North Sea Energy II
Regulatory Framework: Barriers or Drivers for Offshore System Integration

Deliverable B.1.

As part of Topsector Energy:
TKI Offshore Wind & TKI New Gas

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Table of Content

1 Introduction

The North Sea Area (NSA) is of profound economic importance to its littoral states.[1] The North Sea is one of the busiest and most intensively used marine environments in the world, with the exploitation of energy resources, shipping, fisheries, sand extraction, defense, recreation and other uses all claiming a part of the available space.[2] The exploitation of offshore energy resources will be central to this report and can *grosso modo* be divided into two segments.

On the one hand, there is the long established industry for the exploitation of the oil and gas (O&G) reserves on the North Sea. The exploration and production of hydrocarbons has been taking place in the NSA since approximately the 1970s. Oil and gas activities on the North Sea are in a mature phase and as such will be confronted with rising extraction costs and diminishing proven reserves within the license area's.. In view of the depletion of the reservoirs, more and more platforms will cease their economic activities in the nearby future and will therefore need to be decommissioned. In the NSA more than 600 platforms and their associated physical infrastructures, such as pipelines, will have to be removed in the upcoming decades. Focusing on the Dutch part of the North Sea, in policy documents usually referred to as the Dutch continental shelf (DCS),[3] approximately 150 platforms will have to be decommissioned in the upcoming decades.[4]

On the other hand, there is the production of energy from renewable energy sources (RES), such as wind and waves. Currently, especially offshore wind is projected to grow into a substantial source of energy. At the moment, 10 gigawatt (GW) of offshore wind capacity has been installed on the North Sea. In the medium to long term, this installed capacity is projected to grow to 60 GW in 2030 and to approximately 180-250 GW in 2050.[5] Within the Dutch part of the NSA, the Dutch government and the wind energy sector aim at roughly 4,5 GW of offshore wind capacity in 2023 and according to the World Energy Council already more than 10 GW of offshore wind projects are planned for 2030.[6]

Moreover, from a broader sustainability and climate change perspective, the NSA is also increasingly looked at as a place to implement carbon capture and storage (CCS) technology.[7] The utilization of depleted oil and gas reservoirs to permanently store carbon dioxide (CO_2) is currently embraced by the Dutch government as one of the central pillars of its energy and climate policy.[8]

1.1 System integration

The parallel occurrence of the trends identified above, opens up the possibility to search for synergies between both processes. Within the North Sea Energy 2 program, these synergies are explored under the header of offshore system integration.

System integration is described by the overarching TKI Energy program as:

> *"a process of integration between various stages and players of the energy value chains, between various energy carriers, between actors in the value chains and with adjacent*

[1] The North Sea borders the coasts of Belgium, the Netherlands, Germany, Denmark, Norway and the United Kingdom.

[2] Mariene Strategie voor het Nederlandse deel van de Noordzee 2012-2020 (Marine Strategy for the Dutch part of the North Sea), 2012, Part I, p. 53.

[3] In Dutch policy documents, the Dutch part of the North Sea is usually referred to as the NCP (Nederlands Continentaal Plat).

[4] Energiebeheer Nederland, Netherlands masterplan for decommissioning and re-use, 2016, p. 11.

[5] World Energy Council, Bringing North Sea Energy Ashore Efficiently, 2018, p. 6.

[6] Social and Economic Council of the Netherlands (SER), Energieakkoord voor Duurzame Groei (Energy Agreement for Sustainable Growth), 2013, p. 17.; World Energy Council, The North Sea Opportunity, 2017, p. 32.

[7] For a deeper analysis of offshore carbon capture and storage, see section 1.1.3.

[8] Regeerakkoord 2017-2021 Vertrouwen in de toekomst (Coalition Agreement 2017-2021 Confidence in the Future), 2017, p. 38.

sectors in the system, as a consequence of which solutions to bottlenecks are being offered and as a consequence of which opportunities arise for new products and services."[9]

This broad definition highlights some of the central elements of system integration, such as the fact that system integration is about linking previously separated stages, players, energy carriers and adjacent sectors through innovative methods into one large energy system.
Typical forms of integration that are possible offshore are electrification of platforms, the production of hydrogen on platforms and the storage of carbon dioxide in depleted oil and gas reservoirs. Although other integration options exist, such as gas-to-wire (G2W) technology or compressed air energy storage (CAES), the focus of this report will be on the three options identified above. The main reason for this is that the industry partners involved in the North Sea Energy 2 program have identified the former three as the options they consider the most viable for system integration with regard to the platforms they operate.[10] In the upcoming three subsections, the technical and socio-economic specifics of these three system integration options will be introduced. The discussion in these sections does not yet concern the regulatory framework governing these integration options.

1.1.1 Electrification

The first integration option is the electrification of platforms. Currently most platforms make use of diesel- or gas-fired generators and turbines for power supply. Future electrification involves linking the platform to an external source of power. As such, electrification involves the integration of O&G production sites into the electricity system and the replacement of on-site turbines by external power production.
In principle, three tie-in options may be considered for electrification. First, a platform can be connected via a cable to the onshore grid. This option may be viable for near-shore platforms. Secondly, a platform may be connected to an offshore grid. In the Netherlands, the transmission system operator (TSO) TenneT is the designated offshore grid operator with the statutory task to create an offshore grid dedicated to connect offshore wind energy farms to the onshore grids. For many platforms further offshore, it would significantly reduce their costs of obtaining a grid connection if it would be possible to tie in and connect to an offshore grid. A third option could be the direct connection of a platform to an existing or future offshore windfarm. For the North Sea Energy 2 program in particular the potential tie-in with an offshore grid or windfarm are of relevance. For the platform operator, electrification may contribute to lower operational costs and can eliminate the emissions from the diesel- or gas-fired generators and turbines.[11] Moreover, lower operational costs may contribute to extend the lifetime of the field and as such may help to prevent a loss of opportunity to utilize the platform for potential other future purposes, such as offshore hydrogen production.[12]

[9] ''Systeemintegratie is het proces van integratie tussen schakels en spelers in de energiewaardeketens, tussen verschillende energiedragers, tussen actoren in de waardeketen en met aanpalende sectoren in het systeem, waardoor oplossingen voor knelpunten worden geboden en waardoor er kansen ontstaan voor nieuwe producten en diensten.'' See https://topsectorenergie.nl/systeemintegratie.
[10] The industry partners involve Royal Dutch Shell/ NAM, Total, ENGIE and TAQA Energy.
[11] Due to space and weigh limitations on platforms, the generators and turbines used on platforms are usually using singe cycle technology. As a consequence of this, electricity production on platforms is on average rather inefficient.
[12] Many offshore integration technologies are innovative and not yet fully mature and need to be further refined and experimented with before they can be deployed on a larger scale. In that perspective electrification may contribute to bridge the gap by providing an opportunity to extend field life time and delay decommissioning of O&G assets until future operationalisation of other innovative offshore integration options.

1.1.2 Offshore power-to-gas

The second option for offshore system integration is offshore power-to-gas (P2G). This technology involves the usage of an electrolyzer to separate water molecules into hydrogen and oxygen molecules. Generally speaking, electrolysis is an energy-intensive process, whereby electricity is used as input for the decomposition of the water molecules. The hydrogen that is produced through electrolysis can later be used as industrial feedstock or as energy carrier to convert to heat or electricity.

Hydrogen can be produced onshore, but also offshore. With a sufficient supply of fresh water and electricity, it is possible to produce hydrogen on offshore hydrocarbon platforms. Such value chain would involve electricity production and delivery to the platform,[13] assuring a supply of fresh and desalinized water, the decomposition of water into hydrogen and oxygen on the platform via electrolysis and the transport of the hydrogen to shore. This transport can in principle take place in three ways. First of all, for as long as the platform is operating and producing natural gas, the hydrogen can be admixed to the outgoing stream of natural gas. Secondly, it is possible to dedicate a disused gas production pipeline to the exclusive transport of hydrogen or to construct a new dedicated pipeline for hydrogen transport. Thirdly, the hydrogen can be transformed into an identical chemical substance as natural gas labelled as Synthetic Natural Gas or Substitute Natural Gas (SNG). Through a process called methanation, hydrogen can be turned into SNG by adding carbon dioxide. SNG could be technically transported through the gas transport infrastructure and does not require dedicated SNG-only infrastructure. The North Sea Energy 2 program in principle only focusses on the first two options.

P2G may contribute first of all to an extended economic life time of the platform and a postponement of decommissioning costs. From a holistic energy system perspective, P2G may also contribute to large scale (renewable) energy storage,[14] whereby excess electricity (produced by offshore wind farms) can be stored as hydrogen in times when electricity production exceeds demand and can be applied for industrial use or may be turned into electricity once again when electricity demand exceeds (renewable) electricity production. Besides that, where hydrogen can be transported via the already existing offshore (gas production) pipeline system, it may extend the economic life time of such pipelines and may avoid or reduce investments in offshore electricity cables in the situation (for instance far from the coast) where the entire production of a wind park can be turned into hydrogen.

1.1.3 Offshore carbon dioxide storage

Option three involves the permanent offshore storage of CO_2 in depleted oil and gas reservoirs. This CO_2 can be captured at industrial production facilities and thermal energy plants and can be transported offshore through dedicated CO_2 pipelines. This may involve either the reuse of disused gas production pipelines or the construction of new pipelines specially designated for the transport of CO_2 for the purpose of offshore carbon storage.[15] At the storage site, the CO_2 will be injected into the depleted O&G reservoirs. Once the reservoirs are full, the storage site will be sealed, the injection facilities will be removed and the location will be monitored to detect any leakages occurring.

It should be noted that CCS is an energy-intensive and costly measure. The economic viability of offshore CCS is largely dependent on the price of emission allowances compared to the costs for CCS. When the emission allowance price will remain low, it will be cheaper for companies to buy addition allowances than to capture and store the CO_2. As such, the development of the allowance price has a significant impact on the viability of offshore CCS. From a climate change perspective, the advantage of offshore CCS is its potential contribution to the limitation of emissions. For platform operators, CCS provides the opportunity to extend the economic lifetime of their offshore assets.

[13] Electricity can be supplied via one of the three options identified under 1.1.1.
[14] It is easier to store energy content in the form of molecules, than in the form of electrons.
[15] Liquefaction and shipping of CO_2 is not within the scope of NSE2.

1.1.4 Rationale behind system integration

System integration may be beneficial for the energy system in various ways. First, a larger integrated energy systems with increased flexibility, increased storage possibilities and the opportunity to switch between energy transport and storage via molecules or electrons, will contribute to a more robust and resilient energy supply. Second, system integration may contribute to decreasing costs for the energy transition on the North Sea. Currently, the World Energy Council estimates that the decommissioning of O&G assets and the ramp-up of wind energy on the North Sea at large will cost between 390 and 690 billion Euros.[16] Re-usage and optimization of investment strategies in new assets are likely to lower those costs significantly. Thirdly, system integration will also make the energy system itself more efficient as increased storage possibilities will allow for the possibility to store energy when there is an excess of (renewable) production and to utilize this energy in periods when demand exceeds the (renewable) production. Finally, through the re-use of assets, the environmental disruptions resulting from the construction of new infrastructures, such as cables, can be reduced. Besides that, the negative environmental effects of decommissioning platforms can be postponed by extended life time.

1.2 Structure

This report will analyze the legal barriers and drivers for offshore system integration. This report will do so in four chapters. The subsequent chapter, chapter two, will analyze the international legal aspects of offshore system integration through the perspective of international maritime law. Chapter three will analyze the current Dutch legislation in place pertaining to offshore hydrocarbons production, wind energy activities, carbon storage and hydrogen production. The fourth chapter will then provide an overview of possible barriers and drivers in realizing an integrated and hybrid offshore energy system.

[16] WEC, 2017, p. 8.

2 International Law of the Sea

When discussing the regulation of offshore energy activities, a good point of departure is the observation that states in principle enjoy sovereignty over their territory and as such have the jurisdiction to regulate the activities taking place within their territory.[17] This sovereignty covers the entire landmass of a state, including the natural resources that can be found in for example subsoil deposits.[18] Offshore however, the sovereignty and jurisdiction of states is limited and embedded in the international law of the sea. To assess the international maritime regulation of offshore system integration, this chapter will give an overview of the various maritime jurisdiction zones and will analyse the international rules pertaining to the construction and decommissioning of offshore infrastructures.

2.1 Offshore zones

The United Nations Convention on the Law of the Sea (UNCLOS) is without much doubt the most important international legal instrument dealing with the law of the sea in general and with offshore jurisdiction in particular.[19] UNCLOS can be seen as the successor to the 1958 Geneva Conventions.[20] Since all North Sea states, including the Netherlands, have ratified UNCLOS, this treaty provides the general legal framework for offshore energy activities on the North Sea. UNCLOS divides the sea into four zones, all with their own characteristics in terms of coastal state sovereignty and jurisdiction. Of those four zones, i.e. the territorial sea, the continental shelf, the Exclusive Economic Zone (EEZ) and the high seas, only the first three are relevant for the North Sea region.

2.1.1 Territorial sea

The zone closest to shore is the territorial sea. This zone covers the water column, seabed and subsoil up to 12 nautical miles (22.2 kilometres) from shore.[21] In this zone, coastal states enjoy full sovereignty and consequently all national laws apply.[22] Pertaining to energy activities, this means that the state has the right to regulate the construction and use of the assets necessary for, *inter alia*, oil and gas production, electricity production from wind, the conversion of electricity into hydrogen and the permanent storage of carbon dioxide in the subsoil. The only limitation on the state's ability to regulate in the territorial sea are other international legal commitments binding the state and the right of innocent passage, which means that coastal states should assure that foreign ships are still capable of navigating the territorial sea.[23]

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[17] Jurisdiction entails the right of a state to legislate, to apply this legislation and to enforce it within a territory or over particular subjects. Jurisdiction always needs to have an implicit or explicit basis. The most common forms of jurisdiction are territorial jurisdiction, where a state enjoys jurisdiction over its territory, and treaty-based jurisdiction, where a state enjoys jurisdiction by virtue of an international treaty that allocates this jurisdiction to it.

[18] As a rule of customary international law states in principle enjoy permanent sovereignty over their natural resources and can as such regulate the exploration and exploitation of these resources.

[19] United Nations Convention on the Law of the Sea (UNCLOS), Montego Bay, 1982.

[20] The 1958 Geneva Conventions include the Convention on the Territorial Sea and the Contiguous Zone, Geneva, 1958.; the Convention on the High Seas, Geneva, 1958.; the Convention on Fishing and Conservation of the Living Resources of the High Seas, Geneva, 1958.; and the Convention on the Continental Shelf, Geneva, 1958.

[21] UNCLOS, art. 3.

[22] UNCLOS, art. 2.

[23] UNCLOS, art. 2 (3) and art. 17-26.

2.1.2 Continental shelf

The second maritime zone to be found in UNCLOS is the continental shelf. Geologically, a continental shelf is a relatively shallow submarine terrace of continental crust forming the edge of a continental landmass. Under UNCLOS, the definition of continental shelf is limited to that part of the geological continental shelf that is located beyond the territorial sea and extends up to a maximum of 200 nm.[24] On the seabed and in the subsoil of this maritime zone, states enjoy sovereign rights for the purpose of exploring and exploiting natural resources.[25]

2.1.3 Exclusive Economic Zone

One the legal innovations of UNCLOS in comparison to the Geneva Conventions is the introduction of a so-called Exclusive Economic Zone. Beyond 12 nautical miles (nm), states may under UNCLOS establish an EEZ. This maritime zone may extend to 200 nm from shore.[26] Unlike the continental shelf, an EEZ needs to be explicitly proclaimed. In the NSA, all states, including the Netherlands, have done so.[27] The North Sea states have moreover delimitated their EEZs in accordance with UNCLOS in those cases in which opposing or adjacent states held overlapping EEZ claims. National laws do not automatically apply to the EEZ. Only laws that explicitly state so are applicable.

Within the EEZ, coastal states enjoy sovereign rights instead of sovereignty.[28] Sovereign rights can best be understood as a limited and derived form of sovereignty, where the state only has sovereignty for the purpose of exploring, exploiting, conserving and managing the natural resources and regarding other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds.[29] In terms of jurisdiction, this translates in a functional jurisdiction, i.e. jurisdiction for the purpose of regulating these particular activities. This in principle involves the right of the state to regulate O&G and wind energy assets. Moreover, since UNCLOS provides that sovereign rights are extended to the economic exploitation and exploration of the CS and EEZ and that coastal states have the exclusive right to regulate the construction of artificial islands, installations and structures for any economic purpose in the EEZ, offshore P2G and CCS activities also fall under the jurisdiction of the coastal state.[30] In the NSA, the continental shelfs of the littoral states overlap with the proclaimed EEZs. Consequently, both the continental shelf and the EEZ regimes of UNCLOS apply to these areas of overlap.[31]

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[24] UNCLOS, art. 76 (1); hereafter the term 'continental shelf' will be used to refer to the continental shelf as defined by UNCLOS, the geological phenomenon continental shelf will be referred to as 'geological continental shelf'.
[25] UNCLOS, art. 76 (1) and 77.
[26] UNCLOS, art. 57.
[27] The Netherlands established an EEZ through the Kingdom Act Establishing Exclusive Economic Zone (*Rijkswet instelling exclusieve economische zone*), which entered into force on 28 April 2000.
[28] UNCLOS, art. 56 (1)(a).
[29] Ibidem.
[30] UNCLOS, art. 56 (a)(b) and 60 (1)(a)(b).
[31] H.K. Müller, A Legal Framework for a Transnational Offshore Grid in the North Seas, Antwerp, Intersentia, 2016, (hereafter: Müller 2016) p. 22.

2.2 Offshore infrastructure

To dovetail the various uses of the seas and the rights of the various users of the sea, UNCLOS provides guidelines on the construction and the decommissioning of offshore infrastructures, such as platforms, wind turbines, pipelines and submarine cables.

2.2.1 Constructing offshore infrastructure

When a state has the jurisdiction to regulate a particular activity, it can adopt national laws with regard to the construction of the necessary infrastructures for the concerned activity, the operation of these infrastructures and the decommissioning of these infrastructures. One important limitation in this respect is that such national laws will have to comply with other rules of international law. The degree to which a coastal state has to take into account the rights of other users of the sea when executing its right to regulate offshore activities however differs per maritime area.

Within the territorial sea, states have full jurisdiction to allow for the construction of any infrastructures as long as they exercise their jurisdiction subject to UNCLOS and other rules of international law.[32] In its EEZ, a state has the right to allow for the construction of offshore structures for any economic purposes. This right is however limited by the duty to have due regard to the rights and duties of other states.[33] These rights are listed in article 58 of the Convention and include the right of navigation, the right of overflight, the right to lay pipelines and submarine cables.[34] The same regime applies to the continental shelf, where the coastal state can exercise its jurisdiction as long as this does not infringe or result in any unjustifiable interference with navigation and other rights and freedoms of other states as provided for in UNCLOS.[35]

2.2.2 Decommissioning platforms, wind turbines, pipelines and cables

Offshore infrastructures may hamper the rights of other states to fully exercise their rights and freedoms. To balance the rights of coastal states to exploit their offshore resources with the freedoms of other states, international rules have been established to limit any unjustifiable interference with the freedoms of third states. As such, UNCLOS provides with regard to installations or structures constructed in the EEZ or on the continental shelf that:

> *"Any installations or structures which are abandoned or disused shall be removed to ensure safety of navigation, taking into account any generally accepted international standards established in this regard by the competent international organization".*[36]

One of the weaknesses of the UNCLOS regime is that it does not define terms such an 'installations' and 'structures.' It is however generally accepted that these terms at least cover large physical infrastructures such as offshore platforms and wind turbines. Given the explicit reference to safety of navigation, it is generally understood that cables and pipelines are not covered by this obligation.[37] A further light on this issue can be

[32] UNCLOS, art. 2 (3).
[33] UNCLOS, art. 56 (2).
[34] UNCLOS, art. 58 (1).
[35] UNCLOS, art. 78 (2).
[36] UNCLOS, art. 60 (3).
[37] Generally, under UNCLOS, pipelines and cables not seen as being an integral part of the installations to which they are connected. Rather they are seen as separate activities. See: Müller 2016, p. 18.

shed by assessing the “generally accepted international standards established in this regard by the competent international organization” referred to in article 60 of UNCLOS.

A first set of internationally recognised standards are the 1989 Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone issued by the International Maritime Organisation (IMO). [38] Although the IMO guidelines are adopted as recommendations to the IMO members, [39] the fact that these guidelines are generally seen as being international standards in the sense of article 60 of UNCLOS, provides them with an important role in determining when an installation or structure should be removed. According to the categories of installations and structures established by the guidelines, all Dutch North Sea platforms and wind turbines in the EEZ and on the continental shelf will have to be completely removed once they become disused. [40] An important observation in this respect is the fact that the IMO guidelines explicitly mention the possibility to keep installations and structures in place in those cases in which a new purpose can be found for these assets.[41] Pipelines and cables are not covered by the IMO Guidelines.

A second set of standards on decommissioning on the North Sea is the OSPAR Convention and the OSPAR Decision 98/3 on Disposal of Disused Offshore Installations.[42] The OSPAR Convention, also known as the Convention for the Protection of the Marine Environment of the North-East Atlantic, is a regional convention of which all North Sea states are signatories and that covers the marine environment in the North-Eastern part of the Atlantic. The OSPAR Convention stipulates that no disused offshore installations or disused offshore pipelines shall be dumped offshore and that no disused offshore installations shall be left in place without a permit issued by the competent authority of the contracting parties.[43] In the OSPAR Convention, offshore installations are fixed structures placed in the marine environment for the purpose of hydrocarbons production.[44] As such, OSPAR does not contain any removal obligation pertaining to offshore structures that are being place in the marine environment for the purpose of producing wind energy. It is important to note that OSPAR Decision 98/3 provides further clarification on this obligation and establishes that platforms serving another legitimate purpose in the maritime area authorised or regulated by the competent authority of the relevant contracting party are not considered as being disused and do therefore not need to be removed.[45]

A legally challenging situation can arise when platforms are temporarily shut down in the period between the cessation of oil and gas production and the commencement of a new use. Does such an act go against the decommissioning obligation enshrined in the UNCLOS and the above mentioned standards? Currently, no legal guidance is provided on this issue. Given the explicit opening provided for re-use in both the IMO Guidelines and the OSPAR regime, it is however questionable whether a temporal disuse for a reasonable amount of time would go against the aims and norms of the current decommissioning regime.

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[38] International Maritime Organisation Assembly resolution A.672(16) Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone (IMO Guidelines), 1989, London.
[39] IMO Guidelines, art. 2.
[40] IMO Guidelines, annex, art. 3.1 and 3.2.
[41] IMO Guidelines, art. 3.4.1.
[42] Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention), 1992, Paris.; OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations (OSPAR Decision 98/3), 1998, Sintra.
[43] OSPAR Convention, annex III, art. 5.1.
[44] OSPAR Convention, art. 1 (j) and (l).
[45] OSPAR Decision 98/3, art. 1.

2.3 Conclusion

In short, UNCLOS provides for four different maritime zones. Coastal states have the right to regulate oil and gas exploration in three of them, i.e. the territorial sea, the EEZ and the continental shelf. Pertaining to wind energy production, offshore CCS and offshore P2G, coastal states only have jurisdiction when the activities are located on the territorial sea or in the EEZ. In the exercise of their rights, coastal states should however always have due regard of other obligations under international law, such as those that serve the rights and freedoms of third states. Pertaining to decommissioning, a reading of UNCLOS, the IMO Guidelines and the OSPAR Convention makes clear that in principle all platforms on the DCS will have to be removed once they become disused. The term disused under these legal instruments however seems to leave room for the repurposing of platforms. Wind turbines will also have to be removed in accordance with the UNCLOS and the IMO Guidelines. For pipelines and cables no international removal obligation exists, as long as they do not hamper the freedom of navigation.

3 The Offshore Legal Regime on the Dutch North Sea

In the Netherlands, energy activities, both onshore and offshore, are covered by a patchwork of legal instruments. This chapter will analyze the main legal instruments regulating offshore energy production and transport activities. The main bodies of legislation analyzed are the Mining Act, the Water Act, the Wind Energy at Sea Act, the Electricity Act and the Gas Act. It is important to note that this national legislation is in part based on the implementation of European Union law. To avoid duplications however, the authors have decided to primarily describe the Dutch legislation in place and to focus on European legislation only where this would provide added value, for example in cases where the European legislation is developing and such envisaged development will impact Dutch legislation in the short to medium term.

3.1 Mining Act

Since 2003, the exploration and production of hydrocarbons in the Netherlands is governed by the Mining Act (*Mijnbouwwet*). This Act applies onshore, in the territorial sea and on the continental shelf and governs all minerals, including hydrocarbons, that are located at a depth of at least 100 meters.[46] The Act is supplemented by a Royal Decree (*Mijnbouwbesluit*) and a Ministerial Decree (*Mijnbouwregeling*) that both provide further rules on upstream oil and gas activities. The Mining Act contains at least five sets of provisions that are of pivotal importance to offshore energy activities and system integration. Those provisions pertain to the licensing of the exploration and production of hydrocarbons, the licensing of subsoil storage, the regulation of carbon storage sites and the rules pertaining to the construction and decommissioning of offshore infrastructures. Procedurally, the Ministry of Economic Affairs and Climate and the Ministry's oversight body, the State Supervision of the Mines, are responsible for the implementation and enforcement of the provisions of the Act.

3.1.1 Exploration and production license

Both the exploration and production of hydrocarbons are only allowed when holding a license for these activities.[47] Although the term hydrocarbons is not defined by the Act, the chemical definition of a hydrocarbon is an organic compound consisting of hydrogen and carbon. Practically, this means crude oil or natural gas, but excludes the production of pure hydrogen from the orbit of the Act.[48]

Exploration and production licenses are exclusive in the sense that only one exploration or one production license can be awarded for a specific area.[49] The award of both licenses is competitive and follows an open-door system. This means that when a natural or legal person or a consortium of multiple natural or legal persons applies for a license in a particular area, the Minister of Economic Affairs and Climate invites other parties to submit a competitive application.[50] When an exploration license has been awarded for a particular area and the holder or holders of that license find an economically exploitable quantity of hydrocarbons, they can however apply for a production license without competition.[51] The Minister will decide on the award of a license within a period of six months after the end of the application period.[52] A limited list of refusal grounds

[46] Mining Act, articles 2 (1) and 2 (2).
[47] Idem, art. 6 (1)(a-b).
[48] In the same vein the European Hydrocarbons Licensing Directive (Directive 94/22/EC), which has in the Netherlands been incorporated in the Mining Act, also does not contain an explicit definition of hydrocarbons.
[49] Idem, art. 7.
[50] Idem, art. 15 (1-3).
[51] Idem, art. 15 (4).
[52] Idem, art. 17.

and criteria for the assessment of competitive bids can be found in Article 9 of the Act. The most prominent of these include the technical and financial capacities of the applicant, the proposed extraction techniques by the applicant, the conduct of the applicant under any previous licenses held, the management of resources and negative effects for the environment.
The awarded license will specify the minerals and the area to which it applies, as well as the duration of its validity.[53] Although the Minister can modify the license under any of the conditions specified in Article 18 of the Act, it is impossible to modify the license in such a way that it will cover other activities or minerals.[54] The holder of a license can only pass its license to another natural or legal person after approval of the Minister.[55] The Minister also has the right to revoke entirely or partially the license when the license is for example no longer needed for the execution of the activity for which it has been awarded.[56] When the license is held by a group of legal persons, the horizontal legal relations between the various parties holding the license is regulated by a joint operating agreement. This agreement inter alia regulates the distribution of revenue and liability within the exploration and production venture. When multiple parties hold the license, they will appoint an operator for the project and will allocate the responsibility of the execution of the exploration and production to that party.
The production of hydrocarbons takes place in accordance with a production plan.[57] This plan needs to be approved by the Minister,[58] and at a minimum describes the location of the production, the mining works involved, being all works necessary for the production of the minerals, the production techniques, the risks of earth movements and the minerals involved in production.[59] Moreover, the operator is also held to produce a so-called work plan which has to be renewed only a yearly basis.[60] The work plan contains among other things an overview of all mining activities foreseen for the next five years, descriptions of any construction activities such a drilling boreholes, changing mining works and constructing pipelines, an overview of the organization and the persons responsible for the various mining activities, maps and a time pad with all activities.[61]
To ensure the health and safety of the staff located on offshore hydrocarbons production sites, the operator or the license holder is responsible to prepare a report on the large dangers on the platform.[62] This report includes a company policy for preventing heavy accidents, a document describing, the safety and environmental control systems on the platform and a regulation for independent verification of the platform.[63] The report moreover entails a security and health document in accordance with the Dutch Royal Working Conditions Decree and an internal emergency plan.[64] In case of essential changes of the installation, the report needs to be updated.[65]

3.1.2 Storage license

Mirroring the exploration and production licensing system, the storage of substances is prohibited without a license.[66] Although the term substances is not defined, it at a minimum includes oil, natural gas and carbon

[53] Idem, art. 11.
[54] Idem, art. 18 (2).
[55] Idem, art. 20 (1).
[56] Idem, art. 21 (1)(b).
[57] Idem, art. 34 (1).
[58] Idem, art. 34 (3)
[59] Royal Mining Decree, article 24.
[60] Idem, art. 4.
[61] Ministerial Mining Decree, article 1.11.1.
[62] Mining Act, article 45b.
[63] Idem, art. 45c.
[64] Royal Mining Decree, article 84b.
[65] Idem, art. 45e.
[66] Mining Act, article 25 (1).

dioxide.[67] A storage license is exclusive in that it cannot be awarded for any area for which an exploration, production or storage license is being held by another party.[68] Like the exploration and production licensing system, storage licenses are in principle also awarded on a competitive basis, whereby after an initial application has been made by one party, the Minister invites other parties to submit competitive applications for that area.[69] The major exception to this rule is however that, given the exclusive nature of the license, a storage license cannot be awarded for an area for which at the moment that the license would come into force a exploration, production or storage license is held by another actor.[70] This in principle limits, the competitive procedure to situations in which the exploration, production or storage license for a particular area has lapsed or is revoked at the moment that the new storage license would enter into force.
The Minister can refuse to award a license on the limited grounds laid out in article 27 of the Act, which to a significant extent mirror the grounds found in Article 9 regarding the exploration and production license. When the Minister decides to award a storage license, the license will specify the substances to be stored, area of storage, the time frame of storage and whether storage is temporary or permanent.[71] As with production, storage has to be executed in accordance with a storage plan and a work plan.[72] The operator or license holder is not obliged to have in place a report on the large dangers, but should have in place an emergency plan.[73]

3.1.3 Carbon dioxide storage

One specific category of storage that is covered by additional regulation is the permanent storage of carbon dioxide. In respect of carbon dioxide storage, two licenses exist. A license for the exploration of carbon dioxide storage sites and a license for the permanent storage of carbon dioxide. Per area, only one carbon dioxide storage site exploration license can be awarded.[74] Moreover, such an exploration license cannot be awarded for any areas to which a storage license applies on the date that the exploration license would enter into force, independent on who holds the storage license.[75] It is however possible to be awarded an exploration license for carbon dioxide storage sites for an area in which another actor holds a hydrocarbons exploration or production license.[76] The award of the exploration license is competitive in nature, with the Minister calling for alternative bids once a first bid has been made.[77] An important implication of this is that the holder of an hydrocarbons exploration or production license does not have a privileged position in obtaining the carbon dioxide storage sites exploration license. Even more surprisingly, given the possibility for awarding the exploration license for areas where also a hydrocarbons exploration or production license is in place, two different actors may hold licenses for two different activities at the same time for the same area. The Minister has acknowledged this odd situation, but does not see any risks in it.[78]
In addition to an carbon dioxide storage sites license, there is also a license for permanent carbon dioxide storage. This license is also exclusive in that only one storage license, independent whether it's a license for

[67] As will be highlighted in section 3.1.3., the permanent storage of carbon dioxide is governed by additional requirements.
[68] Mining Act, art. 26 (1-2).
[69] Idem, art. 26b (1-3).
[70] Idem, art. 26b (4)(b).
[71] Mining Act, article 28.
[72] Idem, art. 39 (1) and 34 (1).
[73] Royal Mining Decree, article 85 (1).
[74] Mining Act, article 26 (6).
[75] Ibidem.
[76] Idem, art. 26 (7).
[77] Idem, art. 26b.
[78] See also: Kamerstukken II, 34 348 nr 20, p.7-8.

storing carbon dioxide or another substance, can be held for a particular area.[79] Like the exploration license for carbon dioxide storage sites, this license can however also be combined with an exploration or production license for hydrocarbons. The award procedure for the permanent storage license is like the other license competitive in nature, except when the holder of an exploration license for carbon dioxide storage sites applies for the permanent storage license.[80] Once again, this creates a situation in which the holder of a hydrocarbons exploration or production license does not hold a privileged position and will not automatically rewarded the storage license. In the same vein as above, the holder of the hydrocarbons license may be confronted with another party obtaining a carbon dioxide storage license for the area for which it holds the exploration or production license for hydrocarbons. The permanent carbon dioxide storage licensing procedure has the same refusal grounds as the procedure for a normal storage license, with some addition grounds. The most important of these are the risks of carbon dioxide leakage and the risk of significant health and environmental effects.[81]
In case the storage license pertains to the permanent storage of carbon dioxide, the license moreover will contain a more elaborate lists topics, including information on the quantity and quality of the carbon dioxide and the execution of risk management, monitoring, closure, corrective measures and financial securities.[82]
During the operation of the CCS storage site, the holder of the license and the entity exploiting the carbon dioxide transport network are held to provide third parties access on fair, transparent and non-discriminatory grounds. The holder of the carbon dioxide storage license is moreover obliged to keep a registry with the delivered, stored and leaked quantities of carbon dioxide and to inform the Minister on a yearly basis about the monitoring outcomes.[83]
Once the injection of carbon dioxide is ended in accordance with the license, the license holder is obliged to permanently close the storage site and remove the injection facilities.[84] The license holder can be relieved of his license after the finalization of the storage activities under the conditions that the carbon dioxide is permanently stored, the storage site is permanently closed, the injection facilities have been removed, after a time period of approximately 20 years has passes since the permanent closure of the storage site and when the license holder provides a financial contribution sufficient to cover the monitoring costs for at least 30 years.[85] After the cancellation of the license in accordance with the previously mentioned provision, the Minister will become responsible for monitoring and corrective measures.

3.1.4 Construction of infrastructures

The system of the Mining Act is such that the award of a license gives the license holder the right to use the soil and the subsoil for the purpose of the activity for which the license was awarded. In the case of a production license this for example translates into a right to place infrastructures for the production of a particular resource. These infrastructures can however not be placed randomly or at will of the license holder. The placement of infrastructures is a delicate process which involves further permitting, obtaining approvals and coordination with the Ministry of Economic Affairs and Climate and the State Supervision of the Mines.
A first important observation in this respect is that the Mining Act distinguishes between different types of infrastructures. First of all, there is the so-called mining installation, which is an mining work that is permanently affixed or present above the soil of a surface water.[86] A mining installation is defined a work designed for 1)

[79] Idem, art. 26 (6).
[80] Idem, art. 26b (4)(d).
[81] Idem, art. 27 (3).
[82] Idem, art. 31d.
[83] Idem, art. 31f and 31g.
[84] Idem, art. 31i.
[85] Idem, art. 31j.
[86] Idem, art. 1 (o).

the exploration and production of resources and geothermal energy, 2) the storage of substances or 3) works connected to works for the previous two purposes.[87] A pipeline or cable is not included within the definition of a mining work. They are seen as separate objects with a separate legal status. In accordance with the Mining Decree, a pipeline is a line between two or more mining works for the purpose of transporting substances or any pipeline that connects a mining work with another work for the purpose of transporting substances.[88] A cable is defined as a line in the territorial sea or on the continental shelf between two or more mining installations or between a mining installation and another work for the purpose of transporting electricity or electronic signals.[89] Mining installations on the one hand and pipelines and cables both have their own separate regime for construction.

For mining installations, a first hurdle is obtaining a special environmental mining work permit. Without such a permit, the erection of mining installations is prohibited.[90] The permit can only be refused on grounds pertaining to the protection of the environment and nature and may contain restrictions with the aim of protecting nature or the environment.[91] Moreover, pertaining to offshore mining works, so-called mining installations, ministerial approval is needed before a platform for production or storage purposes can be put in place.[92] This approval will be granted if the platforms adheres to a set of technical standards and norms.[93] Moreover, two days before the start of production or storage operations, the operator or license holder is obliged to provide to the State Supervision of the Mines a statement by an independent expert that the technical integrity of the installation is guaranteed.[94] In the case that both a hydrocarbons production license and the permanent carbon dioxide license have been awarded for the same area as described in the above section, both license holders as an additional step have to come to a joint agreement on the concurrent execution of both exploration and storage activities.[95]

For the construction of pipelines, a special regime exist in the Royal Mining Decree. Article 94 of this Decree stipulates that pipelines and cables can only be constructed within the territorial sea or on the continental shelf after a permit for their construction has been issued.[96] The permit conditions can be respectively found in Articles 93 and 105 for pipelines and cables.[97] These conditions primarily pertain to the technical integrity of the infrastructure, the risk of damages stemming from the pipelines and cables, and the maintenance of the pipelines and cables.[98] Regarding the operation of the pipelines or cables, the Act stipulates that pipelines and cables can only be taken into use after the Minister has given his approval for this.[99] The operator of the pipeline or cable or moreover held to periodically assess the pipeline or cable with regard to the aspects found in Articles 93 respectively 105 as identified above.[100]

[87] Idem, art. 1 (n).
[88] Royal Mining Decree, article 92 (a).
[89] Idem, art. 92 (b).
[90] Idem, art. 40 (2).
[91] Mining Act, article 40 (3-4).
[92] Royal Mining Decree, articles 55 (1) and 55 (8).
[93] Idem, art. 55 (2).
[94] Idem, art. 53a.
[95] Mining Act, article 42 (3).
[96] Royal Mining Decree, article 94 (1).
[97] Idem, art. 93 and 105.
[98] Ibidem.
[99] Idem, art. 97 and 106.
[100] Idem, art. 99 and 106.

3.1.5 Removal of infrastructures

As noted in the previous chapter, the international law of the sea provides clear guidance on the fact that disused infrastructures should in principle be removed. In Dutch law, the obligation to remove mining installations that are no longer in use can be found in Article 44 of the Mining Act.[101] This obligation rests with the license holder or the operator in case of a joint venture. When the license has already expired, the last holder or operator is responsible for the execution of the removal obligation. To assure that the costs of removal will be borne by the licensee or the operator, the Minister can request a financial guarantee.[102] To date the Minister has however not yet made use of this provision. The Minister can determine a time frame within which the installation has to be removed.[103] According to the explanatory memorandum of the Act, this provision has been included to provide the Minister with a measure to oblige parties to fulfill their removal obligations, but also to allow a postponement of the decommissioning. The memorandum does give one example of a condition under which postponement may be an option, i.e. when a platform does not have function anymore in the production of hydrocarbons, but still has a role in the transport system.[104] The removal of a mining installation occurs in accordance with a removal plan, which needs to be approved by the Minister.[105] Unlike onshore, where the closure plans for disused mining works need to be submitted to the Minister within 12 months after the end of production, there is no explicit deadline for submitting the removal plans for offshore mining installations.[106] The removal plan at a minimum describes the method of removal, the method of proving that the entire installation and its debris have been removed, the method of transport of the installation and the debris, the final destination of the installation and the debris, any waste present on mining installation and its destination and a time pad for the execution of these tasks.[107]

With regard to cables and pipelines subject to the Mining Act, the Minister has been awarded the discretion to decide whether these assets need to be removed after disuse.[108] Article 104 of the Royal Mining Decree stipulates that any pipelines will in principle be cleanly and safely left behind, unless the Minister decides otherwise.[109] In accordance with Article 106, the same standard applies to cables subject to the Mining Act.[110]

3.2 Water Act

A second important act for offshore energy production and transport is the Water Act (*Waterwet*). This Act provides the general framework for the regulation of all activities taking place in water systems to the extent that they are not partially or in whole regulated by specific sectoral legislation, such as the Mining Act.[111] The Water Act has three primary aims, i.e. the prevention of flooding and water scarcity, assuring and improving the chemical and ecological quality of water systems and assuring the execution of societal functions by the water systems.[112] The Ministry of Infrastructure and Environment and its oversight body *Rijkswaterstaat* are the principle bodies responsible for the execution and enforcement of the provisions of the Water Act. Given its functions, the Act plays a pivotal role in the managing the different uses of water systems, such as the North

[101] Mining Act, article 44 (1).
[102] Idem, art. 47 (1).
[103] Idem, art. 44 (3).
[104] Kamerstukken II, 26 219 nr. 3, p. 27.
[105] Royal Mining Decree, article 60 (1-2).
[106] For onshore mining works the Mining Decree uses the term ‘closure plan’ (*sluitingsplan*) and for offshore installations the Mining Decree uses the term ‘removal plan’ (*verwijderingsplan*).
[107] Idem, art. 61.
[108] Mining Act, article 45 (1).
[109] Royal Mining Decree, article 104.
[110] Idem, art. 106.
[111] Another example of an sectoral act is the Wind Energy at Sea Act, which we will discuss later.
[112] Water Act, article 2.1 (1).

Sea. For offshore energy activities and system integration, three provisions of the Water Act are of importance: those concerning the national water plan, those concerning the water permit and those concerning the extraction of water from water systems.

3.2.1 National water plan

The Water Act is first of all important for the offshore energy industry since it is the legal basis for the national water plan. This plan outlines the national water policy, including the spatial aspects of the different uses of national water bodies, such as the North Sea.[113] Moreover, the national water plan contains a separate annex outlining the North Sea policy of the Dutch government (*beleidsnota Noordzee*).[114] Given the limited space of the Dutch part of the North Sea and the multiple uses, such as hydrocarbons production, wind energy production, shipping, national defence and environmental protection, taking place on the North Sea, some guidance by the government on the allowed and desirable development of these uses is necessary. This guidance is in practice provided by the national water plan and the North Sea policy annex.

Pertaining to the offshore energy industry, the North Sea policy annex gives clear guidance on the government's vision on the different offshore energy activities, such as hydrocarbons production, wind energy production, carbon storage and the situation of pipelines and cables. The document outlines the visions and challenges of these activities and the policy of the government pertaining to the offshore application of those activities. These policy statements found in the North Sea annex tend to be rather short and general. In the 2016-2021 National Water Plan, it is for example stated with regard to carbon dioxide storage that this is an activity of national importance and that there should be sufficient space for this activity on the North Sea.[115] For carbon dioxide storage, as for hydrocarbons production, the government has thus decided to take a more passive role in the spatial allocation of these functions by waiting for market parties to make their interest known in the execution of one of these activities in a particular area. Only after market parties have made their interest known, the government will make an assessment of whether it will allow the execution of that activity in a particular area.

With regard to wind energy however, the national government has taken a more active role in directing the spatial use and locations of this function. In the 2009-2015 National Water Plan and the 2014 revision of this National Water Plan, the government has assigned four areas for offshore wind energy production: Borselle and IJmuiden Ver (National Water Plan 2009-2015) and Hollandse Kust/ Dutch Coast and North of the Wadden Islands (2014 Review).[116] Only within these assigned areas, the production of electricity from wind is a possible spatial use.[117] As already noted above, this active spatial steering through the offshore allocation of energy functions to a particular area is exceptional.

3.2.2 Water permit for placing objects and using a maritime area

As already noted above, the start of activities that fall within the working sphere of the Mining Act, such as hydrocarbons production, the storage of substances, the permanent storage of carbon dioxide or the laying of cables and pipelines, is only allowed when a license to these ends has been awarded. Not all offshore activities however fall under the Mining Act. In this respect one can for example think of the construction of a platform

[113] Idem, art. 4.1 (1).
[114] Idem, art. 4.1 (3)(b).
[115] National Water Plan 2016-2021 (NWP2), North Sea Annex, p. 48.
[116] See National Water Plan 2009-2015 (NWP1) and the 2014 Review of National Water Plan 2009-2015.
[117] The further operationalization of wind energy takes place under the Wind Energy at Sea Act that is analyzed in section 3.3.

for offshore hydrogen production or the laying of offshore electricity cables for the transport of wind energy to shore. For these activities, for which the offshore placement is not regulated by a separate sectoral act, the Water Act provides a general permitting framework.
On the basis of Article 6.5 of the Water Act it is prohibited to establish installations or structures or lay cables or pipelines within a maritime area, such as the North Sea, without a permit to that end from the Minister of Infrastructure and the Environment.[118] This prohibition does however not apply to installations, structures, cables and pipelines covered by the Mining Act and to wind parks permitted under the Wind Energy at Sea Act. The latter Act will be described in more detail below.[119]
The permit awarded under Article 6.5 of the Water Act is also known as the water permit. The award is not competitive and involves an actor requesting the permit for a particular usage of an area of the concerned water body. This request is assessed against the general purposes of the Act and only when the proposed usage is incompatible with these purposes the Minister can refuse the request.[120] These purposes are, as highlighted above, preventing floods and water scarcity, protecting the chemical and biological quality of the water systems and assuring the societal functions of the water system.[121] In accordance with the Ministerial Water Decree (*Waterregeling*), a request for a water permit for the construction of an installation or structure should always include information on the removal of that installation or structure.[122] When awarding the permit, the Minister of Infrastructure and the Environment, can include instructions in the water permit with regard to, inter alia, the compensation and removal of negative effects to the environment when the activity is ceased and the financial security of the permit recipient with regard to fulfilling the instructions.[123] This can include an instruction in the Water permit with regard to the removal of the physical infrastructures when these will become disused.[124]

3.2.3 Water permit for the extraction of water

The last relevant aspect of the Water Act is that the Act governs the extraction of water from surface water bodies. Such extraction will be especially relevant for offshore hydrogen production, since desalinated water is a primary input in the hydrogen production process. Within the meaning of the Act, the term surface water bodies refers to all bodies of water available on the surface of the earth, which in practice involves seas, lakes and rivers.[125] For waters that are managed by the central national government, such as the North Sea, the Water Act prohibits the extraction or injection of water into surface water bodies without a water permit.[126] The Ministerial Water Decree specifies that a permit is necessary if an actor wants to extract more than 100 m^3 of water per hour with an inflow velocity of more than 0,3 m/s.[127] When an actor wants to extract more than 100 m3 of water per hour from a national water body with an inflow velocity below 0,3 m/s, the actor needs to notify the Minister of Infrastructure and the Environment of his plans.[128] In cases in which no permit is necessary on the basis of article 6.5 of the Water Act, the extraction actor is still held by a duty of care not negatively affect

[118] Water Act, article 6.5 (c).
[119] Idem, art. 6.5a and 6.12 (d).
[120] Idem, art. 6.21.
[121] Idem, art. 2.1.
[122] Ministerial water decree, article 6.26.
[123] Water Act, article 6.20 (1).
[124] The Minister has for example used this possibility with regard to the offshore network constructed by TenneT, see for example the Water permit for the offshore network in the Borselle Area, permit RWS2016/28137, instruction 14, p. 10.
[125] Water Act, article 1.1 (1).
[126] Idem, art. 6.5 (a).
[127] Ministerial Water Decree, article 6.16 (1).
[128] Idem, art. 6.17.

the ecological state of the waterbody or the water level.[129] For water bodies that are not governed by the national government, the so-called regional water bodies, the regional water boards can establish their own regulation with regard to water extraction. The exact regulation thus differs per regional water board and can be found in the concerned regional water regulation – also known as *keur* in Dutch.

3.3 Wind Energy at Sea Act

The Wind Energy at Sea Act (*Wet windenergie op zee*) provides the legal framework for the offshore construction of wind parks. Wind parks within the meaning of the Act includes the facilities necessary to produce electricity from wind energy, the connections between these facilities, and the connection of these facilities to a connection to the network.[130] The Act provides the Minister of Economic Affairs and Climate with the necessary instruments to transform the designated wind energy areas from the national water plan into areas where also in practice electricity is produced by wind parks. These instruments are the plot decision and the wind energy at sea permit.

3.3.1 Plot decision

Since the wind energy areas identified in the national water plan are of significant size, the government has considered it opportune to subdivide these areas into smaller plots. In determining which parts of the identified locations will be turned into plots, the Minister of Economic Affairs and Climate takes into considerations both the other uses of the sea and the costs and possibilities of creating a wind energy project in the subparts of the identified areas.[131] When the Minister is of the opinion that a particular area should be turned into a wind energy plot, he takes a plot decision which contains information on the physical characteristics of the plot, the measures taken to limit the environmental impact of the wind park, a time frame for the future wind energy permit and the rights of third parties pertaining to the plot.[132] In addition to delimitating plots, the plot decision also specifies the location of the cables connecting the wind park to the network.[133]

3.3.2 Wind energy at sea permit

For the available plots, the Minister will organise a tender for the award of an exclusive permit for the construction and operation of a wind park on the concerned plot.[134] Without such a permit both the construction and operation of a wind park are prohibited. The permit cannot be awarded for any area outside a plot or for a plot for which a permit has already been awarded.[135] These tenders are announced through the issuing of a separate Ministerial Decree and are competitive in nature and can follow two procedures: one for project developers who do not require a subsidy for the construction and operation of the wind park and one procedure for project developers that do need subsidy.

Independent of which of the procedures is followed, all applications are on the basis of Article 14 of the Act always assessed on, inter alia, whether they provide sufficient ground to assume that the construction and operation of the wind park is technically, financially and economically achievable.[136] When the procedure

[129] Idem, art. 6.18.
[130] Wind Energy at Sea Act, article 1.
[131] Idem, art. 3 (3).
[132] Idem, art. 4.
[133] Idem, art. 3 (2).
[134] Idem, art. 12, 14.
[135] Idem, art. 13.
[136] Idem, art. 14.

without subsidy is followed, the application should at a minimum describe the design of the wind park, the time scheme for construction and exploitation, an estimation of the costs and benefits of the park, an inventory and an analysis of risks, a description of the measures taken to assure cost efficiency and an overview of all parties involved in the construction and exploitation of the wind park including an description of the expertise and experience of the different parties involved.[137] When more than one applicant has submitted a plan that provides sufficient ground to assume that it is achievable, the Minister will rank the different applicants on the basis of the expertise and experience of the involved parties, the quality of the design of the wind park, the capacity of the wind park, the societal costs of the park, the quality of the risk inventory and analysis and the quality of the proposed measures to assure cost efficiency.[138] In the most recent standard wind park tender in 2018, this procedure was followed and a permit for two plots was awarded to Chinook C.V., a subsidiary of Vattenfall, without subsidy.

Previously however, also permitting procedures with subsidy have been organised. Under this procedure the subsidy procedure and a permitting procedure are simultaneously executed. The permit is awarded to the applicant that meets the requirements found in Article 14 of the Act and that obtains the subsidy. The subsidy is awarded under the Royal Decree governing renewable energy production (*Besluit stimulering duurzame energieproductie*). Pursuant to Article 2 of this Decree a special Ministerial Decree will be issued with a call for subsidy applications pertaining to the concerned plot. The applicant with the lowest amount of requested subsidy will in practice be awarded the subsidy and consequently, the permit. The subsidy can be awarded for renewable electricity that is fed into an electricity network, such as the offshore electricity network administered by TenneT, [139] which will also be discussed below, or for renewable electricity that is fed into an installation and for which a guarantee of origin for non-network delivery has been issued.[140] Under this provision subsidy can also be awarded for electricity fed into an offshore hydrogen production installation.

The awarded wind park permit, independent of the procedure under which it has been awarded, will specify its validity, the plot to which it applies and the time frames within which the licensed activities should start.[141] The license will be valid for a maximum of 30 years.[142] As with the hydrocarbons licenses found above, the licenses can be withdrawn or transferred under specific conditions.[143]

3.3.3 Foreseen amendments

In February 2018, the Minster of Economic Affairs and Climate has open a consultation for an Act amending the Wind Energy at Sea Act.[144] The proposed amending Act will involve two major revisions of the current regime for offshore wind. First of all, the amending Act will broaden the scope of the Wind Energy at Sea Act from an exclusive focus in producing electricity to the broader production of wind energy, which can be any energy carrier based on the conversation of wind.[145] The explanatory memorandum on this aspect explicitly refers to ammonia and hydrogen as possible energy carriers.[146] To facilitate the production of alternative carriers, the amending Act also replaces the concept of a network connection with the concept of a connection point. Whereas the previously used concept of a network connection only referred to connecting the wind park

[137] Idem, art. 23 (2).
[138] Idem, art. 24 (1-2).
[139] Royal Decree governing renewable energy production, article 15 (1).
[140] Idem, art. 15 (6).
[141] Idem, art. 15 (1).
[142] Idem, art. 15 (2).
[143] Idem, art. 16 and 17.
[144] Act amending the Wind Energy at Sea Act (supporting the targets for wind energy at sea).
[145] Amending Act, article 1 (A).
[146] Memorandum, page 17-18.

to a network, the connection point concept refers to a connection that is either connecting the wind park to a network or an installation.[147] The explanatory memorandum gives three examples of such connection point:

1. The connection of an electricity cable to a hydrogen factory (on shore or offshore);
2. The connection of a hydrogen pipeline to an installation where the hydrogen is distributed over various means of transport (such as pipelines, ships or trucks);
3. The connection of a hydrogen pipeline to an installation where electricity is produced from hydrogen.[148]

The relevance of this changing conception of connection is that depending on the connection point chosen, the plot decision under the amended act will extend to that connection point.
Secondly, the amending Act will introduce two new permitting procedures for the wind permit. The first new option concerns the possibility of a procedure with a financial bid. In this procedure interested actors can submit a financial bid with their application and this financial bid will be part of the overall assessment of the Minister on who he will award the license. A second new option is the possibility of an auctioning of the licence in which the Minister awards the license to the highest bidder.[149]

3.4 Electricity Act

The Electricity Act (*Elektriciteitswet*) regulates the entire value chain of electricity production from production to transmission, distribution and supply to the consumers. The offshore applicability of the Act in the EEZ is limited to three aspects of the electricity value chain: offshore electricity production, the offshore electricity network and transboundary electricity networks. For the scope of this research project especially the first two cases are relevant.[150]

3.4.1 Renewable energy

The rise of renewable energy production is a relatively recent development in the offshore domain. Currently, offshore renewable energy production is largely limited to the production of electricity from wind. This form of renewable energy production is in part regulated through the Wind Energy at Sea Act, which provides the legal framework for the siting of the wind park and the subsidy allocation to the wind park operator. The relevance of the Electricity Act to offshore wind parks is first of all, that the Act regulates the issuing of guarantees of origin.[151] These guarantees are issued by CertiQ, a subsidiary of TenneT, and count as proof that a certain amount of energy is produced from renewable sources. These guarantees in practice serve as a basis from obtain renewable energy subsidies and moreover be used by suppliers to prove the renewable origin of their energy portfolio. Guarantees can moreover be traded independent from the physical flows in electricity and are often sold separately by producers to supply companies to green their portfolio. As such they can serve as an additional source of revenue for energy producers.

3.4.2 Offshore network

Another important set of provisions of the Electricity Act are those that deal with the offshore transport of electricity. Before the amendment of the Electricity Act in 2016, wind energy project developers were themselves responsible for transporting their electricity onshore. In this situation, every project developer

[147] Amending Act, article 1 (A).
[148] Memorandum, page 17-18
[149] Amending Act, article 1 (U).
[150] Electricity Act, article 1 (5).
[151] Idem, art. 75.

constructed its own electricity cable between the wind park and the onshore grid. With the introduction of Article 15a in the Electricity Act this situation has changed. This article mandated the construction and operation of an offshore network. This article has been introduced by the legislator to promote the deployment of offshore wind and to assure the efficient transport of this energy to shore.
According to the amended Act, the offshore network encompasses the transport network that transports the electricity produced by one or more wind parks to the onshore network. The cables for electricity transport between wind parks and the onshore grid that have been permitted before 2016 under the Water Act or the Public Works and Water Management Act fall outside the scope of the offshore network.[152] The offshore network has its own network operator, TenneT, that has been appointed by the Minister of Economic Affairs and Climate.
To assure a smooth development of the offshore network, article 16e of the Act stipulates that the Minister of Economic Affairs and Climate will draft a development framework for wind energy at sea stating, inter alia, the location of the foreseen wind parks, the foreseen starting dates of production for these wind parks, the capacity of these wind parks and the foreseen delivery dates of parts of the offshore network.[153] In case TenneT does not deliver the offshore network in time or is insufficiently capable of transport all electricity of the wind parks, project developers are entitled to compensation.[154] TenneT operates under the scrutiny of the Authority for Consumers and Markets that also regulates the income of TenneT as the offshore network operator.[155] This income is provided to TenneT in the form of a subsidy by the Minster.[156]

3.4.3 Recast Electricity Directive

An important legal development pertaining to the Electricity Act can be found on the European level, where currently a new Electricity Directive is being negotiated. This so-called Recast Electricity Directive contains a proposal for a new and specific set of provisions on energy storage, which is defined as “in the electricity system, deferring an amount of the electricity that was generated to the moment of use, either as final energy or converted into another energy carrier”[157] The current proposal by the Commission contains elaborate provisions on the ownership of energy storage facilities. The Commission seems to take the view that energy storage is a commercial activity and therefore in principle prohibits transmission system operators and distribution system operators from owning, managing or operating an energy storage.[158] As the legislative process pertaining to the Recast Electricity Directive is still ongoing, the precise content of the foreseen regulation of energy storage may however still change.

3.5 Gas Act

The Gas Act (*Gaswet*) predominantly regulates the transport and delivery of both natural and synthetic gas on the territory of the Netherlands, the territorial sea, the EEZ and the continental shelf. The Minister of Economic Affairs and Climate is the ministry responsible for the implementation of the Gas Act. The Authority for Consumers and Markets is the entity responsible for the enforcement of the economic provisions of the Act. The working sphere of the Act is defined by the definition that the Act gives to the term gas. Since 2012, the Act contains an explicit reference that the term gas covers both natural gas and substances, such as biogas,

[152] Idem, art. 15a.
[153] Idem, art. 16e.
[154] Idem, art. 16f.
[155] Idem, art. 42a-42e.
[156] Idem, art. 77g.
[157] Recast E-Directive, commission proposal (COM 864 final/2), art. 2 (47).
[158] Recast E-Directive, commission proposal (COM 864 final/2), art. 36 and 54.

to the extent that these meet a set of specifications concerning production method and the chemical state of the substance when held under a particular temperature and under a particular pressure. One important requirement pertaining to the chemical state is that the substance should mainly consist of methane or another other substance that is equivalent to methane in terms of its characteristics and that can safely be transported in accordance with chapter 2 of the Act. Chapter 2 does not provide any further guidance on safe transport, but article 11 of Chapter 2 does provide for a list of requirements that gas should meet before it can be fed into the gas transport network. These requirements are set out in the Ministerial Decree on gas quality (*Regeling gaskwaliteit*). As will be analysed below, this Decree rules out the transport of pure hydrogen and therefore pure hydrogen transport and delivery seems to be outside the working sphere of the Gas Act. Consequently, the Gas Act is only of relevance for the offshore natural gas sector. For this sector, the Act contains three points of relevance, i.e. the provisions on gas production networks, the provisions on gas quality and the provisions on gas storage.

3.5.1 Gas production networks

The Gas Act distinguishes between two types gas networks, i.e. production networks and transport networks. The former denotes the pipelines that are part of an oil or gas production project or the pipelines that connect a gas production project with a treatment facility, a storage facility or a landing place, whereas the later denotes the pipelines that used for the transport of gas, but that are not part of a gas production network.[159] The pipelines located on the continental shelf are in practice all gas production networks.

The difference between both types of networks is of relevance, since the regulatory regimes for both networks differ substantially. Unlike transport networks, production networks are not covered by the unbundling, third party access and tariff regulation provisions of the Gas Act. In short, this means that the operator of a production network does not have to be independent from entities engaging in either gas production or delivery, that there is no regulated third party access regime and that there is no tariff regulation by the Authority for Consumers and Markets. Practically, this means that access to offshore production networks is based on negotiations with the network operator and that it is up to the network operator to set the tariffs for the use of its network. The Gas Act does however put one limit on the freedom of gas production network operators to determine their own access conditions and network tariffs. Although the applicability of the Competition Act (*Mededingingswet)* is limited to the Dutch territory and the territorial sea, the Gas Act broadens this applicability to cover gas production networks on the continental shelf.[160] The implication of this is, that a gas production network operator can be disciplined by the Competition Authority when it abuses its dominant position vis-à-vis entities requesting access to its network.

3.5.2 Gas quality

Another requirement that does pertain to the onshore gas transport network, but not to the offshore gas production networks are gas quality standards. All gas fed into the onshore gas transport network needs to adhere to certain quality standards.[161] The Ministerial Decree on gas quality stipulates the exact composition requirements of the gas fed into the transmission network. As already noted above, the gas fed into the network should primarily consist of methane or equivalent substances. Nonetheless, some room for the injection of hydrogen into the onshore gas network exists. In 2016, the Minister updated the gas quality requirements and provided additional room for the development of hydrogen in the gas network, the Minister has set the

[159] Gas Act, article 1 (1).
[160] Idem, art. 17.
[161] Gas Act, article 11.

maximum content level of hydrogen in the low-calorific gas network at 0,5%.[162] Although this requirement does not apply to the gas transported through the offshore production network, any quantity of gas that is transported from an offshore location to the onshore transmission network will have to be treated in such a way that it meets the criteria upon injection into the onshore network. In practice this means it will either have to be fed into the offshore pipelines in such a way that it meets the onshore criteria or that it will have to be treated onshore prior to injection into the network. This consequently limits the possibilities for admixing offshore produced hydrogen into gas that is transported to the onshore network.

3.5.3 Gas storage

The Gas Act also applies to the storage of gas within the meaning of the Act. Where gas is stored underground, the Mining Act also applies to this storage. In short reiteration of the points made above, the Mining Act prohibits the underground storage of any substance without a license to this end and requires the operator of such a storage to Act in accordance with a set of health, safety and environmental requirements. The Mining Act however does not provide any rules on the market conduct of such operator.

These rules can in turn be found in the Gas Act. The two most important sets of market conduct rules are unbundling and third party access. Pertaining to unbundling, the operator of a gas storage needs to be independent in its legal form, organisation and decision-making from entities active as producer or supplier on the gas market.[163] Gas storage operators moreover have to adhere to a regime of negotiated third party.[164] In this respect it is however important to observe that the working sphere of the Gas Act provisions on storage are more narrow than the provisions of the Mining Act on this issue. Whereas the Mining Act applies to all possible gaseous substances, the market rules of the Gas Act only apply in those cases that the stored substance falls within the meaning that the Gas Act gives to the term gas.

3.6 Miscellaneous acts

3.6.1 Environmental Management Act

The Environmental Management Act (*Wet milieubeheer*) governs environmental protection through environmental plans, environmental impact assessments (EIA's) and general environmental rules. In the Exclusive Economic Zone, only parts of the Act are applicable. These parts includes the provisions governing EIA's and the provisions governing greenhouse gas emissions.[165]

Concerning the first category, the Royal Decree on environmental impact assessments (*Besluit milieueffectrapportage*) provides a list of activities subject to an EIA. These activities at a minimum include the construction of pipelines for the transport of gas, oil, chemicals or carbon dioxide for the purpose of geological storage in cases in which these pipelines have a diameter of more than 80 centimetres and a length of more than 40 kilometres, the establishment of carbon dioxide storage sites, the establishment of carbon dioxide capture installations where carbon dioxide is captured with the later aim of permanent geological storage, the production of hydrocarbons and the establishment of wind turbine parks with more than 20 turbines.[166] In

[162] Ministerial Decree on gas quality, annexes 2 and 4.
[163] Gas Act, article 9b.
[164] Idem, art. 18g.
[165] Environmental Management Act, article 7.2 (7) and article 16.3.
[166] Royal Decree on environmental impact assessments, annex under C.

particular situations, lower thresholds may apply for the above mentioned activities, moreover subsoil gas storage may also require an EIA when certain requirements are met.[167]
Pertaining to greenhouse gas emissions, all establishments containing one or more greenhouse gas installations are obliged to hold an emissions permit issued by the Dutch Emissions Authority.[168] According to the Royal Decree on trade in emission rights (*Besluit handel in emissierechten*), this includes installations for the capture, transport and storage of carbon dioxide under the condition that these activities take place with the aim of permanent storage and installations for the production of hydrogen or synthetic gas by reforming or partial oxidation with a production capacity of more than 15 tones per day.[169]

3.6.2 Environmental Licensing (General Provisions) Act

The Environmental Licensing (General Provisions) Act (*Wet algemene bepalingen omgevingsrecht*) governs the award of so-called environmental permits. These permits are required for the execution of a list of projects with potential environmental effects.[170] Although mining activities are in need of an environmental permit, the Act only applies onshore and on the territorial sea. For this reason, the Mining Act has a specific provision for the award of an environmental mining work permit for mining activities in the EEZ and on the continental shelf.[171]

3.6.3 Spatial Planning Act

The Spatial Planning Act (*Wet ruimtelijke ordening*) regulates spatial planning onshore and offshore, both on the territorial sea and in the EEZ.[172] Most importantly, the Act includes the possibility to draft a structure vision for the North Sea describing the main aspects of the spatial development of an particular area.[173] The spatial aspects of the National Water Plans drafted pursuant to the Water Act are a structure vision within the meaning of the Spatial Planning Act.[174] The Act moreover opens the possibility to draft a special national governmental spatial zoning plan (*rijksbestemmingsplan*) for the North Sea.[175] Through this zoning plan, the national government could allocate spatial uses to the different zones of the North Sea. So far, the national government has not made use of this possibility.

3.6.4 North Sea Installations Act

The North Sea Installations Act (*Wet installaties Noordzee*) explicitly extends the applicability of the Dutch criminal code to offshore installations on the continental shelf.[176]

[167] Idem, annex under D.
[168] Idem, art. 16.5.
[169] Royal decree on trade in emission rights, annex 1.
[170] Environmental Licensing (General Provisions Act), article 2.1 (1).
[171] See also section 3.1.4.
[172] Spatial Planning Act, article 1.1 (2)(a).
[173] Idem, art. 2.3 (1).
[174] Water Act, article 4.1 (1).
[175] Spatial Planning Act, article 10.3.
[176] North Sea Installations Act, article 2.

3.7 Conclusions

All in all, it can be noted that although a limited number of laws are applicable offshore, they nonetheless provide for a fragmented legal framework under which different aspects of a value chain can be regulated by different acts.

4 Barriers to offshore system integration

The new offshore energy developments taking place under the header of offshore system integration challenge the fundamentally fragmented legal landscape for offshore energy activities. This chapter builds on the previous chapter and looks at the misfit between the emerging technological energy options for the North Sea and the current legal framework. Where the previous chapter had an approach focussing on the content of the different applicable acts offshore, this chapter is more issue-centric. This shift in approach is used to facilitate cross-referencing and to prevent unnecessary repetitions and duplications. The legal issues associated with system integration are grouped into three large categories: re-use of platforms, re-use of pipelines and the constructing and operation of electricity cables.

4.1 Re-using platforms

As noted in the previous chapter, the construction and operation of installations and objects in a national water body is in principle prohibited unless one has obtained a special permit or license to that end. For hydrocarbons production and carbon dioxide injection such a license will be based on the Mining Act and will take the form of respectively the hydrocarbons production license and the carbon dioxide storage license. For hydrogen the situation is different. Since hydrogen is not covered by the Mining Act or any other sectoral legislation governing its offshore construction and operation, the construction of an offshore hydrogen installation will have to be permitted on the basis of the Water Act.

4.1.1 Licensing

As noted in the previous chapter, the construction and operation of installations and objects in a national water body is in principle prohibited unless one has obtained a special permit or license to that end. For hydrocarbons production and carbon dioxide injection such a license will be based on the Mining Act and will take the form of respectively the hydrocarbons production license and the carbon dioxide storage license. For hydrogen the situation is different. Since the production of hydrogen is not covered by the Mining Act or any other sectoral legislation, the construction of an offshore hydrogen installation will have to be permitted on the basis of the Water Act.

From a practical perspective, this creates four possible scenarios.

4.1.1.1 Carbon dioxide storage

From a practical perspective, this creates four possible scenarios. The first possibility is that the holders of a hydrocarbons production license want to engage in carbon storage activities once hydrocarbons production has ceased. In such a case, the holders of the production license will have to apply for a license for the permanent storage of carbon dioxide for the particular area for which it holds a production license. As noted in the previous chapter, the award of this CCS-storage license is in principle competitive in nature, which means that it is not an exclusive priority right that the holder of the original hydrocarbons license will also be awarded the permanent CCS-storage license. This involves the theoretical risk that a third party may submit a competitive bid and may obtain the CCS-storage license instead of the hydrocarbons production license holder. In practice however, it will be nearly impossible for a third party to submit a competitive bid without prior surveying and exploration activities for carbon dioxide storage sites given the necessity to include detailed information on the storage sites in the license application.

A more realistic legal risk in this scenario involves the decommissioning obligation for the license holder to remove the installations that will be out of use once the production activities will come to an end. Decommissioning obligations will also apply to the (new) CCS-storage license, but the fact that the new CCS-storage license will impose decommissioning obligations as well, does not automatically rescind or include the

decommissioning obligation existing under the previous production license. The Mining Act does not elaborate the re-use, let alone a procedure to streamline the administrative procedures for transfer and re-use of mining installations for the purpose of CCS-storage activities, for instance the rescission or fulfilment of any decommissioning obligation under a previous license in the situation that the license area will be transformed form a production license area into a CCS-storage license area. In the absence of any formal streamlined procedure for re-use, the hydrocarbons license holder will have to enter into negotiations with the Ministry on the possibilities to coordinate the decommissioning procedures under the original production license and the award of a new license. From an industry perspective, this creates legal uncertainty for license holders who may want to re-use their platform a.o. for CCS-storage activities. On a positive note, the Minister of Economic Affairs has acknowledged this issue and is planning to come with a proposal to amend the Mining Act to facilitate re-use of platforms.[177]

4.1.1.2 Hydrogen production

A second integration option is that the holders of the hydrocarbons license want to start producing hydrogen once oil or gas production has ceased. As noted in the previous chapter, hydrogen production is not a mining activity and falls outside the scope of the Mining Act and consequently the production location of hydrogen cannot qualify as a mining installation. This means that the mining license necessary for the construction and operation of the mining installation may need to be complimented or replaced by a water permit for the construction and operation of an offshore hydrogen production installation. A potential legal problem in such a situation could be the institutional complexity of coordinating all procedures. As with the first option, no codified legal procedure for re-using platforms exists, which creates a need for coordination between the administrative wrap-up of the hydrocarbon activities and permitting of the new hydrogen activities. This coordination will be more complex than in the CCS-storage scenario, because the license holder will have to interact with two separate legal systems for enforcement and supervision: on the one hand it will have to report to and interact with the Ministry of Economic Affairs and Climate and the State Supervision of the Mines on the issue of decommissioning pursuant to the original mining license and on the other hand it will have to interact with the Ministry of Infrastructure and the Environment and its supervisory body *Rijkswaterstaat* to obtain new water permit to leave in place the existing platform and to re-use it as a hydrogen installation. Moreover, given the different requirements to qualify for a mining license and the refusal grounds for a hydrocarbons production license and the environmental mining work permit on the one hand and the water permit on the other, it is not an automatism that a water permit will be awarded for keeping in place the platform and starting hydrogen production on the platform.

4.1.1.3 Dual usage

A potential third and fourth option is when the start of the new activity is not subsequent to, but rather coinciding with the original use. In other words, a third option would be the dual usage of a platform for both hydrocarbons production and CCS and a fourth option would be dual usage for hydrocarbons production and hydrogen production. For both options a primary question pertains of course to the technical feasibility of combining multiple uses on one platform given the space and weight limitations of offshore platforms. Independent from this issue, the legal situation is quite straightforward in situation three. As noted in the previous chapter, it is possible to obtain a carbon storage license for the same area as the area for which one holds a hydrocarbons production license. So from a legal perspective, there is no impediment to the simultaneous execution of both activities within one area. When carbon dioxide injection is however incidental and instrumental in increasing

[177] Kamerstukken I 2017/18, 30 196, G.

the hydrocarbons output of a reservoir, the so-called enhanced hydrocarbons recovery method, the injected carbon dioxide is seen as a facilitating substance for hydrocarbons production and consequently no CCS storage license is required. When carbon dioxide is injected for both enhanced hydrocarbons recovery and permanent storage, a CCS storage license is required for that part that of the carbon dioxide that will be permanently stored.[178]

With regard to hydrogen production, the situation is less transparent. Hydrogen activities are not regulated under the Mining Act. There is legal uncertainty whether the dual usage of a platform for hydrocarbon production and hydrogen production is allowed and which licenses or permits would be necessary for combining hydrocarbons and hydrogen production. The first option would be to license the platform under the Mining Act. The Mining Act does however not provide any guidance on the usage of mining platforms for other purposes than those connected with the mining activities. From the system of the Mining Act it is clear that when a platform does no longer fulfil a function related to a mining activity, it should be removed. The Mining Act and the explanatory memorandum are however silent on dual usage. A second option would be the Water Act. This Act however clearly provides that it cannot be used to permit any activity falling within the working sphere of the Mining Act.

4.1.2 Timing

Another issue that plays a role in the re-use of offshore platforms is the adjustment of the time horizons of both the old and the new use of the platform. Problems with regard to timing can exist, when the original mining activity comes to an end and the new activity cannot yet start because certain infrastructures are not yet ready or even when investment decisions are still pending. A misalignment between the time horizons of the old and the new use may be a problem for at least two reasons. First of all, there is the decommissioning obligations that rests on the shoulders of the hydrocarbons production license holders. As noted in the previous chapter, the Mining Act does not explicitly state when the platform should be decommissioned, but it is clear that this should happen within a reasonable timeframe after production activities have ceased. As there is not yet any experience in this field, it is unclear how the Minster would approach such issue and for how long the decommissioning obligation can be postponed and how certain the re-use plans have to be before the minister would be willing to postpone the obligation. If the time gap between the old and new activities will be too significant, the decommissioning rules found in the Mining Act may impede the re-use of the platform.

Secondly, in the time period between the end of the original activity and the start of any new activities, the so-called mothballing period, the platform will have to be maintained and the license holders will remain liable for any damage occurring during the mothballing. These costs and liabilities may provide a limit on the willingness of the license holders to keep in place the platform.

4.1.3 Changes in license holders

A third problem with the re-use of platforms that not all of the original license holders may be interested in re-using the platform and taking part in the new activities. In the same vein, other parties with specific knowledge and expertise in the field of for example hydrogen production or carbon storage may be interested to step in or take over as license holders for the new activity. To achieve the changes in the composition of the license holder group between the original and the new activity may be a challenge or even provide a barrier to the re-use of platforms.

First, the transfer of license interests requires the prior consent of the Minister. To the extent that new parties would enter or exit under an already existing license, this change is only allowed after approval of the Minister.

[178] Kamerstukken I 2009/10, 32 343, no. 3, p. 15.

To be eligible to as license holder, the new parties will have to fulfil the requirements found in article 9 of the Mining Act. To the extent that new parties would enter in a new license, they will also have to comply with the requirements of article 9.

Second, changes in the composition of the license holder group may increase the complexity of the decommissioning and licensing procedures. As noted above, the re-use of a platform involves both finalising and fulfilling all obligations with regard to the original activities and making all necessary arrangements to allow for the start of the new use. Since both these activities need to be closely aligned, increasing the number of actors involved in any of both processes significantly increases the complexity of the issue.

Further, an important issue in this respect will be the costs of decommissioning the platform at the end of its lifetime. From a legal perspective, it is possible to include the decommissioning obligation in the new license. When the hydrocarbons production license is replaced by a carbon storage license, the decommissioning costs automatically fall on the new license holders. This is the case because the decommissioning obligation is enshrined in the Mining Act and not in the license. In the case of a water permit for hydrogen production, such an obligation can be included in the provisions of the permit. This may include provisions with regard to financial security.

Third, pertaining to the horizontal relations between the license holders, the participants of the joint venture will have to make the necessary arrangements to adequately distribute the costs and benefits among each other. Once again especially the decommissioning costs may be an important issue that needs to be horizontally settled. This is especially the case when some of the original parties leave the joint venture.

4.2 Re-using pipelines

In addition to re-using platforms, some of the identified system integration scenarios also involve re-using offshore pipelines. Both the hydrogen production and carbon dioxide injection scenarios require pipeline capacity to respectively transport the offshore produced hydrogen to shore and to transport the carbon dioxide that is captured at onshore installations offshore to permanently store it in subsoil reservoirs. Depending on the local characteristics of a project, the project developer can choose to re-use existing pipelines that were previously used for hydrocarbons transport or can choose to construct new dedicated pipelines for hydrogen or carbon dioxide transport. Issues that play a role in this choice include the availability of existing pipelines and the state of the existing pipelines. This section will exclusively look at the re-use of pipelines. Constructing new pipelines will follow the procedures outlined in the previous chapter, i.e. the procedure under Article 94 of the Royal Mining Decree for carbon dioxide pipelines and the water permit procedure in case of hydrogen pipelines as found in Article 6.5 of the Water Act. This section will not focus on these situations given the fact that the standard situations have already been discussed in the previous chapter.

4.2.1 Licensing

To assess whether a pipeline can be re-used, it is first of all necessary to assess whether a new license or permit is necessary when the use of a pipeline is changed. This situation differs on whether the pipeline is place will be re-used for carbon dioxide or hydrogen transport. In the former case, the pipeline remains within the working sphere of the Mining Act. As noticed in the previous chapter, Article 94 of the Royal Mining Decree only requires the award of a pipeline permit for the construction of the pipeline and not for the operation of the pipeline. Since both hydrocarbons and carbon dioxide pipelines fall under the concept of a pipeline in the sense of this Decree, it seems that no new pipeline permit will be necessary when a pipeline will be re-used for the transport of another substance as long as the pipeline under its new function remains within the working sphere of the Mining Act and the Mining Decrees. This view is reinforced by the fact that pipeline permits usually not

contain any specifications on the type of substances transported through the permitted pipeline.[179] Re-using existing hydrocarbons transport pipelines for the purpose of carbon dioxide transport thus does not seem to require a new pipeline permit. Under the new use, the operator moreover remains required to act in accordance with the operational requirements found in the Decree regarding maintenance and regular assessment of the technical integrity of the pipeline as described in the previous chapter.
The situation is more complicated when a pipeline will be re-used for a purpose outside the working sphere of the Mining Act. As has been noted above, a platform exclusively used for hydrogen production will not qualify as a mining installation and consequently the pipeline connected to that platform will also no longer qualify as a pipeline within the meaning of the Mining Decree. The fact that the pipeline when it will be re-used for hydrogen transport is no longer regulated by the Mining Act and the Mining Decrees makes that it enters the working sphere of the Water Act. In accordance with this Act every pipeline that is not regulated under the Mining Act, is in need for a water permit for its construction and operation. In analogy to the re-use of a hydrocarbons production platform for hydrogen production, this situation requires a close coordination between the procedures for ending the function of the pipeline within the working sphere of the Mining Act and the decommissioning obligations that follow from that on the one hand and the re-permitting of the pipeline under a new water permit on the other hand. Regarding the operations of the pipeline, the Minister of Infrastructure and the Environment can include instructions into the water permit regarding the maintenance and technical integrity of the pipeline with the aim of preventing environmental damage to the water systems.

4.2.2 Pipeline regimes

When it comes to the operations of the different types of pipelines, a difference can be made with regard to the rules pertaining to health, safety and the environment on the one hand and the rules pertaining to the market conduct of the operator on the other hand. The former set of rules is already highlighted in the above section and in the case of pipelines primarily pertains to regular inspections and assessments of the technical integrity of the pipelines. The latter set of rules is however more elaborate and pertains to issues such as asset ownership and unbundling, third party access to the asset and the regulation of the tariffs and access conditions when making use of the asset. These market rules differ greatly depending on how a particular pipeline is qualified. When a pipeline is seen as a gas production network in accordance with the Gas Act, the access conditions and tariffs have to be negotiated between the pipeline operator and the actor requesting access. The market power of the production network operator is however limited by the applicability of the Competition Act to this type of pipelines. When the pipeline is used for carbon dioxide transport, it is explicitly stipulated in Article 32 of the Mining Act that third party access and tariff setting is more explicitly regulated and should be fair, transparent and non-discriminatory. Moreover, access to a carbon dioxide transport network can only be refused on a limited number of grounds as listed in Article 32 (2) of the Mining Act. Hydrogen transport through pipelines on the other hand is not regulated at all. Given the fact that offshore hydrogen transport falls outside the scope of the Gas Act, the Mining Act and the Competition Act, no explicit regulation on this issue exists.

Table 1: Market Conduct Regulation for pipeline transport on the EEZ and the Continental Shelf per substance

Substance	Qualification	Act	Unbundling	TPA	Tariff regulation

[179] See for example

Gas (including hydrogen admix)	Gas production network	Gas Act	n/a	Negotiated*	Set by operator*
Carbon dioxide	Carbon dioxide transport network	Mining Act	n/a	Fair, transparent and non-discriminatory conditions with a limited list of refusal grounds	Fair, transparent and non-discriminatory conditions
Hydrogen	n/a	n/a	Not regulated	Not regulated	Not regulated

* Within working sphere of the Competition Act

4.3 Constructing and operating electricity cables

A last set of legal issues revolves around the issue of offshore electricity consumption. All three system integration scenarios, i.e. electrification of the hydrocarbons production, carbon dioxide injection into the subsoil and hydrogen production require the offshore tie-in to an electricity distribution system for the supply to and consumption of electricity by offshore platforms. *Grosso modo*, this electricity can technically be supplied from two possible sources. First of all, when the platform is located in the vicinity of a wind park, it is possible to connect an offshore platform directly to an offshore wind park. Secondly, it is possible to connect the platform to the offshore network operated by TenneT. For both of these options a difference can be made with regard to the rules for construction, connecting and operating such cables.

4.3.1 Constructing offshore electricity cables

In reiteration of the points made previously, the construction of any offshore structures, installations, pipelines and cables is only allowed with a license or permit to that end. The construction of an offshore electricity cable can be licensed or permitted on the basis of either the Mining Act or the Water Act, depending on whether a particular cable falls inside or outside the working sphere of the Mining Act. The working sphere of the Mining Act with regard to cables is limited to cables connected to at least one mining work. In the above mentioned scenarios, an electrified hydrocarbons production platform and a carbon storage injection platform would qualify as being mining works. Consequently, any electricity cable connected to either of these installations would fall inside the working sphere and can be permitted on the basis of the Mining Decree. The permitting method is equivalent to the permitting of pipelines on the basis of the Mining Decree. All other cables can be permitted on the basis of the Water Act in the same way as the Water Act regulates the construction and operation of pipelines.

4.3.2 Connecting offshore electricity cables

4.3.2.1 Connecting wind parks and platforms

In addition to constructing and physically placing a cable on the sea floor, another issue of importance is the possibility to connect the cable to the concerned electricity production installation or network. For the first option, a cable between an offshore wind park and an offshore platform, no explicit regulation exists. The current system of the Wind Energy at Sea Act however does not seem to preclude this possibility. Moreover,

the proposed amendments to the Wind Energy at Sea Act even seem to promote this option, given the fact that it introduces the connection of the wind park to an energy conversion installation as an alternative to connection of the wind park to the offshore network of TenneT.

4.3.2.2 Connecting the offshore network and platforms

With regard to the second option, the situation is more difficult. The offshore network that is developed by TenneT is defined in the Electricity Act as those networks intended for the transport of the electricity of one of more wind parks to the onshore grid. This means that the offshore network only has the function of transporting electricity offshore and is not meant for the facilitation of offshore electricity consumption. This makes is highly unlikely that connecting a platform to this grid is allowed at all. Furthermore, even to the extent that if would be allowed to connect an offshore platform to the offshore electricity network, is also doubtful whether it is technically possible to connect offshore platforms to the offshore network. This is complicated by the fact that the offshore network is developed in accordance with a development framework issued by the Minister. This development framework only takes into consideration the connection between the offshore network and the offshore wind parks. Since the network and the offshore substation are exclusively designed for connecting the designated wind parks, it is possible that the network would not have the technical characteristics to accommodate additional connections to offshore platforms. Moreover, any adjustments that TenneT would need to make to the offshore network with the aim of technically accommodating these extra connections would also not be eligible for subsidy under the Electricity Act, since connecting offshore platforms to the offshore grid is not a statutory task of TenneT.

The regulatory gap with regard to offshore network connection may also affect the right of electricity transportation in the absence of regulated services and/or tariff regulation. This will complicate the entering into a power supply agreement (including balancing services *'programma verantwoordelijkheid'*) in addition to entering into an offshore connection and transportation agreement.

4.3.3 Operating offshore electricity cables

A last venue of interest may be the market rules on the operation of an offshore electricity cable between a platform on the EEZ or continental shelf and the identified electricity sources. Both options would involve the construction and operation of a new type of cable for which no legal topology exists yet. All of them would fall outside of the working sphere of the Electricity Act and consequently the market rules on unbundling, third party access and tariff regulation.

4.4 Conclusions

As this chapter has shown, the various system integration techniques would introduce situations that are not yet covered by the current legislation. Examples of points where the current legislation provides insufficient guidance include the administrative coordination of re-use initiatives as alternative to decommissioning, the regulation of dedicated hydrogen pipelines and the transport and supply of electricity to offshore consumers.

5 Conclusions

All in all it can be concluded that system integration is a promising development for the offshore energy system. As noted in chapter one this report primarily looked at three scenarios, i.e. electrification of offshore hydrocarbons production, permanent carbon dioxide storage and offshore hydrogen production. Chapter two in this respect showed that states have the sovereign rights to regulate these activities in their EEZs, but that they should strike a balance between the execution of this right and the rights of other users of the sea. Chapter two moreover described the international rules on the decommissioning of offshore energy assets. Hereafter, chapter three described the most important legal instruments applicable to offshore energy activities on the Dutch continental shelf and in the Dutch EEZ. These instruments included the Mining Act, the Water Act, the Wind Energy at Sea Act, the Electricity Act and the Gas Act. As noted in chapter four, the three system integration scenarios are faced with various legal barriers and challenges.

Fundamentally, these barriers and challenges can be grouped into three issues. First of all, there is the issue of re-using platforms and pipelines and the applicable rules and licensing regimes. Currently, the legal framework for constructing, operating and decommissioning offshore structures, installations and pipelines provides insufficient guidance on the possibilities to re-use disused mining installations. Especially the situations where a platform will be re-used for hydrogen production or will be engaged in dual usage are not fully clear. The current legal framework does not seem to have envisioned such developments to happen, so it is not entirely clear whether these developments are allowed and if they are allowed, which licenses would be required. Moreover, the current administrative procedures for decommissioning do not facilitate the re-use of assets, since they provide little guidance or streamlining on the steps that operators or license holders should take if they want to re-use their assets. This problem is however acknowledged by the Minister and in the nearby future legislation is expected to facilitate the re-use of existing infrastructures.

Secondly, there is the issue of the offshore electricity network. For all system integration scenarios, the offshore consumption of electricity plays a pivotal role. The offshore electricity network operated by TenneT could function as a source of electricity for offshore platforms, but unfortunately the current legal framework blocks this potential. The current regulatory framework found in the Electricity Act only allows for the connection of offshore wind parks to the network. To be able to connect offshore platforms to the network a fundamental revision of the Electricity Act would be necessary.

Thirdly, there is the issue of the applicable legal market regimes to offshore pipelines and cables. Currently, the Electricity Act and Gas Act provide no clear guidance on the market regimes (unbundling, third-party access and tariff setting) applicable to various new types of pipelines (hydrogen pipelines f.e.) and cables (the cable between offshore wind parks and offshore platforms f.e.).