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# TRANSITIONING TO AN INTEGRATED RENEWABLE ENERGY SYSTEM IN THE DUTCH NORTH SEA

Liv Malin Andreasson & Lisa van Nieuwkoop<sup>1</sup>

Abstract

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The North Sea has long been the energetic backbone of the surrounding countries and its hydrocarbon resources have enabled economies to grow. However, faced with an unsustainable level of greenhouse gas emissions, as well as with the depletion of hydrocarbon resources, the North Sea is described as a 'sea in decline'. The coming decades will see two parallel developments in the North Sea: major investments will be needed to decommission disused hydrocarbon assets while at the same time renewable energy projects will be developed. The question that arises is what legal barriers such a transition entails and how the integration of a renewable energy system in the North Sea should be regulated.

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## **1 Introduction: New Offshore Energy Developments and System Integration**

In the same spirit as Martha Roggenkamp, we began our academic journey by examining the legal framework pertaining to new energy developments in the North Sea. Having the leading expert in the field as a supervisor during our PhD trajectories is truly rewarding

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and with this contribution, we would like to express our gratitude for her ongoing support in our academic careers.

Maintaining momentum in the reduction of greenhouse gas emissions and transcending into a net-zero carbon economy will require increased efforts in the exploitation of renewable energy sources. Therefore, offshore development of wind energy and other renewable energy sources (such as solar, wave and tidal) and production of carbon-neutral gases (such as hydrogen) play a pivotal role.<sup>2</sup> Currently, existing laws in the Netherlands regulate each category of offshore energy activity specifically. It is, therefore, difficult to ascertain which rules apply to new types of offshore energy activities and their interlinkages.

Given its vast potential to deploy low-carbon energy solutions (such as the generation of wind and solar energy), the North Sea region is destined to become a pioneering region for the European energy transition towards a climate neutral economy by 2050.<sup>3</sup> The parallel occurrence of declining hydrocarbon resources and the need to transition to a low-carbon energy system opens up the possibility of searching for synergies between the different types of energy systems.<sup>4</sup>

System integration entails linking previously separate players, energy carriers and adjacent sectors of the energy value chain through innovative methods into one large energy system.<sup>5</sup> Typical forms of integration that are possible offshore are (i) platform electrification, (ii) hydrogen production and (iii) energy storage.<sup>6</sup> Thus, this chapter provides an overview of some of the most prominent legal barriers to new offshore energy developments and system integration options in the Dutch North Sea.

## 2 The Current Legal Framework

The development and integration of new types of offshore energy installations and networks requires an enabling legal framework. Without legal certainty, investments will

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2 Dutch Climate Agreement of 28 June 2019.

3 Communication from the Commission, 'The European Green Deal', COM (2019) 640 final.

4 Communication from the Commission, 'Powering a climate-neutral economy: An EU Strategy for Energy System Integration', COM/2021/299 final.

5 The EU has defined 'system integration' in a policy document, see Communication from the Commission, 'Powering a climate-neutral economy: an EU Strategy for Energy System Integration', COM/2021/299 final.

6 North Sea Energy Programme, 'Unlocking potential of the North Sea: Towards an inclusive and integrated design of the North Sea energy system with optimal value for society and nature', 2020, p. 7-8.

not be made and novel developments will not take place. This section, therefore, focuses on the current regulation of offshore energy developments.

### International and EU Law

The extent to which the Netherlands may regulate offshore energy activities depends on their location, and in particular whether they are taking place in territorial waters or the area beyond territorial waters, *i.e.* the Continental Shelf (CS) or the Exclusive Economic Zone (EEZ). While the territorial sea of the Netherlands is part of its land territory and thus its sovereignty,<sup>7</sup> the Netherlands was given sovereign rights to exploit hydrocarbons on its CS<sup>8</sup> and to produce offshore renewable energy from the water, currents and wind in its EEZ.<sup>9</sup> Additionally, the Netherlands may authorise and regulate offshore drilling,<sup>10</sup> and the construction, operation and use of installations and structures.<sup>11</sup> UNCLOS confirms that the Netherlands has jurisdiction over submarine cables and pipelines constructed and used in connection with exploitation activities on its CS and economic activities in its EEZ.<sup>12</sup> Submarine cables and pipelines that are not linked to any of these activities are covered by the general freedom to lay cables and pipelines.<sup>13</sup>

Since the Netherlands is a Member State of the EU, it is necessary to take into account EU legislation governing the energy sector. Of particular importance are the Natural Gas and Electricity Directives,<sup>14</sup> the Renewable Energy Directive (RED)<sup>15</sup> and the Hydrocarbons Directive.<sup>16</sup> EU law applies where Member States have any degree of national sov-

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7 Article 2 United Nations Convention on the Law of the Sea, Montego Bay, 1982 (UNCLOS).

8 Article 77 UNCLOS. See also United Nations Convention on the Continental Shelf, Geneva, 1958.

9 Article 56 UNCLOS.

10 Article 77(1) UNCLOS.

11 Articles 60 and 88 UNCLOS.

12 Article 79(4) UNCLOS.

13 Articles 58(1) and 87(1)(c) UNCLOS.

14 Directive (EU) 2019/692 of the European Parliament and of the Council of 17 April 2019 amending Directive 2009/73/EC concerning common rules for the internal market in natural gas [2019] OJ L 117/1; Directive (EU) 2019/944 of the European Parliament and the Council of 5 June 2019 concerning common rules for the internal market in electricity and repealing Directive 2012/27/EU, [2019] OJ L 158/125.

15 Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources [2018] OJ L328/82.

16 Directive 94/22/EC of the European Parliament and of the Council of 30 May 1994 on the conditions for granting and using authorizations for the prospection, exploration and production of hydrocarbons [1994] OJ L164/3.

ereignty. Consequently, when an offshore activity falls under a coastal Member State's functional jurisdiction – and the coastal Member State's sovereign rights – EU law applies as far as that activity is concerned.<sup>17</sup> Of relevance is also the EU Strategy for System Integration, as its two main pillars are to (i) promote renewable and low-carbon fuels and (ii) create a more integrated energy infrastructure.<sup>18</sup> However, this Strategy is a policy document and, therefore, lacks legal significance.<sup>19</sup> Although no reference has been made to 'system integration' in existing EU laws, it will most likely be enshrined in a (national) binding legal document in the (near) future.<sup>20</sup>

### Dutch Law

Taking into account the relevant EU laws pertaining to the offshore energy sector, the question that arises is how the Netherlands has used its powers to regulate offshore installations, cables and pipelines. On the CS and in the EEZ, the following Dutch laws currently apply: the Mining Act,<sup>21</sup> the Wind Energy at Sea Act,<sup>22</sup> the Water Act,<sup>23</sup> and to some extent the Gas Act<sup>24</sup> and the Electricity Act.<sup>25</sup> While the Mining Act and the Wind Energy at Sea Act regulate specific offshore energy activities, *i.e.* exploitation of hydrocarbons and wind energy, the Water Act is more general in scope regulating all offshore activities that are not regulated by sector-specific laws. As for the Gas Act and the Electricity Act, only certain provisions, where explicitly stated, apply offshore. With technological advancements, not only hydrocarbons and wind energy will be exploited as integrating novel offshore energy generation, storage and transport technologies will play a pivotal role, which will be examined below.

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17 See J. Waverijn, C.T. Nieuwenhout, 'Swimming in ECJ case law: The rocky journey to EU law applicability in the continental shelf and Exclusive Economic Zone' (2019) 56 Common Market Law Review 1623.

18 Communication from the Commission, 'Powering a climate-neutral economy: an EU Strategy for Energy System Integration', COM/2021/299 final, p. 17.

19 A. Saurat, *Studies in Law, Politics and Society* (Emerald Group Publishing Limited 2014).

20 Article 6 Regulation (EU) 2018/1999 of the European Parliament and the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action [2018] L328/1.

21 Mining Act (*Mijnbouwwet*) of 31 October 2002.

22 Wind Energy at Sea Act (*Wet windenergie op zee*) of 24 June 2015.

23 Water Act (*Waterwet*) of 29 January 2009.

24 Gas Act (*Gaswet*) of 22 June 2000.

25 Electricity Act (*Elektriciteitswet*) of 2 July 1998.

### 3 Legal Challenges

In this section we introduce some of the shortcomings in the Dutch legal framework for the North Sea region related to the future offshore developments and system integration options. These developments are still at an early stage of commercialisation and may require a new legal approach.

#### Platform Electrification and Alternative Cable Connections

Most hydrocarbon platforms nowadays make use of diesel- and gas-fired generators and turbines for power supply. Platform electrification involves linking an external source of power, such as offshore wind, in order to replace those onsite turbines. Electricity generated from offshore wind farms can also be used as an input for hydrogen production on existing offshore hydrocarbon platforms through the decomposition of water molecules by electrolysis, which facilitates green hydrogen production.

The offshore electricity grid operated by TenneT in the Netherlands would play a key role when organising the transport of electricity to offshore gas production platforms. However, the current legal framework hampers this possibility since the Electricity Act only allows for the connection of offshore wind farms to the grid in order to bring the electricity to shore.<sup>26</sup> Therefore, to enable the connection of offshore gas production platforms to the offshore electricity grid, a revision of electricity legislation, clarifying whether it is legally permissible to establish such a connection, would be required.

Proposed amendments to the Wind Energy at Sea Act seem to promote the possibility of connecting offshore wind farms to offshore gas production platforms through the introduction of a new type of connection.<sup>27</sup> Nonetheless, this amendment lacks a clarification on how to legally classify the cable establishing such a connection. Such a cable may be qualified as a 'direct line' pursuant to the Electricity Act. However, the provisions relevant to direct lines are not applicable offshore.<sup>28</sup> Rules on the responsibility for the development, ownership and operation of such cables must, therefore, be adopted to remedy legal uncertainty.

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<sup>26</sup> See Articles 15a and 16(2)(n) Electricity Act. The purpose of the offshore electricity grid is not to facilitate offshore electricity supply and consumption, but to bring to shore electricity generated offshore.

<sup>27</sup> Kamerstukken II 2018/19, 35092, *Wijziging van de Wet windenergie op zee* (paragraph 2.1.2).

<sup>28</sup> Articles 1(1) and 1(5) Electricity Act.

## Green Hydrogen Production and Transport

The Dutch Mining Act does not prescribe any specific procedures for the production of hydrogen on existing hydrocarbon platforms, nor any rules for the reuse of such platforms for hydrogen production.<sup>29</sup> Although certain alternative legal arrangements apply in accordance with the Water Act, these arrangements are limited in scope and provide only *ad hoc* solutions.<sup>30</sup> The same applies to the development of new offshore platforms for hydrogen production. None of these legal acts contain provisions for the operation of such platforms or specific safety regulations. To remedy these legal uncertainties, it may be necessary to either introduce general rules that apply to hydrogen when necessary or issue specific rules for the production of hydrogen and the operation of hydrogen platforms offshore.

To accommodate the transport of hydrogen to shore via existing offshore natural gas pipelines, the adaptation of national admixing restrictions in the onshore natural gas network may be required. The same applies to the reuse of disused offshore natural gas pipelines for hydrogen transport.<sup>31</sup> Currently, there is no standardised procedure enshrined in Dutch legislation for the reuse of disused natural gas pipelines, as the applicable laws merely provide *ad hoc* solutions. Thus, they do not contain operational and safety rules for such pipelines, nor for new dedicated offshore hydrogen pipelines. Finally, it remains unclear who is entitled to operate reused natural gas pipelines and new pipelines for hydrogen transport. To remedy these legal uncertainties, it can be argued that rules for hydrogen pipelines should be adopted.

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29 See Articles 1(a) and 6 Mining Act. The Netherlands prepared a bill seeking to amend the rules on the removal of disused hydrocarbon installations, which proposes to grant exemptions from the obligation to remove such installations if they can be reused for *inter alia* hydrogen production or any other offshore energy related activities, see Kamerstukken I 2020/21, 35462, *Wijziging van de Mijnbouwwet (het verwijderen of hergebruiken van mijnbouwwerken en investeringsaftrek)*.

30 It is necessary to obtain a permit under the Water Act, which regulates (the development of) activities in onshore and offshore waters unless these activities are governed by sector-specific laws such as the Mining Act, see Article 6(5)(c) Water Act.

31 Operators of offshore natural gas pipelines must ensure that the gas they deliver to the onshore pipeline network complies with the entry specifications (gas quality standards) applicable to that network, see Article 1.1(b) Gas Act and Articles 2(1)-(4) and Annexes 1-4 Ministerial Decree on Gas Quality (*Regeling Gaskwaliteit*) of 11 July 2011.

## Floating Solar and Ocean Energy

Floating solar is a relatively new form of power generation and it is currently deployed in landlocked waters.<sup>32</sup> However, with technological advancements it will become commercially viable in both the territorial sea and the EEZ.<sup>33</sup> Although the Dutch House of Representatives accepted a legislative proposal to create a Dutch roadmap for solar on water in 2021, it remains unclear how this type of renewable energy generation will be regulated.<sup>34</sup> A different type of offshore energy production is ocean energy, which refers to all forms of renewable energy derived from the sea, *i.e.* tidal, wave and ocean thermal.<sup>35</sup> In comparison with offshore wind, which is regulated by the Wind Energy at Sea Act, there is no specific regulation for the offshore development of any of these technologies. The RED provides a common framework for the promotion of, among others, these types of renewable energy sources, but there are no specific provisions in Dutch legislation pertaining to the offshore operation and safety of the installations necessary for such generation.<sup>36</sup>

## Electricity Storage

The ambition to develop large-scale offshore renewable energy production creates challenges such as how to feed large amounts of intermittent power into the onshore electricity grid and how to cope with mismatches in demand and supply. One alternative to address these challenges is to develop offshore electricity storage installations.<sup>37</sup> The EU recently adopted new legislation on energy storage in the Electricity Directive, which is

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32 Offshore energy, 'Floating solar farms could mitigate harmful climate change effects on water', 6 April 2021 <<https://www.offshore-energy.biz/floating-solar-farms-could-mitigate-harmful-climate-change-effects-on-water/?web=1&wd-LOR=C45DB4D50-9C82-ED4A-AADD-46DE7C456033>> accessed 26 September 2021.

33 World Bank Group, *Where Sun Meets Water. Floating Solar Market Report*, 2018; Norton Rose Fulbright, *Floating solar*, 19 August 2020.

34 Kamerstukken II 2020/21, 32813 nr. 665.

35 For an explanation of the technologies, see World Economic Forum, 'Floating solar farms could cool down lakes threatened by climate change', 16 April 2021 <<https://www.weforum.org/agenda/2021/04/floating-solar-farms-lakes-threatened-climate-change/>> accessed 27 September 2021.

36 The construction of such installations is subject to a water permit, see Article 6(5)(c) Water Act.

37 For an explanation of the technology, see Ocean Grazer, 'Large scale offshore energy storage' <<https://oceangrazer.com>> accessed 27 September 2021.



relevant to the integration of energy storage in the electricity system.<sup>38</sup> However, the development of offshore electricity storage is a new concept and there is not much legal research conducted on the topic.

The new rules for energy storage in the Electricity Directive have not yet been implemented in the Dutch Electricity Act. Thus, it is difficult to ascertain how such storage will be regulated. However, to create legal certainty for the development of offshore electricity storage, it is not sufficient to just implement the rules on energy storage adopted by the EU. The Netherlands needs to make sure that the relevant provisions on storage also apply to the offshore area. Although the offshore development of electricity storage installations would be subject to the permitting regime of the Water Act, there are no specific rules on the operation and safety of such installations.<sup>39</sup>

#### 4 Assessment

In 2020, the Dutch Energy Act was proposed to stimulate the energy transition by integrating the Dutch Electricity Act and Gas Act.<sup>40</sup> One of the objectives of the proposed Act is to strengthen the regulatory framework for system integration. However, it lacks any specific reference to *offshore* system integration.<sup>41</sup> The lack of such a reference contributes to a plethora of legal acts that must be taken into account when developing and linking new offshore energy activities. Although we could continue with the *status quo* of adopting sector-specific laws for each type of offshore energy activity, we question whether it is not more effective to adopt an overarching offshore legal framework, in line with the concept of offshore system integration. The fact that the aforementioned offshore energy infrastructure is covered by the terms ‘installations’ and/or ‘structures’ (as enshrined in Article 60 of UNCLOS) could serve as a starting point to integrate rules applicable to such infrastructure.<sup>42</sup> As previously concluded, the current sector-specific laws regulating offshore energy activities are likely not comprehensive enough to facili-

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38 Article 2(59) EU Electricity Directive.

39 Article 6(5)(c) Water Act.

40 Dutch Ministry of Economic Affairs and Climate Policy, *Conceptvoorstel van de Wet houdende regels over energiemarkten en energiesystemen (Energiewet)* of 17 November 2021.

41 Dutch Ministry of Economic Affairs and Climate Policy, *Memorie van toelichting wetsvoorstel Energiewet* of 17 December 2020.

42 See, for instance, Barrett, J. & Barnes, R., *Law of the Sea. UNCLOS as a Living Treaty* (British Institute of International and Comparative Law 2016); Nordquist, M.H., *UNCLOS 1982 Commentary* (Brill Nijhoff) 2012; United Nations, *United Nations Convention on the Law of the Sea at Thirty: Reflections* (United Nations 2013).

tate the proposed developments, as shortcomings in the current sector-specific laws still prevent energy system integration from fully materialising. Given the commonalities of the described energy challenges and opportunities faced by the Netherlands, the government could strive for a common approach and adopt an overarching legal framework governing offshore energy activities.

## **5 Conclusion**

It is clear that several changes are taking place in the near future in the Dutch North Sea, which demonstrates the increased economic significance of this area for new energy developments. The above analysis illustrates that the current legal situation is a normative jigsaw puzzle, which potentially leads to inappropriate or non-existent rules. Therefore, we argue that it is desirable to promote a paradigm shift from a reactive, fragmented legal offshore energy source-based framework to a proactive and coherent regulatory framework pertaining to the offshore energy sector. The energy transition in the North Sea is a pressing matter and legislative changes are required. It remains an area in constant transition, from Martha's dissertation in 1999 to our dissertations in (hopefully) 2024 (and onwards).