and cumulative) environmental impact of the different options.

[815] An exception is that some interconnectors are so-called exempted interconnectors, that receive their income from congestion rents rather than from regulated tariffs. This is possible for 'new interconnectors' via Regulation (EU) 2019/943, art. 63. For an assessment of the regulatory framework for exempted interconnectors, see A. Rubino, M. Cuomo, 'A regulatory assessment of the Electricity Merchant Transmission Investment in EU' *Energy Policy* [2015 85].

[816] In this paragraph, 'equity' is used in financial context (as opposed to philosophical context of equity vs. equality). Equity financing is financing of a certain business or activity through selling company stock or shares to investors. The relation between debt and equity, the debt/equity ratio, is an important metric in corporate financing, used to evaluate a company's financial leverage. A. Armeni, G. Gerdes, A. Wallasch, L. Rehfeldt, Deliverable 7.6 Financing framework for meshed offshore grid investments, PROMOTioN 2019, p. 48.

[817] Armeni et al. 2019, p. 44.

7.2.3 Status Quo Bias

In the analysis of both the legal perspective and the financial perspective, an inclination towards the status quo is visible. Options that deviate from the status quo will score lower in the legal perspective as it will take longer to implement than options that are closer to the status quo. From a financial perspective, changes to the status quo also score negatively. This is because investors favour legal certainty and changes to the status quo may decrease legal certainty.

This inclination towards the status quo is also visible in other social sciences, where it is called 'status-quo bias'. The theoretical background for this is based on psychology, political science and economics. In psychology, status quo bias is described by Samuelson and Zeckhauser, tested by giving people the choice between keeping something the way it was or changing it.[818] Although the term stems from psychology, it is also relevant in the context of the analysis for this chapter. The bias visible in this chapter could be caused by the psychological patterns described by Samuelson and Zeckhauser – after all, policy makers, lawyers and investors are not immune to psychological patterns. The status quo bias in decision-making can also be explained by incrementalism, as described in chapter 5,[819] or path dependence, which means that decisions made in the past limit the scope for future decision-making.[820]

7.2.4 Method of Assessment

The options are ranked based on a qualitative assessment. Per topic, the different options are presented in a table with the five criteria mentioned above. Every option is scored against the five criteria, with a (-) or (--) for negative impact, a (0) for neutral impact and a (+) or (++) for positive impact. The way this is assessed is described above.

The scores are compared and the option with the most positive scores and the fewest negative scores is recommended to be included in the legal framework of the MOG. The pluses and minuses cannot be added to each other directly, as this would depend on the relative weight of the different parameters. However, for many topics, it becomes clear that one option has significantly more positive aspects/fewer negative aspects than another. Thus, in the example table below, Option 3 will be recommended to be adopted in the legal framework. Option 1 also scores relatively well, which should be reflected in a sensitivity analysis (see below).

Table 4: Mock Topic

	Economic	***Legal***	***Socio-Political***	***Financial***	***Environmental***
Option 1	++	-	+	+	0
Option 2	--	+	0	+	-
Option 3	++	++	--	0	+

[818] W. Samuelson, R. Zeckhauser, 'Status Quo Bias in Decision Making', *Joumal of Risk and Uncertainty* [1988, 1], pp. 7-59.
[819] See chapter 5.1.1.
[820] See, e.g., P. Pierson, 'Increasing Returns, Path Dependence, and the Study of Politics', *The American Political Science Review* [2000, 94 (2)] pp. 251-267.

7.2.5 Sensitivity Analysis

The analysis in this chapter is based on a qualitative analysis of the positive and negative influences on the development of an offshore grid, from an economic, legal, socio-political, financial and environmental perspective. However, as the (offshore) electricity sector develops quickly, the assessment of the different perspectives on which the analysis is based, may also change over time. In order to add to the *robustness* of the results over a longer period, a sensitivity analysis adds insight in to what extent the results change when the assessment changes.

Therefore, throughout the chapter, for each topic a paragraph on the sensitivity of the recommendations is added. This is done by first assessing the difference between the recommended outcome and the other outcomes, and then by analysing how likely it is that the assumptions or analysis change. Additionally, a general analysis on the sensitivity of the parameters is provided below.

7.2.5.1 Economic Perspective

Offshore grids are in an innovative phase, with many technological developments, related for example to the switch from high voltage AC to HVDC, and the electrical infrastructure associated with this, such as converters and switchgear. The costs for HVDC technology are still high at the moment, but once the technology is deployed more often and the risks decrease, the costs are expected to go down as the risks decrease, when teething problems have been solved and the technology is proven in practice.[821] At the same time, the costs of other technologies (such as HVAC technology) may also change in the timeframe analysed in this dissertation, or new technologies for transmitting energy may be developed.

Next to the technology itself, the offshore grid development scenario considered most economically or technically advantageous may also be subject to change.[822] For example, a hub-based grid development requires less cable length than a decentralised meshed gid development. However, the assumption that options with a more coordinated approach avoid stranded assets more than less coordinated approaches, thereby limiting the risk of subobtimal grid configuration, is not likely to change.

Costs are not only influenced by the costs of the technology itself but also by risks and transaction costs. For the analysis in chapter 7, it is assumed that more regional cooperation and connections provides more benefits and leads to a lower cost per unit of electricity added, as the usage of the grid increases when the grid can also be used for electricity trade instead of only for the transmission of wind energy to the onshore electricity grid. Moreover, it is assumed that connections to the United Kingdom are beneficial due to the wholesale market

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[821] The costs (and benefits) of different development scenarios for the offshore grid are listed and compared in J. Moore (TenneT), 'Deliverable 12.3 – Draft Deployment Plan' *PROMOTioN* (2020), chapter 2.

[822] See section 1.7.4.

price difference and due to the system benefits for both sides. Nevertheless, the future cooperation of the nations around the North Sea may be difficult,[823] which may make cooperation costlier and transaction costs (e.g. negotiation and decision-making costs) higher. Thus, whether or not cooperation with the UK is beneficial depends on future relations between the UK and the EU, which are unclear at the moment.

7.2.5.2 Legal Perspective

The legal perspective reflects how radical the proposed changes are compared to the current legal framework. The more radical, the longer it is likely to take to implement. As the legal framework does not change often, this assessment is expected to stay more or less the same.

7.2.5.3 Socio-political Perspective

An unstable factor at the moment is the future relation between the UK and the EU. In the assumptions, it is expected that it is possible to reach a political agreement between the UK and the EU on North Sea MOG related issues. However, whether this is indeed possible remains uncertain. It depends on the political attitude and negotiation positions of the coastal states towards each other.

Another factor that is (inherently) difficult to assess, and that fluctuates over time, is political willingness of states to act together, in a regional context. The sentiments towards the EU provide a good example thereof: the development of the internal market with free movement of goods, services, persons and capital is deemed to have brought significant wealth to the Member-States of the EU.[824] Nevertheless, the case of Brexit, and the rise of anti-EU sentiments in the political discourse of many states in Europe,[825] show a decreasing willingness to cooperate on a regional level. This shows that the political willingness of states to act together is not only dependent on expected or material economic benefits, but also on other factors, that are difficult to predict.

7.2.5.4 Financial Perspective

The financial perspective reflects the amount of financial certainty and predictability an option provides to investors compared to other options. This is not expected to change within the coming years. Investors will appreciate certainty and predictability now and in the future. It is unlikely that this preference changes. The total amount of funding available for offshore grid investments may fluctuate, but the relative comparison of the options will remain the same. The assessment itself, as performed in chapter 7, is also not expected to change much, as it is a relatively clear-cut assessment as to whether the options deliver more or less financial certainty than other options.

[823] Due to the downwards pressure on integration, see Hooghe, Marks 2008.
[824] "The main idea is that such an internal market allows all the factors of production, labour, capital and enterprise, to move freely, generating maximum allocative efficiency and hence increasing overall wealth." A. Cuyvers, 'The EU Common Market', in E. Ugirashebuja, J.E. Ruhangisa, T. Ottervanger, A. Cuyvers (Eds.) *East African Community Law: Institutional, Substantive and Comparative EU Aspects* (Brill Nijhoff 2017), p. 294.
[825] Hooghe, Marks 2008.

7.2.5.5 *Environmental Perspective*

More research is needed on long term development of marine ecology with regard to the construction, operation and decommissioning of OWFs and offshore grid components. Further research would help to substantiate policy choices on the permitting requirements for OWFs and offshore grid assets, on maritime spatial planning considerations, and on the choices regarding the decommissioning of OWFs and grid infrastructure. The assessment on this issue may change when more insights in the long-term impact of the presence of submarine cables and of wind turbines and their foundations are available. As mentioned briefly already in section 5.1.1, the uncertainty concerning the long-term environmental impact and the complexity of the maritime ecology calls for 'adaptive governance', with which policy choices are regularly reiterated if new information becomes available.

7.3 Analysis of Substantive Proposals

In Part I of this dissertation, barriers to the construction of the offshore grid have been mentioned. They cover a variety of topics, which should be included in the legislative framework. This chapter, rather than only mentioning which topics should be covered, investigates what the possible options are to address the topics mentioned, and which options score highest from an economic, legal, socio-political, financial and environmental perspective. The topics addressed here follow the lifetime of the offshore grid, starting with governance and planning and continuing with project development issues, such as connection responsibilities, support schemes and regulatory supervision. After this, more practical issues are treated: offshore grid operation, dispute settlement and, finally, decommissioning.

7.3.1 Governance of the MOG

Governance can be defined as "the activity of governing a country or controlling a company or an organisation; the way in which a country is governed or a company or institution is controlled".[826] For the offshore grid, one possible definition, that can also be used for governance of the offshore grid is "the combination of heterarchical (non-hierarchical) and possibly hierarchical institutions (formal and informal) that guide decision-making in a networked multi-level, multi-actor system."[827] In this dissertation, the same definition of governance will be used, as the states around the North Sea can be considered heterarchical institutions (there is no hierarchy among states), while there is a hierarchy between the EU, coastal states and actors such as NRAs, TSOs and OWF developers.

Governance of the offshore grid encompasses how decisions concerning the grid and its utilisation are made, for example relating to grid expansion and investment, technology choices, strategic decisions on whether other coastal states can join, and any other unforeseen events that require decisions to be taken.

[826] Oxford Dictionary online, "governance".
[827] J. Gorenstein Dedecca derives this definition from M. Bevir, Governance as Theory, Practice, and Dilemma, in M.Bevir (ed.) *SAGE Handbook of Governance* (SAGE 2011). Gorenstein Dedecca 2018, p 23.

7.3.1.1 Decentral or central governance

Governance of the grid can be organized in different ways; either decentralised, i.e. bilaterally between bordering states, or centrally, by all connected states together. For the continental synchronised onshore electricity grid, there is no longer a choice: since the interconnected AC network reacts to any change in any part of the network,[828] a coordinated planning is strictly necessary. However, for the MOG, the electricity flows can be isolated from the onshore electricity flows and steered into a particular direction, which means that it is possible to develop a MOG in a decentralised manner, at least when certain standards (such as a standardised voltage level) are set.

In a decentralised governance system, there will be less unity, as states may have a different negotiation strategy with one neighbour than with another neighbour, leading to different agreements across the North Sea.[829] However, it may be more difficult to reach agreement when all states need to agree in a form of centralised governance.

From an economic perspective, the decentralised option leads to higher transaction costs, as more negotiations need to take place and project developers need to adjust to different sets of rules in the different countries. Moreover, it is more likely that economies of scale exist when governance is organised at a central level. Therefore, decentralised governance scores (--) and centralised governance scores (+). From a legal perspective, decentralised governance is the *status quo.*[830] Only minor changes to the legal framework will thus be needed (+). For a centralised governance system, a legal framework for this governance needs to be adopted, for example through the North Sea Agreement. This will take several years to develop and to adopt (-). From a socio-political perspective, centralised governance entails transferring some decision-making power from the national level to the regional (North Sea) level. In the current political climate, states seem to prefer keeping the decision-making power at national level rather than transferring it to a higher level (-).[831] A decentralised system will keep more of the decision-making power at national level (+). From a financial perspective, centralised governance will deliver less diversity of how offshore grid investments are handled and how investors are treated within the system, which is positive (+) as investors know better what to expect. For the decentralised system, the opposite is true (-). From an environmental perspective, the decentralised governance is not expected to alter the environmental impact compared to current practice. The centralised governance system scores positively (+) as a

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[828] A good example of the sensitivity of the synchronized continental electricity network is the effect of a conflict over electricity balancing between Kosovo and Serbia, which disturbed microwave clocks and alarm clocks throughout continental Europe, from Portugal to Poland. See BBC, 'Kosovo-Serbia row makes Europe clocks go slow', 7 March 2018.

[829] This is the practice for gas pipeline treaties in the North Sea, see section 2.4.4.

[830] States have bilateral negotiations and, if need be, bilateral agreements in case of joint or conflicting interests with regard to maritime affairs. There is a centralized framework that allows states, regulators and TSOs to discuss common developments via NSCOGI and NSEC, but this framework does not provide for any binding commitments. See section 5.2.2.

[831] As elaborated in section 7.2.2.3.

coherent centralised policy towards environmental protection in and between OWF zones is expected to have benefits for the protection of species and habitats.

Table 5: Decentralised or Centralised Governance

	Economic	***Legal***	***Socio-Political***	***Financial***	***Environmental***
Decentralised	--	+	+	-	0
Centralised	+	-	-	+	+

From the analysis above, there is a slight preference for centralised governance. This is mainly due to the economic perspective. When there is more political will for a centralised solution, the legal perspective will also score higher, as the time needed to reach agreement and to implement international agreements depends on the willingness to engage in these agreements, which depends more on socio-political factors than on legal factors.

The two options, 'decentralised' or 'centralised' lie very close to each other. If one parameter changes, this may change the recommendation – which makes this choice sensitive to any development in the assessment. The economic and socio-political perspectives are the parameters most prone to change: from an economic perspective, the more states participate in the grid, the more transaction costs can be expected in a decentralised system and the higher the benefits of centralised governance can be. With only a few states participating in the grid, the assessment will change. The socio-political perspective is prone to change due to the considerations elaborated upon in section 7.2.7.3: the willingness of states to act together or to act alone fluctuates, and the assessment on centralised decision-making may change depending on the political inclinations of the moment.

7.3.1.2 Proactive or retroactive decision-making

Another choice is whether to organise the governance of the MOG proactively or retroactively. This relates to the moment when decisions are made: should decisions be made only when problems arise and when project developers file a request for a new connection or project (a retroactive and passive approach), or should a governing body, to be created by the North Sea Agreement, be developing plans and actively steering for a certain direction, which is a proactive approach. Both approaches are currently used,[832] depending on the country and on the situation.

From an economic perspective, a proactive approach scores higher than a retroactive approach. This is because a proactive approach to governance will ensure early adaptation to changing economic or technological conditions, leading to fewer stranded assets, avoiding unnecessary costs, and facilitating a faster development of the grid. From a legal perspective,

[832] For example, Norway and Sweden have an approach that can be called reactive: their policy and permit granting process depends on OWF developers' initiatives. On the other hand, in the Netherlands, Germany and Denmark, proactive approaches to maritime spatial planning, permitting procedures and connection of offshore wind farms are used. See chapter 4 for more details.

both options score neutrally as for both, no laws will have to be adopted – it is rather a matter of implementation. From a socio-political perspective, it is generally preferred to govern proactively rather than waiting for problems to arise before solving them. From a financial perspective, a proactive approach gives more certainty to investors about future policy. This scores more positively than a reactive approach. No differences in environmental impact are expected from this choice.

Table 6: Proactive or Retroactive Decision-making

	Economic	***Legal***	***Socio-Political***	***Financial***	***Environmental***
Proactive	+	0	+	+	0
Retroactive	-	0	-	-	0

The assessment above shows a clear preference for a proactive approach, which fits well with the approach already used by ENTSO-E and the TSOs in the governance of the onshore grid. Still, some countries, such as Norway and Sweden, currently have a rather reactive approach to offshore wind and offshore grid developments. These are also the countries that barely have any offshore wind activities.[833] In further research, it could be analysed whether there is a causal relationship between the lack of activities and the reactive decision-making strategy, or vice versa, with the reactive decision-making causing a lack of interest of offshore wind energy developers. A negative spiral, with both affecting each other, is also possible.

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On almost all aspects, proactive decision-making scores higher than reactive decision-making. Even if the scoring changes on several aspects, the outcome will remain the same. Therefore, this recommendation is considered to be robust and not sensitive to developments in the parameters.

7.3.1.3 Decision-Making Process

Part of governance is the decision-making process itself. In a multi-level (EU, regional, Member States) and multi-stakeholder (TSOs, OWF developers, grid and OWF supply chain industry, other sea users) cooperation, it is important that decision-making processes are designed well, in order to run smoothly and to keep transaction costs for those participating in the MOG low. Otherwise, decision-making for the MOG may be paralysed by the number of different interests and difficulties with regard to political priorities that could change every few years.

In order to give the organisation around the MOG sufficient decision-making power, coastal states should agree on how they want to establish the decision-making process. There are many parameters for this topic, such as who prepares the agenda, how topics are prepared

[833] Norway and Sweden respectively have 2 and 192 MW of installed capacity. The other North Sea coastal states all have more than 1 GW installed capacity. WindEurope, 'Key Trends and Statistics 2018', (2019), p. 12. The other states generally have far more installed capacity, although France can be considered an outlier in this trend. The installed capacity of offshore wind in France is only 2 MW (trial project), although there is a proactive policy towards offshore wind. This can be explained by delays in implementation of the offshore wind projects that are in the pipeline.

for decision-making, which voting procedure is used, the level of the persons involved in decision-making, whether unanimity, qualified majority or simple majority is needed, and the frequency of meetings. Different decision-making processes could be used for different types of decisions, depending on whether they have a more technical or a more political character. This makes it difficult to compare the options in a table. Thus, rather than evaluating all options, only general suggestions are made here.

The decision-making process could be codified in the North Sea agreement that is proposed as a backbone for MOG governance.[834] Similar to other regional agreements with joint decision-making and with both EU Member States and third states (the Rhine Convention and the Alpine Convention),[835] a (bi)annual conference could serve to decide on important broad themes, such as the principles governing the grid, the general direction of the MOG development (centralised or decentralised) and final decisions on standardisation of technology. Technical (standardisation), economic (regulation) and environmental (decommissioning) topics can be addressed at lower levels through a committee or working group structure. The latter reflects the decision-making structure of the Rhine and Alpine Conventions.[836]

7.3.2 Spatial Planning of OWFs and Transmission Infrastructure

The MOG will be constructed in order to connect OWFs. The location and extension of the grid will thus depend on where the OWFs are located, which depends on many factors, such as wind resources, seabed structure and other uses of the sea. Industry stakeholders have indicated that they appreciate a coordinated plan for OWF rollout, with a steady stream of projects.[837] They have also described this as a 'backbone structure' providing them with information on what is going to be constructed, when and by whom.[838]

In this subchapter, coordinated planning, location and grid extension are treated together, as the location and timing of OWF projects will determine where and when the grid needs to be extended and with what capacity, and, *vice versa*, cable trajectories and grid extension in a certain area will also facilitate OWF construction in that area, as a connection is closer and the connection costs, whether borne by society or by the OWF developer, will be lower if the OWF is located where there is capacity on the grid to evacuate the offshore generated electricity. At the moment, each state has a different system for deciding on the location of the OWFs and on the cable trajectory for the grid connection.[839] For the governance of the MOG, it is relevant to make clear ***who decides*** where the OWFs and the cables are going to be located and how the grid is extended, and ***how these decisions are reached***.

[834] See section 6.3.
[835] See section 6.2.
[836] Ibid.
[837] WindEurope, 'Offshore Wind Energy in the North Sea, Industry Recommendations for the North Seas Energy Forum', 2017, p. 4.
[838] Armeni et al. 2019, chapter 2, based on stakeholder interviews.
[839] Nieuwenhout (2017), chapter 5. See also, P. Bhagwat (2019), p. 63 ff.

7.3.2.1 Country-specific or regional (North-Sea) approach

At the moment, coastal states have spatial planning laws for their own EEZ.[840] Some also have a specific development plan which indicates which OWF zones will be connected in which year.[841] Rather than nationally-oriented grid development plans, it is also possible to draft regional grid development plans that encompasses the entire North Sea MOG area. There is a relation between this topic and the topic of centralised or decentralised governance, but governance is much broader in scope than spatial planning. Therefore, regardless of whether governance in general is organised centrally or is decentralised, a decision should be made on the extent to which spatial planning and grid extension are coordinated.

There is already an example of regional planning of electricity infrastructure, namely the 'Ten Year Network Development Plan' (TYNDP) process.[842] For the planning of the meshed offshore grid, the TYNDP process will probably form an integral part of the grid planning process. To this end, the time horizon of the TYNDP, which is originally ten years but is in practice already longer (to 2040 in the 2018 version),[843] should be kept sufficiently long term. Moreover, the forecasts on when and where OWFs will be constructed could be elaborated further by coordinating the location- and time-wise planning of OWFs between different states, in order to keep a steady pipeline of projects for the offshore wind manufacturing and installation industry. The question is, however, whether the United Kingdom would participate in the TYNDP process when they are no longer part of the EU (and possibly also no longer part of ENTSO-E) and when there is no technical necessity to cooperate as they are not in a synchronous AC grid with other European states.

From the economic perspective, the major difference between the two options is the way the scarce space available at the North Sea is most efficiently used. By grouping OWFs in certain wind-resource rich areas, the MOG can also be developed in the most cost-effective way as less cable length is needed when OWFs are located close to each other. In several countries, this is currently done at a national level, but it could be more efficient if coordinated at European level (++), as that allows for placing the OWFs in the areas with the most advantageous wind resources and the lowest interference with the environment.[844] When spatial planning is organised solely at national level, OWFs may be located much further from

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[840] See section 4.1.

[841] This is the case for example in Germany (BSH, 'Flächenentwicklungsplan 2019 für die deutsche Nord- und Ostsee'), and the Netherlands (Ministerie van Economische Zaken en Klimaat, Directoraat-generaal Klimaat en Energie, 'Ontwikkelkader windenergie op zee', actualisatie sept. 2018.

[842] The TYNDP is a pan-European network development plan updated every two years. It is drafted by ENTSO-E on the basis of the submissions of the TSOs. It analyses the planned projects and matches this with the scenarios on the development of electricity demand and supply, and makes visible where network congestion exists or may arise. The TYNDP and its drafting process is based on Directive (EU) 2019/944 on common rules for the internal market for electricity, OJ L 158, 14.6.2019, art. 51. Although it is based on EU legislation, its impact is larger than only the EU, as it also incorporates all non-EU Member States that are part of the synchronous continental grid in Europe.

[843] ENTSO-E, 'Connecting Europe: Electricity 2025 - 2030 – 2040, Executive Summary', (2019 Final version after consultation and ACER opinion), p. 40.

[844] This works best in combination with a joint support scheme, as described in section 4.4.4.

each other and less optimally organised, i.e. not in the areas with the highest amount of wind energy or the most favorable location criteria. This scores negatively (--) as it entails much higher costs for the MOG, since more cable length is required and more space is used.

From a legal perspective, the speed of implementation will be lower if regional decision-making is used (-), as this is more complex and further away from the status quo than country-specific decision-making, meaning that it will need more time to be implemented. From a socio-political perspective, if multiple actors are involved in a bottom-up process of planning the usage of the sea, the socio-political acceptability will be higher but the more actors involved, the longer it may take to reach consensus. Governments as a central authority is neutral (0) – it is the status quo in many countries, so it does not need much implementation, but on the other hand, every tender needs to be prepared, which requires organisational capacity from governments. Regional decision-making scores slightly negatively (-) as it entails a transfer of authority from national states to a higher level, which some states do not deem acceptable. From a financial perspective, there are no differences when a different scope is used, as long as there is a predictable pipeline of projects and sufficient OWFs to connect. From an environmental perspective, a regional (North Sea) perspective would allow states to cooperate together to avoid sensitive areas (+), which is not always happening with a country-specific approach (0). An example of this is the Dogger Bank: whereas the German authorities regard the Dogger Bank area as a no-go zone for OWFs (as a Special Area of Conservation),[845] the UK Crown Estate has licensed several gigawatts of OWF capacity in the UK part of the Dogger Bank area.[846] Meanwhile, the Dutch and Danish TSOs are contemplating constructing an artificial island in this area.[847] This example shows that the same sensitive area can be treated very differently with regard to offshore wind and offshore grid developments. In a coherent environmental policy, the same ecologically valuable area should be treated similarly on different sides of a maritime border, regardless of these borders.

Table 7: Spatial Planning: Scope

	Economic	***Legal***	***Socio-Political***	***Financial***	***Environmental***
Country-specific	--	+	0	0	0
Regional (North Sea)	++	-	-	0	+

From the analysis above, the regional (North Sea) approach seems to deliver the most economic benefits, which compensates for the longer time needed to implement regional spatial planning. Also, the economic benefits may convince those who have political

[845] Bundesamt für Naturschutz: https://www.bfn.de/en/activities/marine-nature-conservation/national-marine-protected-areas/north-sea-eez/dogger-bank-sac.html.
[846] The consortium behind the licenses is Forewind: http://forewind.co.uk/dogger-bank/overview.html. Recently, contracts for difference have been allocated to these OWFs: Contracts for Difference Allocation Round 3 Results – Published by BEIS on 20 September 2019, Revised on 11 October 2019.
[847] North Sea Wind Power Hub, https://northseawindpowerhub.eu/project/. See also: Renée Postma, 'Stroomfabriek Doggersbank', *NRC* (Dutch newspaper), 11-6-2016.

difficulties with giving power to a higher authority, in order to organise regional spatial planning for OWFs and for the MOG.

The difference between national and regional planning is small. It depends mainly on the estimate of the economic perspective; if this is changed, country-specific planning may be preferable above regional planning, as country-specific planning is faster and has lower transaction costs. Whether national or regional planning is recommendable also depends on the preferred grid development scenario as well: if the grid is based on a few large hubs that are connected to each other, country-specific planning will be more feasible, whereas if a decentralised meshed approach is chosen, regional planning is more important. Thus, this recommendation is sensitive to changes in the assessment, which might happen specifically in the economic perspective.

7.3.2.2 Permitting System: Centralised, Zonal or Open-door

There is a strong link between spatial planning considerations and the choice for organising the permitting system for offshore wind farms as a centralised system, with predetermined locations, or as an open-door system in which the developer decides freely on the location (within the boundaries of the law). A middle way, with predetermined wind farm zones in which developers can then choose their preferred location also exists. An open-door regime exists in Norway and Sweden.[848] Germany, the Netherlands and Denmark have a centralised approach and the UK seeks the middle way with a zonal approach.[849] The centralised approach allows preparation of tenders for OWFs and anticipatory investments in the MOG, as it is known at an early stage where OWF development will take place. On the other hand, open-door and zonal approaches give more liberty to the project developers, to decide where they want to construct an OWF. This allows them to optimise the location of their OWF.

From an economic perspective, advantageous areas in the North Sea, with good wind resources and not reserved for other, overriding interests, are scarce. Therefore, the most efficient spatial planning scores the highest. A centralised approach in which specific areas are dedicated to OWFs gives most certainty that the available space is used in the most efficient way. An additional benefit for the centralised approach is that authorities can prepare the OWF area in terms of seabed surveys and EIA, as is happening in the Netherlands (+).[850] A zonal approach is in the middle (0) and for an open-door regime, efficient use of the available space is not guaranteed (-).

From a legal perspective, there is no large difference between the options (0). The countries are currently divided over the three options, which means that for each option, some countries will have to change their legal system.

[848] See section 4.2.1.
[849] Ibid.
[850] See section 4.2.3.

The socio-political acceptability is high (+) when governments are in charge, at least, if they also involve stakeholders in their decision-making processes. Letting OWF developers decide, in an open-door regime, scores negatively (-), as it will be more difficult to find a compromise with the other users of the sea if the scarce space is not used in the most efficient way. The zonal approach also allows for efficient spatial planning, although slightly less than with the centralized approach (+). On the other hand, the zonal approach does allow for a little leeway for developers in choosing their location.

From a financial perspective, it is important for investors that there are sufficient users of the MOG, which means that investors in the grid have the opportunity to recoup their investments. If developers decide the location of the OWFs, in an open-door regime, it is less certain that there are sufficient users of the connecting grid infrastructure (-) than if this is decided through a centralised approach (+), which is more likely to ensure a steady roll-out of OWF projects to be connected to the MOG, in locations that are strategically close to each other, making the grid connection costs lower. Having a coordinated regional plan creates more certainty and long-term foresight into the project pipeline, for both developers and financiers.

From an environmental perspective, a centralised or zonal approach gives power to the authorities to decide where OWFs will be located. If the planning authorities take into account environmentally sensitive areas, which they are required to do under EU environmental law and international law,[851] this scores positively (+). Vice versa, when developers are free to decide where to locate their OWFs, it is less certain that environmental impact is taken into account in the location choice.

Table 8: Permitting Approach for OWFs

	Economic	***Legal***	***Socio-Political***	***Financial***	***Environmental***
Centralised approach	+	0	+	+	+
Zonal approach	0	0	+	+	+
Open-door regime	-	0	-	-	-

On the basis of the analysis above, the centralised option is the recommend option. This option leads to the largest economic benefits as it leads to the most efficient utilisation of the space available in the North Sea. This is under the condition that maritime spatial planning is well developed, that other stakeholders are also consulted and that states choose OWF locations on the basis of an evaluation of relevant criteria such as water depth, seabed surveys

[851] See sections 3.4.4.2 and 3.4.4.3 on EU environmental law, the obligations under international law are based on the OSPAR Convention, see section 2.2.3. It must be noted that the coastal states have a different interpretation of this in practice.

and wind resources. The experiences in the Netherlands and Denmark prove that states are able to do this.[852]

The zonal approach received only a slightly lower score than the centralised approach. Thus, choosing an approach in which the potential locations are more or less clear (zonal and central approach) compared to the open-door approach is insensitive to future developments in the economic or socio-political perspective. The choice between centralised and zonal is sensitive to any changes in assessment of the parameters. In fact, the difference between centralised and zonal can be seen as a sliding scale, from larger to smaller areas in which OWFs are planned.

7.3.2.3 Multiple-use of OWF areas

At the moment, the status quo is that many coastal states have a 500 metre safety zone around OWFs (and cable trajectories),[853] which means that it is not permitted to sail through an OWF area, or to fish in that area. This is the case for example in Belgium, the Netherlands and Germany, although exceptions may occur, for example with regard to small vessels (shorter than 24 metres).[854] An exception is the United Kingdom, where OWF safety zones are much more limited and where, consequentially, fishing is allowed inside OWFs.[855] Another exception is Denmark, where no mandatory safety zones exist during the operational phase of OWFs. Although the rules are less stringent in Denmark and the UK, the rules in the other coastal states imply a loss of fishing grounds for commercial fisheries,[856] an important group of stakeholders regarding the development of different activities at sea.[857] With a scarcity of space at sea, it is important to assess to what extent multiple use of OWF areas can be allowed. OWF areas could be used for example for aquaculture, fishing with certain technologies and shipping for smaller vessels, especially if the turbines are sufficiently far away from each other.

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[852] See section 4.2.3.

[853] For cable trajectories, the safety zone entails that sailing across the cable is allowed but that anchoring and fishing with gear that disturbs the sea bottom is not allowed.

[854] See for Belgium: F. Maes, 'Hernieuwbare Energie en Scheepvaart' in A. Cliquet, F. Maes (Eds.), *Recht door Zee, Hedendaags Internationaal Maritiem en Zeerecht* (Maklu, 2015) p. 70-71. For the Netherlands, an experiment allowing small vessels (until 24 metres) to sail through certain OWFs, at day time and while respecting a number of safety rules, is currently running: https://www.noordzeeloket.nl/functies-gebruik/windenergie-zee/doorvaart-medegebruik/. Fishing (except with a fishing rod) is still not allowed. In Germany, the rules differ per OWF, but in some OWFs, sailing through an OWF safety zone is permitted under certain circumstances. The exceptions are listed in documents called *Allgemeinverfügung,* published by Wasser und Schifffahrtsverwaltung des Bundes (WSV). See for example: WSV, Allgemeinverfügung 7 June 2016 concerning the OWF 'Dan Tysk', available at: https://www.elwis.de/DE/Seeschifffahrt/Offshore-Windparks/Dan-Tysk.pdf?__blob=publicationFile&v=3. Here, also, except for rods, usage of fishing gear is not allowed.

[855] See D. Davies, 'FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison', p. 34 for an overview of when and where safety zones are allowed.

[856] V. Stelzenmüller et al.,'Co-location of passive gear fisheries in offshore wind farms in the German EEZ of the North Sea: A first socio-economic scoping', *Journal of Environmental Management,* [2016 183], 794-805, p. 797-798. See also K. Bolongaro, 'Fishermen and wind farms struggle to share the sea', *Politico* 29-12-2017.

[857] T. Gray, C. Haggett, D. Bell, 'Offshore wind farms and commercial fisheries in the UK: A study in Stakeholder Consultation', *Ethics Place and Environment* [2005 8:2] 127-140, p. 129.

It is also possible to dedicate the space between wind turbines for nature protection.[858] In the future, more usage possibilities could be envisaged and developed.

Whether or not a certain activity is compatible with the OWF and offshore grid development in a certain region depends on many factors, such as the space requirements of the activity, support for innovation, business case, whether or not there is a chance of damage of the turbines or the grid components and the willingness to use the space between turbines. Rather than assessing all possible usages for the space between wind turbines there are at the moment, it is sufficient to generally assess whether multiple use in general should be allowed or not. Whether a specific project should be allowed can then be assessed on a case-by-case basis.

From an economic perspective, space is a scarce commodity. When many OWFs are installed in the North Sea, a significant amount of space is lost to other activities, such as fisheries, aquaculture, tourism and shipping. From an economic perspective, using the space between OWFs for other activities increases the economic profit of that area compared to the status quo, where no other vessels (except maintenance vessels) are allowed inside an OWF. Although there may be extra costs to make the area ready for multiple use, for example by placing extra markings (buoys) inside an OWF rather than only around the OWF, these costs are relatively small compared to the benefits which may be gained from other activities, such as aquaculture (+). However, it must be noted that the balance between the costs and the benefits differs per activity. From a legal perspective, some laws will have to be amended in order to allow multiple use, which will take some time.[859] From a socio-political perspective, more groups of stakeholders can be served if the space between wind turbines is used for other purposes. Therefore, making it possible for other stakeholders to access this space for other activities scores positively. Retaining current restrictions scores neutrally. From a financial perspective, multiple use of the area adds complexity and entails more risks, for example risks to damage cables and installations, which may increase the cost of capital as the perceived risks are greater. Therefore, allowing other activities in OWF areas scores negatively (-).

From an environmental perspective, not allowing any other activity inside an OWF creates 'safe havens' for maritime ecology with positive effects partially from the absence of fisheries or other human activities in the area.[860] The absence of fisheries is not only expected to have a positive effect on the targeted fish species, but also on other parts of the ecosystem, such as harbour porpoises and grey seals. Therefore, allowing fisheries inside OWF areas has a

[858] The project "De Rijke Noordzee" is currently experimenting with nature conservation between wind turbine foundations in OWF Luchterduinen. Information is available at www.derijkenoordzee.nl.

[859] The Dutch Noordzeeoverleg (North Sea Dialogue) is an example of a holistic spatial planning approach for the entire Dutch part of the North Sea. In the process, many stakeholders are included. This is supposed to lead to a Dutch North Sea Agreement in which the government and different stakeholders state their commitments and agreements with regard to developments in the North Sea.

[860] H.J. Lindeboom et al., 'Short-term ecological effects of an offshore wind farm in the Dutch coastal zone; a compilation' *Environmental Research Letters* [2011 6] 035101, p. 8.

strongly negative environmental impact (--), whereas keeping OWFs free from fisheries has a strongly positive impact (++). It must be noted that other human activities, such as sailing through a specified corridor inside an OWF or exemptions for small vessels that are not fishing vessels will have less environmental impact. This could be taken into account in policy on this topic, for example through case-by-case exceptions for activities with relatively small environmental impact.

Table 9: Multiple Use of OWF Areas

	Economic	***Legal***	***Socio-Political***	***Financial***	***Environmental***
Allowed	+	-	+	-	--
Not allowed	-	+	0	0	++

The difference between the two options is small, in favour of not allowing multiple use. However, it can be adapted by only allowing activities from which no negative environmental impact is expected (such as the exception for small, non-fishing vessels described above).

7.3.3 Connection Responsibility

At the moment, in different countries, different parties have the responsibility for connecting OWFs to the onshore grid. These can be the onshore TSO, the OWF developer or a third party, such as an OFTO. For the MOG, the first question is whether the same party across the region is responsible for connecting OWFs. The second question, if the first question is answered affirmatively, is which entity should connect the OWFs. In some coastal states, the connection responsibility is coupled to the discussion of grid ownership: the entity responsible for connecting the OWFs is also the grid owner and operator (as explained in section 4.3, this is the case for example in the Netherlands and Germany). However, it is not necessary that the connection responsibility, the ownership of the grid and the operation of the grid are in the same hands. For example, after construction of an OWF connection, the asset can be transferred to another party. Moreover, it is also possible to split ownership of the grid and operation of the grid. In this section,

Regarding the first question, whether grid ownership and connection responsibilities need to be harmonised across the region, having the same (type of) entity responsible for the grid and the connection of OWFs facilitates cooperation. When a regulated entity, such as a TSO, and a commercial entity, such as the OWF developer, have to agree on investments, they may have very different interests: maximising their revenues on a relatively short timeframe vs. cost-effective development of a reliable electricity network over a much longer timeframe. Also, the coherence of grid operation and planning becomes more difficult when more (different) entities with different interests have to be involved. This becomes clear for example when anticipatory investments have to be made in a first connection in order to facilitate the connection of a second OWF several years later. The willingness to make this type of investment may be different for different entities.

From an operational perspective, there is no need to harmonise the grid connection responsibility of all OWFs. Instead, it suffices to harmonise the technical standards, in order to ensure operational safety and compatibility between different parts of the grid.

Regarding the second question, which entity should be responsible for the connection of OWFs, is subject to debate. At the moment, three systems exist in parallel. In most countries, the (onshore) TSO has the responsibility to connect OWFs to the onshore grid or to an offshore grid.[861] In others, the OWF itself is responsible for the connection to the onshore grid – in other words, the grid connection takes place on land and the infrastructure upstream of this connection is owned and operated by the OWF owner. A third option is the OFTO-model, in which private investors own and operate the cable between the OWF and the onshore grid (although the cable connection is usually first constructed by the OWF developer and only transferred to the OFTO before commissioning of the OWF).[862]

From an economic perspective, the first option, connection by TSOs, has the advantage that TSOs have a long-term perspective on grid development.[863] This makes it easier to facilitate anticipatory investments and to facilitate a cost-effective development of the MOG on the long term (++). Also, research has shown that TSO-based OWF connections are currently more cost-effective than the alternatives.[864] On the other hand, earlier research has shown the third-party (OFTO) system to be most cost-effective for the connection of OWFs, even when one accounts for the higher transaction costs needed for the tender process to decide which party receives the right to own and operate the connection.[865] However, the latter does not take into account the possibility of clustering OWFs and connecting them to an offshore grid, which requires long-term coordination of investments. The developer-based system does not support anticipatory investments unless the OWF developer is also the developer of the OWFs further away or the entire hybrid asset. With a more complex grid, this is more difficult, as it may not yet be known who will be the developer of the OWFs further away, or the connection may be to another part of an existing grid with existing OWFs owned by other companies. This leads to suboptimal development of the MOG. Therefore, the TSO-based system will lead to more benefits in the long term than the third party-based system (+). Moreover, from the viewpoint of market power, especially taking into account the essential facilities doctrine,[866] it is not advantageous to let the OWF owners, which have specific interests in production facilities, operate the connection (--).

From the legal perspective, the TSO-based and developer-based systems are the least difficult to implement. With a third party based system, a more complex legal system needs to be in

[861] See section 4.3.1.
[862] Ibid.
[863] Directive 2019/944 on common rules for the internal market for electricity, art. 2(35): Definition TSO:, (…) ensuring the long-term ability of the system to meet reasonable demands for the transmission of electricity.
[864] https://www.tennet.eu/fileadmin/user_upload/Company/News/Dutch/2019/20190624_DNV_GL_Comparison_Offshore_Transmission_update_French_projects.pdf.
[865] CEPA, 'Evaluation of OFTO Tender round 2 and 3 Benefits' (Ofgem, 2016) p. 43.
[866] See footnote 440 above for an explanation of the essential facilities doctrine.

place – as there are more interfaces where the parties need to cooperate (OWF – third party; third party – TSO; third party – another third party), which means that the legal framework should provide for these interactions and describe what norms the different parties have to abide to.

From the socio-political perspective, the TSO-based system has a slight preference in many coastal states. In part, this is because the TSO is in public hands in several coastal states, which is sometimes even a legislative norm in these countries.[867] This gives states the possibility to influence the way the grid is constructed and governed. If the TSO is not in public hands, the influence in the way the grid is constructed and governed has to take place via the regulatory authority, but this influence is less strong than the direct influence of the state as stakeholder. As the reliance of the onshore grid on the offshore grid becomes larger, this preference will also become larger. Both the developer-based system and the third party-based system entail a departure from publicly owned and governed grids, which is the status quo in, for example, Denmark and the Netherlands. In the UK, the system is the reverse. There, a strong preference for having OWF grid connections in private hands is visible. The onshore TSO (national grid) is also not in public hands in the UK as shares in the company are available on the stock exchange.[868] Germany has opted for a middle way: out of the four TSOs, two are owned by the parent companies of the Dutch and Belgian TSOs (respectively TenneT and 50Hertz (80%, the other 20% being owned by German development bank KfW). TransNetBW is owned by the state of Baden-Württemberg and Amprion is in private hands, with its shares divided between institutional investors (74.9%) and RWE AG (25.1%).

From a financial perspective, the third party-based system has as an advantage in that it facilitates financing from the private sector (++). This is important as the construction of a MOG creates a large financial burden that will probably be difficult to bear by TSOs (-).[869] The developer-based system also allows for access of private capital to grid investments, more than the TSO-based system. However, this is limited to the OWF developers, which makes the score lower than the third party-based system (+), in which any investor with a long-term perspective could participate. No differences in environmental impact between these approaches are expected.

Table 10: Connection of OWFs

	Economic	*Legal*	*Socio-Political*	*Financial*	*Environmental*
TSO-based	++	+	+	-	0
Developer-based	--	+	-	+	0
Third party-based	+	--	-	++	0

[867] Armeni et al. 2019, p. 29.
[868] https://investors.nationalgrid.com/debt-investors/group-structure.
[869] Armeni et al. 2019, p. 85.

Based on the analysis above, the recommended option is to make the TSO responsible for the connection of OWFs and for the construction of a meshed offshore grid. The long-term perspective helps them make investments that are valuable from a socio-economic perspective. An important point of attention is that methods need to be developed to attract sufficient funds for the large investments needed for the MOG.[870]

Within the TSO-based system, one possibility could be to establish a common North Sea TSO. Such an entity could organise grid planning and ownership on behalf of the coastal states,[871] and secure the operational security of the grid. Especially when a substantial share of electricity used in coastal states is (offshore) wind, it becomes attractive to be able to control the output of single OWFs with the aim of reducing the total cost of the combined infrastructure of offshore grid and wind farms. When such a North Sea TSO requires certain OWFs to limit their output (curtailment) to the benefit of all users of the offshore electricity grid, it is logical that the 'costs' are also shared by all participants, regardless of the country they are in. However, this would be a large step away from the current situation, with many regulatory implications. A 'light' version of this would be to have a North Sea system operator, which allows for different ownership models (depending on the differing preferences of the coastal states) but which makes sure that the system is operated in a coordinated way.

In the assessment table, the difference between TSO-based, developer-based and third party-based grid connections is not large, which means that the analysis can change when the assessment changes. The difference depends on the interplay between the economic perspective and the financial perspective, specifically the possibility of attracting sufficient investment to finance the offshore grid. If the economic assessment of third-party based solutions becomes more positive than TSO-based, or if the legal implementation becomes less difficult, the third-party based solution may be recommended rather than the TSO-based model. This recommendation is sensitive (but not highly so) to changes in the assessment of the parameters.

7.3.4 Support Schemes

Support schemes facilitate the development of OWFs. Although this dissertation is more about the offshore grid than about the OWFs connected to it, the rules on support schemes greatly influence the willingness of OWF developers to develop OWFs that are to be connected to the MOG (rather than investment in radially connected OWFs). After all, without OWFs to connect, there is also less need for a MOG. Therefore, the topic of support schemes for OWFs is relevant to include in a legal framework that facilitates the development of a MOG.

At several competitive tenders for the construction and operation of offshore wind farms, it may seem that no support is needed anymore.[872] However, it is important to examine this

[870] Ibid.
[871] Armeni et al. 2019, p. 66 discusses the different varieties of ownership models and their advantages and disadvantages.
[872] See the introduction of section 4.4 above.

claim in more detail. First, the zero-subsidy auctions have so far only occurred in states where the export cable is financed and constructed by the TSO, thus, developers do not have to pay these costs. The export cable costs are either subsidised separately or socialised through the general grid tariffs all electricity consumers pay.[873] Secondly, zero-subsidy bids are only possible in countries with a stable and mature offshore wind energy supporting regulatory regime. In less stable regimes or regimes with less favourable conditions, zero-subsidy bids will probably not occur. Third, the costs of offshore wind are also influenced by the steel price, the fuel price and the (lack of) investment in the offshore oil and gas industry. Thus, even though currently very low or zero subsidy tenders occur for offshore wind,[874] it is still relevant for the regulatory framework for the MOG to include provisions on how support schemes should be treated when OWFs are connected to multiple coastal states.

There is a strong link between the way the OWFs are connected, the market rules applicable to the OWFs, and the level of financial support needed for OWF developers. Some states only provide support when the electricity generated at an OWF is fed into the national grid of that state.[875] For OWFs connected to a MOG, this cannot be guaranteed. Therefore, in order for a MOG to develop, a separation between physical electricity flows and market flows should be considered as an alternative to the current system (section 7.3.4.1). The next choice is whether a national or regional support scheme should be preferred (section 7.3.4.2) and how this support scheme should be financed (section 7.3.4.3).

7.3.4.1 Separation market flows – physical flows

Some North Sea coastal states used to have a clause in the legislative framework for their renewable energy support schemes that the electricity must be fed into the national transmission (or distribution) grid of the state that gives the financial support. This clause is harmless for renewable energy installations located onshore. However, for offshore wind energy, this proves to be a barrier to the development of the MOG,[876] as one of the fundamental characteristics of the MOG is that it allows electricity to flow to different countries, depending on where the demand is the highest. In a MOG, it is no longer possible to say beforehand to which country the electricity physically flows. An alternative to this approach is to decouple physical flows from market flows. This is done for example in the case of the Kriegers Flak Combined Grid Solution.[877] In this way, OWF developers still have one market to take into account, similar to if they were connected radially, and states can be reassured that the economic benefits of the OWF, namely a reduced electricity price,[878] flow

[873] See section 4.3.
[874] WindEurope, 'Wind energy in Europe in 2018 – Trends and Statistics' (2019), p. 21.
[875] See section 5.2.5.
[876] Ibid.
[877] See section 3.5.2 above.
[878] As OWFs have low marginal costs, they pull down the electricity price by pushing more expensive plants out of the market.

to the state in whose EEZ the OWF is located. At the same time, cross-border electricity flows are facilitated by marketing the remaining capacity on a connection.

Other countries have overcome this problem by changing the definition of where electricity must be exported to, for example by adding 'or offshore grid' to the requirement that the electricity should be fed into the national electricity grid, as happened in the Netherlands. In Germany, the Renewable Energy Act was amended to include the possibility of a joint support scheme.[879] The conditions mentioned in the Act are that the other states should be EU Member States, that they have a similar scheme or open up their national support scheme for German participation (reciprocity), and that the electricity has to physically be imported into Germany or has a similar effect on the German wholesale electricity market. This last condition is interesting in the context of the analysis in this paragraph: with the last phrase, Germany allows for electricity that does not physically flow to Germany to still receive support, provided it has a similar effect on the German electricity market.

For the development of a MOG, it is a necessity that the support schemes for OWFs connected to the MOG are not limited only to electricity that is physically fed exclusively into the (onshore) national transmission grid.

7.3.4.2 Support Scheme Design: national or regional

When the market flows are decoupled from the physical flows, there are still many choices to be made. There are various options for the design of support schemes, namely the design of the competitive tender to determine which party will receive the permission to construct and operate a wind farm and to receive support,[880] and to what extent bidders have to make costs before the tender.[881] However, in this paragraph, the main question is whether support schemes should be designed for only one state or for the entire region.

Support schemes for offshore wind are currently organised nationally, with OWFs receiving support from the one coastal state they are connected to, which is the coastal state of the EEZ in which the wind farm is located. In future grid designs, this may differ when OWFs are no longer only connected to one country but rather to a meshed grid, in which it is impossible to discern to which country the electricity flows. In order to make this more acceptable from a socio-political point of view, the support scheme design and financing of the support scheme should be reconsidered.

Support could be organised on a national basis, but with decoupled physical flows and market flows. This is the practice for Baltic 1 and 2 and Kriegers Flak, all connected to the Kriegers Flak combined grid solution.[882] In this way, even though the electricity may physically flow to

[879] German Renewable Energy Act (*Erneuerbare Energien Gesetz)*, art. 5(3).
[880] See L. Kitzing et al., 'Auctions for Renewable Energy Support: Lessons Learned in the AURES Project', *IAEE Energy Forum* [2019 3].
[881] This depends on whether the state prepares the tender, for example by providing sea-bed surveys, wind and water data, an environmental impact assessment etc. See section 4.2.3.
[882] Nieuwenhout 2018.

another country, the market flow is towards the coastal state. In this way, the coastal state still has the benefits (lower wholesale electricity price; more liquidity), whereas the connection to the MOG is not blocked. It must be noted that the benefits for the coastal state also depend on the interconnector capacity. The downwards pressure on the electricity prices of OWF developers selling their electricity on the wholesale electricity market of the coastal state is diminished again by using the same offshore grid connection in the reverse direction, as an interconnector, to export electricity, as this increases the prices on the wholesale electricity market again (as this reduces the supply side of the market, albeit to a limited extent).

Another option is to organise support schemes in a joint, regional, way. This could be for example through a joint fund in which the countries connected to the MOG participate. The legal basis of such a fund could be a specific agreement such as the agreement between Norway and Sweden on their joint support scheme.[883] This type of support scheme is also supported by the cooperation mechanisms of the Renewable Energy Directive.[884]

From an economic perspective, the option to be recommended for the cost-effective development of the MOG is the option that places OWFs relatively close to each other, in order to allow for clustering and for strategic connections, such as 'stepping stone connections'.[885] Regionally organised support schemes score slightly positive, as countries may decide to fund OWFs in the location with the most beneficial circumstances, whatever country that may be.[886] This leads to a more efficient use of the funds for offshore wind energy, as less financial support is needed when OWFs are constructed there where the yield is the highest. Also, it leads to a more cost-effective development of the MOG if the OWF tenders are organised in such a way that OWFs close to each other are developed within the same time period, as this allows joint grid connections. Nationally oriented support schemes lead to a suboptimal division of OWFs and grid development (-), as the location and size of the OWFs is then mainly determined by the national support system rather than by what the optimal location would be based on yield and grid development perspective.

From a legal perspective, national support schemes are the status quo, no changes need to be made (+). For regional support schemes, some changes will need to be made (-), but it must be noted that these changes all fit within the system of cooperation mechanisms as available in EU law since 2009.[887] With this system, cooperation in support schemes between EU states

[883] See section 4.4.4.
[884] See section 3.4.2.
[885] Ministerie van Economische Zaken en Klimaat, Directoraat-generaal Klimaat en Energie, 'Ontwikkelkader Windenergie op Zee', geactualiseerd september 2018, p. 14 (in Dutch, the stepping stone approach is referred to as 'stapsteen naar verder gelegen gebieden').
[886] The experience from a joint solar photovoltaic tender between Germany and Denmark teaches us that this may depend rather on the regulatory regime in place (local rules and conditions, tax conditions), than on geographical conditions.
[887] See section 3.4.2.

and third states is also possible, which would allow the UK to participate as well – if the UK is willing to engage in this. Whether this is the case, is treated in the next paragraph.

The largest differences occur in the socio-political perspective. When, inside a MOG, national support schemes are used, most countries are funding electricity that will then flow to another country. This means that the costs, paid by public funds, lie in one country, whereas the benefits, namely a lower wholesale electricity market price, lie in another country. Except for the country on the receiving side, this will be difficult to accept from a socio-political perspective. In a regionally organised support scheme, it is possible to prevent this by calculating the support scheme based on which country benefitted from the OWF, based on the actual electricity flows.[888] It is estimated that this option is more acceptable from a socio-political perspective, as the costs lie with the country where the benefits are. On the other side, states like to keep control over their support schemes, which is easier with nationally oriented support schemes than with regional support schemes. Nevertheless, the system is limited to only offshore wind energy, which means that for all other sources, states still keep control over the support schemes and sources of electricity. Therefore, this negative aspect does not weigh up to the benefits of a fairer division of support, based on the 'beneficiary pays' principle. Thus, for the North Sea at large, regional orientation scores positively (+). One notable exception to this is the United Kingdom, as it may be politically difficult for the UK and the EU coastal states to work together on a common support scheme for offshore wind energy, especially if this common support scheme is mainly based on EU law. This does not necessarily have to be the case, as for example the common support scheme between Norway and Sweden is based on an international agreement and on national laws in the two countries. Nevertheless, with the current political situation, it is unlikely that the UK would participate in a common support scheme for the North Sea. However, a regional support scheme will also work if not all North Sea coastal states participate.

No differences in environmental impact are expected from this choice. Also, from a financial perspective, there is no difference between the options for the financing of the MOG.

Table 11: Support Scheme Design

	Economic	***Legal***	***Socio-Political***	***Financial***	***Environmental***
National support schemes	-	+	-	0	0
Regional support scheme	+	-	+	0	0

From the analysis above, it appears that for OWFs connected to the MOG, it is recommend to pursue a regionally organised support scheme rather than a nationally oriented support scheme. This is because with a nationally oriented scheme, one country may be subsidising

[888] With HVDC networks, it is possible to steer electricity flows and to discern where they originate. With AC networks, this is hardly possible.

electricity that then flows directly to another country, which is politically less acceptable than a system in which the receiving country pays for the support (beneficiary pays principle).

The difference between a regional and national support scheme is small. This is because the legal and socio-political perspective oppose each other and keep each other in balance. The balance is on the regional support scheme now, because the economic assessment scores more positively there. However, both the economic and the socio-political assessment may change. Therefore, this recommendation is sensitive to changes in the assessment.

7.3.4.3 Financing of Support Schemes

Alongside the way the support is organised, it is important for the socio-political acceptability of the MOG to elaborate on how a regionally organised support scheme should be financed, as this allows states to agree on a fair division of the costs and benefits, rather than the status quo in which states risk financing OWFs that produce electricity that predominantly flows to other countries. Three types of financing are possible. The first possibility is that each country participating in the fund contributes equally. This is the case in the joint support scheme between Norway and Sweden.[889] The upside of this division is that it is easy to understand and to foresee the costs. The downside is that it can be deemed unfair if there are large differences in installed capacity between the coastal states and if the benefits of the scheme are unevenly distributed, which may make states less willing to participate in a joint support scheme. Thus, as a second option, in order to come to a fair contribution of each country, the country that benefits from the electricity at a given moment should finance the support for that moment. It could be calculated ex-post which country benefited from the electricity. This could be calculated on a monthly or yearly basis. In order for this option to be a success, decoupling between physical flows and market flows is still necessary, but the obligation that electricity produced by OWFs should be marketed in the coastal state needs to be removed. A third option is to fund the scheme through EU funding, for example via a specific part of the financial instruments of the Connecting Europe Facility (CEF), which is currently used for financial support of projects that contribute to the trans-European network for electricity.[890] In order for the CEF to be able to fund this type of projects, an amendment procedure is needed. Moreover, the UK will not be able to benefit from CEF funding. However, as mentioned above, it can be doubted anyway whether the UK would want to participate in a common support scheme for the North Sea offshore grid in the current political situation.

From an economic perspective, there is in principle no difference in the costs and benefits (0) between these options, as it only determines where the support comes from, not how much the support should be. The three options are all oriented towards a regional form of support, which means that the benefits will be more or less the same. The costs may vary slightly

[889] See section 4.4.4.
[890] See section 3.4.5.

depending on the transaction costs, but this depends rather on the implementation than on the form of the fund.

From a legal point of view, it will be less complex to introduce a fund in which all states participate equally (+), than it is to design a fund in which states participate on the basis of actual electricity flows (-). Support for OWFs on the basis of the CEF fund will have a longer implementation time (-), as such an instrument would need to go through the entire legislative procedure of the EU.[891]

The most important parameter for this table is socio-political acceptability. A solution in which the states contribute equally will not be acceptable for the smaller states and for states with low electricity prices compared to the other coastal states, meaning that the offshore generated electricity will on average flow away from their EEZ towards other coastal states. Thus, the option 'every state pays equally' scores very low (--). Moreover, the issue flagged in the preceding paragraph, that some countries will mostly contribute but not receive the benefits, is not solved with this option. A fund based on the actual electricity flows (and thus coupled to which state receives the benefits of the installed OWF capacity) is much fairer – the state that benefits will pay for the fund. As this is difficult to predict in advance, it can be divided on the basis of ex post calculation, on for example a monthly or yearly basis. In order to limit the risks for states, the total amount of support or the maximum contribution per country could be capped. This would make the scheme more complicated but it could relieve political hesitance due to the large sums of money needed for such a fund. Support on the basis of EU instruments will probably score high on socio-political acceptability for the North Sea states, but the states not connected to the North Sea will be less willing to agree to such a scheme, resulting in an average (0).

Another complexity linked to the socio-political perspective as well as to the economic perspective, is that the final benefits of the generated electricity may not lie within one of the North Sea states but rather with states connected to the North Sea states via the interconnected AC networks.[892] This means that states will either have to add a layer of complexity to the funding scheme in order to account for this, which implies additional transaction costs, or they will have to accept that this is inherent to participating in cross-border synchronous electricity grids. This is no novelty that occurs specifically due to the MOG. It already happens today, with renewable electricity produced from onshore and offshore sources that are also funded from national support schemes.[893] The reason why it should still be mentioned here are twofold: the MOG may make it more visible that electricity flows from an OWF do not reach the coastal state but go directly to another country. In onshore electricity

[891] CEF is created through the CEF Regulation, see section 3.4.5.
[892] See www.electricitymap.org for a real-time overview of primary sources of electricity as well as electricity flows between states. This map shows the complexity of electricity flows.
[893] When there is a large supply of (onshore and offshore) wind energy in Northern Germany, it is transported as much as possible to adjacent states, due to market dynamics and due to the fact that there is congestion inside the German electricity transmission network.

systems, this is covered by the complexity of the electricity market, but with offshore cables, the flows can be made visible much more easily. The second reason is that the MOG connects large capacities of renewable energy, which means that the effect is larger and therefore more visible.

It is not expected that the source of the OWF support will have a significant impact on the provision of private capital for the MOG, as long as it is clear that there is a stable support system for the main parties connected to the MOG, namely OWFs. Also, no differences in environmental impact are expected from this choice.

Table 12: Funding of Support Schemes

	Economic	***Legal***	***Socio-Political***	***Financial***	***Environm'l***
Equal funding per country	0	+	--	0	0
Based on electricity flows	0	-	++	0	0
EU funding	0	-	0	0	0

7

Following the analysis above, the recommended way of funding a support scheme is calculation on the basis of electricity flows. The specifics of the funding arrangements should be developed in further (economic) research. It must be noted that for this topic, the options do not always exclude each other. For example, co-financing of the scheme via EU funding could be envisaged alongside funding from the participating member states. Nevertheless, on the basis of the analysis above, there are no specific benefits to funding from the EU rather than funding from the member states.

The results only differ in their assessment of the legal and socio-political parameters. As the socio-political assessment is not likely to change, the sensitivity of the recommendation to changes in the assessment is low. The socio-political assessment is not likely to change because the underlying ideas, that the division of the costs should be fair, for example based on the 'beneficiary pays' principle,[894] are widespread among different countries, societal groups and political ideologies. They are not likely to change within the coming years.

7.3.5 Regulatory Supervision

Due to the large upfront investments needed to construct offshore transmission infrastructure and the small marginal costs of extra users on the grid, the MOG is considered a natural monopoly.[895] A form of regulation is needed in order to compensate for the lack of competitive pressure due to the monopolistic character of the grid.[896] A sector cannot be regulated without implementation of the rules, and supervision of whether the rules are adhered to. In practice, the tariffs and conditions for access need to be assessed and the

[894] P. Bhagwat 2019, p. 128 and further.
[895] See chapter 3.5.2. The transmission of electricity in general is deemed to be a natural monopoly: J. Perloff, *Microeconomics* (Pearson 2009, 5th ed) p. 369/70
[896] Ibid.

performance of the grid owner in terms of efficiency and reliability of the grid need to be evaluated. For the onshore electricity grid, these tasks are fulfilled by NRAs, either as an independent entity for the energy sector (Belgium, Denmark, Germany, UK) or as part of a larger antitrust and competition agency (the Netherlands).[897] For the MOG, it can be discussed whether the same system should be used as for onshore grid regulation, or whether the special character of the MOG requires a different kind of regulation and/or a different regulatory authority.

The MOG requires regulatory decisions on a regular basis, and these decisions will be cross-border by nature. There is a risk of disorganised or slow decision-making processes when many regulatory authorities are in charge, when it is not clear which authorities are in charge of cross-border assets or when unanimity is required for any decision. Therefore, the legal framework for the MOG should include provisions on how the offshore grid should be regulated and who should regulate the grid.

Various options for the regulatory supervision of the MOG are available. However, before analysing the options in detail, it is important to be aware of the interdependencies between these choices and earlier choices about ownership and operation of the offshore grid. If the grid is owned by one entity, it should be regulated as one grid, in order to make sure that the grid is operated and developed in an optimal way from a regional perspective. With regional ownership of the grid in combination with nationally oriented regulation, there may be perverse incentives to develop the grid in a nationally oriented way, even though this is suboptimal from a regional (North Sea) socio-economic perspective. Moreover, if the grid is owned by multiple entities, there should be regulatory decisions for each entity individually, due to the principles of (national) administrative law. This implies that the choice for one MOG owner and operator or for multiple owners and operators influences the choice for the regulatory governance.

There are various possible options for the regulation of the MOG. The options could be divided into whether there should be one regulatory authority for the entire MOG or whether there should be multiple regulatory authorities, for example a separate regulator for each EEZ. 'One regulator for the MOG' could be a new entity, a special purpose 'North Sea Grid regulator', in which national experts of the participating countries take place, or ACER as an existing entity that could get a new role (although this would require an amendment of the legislative framework for ACER).[898] Both of these options entail the transfer of regulatory and supervisory

[897] Respectively *BundesNetzAgentur* (Germany, National Network Agency), Commission for Electricity and Gas Regulation (Belgium, CREG), Office of Gas and Electricity Markets (UK, Ofgem) and Authority for Consumers and Markets (Netherlands, ACM).

[898] To make ACER responsible for the regulation of the MOG means that ACER will have to take up new tasks and responsibilities. Currently, it is an EU body responsible for promoting regulatory cooperation and for coordinating NRAs' activities in the EU. It plays a central role in the institutional framework introduced by the Third Energy Package, with tasks relating to facilitating cross-border connections and the development of the internal market in energy, and facilitating the adoption of EU Network Codes. ACER could to take over a

powers from the national level to the regional level. The other two options are based on having multiple regulators that retain their own powers. This is possible in the current system, in which NRAs all regulate activities in their 'own' EEZ, with ad-hoc cooperation for cross-border connections. Alternatively, formal cooperation between multiple NRAs for the entire MOG could be adopted. The difference between the cooperation of multiple NRAs and founding a new North Sea Regulator is that in the former, the NRAs cooperate as institutions but keep their own authority, whereas in a new North Sea Regulator, the authority is shifted to this new entity. In practice, the same persons may decide on the regulatory governance on the North Sea, but either they do this as representative of their own NRA, or they are seconded or employed by the new entity and decide on behalf of the new entity. In a schematic way, the structure looks as follows:

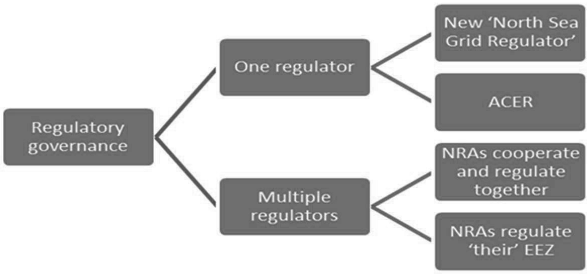

Image 7: Overview of Options for Regulatory Supervision. Source: author's own production

From an economic perspective, the creation of a new regulatory body on top of the existing national regulatory bodies will entail extra costs in the short term, compared to other options. However, the possibilities for specialisation and learning (both leading to cost savings) in a dedicated offshore regulatory agency may offset the upfront investment in the long term, leading to a slightly positive score (+) for the North Sea Regulator. Cooperation of national NRAs will not lead to large upfront investments, as there is no need for the establishment of a new entity. One may fear larger transaction costs in the long term, but NRAs have indicated that they experience a learning curve with regard to cross-border cooperation, which means that transaction costs may decrease over time.[899] As the infrastructure for NRA cooperation already exists, this is the option with the least costs and with similar benefits potential on the long term, thus scoring very high (++). Making ACER responsible for the regulation of the MOG on the North Sea will lead to extra costs to construct capacity at ACER for fulfilling this new function, as ACER currently does not fulfil the role of regulator. At the moment, it only fulfils specific roles related to facilitating the regulatory cooperation of states. On the other hand,

broader set of responsibilities regarding the MOG, acquiring the same competences as an NRA has for the onshore grid. After all, ACER already has a clear operational responsibility on the EU market monitoring process.

[899] This was confirmed in stakeholder meetings with TSOs, governments and regulators. The findings are based on experiences in the field of interconnector development over the past decade.

with ACER as a regulatory body, it will be possible to have a team specialising in MOG regulation, which is beneficial. This mitigates some of the negative impact of the extra costs, leading to a (-) as score for making ACER responsible. Finally, NRAs regulating 'their' EEZ leads to 'islands' of regulation, i.e. every regulator only with the interests of the own state in mind, rather than what is in the best interest for the region as a whole. This may also lead to double regulation of cables that cross EEZ borders and to complex situations if the regulatory requirements are different in different EEZs, leading to a very negative score (--).

From a legal perspective, maintaining the status quo that NRAs regulate their EEZ will be the fastest option in the short term, for relatively simple hybrid assets, as nothing will have to be changed from the current system. However, it may be that this causes longer discussions at a later stage, especially if more complex connections are developed, linking three or more countries. Moreover, for the MOG, repeated negotiations are needed for each connection. Therefore, it may not be the fastest approach in the long term. Using ACER as a regulator requires adjustment of the ACER Regulation in order to allow ACER to take up more tasks, which will take a few years (-). Creating a North Sea Regulator will take more time on the short term, as a new institution will have to be created (-). However, in the long term, increased speed of decision-making can be achieved compared to the previous two options. Cooperation of the NRAs will build on existing structures, leading to a fast speed of implementation in the short term. In the long term, a method needs to be found to allow for standardised decision-making between the NRAs, especially if repeated decision-making is needed for the MOG. To what extent this is necessary depends on the offshore grid development scenario that is used, i.e. for decentralised grids with many connections, this is more important than if a few large hubs are created with relatively fewer connections.

From a socio-political perspective, the most important factor is that it is unclear what the relationship between third states around the North Sea with ACER would be, making ACER score negatively in this regard (-). An EU briefing paper in the context of Brexit indicates that the UK could re-join ACER as an associate member with the agreement of the EU27 (although this has never happened before).[900] It is unclear whether this position would be acceptable to the UK Government as it would require adhering to the decisions of a body which is controlled by the EU Court of Justice. Creating a new North Sea Regulator scores slightly negatively (-), as it entails a transfer of authority to an international body, which is more difficult to control for the coastal states, and the assumption is that states prefer to keep the control over regulatory bodies. Letting NRAs regulate 'their' EEZ will be acceptable from a socio-political perspective, as it is the status quo (+). Cooperation between national NRAs scores positively (+), as this is also a current practice which is generally evaluated positively by NRAs and national governments. Such cooperation can evolve over time, if coastal states are willing to increase the amount of cooperation, eventually creating a de-facto North Sea Regulator.

[900] G. Frederiksson, A. Roth, S. Tagliapietra, G. Zachmann (Bruegel), Briefing: The Impact of Brexit On the EU Energy System, European Parliament (ITRE), November 2017.

From a financial perspective, it is important that investors know well in advance what they can expect in terms of financial (income) regulation, and that it is clear what duties the grid owner and operator have in terms of providing access and delivering a high security of supply. This influences the level of the costs for a MOG as well as the income of the grid owner, which is relevant for investors. Building on an existing legal framework gives certainty to investors, so the options 'cooperation of national NRAs' and 'NRAs regulate their own EEZ' both score positively (+), whilst the other two options score negatively (-). No differences in environmental impact are expected from this choice.

Table 13: Regulatory Governance

	Economic	***Legal***	***Socio-political***	***Financial***	***Environmental***
New North Sea Regulator	+	-	-	-	0
Cooperation of national NRAs	++	+	+	+	0
ACER	-	-	-	-	0
Each NRA regulates 'own' EEZ	--	++	+	+	0

From the analysis above, cooperation of the national NRAs is the recommended option to incorporate into the legal framework for the governance of the MOG. The NRAs should decide together on the regulatory context, such as tariffs, access regime and safety standards. Such cooperation can evolve over time, if coastal states are willing to increase the amount of cooperation, eventually creating a de-facto North Sea Regulator. However, it is important for socio-political acceptance that this is a bottom-up process rather than a decision imposed on the NRAs.

There are large differences in the scores for this topic. This means that the recommendation is stable and not sensitive to any changes in the assessment of the individual options.

7.3.6 Offshore Grid Operation and Market Rules

In order to have a reliable and safe offshore grid, it is important to have technical and operational rules that secure certain standards. At the moment, these rules are adopted in the European Grid Codes as well as in national codes.[901] The rules can be subdivided in technical rules, setting for example a common voltage level and protection system, and market rules, which guarantee a level playing field between different entities connected to the MOG.[902]

7.3.6.1 Technical Rules

The technical rules need to be adjusted, as the current Network Codes do not take into account meshed HVDC grids. There is a Network Code specifically on HVDC, but this code aims

[901] See sections 3.4.6 and 4.5.
[902] See section 3.4.6.

to regulate the transition between AC and DC. Operational rules for pure DC networks have yet to be developed.[903] It is important that the operational rules, for example on the voltage level, are clear well in advance. As the MOG is expected to develop gradually, compatibility with earlier and later grid developments is essential.

Assessing which technical rules should be adopted in the legislative framework for a MOG cannot be done using the tables of parameters used in earlier sections.[904] This is because the rules should be primarily based on technological possibilities and calculations, rather than on the parameters used earlier in this chapter. The rules should be established in the same way as the other Grid Codes are developed. Enabling technological standardisation and interoperability of different grid components should be one of the aims of the Grid Codes and of the wider HVDC industry.

A source of inspiration for how a simple provision regarding technical standardisation and operability can be adopted in a general legal framework can be found in the Model Intergovernmental Agreement (IGA) for pipeline systems, as developed by the Energy Charter Secretariat: *The States shall endeavour to harmonise their respective technical standards applicable to Project Activities*.[905] With such a clause, the parties agree to harmonise technical standards. How this is done specifically can be decided in technical working groups on the specific issues to be addressed. A similar clause can also be included in the proposed North Sea agreement.

7.3.6.2 Market Rules

An important question for the network operators and for OWFs connected to the offshore grid alike is whether the market rules for the offshore grid remain the same or whether they are adjusted to the specific characteristics of offshore grids. As explained in section 3.5, the current EU-rules for interconnectors will lead to a suboptimal development of the offshore grid. There are two ways to address this, namely by amending the EU Regulation in which these rules are currently laid down or by introducing a new type of market model, based on small bidding zones (a 'nodal' model) rather than the current bidding zones that are based on the EEZs of the different coastal states. This latter option would bring several benefits, such as that it gives more efficient market signals (related to the location of the OWFs and the transmission capacity around that OWF), and that it will be easier to fit in the current EU legal framework regarding the obligation to bring at least 70% of the available capacity to the market.[906] However, it also brings several difficulties, such as that in a small zones pricing model, high congestion rents and low revenues for OWF owners may be expected - which

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[903] P. Sørensen, 'Deliverable 11.1 - Harmonisation Catalogue', PROMOTioN, 2019.
[904] Instead, proposals for technical standardization and operational rules are described in PROMOTioN Deliverable 11.1, P. Sørensen 2019.
[905] Energy Charter Secretariat, Model Intergovernmental and Host Government Agreements For Cross-Border Pipelines, Second Edition, 2007, art. 11. The Model IGA is available at https://energycharter.org/fileadmin/DocumentsMedia/Legal/ma2-en.pdf.
[906] See section 3.5.5.

needs to be corrected in order to allow a fair division of benefits between the OWF owners and the grid owners.[907]

When a different market model, such as a 'nodal' or a 'small bidding zones' market model, is introduced, some market rules may need to be adjusted.[908] This relates for example to the division of income between grid owners and OWFs, which needs to be fair for all parties: without any change to the current rules, the income for the grid owners would be much higher than the status quo, due to extra congestion income, whereas the OWF owners would have a much lower income.[909] This effect can be mitigated by granting so-called financial transmission rights (FTRs) to the OWFs connected to a small bidding zone, via a tender process, such as the tender process that currently already exists to determine which developer may construct the OWF in a certain location. These FTRs would allow OWFs access to a certain capacity of the grid in a certain direction, coupled to the capacity of the OWF. If such a system is introduced, some of the existing market rules may have to be altered. This relates for example to the provisions on electricity balancing,[910] and the rules on forward capacity allocation.[911]

7.3.7 Dispute Settlement

Within the context of the MOG, different types of disputes may arise. Disputes may arise between different states participating in the network, between commercial parties, such as between the grid owner and a subcontractor responsible for a certain project, and between the grid owners and a higher authority, such as a regulatory authority. Conflicts of this kind could be about regulatory decisions regarding the tariff levels for grid use, the level of grid safety and security or the conditions for access for certain (groups of) connections.

Conflicts between two commercial parties are generally organised according to the relevant dispute settlement clauses in the commercial contracts that they conclude. Therefore, these types of disputes do not have to be addressed in the legal framework for the MOG. However, the other two types of disputes are addressed below.

7.3.7.1 Disputes between States

For disputes between states, different options are available, namely 'all disputes are addressed through arbitral procedures' (such as the procedures as described in the ECT), a mix: 'procedures at the CJEU for disputes between EU states and arbitral procedures for disputes between EU states and third states', or 'all disputes are addressed through procedures at the CJEU'.

[907] J. Moore (TenneT), 'Deliverable 12.3 – Draft Deployment Plan' *PROMOTioN* (2020), Appendix V.
[908] Ibid.
[909] Ibid.
[910] Suggestions to this end are analysed in P. Bhagwat 2019, p. 185-200.
[911] Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation, art. 39 and further (regarding the operational rules of forward capacity allocation).

Whereas for other topics in this chapter, the different options are evaluated on the basis of economic, legal, political and financial perspective, such an evaluation is not possible for this topic. Costs and benefits depend on the length of the procedures, and this varies significantly between cases. Moreover, the costs depend on the rules of procedure that are adopted, for example on the number of experts each party is allowed to bring forward; the length of the procedure and the possibilities for appeal. On the other hand, the legal and political perspective overrule other considerations, as some options may not be possible from a legal doctrinal point of view. Therefore, another method of evaluation is necessary here.

There are some fundamental legal rules that influence the choice between the options mentioned above. The evaluation of these options is done on the basis of legal doctrine. A definite preference cannot be given at this stage as this depends on the future relation between the UK and the EU, which is unclear at the moment.

The first option, 'all disputes are addressed through arbitral procedures', requires attention from a doctrinal perspective. In a long line of case law, the CJEU has made clear that legal disputes between two EU Member-States for which the CJEU has jurisdiction, that raise potential issues for EU law should be judged only by the CJEU, and not by other bodies such as international courts or other dispute settlement oganisations. This doctrine derives from the *Mox Plant* Case,[912] and relates to the exclusive jurisdiction of the CJEU and the autonomy of the EU legal order.

More recently, in the *Achmea* Case,[913] the CJEU judged that the arbitration clause in the Bilateral Investment Treaty between the Netherlands and Slovakia was deemed to be against the autonomy of the EU legal order.[914] The reasoning of this case provides a two-step test of whether a dispute settlement body of a treaty is compatible with EU law. The first step is a test whether the dispute settlement body proposed by a treaty could be placed in a position where it would need to interpret parts of EU law. This was the case with the tribunal proposed in the Bilateral Investment Treaty between the Netherlands and Slovakia, the subject of the *Achmea* case. The second step is to test whether the dispute settlement body could be considered as a national court in the context of art. 267 TFEU. This would entail that the dispute settlement body takes part in the system of internal legal order of EU Law with the preliminary reference procedure between national courts and the CJEU, which guards the uniformity of EU law.[915] In the *Achmea* case, the tribunal could not be considered a national court in the context of art. 267 TFEU. The combination of these two steps made the tribunal

[912] C-459/03 *Commission v. Ireland* (Mox Plant Case), ECLI:EU:C:2006:345.
[913] C-284/16 *Slovak Republic v. Achmea B.V.,* ECLI:EU:C:2018:158.
[914] Ibid., para 58/59.
[915] P. Merkouris, C. Verburg, 'The autonomy of the European legal order and its internal and external implications for treaty based investor-state arbitration' (forthcoming). This is not the case for all dispute settlement bodies, see for example N. Lavranos, C. Verburg, 'Recent Awards in Spanish Renewable Energy Cases and the Potential Consequences of the *Achmea* case for intra-EU ECT Arbitrations' *European Investment Law and Arbitration Review* [2018 vol 3], p. 210 and further.

in the Bilateral Investment Treaty between the Netherlands and Slovakia incompatible with EU law.

Dispute settlement clauses in treaties *can* be compatible with EU law under a number of conditions. Recently, the CJEU set out these conditions when it gave an opinion on the dispute settlement procedures of CETA (Comprehensive Economic and Trade Agreement), the trade agreement between the EU and Canada. This agreement is also a mixed partial agreement to which the EU Member States, the EU itself and Canada as a third state are member. In this opinion, the CJEU again started with the consideration that the EU protects its legal order through a judicial system intended to ensure consistency and uniformity in the interpretation of EU law.[916] As in the *Achmea* case, the tribunal installed in the context of CETA would not be part of the legal orders of either the EU or Canada or any of the EU states.[917] Nevertheless, the tribunal does not have the power to amend any EU law, except for CETA itself, which becomes part of the EU legal order as soon as it is signed and ratified by the Member-States and the EU itself. Moreover, the tribunal proposed by CETA cannot make arbitral awards that might have the effect of preventing the EU institutions from operating in accordance with the constitutional framework of the EU.[918] Moreover, CETA provides sufficient leeway for the host states to adopt their own rules, as CETA does not allow the tribunal to judge on the legality of national rules. Instead, the tribunal may only consider national law as a matter of fact.[919]

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In the light of the *Achmea* and CETA judgments, the criteria for a dispute settlement mechanism such as an arbitral tribunal are that the tribunal does not judge on the application of EU law, except for the treaty itself. A mixed partial agreement on the North Sea should also consider this in the provisions adopted on the topic of dispute settlement.

Another way to guarantee compatibility of a mixed partial agreement with EU law is the 'disconnection clause'.[920] This type of clause makes EU member states solve disputes between themselves via the EU legal system, whereas disputes with third states are settled according to the arbitration rules of the treaty in question. Two examples of this clause in international agreements, of the Council of Europe and of the OECD are:

> "Parties which are members of the European Union shall, in their mutual relations, apply Community and European Union rules in so far as there are Community or European Union rules governing the particular subject concerned and applicable to the

[916] CJEU Opinion 1/17, ECLI:EU:C:2019:341, para 111.
[917] Ibid., para 113/114.
[918] Ibid., para 118.
[919] CETA (EU-Canada Comprehensive Economic and Trade Agreement), Preliminary Consolidated text, available at http://trade.ec.europa.eu/doclib/docs/2014/september/tradoc_152806.pdf, art. 8.31(2); Merkouris, Verburg (forthcoming)
[920] Ibid.

> specific case, without prejudice to the object and purpose of the present Convention and without prejudice to its full application with other Parties."[921]

> "Those Parties which are member States of the European Union can apply, in their mutual relations, the possibilities of assistance provided for by the Convention in so far as they allow a wider co-operation than the possibilities offered by the applicable European Union rules."[922]

The adoption of a 'disconnection clause' (such as the examples above) in the North Sea Agreement brings us to the second option, namely two parallel ways of dispute resolution - CJEU for disputes between EU Member States and arbitration for disputes between EU states and third states. This may lead to multiple interpretations of the same text, which creates undesirable legal difficulties and uncertainty for stakeholders over the interpretation of clauses. However, this option does provide certainty that the Agreement, even with an arbitration clause in it, is in line with EU law, which may increase the political acceptability of the agreement for EU Member States.

The third option, all disputes are addressed by the CJEU, is probably not acceptable from a political point of view to third states. Third states will not allow jurisdiction of a foreign court over disputes that they are involved in. Therefore, currently, the option of two parallel systems with a disconnection clause is the option with the least difficulties and is thus the recommended option.

7.3.7.2 Regulatory Disputes[923]

Disputes may also arise between grid owners and the responsible regulatory agencies. In the current regulatory system, decisions by the national regulator can be appealed at national level and tested through national legal procedures. Often, the judge will not engage in a full reconsideration of the case, but rather apply a marginal test, in which it is only verified whether the regulatory authority could reasonably have arrived at its decision and whether no procedural mistakes were made. The judgment by the national court follows the procedures that exist in national administrative law. For projects that are located fully within one coastal state's EEZ, the NRA of that state would be the competent authority and the national administrative procedures would be applicable.

For cross-border projects, this procedure is currently replaced with procedures that stem from EU law. For decisions concerning cross-border interconnector projects, the procedure is that

[921] Council of Europe Convention on Laundering, Search, Seizure and Confiscation of the Proceeds from Crime and on the Financing of Terrorism, Warsaw 2005, CoE Treaty Series 198, art. 52(4).
[922] OECD and Council of Europe, Convention on Mutual Administrative Assistance in Tax Matters, Strasbourg, 25 January 1988, U.N.T.S. I-33610, art. 27(2).
[923] There is an important link between this topic and Regulatory Supervision (7.3.5). When the option 'One North Sea Regulator' is chosen, the topic of regulatory disputes also becomes much more important compared to when the option 'Cooperation of national NRAs' is chosen. In the latter case, most disputes will be addressed by the competent national judge and only issues that have a clear cross-border context need to be addressed separately.

the NRAs should first reach a decision together. If they cannot reach a decision together, they refer the case to ACER. ACER provides for a Board of Appeal for internal review of its decisions. If the developer does not agree with the decision of the ACER Board of Appeal, the project developer can appeal the decision at the General Court (previously known as the Court of First Instance), part of the Court of Justice of the EU. This happened in practice in the case of *Aquind*, which shows the necessity of having procedures if NRAs cannot agree on a decision for cross-border projects:

> *Case study Aquind*
>
> *Aquind is an interconnector to be constructed between the UK and France.[924] The project developers applied for an exemption under art. 17 of Regulation 714/2009.[925] A partial exemption from EU law is sought, namely with regard to the use of revenue requirements; third party access and unbundling rules.*
>
> *There has been a dialogue between Ofgem and CRE, the relevant NRAs, since 2015. After the official exemption application in September 2017, both NRAs indicated they could not reach a joint decision on the case.[926] As the NRAs could not reach a decision, the case was referred to ACER, which decided on the case in June 2018. ACER decided that the exemption would not be permitted. The Aquind consortium appealed this decision at the ACER Board of Appeal, which upheld ACER's decision to refrain from granting an exemption.[927] Aquind started proceedings at the General Court (part of the Court of Justice of the EU, CJEU). So far, the General Court has not yet judged on the case (as of 31-12-2019).*

The *Aquind* case makes clear how project developers currently rely on appeal mechanisms and procedures that are developed in EU law, providing legal certainty and uniform application of the law. However, as mentioned above, it is questionable whether third states will accept the CJEU as the highest court to judge on cases about interconnectors, network codes, tariffs and access regimes. At the same time, as the decisions concern cross-border projects, the national courts would also not be competent to review decisions.

Decisions on regulatory matters are slightly different than the other investor-state or state-state disputes treated above. This is because, with the swift development of offshore wind and offshore grid connections, it is important that appeals procedures for regulatory decisions should not take too long. If they do, this may cause uncertainty about the regulation of other parts of the grid that are in the same situation. In the example above, for as long as it is not

[924] For general information, see (last visited 11-2-2019): http://aquind.co.uk/.
[925] Regulation 714/2009 on conditions for access to the network for cross-border exchanges in electricity, art. 17.
[926] Internal minutes by Aquind, available at (last visited 11-2-2019): http://aquind.co.uk/wp-content/uploads/2018/11/Internal-minutes-of-Appeal-Hearing.pdf, p. 2.
[927] https://acer.europa.eu/en/The_agency/Organisation/Board_of_Appeal/Decisions/Case%20A-001-2018%20%E2%80%93%20BoA%20decision.pdf.

clear whether an exemption will be granted, the project cannot be constructed. If this procedure lasts several years, the economic conditions may be very different, i.e. because other cable connections are constructed in the meantime, or because markets may have changed. The longer the appeals procedure lasts, the longer the uncertainty lasts. If multiple projects depend on the same decision or on the same methodology that is appealed, the consequences could be even larger if the procedures last too long. Therefore, an appeals procedure for regulatory decisions concerning cross-border grid elements should be adopted in the North Sea Agreement.

Such an appeals procedure could be organised through an appeals committee in which representatives of the different coastal states take place, similar to the ACER board of appeals.[928]

7.3.8 Decommissioning

The notion of decommissioning[929] has been established for decades in the offshore oil and gas sector, where decommissioning entails ending the operations, closing the wells securely, removal of the installation and waste management of the removed parts.[930] A main difference between the offshore oil and gas sector and the offshore wind sector is that decommissioning of oil and gas infrastructure comes naturally when the field is depleted and the infrastructure loses its function, or when it is technically or economically not feasible to extract the remaining resources.[931] For OWFs, this is a different story. The wind will continue to blow, so decommissioning will not start when the source is depleted, but when the OWF is technically or economically[932] at the end of its lifetime.[933] Individual turbines or other parts that are technically at the end of their lifetime could be replaced by new turbines, especially if the foundations are still solid and reliable. However, there comes a time when the entire OWF is at the end of its lifetime or when the permit that allows its operation expires permanently. At that moment, it should be decided whether the grid should also be removed when the OWF

[928] The ACER Board of Appeal is created by Regulation 2019/942 of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators. In art. 25 of this Regulation, its tasks and procedures are explained.

[929] Decommissioning is not officially defined in legal terminology, nor does the term appear in any major legal docment on this issue. See B.A. Hamzah 'International rules on decommissioning of offshore installations: some observations' *Marine Policy* [2003 27 4] p. 33. However, for the purposes of this dissertation, decommissioning entails what happens to an asset at the end of its lifetime.

[930] Exemptions may apply in cases where the structure has no potential effects on navigation and environment or costs are too high or non-proportional risks to personnel are involved, Resolution A.672(16), 2.1.

[931] There is research on the re-use of offshore oil and gas platforms for the purpose of CO_2 storage in depleted fields. In that case, platforms could be re-used after their operational lifetime. There is only a removal obligation for installations that are not in use any more. Therefore, as long as the platform is used, it can remain at its place.

[932] When maintenance costs exceed the proceeds from the generated electricity, a windfarm is economically at the end of its lifetime.

[933] Another reason for decommissioning is that the OWF license expires. These licenses are time-bound, generally 15-20 years. Some licenses can be renewed/extended. In this subchapter, it is assumed that when the OWF is not yet at the end of its technical and economic lifetime and there are no dangers to maritime safety, authorities are willing to extend the license rather than decommissioning the OWF before the end of its technical and economic lifetime.

is removed, or whether the same grid connection should be used again for a new OWF in the same area. These options are compared in this section.

Alongside the decommissioning of OWFs, the lifespan of parts of the meshed offshore grid should also be discussed.[934] Cables may keep their function as an interconnector, even when individual OWFs are removed. Nevertheless, when a certain connection loses its function as interconnector, or when it is technically at the end of its lifetime and replacement is no longer economically feasible, it should be clarified what should happen to the assets, should they remain in place or should they be removed? Based on current international law, there is no removal obligation for cables, but it might be discussed as part of a new legal framework for a MOG, whether such an obligation should be introduced in specific cases, for example to avoid the 'spaghetti scenario' in areas with many different subsea cables, and/or to recycle the valuable or toxic materials inside the cables.[935]

7.3.8.1 Relevance of Decommissioning

The norms around decommissioning of parts of the grid and of OWFs connected to it are relevant for the legal framework for the MOG for several reasons. First, it is important for the offshore grid design to know what happens after decommissioning of OWFs: will the same sites be used for new OWFs, leaving the connection point in place? This entails that the grid should not be removed as it will keep serving its purpose. Or will the OWF foundations be left in place in the context of a new function, such as a function as 'artificial reef'? This may influence the opportunities for the construction of new OWFs in the same area, and thus influences whether the grid connections in that area will keep their use or become redundant. This may make a difference for grid design and development. This is especially relevant as the estimated lifetime of an OWF is currently around 25 years, whereas the cable infrastructure may last even 40+ years.

Secondly, it is relevant for the CBA (cost benefit analysis) of the MOG to have a cost estimate for decommissioning of offshore transmission assets, including converter stations and possibly for cables, if states agree to introduce a removal obligation for subsea cables. This needs to be taken into account in the CBAs for offshore grid projects.

Thirdly, the rules on decommissioning transmission infrastructure in a MOG which are adopted in the legal framework for a MOG, will affect the environmental impact of the infrastructure.

[934] For this chapter, inter-array cables are considered to be part of the OWF. In most countries, the inter-array cables are included in the removal obligation of the OWF. Thus, there is a difference in submarine cables that are part of the offshore grid and cables that are part of the OWF.

[935] Next to the metals used as conductor of the electricity (often copper or aluminium), subsea electricity cables generally contain lead for insulation purposes. However, alternative materials are being investigated. See B. Sonerud, F. Eggertsen, S. Nilsson, K. M. Furuheim, G. Evenset, 'Material considerations for submarine high voltage XLPE cables for dynamic applications', Conference Paper (Conference on Electrical Insulation and Solid Dielectrics (CEIDP, 2012).

As a consequence, it is important to establish rules on decommissioning for the OWFs connected to a MOG and for parts of the MOG itself. These rules need to be part of the legal framework for a MOG in order to provide certainty on the costs of future grid development. Decommissioning for OWFs and the offshore grid entails many new choices that cannot directly be copied from the oil and gas sector. This section explores the issue and the policy choices that could be made. More technical, environmental and economic research is needed in order to come to a well-developed decommissioning policy for the MOG and the OWFs connected to it.

7.3.8.2 Grid Removal at the End-of-lifetime of OWFs

When OWFs are at the end of their technical or economic lifetime or when licenses can no longer be extended, the cable from the OWF to the nearest converter station of the offshore grid is often not yet at the end of its lifetime. Thus, it should be decided what to do with the grid components when the OWF reaches the end of its lifetime. There are various options: either the grid connection is removed up to the nearest MOG hub that still has a function for the connection of other OWFs,[936] or the cable is reused, either because the OWF is fully or partially repowered by the same developer (in a way, extending this developer's license to operate an OWF on the same location), or to connect a new OWF based on a new tender.

From an economic perspective, the costs and benefits of the different options depend on the grid development scenario that is constructed.[937] For example, for centralised hubs, the lifetime of the OWFs connected to it is much shorter than for the hub itself. It would be a waste of resources not to use the capacity of the converter station. This makes it more logical to reuse the connection. For the areas in which it is not cost-effective to create a new wind farm, for example because the area is too small to construct the (probably much larger)[938] wind turbines, removal of the converter station (and, if coastal states decide to introduce this, the cables between the OWF and the converter station) is more logical. A relevant point here is the division of the costs of removal between different coastal states, where it concerns hubs to which multiple states are connected and from which multiple states profit. The simplest solution is to take decommissioning costs well into account in the total CBA and possibly also in the Cross Border Cost Allocation (CBCA).

From an economic perspective, creating a new OWF in the same area is more positive than repowering the old OWF, as it will allow for increased turbine size, leading to higher yield, as well as more competition and innovation, which may translate into economic benefits. From the legal perspective, all options are possible with only minor changes to the legal framework. Therefore, all options score positively (+).

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[936] In case offshore grid components are removed, the removed materials will need to be brought ashore and handled according to the applicable legal framework for waste management, including electronic waste management. See Fleming, Mas, Nieuwenhout 2018, p. 22.

[937] J. Moore (TenneT), 'Deliverable 12.3 – Draft Deployment Plan' *PROMOTioN* (2020), chapter 2.

[938] Over the last decades, both wind turbines individually and OWFs have significantly increased in size and capacity. WindEurope, Offshore Wind - Key Trends and Statistics 2018, p. 20-21.

From the environmental perspective, it is not clear whether a time difference between grid removal and OWF removal influences the environmental impact. Therefore, the option 'remove grid when OWF is removed' is scored neutral (0). Repowering of the old OWF or constructing a new OWF in the same area will score negatively, as there is more construction activity, which has a local environmental impact.

From the socio-political perspective, removing the grid when the OWF is removed leads to an inefficient use of (public) resources, which is slightly negative in terms of socio-political acceptability (-). Using the grid is more positive, as it increases the usage of the resources (+). Between repowering the old OWF and creating a new OWF in the same area, the latter is more positive than the former, as it will allow new developers a fair chance to enter the industry.

From the financial perspective of the MOG, it is most advantageous to maximise grid usage, which means repowering OWFs or creating a new OWF on the same connection as a previous OWF (both score positively (+)). Removing the grid when the OWF is removed, not taking into account the much longer lifetime of the cables, will score negatively (-), as investors in the grid will have less time to make a return on their investment.

Table 14: End-of-lifetime of OWFs

	Economic	***Legal***	***Socio-Political***	***Financial***	***Environm'l***
Remove grid when OWF is removed	--	+	-	-	0
Repower OWFs	+	+	+	+	--
New tender for same area	++	+	++	+	--

Following the analysis, the option to be recommended concerning what should happen to the grid connection at the end of the lifetime of the OWF connected to it, is a new tender for the same area, if this is technically possible. Together with repowering the OWFs, this is the most economically efficient option. However, between these options, a new tender for the same area is a chance for new entrants, which opens the market, whereas repowering OWFs is done by the former owners of the OWF. A new tender for the same area thus brings more competition than repowering by the existing wind farm owner.

The analysis of the options for the course of action when an OWF reaches the end of its lifetime shows only a small difference between 'new tender for the same area' and 'repower OWFs', and a large difference between the former and 'remove grid when OWF is removed'. Thus, the sensitivity of this outcome to changes in the assessment is average. The parameters most likely to change, and most likely to influence the outcome are the economic and socio-political assessment. Regarding the economic assessment, what is most advantageous also depends on the grid development scenario – which may be different than originally envisaged. This can change the analysis.

7.3.8.3 Removal of Cables

Currently, there is no removal obligation for subsea cables under international law.[939] In national law, some states have specific rules on the removal of cables, but most states stay silent on the matter.[940] However, with the large amount of subsea cables that need to be installed in the context of the MOG, it might be discussed whether a removal obligation for subsea cables should be introduced in international law.

It must be noted that a differentiation between cables in the MOG can be made: main connections and connections to hubs with multiple OWFs will remain functional for much longer than cables that lead to isolated OWFs. Thus, they will probably be replaced when they reach the end of their technical lifetime. However, cables that lead to isolated OWFs may lose their function if the OWF is decommissioned and the connection is not re-used. This part is about the removal of cables that lose their function.

There is a knowledge gap about the environmental and spatial impact of leaving submarine cables in place and about the environmental impact of removal of these cables from the seabed. Concerning the spatial impact, the 'spaghetti scenario' with many cables that cross each other and that are not removed after use, leaving less place for new cables, is mentioned as an undesirable situation that should be avoided.[941] Concerning the environmental impact, submarine electricity cables consist of several materials, some of which should not leak or remain into the marine environment, such as lead.[942] However, the disturbance of the seabed with removal of the cable may be larger than the negative effects of leaving the cables in place. This topic requires more research to be done.

Different options regarding the removal of cables in the MOG are:

- No common rules
- Removal of the cables
- Leave cables in place
- Leave cables except in specific sensitive areas, such as the landing to the beach or important waterways

From an economic perspective, there is a cost involved in removing the cables that are buried in the seabed. It is more expensive to remove the cables than to leave the cables in place and solve problems such as cables crossing each other (in a 'spaghetti scenario') locally. Therefore, the option full removal scores lowest in terms of costs (--), and the option to leave all cables

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939 See section 2.3.2.

940 See section 4.6.

941 The "spaghetti scenario" is a term coined in several studies to depict a large uncoordinated amount of cables in the seabed. The term has been coined already in 2013 and possibly already before. See for example: http://www.elia.be/~/media/files/Elia/PressReleases/2013/EN/20131112_BOG-permits_ENG.pdf.

942 B. Sonerud, F. Eggertsen, S. Nilsson, K. M. Furuheim, G. Evenset, 'Material considerations for submarine high voltage XLPE cables for dynamic applications', Conference Paper (Conference on Electrical Insulation and Solid Dielectrics (CEIDP, 2012).

in place, scores highest (+). With no common rules, it is up to the countries and will depend on the local rules. This is slightly negative as it hinders standardisation. The option 'No common rules' will lead to a fragmented regulatory landscape, which scores negatively as it entails administrative costs for project developers to take into account the different rules per country (-).

From a legal perspective, all options except removing all cables are currently possible with only minor changes to the legal framework (+). The full removal of all cables is currently not required in international environmental law, and also in national legal requirements, full removal of the cables is not required.[943]

From a socio-political perspective, having no common rules will lead to a fragmented landscape and environmental policy with regard to the seabed, which is slightly negative (-). Removal of the cables follows the general principle of 'polluter pays' and will therefore be more acceptable (+) than leaving the cables in place, which may lead to a public image of creating a 'spaghetti scenario' in the North Sea (-). Leaving the cables in place except in specific sensitive areas will take away the concerns of those who fear adverse consequences in specific areas (including the 'spaghetti scenario') in areas close to the coast, whilst also not causing excessive costs.

From a financial perspective, first of all, the rules need to be consistent, so that investors can take the costs and risks for the prescribed decommissioning standard into account. 'No common rules' will lead to a fragmented landscape, which results in administrative costs and risks for investors in the MOG (-). Leaving the cables in place requires the least action, and thus the least risk, which scores positively (+). The other two options score neutral as there is no specific influence.

The environmental impact of leaving the cables in place will probably be lower than that of removing the cables dug into the seabed, as this disturbs the seabed locally.[944] However, this depends on which type of materials used in the cable and whether it is buried deep into the seabed or not. Leaving the cables in place where this does not do harm to the environment, and removing them in specific areas, such as shipping routes or landing points on the beach scores the highest from the environmental perspective, under the condition that the insulation material of the cables cannot leak into the water. The option 'no common rules' will probably lead to cable owners choosing the option that costs the least, with removal bringing high costs and leaving the cables in place bringing lower costs.

[943] See section 4.6.
[944] Disturbance of the seabed has an impact on the local maritime environment. NIRAS, 'Subsea Cable Interactions with the Marine Environment' (2015), p. 22.

Table 15: End-of-lifetime of the Cable Infrastructure

	Economic	Legal	Socio-Political	Financial	Environmental
No common rules	-	+	-	-	+
Removal of cables	--	-	+	0	-
Leave cables in place	+	+	-	+	+
Leave cables in place except in sensitive areas	+	+	+	0	++

From the analysis above, the recommended option to be adopted in the future legal framework for a MOG is to leave the cables in place except in specific sensitive areas. Under this approach, most cables will stay in place, but in specific sensitive areas, for example with high shipping or fishing activity, or at environmentally sensitive areas like the beach, the cables will be removed. It should be weighed per area whether removal causes more or less disturbance than leaving the cables in place. The area-specific approach costs less than full removal, and scores higher from the environmental perspective and the socio-political perspective than leaving all cables in place. Guidelines on this topic should be introduced.

The difference between the options varies from small to large, depending on which options are compared. On the whole, the sensitivity to changes in the analysis is average. The least certain option in this assessment is the environmental assessment, as the impact of the environment of different removal scenarios still needs to be researched further and new discoveries may change this assessment.

7.4 Interim Conclusion

The measures that need to be adopted in the legal framework for the MOG have been weighed against each other in this chapter. There is often more than one way to address a topic, but the way a topic is addressed may have significant impact on how the MOG is developed and regulated. Specifically, there may be impacts on the cost-effectiveness of the MOG, the time it costs to implement the proposals and to construct the MOG, the acceptance of the MOG by different stakeholders and the risk assessment of the MOG made by investors. This chapter lists the different options and analyses them in terms of their economic, legal, socio-political and financial impact for the offshore grid. This is done on the basis of a qualitative, informal CBA.

The outcomes of this assessment per topic are presented below. It must be stressed that the nuances of the analysis are not displayed in the outcomes. Therefore, recommendations should not be based solely on the list of outcomes below but rather on the analysis behind it, which can be found in the text of the chapter itself. The outcomes have been incorporated in a Model North Sea Agreement, which is added in the appendix to this dissertation.

Decision-making (section 7.3.1)
Decision-making should be based on a centralised rather than a decentralised approach – in order to take into account regional (North Sea-wide) effects. Moreover, rather than waiting until issues arise, proactive decision-making should be used. In this way, both grid developers and the parties connected to the grid have more certainty.

Planning (section 7.3.2)
Grid planning can be organised per country or on a regional scale. It is recommended to use a regional perspective in grid planning. Specifically, the locations of OWFs should be based on a centralised or zonal approach and there should be limits on the use of OWF areas for other economic purposes in order to preserve the maritime environment and ecology.

Connection Responsibility (section 7.3.3)
The different options are connection by the developer, by an OFTO or by a TSO. The latter option, connection by a TSO, is recommended as this option assures the long-term perspective necessary for offshore grid development. However, this choice is highly political. Therefore, rather than prescribing one harmonised connection responsibility (and ownership) model for the MOG in a North Sea Agreement (which is probably not feasible), states should rather aim to make sure that the models they have are compatible with each other.

Support Schemes (section 7.3.4)
First, it is important that physical flows are not hindered by market restrictions around support schemes – this enables OWFs to be connected to an offshore grid with multiple coastal states. EU law offers various possibilities for organising support schemes for cross-border objects. These possibilities should be utilised, as a regional support scheme rather than a national support scheme for MOG-connected OWFs is recommended. The financing of such a support scheme should be based on the 'beneficiary pays' principle, which means that a calculation of the contributions of states is based on the flow of the electricity towards the different coastal states. Th

Regulatory Supervision (section 7.3.5)
As the MOG will be a natural monopoly, regulatory supervision is necessary. Different options are that NRAs regulate 'their' part of the MOG, that ACER takes this task, that a North Sea regulator is created or that NRAs from the coastal states increase their cooperation. The latter option is recommended.

Offshore Grid Operation and Market Rules (section 7.3.6)
Both technical rules and market rules need to adapt to the specific characteristics of DC grids and the large infeed of offshore wind energy. This needs to be adopted in the

EU Network Codes. Moreover, compatibility between the UK and continental part of the MOG need to be ensured and standardisation of technical norms needs to be encouraged.

Dispute Resolution (section 7.3.7)
It is recommended to adopt dispute resolution clauses in the legal framework for the MOG. In order to make sure that conflicts regarding the legal framework for OWFs will not lead to changes in the interpretation of EU law, a disconnection clause is needed. Moreover, it is important to provide for dispute resolution for regulatory disputes as well in a North Sea Agreement.

Decommissioning (section 7.3.8)
The differing lifetimes of OWFs and the MOG are a point of attention that needs to be addressed in the legal framework for the MOG. At the end of an OWF's lifetime it is recommended that new tenders are organised for the same area, in order to be able to use the same MOG connection. Considering the large amount of cables to installed in the context of the MOG, it could be discussed whether a removal obligation for cables should be introduced. More research into this topic is necessary, but a preliminary analysis shows that cables can be left in place except in sensitive areas.

These recommendations should be adopted in the legal framework for the MOG. Based on the analysis in chapter 5, the recommendations on decision-making should be adopted in the proposed North Sea Agreement. Guiding principles on grid planning and the compatibility of connection responsibilities (without requiring full harmonisation thereof) can also be included here. The recommendations on support schemes should not be included in such an Agreement but rather implemented at national level. Regulatory supervision, when organised through cooperation of NRAs, needs to be implemented in policy, but adding this to the North Sea Agreement will give the cooperation a formal basis. Dispute settlement needs to be part of the North Sea Agreement, whereas the standards of decommissioning should be adopted in international standards instead.

In order to complete the analysis on the substantive legislative framework for the MOG, the last question to be answered is whether this approach solves all legal barriers for the development of a MOG. This is not (and cannot be) the case, as new legal questions will arise when technology develops further or when political priorities change. This should not be problematic, as the methodology presented in this chapter can be copied and re-used when there are further topics to be addressed, or when the possible options for a certain issue change. Thus, the methodology presented can be used as part of an iterative and dynamic legislative process in which the regulatory framework for the MOG is refined and developed as the MOG itself develops. Nevertheless, the recommendations for the substantive legislative framework above are meant to provide legal certainty for the cost-effective development of the MOG over the coming decades.

8

CHAPTER 8

Conclusion and Recommendations

8 Conclusion and Recommendations

This dissertation provides an analysis of how the legal framework for the MOG should develop in order to facilitate the cost-effective development of an offshore electricity grid in the North Sea. In this chapter, the answers to the research sub-questions are (re)stated based on the analysis in the preceding chapters (section 8.1). Then, the main recommendations for the legal framework for the development of a MOG are given (section 8.2). The first main recommendation is that a North Sea Agreement should be developed to serve as a stable backbone for the legal framework for the MOG. What makes this dissertation unique compared to previous literature on this matter is that a 'Model North Sea Agreement' is added in the appendix to this dissertation. Then, to round off this dissertation, it is checked whether the design principles that were stated in the introduction are indeed incorporated in the legal framework (section 8.3). Finally, this chapter closes with an outlook towards future developments and further research topics (section 8.4).

8.1 Answering the Research Questions

This dissertation answers the seven research questions formulated in the introduction. In this paragraph, the main conclusions on the research questions are stated, divided over the three parts of the dissertation.

Part I:

Current Legal Framework for Offshore Electricity Infrastructure in the North Sea

The first part of the dissertation provides an answer to the questions: *what is the current legal framework for offshore electricity transmission infrastructure under international, European and national law, and which parts of the current legal framework are holding back the development of an offshore grid?* The latter question is especially important, as it forms the basis of the rest of the dissertation.

At international law level, a main issue in this regard is the extent of jurisdiction of coastal states over different parts of an offshore electricity grid. This dissertation concludes that whereas the extent of jurisdiction over wind farms and over interconnector cables is clear, it is not clear to what extent coastal states have jurisdiction over hybrid assets, the building blocks of a MOG, as well as over a MOG itself. Another finding is that some questions remain with regard to decommissioning: the guidelines on the decommissioning of installations and structures at sea are clear in general, but exceptions may differ per state, based on the applicable IMO Guidelines. Moreover, there is currently no removal obligation for cables, but it could be discussed whether such a removal obligation should be introduced in light of the increase in the amount of cables necessary to connect the planned amount of offshore wind capacity over the coming decades. These two issues (jurisdiction over hybrid/MOG assets and decommissioning) need to be addressed in a legal framework for the development of a MOG.

At EU law level, there are many instruments that are relevant for the legal framework for an offshore grid. The majority of North Sea coastal states are members of the EU, and for these states, EU law strongly influences the general organisation of the energy sector. Moreover, the legal instruments on (maritime) spatial planning, environmental protection, the construction of trans-European electricity networks and the network codes are highly relevant for the offshore grid. However, not all states around the North Sea are EU member states. Most EU law related to the internal electricity market is applicable to Norway via the EEA Agreement. Regarding the United Kingdom, this is much more difficult in the light of recent political developments around Brexit, which means that a solution to 'bridge the gap' between EU law and future UK law needs to be sought.

In substantive EU law, the main barrier for the development of a MOG is the regulation of 'hybrid' assets, electricity cables that have the dual functionality of connecting offshore wind energy and providing interconnection between different states. This needs to be addressed specifically. Furthermore, some other questions remain, for example with regard to whether it is desirable to expand the EIA obligation for overhead power lines to also include submarine high voltage cables, of which many will have to be constructed over the coming decades.

In the national legal frameworks of the North Sea coastal states, large diversity in the approaches towards offshore wind and offshore electricity grids is visible. To a large extent, it is not problematic that different states have different approaches. However, for some issues it is more efficient to converge the legal systems, for instance by streamlining the planning and permitting approaches of the coastal states. This should be a point of attention for the North Sea coastal states both when legislation on OWFs and offshore electricity cables is amended, and when specific cross-border projects are envisaged. In the latter case, these cross-border projects could serve as trial projects for increased cooperation between the permitting authorities of the coastal states involved, which should lead to streamlining of the permitting process between these states.

Part II:

A New Legal Framework for Offshore Electricity Infrastructure in the North Sea

In the second part of the dissertation, the different instruments that could be used for the legal framework for the MOG were investigated. Chapter 5 provided an answer to the question *"Which different levels of legislation are there and how to decide which level is most suitable to address a certain issue?"* The different levels of legislation are national, EU-based and international legislation. Within these three levels, both 'hard law' and 'soft law' instruments can be considered. In this chapter, a decision tree for deciding which topic should be addressed at which level is developed. Then, this decision tree was used to define which legal instruments should be used for the legal framework for the offshore grid. The outcomes of this analysis are that concerns about the jurisdiction over parts of the MOG should be addressed by an agreement under international law. The same agreement can be used to address the governance of the offshore grid. This agreement could serve as a framework agreement for the North Sea offshore grid, or (wider) for North Sea energy activities that need to be coordinated. In this dissertation, the agreement is referred to as the North Sea Agreement.

Some issues should be addressed in the existing legal framework. Operational issues, for example, should be addressed through the existing European Network Codes (albeit with an extra clause to ensure compatibility with the UK part of the grid). Inconsistencies and incompatibilities in national legal frameworks for offshore developments, for example related to permitting and licensing procedures, should be addressed at the national level. The same goes for incompatibilities in support scheme frameworks. Finally, questions on decommissioning of offshore grid components should be addressed by developing guidelines at international level, through IMO or OSPAR, building on the existing international law on the topic of decommissioning.

In chapter 6, the North Sea Agreement as a framework treaty for the legal framework of the MOG was explored. The North Sea Agreement should be designed as a mixed partial agreement, to which the relevant North Sea coastal states and the European Union are signatories. The European Union needs to be member of the agreement, because EU member states have transferred their competence to the EU for many issues, which means that they can no longer autonomously conclude treaties on the topics for which they have conferred their competence (pre-emption). There are some examples of earlier mixed partial agreements that are used for the governance of a specific geographical region, such as the Alpine and Rhine Conventions, or for a specific economic activity, such as the Schengen Agreement and the Energy Charter Treaty. These examples could be used as a blueprint for a North Sea Agreement, as is visible in the Model North Sea Agreement that is added in the appendix to this dissertation.

Part III:

Substantiating the Rules: Concrete Proposals for the Development of a MOG

In the third part of this dissertation, substantive proposals for the legal framework are assessed, based on a qualitative analysis of different alternative ways to address an issue, on the basis of their economic, legal, socio-political, financial and environmental impact. This assessment is performed on the basis of an 'informal' cost-benefit approach, as mathematical precision cannot be reached at this stage and with these parameters.

The result of this approach is a list of recommendations that says which options will deliver a cost-effective development of the offshore grid in the North Sea. These recommendations have been incorporated in the Model North Sea Agreement that is added in the appendix to this dissertation.

The central research question, "*What legal framework should be implemented in order to facilitate the cost-effective development of a MOG in the North Sea?",* can be answered based on the outcomes of all previous questions. The legal framework that should be implemented in order to facilitate the cost-effective development of an offshore electricity grid in the North

Sea is a combination of various measures, as there is no one-size-fits-all legal instrument to address all barriers. Therefore, the legal framework should consist of the combination of instruments described in chapter 5, with the North Sea Agreement, described in chapter 6, as the backbone for the governance of the offshore grid. The concrete measures described in chapter 7 complete the legal framework for now. The findings from this dissertation have been brought together in a Model North Sea Agreement in the appendix to this dissertation.

Finally, it must be noted that with the offshore wind and offshore grid sectors changing constantly due to new economic and technological developments, the legal framework for a MOG should not be static, but dynamic. It should be adapted to new developments when they occur. New developments and new legal barriers can be addressed using the structure provided in this dissertation, namely the method for determining with which type of legal instrument an issue needs to be addressed (chapter 5), and the assessment framework which combines the economic, legal, socio-political, financial and environmental perspective, in order to compare alternative ways to address a topic (chapter 7).

8.2 Recommendations for the Legal Framework for the MOG

Based on this dissertation, a number of recommendations on the legal framework for the MOG can be made. First and foremost, the North Sea coastal states should initiate negotiations on a North Sea Agreement as a legal framework for the MOG. As the negotiations for such an international agreement are expected to take several years, it is important that this process is started without delay. Secondly, the legal barriers for hybrid assets in EU law should be removed. Hybrid assets are considered to be the first building blocks of the MOG, so their development over the coming years is an important step towards development of a MOG. Thirdly, the existing national legal frameworks need to be adapted to each other and to the future development of a MOG.

8.2.1 Adopt a North Sea Agreement

The first recommendation is that the North Sea coastal states that wish to develop a MOG together should start negotiations on a North Sea Agreement, an agreement under international law signed both by the coastal states and by the EU (a mixed partial agreement). There are various reasons why such an agreement is necessary. First, such an agreement is necessary to provide the structure and legal stability for intensive and long-term collaboration between the coastal states. The North Sea Agreement can provide for the common aim and principles of the MOG and provide a decision-making structure. Secondly, as the United Kingdom is leaving the EU, the MOG cannot be based solely on EU energy law. Thus, there is a need to specify which principles and rules will be applicable to offshore electricity infrastructure between the EU and the UK. Thirdly, there needs to be legal certainty on various concrete issues, such as how the offshore grid is governed, how regulatory supervision of the MOG is organised, how technical decisions are reached and how dispute resolution inside the MOG works.

As the negotiation of an agreement under international law may take several years, it is important that this process is started well ahead of when it is required. Suggestions on the contents of the agreement are added in the Model North Sea Agreement in the appendix to this dissertation.

8.2.2 Facilitate Development of Hybrid Assets

A second important recommendation is to facilitate the development of hybrid assets on the short term. At the moment, the substantive provisions of the Electricity Regulation, especially the so-called "70% rule", hold back the development of hybrid assets. It needs to be made clear by the European Commission how the "70% rule" needs to be interpreted with regard to offshore hybrid assets, and whether recital 66 of the Electricity Regulation can have any substantive effect, for example by providing exceptions for hybrid assets.

Furthermore, it needs to be verified whether the alternative of introducing several small bidding zones is indeed in line with current EU law. The small bidding zones model seems attractive, as it circumvents the difficulties with regard to the 70% rule. However, it significantly (negatively) influences OWF developers' revenues, whereas the grid owners may receive a disproportionately high congestion income. The difference in revenues between OWFs and grid owners needs to be balanced, in order to give OWF owners the possibility to recoup their investments on the electricity market rather than resorting to a continuous redistribution via higher subsidies. This could be done by providing financial transmission rights combined with contracts for differences to the different markets an OWF is connected to.

There are three requirements regarding the legal framework in order to make this possible: first, the national support schemes for OWFs need to be adjusted in order to make it possible to grant OWFs financial transmission rights coupled to contracts for difference in different coastal states. Secondly, there needs to be sufficient time before this is introduced, in order to provide legal certainty: this change requires OWFs and grid owners to change their market models and algorithms, which may take some time. Thirdly, some provisions from the EU Network Codes, such as the rules on Forward Capacity Allocation, may need to be amended.[945] The exact rules of changing the market model to a small zones model need to be developed in further legal and economic research.

8.2.3 Adapt the National Legal Frameworks to Each Other

Stakeholders have indicated that the permitting procedures for electricity transmission projects are perceived as a large hurdle to project development. This is already the case for projects within one state, but even more so for cross-border projects with permitting

[945] Specifically Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation, art. 39 and further; which describe the rules for forward capacity allocation. For example, it might be discussed whether OWFs should be able to transfer their financial transmission rights to other parties (art. 44), or whether the rights should be returned to the TSO if they are not used – after which the TSO can market them again. The OWFs in principle only received the rights in order to transport their offshore generated electricity to shore, not to trade and speculate on these rights.

procedures in two or more jurisdictions. For the MOG, many connections will have to be constructed, which means that many permitting procedures will need to be completed. The administrative costs related to the MOG will decline when the national permitting procedures for cross-border (electricity transmission) projects are streamlined. The same goes for national support scheme rules, as mentioned above: they need to be adjusted to the possibility that OWFs are not connected only to one coastal states, but to multiple states. This requires amendments of national law.

8.2.4 Provide Clarity on End-of-Lifetime of OWFs and MOG Assets

In international law, the general rule is that installations should be removed at the end of their lifetime. However, if they obtain another function (including an ecological function as artificial reef), they can remain in place if the coastal state so decides. This can also be applicable to offshore wind turbine foundations, which are known to function as artificial reefs in certain circumstances. Whether foundations are removed at the end of the lifetime of the OWF, or whether they stay in place in a new function matters for the configuration of the offshore grid, as it determines whether new OWFs can be constructed in the same area, and thus whether certain grid connections or hubs can be re-used or not. The coastal states should provide more clarity on what happens at the end-of-lifetime of OWFs.

Moreover, there is currently no obligation to remove subsea cables when they lose their function. It could be discussed whether such an obligation should be introduced. There are two reasons for this, namely because states may want to avoid the 'spaghetti scenario' with an uncoordinated amount of subsea cables, especially close to landing points, and because subsea electricity cables may contain materials that should not leak into the marine environment. However, the environmental impact of removing the cables should be weighed against the environmental impact of leaving the cables in place – a case-by-case approach can reflect the different impact in different situations (i.e. removal of cables when they are located in specific, heavily used, areas, but leaving the cables in place in other cases). International guidelines on this topic could be developed.

8.2.5 Time is Crucial

A final recommendation, which is applicable to all other recommendations, is that governments need to start to implement the aforementioned changes, because time is of the essence. Legislative changes generally take a long time to prepare, adopt and implement. Therefore, governments need to start in time in order to make sure that barriers in the current legislative framework are amended before they hold back offshore grid developments in the coming decades. If time is wasted, development costs are likely to be higher and societal benefits may be delayed.

8.3 Design Principles for the MOG

As described in the introduction to this dissertation, the future legal framework for the MOG should adhere to two design principles: first, the legal framework should be able to cope with the uncertainty around technological developments, the grid development scenario that is chosen and other unknown developments, and secondly, the legal framework should take into account the complexity of the multiple layers of legislation and the many actors and interests involved.

The uncertainty about future developments is addressed through designing a legal framework that is independent of the technologies used and of the preferred grid development scenario. In this way, it does not matter how the grid develops exactly or which technologies are employed – the legal framework will be ready for any type of offshore grid development.

The complexity of the multi-layer legal framework is addressed through the mixed partial agreement that provides for a governance framework in which both the EU and the coastal states (both EU members and non-EU members, regardless of their legal relation with the EU) are able to participate. Moreover, specific attention is paid to specific groups such as the NRAs (in section 7.3.5 on Regulatory Supervision), the TSOs (in 7.3.3 on Grid Ownership) and the OWF developers (in section 7.3.4 on Support Schemes and section 7.3.6 on Market Rules).

8.4 Future Outlook and Further Research

A future outlook to the development of offshore electricity grid is difficult to give, as this depends on technological development which is difficult to predict. However, some broad forecasts can be given.

A first development is that as the installed capacity of offshore wind is expected to rise considerably, and as the volatility of electricity supply increases as a consequence, a main point will be sector integration between electricity and other energy carriers, such as methane and hydrogen, which may take place onshore, offshore or both. This requires not only technological research and development, but also a legal framework that allows for sector integration to take place. This includes the regulatory framework as well as a clear division of roles and responsibilities. An example of a regulatory question that should be addressed is whether the TSO has the obligation to construct an electrical connection from an OWF to the offshore (or onshore) grid if there is a more cost-effective alternative, for example via conversion of the electrical energy into chemical energy (through power-to-gas), and to transport the gas to the onshore (gas) network via existing gas infrastructure. This could be the case for OWFs that are located relatively close to existing gas infrastructure and relatively far from existing offshore electricity grid infrastructure.

Another development, indirectly related to the development of a MOG, is the possible construction of artificial islands in the North Sea. These artificial islands could serve as locations for the large converter stations that are needed for the MOG and as hubs for OWF logistics, for example for spare parts and maintenance. There are many legal questions with regard to the development of artificial islands, such as which entity would be responsible for the construction of such islands, what (national and EU) law is applicable to artificial islands and to what extent artificial islands can be developed in environmentally sensitive areas. These questions can be addressed in future legal research.

Several other issues that have been analysed in this dissertation need more research. First, it would be valuable to substantiate the findings of chapter 7 through stakeholder surveys. For example, it would be helpful to perform a sensitivity analysis on the outcomes of the analysis through surveys to policy makers, representatives from NRAs, grid developers (TSOs and OFTOs), OWF developers, NGOs and (potential) investors. In such surveys, the policy makers and stakeholders should indicate whether they would estimate the economic, legal, socio-political, financial and environmental impact of a certain alternative as positive or negative, and whether they consider the weight of the different parameters equal or whether they think the different interests should be weighted differently. This would provide insight into the robustness of the analysis with regard to the opinions of different (types of) stakeholders.

Secondly, the shift from the current market model to a 'small bidding zones' model requires a solution on the changed income pattern for OWFs versus grid owners. Rather than continuous redistribution via subsidies to the OWFs, this can be based on market solutions, such as financial transmission rights. The exact rules for such financial transmission rights require further legal and economic research.

Finally, more research is required on the (cumulative) environmental impact of different decommissioning options over the short and long term. In such an analysis, it is important that the differences between the oil and gas sector and the offshore wind and offshore electricity transmission sector are recognised. Then, legislation on this topic should be based on a comparison of environmental impacts of removal, and leaving (part of) the installations and cables in place.

B

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APPENDICES

A Model North Sea Treaty
Summary
Nederlandstalige Samenvatting
Curriculum Vitae

A Model North Sea Agreement

A North Sea Agreement should be developed by the legislative authorities of its contracting parties. However, on the basis of the research in this dissertation, some suggestions on the contents of such a North Sea Agreement can be made. These suggestions are listed below, in the form of a Model North Sea Agreement.

Model North Sea Agreement

Article 1: Aim and Principles of the MOG

All contracting parties should agree on the common aim and principles of the cooperation. This could be either narrow, i.e. the cost-effective connection of offshore wind energy to the onshore electricity grids of the contracting states, or broad, i.e. to facilitate the energy transition in a wider sense, including the use of depleted oil and gas fields and the possibility of offshore power-to-gas.

Article 2: Scope and Definitions

As the legal situation of different types of assets needs to be clarified, a definition of the assets is necessary. This article could also be used to clarify a common interpretation of relevant UNCLOS provisions on jurisdiction over different types of cables.

Article 3: Decision-making Structure

An important goal of the North Sea Agreement is to provide a stable structure for the coastal states to cooperate with each other on a long term. A clear decision-making structure is indispensable for this. This article could introduce different levels of decision-making, as some decisions are rather political whereas others are of a technical nature. Centralised decision-making for the entire North Sea region, rather than individual decision-making by all the coastal states separately, should be pursued. Moreover, proactive decision-making is to be preferred over reactive decision-making.

Article 4: (Bi)annual Conference of the Parties

Based on other mixed partial agreements for the governance of a certain geographic area (chapter 6), it seems beneficial to split decision-making into different levels. A (bi)annual conference of the parties would then be the highest level of decision-making, reserved for political decisions. This article should specify when such a conference is organised, who sets the agenda and what voting procedure is used.

Article 5: Committee Structure

A second layer of decision-making could then be reserved for decisions of a more technical nature, such as decisions on long-term grid planning, on operational rules, on regulatory governance etc. This article should sketch the committee structure, the composition of the committees, agenda setting in the committees and operation of the committees.

Article 6: Secretariat

Again following the example of other mixed partial agreements, a secretariat provides for the continuity of an agreement and organises day-to-day management. This could be valuable for the governance of a MOG as well. This article should describe the tasks and responsibilities of the secretariat.

Article 7: Long-term Grid Planning

One of the most important issues related to the MOG is long-term planning of OWFs and grid development, both geographically and temporally. This long-term planning of both OWFs and the grid itself is necessary in order to come to the most cost-effective connection of OWFs, to avoid stranded investments (i.e. cables to nowhere) and to make sure that the project pipeline is evenly distributed in time, which is important for the supply chain of offshore grid components.

Long-term grid planning should be organised in a similar way as the TYNDP process or even as a part of the TYNDP process (if the UK agrees). Otherwise, a regional infrastructure plan, such as suggested by Müller,[946] could be used. The grid planning should have a sufficiently long scope in time, in order to allow for anticipatory investments in future connections. Moreover, the planning should be updated regularly (i.e. biannually, in parallel to the TYNDP), in order to allow for new developments to be taken into account.

Article 8: Regulatory Supervision

Currently, all national regulatory authorities decide on the income and tariffs of grids in 'their' part of the North Sea. However, with a complex cross-border grid, it becomes difficult to do this, and grid owners will be confronted with a variety of different income and tariff decisions. These national differences may lead to perverse incentives and not necessarily to the most cost-effective grid development. Therefore coordination of regulatory supervision is necessary. After weighing different options, including the founding of a new 'North Sea Regulator' and giving this task to ACER, the most beneficial option is not creating a new entity but rather fortifying the existing cooperation between national regulatory authorities around the North Sea. How this should be done specifically, should be included in this article as well.

Article 9: Regulatory Framework for the MOG

At the moment, the electricity grids of the EU Member States are regulated on the basis of EU law. However, when the UK leaves the EU, the UK part of a MOG will no longer be bound by EU law, which means that the regulatory framework of electricity grids on both sides will start to diverge from each other. This can be problematic for cross-border MOG connections between EU states and the UK. A provision bridging the legislative gap might be needed – unless this topic is already addressed in a possible future general cooperation agreement

[946] Müller (2016), p. 328 and further.

between the EU and UK. If necessary, this article would then need to specify how MOG assets are regulated, as a *lex specialis* to general (EU) energy law.

Article 10: Operational Rules

A similar issue exists with regard to the EU Network Codes, which currently specify all operational rules for electricity grids, but to which the UK will no longer be bound after the UK leaves the EU. This means that even though the rules and procedures may be similar at the moment, they will diverge from each other when the rules are updated and the UK is not required to follow this update. This article should specify how this issue is handled. It is not necessary to provide a solution for the very specific operational rules for interconnected AC grids, as the MOG (or at least the cross-border connections to the UK inside the MOG) will be based on HVDC technology. Therefore, it suffices to specify the rules for DC networks.

Article 11: Technical Standardisation

Next to operational rules, some technical standardisation is needed in order to make sure that grid assets from different manufacturers can be used without causing disruptions to the MOG. A source of inspiration for how a simple provision regarding technical standardisation and operability can be adopted in a general legal framework can be found in the Model Intergovernmental Agreement (IGA) for pipeline systems, as developed by the Energy Charter Secretariat: "*The States shall endeavour to harmonise their respective technical standards applicable to Project Activities*."[947] With such a clause, the parties agree to harmonise technical standards.

Article 12: Appeals Procedures and Dispute Resolution

With any long-term cooperation, disputes can arise, either between contracting parties or between a contracting party and a grid owner (a regulatory dispute). In order to make sure that conflicts regarding the legal framework for OWFs will not lead to changes in the interpretation of EU law, a so-called disconnection clause is needed. Moreover, it is important to provide for an appeals procedure for regulatory disputes as well in a North Sea Agreement, since the currently existing course of legal action (ACER Board of Appeal, CJEU) will not be available for regulatory disputes concerning cross-border lines with the UK.

[947] Energy Charter Secretariat, Model Intergovernmental and Host Government Agreements For Cross-Border Pipelines, Second Edition, 2007, art. 11. The Model IGA is available at https://energycharter.org/fileadmin/DocumentsMedia/Legal/ma2-en.pdf.

A

Summary

With the fast-growing capacity of offshore wind energy in the North Sea and an increasing demand for interconnection between its coastal states, there is a trend towards developing offshore electricity infrastructure in the North Sea. Such infrastructure would facilitate the cost-effective connection of offshore wind farms as well as increase the possibilities for electricity trade between the different coastal states. This is true especially when, rather than using separate connections for the offshore wind farms and for the connections between countries, a Meshed Offshore Grid (MOG) is developed in which both functions are combined. However, the current legal framework on offshore electricity cables was not developed with a MOG in mind. As a result, there are several barriers in the current legal framework which need to be addressed in order to facilitate the development of a MOG in the North Sea. This dissertation answers the central research question "*What legal framework should be implemented in order to facilitate the cost-effective development of a MOG in the North Sea?"*

This question is answered in three parts. In the first part, the current legal framework for offshore electricity infrastructure on international, European and national level is examined. In the second part, the various options for legal instruments to address the barriers identified in the first part are discussed. In the third part, the concrete measures to substantiate the legal instruments recommended in the second part are discussed.

This dissertation concludes that the legal framework for the MOG should be formed on the basis of a mixed partial agreement, a North Sea Agreement. The contents of such an agreement are discussed in the dissertation, and an overview of these suggestions is added in the Appendix.

Part I: The Current Legal Framework

Regarding the current legal framework at international law level, two topics are relevant for the MOG: to what extent do states have jurisdiction over a certain asset, and what responsibilities do states have under international law, for example with regard to environmental protection. Concerning the former, an important finding is that the extent of coastal states' jurisdiction is clear with regard to existing types of electricity cables (namely, the cables needed to transport electricity from offshore windfarms (OWFs) to the onshore grid and regular interconnector cables between two states) when they are viewed separately. However, when these two functions are mixed, forming an offshore grid, the jurisdiction over the assets is not clear. This should be addressed in the future legal framework for a MOG. This can be done by amending UNCLOS or by concluding a new treaty. Alternatively, the states around the North Sea could create legal certainty by agreeing on a common interpretation of the existing formulations in UNCLOS and in national legal texts.

Concerning EU law, it is important to note that EU law can only be applicable as far as the coastal states have jurisdiction over the assets. Assuming that the states have resolved the issue around jurisdiction described above, EU law will have a large influence on various aspects of activities related to the MOG. First, the general principles of the energy market, such as unbundling and third party access, will also apply to the MOG. Moreover, there are several EU Directives in the context of maritime spatial planning and environmental law that are relevant to the development of offshore electricity infrastructure. Finally, the more technical EU Network Codes, that are currently applicable to electricity grids and the internal electricity market, should be slightly amended in order to incorporate HVDC technology, which is necessary for the operation of a MOG.

The most important legal barrier at EU law level is that, without any changes, the currently applicable rules for interconnectors will also be applicable to the MOG. This would lead to various difficulties, such as that the operator of a cable that is used both for interconnection and for the connection of OWFs (a 'hybrid' cable) cannot give preferential access to the OWFs connected to the cable. This is no longer possible under the legislative changes of the 'Clean Energy Package', but without such access, it is difficult for the OWF owners to market the offshore generated electricity under the same circumstances as other sources of electricity. Thus, OWFs connected to a MOG will have a significantly worse position than OWFs connected to the onshore grid via a radial connection (the status quo) and compared to other types of (onshore) renewable energy. This can be addressed in the legal framework for the MOG by changing the EU Regulation at this point, by introducing separate rules for 'hybrid' cables and cables that are part of the MOG, or by introducing a new system of bidding zones, namely small bidding zones rather than bidding zones based on the EEZs of the coastal states.

For the analysis of national legal frameworks of the North Sea coastal states, a comparative method is used. It appears that there is a large diversity in the national legal frameworks that are relevant for a cross-border offshore grid, such as maritime spatial planning, financial support for OWFs and the rules on decommissioning at the end of the lifetime of OWFs. In principle, a diversity of rules is not problematic for the MOG, but some degree of compatibility between the different systems is required, for example with regard to the permits needed for cross-border infrastructure. Interestingly, a natural convergence between the legal frameworks of several coastal states is already noticeable. Coastal states seem to copy successful features from other states' legal frameworks in their own legal frameworks, and appear to remove or improve unsuccessful features when they copy from other states' legal frameworks. This brings the legal frameworks closer to each other. However, in the new legal framework, attention still needs to be paid to the compatibility of the permitting procedures for cross-border assets, rules on support schemes, rules on network charges (specifically on the issue of charges for generators), and decommissioning obligations.

In Part I, it thus becomes clear that legal barriers to the development of a MOG exist on international, EU and national level that need to be addressed in the new legal framework.

Part II: A New Legal Framework for Offshore Electricity Infrastructure in the North Sea

In Part II, the different instruments that could be used for the legal framework that applies to the MOG are analysed. Within the three levels (international, EU and national), both 'hard law' and 'soft law' instruments have been considered. However, which legal barrier should be addressed with what instrument is not always clear. Therefore, in this dissertation, a decision tree has been developed to decide which topic should be addressed at which level. Subsequently, this decision tree is used to define which legal instruments should be used for the legal framework that applies to the offshore grid. The outcomes of this analysis are the following:

- Concerns about the jurisdiction over parts of the MOG should be addressed by an agreement under international law. The same agreement can be used to address the governance of the offshore grid. This agreement could serve as a framework agreement for the North Sea offshore grid, or for (wider) North Sea energy activities that need to be coordinated.
- Operational issues should be addressed through the existing regime of European Network Codes.
- Inconsistencies and incompatibilities in national legal frameworks for offshore developments should be addressed at the national level.
- Incompatibilities in support scheme frameworks should be addressed by amending national law.
- Finally, the decommissioning of offshore grid components should be addressed by developing guidelines at the international level, through IMO or OSPAR, building on the existing international law related to decommissioning.

The agreement mentioned above (referred to as the North Sea Agreement) should function as a framework treaty for the legal framework of the MOG. Since EU Member States cannot autonomously conclude treaties on topics for which they have conferred competence to the EU, the North Sea Agreement should be designed as a mixed partial agreement. This is an agreement to which both the coastal states and the EU are signatories – both for their respective competences – and which non-EU member states can also join. There are some examples of existing mixed partial treaties that are used for the governance of a specific geographical region, such as the Alpine and Rhine Conventions, or for a specific topic, such as the Schengen Agreement and the Energy Charter Treaty. These examples could be used as a blueprint for a North Sea Agreement.

Part III: Concrete Proposals for the Development of an Offshore Grid

The third part of this dissertation assesses substantive proposals for the legal framework based on a qualitative analysis of different alternatives to address an issue, whilst taking into account their economic, legal, socio-political, financial and environmental impact. This assessment is performed on the basis of an 'informal' cost-benefit approach (CBA), as mathematical precision cannot be reached due to the qualitative nature of various parameters and/or due to a lack of quantitative data.

The result of this analysis is a list of recommendations showing which options will deliver a cost-effective development of the offshore grid in the North Sea. The main outcomes of this analysis are:

- Centralised and proactive decision-making are preferred over decentralized and reactive decision-making.
- Regional planning is recommended above country-specific planning.
- A centralized or zonal permitting system is more likely to lead to a cost-effective development of a MOG rather than open-door approaches: in the latter, OWFs may be constructed far away from existing grid developments and require the bridging of much longer distances for grid connection.
- Multiple-use of the area between turbines inside an OWF should not be allowed, or only allowed for activities which have no or very little negative environmental impact.
- The responsibility for grid connection of the OWFs should lie with transmission system operators (TSOs), who have a long-term perspective on (offshore) grid development.
- In order to take away legal barriers regarding support schemes, it is recommended to decouple the market flows from physical flows. In other words: national legislation should not require electricity flows to physically reach the coastal state, as this goes against the central principles of the offshore grid, namely that the electricity flows to the area where it gives the highest socio-economic benefits. In order to reap the benefits of the offshore generated electricity, it is possible to require the electricity to be marketed in the coastal state. In the long term, a regionally organised support scheme is recommended, in which the states that benefit from the generated electricity pay for the support.
- For the regulatory supervision of the offshore grid, no new entity should be created. Rather, the cooperation between national regulatory authorities (NRAs) should be enhanced.
- The differing lifetimes of OWFs and the MOG are a point of attention that needs to be addressed in the legal framework for the MOG. At the end of an OWF's lifetime it is recommended that new tenders are organised for the same area, in order to be able to use the same MOG connection. Considering the large amount of cables to be installed in the context of the MOG, it could be discussed whether a removal obligation for cables should be introduced. More research into this topic is necessary, but a preliminary analysis shows that cables can be left in place except in ecologically sensitive areas.

The central research question, "*What legal framework should be implemented in order to facilitate the cost-effective development of a MOG in the North Sea?",* can be answered as follows. The legal framework that should be implemented in order to facilitate the cost-effective development of an offshore electricity grid in the North Sea is a combination of various measures. However, as a backbone for the legal framework, a 'North Sea Agreement' should be adopted. The concrete measures as described in chapter 7 complete the legal framework for now, and are in fact suggestions for the contents of a North Sea Agreement (a full list of suggestions can be found in the Appendix).

Nevertheless, with the offshore wind and offshore grid sectors changing constantly due to new economic and technological developments, the legal framework for a MOG should not be static but dynamic. It should be adapted to new developments when they occur. New developments and new legal barriers can be addressed using the structure provided in this dissertation, namely the method for determining which type of legal instrument should address a particular issue (chapter 5), and the qualitative assessment framework which combines the economic, legal, socio-political, financial and environmental perspective, in order to compare alternative ways to address each upcoming issue (chapter 7).

Nederlandstalige Samenvatting

Met de groei van windenergie op zee in de Noordzee en met een steeds groter wordende behoefte aan interconnectie tussen de Noordzeelanden, neemt de interesse toe in het ontwikkelen van een offshore elektriciteitsnet. Dergelijke infrastructuur zorgt ervoor dat offshore windparken op een kosteneffectieve manier kunnen worden aangesloten op de bestaande elektriciteitsnetten en vergroot tegelijkertijd de interconnectiecapaciteit tussen de kuststaten, zeker wanneer de twee hierboven genoemde functies (aansluiting van offshore windparken en verbinding van kustlanden met elkaar) worden gecombineerd in een zogenoemd 'vermaasd' elektriciteitsnet (hierna 'net op zee'). Het huidige juridische kader is echter ontwikkeld vóórdat er sprake was van zo'n net op zee, waardoor er nu verschillende (juridische) barrières voor het ontwikkelen van een net op zee zijn. Deze barrières moeten worden beslecht om te zorgen dat het net op zee kan worden ontwikkeld. De centrale vraag van dit proefschrift is dan ook *"Wat voor juridisch kader is nodig voor de kosteneffectieve ontwikkeling van een elektriciteitsnet in de Noordzee?"*

Deze vraag wordt beantwoord in drie delen. In het eerste deel wordt het huidige juridische kader voor offshore elektriciteitsinfrastructuur op internationaal, Europees en nationaal niveau besproken. In het tweede deel worden de verschillende juridische instrumenten geanalyseerd die aangewend kunnen worden om de (in Deel I) geïdentificeerde barrières weg te nemen. In het derde deel worden de concrete maatregelen besproken die kunnen worden opgenomen in het juridisch kader voor een offshore elektriciteitsnetwerk.

Een hoofdbevinding van dit proefschrift is dat er een Noordzeeverdrag zou moeten worden gesloten, als ruggengraat voor het juridisch kader voor het net op zee. De inhoud van zo'n verdrag wordt besproken in het proefschrift, waarbij in de Appendix een overzicht van de mogelijke inhoud van het verdrag wordt gegeven.

Deel I: Het huidige juridische kader

In het huidige juridische kader op internationaalrechtelijk niveau zijn twee onderwerpen relevant voor het net op zee, namelijk in hoeverre kuststaten jurisdictie hebben over bepaalde kabels en installaties, en wat voor verantwoordelijkheden staten hebben onder internationaal recht met betrekking tot de bescherming van het maritieme milieu. Met betrekking tot de jurisdictie van kuststaten over kabels en installaties is een belangrijke constatering dat de juridische situatie van kabels verschilt afhankelijk van hun gebruik, namelijk om windenergie naar land te brengen, dan wel om een handelsverbinding tussen twee landen te scheppen. Zodra deze functies worden gecombineerd, in het kader van een net op zee, is de rechtspositie van kuststaten met betrekking tot deze infrastructuur niet meer duidelijk. Dit heeft dringend opheldering nodig. Dit kan gebeuren door UNCLOS te amenderen of door een nieuw verdrag te sluiten. Een alternatieve oplossing is dat de Noordzeestaten meer juridische zekerheid kunnen creëren door samen een gemeenschappelijke interpretatie van UNCLOS af te spreken.

Met betrekking tot Europees recht is het ten eerste belangrijk dat Europees recht alleen van toepassing is voor zover de kuststaten jurisdictie hebben over de kabels en installaties.

Aangenomen dat de kuststaten de (in de vorige alinea genoemde) onduidelijkheid rond jurisdictie hebben opgelost, heeft Europees recht een grote invloed op verschillende aspecten van het net op zee. Ten eerste zijn de algemene principes van de interne energiemarkt, zoals ontvlechting van netbeheer en commerciële activiteiten alsmede derdentoegang tot het elektriciteitsnetwerk, ook van toepassing op het net op zee. Daarnaast zijn er meerdere EU Richtlijnen in de context van maritieme ruimtelijke ordening en milieurecht van toepassing. Vervolgens gelden ook de meer technische EU Netcodes voor elektriciteitsnetwerken en voor de elektriciteitsmarkt. Deze Netcodes moeten wel enigszins aangepast worden om te zorgen dat de regels ook aansluiten bij de techniek van hoogspanningsgelijkstroom (HVDC), aangezien deze techniek de basis vormt van een offshore elektriciteitsnetwerk. De belangrijkste juridische barrière op EU niveau is dat de huidige regels voor interconnectoren ook van toepassing zullen zijn op het net op zee. Dat leidt tot verschillende problemen. Een voorbeeld daarvan is dat de beheerder van een kabel die zowel gebruikt wordt om wind op zee aan te sluiten op het landelijke net en om handel te drijven tussen twee kuststaten (een 'hybride' kabel) geen voorrang mag geven aan de windparken die aangesloten zijn op die kabel. Die kabel heeft echter wel een beperkte transmissiecapaciteit, die soms al vergeven kan zijn aan handelsstromen in plaats van aan de windenergie. Daardoor hebben deze windparken een significant slechtere positie, zowel in vergelijking met offshore windparken die met een directe kabel aan het onshore netwerk worden aangesloten (de status quo), als in vergelijking met andere hernieuwbare energiebronnen (op land). Dit kan worden opgelost door de Europese verordening op dit punt te veranderen door aparte regels op te stellen voor 'hybride' kabels en offshore elektriciteitsnetwerken, of door een nieuw systeem van biedzones te introduceren, namelijk kleine lokale biedzones in plaats van biedzones gebaseerd op de zeegrenzen van de kuststaten.

Voor de analyse van de nationale juridische kaders van de Noordzeestaten wordt een rechtsvergelijkende methode gebruikt. Er blijkt een grote diversiteit te bestaan tussen de juridische kaders van de verschillende kuststaten op het gebied van maritieme ruimtelijke ordening, financiële steun voor offshore windparken en de regels rond het verwijderen van de windparken aan het eind van hun levensduur. In principe is een diversiteit aan regels tussen de verschillende staten niet problematisch voor een net op zee, maar op onderdelen moet er wel enige afstemming zijn tussen de verschillende regels, bijvoorbeeld met betrekking tot de nu variërende vergunningseisen voor grensoverschrijdende infrastructuur. Een interessante ontwikkeling is dat er reeds een natuurlijke convergentie tussen de juridische kaders van de kuststaten zichtbaar is. Kuststaten lijken de succesvolle onderdelen van elkaars juridische kader over te nemen, terwijl de onsuccesvolle elementen worden aangepast of verwijderd. Hierdoor komen de nationale juridische kaders dichter bij elkaar. Toch moet er in het voorgestelde nieuwe juridische kader voor een net op zee meer aandacht besteed worden aan de afstemming van de regels in verschillende kuststaten met betrekking tot de vergunningverlening voor grensoverschrijdende projecten, financiële steun voor de windparken, regels rond de netwerktarieven voor elektriciteitsproducenten en regels rond het weghalen van kabels aan het eind van hun levensduur.

In Deel I zijn kortom verschillende juridische barrières geïdentificeerd, zowel op internationaal, EU- als nationaal niveau. Om deze barrières te beslechten is een nieuw juridisch kader voor het net op zee vereist.

Deel II: Een nieuw juridisch kader voor een elektriciteitsnet in de Noordzee

In Deel II worden de verschillende juridische instrumenten geanalyseerd, waarmee de eerder geïdentificeerde barrières kunnen worden opgelost. Binnen de drie rechtsniveaus (internationaal, EU en nationaal recht) worden zowel harde als zachte (niet juridisch-dwingende) instrumenten beoordeeld. Welk instrument gebruikt moet worden om welke barrière op te lossen is niet altijd duidelijk. Daarom is in dit proefschrift een beslisboom ontwikkeld waarmee besloten kan worden welk onderwerp door welk juridisch instrument aangepakt kan worden. Deze beslisboom wordt daarna toegepast op de barrières voor het offshore elektriciteitsnetwerk. Daar komt het volgende uit:

- Onzekerheden inzake de jurisdictie over delen van het offshore elektriciteitsnet moeten worden verholpen door middel van een verdrag onder internationaal recht. Hetzelfde verdrag kan gebruikt worden om het beheer van het elektriciteitsnetwerk te regelen (bijvoorbeeld omtrent de verantwoordelijkheden en de besluitvormingsprocedures). Dit verdrag kan ofwel specifiek gelden voor het Noordzeenet ofwel gebruikt worden om een breder palet aan energie-gerelateerde onderwerpen voor de Noordzee te regelen.
- Operationele problemen zouden binnen het bestaande kader van Europese netcodes moeten worden opgelost.
- Inconsistenties en slechte afstemming in nationale juridische kaders zouden moeten worden aangepakt in de nationale juridische kaders zelf.
- De nationale subsidieregimes voor offshore windparken zouden op elkaar moeten worden afgestemd door de nationale juridische kaders op dit punt aan te passen.
- Het weghalen van onderdelen van het offshore elektriciteitsnet aan het einde van de levensduur zou moeten worden gecoördineerd door richtlijnen op internationaal niveau, bijvoorbeeld via de IMO of OSPAR, voortbordurend op bestaand recht ten aanzien van dit onderwerp.

A

Het hierboven genoemde verdrag (in dit proefschrift: *the North Sea Agreement)* zou een raamwerkverdrag moeten zijn dat het juridische kader biedt voor het net op zee. Omdat EU-lidstaten niet meer autonoom verdragen kunnen sluiten over onderwerpen waarvoor zij de competentie aan de EU hebben overgedragen, moet het verdrag vormgegeven worden als een zogenaamde *mixed partial agreement:* een verdrag waar zowel de lidstaten zelf, als de EU, als derde landen (niet-EU lidstaten) aan mee kunnen doen. Er zijn enkele voorbeelden van dergelijke verdragen die gebruikt werden voor een bepaald geografisch vastomlijnd gebied, zoals het Alpenverdrag en het Rijnverdrag, en verdragen die worden gebruikt voor het regelen van één specifiek thema, zoals het Schengenverdrag en het Energiehandvestverdrag. Deze bestaande voorbeelden kunnen dienen als blauwdruk voor een Noordzeeverdrag.

Deel III: Concrete voorstellen voor de ontwikkeling van een net op zee

In het derde deel van het proefschrift worden concrete voorstellen ten aanzien van het juridisch kader voor een net op zee getoetst aan hun economische, juridische, sociaal-politieke, financiële en milieu-impact. De analyse is gebaseerd op een 'informele' kosten-baten analyse (KBA), aangezien wiskundige precisie op veel van de thema's niet mogelijk is, door de aard van de thema's en/of omdat er simpelweg niet genoeg data beschikbaar zijn.

Het resultaat van deze kwalitatieve analyse is een lijst met aanbevelingen die zorgen voor een kosteneffectieve ontwikkeling van een Noordzee-elektriciteitsnetwerk. De belangrijkste uitkomsten van de analyse zijn:

- Gecentraliseerde en proactieve besluitvorming hebben de voorkeur boven gedecentraliseerde en reactieve besluitvorming;
- Regionale planning wordt geprefereerd boven landenspecifieke planning;
- Een gecentraliseerd of op zones gebaseerd vergunningensysteem draagt eerder bij aan een kosteneffectieve ontwikkeling van het Noordzee-net dan *open-door* procedures (waarin de ontwikkelaars zelf de plaats kiezen waar zij een windmolenpark willen bouwen), omdat in het laatste geval de windparken ver weg kunnen komen te liggen van de bestaande netwerkinfrastructuur;
- Dubbel gebruik van de ruimte in een offshore windpark (bijvoorbeeld voor aquacultuur of visserij) zou niet moeten worden toegestaan of alleen als er geen of weinig negatieve milieu-impact te verwachten valt (wat per individueel geval beoordeeld moet worden);
- De verantwoordelijkheid voor het aansluiten van de windparken zou moeten liggen bij de netbeheerders, die immers een langetermijnperspectief hebben op de ontwikkeling van een offshore elektriciteitsnetwerk;
- Wat betreft de subsidie voor offshore windparken wordt aanbevolen om niet langer het vereiste te hanteren dat de opgewekte elektriciteit fysiek het netwerk van de kuststaat bereikt in wiens gebied het windpark ligt. Dat is nu soms nog wel het geval, maar dit gaat in tegen het principe van een vermaasd elektriciteitsnetwerk, namelijk dat de elektriciteit vloeit naar de plaats waar er de meeste behoefte aan is, dus waar het sociaal-economische voordeel het grootst is. Op de lange termijn wordt aanbevolen om een regionaal subsidiemechanisme te maken, waarin de landen die profiteren van de opgewekte elektriciteit ook betalen voor de subsidie op dat moment. Dat kan via een nacalculatie gebeuren.
- Voor het regulatoire toezicht op het offshore elektriciteitsnetwerk is het niet nodig om een nieuwe toezichthouder te creëren. In plaats daarvan zou de samenwerking tussen de verschillende nationale toezichthouders van de elektriciteitsnetwerken verder versterkt moeten worden.
- Er is meer onderzoek nodig naar de milieu-impact rond het verwijderen van netwerkonderdelen aan het eind van hun levensduur (de levensduur van het

elektriciteitsnetwerk is veel langer dan die van de windparken zelf). Op basis van de huidige informatie wordt aanbevolen dat een windpark tegen het einde van zijn levensduur wordt vervangen door een nieuw windpark in hetzelfde gebied, waardoor dezelfde netwerkinfrastructuur hergebruikt kan worden. Verder zou het, gezien de grote hoeveelheid kabels die de komende jaren in de zee zal worden neergelegd, besproken kunnen worden of een verwijderingsplicht voor onderzeese kabels moet worden ingevoerd. Er is meer onderzoek nodig naar dit onderwerp, maar het zou bijvoorbeeld kunnen worden voorgesteld dat kabels in principe kunnen blijven liggen behalve in ecologisch gevoelige gebieden.

De centrale onderzoeksvraag, *"Wat voor juridisch kader is nodig voor de kosteneffectieve ontwikkeling van een elektriciteitsnet in de Noordzee?"* kan als volgt beantwoord worden. Het juridische kader dat nodig is om de kosteneffectieve ontwikkeling van het Noordzeenet te faciliteren is een combinatie van verschillende maatregelen. Het Noordzeeverdrag dat in dit proefschrift geïntroduceerd wordt zou moeten dienen als raamwerk voor het juridisch kader. De concrete maatregelen die vervolgens genomen moeten worden, uitgewerkt in hoofdstuk 7, completeren het juridisch kader voorlopig. Deze maatregelen zijn suggesties om op te nemen in het Noordzeeverdrag (waarbij een volledige lijst van suggesties in de Appendix te vinden is).

Aangezien de offshore windsector en offshore elektriciteitssector zich constant ontwikkelen, moet het juridisch kader niet statisch maar juist dynamisch zijn. Het moet derhalve aangepast kunnen worden aan nieuwe ontwikkelingen. Nieuwe ontwikkelingen alsmede nieuwe barrières die opkomen kunnen vervolgens met dezelfde, in dit proefschrift gebruikte, structuur geanalyseerd worden. Ten eerste gaat het er dan om welk juridisch instrument gebruikt kan worden voor welk probleem. Ten tweede kan dan hetzelfde vergelijkingskader gebruikt worden als in hoofdstuk 7, waarbij voor de oplossing van een probleem verschillende alternatieven worden vergeleken op basis van hun economische, juridische, sociaal-politieke, financiële en milieu-aspecten.

Curriculum Vitae

Ceciel Nieuwenhout was born in Alkmaar, the Netherlands, in 1991. Before commencing her PhD research, in 2016, she acquired an LLM degree from the College of Europe in Bruges in the programme 'European Legal Studies'. Moreover, in 2015, she obtained an LLM-degree from the University of Groningen in European Law with the specialisation 'Energy and Climate Law'. Before that, in 2013, she received her LLB-degree in 'International and European Law' combined with Dutch law from the University of Groningen.

Throughout her university studies, Nieuwenhout pursued various extracurricular activities, such as the University of Groningen Honours College (Bachelor and Master) and French and Russian language proficiency courses. She was an active member of various student organisations, including the Dutch United Nations Student Association (in Dutch: SIB) and the student sailing associations G.S.Z. Mayday and Zeilstichting Aeolus. To get a broad understanding of law in theory and practice, she completed internships at the Benelux Union (Brussels), Clifford Chance (Amsterdam) and Gasunie (Groningen).

Nieuwenhout's current research interests are related to energy law, European law, law of the sea, and Competition and State Aid Law applied to the energy sector. At the Groningen Centre for Energy Law and Sustainability (GCELS), she is currently involved in Horizon2020 research project "POCITYF" on Positive Energy Buildings and Districts in various cities in Europe, with a special focus on the energy transition in cultural heritage districts and buildings.

Next to her work at the Faculty of Law, Nieuwenhout has been a member of the City Council of the Municipality of Groningen since January 2019, affiliated with the Green Party (*GroenLinks*).