Offshore wind turbines

An examination of whether there are regulatory differences between fixed and floating offshore wind turbines in Norway

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1. Introduction

1.1. Overview

This thesis will examine the legal requirements that exist in Norway concerning the establishment of offshore wind turbines and determine whether there are regulatory differences between fixed and floating offshore wind turbines. In this connection the thesis will also consider the different types of technology utilized for offshore wind turbines and whether the technological developments in the offshore wind sector influences the practice of current legislation.

Offshore wind turbines generated only 0.3% of the world's total energy production in 2018.[1] In total, renewable energy met 24% of the demand in the electricity sector in 2017.[2] However, with the increasing demand for energy worldwide and the increased focus on renewable energy, the production of wind turbines is rising at the same time as the technology keeps evolving. [3] The new technology of utilizing floating wind turbines opens for new possibilities in the energy sector which in turn may compel governments to adjust their laws in order to facilitate the development, which is what the thesis aims to examine.

Offshore wind turbines might represent a shift in the production of renewable energy and open new areas for commercial wind turbine generation, because its potential capacity is capable of meeting the worlds electricity demand.[4] However, it goes without saying that in order to establish offshore wind farms the legal requirements must be understandable and attainable for developers, while at the same time considering several plausible obstacles.

1.2. Research question

What are the legal requirements concerning the establishment of offshore wind turbines in Norway and are there regulatory differences between fixed and floating wind turbines?

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[1] IEA, Offshore Wind Outlook 2019, (Paris: IEA, 2019), https://www.iea.org/reports/offshore-wind-outlook-2019 page 3.
[2] IEA, Renewables 2018, (Paris: IEA, 2018), https://www.iea.org/reports/renewables-2018, page 19.
[3] IRENA, Offshore innovation widens renewable energy options: Opportunities, challenges and the vital role of international co-operation to spur the global energy transformation, (Abu Dhabi: International Renewable Energy Agency, 2018), https://irena.org/-/media/Files/IRENA/Agency/Publication/2018/Sep/IRENA_offshore_wind_brief_G7_2018.pdf, page 1.
[4] IEA, Offshore Wind Outlook 2019, page 50.

In particular, the thesis will investigate how technological advances affect the regulation of offshore wind turbines in Norway when applying the Offshore Energy Act.

The thesis will further investigate how the different legal sources work together in laying the foundation for the legislation.

The aim is also to review how political aims in the field of renewable energy production is translated into the legislation and how this affects the developers in this field.

1.3. Justification

Offshore wind power, if it is targeted as an industry, has been estimated to potentially become the fifth largest export in Norway in the next ten to twenty years according to "Eksportkreditt Norge" based on a report composed by Multiconsolt.[5] Additionally, offshore wind resources in Norway are commonly advantageous compared to other areas in Europe.[6] This illustrates the relevance of the topic and why it is interesting to study the legal framework in this area.

There is currently only one offshore wind turbine in Norway[7], and that is the Hywind Demo[8] that Statoil ASA (now Equinor ASA) installed off the coast of Karmøy, to test their floating wind turbine technology.[9] However, the Norwegian government has ambitions to expand into offshore wind and has released a proposal that has been undergoing public consultation regarding possible areas offshore that might be suitable for wind turbine establishment.[10]

The Offshore Energy Act from 2010 provides a basis for the regulation of offshore energy facilities in Norway. However, it does leave room for supplementary regulation and the act serves as a foundation for the establishment of additional offshore wind turbines in Norway. New technology, in addition to a new form of energy production on the Norwegian coast, will

[5] Eksportkreditt, "Kraftig vekst i fornybarnæringen, også oljeservice vokser igjen," Accessed April 17, 2020 from https://www.eksportkreditt.no/no/to-rapporter-om-norske-energinaeringer/
[6] The Norwegian Water Resources and Energy Directorate, Offshore Wind Power in Norway, (Oslo: The Norwegian Water Resources and Energy Directorate, 2013), http://publikasjoner.nve.no/diverse/2013/havvindsummary2013.pdf. Page 3.
[7] The Norwegian Water Resources and Energy Directorate, «Vindkraft til havs,» Accessed February 4, 2020 from https://www.nve.no/energiforsyning/vindkraft/vindkraft-til-havs/?ref=mainmenu
[8] Equinor, "How Hywind works," Accessed February 02, 2020 from https://www.equinor.com/en/what-we-do/hywind-where-the-wind-takes-us/hywind-up-close-and-personal.html
[9] The Hywind Demo is now called UNITECH Zefyros by Hywind Technology. Karoline Sjoen, "PRESS RELEASE JANUARY 8TH 2019," Accessed March 1st 2020 from https://unitechenergy.com/2019/01/08/press-release-january-8th-2019/
[10] Press release no: 039/19 (02.07.19) Offshore wind power: Public consultation on areas and regulation. Government.no, Accessed February 02, 2020 from https://www.regjeringen.no/en/aktuelt/offshore-wind-power-public-consultation-on-areas-and-regulation/id2662579/

raise questions in connection with how the legislation should be interpreted and how the development should move forward in order to function in accordance with what the legislators intended. This thesis will attempt to raise awareness towards different aspects of the legislation that might leave room for alteration or improvement.

The development plan for Hywind Tampen, Norway's first floating windfarm and the largest in the world, was in April 2020 approved by the government.[11] The approval signals that development in the offshore wind turbine sector is taking place, and the fact that the wind farm is floating exemplifies why it is necessary to investigate how this technology is perceived in the legislation. Floating offshore wind is now being targeted in a greater scale in Norway.

Finally, renewable energy production is beneficial to the environment as it contributes to reducing C02 emissions, a goal that Norway amongst other countries are striving for since the Paris agreement.[12] As a natural consequence in relation to this, it might therefore also be favorable if the wind turbines themselves represent minimal environmental intrusion. Considering that floating wind turbines are not fixed to the seabed they are less of a threat to the seabed's environment, making the installation less invasive.[13] Consequently, this might also contribute to companies and countries looking to invest in this technology. This is a point that will be further examined when discussing the impact of environmental impact assessments.

1.4. Methodology

In this thesis, the methodology used to analyze the research question is by means of doctrinal legal research, meaning it is primarily analytical, in the sense that it tries to uncover how the existing legal framework impacts the area of offshore wind production.[14] The thesis looks at

[11] Press release no: 020/20 (08.04.2020) Utbygging av Hywind Tampen godkjent. Government.no, Accessed March 23rd, 2020 from https://www.regjeringen.no/no/aktuelt/utbygging-av-hywind-tampen-godkjent/id2697222/

[12] St.meld. nr. 41 (2016–2017) Norway's Climate Strategy for 2030: a transformational approach within a European cooperation framework. Page 5.

[13] Hannon, Matthew, Eva Topham, James Dixon, David McMillan, Maurizio Collu, Offshore wind, ready to float? Global and UK trends in the floating offshore wind market, (Glasgow: University of Strathclyde, 2019), DOI: https://doi.org/10.17868/69501. Page 21.

[14] Duncan, Nigel and Terry Hutchinson, "Defining and describing what we do: Doctrinal Legal Research," *Deakin Law Review* 17, nr. 1 (2012): 83-119. https://doi.org/10.21153/dlr2012vol17no1art70. Page 101.

how the current technological advances and challenges in the field of offshore wind energy production are being catered by the legal framework.

Renewable energy production is a field of interest that is consistently subject to change as the technology matures. The idea behind the thesis is to investigate whether the legislation that has been composed to support and facilitate offshore wind energy development at any stage takes various technology into consideration and whether it would affect potential developers in any way.

Beyond examining the legal sources, the thesis discusses how environmental impact assessments that are conducted in the field of environmental and energy law become an important tool to preserve the environment by requiring that environmental concerns are being considered.[15] It will look at how the findings in such an assessment influences the grounds on which projects under the Offshore Energy Act is implemented.

The methodology is based on the primary legal sources surrounding this topic, such as the Offshore Energy Act, the preparatory works, the proposed regulation and environmental impact assessments that have been conducted in connection with the act. A challenge for this thesis is the lack of extensive legal sources to utilize for analyzing the topic; the Offshore Energy Act has not been subject to much debate yet, and it is lacking in both court decisions, legal articles and books. There are few sources aimed directly at the Offshore Energy Act, apart from a commentary on the Offshore Energy Act by Sigrid Eskeland Shütz that will be available from the end of July 2021.[16] To tackle this, the thesis has applied the existing legal sources extensively to answer the research question as thoroughly as possible.

Various sections of the act will be subject to interpretation, depending on if it is possible to draw out relevant information regarding offshore wind turbines. This will firstly be done by evaluating the objective of the act, to determine whether it gives any insight into whether it is plausible that fixed and floating turbines have different regulatory requirements. The objective is also an interesting element to consider because it sets the main criteria for the act as a whole and it will therefore serve as a background when evaluating other sections of the law. In addition, the thesis will examine the definitions that are included in the act to determine whether there is room to distinguish between the technologies of fixed and floating

[15] Inge Lorange Backer and Hans Christian Bugge, "Forsømt konsekvensutredning av alternativer" *Lov og rett* 2010 p. 115-127, on page 116.
[16] Universitetsforlaget, "Havenergilova," Accessed May 25th 2020 from https://www.universitetsforlaget.no/havenergilova-1

turbines. The system for granting licenses will also be evaluated to discuss how they might be a tool to for the government to create an incentive for developers to for example target a certain technology.

The preparatory works are used to clarify the Offshore Energy Act where it is interpreted as vague or to bring a new perspective to the legal discussion. It is also used to understand the viewpoint of the legislators and whether there is indication that there will be regulatory differences for offshore wind turbines. Preparatory works are a legal source that carry a lot of weight in Norwegian legislation when interpreting the law and it can be a good indication as to what the Storting intended when passing the law.[17] The preparatory works aid in discovering what the legislators' intention was.[18]

The proposed regulation[19] to the Offshore Energy Act will also be considered, as to how it affects and supplements the regulation of wind turbines, if in any way. It will be evaluated to understand how it affects developers that seek to install offshore wind turbines and whether it maintains the aims stated in the objective and the preparatory works.

1.5. Scope

The thesis will not consider the different economic incentives that exist in this field as that is of less relevance in relation to the judicial regulation. Such as an examination into how states may facilitate development of offshore wind energy through economic aids, for example with subsidies. This is because it would go beyond the scope of the thesis and it relates to socio-economic questions which are not under investigation in this paper.

In order to understand the essence of the thesis, it will first explore the technological aspect of the topic, by explaining the main differences between fixed and floating wind turbines. This is important because it serves as a backdrop of information that will be used and referred to throughout the interpretation of legal sources of information.

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[17] Sverre Blandhol, Henriette N. Tøssebro og Øystein Skotheim, «Innføring i juridisk metode» *Jussens Venner*, 50 (2015) nr. 6 page 310-345, on page 323.
[18] Torstein Eckhoff, *Rettskildelære*, 5. utg., Universitetsforlaget, 2001, p. 152.
[19] Olje og energidepartementet. *Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova.* 02.07.2019 https://www.regjeringen.no/contentassets/942d48e60aee4fe6b0d6e1f51d75d2c3/hoyringsnotat-havenergi---opning-og-forskrift-l1060255.pdf accessed February 5th, 2020.

1.6. Thesis structure

This thesis will be divided into three main parts. Firstly, an introduction into the technology behind fixed and floating turbines to understand why the discussion of floating turbines are interesting from a legal standpoint. The benefits of floating wind will also be discussed to showcase why this is a technology that is relevant for Norway in particular.

The second part of the thesis refers to Norwegian legislation in the offshore wind energy sector. This will be the main part of the thesis and will examine how the framework implicates floating technology.

The third and final part of the thesis will contain information regarding the proposed regulation to the Offshore Energy Act, the significance of environmental impact assessments on regulation and some final thoughts regarding the legislation that currently exists.

2. Fixed and floating wind turbines: how are they different?

2.1. The technicalities

Wind energy from wind turbines is produced by converting kinetic energy into electricity.[20] The turbines' blades start rotating when the wind blows and the rotation of the turbines create kinetic energy which is then multiplied by a gearbox inside the turbine to produce enough kinetic energy.[21] The kinetic energy is then converted to electricity using a generator that is connected to the wind turbine.[22]

The reason why it might be interesting to explore whether there are regulatory differences between bottom-fixed turbines and floating turbines is because the floating turbines' characteristics might open for new legislation and a shift in the attitudes people have towards wind turbines. In the following there will be a brief introduction of the two types of turbines to illustrate the differences between these two technologies.

For both bottom-fixed and floating wind turbines there are several different technologies that have been developed. Bottom-fixed turbines vary from structures that use piles to mount the turbine to the sea floor, another technology uses suction to connect to the sea floor and a

[20] WindEurope, "Welcome to Wind energy basics," Accessed March 20th 2020 from https://windeurope.org/wind-basics/
[21] WindEurope, "Welcome to Wind energy basics"
[22] WindEurope, "Welcome to Wind energy basics"

gravity model has also been developed.[23] The floating technologies include "spar buoys, semi-submersibles, barge and tensions-leg platforms"[24].

However, the key is that floating offshore turbines are not fixed to the seabed, which has a few advantages. One clear example is the fact that ocean depths over 45 meters are not suited for commercial offshore wind turbine farms because it would not be financially sustainable to develop these parts and due to the challenges of transporting the heavy equipment out to the turbines in question.[25] If the ocean depths exceed 60 meters, floating turbines are as of today the only viable option.[26] When installing floating turbines, sea depths do not represent the same limitation as for fixed turbines, consequently the placement of floating turbines is less restricted.[27] This might allow for more flexibility in terms of what areas that can be considered for energy facilities.

Furthermore, floating turbines are not reliant on a certain type of seabed to support its structure.[28] All these examples illustrate that fixed and floating turbines differ and allow for various forms of implementing offshore wind energy production. The question is whether the legal framework that has been established to regulate these energy facilities, consider various ways of regulating them at any stage in the regulation.

There is plenty of potential for offshore wind energy production in Norway because the weather is often windy and it is a type of wind which is well suited for energy production.[29] However, the conditions for offshore turbines in Norway are also demanding because of

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[23] Afewerki, Samson, Arild Aspelund, Øyvind Bjørgum, Jens Hanson, Asbjørn Karlsen, Assiya Kenzhegaliyeva, Håkon Endresen Normann, Markus Steen, Erik Andreas Sæther, Conditions for growth in the Norwegian offshore wind industry: International market developments, Norwegian firm characteristics and strategies, and policies for industry development, (Oslo: Centre for Sustainable Energy Studies, 2019), https://www.ntnu.no/documents/7414984/0/CenSES-Offshore-wind-report-v9-digital.pdf/749a6503-d342-46f2-973e-eb9714572931 Page 13.

[24] Afewerki, Samson et al. Conditions for growth in the Norwegian offshore wind industry: International market developments, Norwegian firm characteristics and strategies, and policies for industry deuvelopment. Page 14

[25] Afewerki, Samson et al. Conditions for growth in the Norwegian offshore wind industry: International market developments, Norwegian firm characteristics and strategies, and policies for industry development. Page 14

[26] Ann Myhrer Østenby, Dybde og kompliserte bunnforhold gjør havvind i Norge dyrere enn i Europa, (Oslo: The Norwegian Water Resources and Energy Directorate, 2019), http://publikasjoner.nve.no/faktaark/2019/faktaark2019_15.pdf Page 2.

[27] The Norwegian Water Resources and Energy Directorate, Havvind: forslag til utredningsområder, (Oslo: The Norwegian Water Resources and Energy Directorate, 2010), https://www.regjeringen.no/globalassets/upload/oed/rapporter/havvind_ver02.pdf. Page 22.

[28] Even Winje, Sigrid Hernes, Gjermund Grimsby, Erik W. Jakobsen, Verdiskapingspotensialet knyttet til utviklingen av en norskbasert industri innen flytende havvind, (Oslo: Menon Economics, 2019), https://www.menon.no/wp-content/uploads/2019-69-Verdiskapingspotensialet-knyttet-til-utviklingen-av-en-norskbasert-industri-innen-flytende-havvind-1.pdf. Page 7.

[29] The Norwegian Water Resources and Energy Directorate, Havvind: strategisk konsekvensutredning, (Oslo: The Norwegian Water Resources and Energy Directorate, 2012), http://publikasjoner.nve.no/rapport/2012/rapport2012_47.pdf. Page 20.

variations in the geology of the seabed, in addition to gusty winds and large waves.[30] Furthermore, the Norwegian coastline is characterized by a mixture of both deep and shallow waters, and this is unique for Norway in comparison with the other countries around the North Sea.[31] This factor implies that renewable energy production in Norway would benefit from a technology that is flexible in terms of placement.

Even though there are several floating wind turbine technologies[32] that have been developed, it would be too extensive to analyze them all and consider their possible implications for future regulation, therefore this thesis will refer to the technology that is utilized in Hywind if or when it is necessary to go into further detail regarding the technological aspects.

2.2. Floating wind turbines: how they might represent a new era in the industry

Currently there are more than 5000[33] offshore wind turbines in Europe, which manifests that this form of energy production is well-integrated in the renewable energy market. The offshore turbines represent 22 184 megawatts, while only 36 megawatts of this represent floating turbines that are currently online.[34]

The fact that fixed offshore turbines are so established across Europe, and becoming increasingly cost efficient[35], can raise the question of why there is interest and innovation towards developing floating wind turbines.

As mentioned previously, floating wind turbines can be deployed at greater depths than the ones that are fixed to the ground. The reason why this is important is mainly due to two

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[30] Catherine Banet, "Legal framework to develop offshore wind power in Norway" *The Development of a Comprehensive Legal Framework for the Promotion of Offshore Wind Power* (2016) page 103-143, on page 106.
[31] The Norwegian Water Resources and Energy Directorate. Havvind: forslag til utredningsområder. Page 22.
[32] Examples include turbines by Japan Marine United, which like Hywind also uses a spar buoy, WindFloat and FORWARD, that use a semi-submersible and GICON which uses a tension leg platform. IRENA, Floating Foundations: a Game Changer for Offshore Wind Power, (Abu Dhabi: International Renewable Energy Agency, 2016), https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_Offshore_Wind_Floating_Foundations_2016.pdf. Page 5.
[33] WindEurope, Offshore wind in Europe, (Brussels: WindEurope, 2020), https://windeurope.org/wp-content/uploads/files/about-wind/statistics/WindEurope-Annual-Offshore-Statistics-2019.pdf. Page 7.
[34] WindEurope, "Interactive offshore maps," Accessed March 11th, 2020 from https://windeurope.org/about-wind/interactive-offshore-maps/#international
[35] Steve Gilkes, "Wind turbine design: is this maturity?" *DNV GL* 2019 page 8-9, on page 9 https://issuu.com/dnvgl/docs/b0faf1968d6d4b65b1c7578b93504fbd.

reasons. Firstly, geographically speaking, floating wind turbines are more flexible than fixed turbines in relation to the placement, this can result in a larger energy output and closer proximity to where there is demand and existing infrastructure.[36] Secondly, when it comes to energy production, there is steadier wind offshore.[37] Thirdly, in Norway, complicated seabed conditions and ocean depths makes it difficult to deploy fixed turbines in certain areas.[38] The Norwegian offshore environment thus makes floating offshore technology increasingly relevant as an alternative to the traditional forms of energy production. Fourthly, when turbines are placed further from land, they can harness superior wind resources.[39] Finally, when turbines are further from shore, they will also be less visible to the public and not represent an eyesore.

Furthermore, studies have shown that EU's electricity consumption needs could be fulfilled four times over by offshore wind turbines' energy production in the deep waters of the North Sea.[40] It is considered deep water when the ocean depth is deeper than 50 meters.[41] The advantage that floating wind turbines represent becomes even more clear when "66% of the North Sea has a water depth between 50m and 220m […]".[42] This statement illustrates how much of the North Sea is currently unattainable for fixed turbines.

The preparatory works to the Offshore Energy Act emphasized the unique wind resources that exist offshore in comparison to on land.[43] The full load hours for on shore wind turbines in Norway is approximately 2500 hours, in comparison, offshore turbines have up to 4000 full load hours.[44] It is further stated that the best wind resources typically reside far from shore.[45]

The strategic environmental impact assessment that was conducted in 2012 by the Norwegian Water Resources and Energy Directorate noted that there are many more areas offshore that are suitable for floating wind than fixed turbines, and that it therefore might be a good tactic to focus on technology that is compatible with deeper waters.[46] Therefore, floating technology

[36] Prop. 1 S (2017–2018) (Ministry of Petroleum and Energy) FOR BUDSJETTÅRET 2018, page 157.
[37] Michelle Froese, "World's first floating wind farm delivers promising results," Accessed February 19, 2020 from https://www.windpowerengineering.com/worlds-first-floating-wind-farm-delivers-promising-results/
[38] Ann Myhrer Østenby, Dybde og kompliserte bunnforhold gjør havvind i Norge dyrere enn i Europa, page 1.
[39] IEA, Offshore Wind Outlook 2019, page 22.
[40] European Wind Energy Association, Deep Water: The next step for offshore wind energy, (Brussels: EWEA, 2013), http://www.ewea.org/fileadmin/files/library/publications/reports/Deep_Water.pdf, page 7.
[41] European Wind Energy Association, Deep Water: The next step for offshore wind energy, page 7.
[42] European Wind Energy Association, Deep Water: The next step for offshore wind energy, page 16.
[43] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 30.
[44] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 30.
[45] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 30.
[46] The Norwegian Water Resources and Energy Directorate, Havvind: strategisk konsekvensutredning. page 39.

might open doors for more opportunities in respect to what scale wind production can be installed at, and has potential for becoming an industry in Norway.

Nevertheless, floating wind also faces challenges, one of the central arguments when discussing the current disadvantages of floating wind is that it is a costly business. Electricity from floating wind power costs 5 to 6,5 times more than current electricity prices in Norway.[47] The fact that it is an expensive source of energy can be an interesting point to examine when discussing how the legislation deals with the economic aspects. More companies might be willing to invest in this technology, despite the initial cost, if the framework is accessible and favorable for them.

Floating wind has indeed seen development over the past years, in 2018 the installed capacity was 57 MW in comparison to 2008 when the number was nearly zero.[48] In the UK, the online capacity is currently 32 MW.[49] Japan currently has 12 MW of installed online capacity, while Norway and France each have 2 MW of online capacity.[50] For the development to continue in Norway and to manage the establishment of offshore wind turbines, the legislation must be robust enough to handle variations when it comes to the technology that is utilized.

The next chapter will focus on what the current situation is in Norway and the legal requirements for establishing wind farms at sea.

3. Offshore wind in Norway – the legislation

3.1. Strategies of the Norwegian government

The strategies that the government wishes to follow will be reflected in the legislation and the action plans that are deployed.

It has been stated by the Ministry of Petroleum and Energy in a draft resolution and bill that the government wishes to facilitate the development of offshore commercial renewable energy production in the long run.[51] The management of renewable resources is aimed at being technology neutral in its framework and this is considered an important principle in the

[47] Anders Lie Brenna, "Norge bør satse på flytende havvind nå, selv om det er for dyrt for norske strømkunder,» Accessed February 26, 2020 from https://enerwe.no/havvind-kommentar/norge-bor-satse-pa-flytende-havvind-na-selv-om-det-er-for-dyrt-for-norske-stromkunder/332928

[48] Hannon, Matthew, Eva Topham, James Dixon, David McMillan, Maurizio Collu, "Offshore wind, ready to float? Global and UK trends in the floating offshore wind market", page 3.

[49] WindEurope, "Interactive offshore maps."

[50] WindEurope, "Interactive offshore maps."

[51] Prop. 1 S (2017–2018) FOR BUDSJETTÅRET 2018, page 155.

governments energy policies.[52] These statements indicate that there will not be signs of diversification in the regulation of wind turbines and that the legislation is more geared towards establishing a foundation to regulate the development of renewable energy generation. The following chapters will look at how this aim is followed through in the different parts of the legislation and whether this approach is compatible with the conditions of the Norwegian coast.

3.2. The Offshore Energy Act

The most relevant legislation for offshore wind turbines is the June 4th 2010 number 21 Act on Offshore Renewable Energy Production (abbreviated as the Offshore Energy Act). The purpose of the act is, as stated in chapter 1, section 1-1, to lay the framework for the exploitation of renewable offshore energy generation whilst taking into consideration factors like the environment and other business interests. Section 1-2 establishes the general scope of the legislation, inter alia. Section 1-2, subsection two, states the geographic scope of the act, which consists of the Norwegian territorial sea outside the baselines and the continental shelf. Consequently, all renewable offshore energy generation that is constructed in the area from the baselines and 12 nautical miles out at sea is regulated by the Offshore Energy Act, according to the June 27th 2003 number 57 Act on Norway's territorial waters and contiguous zone section 2, subsection one.

The preparatory works specify that the act establishes the main principles, while still being flexible enough to quickly regulate different issues that may arise.[53] One issue to consider is whether the acts flexibility works at the expense of developers seeking to understand the legal framework.

3.2.1. The objective and its role for the regulation

Section 1-1 of the Offshore Energy Act, specifies the objective of the act and its wording can supply information about the act as a whole and be of guidance regarding the interpretation of the law.[54]

[52] Prop. 1 S (2017–2018) FOR BUDSJETTÅRET 2018, page 156.
[53] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 9.
[54] Eckhoff, *Rettskildelære* (2001) p. 101.

According to the passage in section 1-1 it is an objective to facilitate renewable energy production offshore in accordance with "samfunnsmessige målsetninger". The word «samfunnsmessige» relates to the society as a whole and the word «målsetninger» can be translated into aims, goals or objectives. The term therefore loosely translates into the aims of society. Consequently, the term indicates that the objectives of the society in relation to renewable energy production, will control how this field is approached.

The term "samfunnsmessige målsetninger" is vague and can cover a vast majority of circumstances. The impression is that the wording allows for the act to be flexible enough to cater the needs of the government depending on how much they are investing in offshore energy development at any given time. Its vague meaning might therefore be clarified through the preparatory works.[55] The preparatory works, however, give little supplementary information. They state that "samfunnsmessige målsetninger" must be defined through political priorities.[56]

This highlights the complex structure that surrounds wind turbine regulation. There is a strong link between the commitment towards renewable energy production and the political will concerning development in this field. The consequence of this makes navigating this area not solely a judicial matter. As previously stated, there is political will regarding accelerating the development of more facilities for renewable energy production. The judicial framework that has been composed through the Offshore Energy Act is a means to which political will can be accomplished, due to the ambiguity of the wording "samfunnsmessige målsetninger". This is confirmed in the preparatory works, which state that the degree of development of offshore facilities for renewable energy production depends on circumstances that are beyond the proposed act, meaning political priorities.[57]

Nevertheless, vague statements in the objective of the Act can in effect be harmful in the quest towards obtaining a stable and predictable legislation because it might become difficult for developers to understand how their interests will be weighed against other relevant interests. The wording of the Act needs to be understandable, meaning that it is clear what the wording entails, this ensures that the legislation is predictable for users.[58] A foreseeable legislation where there is coherence between the political agenda and the regulations that are

[55] Eckhoff, *Rettskildelære* (2001) p. 102.
[56] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 79.
[57] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 78.
[58] Blandhol, Tøssebro and Skotheim, «Innføring i juridisk metode», page 322.

composed will stabilize the situation for developers. The consideration of composing predictable regulations also supports this, because if the legislation is easily subject to various political agendas, it might be less attractive for investors to target this market. Given the early stages that offshore wind power currently is at, especially surrounding the floating technology, it is even more pressing that the legal framework is robust – and offers a sense of security and stability. The political agenda will always be subject to change, but in order to acquire an energy production policy that can evolve and be of scale, the objectives of the act should be less vague. The complex process that leads up to composing new legislation supports this, because it is time consuming to amend the regulation each time the technology develops.

This argument is especially strong in relation to offshore wind turbines because this is an industry that is almost nonexistent in Norway. Offshore wind energy's potential for energy generation is enormous and yet there is currently only a single turbine at sea in Norway. Therefore, it is crucial that the legal framework is reliable and stable, because that way it would support the construction of larger scale wind farms.[59] On the other hand, vague objectives can help create a legislation that is more adaptive towards new technological advances. If there becomes an urgent need to establish wind farms and it is given top priority on the political agenda, section 1-1 gives room for an accelerated progress in the offshore renewable energy department. Thus, it is a necessity that there is political will to follow through on the opportunities in this field.[60]

3.2.2. An abundance of considerations

In addition to the first objective of section 1-1, the provision also specifies that it is an objective that energy facilities are planned, built and distributed in a manner where energy supply, environmental, safety and business interests, as well as other interests, are taken into consideration. The section lists a handful of diverse interests that must be considered. This extensive list can have two implications when utilizing the act: either the scope of relevant interests is interpreted to such a wide-ranging extent that it impairs the effect the objective has

[59] Berte-Elen Konow and Ignacio Herrera Anchustegui, «Etter korona: Er tiden kommet for et havvind-løft?,» Accessed May 29th 2020 from https://e24.no/naeringsliv/i/2Gxazr/etter-korona-er-tiden-kommet-for-et-havvind-loeft

[60] Maritime Bergen, «Vårt nye energi-eventyr?,» Accessed May 29th 2020 from https://www.maritimebergen.no/vart-nye-energi-eventyr/.

on energy facility regulation. This might lead to the objective lacking in effect because it is difficult to assert whether one is acting according to the legislator's intention.

On the other hand, it might impair the establishment of energy facilities all together, because the number of interests to consider are redundant. The preparatory works do not give much insight into the second part of the objective in section 1-1. Other than the fact that the requirements must be concretized further through regulations, inter alia.

When it comes to the discussion of the regulatory differences in fixed and floating turbines the different interests to consider might have alternating consequences. For instance, energy supply can relate to the efficiency of the turbines. Floating turbines far from shore have the advantage of harnessing better-quality wind resources. What implication does this have for this technology in the planning, building or distribution process? If energy supply is given significant meaning when planning where to deploy wind turbines, then one could argue that the legislation should open for alternating ways of getting a license depending on whether it was fixed or floating turbines.

Section 1-1 also mentions environmental interests as something the act must take into consideration. The wording "environmental" interests can relate to several issues, for instance how the turbines affect the environment in which it is placed. It can also relate to the desire to have as much renewable energy production and supply as possible. In both cases there are different outcomes depending on whether one is discussing fixed or floating turbines.

The preparatory works state that the objective to protect "the environment" is a hypernym that covers nature protection, biological diversity, the climate, monuments and culture environment.[61] It is further emphasized that the climate is key since the challenges of climate change is an important premise behind the focus on renewable energy.[62] On the one hand, the wide set of interests that are covered in the term "the environment" indicate that the variations of turbines that exist will not be decisive in the initial phase of deploying offshore turbines. This is because the broad term gives the impression that its purpose in the objective is more about acting as a signal to portray the important values behind the act more than a decisive factor in the process of deploying offshore turbines. On the other hand, since the characteristics of floating and fixed turbines vary in relation to where they can be placed and how they are constructed, they also have alternative consequences on the environment. Hence,

[61] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 60.
[62] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 60.

the preparatory works should shed light on a discussion of how they each impact the environment that section 1-1 has set as an objective to protect. This way it would be more apparent if there was a need, beyond considering what was achievable, to have alternating rules for installing fixed and floating turbines. If one concluded that floating turbines for instance, were more beneficial to the environment this should be reflected in the legislation by being more lenient in the procedures to install them in those areas. That would work as an incentive to merge the qualities of energy facilities with the environment in which it would be placed.

The objective also mentions "business interests" as a factor that should be sustained. The preparatory works state that fishery and maritime navigation are included in the term.[63] The preparatory works also acknowledge that conflicts can arise between the interests of energy production facilities and fisheries.[64] It is further stated that conflicts between the fisheries and fixed wind turbines might arise because fixed turbines depend on depths up to 100 meters which also can be important areas for fishers.[65] The difficulty in coordinating the interests of the wind turbine business and fishing have been voiced by fishers themselves, as they are fearful that offshore wind turbines will occupy important fishing areas and that spawning grounds will be endangered.[66] Apart from recognizing that especially fixed turbines might be competing for the same zones at sea, there is no discussion on how to approach these two technologies in relation to the matter. This is problematic in terms of predictability for future developers because it indicates an awareness on the issue, but an unwillingness to approach the problem with legislative measures that are visible in the act itself.

Norway's dependence on its offshore businesses is undisputed and they all have in common a legitimate need to utilize the seas. One example apart from fishing is tourism, which benefits from an undisturbed coast – the preparatory works highlight the importance of evaluating what economic consequences wind turbines will have on this sector.[67] Another important business sector that is dependent on an undisturbed coast is the shipping industry, and the preparatory works imply that floating turbines here might represent more of an issue than

[63] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 60.
[64] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 36.
[65] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 36.
[66] Eivind Molde, Maria Knoph Vigsnæs, "Norges Fiskarlag: Frykter vindkraft kan ødelegge for fisken," Accessed June 3rd 2020 from https://www.nrk.no/norge/norges-fiskarlag_-frykter-vindkraft-kan-odelegge-for-fisken-1.14654458
[67] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 36.

fixed.[68] This is because the limitations that fixed turbines have in regard to water depth and proximity to the coast decrease the possible areas of conflict at sea, whereas fixed turbines and their flexibility in regard to installation might serve as a bigger problem.[69] To counteract this problem the preparatory works mention the importance of regulations that ensure thorough procedures when localizing energy facilities.[70] However, also regarding this matter there is little guidance as to what approach such a regulation would take.

All the above-mentioned factors are reliant on a sustainable and multi-purpose coastline and they underline the need for more thorough rules on how these businesses can co-exist. It is not adequate that the objective of the act states that they are factors that need to be considered when they are of vital importance to the success of offshore energy production.

3.2.3. Technology neutrality as the template

Another question that can be raised is whether the interests that the objective lists fit with the ambition that the government has of promoting technology neutrality.[71] In some respects one can argue that the objective allows for alternating treatment of the two technologies.

The interpretation of the act's objective serves as a backdrop when reading the other sections of the act, in order to understand how it might administer conflicts regarding fixed and floating wind turbines.

The ambiguity of the objective may open for some leeway to incorporate different regulation for the two types of turbines while still being within the framework of the act. It is stated in the preparatory works that the governments vision is for Norway to become an environmentally friendly nation, and to lead the development of environmentally friendly energy production.[72] Ambiguity in the wording of the Offshore Energy Act's objective might therefore be favorable from the governments standpoint, as it gives more access to different approaches within the focus on green energy and its development. On the other side, from the developer's standpoint it might be interpret as if the framework is unstable and prone to frequent changes of action. For developers that are smaller companies with fewer resources

[68] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 37.
[69] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 37.
[70] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 37.
[71] Olje og energidepartementet. Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova. Page 11.
[72] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 6.

this might scare off the will to invest in green energy technology such as wind turbines. This in turn might lead to the main objective of opening areas for energy development to not be fulfilled, and for Norway to not lead the development of green energy.

The preparatory works do not signal that a special procedure will be pursued to boost the new floating technology, it instead describes the status quo. This is a more passive approach to the technological aspect of wind turbine regulation, and it suggests that the Offshore Energy Act's method of regulating renewable energy generation will avoid getting into the fundamentals of how one could create alternative forms of regulation for each of the technologies. This can be explained by the fact that the legislators are operating with a technology neutral standpoint and thus taking the role of the observer, by regulating offshore energy production in a reactive fashion, instead of being proactive.

A technology neutral standpoint will allow the legislation to be applicable and relevant even when the technology advances which can be an advantage to ensure its relevance. However, it can also become more of a liability, in the sense that it does not discuss how it will solve problems – such as offshore co-existence with other businesses – and thus the regulations that later are composed might end up lacking coherence.

As stated in chapter one, the Norwegian government seeks to expand into offshore wind and have proposed areas which have been sent to public consultation. These facts can be a source for interpretation when discussing regulatory differences between types of turbines because it can indicate what path the regulation will take. This is because what areas are opened will also influence what technology that can be utilized in terms of the type of turbine. The argumentative weight of these interpretations might however vary depending on the remaining legal sources that need to be assessed. Nevertheless, one can still argue that technological differences might be taken into consideration at a later stage of the application process or this might become a practice when licenses are being granted. Still, the Offshore Energy Act is at large technology neutral when referring to "production facilities" and the preparatory works do not give indication that the regulatory process will vary depending on the type of turbine.

3.3. The preparatory works to the Offshore Energy Act

3.3.1. Driving forces behind the considerations taken in the preparatory works

One question that can be raised is how the Act's preparatory works can give an insight into the legislators aim with the act, and whether there are indications in this case that there might be regulatory differences with respect to the process of deployment, how the application process works, or the environmental requirements. The factors that are taken into consideration in the preparatory works may contribute to a broader understanding of how the legislation will deal with technological aspects when it comes to the legislation.

The preparatory works state that it is an ambition for Norway to be in the forefront in wind power technology and competence, and that the driving force behind those ambitions is the vast wind resources that the country has and the knowledge in the offshore and maritime technology sector.[73] Furthermore, it stated that the aim to reduce greenhouse gases was an important driving force behind the increased focus on renewable energy.[74] There were also drawn parallels to Norway's potential to produce offshore wind energy given the vast ocean territories outside the Norwegian coast and the competence that the country inhabits regarding offshore technology.[75]

It can be interesting to evaluate whether these ambitions are translated into the legislation itself. Furthermore, those ambitions underline the importance of a framework that works efficiently with the technological developments and the opportunities for offshore wind turbine installation, because in order to build fixed and floating wind turbines installations of commercial scale it is a necessity that the legislation does not leave room for ambiguity that negatively affects developers.

The preparatory works discuss several topics that are relevant in connection with fixed and floating turbines.[76] For example, the problem of visual pollution and how it is an important part of the debate when discussing wind turbines on land.[77] The same issue can be transferred to offshore turbines, where costs in relation to infrastructure promotes installations close to shore, while the argument of visual pollution advises 20 km away from the coast.[78] Weighing

[73] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 29.
[74] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 51.
[75] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 51.
[76] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 32 and 33.
[77] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 36.
[78] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 36.

these arguments at an early stage of regulation is important to show which direction the policy is taking. Since floating turbines can be deployed further from land, they avoid the arguments of visual pollution, yet the preparatory works do not indicate that this will have an impact on regulation.

The possibility of using offshore turbines to generate electricity for oil platforms was also mentioned.[79] Hywind Tampen, a project lead by Equinor, will be the largest floating wind farm in the world, in addition to being the first wind farm of its kind to power oil and gas platforms.[80] The project will provide the oil platforms Snorre and Gullfaks with electricity.[81] This shows that in some areas the government is following through on intentions set in the preparatory works.

Hywind Tampen will be composed of 11 wind turbines and offer a capacity of 88 MW in total, that will supply the oil platforms with 35% of their annual electricity needs.[82] This kind of a project reveals why the advantages that floating turbines represent are important; the wind farm will be stationed about 140 km off the coast of Norway where the ocean is between 260 and 300 meters deep.[83] The limitations of fixed turbines, in that it cannot be deployed at deep waters, would represent a restriction for these projects to be realized. Hywind Tampen is a step towards increasing the use of wind power in Norway and to further test the floating technology.

An essential factor to consider is that the preparatory works, however, are over a decade old. This effects the accuracy and evaluations that concern the technological aspects of the document. The Hywind Demo outside Karmøy was for example only under construction at the time the preparatory works to the Offshore Energy Act were being written.[84] Hence, insecurities regarding the durability of floating wind turbine technology would maybe not have the same impact if the preparatory works were composed today.

[79] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 33.
[80] Equinor, "Hywind Tampen: the world's first renewable power for offshore oil and gas," Accessed March 16th, 2020 from https://www.equinor.com/en/what-we-do/hywind-tampen.html
[81] Equinor, "Hywind Tampen: the world's first renewable power for offshore oil and gas."
[82] Equinor, "Hywind Tampen: the world's first renewable power for offshore oil and gas."
[83] Equinor, "Hywind Tampen: the world's first renewable power for offshore oil and gas."
[84] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 51.

4. Licenses

4.1. The system

The right to hand out licenses for renewable energy production is constituted in the Offshore Energy Act. The license system is a way for the Norwegian government to be able to administer the exploitation of natural resources by restricting any activity in some areas and allowing activity in other, with individual licenses that are granted to those who meet the criteria.[85] By setting restrictions and monitoring the activity, the state can avoid over-exploitation and ensure that the licenses are handed out to those with the best qualifications for the activity in question.[86]

The requirements in the early stages of establishing offshore wind turbines can be deduced from the Offshore Energy Act chapter 2. Section 2-2, subsection one, states that the government, the King in Council, can decide to open areas at sea in order to hand out licenses for production facilities. The preparatory works further state that areas can be opened on certain conditions in relation to what one can apply for, such as restrictions on the maximum size of allowed installations, choice of technology etc.[87] The preparatory works do not elaborate on this matter, but they indicate that the development of a production facility in the areas that are opened, can be tailored by the government to a certain extent. The wording "choice of technology" can cover a variety of elements and it is reasonable to assume that types of wind turbine foundations are relevant aspects in this connection.

The opening of areas offshore are also based on an evaluation of interests that are present in that specific area.[88] And while the preparatory works do not go into detail on which situations that would prompt a certain condition to be set, the mere possibility that such an option exists shows that when it comes a time to open an area, it is not improbable that only one type of technology for instance, could be permitted. In addition to this, it is reasonable to deduct from the option to set conditions for the opening of areas that a possible reason for giving conditions is because it is necessary in respect to the other interests in the area.

[85] Ernst Nordtveit, "Konsesjonsordningar og kvotesystem som regulering av tilgang til opne ressursar – privatisering eller regulering?» i *Pro natura: Festskrift til Hans Christian Bugge*, Inge Lorange Backer, Ole Kristian Fauchald, Christina Voigt (red.), Universitetsforlaget 2012 p. 346-368, on p. 347.
[86] Nordtveit "Konsesjonsordningar og kvotesystem som regulering av tilgang til opne ressursar – privatisering eller regulering?» (2012), page 347.
[87] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 80.
[88] Ot.prp. nr. 107 (2008 – 2009) Om lov om fornybar energiproduksjon til havs, page 80.

When it comes to the question of floating wind turbines it is a key quality that they can be installed further from shore, because this might in turn de-escalate some of the conflict that could arise with the fisheries, for instance, by picking a remote location for the installation. In any case, to ensure that developers are familiar with the degree to which the government can control what types of facilities that are allowed in certain areas, it would be favorable if the ability to set conditions was more pronounced in the act itself. For instance, the act could state in section 2-2 subsection one, that the opening of an area can be limited by certain conditions, such as requiring a specific type of technology. By demonstrating that the opening of areas is subject to limitations and by being clear on how far those limitations reach, the legislation is more predictable. However, there is a fine balance between placing all the relevant information in the act and it still being understandable and organized, thus it is not surprising that not all off the relevant information can be found in the act itself.

In the process of opening an area for offshore wind production, it is another requirement, according to the Offshore Energy Act section 3-1, to get a license. Section 3-1, subsection one, states that "production facilities" cannot be built, owned or run without a license. A production facility is defined in section 1-4 as a construction built for the exploitation of renewable energy to produce electricity. A wind turbine falls within this category and it is therefore undisputed that a license is necessary in order to establish a wind turbine offshore.

The term production facility is broad and does not set any technological restrictions. This implies that the license requirement does not take technological differences into consideration at this stage of the application process. However, this does not necessarily mean that this approach will be followed throughout the rest of the regulation, because section 1-4 contains the broad definitions that were necessary to define in order to understand the central terms that the act refers to. Hence, one could argue that a more precise definition at that point would not be necessary.

The preparatory works[89] maintains a technology neutral stance, when discussing section 1-4 it does not go into much detail in relation to what a "production facility" is, it does however, state that the mounting-apparatus is considered a part of the production facility. This is a relevant point when referring to the regulation of wind turbines because it suggests that the turbine is viewed as a "whole". Subsequently, it does not distinguish between mounting devices or different mounting technologies when referring to wind turbines. This approach

[89] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 80.

towards the different types of production facilities, that the act seeks to regulate, supports the aim of keeping the energy policy technology neutral. It is important to bear in mind when one is interpreting the preparatory works that floating technology was still a new concept. Thus, there was limited knowledge on floating wind turbine technology at the time to call for a more in-depth description of what a "production facility" was.

When the preparatory works discuss technological aspects in is in relation to some of the possible challenges that surrounds the floating technology, by specifying the need to develop turbines that can handle the tough conditions offshore and challenges related to the anchoring of the turbines, amongst other things.[90] The discussion does not suggest that the challenges prompt a different regulation of them offshore, instead it gives the impression that the information is stated to inform about the conditions regarding this technology. The lack of such a discussion is a means of foreshadowing the following legislation and regulations, by maintaining a technology neutral stance.

There might still be room further down the regulative process to go into further detail about the different types of wind turbines. For example, through the regulation to the act – however, it would go beyond the scope of this thesis to examine how such regulations could be made.

4.2. Licenses: a tool to adjust regulation

Nordtveit argues that the traditional license system can be further developed with the purpose of becoming a system that gives incentives for companies to utilize the resources in a sustainable manner.[91] Nordtveit suggests the need for regulations that contains frameworks for individuals to make environmentally sustainable decisions when utilizing the resources in the ecosystem.[92] When discussing the topic of offshore turbines it is interesting to note whether the license system applicable for the Offshore Energy Act in any way favors one type of technology through the use of incentives. Another question that can be raised is how the license system be a tool to administer what type of turbine that is installed.

The opening of specific areas offshore and the ability to set conditions when handing out licenses work together as to driving forces in forming the types of production facilities that

[90] Ot.prp. nr. 107 (2008-2009) Om lov om fornybar energiproduksjon til havs, page 20.
[91] Nordtveit "Konsesjonsordningar og kvotesystem som regulering av tilgang til opne ressursar – privatisering eller regulering?» (2012) p. 368.
[92] Nordtveit "Konsesjonsordningar og kvotesystem som regulering av tilgang til opne ressursar – privatisering eller regulering?» (2012) p. 368.

are installed at sea. The decision behind what areas that are opened can however be equally as effective in determining what production facilities that can be deployed.

The Offshore Energy Act states in section 3-4 that the Ministry can set certain conditions in connection with licenses. There are a wide range of conditions that can be given through numbers one to nine, and on the one hand, the conditions have the ability of shaping the development in a very clear-cut manner, for example by requiring that cables part of the production facilities are compatible with vessels going over them with a trawl net, in accordance with section 3-4 nr. 8.[93]

On the other hand, in addition to the conditions listed through numbers one to nine, the last subsection of section 3-4 states that additional conditions can be given in connection with certain licenses if public or private interests demand it. The wording of "public or private interests" is wide and unclear. The preparatory works state that this subsection relates to conditions that are not mentioned in numbers one to nine.[94] The number of different conditions that can be given in relation to licenses reveal that the ability for the ministry to steer the development in renewable offshore energy is far-reaching. Yet, the conditions must be given in accordance with the Offshore Energy Acts purpose as stated in section 1-1.[95]

Section 1-1 therefore represents a restriction in relation to possible requirements in connection with the license. However, given the ambiguous and extensive list of considerations in the objective of the act this restriction cannot be viewed as very constraining. Public interests can encompass a wide range of matters, and considering some of the conflicts that have been highlighted regarding offshore wind turbines, it is reasonable to presume that there can be set conditions on how close to shore the wind turbines can be to avoid visual pollution – if that is in the interest of the public.

As stated previously there are no offshore wind turbines in Norway apart from the Hywind demo, which is sold to Unitech.[96] Therefore it is not possible to analyze former licenses that are given to determine whether conditions are given to steer the applicators in a certain direction, for example by being more demanding towards developers with fixed turbines versus floating. When the application for a license for Unitech Zefyros was sent to The Norwegian Water Resources and Energy Directorate in 2005, the Offshore Energy Act had

[93] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 82.
[94] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 82.
[95] Gunnar Frogner Dahl, *Norsk lovkommentar: Havenergiloven,* note 14, Rettsdata.no (accessed March 1st, 2020).
[96] Karoline Sjoen, "PRESS RELEASE JANUARY 8TH 2019"

not yet gone into effect when the license application was sent, which makes it less relevant to examine in relation to this evaluation.[97] In addition to this, the turbine offshore from Karmøy was a demonstration project and therefore not equal to commercial turbine farms.

4.3. The proposed opened areas

The government made certain considerations when they picked areas to open, by selecting areas where both floating and fixed wind turbine technology could be encouraged.[98] In addition to this the government pursued areas where commercial projects could be launched.[99]

Before opening an area for energy facilities, a public consultation is part of the required legal process according to section 2-2, subsection three. The procedure of sending the environmental impact assessment to public consultations is similar to the processes that are followed in the UK and Denmark.[100] The three areas that are proposed opened by the Ministry of Petroleum and Energy for renewable energy production offshore and that were sent for evaluation in the public consultation, are "Utsira Nord", "Sandskallen-Sørøya Nord" and "Sørlige Nordsjø II".[101]

The areas in question are, as evident from the maps provided by The Norwegian Water Resources and Energy Directorate[102], located outside the baselines in Norway and the Offshore Energy Act is therefore applicable when the process of eventually establishing wind turbines commences.

"Sandskallen-Sørøya Nord" is located north east of Hammerfest in northern Norway and the area has an average depth of 89 meters, and the variations in depth makes the area suitable for both fixed and floating turbines.[103] It has a close proximity to land which has both positive

[97] Hydro, "Flytende vindmøller: Konsesjonssøknad for HYWIND demonstrasjonsmølle,» Accessed March 1st, 2020 from http://webfileservice.nve.no/API/PublishedFiles/Download/200504151/1033196.
[98] Olje og energidepartementet, Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019), page 5.
[99] Olje og energidepartementet, Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019), page 5.
[100] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 38.
[101] Press release no: 039/19 (02.07.19) Offshore wind power: Public consultation on areas and regulation.
[102] The Norwegian Water Resources and Energy Directorate, «NVE Havvind Strategisk Konsekvensutredning», Accessed February 10, 2020 from https://gis3.nve.no/link/?link=havvind
[103] Olje og energidepartementet. Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019). Page 6.

and negative sides; its location enables low operation and investment costs.[104] The downside is that the installment will be visible from land.[105]

"Sørlige Nordsjø II" is located near the border of the Danish economic zone and has an average depth of 60 meters.[106] It is most suited for fixed turbines, but some floating technologies might also be viable options.[107] It is by far the largest of the proposed areas, which means that it will be easier to take other interests in the area into account.[108]

Floating wind turbines are especially relevant when it comes to Norwegian waters and its regulation as one of the proposed areas, Utsira Nord, is only suitable for these kinds of turbines.[109] "Utsira Nord" is only suitable for floating wind technology due to the average water depth of 267 meters.[110] The floating technology is considered "the most interesting technology from a Norwegian perspective".[111] It is not clear what is meant by this statement, but the circumstances of the statements indicate that this is due to the conditions offshore in Norway.

What reveals itself is a paradox, since the Offshore Energy Act is predominantly technology neutral by setting the same criteria for all, in addition to not discussing how these two parallel technologies will be accommodated. The obscure part is that in several places the preparatory works mentions the importance of floating technology and the desire to aid the advancement of this technology, to the extent that an area is opened solely for floating wind turbines.[112]

The realities of the Norwegian coast, and many other offshore areas around the world, show that there will be variations as to what the prospects are for offshore wind. On the one hand, it can be an advantage if the Offshore Energy Act is technology neutral to stand the test of time and be applicable to all installations of energy facilities. On the other hand, the floating

[104] Olje og energidepartementet. Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019). Page 6.
[105] Olje og energidepartementet. Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019). Page 6.
[106] Olje og energidepartementet. Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019). Page 7.
[107] Olje og energidepartementet. Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019). Page 7.
[108] Olje og energidepartementet. Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019). Page 7.
[109] Olje og energidepartementet. Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019). Page 5.
[110] Olje og energidepartementet. Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019). Page 5.
[111] Press release no: 039/19 (02.07.19) Offshore wind power: Public consultation on areas and regulation.
[112] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 29.

technology is currently not at the same stage of development as floating, and in order to boost the installment and use of this technology it would be better if the legislative framework showed a clear vision of how it would cater to it. Particularly since floating is more interesting in a Norwegian setting, it would be natural to show this by promoting this technology through a special set of rules regarding the license process, or by stimulating the market in other ways. One could argue that this is implicitly what is happening through suggesting opening "Utsira Nord", but there still seems to be a gap between the political standpoints of promoting floating technology and the technology neutral legislation and finally through the proposed opened areas.

5. Looking ahead

5.1. The proposal for a regulation of the Offshore Energy Act

The Offshore Energy Act is the primary source of legislation in connection with the regulation of offshore wind turbines. In Norway, the nature of the law is for it to be accessible and understandable for most people. A natural consequence of this is that the degree of detail will in some cases be lacking in the act itself. To compensate, the legislators can supplement the law with additional regulation, this is also helpful in order to regulate something in greater detail.[113] In these regulations there are supplements to the law to ensure that important aspects have been considered without making the act itself redundant.

A proposal for a regulation of the Offshore Energy Act has been undergoing public consultation and was due November 1st, 2019.[114] Until the regulation is publicly announced it is of limited importance as a legal source, it can however, shed light on how the legislators aim to further regulate wind turbines. From an evaluation of the regulation, one can draw conclusions as to whether there has been taken any steps to differentiate between types of turbines, or any other form of special regulation.

It is stated in the documents that were sent to public consultation that the Norwegian governments strategy is to create a technology neutral renewable energy policy.[115] The environmental impact assessments however, have distinguished areas based one key factor,

[113] Olje og energidepartementet, Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019). Page 11.
[114] Press release no: 039/19 (02.07.19) Offshore wind power: Public consultation on areas and regulation.
[115] Olje og energidepartementet, Høyringsnotat - Forslag til forskrift om fornybar energiproduksjon til havs og forslag til opning av område etter havenergilova (2019). Page 11.

amongst other things, the type of technology that is applicable in that area. Hence one can already at this point speculate as to whether this fact already shows an inconsistency in the policy that is strived for and the realities of the renewable energy industry. The framework does not discuss how it will handle possible implications that the proposed opened areas vary in the technology sector. At this stage it is possible to discuss whether the "one size fits all" approach is sustainable if the grounds on which areas are opened are based on technological variations. It will therefore be interesting to examine how this is reflected in the proposed regulation.

There are multiple steps to follow in order to deploy offshore turbines, as evident from the proposed regulation.

The proposed regulation does not explicitly mention any specific type of technology and solely refers to "energy facilities". Therefore, it will not be possible to discuss how it navigates around the topic of floating and fixed turbines. Still, it will be possible to examine what the key topics of the proposed regulation are to get a sense of what the legislative landscape will look like for future developers and applicants.

5.2. The proposal and wind turbines

The questions that can be raised in connection with the regulation that is relevant to the research question are firstly, how it the policy of technology neutrality reflected in the proposed regulation and secondly, what the main concerns are of the regulation.

In relation to the first question, the proposed regulation only scratches the surface in terms on how it approaches the topic of technology overall. This can be explained by the very nature of the regulation: it aims at being an accommodating tool to manage renewable energy production. The proposed regulation is largely concentrated around the process of attaining a license and it describes the steps which must be followed regarding the different applications that are required.

Unsurprisingly, section 4 of the regulation requires applicants to describe the "energy facility". This cannot be interpreted as a breach of the technology neutral standpoint, but more as a formality and practicality, in the sense that the government understandably needs this information to evaluate the application for a license. Further requirements to describe the energy facilities are listed in section 6, part a) letter i and iii, this is also however, additional requirements that must be interpreted as necessary pieces of information in order to evaluate

each individual project. All in all, the proposed regulation acts as a supplement to the Offshore Energy Act and further describes the process towards gaining a license. Hence, the proposed regulation fulfills the aim of a technology neutral policy. There are no parts of the regulation that delves into the topic of diversifying the requirements of the applicants based on the technology that is used.

A main feature of the regulation is its focus on environmental concerns. For example, section 4 describes what the assessment agenda must include and mentions under part a) that it must describe possible impacts for the environment. The term "environment" can be target for a wide interpretation and include more than just environmental impacts on the seabed, marine areas and birds. Nonetheless, this wording illustrates that environmental evaluations are an integral part of the process for each individual applicant.

Section 4 discusses the requirement for environmental impact assessments specific to each project and part b) naturally obligates the applicant to list how the facility might impact the environment in relation to both the sea, the seabed and fish, amongst other things. Section 9 of the proposed regulation refers to the detailed plan that the applicant must compose, and it further requires additional explanations of the environmental effects that the installation and operation of the energy facility might bring.

The reason why the focus on environmental concerns throughout the regulation might be interesting in a technological perspective is because each type of wind turbine will impact the environment in a variety of ways. Therefore, the choice of technology will implicitly be of importance depending on how it functions with the surroundings. For example, studies have shown that fixed turbines have multiple impacts on the seabed and fauna. "[t]he introduction of hard substructures into the sea has shown that they function very much like artificial reefs, creating biological hotspots".[116] In addition to this wind turbines can even have a possible positive impact on fish such as "enhanced biological productivity and improved ecological connectivity on account of trawling exclusion and the functioning of offshore wind structures as artificial reefs"[117].

These factors are important to note because it highlights the possibility of positive outcomes from installing offshore wind turbines on the marine environment. The proposed regulation is

[116] WWF-Norway, Environmental Impacts of Offshore Wind Power Production in the North Sea, (Oslo: WWF-World Wide Fund For Nature, 2014), https://www.wwf.no/assets/attachments/84-wwf_a4_report___havvindrapport.pdf, page 19 and 20.
[117] WWF-Norway, Environmental Impacts of Offshore Wind Power Production in the North Sea, page 25.

composed of a variety of requirements that applicants must fulfill by informing about the planned installment. It is however, not disclosed how each of these pieces of information will be evaluated regarding whether an application is approved. What is apparent is that environmental concerns are of importance in the regulation. Even though there are no explicit mentions of how different types of turbines (or other energy facilities for that matter) will be weighed, it is reasonable to assume that floating and fixed turbines will be judged differently on the basis of their effects on the environment.

6. Environmental impact assessments

6.1. How do they contribute to the regulation?

An environmental impact assessment (EIA) is considered an important measure to ensure that environmental considerations are assessed when a project might interfere with the environment, as Backer and Bugge put it.[118] The EIA is essential to ensure that the decision making process examines the environmental aspects of the project and how to take environmental concerns into account.[119] It therefore serves as a framework from which the developer can work within.

The Offshore Energy Act Section 2-2, subsection two, states that in order to open an area for license applications, an environmental impact assessment needs to be conducted. This prerequisite was the background for the assessment The Norwegian Water Resources and Energy Directorate published in 2012.[120] This strategic EIA aims to obtain knowledge about the areas under assessment in order to give recommendations regarding which areas to open.[121] In 2018 the government requested The Norwegian Water Resources and Energy directorate to review their findings from the 2012 assessment to examine whether any noteworthy changes had happened that could have affected the conclusions that then were drawn and the directorate noted that no substantial changes had occurred and subsequently proposed the areas "Utsira Nord" and "Sørlige Nordsjø I" or II to be opened for license applications.[122]

[118] Lorange Backer and Bugge (2010) p. 116.
[119] Lorange Backer and Bugge (2010) p. 117.
[120] The Norwegian Water Resources and Energy Directorate, Havvind: strategisk konsekvensutredning.
[121] The Norwegian Water Resources and Energy Directorate, Havvind: strategisk konsekvensutredning. Page 12.
[122] The Norwegian Water Resources and Energy Directorate, **"**NVE anbefaler områder for energiproduksjon til havs." Accessed February 10th, 2020 from https://www.nve.no/nytt-fra-nve/nyheter-energi/nve-anbefaler-omrader-for-energiproduksjon-til-havs/

The EIA influences the regulation of wind turbines because it is a mandatory part of opening areas for energy facilities, thus regulating where they can be installed. The EIA is however not a juridical evaluation, it is a report that assesses environmental consequences and serves as evidence before initiating a project. Yet, the findings of the report are taken into consideration when licenses are given. The question is therefore how these reports influence the legal framework on this field.

Environmental impact assessments have been conducted to determine what areas offshore that are best suited for wind turbine facilities. It is a critical and mandatory step in the process of opening areas offshore for energy facilities, and in order to receive a license to deploy offshore turbines. The conclusions drawn in the EIA are reflected in the public consultation that the government released, and this represents in many ways the starting point that developers must work from.

6.2. How environmental impact assessments influence offshore wind turbine regulation

In accordance with section 2-2 subsection two of the Offshore Energy Act, an area cannot be opened for offshore energy production until an EIA is composed. The EIA is therefore an instrumental part of the process leading up to deploying offshore turbines.

In the following, an evaluation of the reports led by the Norwegian Water Resources and Energy Directorate will be conducted. The question that will be assessed is in what ways environmental impact assessments influence the offshore energy regulation through their findings. It is stated in the 2010 report that EIAs conducted in connection with the Offshore Energy Act must include both fixed and floating turbines, for fixed turbines it is assumed depths of maximum 70 meters and for floating turbines a maximum depth of 400 meters is assumed.[123] Hence, already at this stage two conclusions can be drawn: firstly, that both fixed and floating wind turbines are relevant for Norway's case and secondly, that they have different areas of application.

In order to assert what role EIAs play in regulating offshore wind turbines, it is necessary to examine what factors were being assessed.

[123] The Norwegian Water Resources and Energy Directorate, Havvind: forslag til utredningsområder. Page 178.

In accordance with the preparatory works, a preliminary investigation was conducted into what areas at sea that should be targeted for an EIA, before the strategic EIA.[124] The report was conducted by a group appointed by the government and was published in 2010.[125] The 2010 report states that the purpose of a report that filters out the most suitable places, followed by another report that conducts a strategic environmental assessment report, is appropriate because it gives a general outlook of the environmental and other competing interests that exist offshore.[126] Furthermore, it states that it aids the process of finding areas that are suitable for offshore energy facilities in technical respects.[127] These thorough processes indicate that wind turbines are closely linked to, and dependent on, being in a suitable environment – where there are many relevant factors and possible areas of conflict.

The factors that were evaluated in the 2010 report were in accordance with what the preparatory works suggested.[128] The preparatory works highlighted the following as relevant factors to be reviewed: wind resources, sea depth, electricity connection, supply- and market conditions.[129] The 2010 report also states that there are few areas along the Norwegian coast that are applicable for fixed turbines, and in the areas that fixed turbines *can* be established, they will be visible from land.[130] Additionally, it states that none of the proposed areas that would not interfere with other interests in that area in some way, such as environmental concerns.[131] The findings in the report concluded that 15 areas should be reviewed for the strategic EIA, 11 of the 15 areas were suitable for fixed turbines, while the remaining four areas required floating turbines.[132]

Section 2-2 subsection two further describes that the EIA must include evaluations of what consequences renewable energy production might have for the environment and society, as well as other business interests. The preparatory works[133] to this section specifies that a decision to open a field for energy production must be influenced by the findings of the conducted EIAs and take as much consideration as possible towards environmental and other society interests. It is also stated in the preparatory works[134] that the EIA must consider the

[124] Ot.prp. nr. 107 (2008–2009) Om lov om fornybar energiproduksjon til havs, page 30.
[125] The Norwegian Water Resources and Energy Directorate, Havvind: forslag til utredningsområder. Page 6.
[126] The Norwegian Water Resources and Energy Directorate, Havvind: forslag til utredningsområder. Page 8.
[127] The Norwegian Water Resources and Energy Directorate, Havvind: forslag til utredningsområder. Page 8.
[128] The Norwegian Water Resources and Energy Directorate, Havvind: forslag til utredningsområder. Page 172.
[129] Ot.prp. nr. 107 (2008-2009) Om lov om fornybar energiproduksjon til havs, page 30.
[130] The Norwegian Water Resources and Energy Directorate, Havvind: forslag til utredningsområder Page 88.
[131] The Norwegian Water Resources and Energy Directorate, Havvind: forslag til utredningsområder. Page 88.
[132] The Norwegian Water Resources and Energy Directorate, Havvind: forslag til utredningsområder. Page 172.
[133] Ot.prp. nr. 107 (2008-2009) Om lov om fornybar energiproduksjon til havs, page 80.
[134] Ot.prp. nr. 107 (2008-2009) Om lov om fornybar energiproduksjon til havs, page 80.

relationship towards other businesses in the specific area, the necessity to build infrastructure and regional effects. Most notable in this connection is the requirement to inform about the need to build infrastructure.

Considering that this element is explicitly mentioned, this highlights that the degree of interference that a construction will represent is viewed as especially relevant. Fixed and floating turbines vary in the way they are connected to the seabed and this relates to the infrastructure. Consequently, the need an area might have for infrastructural development might play a part in what type of turbine is permitted.

6.3. Court decisions

The significance of an EIA has been subject to review by the Supreme Court. The decisions of the Supreme Court can aid in illustrating how an EIA affects the legal grounds for whether one is permitted to establish an activity. A well-known court decision is Rt. 2009 s. 661, coined the "Husebyskogen-decision". It discussed what implications an absent EIA had on the decision of where the new American embassy should be in relation to section 41 of the Public Administration Act. Section 41 refers to what the implications are when procedural rules are not complied with where it is required by the Act or a regulation. In Rt. 2009 s. 661, The Supreme Court came to the decision that the absent EIA did not automatically make the decision of where to move the American Embassy invalid. The ruling that the Supreme Court made has been criticized.[135] The decision illustrates that an EIA can have a significant position in a legal perspective despite the outcome of the courts final ruling.

Another court decision from more recent times is HR-2017-2247-A. The case regarded the question whether an administrative decision that impacted the reindeer husbandry was valid when an environmental impact assessment had not been conducted. The Supreme Court ruled that the administrative decision was valid, despite the absent environmental impact assessment based on the grounds that there was no realistic probability that the impact assessment would have changed the outcome of the decision. The Supreme Court referred to the criticized viewpoints of the 2009 ruling in connection with what consequences a lacking impact assessment had for the rules of procedure.

[135] Lorange Backer and Bugge (2010) page 119.

Both abovementioned court rulings are relevant in the current context because they highlight an important point, which is that the findings in an EIA can be decisive for a decision's perceived validity, and also because they influence the grounds on which decisions are made.

Even though both cases came to the decision that the absent EIA's did not cause the administrative decisions to be invalid, they recognize the EIA's importance. The grounds on which decisions regarding offshore wind turbines will be made, are highly influenced by the findings of both environmental impact assessments that have been conducted. This reflects the close connection between conditions in the environment and projects within the renewable energy field. This connection is why the discussion of regulatory differences between fixed and floating wind turbines is interesting.

7. Conclusion

Floating wind turbines expand the possibilities of harnessing winds by their ability to be deployed at greater depths than fixed turbines. This characteristic allows for floating turbines to avoid obstacles that are generally linked to wind turbines, on land there is the issue of allocating enough space for such structures, and at sea it is finding shallow water with an adequate seabed foundation. Norway's coastline of 28 953 km[136] is a gateway to immense resources and profitable industries in petroleum, gas and fishing. Floating wind turbines is a relatively new technology compared to others in Norwegian seas, however, as illustrated in the thesis, there is enormous potential attached to this technology.

The Offshore Energy Act is the legal framework that aims to regulate offshore wind production, inter alia. The policy behind this framework was to be technology neutral, thus creating an Act that did not distinguish between different technologies or approaches within renewable energy production. This is reflected through the objective of the Act which only refers to "energy facilities", a broad term that can encompass a diversity of installations. In respect to composing a flexible legislation that can be applied to a variety of legal conundrums such broad terms can be an advantage. For instance, when the technology advances the underlying framework will still be applicable. In other instances, vague and

[136] Geir Thorsnæs. "Norges geografi," I *Store norske leksikon*, sist endret 27. januar 2020, https://snl.no/Norges_geografi.

wide-ranging terms can cause the legislation to be interpret as shallow, by not going into detail about the core concepts of the act.

The preparatory works to the offshore energy act contains wide aspirations for Norwegian industry when it comes to installing offshore wind turbines and the potential is well documented. Despite this, the preparatory works lacks concrete action plans on how to facilitate the movement towards another impactful industry, like the petroleum and gas sector. The preparatory works are filled with vague statements and barely scratches the surface on the topic of how floating wind turbines might affect the renewable energy field. This lack of discussion is also translated through to the act itself, which contains only the bare minimum on central questions of licensing and the procedures for deciding who gets a permission to run a renewable production facility.

Furthermore, research regarding future potential energy facilities in Norwegian seas is extensive, through the two impact assessments that have been composed. The impact assessments are thorough in revealing the positives and negatives regarding renewable energy production, yet it has not sufficiently stimulated a discussion onto how one can best facilitate the movement towards green energy.

The legislation that has been reviewed does not indicate that there will be different regulatory requirements depending on the type of wind turbine that a developer seeks to install, apart from the restrictions that might stem from areas that are opened only to a specific type of turbine. The restrictions that are set are given due to technical circumstances, such as the fact that technology does not allow for fixed turbines on deep water, not because other reasons have prompted it.

In conclusion, it would be an advantage to expand the regulation of offshore wind turbines in Norway. To support a future offshore industry that is in line with what the government seeks, it is crucial that the legal framework takes a more proactive approach and continues to stimulate additional regulation of this field.

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