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Collided Interests at Seas: How to Protect Navigational Safety while Offshore Renewable Energy Activities are Increasing

*Sevim Sena TASKAYA**

Abstract

Competition for maritime zones is growing. International regulations are crucial to finding a balance between different activities in seas and oceans. While offshore renewable energy activities are increasing, most bottom-fixed or floating renewable energy installations are located close to the shoreline and nearby shipping lanes. This paper discusses the possible conflicts between the navigation of ships and renewable energy production activities in seas and, possibly in the future, in oceans. It provides references to international law, guidelines and recommendations from the relevant organizations and examples from practice to specify the current rules and gaps regarding the safety of navigation and the protection of offshore energy production activities and structures at sea.

Keywords: offshore renewable energy; safety of navigation; maritime safety; international law of the sea

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1. Introduction

Seas and oceans provide abundant benefits to humankind, including transportation of goods and people, supply of marine resources, production of offshore energy, fishing, and socio-economic benefits to coastal communities. Almost all communities are somehow connected to, or more precisely dependent on, this web of shipping and trad-

* PhD candidate at the Transboundary Legal Studies Department, at the University of Groningen, s.s.taskaya@rug.nl. Her PhD research is on regulating offshore renewable energy under the international law of sea framework.

ing. Around 90% of traded goods are carried over seas and oceans.[1] Moreover, seas and oceans offer a vast space for renewable energy activities, especially for island states or those states that have long coastal lines. Offshore wind is expected to lower energy prices, increase energy security, benefit the job market and contribute to the energy transition needed to realize the climate change goals.[2] The first offshore wind farm was deployed in 2002 in Denmark. Since then, the technology has had a major effect on long-term decarbonization of the energy sector.[3] Global wind energy capacity is projected to nearly double between 2022 and 2027, with offshore wind projects accounting for approximately one-fifth of this growth.[4]

However, problems may arise between maritime navigation and offshore renewable energy installations. The first issue is the risk of accidents due to the density of the shipping traffic around these installations. Navigating around offshore energy installations may also increase the costs of shipping because of extended routes.[5] There has been a noticeable number of collisions between ships and traditional energy structures at sea. For instance, in 2011, a support vessel hit the Deep Panuke offshore gas platform in Canada.[6] In 2020, the Maltese-flagged tanker hit an oil and gas production platform

1 Spencer Feingold and Andrea Willige, 'These Are the World's Most Vital Waterways for Global Trade' (*World Economic Forum*, 15 February 2024) <www.weforum.org/agenda/2024/02/worlds-busiest-ocean-shipping-routes-trade/#:~:text=-Supply%20Chain%20and%20Transport,Follow&text=As%2090%25%20of%20traded%20goods,these%20waterways%20flowing%20is%20crucial> accessed 13 April 2024. Also see the Organization for Economic Co-operation and Development (OECD), 'Ocean Shipping and Ship Building' <www.oecd.org/ocean/topics/ocean-shipping/> accessed 13 April 2024.

2 International Renewable Energy Agency (IRENA), 'World Energy Transitions Outlook 2023: 1.5°C Pathway' (Abu Dhabi, 2023) 72 <www-irena-org.translate.goog/Publications/2023/Jun/World-Energy-Transitions-Outlook-2023?_x_tr_sl=en&_x_tr_tl=tr&_x_tr_hl=tr&_x_tr_pto=sc> accessed 13 April 2024.

3 International Renewable Energy Agency (IRENA), 'Fostering a Blue Economy: Offshore Renewable Energy' (Abu Dhabi, 2020) 17 <www.irena.org/Publications/2020/Dec/Fostering-a-blue-economy-Offshore-renewable-energy> accessed 13 April 2024.

4 International Energy Agency (IEA), 'Renewables 2022: Analysis and Forecast to 2027' (Paris, January 2023) 11 <www.iea.org/reports/renewables-2022> accessed 13 April 2024.

5 European Maritime Spatial Planning (MSP) Platform, 'Conflict fiche 7: Maritime Transport and Offshore Wind' <https://maritime-spatial-planning.ec.europa.eu/sites/default/files/7_transport_offshore_wind_kg_0.pdf> accessed 13 April 2024.

6 The Canadian Press, 'Support Vessel Hits Deep Panuke Offshore Gas Platform' (*CTV News*, 8 September 2011) <www.ctvnews.ca/support-vessel-hits-deep-panuke-offshore-gas-platform-1.694500?cache=pdchghmfvlrea%3FclipId%3D68597> accessed 13 April 2024.

while attempting to anchor off the coast of Louisiana.[7] Similarly, an offshore vessel collided with an offshore gas platform in Iran's South Pars gas field in 2021.[8] In 2023, an offshore supply vessel struck a Southern North Sea gas platform.[9]

Moreover, recent incidents show that collisions between vessels and offshore renewable energy installations have now become an issue. On 23 April 2020, a high-speed offshore tender collided with a wind turbine at Borkum Rifgrund wind farm in the North Sea.[10] In 2022, a rudderless cargo ship was drifting around the Hollandse Kust Zuid offshore wind farm in the Dutch North Sea, following a collision with an oil and chemicals tanker in heavy seas in the anchorage area near IJmuiden.[11] In May 2023, a cargo ship hit the Gode Wind 1 offshore wind farm in Germany. This collision was classified as a 'serious marine crash'.[12] The wind turbine was back online about 24 hours after being taken out of operation for inspection.[13]

Overall, these examples inform the purpose of, and illustrate the need for, this paper. Collisions happen without proper management of sea lanes, safety zones and the locations of offshore renewable energy structures. Therefore, preventive legal measures are needed to regulate navigation and offshore renewable energy installations. Ensuring

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7 Nautilus International, 'Oil Platform Collision: Tanker Master Had Not Slept For 50 Hours' (8 December 2021) <www.nautilusint.org/en/news-insight/news/oil-platform-collision-tanker-master-had-not-slept-for-50-hours/> accessed 13 April 2024.

8 Bartolomej Tomic, 'Offshore Vessel Hits Platform at South Pars Field, Off Iran' (*Offshore Engineer, 3* September 2021) <www.oedigital.com/news/490361-offshore-vessel-hits-platform-at-south-pars-field-off-iran> accessed 13 April 2024.

9 Hamish Penman, 'Supply Vessel Collides with Southern North Sea Gas Platform' (*Energy Voice*, 25 April 2023) <www.energyvoice.com/oilandgas/north-sea/rigs-vessels/498571/supply-vessel-collides-with-southern-north-sea-gas-platform/> accessed 13 April 2024.

10 IMCA, 'Windfarm Support Vessel Njord Forseti Hit Wind Turbine Tower' (23 October 2020) <www.imca-int.com/safety-events/windfarm-support-vessel-njord-forseti-hit-wind-turbine-tower-jersey-maritime-administration/> accessed 13 April 2024.

11 Adnan Durakovic, 'Rudderless Cargo Ship Drifts Around Dutch Offshore Wind Farm, Hits Platform Foundation' (*Offshore WIND*, 31 January 2022) <www.offshorewind.biz/2022/01/31/rudderless-cargo-ship-drifts-around-dutch-offshore-wind-farm-hits-platform-foundation/> accessed 13 April 2024.

12 Adrijana Buljan, 'Cargo Ship-Hit Gode Wind 1 Turbine Went Back into Service in 24 Hours; Vessel Said to Have Been Kilometres Off Course' (*Offshore WIND*, 30 May 2023) <www.offshorewind.biz/2023/05/30/cargo-ship-hit-gode-wind-turbine-went-back-into-service-in-24-hours-vessel-said-to-have-been-kilometres-off-course/> accessed 13 April 2024.

13 Michelle Lewis, 'In a First, A Cargo Ship Strikes an Offshore Wind Turbine' (*Electrek*, 4 June 2023) <https://electrek.co/2023/06/04/cargo-ship-offshore-wind-turbine/> accessed 13 April 2024.

safe maritime navigation is necessary for the protection of installations, vessels and the environment in the case of the transportation of dangerous goods.[14]

The question here is how to balance the competing rights of navigation on the one hand, and the installation of renewable energy structures at sea on the other. At this point, it should be noted that balancing competing rights is not a new issue in the law of the sea literature. Creating a balance between different states' competing rights and duties has been always a challenge. For instance, fishing activities in the high seas might affect the marine environment[15], deep sea mining can damage submarine cables[16], energy production activities can result in some interference with fishing activities[17], while military activities can affect the marine environment[18]. Thus, many scholars have already discussed the varying importance of such competing rights or interests.[19] Additionally, in the Chagos Marine Protected Area Arbitration, ITLOS discussed 'a balancing act between competing rights, based upon an evaluation of the extent of the interference, the availability of alternatives, and the importance of the rights and policies at issue' and decided that the UK had failed to carry out such a balancing act with respect to Mauritian fishing activities in the territorial sea of the Chagos Archipelago.[20]

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14 Dawoon Jung, *The 1982 Law of the Sea Convention and the Regulation of Offshore Renewable Energy Activities within National Jurisdiction* (Brill/Nijhoff, 2023) 107.

15 For discussions on the MPAs and fishing activities in the high seas see Gerhard Hafner, 'Does the Freedom of the Seas Still Exist?' (2017) Brill 368-370.

16 For discussions on submarine cables and deep sea mining see Danielle Kroon, 'Due Regard in the High Seas: The Tension between Submarine Cables and Deep Seabed Mining' (2018) 24 Australian International Law Journal 35.

17 For discussions on competing interests for Nord Stream Pipelines Project see David Langlet 'Balancing Competing Interests When Building Marine Energy Infrastructures: the Case of the Nord Stream Pipelines' in Catherine Banet (ed.), *The Law of the Seabed Access, Uses, and Protection of Seabed Resources* (Brill|Nijhoff, 2020).

18 For discussions on military activities and environmental law concerns in EEZ see Pascale Ricard, 'The Limitations on Military Activities by Third States in the EEZ Resulting from Environmental Law' (2019) The International Journal of Marine and Coastal Law 34, 147-150. Also see Geneviève Bastid Burdeau, 'The Respect of Other States' Rights (Freedom of Navigation and Other Rights and Freedoms Set Out in the LOSC) as a Limitation to the Military Uses of the EEZ by Third States' (2019) The International Journal of Marine and Coastal Law 34, 117–127.

19 For an analysis on the navigational rights and offshore renewable energy production specifically within national jurisdiction see Jung (n 14) 105-130.

20 ITLOS, Chagos Marine Protected Area Arbitration (*Mauritius v. United Kingdom*), 2015, 2011-03 para 539-540.

After all, although balancing the competing rights in the law of the sea field is a widely discussed topic, there is still a gap in the literature regarding the balancing act between navigational rights and the right to produce offshore renewable energy. Therefore, this paper aims to analyse the role of international law in ensuring the safety of navigation alongside state production of offshore renewable energy.

This article tries to answer two main questions: *(i)* What are the regulations for the safety of navigation around offshore renewable energy installations at the level of international law? *(ii)* Do these rules and regulations provide a cohesive and comprehensive framework for the safety of navigation and the safety of offshore renewable energy installations? To answer these questions, this article will examine binding and non-binding international treaties and documents. The main set of regulations, the United Nations Convention on the Law of the Sea *(hereinafter UNCLOS),* offers some general rules for the safety of navigation and the relationship between navigational activities and offshore energy production. The guidelines and recommendations of international organizations, mostly International Maritime Organization *(hereinafter IMO)* documents, determine the schemes and more detailed technical rules.

The present analysis unfolds in five sections: (1) An introduction to renewable energy technologies and their future effects on the safety of navigation. (2) The freedoms and obligations of the states in each maritime zone under the UNCLOS framework regarding renewable energy activities and navigational rights. (3) Generally accepted international rules, standards and instruments elaborated by IMO. (4) The duty for the decommissioning of offshore renewable energy installations. (5) An example of policies from the Netherlands to illustrate how international rules and documents guide coastal states. Finally, the conclusion addresses gaps in this current system and stresses the need for a more coherent framework dealing with the effects of offshore renewable energy installations on the safety of navigation.

2. Offshore Renewable Energy Technologies

Before starting the legal discussion, it is useful to introduce the offshore renewable energy technologies and projects from real-world applications. The most developed and common offshore energy type is the bottom-fixed wind turbines. There are different types of these structures; the most common types are gravity-based foundations, monopile foundations, tripod foundations, and jacket foundations. These installations could be deployed in waters up to depths of 60 metres and at up to 80 kilometres distance from the shore.[21] These bottom-fixed structures take space on and under the water and are rooted in the seabed, which might affect marine life and other activities at sea.

Offshore floating wind turbines are a game-changing technology that will enable wind to be harnessed in deeper waters while lowering the costs of deployment. Such floating structures have an anchoring system attached to the seabed. In 2017, the world's first floating offshore wind farm, Hywind, was deployed off the coast of Scotland, with turbines anchored at depths ranging from 95 to 120 metres.[22] Following this project, an offshore wind farm named Hywind Tampen was deployed to supply electricity to oil and gas operations in the North Sea. This project is anchored at depths ranging from 260 to 300 metres and is located 10 kilometres from the shore.[23]

Similarly, solar panels on floating platforms or membranes on water without being permanently fixed anywhere are an emergent technology.[24] Offshore solar panels are similar to land-based ones. In Asia, there are several large-scale floating solar panel

21 International Renewable Energy Agency (IRENA), 'Offshore Renewables: An Action Agenda For Deployment, International Renewable Energy Agency' (Abu Dhabi, 2021) 32 <www.irena.org/Publications/2021/Jul/Offshore-Renewables-An-Action-Agenda-for-Deployment> accessed 13 April 2024.

22 International Renewable Energy Agency (IRENA), 'Future of the Wind' (Abu Dhabi, 2019) 23 <www.irena.org/publications/2019/Oct/Future-of-wind> accessed 13 April 2024. For more information about this project also see Equinor, 'Hywind Scotland' <www.equinor.com/energy/hywind-scotland> accessed 13 April 2024.

23 Further information at Equinor, 'Hywind Tampen: The World's First Renewable Power for Offshore Oil and Gas' <www.equinor.com/energy/hywind-tampen> accessed 13 April 2024.

24 IRENA, 'Offshore Renewables' (n 21) 65.

projects such as Huaneng Dezhou Dingzhuang Reservoir Solar PV Park[25], Three Gorges Huainan Floating Solar PV Park[26] and Clay Quarry Lake Solar PV Park[27] in China. This could be an efficient solution for growing electricity demand in water-scarce places given that floating solar panels can cover water reservoirs or be used for desalination plants in coastal areas.[28] There is also a European Union-funded project in Gran Canary Island for the testing and qualification of floating solar panels for powering a desalination plant.[29] Furthermore, offshore floating solar panels can be operated in conjunction with offshore wind installations. For instance, in the North Sea there are floating offshore solar panels that are being connected, installed and operated within wind farms.[30]

Recent academic work demonstrates that the global yearly demand for energy could be covered more than twice over by the theoretical potential of various ocean energy technologies.[31] Since the early 2000s, more than 20,000 patents have been filed regarding ocean energy technologies. Among all of them, tidal and wave energy have the highest technological readiness levels while other technologies, such as ocean thermal energy conversion *(hereinafter OTEC)* and salinity gradient power are making progress rapidly.[32] Wave energy converters work by harnessing the energy that exists in ocean waves

25 Power Technology, 'Power Plant Profile: Huaneng Dezhou Dingzhuang Reservoir Solar PV Park, China' <www.power-technology.com/marketdata/power-plant-profile-huaneng-dezhou-dingzhuang-reservoir-solar-pv-park-china/?cf-view> accessed 13 April 2024.

26 Power Technology, 'Power Plant Profile: Three Gorges Huainan Floating Solar PV Park, China' <www.power-technology.com/marketdata/power-plant-profile-three-gorges-huainan-floating-solar-pv-park-china/?cf-view> accessed 13 April 2024.

27 Power Technology, 'Power Plant Profile: Clay Quarry Lake Solar PV Park, China' <www.power-technology.com/marketdata/power-plant-profile-clay-quarry-lake-solar-pv-park-china/> accessed 13 April 2024.

28 Vladimir Vidović and others, 'Review of the Potentials for Implementation of Floating Solar Panels on Lakes and Water Reservoirs' (2023) 178 Renewable and Sustainable Energy Reviews, 2.

29 For further information see PLOCAN, 'PLOCAN Presents BOOST in La Palma, The Largest Floating Offshore Solar Energy System in Europe' (14 December 2023) <https://plocan.eu/en/plocan-presents-boost-in-la-palma-the-largest-floating-offshore-solar-energy-system-in-europe> accessed 13 April 2024.

30 As an example of a combined project see Ocean of Energy, 'Crosswind and Oceans of Energy Add Offshore Solar to the Hollandse Kust Noord Offshore Wind Park' <https://oceansofenergy.blue/2023/04/24/crosswind-and-oceans-of-energy-add-offshore-solar-to-the-hkn-offshore-wind-park/> accessed 13 April 2024.

31 IRENA, 'Fostering a Blue Economy' (n 3) 11.

32 ibid 16.

to generate electricity.[33] Tides are the water movements in seas, sometimes up to more than 12 metres in height, occurring due to the interaction of the gravity of the earth, moon and sun. This flow creates kinetic energy and can be harnessed by renewable energy technologies.[34] OTEC is a renewable technology that produces electricity based on the natural temperature difference between the surface and the deeper levels of the ocean.[35] The technology has been successfully tested in Hawaii[36] and Japan[37], however, it is still in the research and development *(Hereinafter R&D)* phase.[38]

In summary, the construction and operation of offshore renewable energy technologies can affect navigational activities by covering the same maritime areas used by the ships. As mentioned above, offshore energy projects can cover large sea areas, including the water surface, the underwater and the seabed. Offshore wind farms are already taking large spaces in the seas and influencing shipping routes in certain areas. When other types of renewable energy technologies become more financially feasible in the future, these installations will interfere with busy routes and maritime traffic.

3. UNCLOS Framework Regarding the Safety of Navigation and Offshore Renewable Energy Activities

UNCLOS sets the general rules for navigation in different maritime zones and regulates any activities at sea of coastal states. Answering the questions of which activities are allowed in which maritime zones by whom under international law is crucial to

33 International Renewable Energy Agency (IRENA), 'Wave Energy: Technology Brief' (Abu Dhabi, 2014) 5 <www.irena.org/publications/2014/Jun/Wave-energy> accessed 13 April 2024.

34 International Renewable Energy Agency (IRENA), 'Tidal energy: Technology Brief' (Abu Dhabi, 2014) 6 <www.irena.org/Publications/2014/Jun/Tidal-Energy> accessed 13 April 2024.

35 TU Delft, 'Thermal Gradient (OTEC)' <www.tudelft.nl/oceanenergy/research/thermal-gradient-otec> accessed 13 April 2024.

36 Power Technology, 'Makai's Ocean Thermal Energy Conversion (OTEC) Power Plant, Hawaii' <www.power-technology.com/projects/makais-ocean-thermal-energy-conversion-otec-power-plant-hawaii/> accessed 13 April 2024.

37 OTEC Okinawa, 'Ocean Thermal Energy Conversion Demonstration Test Facility' <http://otecokinawa.com/en/> accessed 13 April 2024.

38 IRENA, 'Fostering a Blue Economy' (n 3) 15.

explaining the balance between shipping and the energy industry. In this part, the rules under UNCLOS for the safety of navigation and freedom of constructing renewable energy installations will be examined for each maritime zone.

3.1 Territorial Sea

In the territorial sea, the coastal state enjoys its sovereignty, including the air space over the sea, the seabed and subsoil.[39] Thus, as the sovereign state, the coastal state has the right to establish an offshore renewable energy installation in these waters. Alongside the coastal state's sovereignty, ships of all states may enjoy the right of innocent passage in the territorial sea of other states.[40] To call this passage 'innocent', it should not be prejudicial to the peace, good order or security of the coastal state.[41] In this context, activities aiming at interfering with any facilities or installations of the coastal state are considered to be prejudicial.[42] Therefore, this innocent passage is lawful only if it does not interfere with the renewable energy installations of the coastal state. It could be said that UNCLOS establishes a balance between the coastal states' rights and ships' passage in the territorial sea by creating this responsibility for foreign ships passing through the territorial seas of other states.

The coastal state may adopt laws and regulations relating to innocent passage through the territorial sea in respect of the safety of navigation and the regulation of maritime traffic, protection of navigational aids and facilities, and other facilities or installations.[43] This means that the coastal state can make rules to protect its installations from innocent passage in the territorial sea. To achieve this, the coastal state may require foreign ships to use sea lanes and traffic separation schemes while they

39 United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3 Art 2 (UNCLOS).

40 ibid, art 17.

41 ibid, art 19(1).

42 ibid, art 19(2)(k).

43 ibid, art 21.

are passing its territorial sea.[44]

In the designation of sea lanes and the prescription of traffic separation schemes under this article, the coastal state will 'take into account' the recommendations of the competent international organization, which could be understood as IMO.[45] Since the responsibility of the coastal state is formulated using the term 'take into account', it could be said that IMO recommendations are not binding for the coastal state. However, while regulating the sea lanes and traffic separation schemes, the coastal state cannot hamper the innocent passage of foreign ships unless it's in accordance with UNCLOS.[46] Moreover, the coastal state must take into account any channels customarily used for international navigation, the special characteristics of particular ships and channels, and the density of traffic in the area.[47]

In the territorial sea, UNCLOS does not specifically regulate the breadth of safety zones around installations. The overuse of this freedom by a coastal state might limit other states' right to innocent passage. However, the coastal state is obliged not to hamper the innocent passage of foreign ships through the territorial sea except in accordance with UNCLOS.[48] Therefore, coastal states must act proportionally and reasonably while establishing these safety zones and consider other states' passage rights.

3.2 Exclusive Economic Zone

In the exclusive economic zone *(hereinafter EEZ)*, the coastal state does not have the same sovereignty as in the territorial sea. Nevertheless, it has the exclusive right to construct, to authorize and regulate the construction, operation and use of artificial islands,

44 ibid, art 22.

45 ibid, art 22(3).

46 ibid, art 24.

47 ibid, art 22(3).

48 ibid, art 24.

installations and structures in the EEZ.[49] States must maintain warnings regarding the construction of such artificial islands, installations or structures, and other permanent infrastructure. Any abandoned or disused installations or structures must be removed to ensure the safety of navigation, which will be discussed further below. The coastal state is under the obligation of publicizing appropriately the depth, position and dimensions of any installations or structures that have not been entirely removed.[50]

UNCLOS creates 'due regard' obligation for both coastal and other states to avoid conflicts in the EEZ.[51] In exercising its rights and performing its duties in the EEZ, the coastal state must have 'due regard' to the rights and duties of other states.[52] Similarly, other states are required to have 'due regard' to the rights and duties of the coastal state.[53] There is no clear definition or limitation of the obligation to consider other states' rights and duties in EEZ. It is difficult to understand to what extent a state is obliged to balance its rights with other states' rights in the same maritime area. However, as stated recently by the Tribunal in the Advisory Opinion on Climate Change and International Law, all states must act in good faith and must comply with their obligations arising from internationally agreed rules and standards.[54] Therefore, states must consider other states' rights and duties while installing renewable energy installations in EEZ.

If necessary, the coastal state may establish reasonable safety zones around such artificial islands, installations and structures and take 'appropriate measures' to ensure

49 ibid, art 60(1).

50 ibid, art 60(3).

51 Robin Churchill, 'Revealing a Mosaic: International Jurisprudence Concerning the Non-Fisheries Elements of the Exclusive Economic Zone Regime' in Øystein Jensen (ed) *The Development of the Law of the Sea Convention: The Role of International Courts and Tribunals* (Edward Elgar Publishing 2020) 64. For the meaning of 'due regard' obligation see also Chagos Marine Protected Area Arbitration (*Mauritius v. United Kingdom*) [2015] PCA Case 2011-03 para 518-519.

52 UNCLOS (n 39) art 56(2).

53 UNCLOS (n 39) art 58(3).

54 ITLOS, *Advisory Opinion on Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law*, 2024, ITLOS Case n 31 para 270-271.

the safety both of navigation and of the artificial islands, installations and structures.[55] In relation to the Arctic Sunrise case, 'appropriate measures' in the safety zone include the enactment and enforcement of laws or regulations *'provided that such measures are aimed at ensuring the safety of both navigation and the artificial islands, installations, or structures.'* The Tribunal states that these rights of the coastal state go beyond its rights in the EEZ at large.[56]

The breadth of these safety zones is determined by the coastal state, taking into account the international standards. UNCLOS states that these zones must be designed to ensure that they are reasonably related to the nature and function of these structures and they cannot exceed a distance of 500 metres around them, unless it is authorized by international standards or recommended by the international organizations.[57] Thus, states may establish safety zones around offshore renewable energy installations, not exceeding a breadth of 500 metres. The international organization mentioned here can be understood as the IMO and its sub-committees in practice.

In the current international recommendations and standards, there are no other exceptions for extending the 500-meter zone which is for the protection of the structure. However, here, it should be noted that the 500-meter zone described in this paragraph might not mean a safe distance for all structures for safe manoeuvring under other international regulations or standards, such as the Convention on the International Regulations or Preventing Collisions at Sea.[58] Therefore, depending on the situation and the area, IMO can recommend larger safety zones.

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55 UNCLOS (n 39) art 60(4).

56 ITLOS, *Arctic Sunrise Case (The Kingdom of the Netherlands v. The Russian Federation)* 2015, ITLOS PCA Case 2014-02 para 211.

57 UNCLOS (n 39) art 60(5).

58 IMO Sub-Committee on Navigation, Communications and Search and Rescue, 'Report from the World Association for Waterborne Transport Infrastructure (PIANC) on Interaction Between Offshore Wind Farms and Maritime Navigation Submitted by France and the Netherlands (Shortly MarCom WG Report No 161 – 2018)' (12 November 2019) NCSR 7/INF.15 para 3.2.1 < https://docs.imo.org/> accessed 13 April 2024.

There has been a request to the IMO for there to be safety zones larger than 500 metres around artificial islands, installations and structures in the EEZ, submitted by the United States and Brazil.[59] This proposal suggested that the development and guidelines for extending this safety zone would be beneficial for the IMO and the coastal states. IMO Sub-Committee on Safety of Navigation considered document MSC 84/22/4 (Brazil and the United States), proposing to develop comprehensive guidelines for the consideration of requests for safety zones around artificial islands, installations and structures larger than 500 metres in EEZ. Especially, it would be beneficial for the safety of navigation in the zone around offshore artificial islands, installations and structures, and reducing the risk of collision between ships and installations.[60]

After this request, there have been stimulating discussions on IMO's role.[61] The correspondence group regarding the consideration reviewed the existing documents[62] and provided guidelines in its report.[63] Some delegations were in favour of amending the General Provisions on Ships' Routeing *(hereinafter GPSR)* whilst the majority supported the proposition that safety zones were not routeing measures and should therefore not be addressed under GPSR. It was recognized that the need for extension of safety zones beyond 500 metres might be necessary in the future due to the unique nature of offshore installations, wind farms, aqua culture sites and energy exploitation activities.[64]

Later, the legal office of IMO spoke on this matter. They stressed that: *'Article 60(5)*

59 IMO Sub-Committee on Safety of Navigation, 'Development of Guidelines for Consideration of Requests for Safety Zones Larger than 500 metres Around Artificial Islands, Installations and Structures in the Exclusive Economic Zone Submitted by the United States and Brazil' (4 February 2008) MSC 84/22/4 <https://docs.imo.org/> accessed 13 April 2024.

60 ibid, para 3.

61 IMO Sub-Committee on Safety of Navigation, 'Report to the Maritime Safety Committee' (31 August 2010) NAV 56/20 <https://safety4sea.com/wp-content/uploads/2014/09/pdf/nav56-20-final-report.pdf> accessed 13 April 2024.

62 IMO Sub-Committee on Safety of Navigation, 'Guidelines for Consideration of Requests for Safety Zones Larger than 500 Metres Around Artificial Islands, Installations and Structures in the EEZ Report of the Correspondence Group Submitted by the United Kingdom' (23 April 2010) NAV 56/4 para.3-8 <https://docs.imo.org/> accessed 13 April 2024.

63 ibid.

64 ibid, para 9.

of UNCLOS offered two options by providing that such safety zones shall not exceed a distance of 500 metres, except (a) "as authorized by generally accepted international standards", or (b) "as recommended by the competent international organization" Neither of these options referred to an "adoption" procedure.' It discussed that regarding the legal basis for an adoption procedure, reference could be made to other international instruments such as SOLAS regulation V/10 on ships' routeing. However, safety zones are not routeing measures. Thus, IMO should avoid an 'adoption' process language such as 'shall' except where an adoption was required by UNCLOS or another convention. Following this argument, the Sub-Committee referred documents to the Ships' Routeing Working Group for consideration and advice. In the end, the IMO Sub-Committee decided that there was no demonstrated need, at present, to establish safety zones larger than 500 metres around artificial islands, installations and structures in EEZ or to develop guidelines to do so. Therefore, it was decided that a correspondence group on safety zones was no longer necessary.[65]

The last point to be underlined is that ships must respect these safety zones and follow the generally accepted standards regarding navigation in the vicinity of these structures. However, installations and structures and the safety zones around them may not be established where interference may be caused to the recognized sea lanes essential to international navigation.[66] This rule restricts the freedom of the coastal state to construct renewable energy installations in EEZ if there are any essential recognized sea lanes in the area. The question may arise on how to decide whether a sea lane is 'essential' or 'recognized'. As an example, the most attractive areas for offshore wind around Western Europe are on the busy sea lanes such as the North Sea, the English Channel or the Danish Straits.[67] The existing projects have not interfered yet with the current sea lanes considering the size of these projects. However, vast renewable energy installations in these seas may interfere with or disrupt the essential sea lanes in the future.

65 ibid, para 15.

66 UNCLOS (n 39) art 60(6)(7).

67 To search offshore wind projects around this area, see European Offshore Wind Farms Map Public <https://windeurope.org/intelligence-platform/product/european-offshore-wind-farms-map-public/> accessed 13 April 2024.

In such cases, as the recognized authority, IMO and its Sub-Committee on Safety of Navigation might provide recommendations or suggestions to the states.

3.3 Straits

UNCLOS has transit and innocent passage regimes for the navigation through straits based on the maritime zone the strait is in. Transit passage rules apply to the straits which are used for international navigation between one part of the high seas or an EEZ and another part of the high seas or an EEZ.[68] In those straits, ships have the right of transit passage, which means the exercise of the freedom of navigation only for the purposes of continuous and expeditious transit of the strait.[69] Ships in transit passage must comply with generally accepted international regulations, procedures and practices for safety at sea and for the prevention, reduction and control of pollution from ships.[70]

In the straits, bordering states have the right to designate sea lanes and prescribe traffic separation schemes for navigation in straits where necessary to promote the safe passage of ships.[71] These sea lanes and traffic separation schemes must conform to generally accepted international regulations.[72] Ships in transit passage are under obligation to respect these sea lanes and traffic separation schemes.[73]

The bordering state refers proposals to the competent international organization, which is IMO in practice, with a view to their adoption before designating or substituting sea lanes or prescribing or substituting traffic separation schemes.[74] IMO can adopt

68 UNCLOS (n 39) art 37.

69 ibid, art 38.

70 ibid, art 39(2).

71 ibid, art 41.

72 ibid, art 41(3).

73 ibid, art 41(7).

74 ibid, art 41(4).

only such sea lanes and traffic separation schemes as may be agreed with the states bordering the straits, after which the states may designate, prescribe or substitute them.[75] From this provision, it could be said that IMO has no right to adopt such lanes and schemes by itself without the agreement of bordering states.

The regime of innocent passage applies to straits that are excluded from the regime of transit passage, or to straits that connect a part of the high seas or an EEZ with the territorial sea of a foreign state.[76]

UNCLOS does not provide any specific rules on installations and structures in the straits. Thus, the state bordering the strait can exercise their sovereignty or jurisdiction under UNCLOS over these waters considering passage rights, sea lanes and traffic separation schemes, as well as other international obligations.

As a final point on straits, UNCLOS states that the regime of passage through straits used for international navigation does not affect the legal status of these waters, nor the exercise by the states bordering the straits of their sovereignty or jurisdiction over such waters and their air space, bed and subsoil. This provision also allows the states bordering a strait to exercise their jurisdiction to install renewable energy installations or structures. For instance, Singapore has built a big offshore floating solar PV farm in the Straits of Johor between Singapore and Malaysia.[77]

3.4 Archipelagic Waters

An archipelagic state is a state constituted wholly by one or more archipelagos and other islands. UNCLOS defines the term 'archipelagos' as a group of islands, including

75 ibid, art 41(4).

76 ibid, art 45.

77 Clara Chong, 'Singapore Now Home to One of the World's Largest Floating Solar Farms' (*The Strait Times*, 24 March 2021) <www.straitstimes.com/singapore/singapore-now-home-to-one-of-the-worlds-largest-floating-solar-farms> accessed 13 April 2024. Veselina Petrova, 'Sunseap Installs 5-Mwp Floating Offshore PV Plant in Johor Straits, Renewables Now' (*Renewables Now*, 23 March 2021) <https://renewablesnow.com/news/sunseap-installs-5-mwp-floating-offshore-pv-plant-in-johor-straits-735359/> accessed 13 April 2024.

parts of islands, interconnecting waters and other natural features that are so closely interrelated that such islands, waters and other natural features form an intrinsic geographical, economic and political entity, or which historically have been regarded as such.[78] UNCLOS creates a special baseline measurement method under Article 47 for archipelagic states. Accordingly, the breadth of the territorial sea, the contiguous zone, the exclusive economic zone and the continental shelf will be measured from archipelagic baselines.[79]

An archipelagic state has the sovereignty over the waters enclosed by the archipelagic baselines drawn in accordance with Article 47. This sovereignty extends to the air space over the archipelagic waters, to their bed and subsoil, and the resources contained therein.[80] Since the state has sovereignty over these waters, it might establish offshore renewable energy installations within archipelagic waters. On the other hand, ships of all states have the right of innocent passage through archipelagic waters.[81] Also, an archipelagic state can designate sea lanes suitable for the continuous and expeditious passage of foreign ships for the right of archipelagic sea lanes passage. This implies that navigation is permitted only in the normal mode and solely for the purpose of continuous, expeditious, and unobstructed transit between one part of the high seas or an EEZ and another.[82]

3.5 The High Seas

The high seas are open to all states and their activities. This freedom includes freedom of navigation, laying submarine cables, constructing artificial islands and other installations.[83] Also, every state, whether coastal or land-locked, has the right to nav-

78 UNCLOS (n 39) art 46.

79 ibid, art 48.

80 ibid, art 49.

81 ibid, art 52.

82 ibid, art 53(3).

83 ibid, art 87(1).

igate on the high seas.[84] Therefore, states may freely sail their ships and, theoretically, any state can install an offshore renewable energy installation on the high seas. Also, all states are entitled to lay submarine cables and pipelines on the bed of the high seas beyond the continental shelf.[85] Therefore, when ocean energy technologies are being used in practice in the future, states may freely lay cables from these structures to the coast.

Although offshore technologies have not been used on the high seas yet, considering the rapid rate of technological development, it will soon be possible to harness ocean energy from the vast high sea waters. Floating solar panels or huge wind farms on the high seas are not impossible, especially if the costs of these activities reduce in the near future. This raises certain questions about how offshore installations would affect navigation in these waters.

Unlike other maritime zones, structures and installations on the high seas are minimally regulated under the framework of international law. UNCLOS lays out that states may conduct their activities on the high seas freely while considering the interests of other states.[86] This obligation can be basically explained as considering other states' activities before starting an activity in the high seas to create a balance between competing interests.[87]

Moreover, Article 90 of UNCLOS creates an obligation for the flag state of the ship to ensure the safety of seas regarding the use of signals, maintaining the communication methods, and the prevention of collisions.[88] Thus, it could be said that this obligation includes ensuring the safety of navigation around future offshore renewable energy installations and the safety of energy installation on the high seas.

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84 ibid, art 90.

85 ibid, art 112.

86 ibid, art 87(2).

87 Danielle Kroon, 'Due Regard in the High Seas: The Tension between Submarine Cables and Deep Seabed Mining' (2018) 24 Australian International Law Journal 48.

88 UNCLOS (n 39) art 94(3)-c.

Besides the obligations mentioned, the newly adopted United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction *(hereinafter BBNJ Treaty)* creates obligations for marine biological diversity on the high seas.[89] Although this Treaty does not have any specific obligations regarding the safety of navigation or renewable energy activities in seas, it is still relevant to the issue because any collision between vessels and installations might affect marine biological diversity on the high seas.

Moreover, considering the knowledge and scientific development at the time UNCLOS was written, there is no clear solution for the conflict between navigational rights and installing offshore renewable installations on the high seas. It should be noted that when a conflict arises on the high seas, the general obligation to protect and preserve the marine environment under Part XII of UNCLOS and the due diligence obligation of the states[90] are applicable. Additionally, the duty to solve disputes through compulsory binding dispute settlement might be helpful in solving conflicts on the high seas. This would give international courts and tribunals a role in further developing the relevant rules.

A summary of the rules and regime under UNCLOS regarding maritime safety and offshore renewable energy activities is provided in Table 1.

89 Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Treaty) (adopted on 19 June 2023).

90 *South China Sea Arbitration (The Republic of Philippines v. The People's Republic of China)* [2016] PCA Case 2013-19 para. 944. Also see *Case Concerning Pulp Mills on the River Uruguay (Argentina v Uruguay)* [2010] ICJ Rep 14, para 177: 'It is an obligation which entails not only the adoption of appropriate rules and measures, but also a certain level of vigilance in their enforcement and the exercise of administrative control applicable to public and private operators, such as the monitoring of activities undertaken by such operators, to safeguard the rights of the other party'.

Table 1. Maritime safety and offshore renewable energy (ORE) rules under international law

	Actor/regime for ORE activities	Actor/regime for maritime safety
Territorial Sea	• Coastal state sovereignty	• Innocent passage • Coastal state may designate sea lanes and traffic separation schemes
EEZ	• Exclusive rights to construct, authorise, regulate installations and structures • Safety zones around installations • Decommissioning duty	• Ships must respect safety zones and generally accepted standards around installations • Safety zones cannot be established on recognised sea lanes essential to international navigation
Straits	• No specific reference to installations or structures.	• Transit passage (between high seas/EEZ and high seas/EEZ) • Innocent passage (between high seas/EEZ and territorial sea) • Bordering state may designate sea lanes/traffic separation schemes
Archipelagic Waters	• Archipelagic state sovereignty • No specific reference to installations or structures	• Innocent passage • Archipelagic state may designate sea lanes and prescribe traffic separation schemes for the safe passage of ships through narrow channels.
The High Seas	• Freedom of constructing installations for all states	• Freedom of navigation for all states • Flag state responsibility to ensure the safety of sea

4. Other International Regulations and Guidelines Related to Safety of Navigation and Offshore Renewable Energy Installations

So far, this paper has outlined the UNCLOS framework for the safety of navigation, routeing and offshore installations. There are several references to generally accepted international rules and standards regarding shipping. IMO elaborates these rules in detail in its guidelines and recommendations. IMO, as the competent international organization, approves the vessel routeing and safety zones around offshore installations.[91] In this section, the main IMO documents on ships' routeing, avoidance of collisions, safety of navigation and the manoeuvrability of the vessels will be examined by emphasizing their connection to offshore renewable energy installations.

4.1 General Provisions on Ships' Routeing (IMO Resolution A.572(14))

IMO is the United Nations specialized agency with responsibility for safe and secure shipping, and the protection of the marine environment from shipping. The main purpose of this organization is to universally regulate the shipping industry and implement these policies.[92] IMO is the only international body responsible for establishing and recommending measures on an international level concerning ships' routeing according to Resolution A.572(14).[93] The resolution defined the *'routeing system'* as any system or measures aimed at reducing the risk of casualties. The routeing systems include various measures such as traffic separation schemes, two-way routes, recommended tracks, areas to be avoided, inshore traffic zones, roundabouts, precautionary areas, and deep-water routes.[94] Resolution A.572(14) guides states and IMO for the process of establishing routeing systems, even though it is a non-binding document.

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91 Catherine Redgwell, 'The Role of GAIRS in UNCLOS Implementation' in Jill Barrett and Richard Barnes (eds), *Law of the Sea: UNCLOS as a Living Treaty* (BIICL, 2016) 180.

92 MarCom WG Report No 161 – 2018 (n 58) para 3.1.3.

93 IMO Assembly, 'General Provisions on Ships' Routeing' (adopted on 20 November 1985) Res.572(14) para 3.1

94 ibid, para 2.1.1.

Ships' routeing is crucial for improving the safety of navigation in converging areas, areas where density of traffic is great or where freedom of movement of shipping is inhibited.[95] The routeing system will depend upon the hazardous circumstances which it is intended to alleviate. The resolution lists some hazardous circumstances as examples. The organization of safe traffic flow in areas of concentrated offshore exploration or exploitation is one of them.[96] Considering that the resolution was adopted in 1986, it mainly concerned traditional energy installations such as oil platforms or rigs at sea. However, harnessing offshore renewable energy sources by different installations and structures might increase the risks against the safety of navigation too. Therefore, it might be said that *'concentrated offshore exploration or exploitation areas'* include offshore renewable energy activity areas. Therefore, the routeing systems adopted by IMO will depend on offshore renewable energy installations in a maritime area for the safety of shipping.

IMO cannot adopt or amend routeing systems without an agreement with the coastal states where this system might affect their rights and practices in respect of the exploitation of living and mineral resources.[97] The expression *'exploitation of living and mineral resources'* in paragraph 3.4.1 of the resolution covers activities such as fishing or seabed mining. However, it does not refer to offshore wind or other non-mineral ocean energy systems. Given the era in which this resolution was adopted, it is understandable that the only sources mentioned were living or mineral sources in the seas. However, the resolution covers broader activities including new offshore structures, especially with the new Resolution MSC.419(97) amendment mentioned below. Thus, for the safety of navigation and installations, it is better to interpret this obligation as including exploitation of renewable energy sources. Consequently, IMO would be under the obligation of agreeing with the coastal states if the new routeing system affects the offshore renewable energy activities of the coastal state. Also, it is important to mention that, according to the resolution, the selection and development of routeing systems is primarily the re-

95 ibid, para 1.1.

96 ibid, para 1.2.4.

97 ibid, para 3.4.1.

sponsibility of the states concerned.[98] This provision shows that IMO does not have the authority to adopt routeing systems without the states concerned.

If a state proposes a new routeing system or an amendment to an adopted routeing system beyond their territorial sea, it should consult IMO.[99] The purpose of this consultation is to adopt or modify the system established by the IMO for international navigation. Therefore, it is crucial to consult IMO for any changes beyond the territorial sea of the coastal state in order to protect the safety of international navigation. When this routeing system is adopted, it cannot be amended or suspended before consultation with, and agreement by, IMO. It means that the coastal state is under an obligation to consult IMO when creating a new routeing system beyond their territorial sea. Within their territorial sea, states may establish traffic separation schemes by designing them in accordance with IMO criteria and submit them to IMO for adoption.[100]

Resolution A.572(14) recommends states to ensure that oil rigs, platforms and other similar structures are not established within routeing systems adopted by IMO or near their terminations.[101] Here, *'similar structures'* may refer to offshore renewable energy installations. Thus, states must consider the adopted routeing systems when they establish new installations.

Resolution A.572(14) was amended by Resolution MSC.419(97) with the new paragraph 3.14 which regulates the offshore structures. With regard to safety of navigation, states are under a responsibility to take into account the impact of structures at sea, including, but not limited to, wind turbines. When a state plans to establish multiple structures in the sea, it should consider traffic density and prognoses, the presence or establishment of routeing measures in the area, and the manoeuvrability of ships and their obligations under the 1972 Collision Regulations. Also, sufficient space extending

98 ibid, para 3.7.

99 ibid, para 3.8.

100 ibid, para 3.12.

101 ibid, para 3.10.

beyond the side borders of traffic separation schemes should be provided for emergencies in the vicinity of multiple structure areas.[102]

In summary, routeing systems are needed for the safety of navigation, especially around installations and structures at sea. IMO can establish and recommend measures on an international level concerning ships' routeing. In territorial seas, states can establish traffic separation schemes according to IMO criteria and submit them to IMO for adoption. Beyond their territorial seas, the state should consult IMO. Although IMO is the competent international body for routeing systems, there is a limitation to this power. IMO should agree with the coastal state when the routeing system affects states' rights and practices regarding the exploitation of living and mineral resources. Although there is no clear mention of offshore renewable energy sources here, considering the technological changes since the adoption of the resolution, IMO should make an agreement with the coastal state when the system might affect the exploitation of renewable energy sources. The amendment to the resolution regarding offshore structures was necessary and creates a special responsibility for states to consider routeing systems and shipping traffic before establishing offshore renewable energy structures. It could be argued that IMO's role in establishing routeing measures around offshore renewable installations could be designed more clearly with this amendment.

4.2 Convention on the International Regulations for Preventing Collisions at Sea (Colregs)

The Convention on the International Regulations for Preventing Collisions at Sea *(hereinafter COLREGs)* governs the navigation of all vessels on the high seas, as well as in all connected waters navigable by seagoing vessels.[103] Rule 10 of COLREGs applies

102 IMO, 'Resolution MSC.419(97): Amendments to the General Provisions on Ships' Routeing (Res.572(14), as amended)' (adopted on 25 November 2016) para 3.14.

103 Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (adopted on 20 October 1972, entry into force on 15 July 1977) rule 1.

to traffic separation schemes adopted by IMO.[104] This provision guidesvessels at sea in determining safe speed, the risk of collision and the conduct of vessels operating in or near traffic separation schemes.

4.3 International Convention for the Safety of Life at Sea (SOLAS)

The International Convention for the Safety of Life at Sea *(hereinafter SOLAS)* sets rules for the safety of life in seas and oceans by regulating various topics, such as the construction of ships, safety of navigation, radiotelegraphy, carriage of goods, and life-saving or safety measures for various types of vessels. The main focus of this convention is the safety of human life in all maritime-related activities. Measures set in SOLAS indicate that this convention is forward-thinking in terms of incorporating technological advances with various amendments over time.[105]

Chapter V of SOLAS regulates the safety of navigation for all ships on voyages.[106] Regulation 10 of Chapter V indicates that ships' routeing systems contribute to the safety of life at sea, the safety and efficiency of navigation and the protection of the marine environment.[107]

SOLAS, here, recognized IMO as the only international body for establishing and adopting measures on an international level concerning routeing and areas to be avoided by ships.[108] IMO may develop guidelines, criteria and regulations on an international level for ships' routeing systems. Contracting states should refer proposals for the adop-

104 ibid, rule 10.

105 Anish Joseph and Dimitrios Dalaklis, 'The International Convention for the Safety of Life at Sea: Highlighting Interrelations of Measures Towards Effective Risk Mitigation' (2021) 5(1) Journal of International Maritime Safety, Environmental Affairs, and Shipping 9.

106 International Convention for the Safety of Life at Sea (SOLAS) (adopted on 1 November 1974, entry into force on 25 May 1980) ch V reg 1.

107 ibid, ch V reg10.

108 ibid.

tion of ships' routeing systems to IMO.[109] When two or more states have a common interest in a particular area in the sea, according to SOLAS, they should formulate joint proposals for the delineation and use of a routeing system therein to IMO.[110]

All adopted ships' routeing systems and actions taken to enforce compliance with those systems must be consistent with international law and the provisions of UNCLOS.[111] In other words, provisions of SOLAS or its associated guidelines and criteria should not prejudice the responsibilities of states under international law.[112]

4.4 Standards for Ship Manoeuvrability (MSC.137(76))

The Maritime Safety Committee, at its seventy-sixth session, adopted Resolution MSC.137(76) on Standards for Ship Manoeuvrability. IMO Res. MSC.137(76) creates the standards for ship manoeuvrability which should be used to evaluate the manoeuvring performance of ships and to assist those responsible for the design, construction, repair and operation of ships.[113] These standards and methods can be periodically reviewed and updated by IMO.[114] Additionally, Maritime Safety Committee's Circular 1053 has explanatory notes for the application of the standards.[115] These standards and tests for the vessels are used for designing the safety distances between offshore wind farms and surrounding traffic lanes.

5. Decommissioning of Offshore Renewable Energy Structures for The Safety of Navigation

The lifetime of an offshore wind farm, as the most common offshore renewable energy

109 ibid, ch V reg 10(2).

110 ibid, ch V reg 10(5).

111 ibid, ch V reg 10(9).

112 ibid, ch V reg 10(10).

113 IMO, 'Resolution on Standards for Ship Manoeuvrability' (adopted on 4 December 2002) MSC.137(76) para.1.1.

114 ibid, para 1.2.

115 IMO Maritime Safety Committee, 'Explanatory Notes to the Standards for Ship Manoeuvrability' (2002) MSC/Circ.1053.

type, is approximately 20-25 years.[116] For the other renewable energy technology types, such as ocean energy technologies, it is not even clear yet how long they will be used in practice since most of them are still in the R&D stage. After an installation ceases its operations, the question arises as to what will happen to this installation. Clearly, at the international law level the offshore wind energy industry and the coastal states must follow the rules under UNCLOS.

Article 60 of UNCLOS regulates installations and structures in EEZ. Particularly, paragraph 3 of the article focuses on the decommissioning of abandoned or disused installations or structures:

> *'Due notice must be given of the construction of such artificial islands, installations or structures, and permanent means for giving warning of their presence must be maintained. 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. Such removal shall also have due regard to fishing, the protection of the marine environment and the rights and duties of other States. Appropriate publicity shall be given to the depth, position and dimensions of any installations or structures not entirely removed.'*

UNCLOS specifies that any installations or structures which are abandoned or disused must be removed for the safety of navigation considering the international standards established in this regard by the competent international organization.[117] This means that the unused offshore energy installations must be removed following the IMO standards and guidelines and, if there are any, other international rules and standards in practice. UNCLOS uses a language referring to the safety of navigation as the main reason for decommissioning. It could be said that the treaty makers' main concern about the

116 Eva Topham and others, 'Recycling Offshore Wind Farms at Decommissioning Stage' (2019) 129(4) Energy Policy 698.

117 UNCLOS (n 39) art 60(3).

decommissioning of abandoned or disused installations is maritime safety in that area.

There is no clear obligation regarding unused installations in territorial seas under UNCLOS framework. Article 60 only applies to EEZ and continental shelf. Thus, this obligation would not be applicable to territorial seas. However, the coastal state is still under the obligation to protect the marine environment under Part XII UNCLOS and not interfere with the right of innocent passage in territorial seas under Article 19 of UNCLOS.[118]

Similarly, for the high seas, there is no obligation of removal or decommissioning of abandoned or disused installations under UNCLOS. Article 87 provides the rule for freedom to construct artificial islands and other installations on the high seas. However, there is no rule about the aftermaths of these installations when they are not used anymore.

IMO Resolution A.672, namely '*Guidelines and Standards for The Removal of Offshore Installations and Structures on The Continental Shelf and in the Exclusive Economic Zone*', regulates the rules for removal of abandoned or disused installations following Article 60 of UNCLOS.[119] According to these guidelines, abandoned or disused offshore installations on any continental shelf or in any EEZ are required to be removed with certain exceptions. Also, removal must be performed without causing any significant adverse effects upon navigation or the marine environment.[120]

Besides IMO guidelines and standards, there are several conventions regarding decommissioning of abandoned or unused installations or structures in seas, mostly concerning the marine environment. The 1976 Barcelona Convention for the Protection of

118 Seline Trevisanut, 'Decommissioning of Offshore Installations: a Fragmented and Ineffective International Regulatory Framework' in Catherine Banet (ed), *The Law of the Seabed: Access, Uses, and Protection of Seabed Resources* (Brill | Nijhoff 2020) 436-437.

119 IMO Assembly, 'Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone' (adopted on 19 October 1989) Res. A.672 (16).

120 Simon Moore, 'Decommissioning' in Stuart Beadnall, Simon Moore and Max Lemanski (eds), *Offshore Floating Production: Legal and Commercial Risk Management* (Routledge 2023) 192.

the Marine Environment and the Coastal Region of the Mediterranean has the Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil.[121] This protocol regulates a detailed system for offshore operations including the removal of the installations in seas under Article 20.

Another example is the Convention for the Protection of the Marine Environment of the North-East Atlantic[122] *(hereinafter OSPAR)*, which was signed for the protection of the marine environment of the North-East Atlantic, including the North Sea. For offshore installations, the OSPAR Decision 98/3[123] bans the disposal of offshore installations in seas, except when the competent authority permits leaving specific installations or parts of the installations.

The other significant conventions related to decommissioning is the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter[124] and its protocol[125]. 'Dumping' under the London Protocol covers any deliberate disposal of wastes or other matter from offshore platforms or other man-made structures into the sea, in the seabed or the subsoil. According to the Protocol, parties may prohibit the dumping of any wastes or other matter with the exception of those listed in Annex 1, which includes 'vessels and platforms or other man-made structures at sea'. This means that the prohibition for dumping is not absolute. Since offshore renewable energy platforms could be considered as 'platforms' or 'man-made structures', they could be considered for a dumping permit under certain circumstances.

121 Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil (adopted on 14 October 1994).

122 The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention), (1992).

123 Ministerial Meeting of the OSPAR Commission, Decision 98/3 on the Disposal of Disused Offshore Installations <www.ospar.org/documents?v=6875> accessed 13 April 2024.

124 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the London Convention) (1972).

125 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (entered into force on 24 March 2006).

6. An Example from the Practice: the North Sea Policies of the Neth erlands

Having addressed the key international agreements and standards relevant to the topic, in this section the Dutch North Sea policies will be examined as an example of the planning of the shipping routes, and swift and safe navigation around offshore wind farms.

The Netherlands is one of the leading countries for offshore wind farms and plans to increase the number of offshore wind energy structures in the future. The planned wind energy areas in the Netherlands are Borssele, IJmuiden Ver, Coast of Holland and North of the Wadden Islands which cover the area around 2,900 km^2.[126] North Sea Policy Document (2016-2021) for the Dutch exclusive economic zone offers a system for the usage of the North Sea related to the wind energy activities and shipping.[127]

For the safety distances between the ships and the offshore renewable energy installations, it is crucial to make a description of the ships that navigate around the installation. There might be a commercial ship that carries goods or passengers, fishing vessels, pleasure boats or supply vessels, tugboats or maintenance boats. Factors such as the type of goods being carried, their hazardous nature, the size of the vessel, its manoeuvring characteristics, and auxiliary systems are considered important for accurate description.[128]

The distance between the wind farms and shipping routes depends on the calculation of the reference ship size. In the North Sea Policy Document, the reference ship is 300-400 metres long. According to this reference size, the sufficient space for the largest manoeuvre of a ship is a minimum of 6 ship lengths. Additionally, an extra 0.3 NM is

126 Government of the Netherlands, 'Policy Document on the North Sea 2016-2021, Including the Netherlands' Maritime Spatial Plan appendix 2 to the National Water Plan 2016-2021' 88.

127 ibid.

128 MarCom WG Report No 161 – 2018 (n 58) para 4.1.1.

necessary for a ship to execute a round turn. Therefore, the overall space required for a round turn is 0.3 NM + 6 ship lengths. Also, the North Sea Policy Document refers to the safety zone of 500 metres in force around the wind turbines. Within this zone, passage is not possible presently.[129]

Lastly, the Dutch government body (Rijkswaterstaat) planned a risk assessment package prepared with relevant stakeholders, including wind farm owners and the shipping sector. The Dutch government opened some wind farms for transit passage or co-usage as a pilot project for ships up to 24 metres in length and under specific conditions.[130] Nonetheless, it could be an example of future co-usage of renewable energy installations with shipping activities.

7. Concluding Remarks

This article seeks to investigate the international law framework on offshore renewable energy projects and its effects on the safety of navigation in seas. To this end, the article assesses these aspects: (i) gaps in the international law of the sea framework, (ii) the complexity and technicality of the international guidelines and standards on maritime safety, (iii) current and possible impacts of offshore renewable energy installations on the safety of navigation.

There is no general international treaty on installing and operating offshore renewable energy structures, so it is under the general provisions of UNCLOS. UNCLOS aims to strike a balance between the coastal state's right to install renewable energy structures and maritime safety around these installations and the freedom of navigation. The Convention provides mechanisms such as safety zones, routeing measures or traf-

129 Government of the Netherlands, Policy Document on the North Sea (n 126) 84.

130 (MSP) Platform, Conflict Fiche 7: Maritime Transport and Offshore Wind (n 5) 8-9. Also see Noordzeeloket, Offshore Windpark Egmond aan Zee (OWEZ) <www.noordzeeloket.nl/functies-gebruik/windenergie/doorvaart-medegebruik/offshore-windpark-egmond-zee-owez/> accessed on 13 April 2024: 'The Offshore Windpark Egmond aan Zee wind farm is only accessible to ships up to 24 metres in length under strict conditions. The gedragscode for safe sailing through wind farms contains the rules and safety tips for sailing through this park correctly.'.

fic schemes. In territorial seas, rules and regulations regarding passage, sea lanes and maritime traffic depend on the coastal state as the sovereign state. A potential criticism could be that, as distinct from the EEZ, there is no specific rule on safety zones and decommissioning in territorial seas. On the other hand, in the EEZ, safety zones and decommissioning rules limit the coastal state's freedom. There is also a limitation on the coastal state installing a renewable energy installation on an essential sea lane. However, under the current UNCLOS framework, future renewable energy projects on the high seas, including the possibility of collisions between a vessel and an energy installation, are not foreseen. IMO documents mentioned above, such as COLREGs, SOLAS, or IMO Res. MSC.137(76), elaborate the provisions of UNCLOS in technical matters.

There are no international organizations specifically for offshore renewable energy activities. There are a few international agencies on renewable energy; IRENA, one such example, aims to promote sustainable use of energy. However, unlike IMO, IRENA does not provide any regulations or guidelines.[131] It is also apparent that no international convention currently regulates offshore renewable energy installations specifically, yet there are a number of relevant international treaties and non-binding rules. IMO offers comprehensive guidelines and standards on technical matters on installations and shipping. However, IMO mainly represents the shipping industry perspective. Establishing a sub-committee for offshore renewable energy installations could prove beneficial in the long term, as it would enhance the representation of all interests and stakeholders. Furthermore, the current complex framework and international regulations could be harmonized in the future. Co-design of shipping routes with better collaboration between maritime and energy sectors could also be beneficial. Consulting all relevant sectors and international bodies appears necessary to develop efficient solutions for future marine planning. As an example, the Netherlands and Belgium had a project for a wind farm on the Scheldt estuary which already had sand banks that affected navigation. There were concerns regarding both safety and the navigational route. A joint consultation group consisting of public authorities, ports, former vessel operators, consultants, shipping companies and

131 Jung (n 14) 77.

associations, and offshore wind farm developers was formed to define the best route and propose safety measures and rerouteing to the IMO.[132] This type of collaboration between industries is necessary to govern seas and oceans for future activities.

This paper demonstrates the challenges and complexity of creating a balance between the shipping industry and rising offshore renewable energy activities. UNCLOS and IMO regulations provide a framework for navigation and safety to a certain level, however, it is clear that there is a need for more comprehensive international regulation of navigation and maritime safety around renewable energy installations in areas under the control of the coastal state as well as, in the near future, on the high seas.

132 (MSP) Platform, Conflict Fiche 7: Maritime Transport and Offshore Wind (n 5) 13.