

Legal Framework for Sustainable Floating City Development: A Case Study of the Netherlands



Fen-Yu Lin, Otto Spijkers, and Pernille van der Plank

Abstract Sustainable floating city development has recently gained increasing popularity as a serious solution to climate change threats and land scarcity faced in urban areas. While many design and engineering aspects have been widely studied and tested, social acceptance and legal issues have been relatively underemphasized. The legal aspects of floating city development are multifaceted, contextual and rather complicated. It involves different scales and levels of legislation and branches of law. This paper aims to identify the current legal framework at different levels, as well as the knowledge gaps that still need to be filled in order to make living (i.e. human settlement) at sea possible and regulated. Taking the Netherlands as a host nation example for floating city development, the research investigates into the status-quo and future challenges regarding international law (United Nations Law of the Sea Convention [LOSC]), national laws and property law. The results shed light on the complex interrelations between different scales and levels of laws that need to be taken into account for expanding cities on water. Recommendations on future research and regulatory actions needed to overcome the challenges and facilitate the realization of sustainable floating city development are provided.

F.-Y. Lin (✉)
Blue21 B.V., Molengraaffsingel 12, 2629 JD Delft, The Netherlands
e-mail: vicky@blue21.nl

O. Spijkers
China Institute of Boundary and Ocean Studies (CIBOS), Research Institute
of Environmental Law (RIEL), and International Water Law Academy (IWLA),
Wuhan University, Hubei Province, 299 Bayi Road, Wuchang District,
43007 Wuhan, P.R. China
e-mail: ottospijkers@whu.edu.cn

P. van der Plank
Molengraaff Institute for Private Law, Utrecht University School of Law,
Utrecht, The Netherlands
e-mail: p.j.vanderPlank@uu.nl

P. van der Plank
Utrecht Centre for Water, Oceans and Sustainability Law, Utrecht, The Netherlands

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1 Introduction

Land cultivation is often followed by human settlement near areas where natural resources are rich, and eventually leads to rural–urban migration. Cities grow due to the rapid increase in world population and urbanization. Globally it has been estimated that by 2050, 66% of the world's population will live in urban areas [1]; in Europe, this number rises to even 80% [2]. Extraordinary pressure on finding more land for people to live, produce food, energy and other ecosystem services has thus been created. Traditionally, cities in countries with limited space such as Singapore and the Netherlands have resorted to land reclamation, a process of creating new land from the sea by filling the area with large amount of rock and soil to raise the elevation, or by draining submerged wetlands [3]. Lately some even take a giant step forward and investigate into the feasibility of moving to Mars. Instead of colonizing Mars, how about taking a look at somewhere closer to us, the resource of which 70% of our planet consists: water? Why not introduce floating cities, creating new space on top of large-scale platforms that float on water, which has (by far) hardly been used for urbanization?

Particularly land reclamation has become a questionable proposition due to environmental concerns over the decremental impacts of sand mining, increasing scarcity of sand resources and land subsidence being a significant problem [4, 5]. In comparison, floating platforms provide many advantages which are absent in land reclamation, including cost efficiency in large deep water, environmentally friendliness in marine ecosystem, ease and rapidness of construction, and adaptability to water level changes [6, 7]. By 2050 the global land scarcity is estimated to be between 13 and 36 million km², marine floating city development could potentially be a more sustainable alternative solution to address land scarcity issues [8]. While numerous technical studies have been conducted and proofs have shown that floating city development is technically feasible [9–11], legal issues, financial implications and social acceptance have generally been underinvestigated. To facilitate and catalyze the development of floating cities, the status-quo of these topics in relation to floating development must be scrutinized in depth.

This study aims to identify the current legal framework of floating city development at the international, regional and national level, as well as the knowledge gaps that still need to be filled in order to make living (i.e. human settlement) at sea possible and properly regulated. The research takes the Netherlands as a host nation example for large-scale floating city development. The country is renowned for its water engineering and management. It has successfully created many new lands, or

polders,¹ with water pumped out or drained by opening sluices at low tide. The country carried out major land reclamations since the 70s, marking the start of the modern era of land reclamation [3]. This study intends to shed light on how the Netherlands could take a leading role in innovating and taking land creation to the next level by “creating land on water”.

1.1 The Past, Present and Future

Historically, humans have settled at sea or large inland water bodies for different reasons. Hundreds of years ago, in southeast Fujian province of Luoyuan Bay, China, fishermen formed a floating village by the sea where their livelihood, fish farming, took place on a daily basis. In Lake Titicaca in South America, floating islands were created by the Uros, the indigenous people of Peru and Bolivia, after their escape from fierce assaults by the ruling tribes (Fig. 1). Since 1960s, the concept of creating habitable conditions for humans at sea was successfully replicated in the offshore oil and gas industry in the form of oil-rigs or naval sea forts [12]. During the same period, Kenzo Tange’s Plan for Tokyo envisaged man-made islands on Tokyo Bay for the first time, followed by Buckminster Fuller’s Triton City. In Europe, Hall Moggridge’s Sea City with sheltered floating marinas was designed for Dogger Bank in the North Sea [13]. Visionaries have never ceased to come up with plans to expand cities on water since.

In recent years floating has gradually gained ground in urban environment as an innovative and climate-adaptive building solution in face of increasing floods or rising sea level. At building level, numerous references could be found around the world. In 2017, the world’s largest floating villa was constructed in Finland (Fig. 2); at district level, the most sustainable floating district in Europe, consisting of 46 floating homes, began construction in the same year in Amsterdam, called



Fig. 1 Floating village in Fujian Province, China (left) and floating islands between Peru and Bolivia (right). *Source* Dailymail and Natgeotraveller, retrieved in May, 2019

¹low-lying land reclaimed from the sea or a river and protected by dikes.



Fig. 2 The world’s largest (privately commissioned) floating villa constructed in Finland (left), and the most sustainable floating district, Schoonschip, in Amsterdam, the Netherlands (right). *Source* ADMARES and Gemeente Amsterdam, retrieved in July 2020



Fig. 3 Blue Revolution of Blue21 (left) and Green Float of Shimizu Corporation (right). *Source* Blue21 and Shimizu Corporation, retrieved in July 2020

“Schoonschip” [Clean ship]; at city level, for the first-time ever, UN-Habitat convened a roundtable discussion at the UN Headquarters in New York in 2019, where architects, engineers, designers, academics and entrepreneurs gathered to discuss how floating cities could be a viable solution to urban challenges such as climate change and lack of affordable housing [14].

There have been several visions illustrating what mega floating cities could look like, in internal waters, in the territorial sea, in the Exclusive Economic Zone (EEZ) or even on the high seas. These include the Blue Revolution from Blue21, Green Float from Shimizu Corporation (Fig. 3) or the Floating city within the Future World Vision of the American Society of Civil Engineers. On the one hand, floating city development has gained unprecedented momentum with many realizing its potential and feasibility; on the other hand, many questions still need to be answered for such an innovative way of urban development, particularly the legal aspects of floating cities.

1.2 Research Background and Questions

Floating cities consist of superstructures and substructures. A superstructure refers to the part of the structure that is constructed above the “ground level” (i.e. the



Fig. 4 Visualizations of large-scale floating city development: 2,000 people (left) and 50,000 people (right). *Source* Waterstudio.Blue & Blue21, 2019

buildings); whereas, a substructure refers to the “foundation” (i.e. floaters), or the part of the structure that is built below the “ground level”. The superstructures and substructures could both be constructed elsewhere, towed to the installation site and be assembled. The substructures would then be connected and moored to the seabed, which would limit the movement of the structure and ensure stability and safety.

While the superstructure of a floating city resembles buildings on land or accommodation units on offshore platforms, it remains unclear what the substructure is. Different names have been used to address this substructure, including (artificial) islands, installations, platforms, structures, perhaps even vessels or ships. However, which of these terms or categories do floating cities belong to? What are the legal consequences? Are these substructures considered movable or immovable properties? What legal consequences do these different labels have? And does it matter, again from a legal point of view, whether they are to be connected to the coast, to be situated in internal waters, the territorial sea, the EEZ, or even in the high seas?

These questions arose in Living@Sea work package within the 3-year EU Horizon2020 funded research project, Space@Sea (2017–2020). Living@Sea aimed to conceptualize a large-scale floating city development for nearshore and offshore community (Fig. 4). During the research, the work package came across critical legal challenges that needed further investigation but were outside of the research scope of Space@Sea, as well as the expertise of the consortium. Thus, external experts with international law and private law backgrounds have been invited to probe further into the legal issues of floating city development.

This study aims to answer the following questions:

- How are floating cities currently defined legally?
- Which laws and regulations are relevant to investigate into for the governance of floating cities at different levels and legal systems?
- What are the legal consequences of the locations of floating cities?
- Why is it important to find the right legal status for floating cities?

In Sect. 2, the governance of floating cities in the territorial sea or EEZ is discussed from the perspective of the international law of the sea. Different labels

are scrutinized for their relevance to floating cities; Section 3 describes the status-quo, legal challenges and solutions to enable large-scale floating development within Dutch internal waters and territorial waters from the property law perspective. In Sect. 4, permit requirements and spatial planning (urban and maritime) from the Dutch context are reviewed and presented. Section 5 summarizes the topics discussed in this paper, and provides some recommendations for future research and policy.

It should be noted that different terms are used throughout this study, including “floating cities”, “floating development”, “floating houses”, “floating structures” or “floating platforms”. None of these terms exists in international law, but they are nonetheless used in this paper, as they are used frequently by most professionals working in this field. “Floating platform” is further discussed in Sect. 3. The approach of the research is qualitative, focusing on literature review and using the Netherlands as a case study. Scientific literature that is peer-reviewed and grey literature from governmental sectors and research institutes are both main sources of references.

2 International Law

This section looks at the relevance of the international law of the sea for the governance of floating cities. The term “floating city” does not exist in the international law of the sea. Depending on the precise characteristics and purpose of a floating city, we need to identify the proper label to attach to it. We can label it an “artificial island”, “installation” or “structure”, “permanent harbor work”, “ship” or “vessel”. Floating cities are often characterized as “platforms”, but the latter do not constitute a separate category in the law of the sea. Platforms may fall into different categories, depending on whether they are fixed to the seabed or floating (more on this below).² From the perspective of international law, this choice of label is not without consequences: the label we attach to the floating city might determine what the legal rights and obligations are, primarily of the coastal State.³

Another crucial question is the location of the floating city: the international law of the sea is zonal, i.e. different rights and obligations govern different maritime zones. In what follows, the focus is on floating cities situated either in the territorial sea or in the Exclusive Economic Zone (EEZ), because it is most likely that they will be placed there. Floating cities on the high seas are beyond the scope of this analysis.

Floating cities may also be situated in the internal waters of the Netherlands. Those are the waters situated “on the landward side of the baseline of the

²In Article 1 of the United Nations Law of the Sea Convention (LOSC), concluded in Montego Bay, on 10 December 1982, entry into force 16 November 1994. The Netherlands signed the LOSC on 10 December 1982 and ratified it on 28 June 1996.

³Note that the international law-based label does not always determine its legal qualification under Dutch property law.

territorial sea”.⁴ Internal waters are subjected to the same sovereignty a coastal State has over its land territory. Internal waters are not regulated by the law of the sea *stricto sensu*—i.e. the regime created under the Law of the Sea Convention (LOSC). They thus fall outside the scope of this section. Internal waters may include both saltwater areas as well as freshwater areas, such as rivers and lakes. The use of transboundary watercourses, including rivers and lakes shared with other states, is regulated by international water law, and is also beyond the scope of this research.

Generally speaking, a coastal State has sovereignty over all maritime features situated inside its territorial sea, including artificial islands, installations, and structures. In that zone, the legal reality is thus quite clear and straightforward. The same can be said of maritime features situated in the internal waters. Over maritime features other than naturally formed islands situated outside its territorial sea, e.g. on its continental shelf or in the EEZ, the coastal State has only sovereign rights. In what follows below, the legal consequences of this distinction are mentioned, where relevant.

2.1 *Finding the Right Label*

What label must we attach to a “floating city”? We can choose between “island”, “artificial island”, “installation” or “structure”, “permanent harbor works”, and “ship” or “vessel”. After a brief introduction of all these labels, an explanation is provided of the reasons why these terms must be distinguished for the purpose of the present research.⁵ Of note is that the LOSC itself does not provide a definition of any of the labels listed. Some are defined in other treaties, but that is of only limited help. After all, unless we find evidence suggesting otherwise, the meaning of a term in one treaty may not correspond with the meaning of the same term in another treaty. For example, Article 2(4) of the International Convention for the Prevention of Pollution from Ships, concluded in London in 1973, defines a “ship” as “a vessel of any type whatsoever operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms”. As we shall see below, defining fixed platforms as ships is problematic, because the LOSC labels such fixed platforms as “installation”, “structures”, or possibly even as “artificial island”. To complicate matters further, some conventions introduce entirely new terms, which are not used at all in the LOSC. For example, in Article 1(3) of the Protocol for the Suppression on Unlawful Acts against the Safety of Fixed Platforms located on the Continental

⁴Article 8 LOSC.

⁵See also Mohammad Ali Zohourian, ‘The Real Nature of Artificial Islands, Installation and Structures from Perspective of Law of the Sea’, in the *Asia-Pacific Journal of Law, Politics and Administration*, Vol. 2, No. 1 (2018), pp. 13–26.

Shelf, signed at Rome in 1988, a “fixed platform” is defined as “an artificial island, installation or structure permanently attached to the seabed for the purpose of exploration or exploitation of resources or for other economic purposes”. The LOSC does not use this term at all. On the other hand, the LOSC does use the terms contained in the just-cited definition of a fixed platform, i.e. artificial island, installation or structure.

2.1.1 Island

Can a floating city be defined as an island? According to Article 121 LOSC, an island is a “naturally formed area of land, surrounded by water, which is above water at high tide”.⁶ Since islands must be naturally formed—and not be man-made—we can quickly conclude that this is not the appropriate label for our floating cities.

2.1.2 Artificial Island

Can a floating city be defined as an artificial island?⁷ An “artificial island” is constructed by human beings; it is not naturally formed. This distinction does not relate to the materials of which the island is made, but to the process of its becoming. In other words, islands consisting of natural materials—such as sand, gravel, and stone—but manufactured by human beings are not naturally formed, and thus belong to the category of “artificial islands”. Artificial islands are areas of land, surrounded by water, above water at both high and low tide (that basically means they are always above water), and made by human beings. A city constructed on a platform cannot be said to constitute an artificial island, primarily because it is not made of land-like materials, and is thus not an “area of land” (see also “installation”, discussed immediately below).

2.1.3 Installation or Structure

Can a floating city be labelled as an installation or a structure? The term “installation”—but not the term “structure”—was already used in Article 5 of the Convention on the Continental Shelf, concluded in Geneva in 1958. Interestingly, at the time of drafting of this Convention, the Dutch delegation noted that the term

⁶See also Myron H. Nordquist, ‘Textual Interpretation of Article 121 in the UN Convention on the Law of the Sea’, in Holger Hestermeyer and Rudiger Wolfrum (editors), *Coexistence, Cooperation and Solidarity: Liber Amicorum Rudiger Wolfrum*, Brill Nijhoff, 2012.

⁷See also Alex Oude Elferink, ‘Artificial Islands, Installations and Structures’, in the *Max Planck Encyclopedia of Public International Law*, September 2013; and Alex Oude Elferink and Alfred Soons, ‘Recht van de Zee’, in Nathalie Horbach, René Lefeber & Olivier Ribbelink (editors), *Handboek Internationaal Recht*, 2007, pp. 748–750.

“installation” was normally used to refer only to “fixed structures”, and floating structures would not be considered “installations”. This is worth noting, because Article 60 LOSC—the central provision on installations and structures situated in the EEZ, more on this below—is very similarly phrased as Article 5 Convention on the Continental Shelf, with the difference that it refers to both installations and structures, without really distinguishing between the two.

There is no definition of the terms “installation” and “structure” in the LOSC. Some definitions have been proposed during the drafting process of the LOSC, and those we find in the *travaux préparatoires*. For example, the United States proposed to define installations as “all offshore facilities, installations, or devices other than those which are mobile in their normal mode of operation at sea”.⁸ The United States, like the Netherlands in the 1950s, clearly wanted to exclude floating platforms from the category of installations. Belgium agreed, and proposed to regard floating installations as ships instead.⁹

Of course, these documents of the *travaux préparatoires* are all very interesting; but one should be careful to draw any conclusions from them. After all, a treaty must be interpreted in good faith, in accordance with the ordinary meaning to be given to the terms of the treaty.¹⁰ In short, remarks made by the Netherlands, Belgium and US delegations at the time the treaty was being drafted, are not decisive in determining the meaning of the terms “installation” and “structure” in the LOSC today.

A distinction between “artificial islands” on the one hand, and “installations” and “structures” on the other, which was proposed by Fred Soons in 1974, is still often quoted in literature. According to Soons, artificial islands are “constructions which have been created by the dumping of natural substances like sand, rocks and gravel” on the seabed; and installations are “constructions resting upon the seafloor by means of piles or tubes driven into the bottom” or “concrete structures”.¹¹ The reference to piles or tubes was not meant to exclude other methods of attaching such constructions to the seafloor. The key message to take from Soons’ distinction, is that installations and structures are not artificial “land areas”, i.e. they do not consist of natural substances dumped on the seafloor. It must be noted, however, that this view is not universally accepted. Soons’ approach focuses on the materials of which the thing is made; and not on the purpose it is meant to serve. What both installations/structures and artificial islands have in common, is that they are not naturally formed—like islands proper—but made by human beings.

⁸United States of America, in the ‘Selected Documents from the Meetings Held from July 20 to August 24, 1973 (Artificial Islands, Land-Locked States, Settlement of Disputes, Territorial Sea, Continental Shelf, Straits, Fisheries, Economic Zones, Archipelagos)’, in *International Legal Materials*, vol. 12 (1973), p. 1236.

⁹Belgian note, published in *idem*, pp. 1210–1213.

¹⁰*Cf.* Articles 31 and 32 Vienna Convention on the Law of Treaties, concluded in Vienna on 23 May 1969, entry into force on 27 January 1980.

¹¹Fred Soons, *Artificial Islands and Installations in International Law*, Law of the Sea Institute, 1974, p. 3.

As said, the LOSC does not establish a special regime for “platforms”, but the term is used in the treaty occasionally. Most importantly, in Article 1 LOSC mention is made repeatedly of “platforms or other man-made structures at sea”, which suggests that platforms are best seen as a sub-category of structures.

The LOSC specifically refers to a number of subcategories of installations, such as “lighthouses”,¹² “port installations”,¹³ and “scientific research installations”¹⁴; and it distinguishes “installations” from “equipment”.¹⁵ This accords with the way in which these terms are generally used: an installation is a place with equipment that is put there for a particular purpose.

All the above considered, we can conclude that the category of installations and structures includes fixed platforms. It might also include floating platforms which have been (temporarily) anchored into the seafloor with mooring lines, although there is some room for different opinions on this (cf. with the definition of a “ship” or “vessel”, discussed below).

Some installations or structures, situated in the EEZ, may have their own harbor, and this might very well be the case for our floating cities.¹⁶ In that case, one may wonder whether such a harbor is legally part of the installation. Paragraph 5 of Article 60 LOSC, which regulates the use of installations and structures in the Exclusive Economic Zone, states that the safety zone of installations shall be “measured from each point of their outer edge”.¹⁷ It could be argued that this outer edge refers to the low-water line along the installation.¹⁸ This would mean that the waters of the port of a floating city, situated on a fixed platform in the EEZ, are part of its safety zone. Consequently, the coastal State would not have full jurisdiction over these waters, but could exercise only the limited rights that the coastal State has in safety zones around the city, where it has been established. These limited rights are enumerated in Article 60 LOSC. However, there are good reasons to believe that the port of a floating city is part of that city, and that the waters of the

¹²See Articles 7 and 47 LOSC.

¹³See Article 129 LOSC.

¹⁴See Articles 249, and 258–262 LOSC.

¹⁵See Article 249(1)(g), and 258–262 LOSC.

¹⁶And some may have their own airport. On this see, Henri Wassenbergh, ‘The Status and Use of an Airport on an Artificial Island’, in *Air & Space Law*, Vol. XXIV, Number 4/5 (1999), pp. 177–180.

¹⁷See also Sebastian tho Pesch, ‘Coastal State Jurisdiction around Installations: Safety Zones in the Law of the Sea’, in *International Journal of Marine and Coastal Law*, vol. 30 (2015), pp. 512–532; Pauline van der Meer Mohr, ‘Measures to Prevent Collisions with Offshore Installations on the Dutch Continental Shelf’, in the *Leiden Journal of International Law*, volume 1 (1988), pp. 222–230. For more info specifically about safety (zones) of offshore oil rigs, see e.g., Stuart Kaye, ‘International Measures to Protect Oil Platforms, Pipelines, and Submarine Cables from Attack’, in the *Tulane Maritime Law Journal*, vol. 31(2007), pp. 377–423; Hossein Esmaeili, ‘The Protection of Offshore Oil Rigs in International Law’, published in two parts in the *Australian Mining and Petroleum Law Journal*, in vol. 18 (1999), pp. 241–252, and vol. 19 (2000), pp. 35–43, respectively.

¹⁸Cf. Article 5 LOSC.

port are thus also part of the city itself, and not part of the city's safety zone. What are these good reasons? Firstly, it can be assumed that the port of a floating city is normally constructed together with the city itself. Secondly, considering that ordinary ports—i.e. ports situated on a State's land territory or on a naturally formed island—are considered an integral part of the coastal State's territory, we can assume, applying analogous reasoning, that ports of a floating city are an integral part of that city. Thirdly, Article 11 LOSC says that permanent harbor works “are regarded as forming part of the coast”.¹⁹ Again, there is no reason to treat the harbor works of a floating city any different.

2.1.4 Permanent Harbor Works

Some platforms in the territorial sea are located very close to the port, which makes it difficult to determine whether they still belong to the port, or whether they are stand-alone installations/structures. Article 11 LOSC suggests that “the outermost permanent harbor works” still “form an integral part of the harbor system”. However, “[o]ff-shore installations and artificial islands shall not be considered as permanent harbor works”. There is no definition of “permanent harbor works” in the LOSC. Already in 1989, the UN Office for Ocean Affairs and the Law of the Sea defined them as “permanent man-made structures built along the coast which form an integral part of the harbor system such as jetties, moles, quays or other port facilities, coastal terminals, wharves, breakwaters, sea walls, etc.”.²⁰ This means that offshore loading and unloading areas, meant to service ships that are too large to enter the port, are not to be considered harbor works, and therefore they must fall within the category of either “artificial islands” or “installations/structures”.

Note that there is no definition of “off-shore”, and thus it can be assumed to simply mean “away from or at a distance from the coast”. There is no reason to suppose that the distance must be considerable, or that it is an implicit reference to a particular maritime zone.

Since floating cities have an entirely different purpose compared with ports, it seems unlikely that they can be qualified as “permanent harbor works”, no matter how closely they are situated to an existing port, and no matter whether they form an integral part of the harbor system or not.

The difference between artificial islands and installations/structures, on the one hand, and permanent harbor works, on the other, is important because the latter, which form an integral part of the harbor system and are regarded as forming part of the coast, can cause a seaward shift of the coastal State's baseline. The same effect can be achieved by artificially enlarging a coastal State's land territory, as was done

¹⁹See also Articles 25(2), 50 and 218–220 LOSC.

²⁰UN Office for Ocean Affairs and the Law of the Sea, *Baselines: An Examination of the Relevant Provisions of the United Nations Convention on the Law of the Sea*, Appendix I (Glossary of Technical Terms), 1989, p. 56.

with the construction of the Maasvlakte in the Netherlands. Some floating cities, situated in a State's territorial sea, may be regarded as such, i.e. as land reclamation, if their connection with the coast is sufficiently dense. The core question, in both cases, is how to distinguish between an artificial island or installation/structure, and an artificial extension of the port or natural coast. Only the latter leads to a shift in the coastal State's low-water line. Off-shore artificial islands, installations and structures are not considered to be part of the coast or a port system and expressly do not have such an effect.²¹ When a floating city is artificially connected to the mainland, for example by means of a bridge, tunnel, or land road (dirt road), then the question arises whether it has thereby become an integral part of that mainland. The LOSC does not provide much guidance here. This lack of clarity is unfortunate, because this may turn out to be a crucial question for floating cities situated close to a State's land territory, and in some way connected with it.

2.1.5 Ships

The most important characteristic of a "ship" or "vessel" is its purpose: it must be used primarily to navigate from one place to another. In other words, it must be designed and intended for transportation on water, and it must actually be used for that purpose. Transportation can be described as the conveyance of things or persons from one place to another.²² Floating oil platforms and similar structures do not have this purpose, and are therefore not considered to be a ship or vessel. This is equally true of our floating cities.

The difference between installations/structures on the one hand, and ships and vessels on the other, is important, because ships do not fall under the regime of Article 60 LOSC, which regulates the use of installations and structures situated in the EEZ. As explained above, objects made by humankind, which move (independently) in the marine environment, and which serve to navigate from one place to another, fall under the freedom of shipping or navigation. However, as soon as such an object is moored, submerged, or anchored for purposes other than what falls within "the normal activities of ships" as provided for in Article 58 LOSC, it no longer falls under Article 58, but under Article 60, and it can be regarded as an installation or structure. This distinction between vessels/ships and installations/structures is thus crucial for floating cities.

²¹ LOSC.

²² Cf. Ryan C. Schmidtke, 'Artificial Islands of the Future: The Seasteading Movement and the International Legal Regimes Governing Seasteads in EEZs and on the High Seas', in the *Asian-Pacific Law & Policy Journal*, vol. 21, no. 1, Fall 2019, p. 1–28, at p. 14.

2.1.6 Floating Cities?

In the above section on “installations” and “structures”, we already noted that installations primarily include constructions resting upon or fixed to the seafloor. This suggests a firm attachment; they are fixed. This raises the question whether a floating city, anchored (temporarily) into the seafloor only with a couple of mooring lines, can qualify as an installation. And if not, whether it is then a ‘vessel’. But from the above section on “ships” or “vessels”, we must conclude that floating cities cannot be categorized as such, because they do not navigate from one place to the other. So, what are they?

It has been suggested in literature that none of the labels listed above can be properly attached to floating cities. In other words, it is argued that they constitute an entirely new category, unregulated in the LOSC. Floating cities consist of a substructure (the foundation, the floater), on top of which one or more superstructures are built, i.e. a single or multiple buildings (see also Sect. 1.2). They could be qualified as “barge”, which is a term not used in the LOSC, and the supposed consequence of this would arguably be that their use is as yet unregulated.²³ Since the LOSC was meant to regulate all uses of the sea, this is a conclusion we should not accept too easily.

Another term one finds in the literature is “floating asset” or “offshore asset”, which refers to structures like a drifting abode, process plant, recreational facility, or luxury yacht.²⁴ Again, this is a term not used in the LOSC. The term “asset” is used frequently in that Convention, but primarily in the economic sense, not as an alternative classification to the ones discussed above—i.e. “island”, “artificial island”, “installation” or “structure”, “permanent harbor works”, and “ship” or “vessel”. The term “floating asset” could thus be used when reference is made to structures at sea in the economic context, but that does not resolve our classification problem.

So, what would be the alternative? It has also been suggested that cities located on floating platforms should be qualified as “vessels” when they are being moved (towed) to their location, and that they become “artificial islands” when moored.²⁵ However, considering the distinction made above between “artificial islands” and “installations/structures”, it appears that floating cities, when moored, are best

²³See e.g., Ryan C. Schmidtknecht, ‘Artificial Islands of the Future: The Seasteading Movement and the International Legal Regimes Governing Seasteading in EEZs and on the High Seas’, in the *Asian-Pacific Law & Policy Journal*, vol. 21, no. 1, Fall 2019, p. 1–28, at pp. 14–15.

²⁴See e.g., ‘Floating asset; Ambrosia III offers a life of luxury on the ocean for Euro 40 million’, in the *South China Morning Post*, November 27, 2007.

²⁵See e.g., Ryan H. Fateh, ‘Is Seasteading the High Seas a Legal Possibility: Filling the Gaps in International Sovereignty Law and the Law of Seas’, in the *Vanderbilt Journal of Transnational Law*, vol. 46, no. 3, May 2013, pp. 899–932, at p. 909; Max K. Morris and John W. Kindt, ‘The Law of the Sea: Domestic and International Considerations Arising from the Classification of Floating Nuclear Power Plants and Their Breakwaters as Artificial Islands’, in the *Virginia Journal of International Law*, vol. 19, no. 2, Winter 1979, pp. 299–320.

qualified as “installations” or “structures”.²⁶ After all, they are not made with natural and local materials such as rocks, sand, and soil. If floating cities, when moored, become non-movable constructions mounted on piers resting on the seabed, then they are probably best labelled as “installations”.²⁷ The term ‘non-movable’ does not mean that the installation has to remain completely static. If the mooring lines allow the floating city a very limited degree of motion, for example to move with the changing tides, as a means to ensure the safety and comfort of the people living in the floating city, this is not considered movement. It also does not mean to suggest that the city loses its capacity to move; it only means that it is attached to the seafloor in such a way that it is, until it has been detached again, non-movable.

3 Property Law Aspects of Floating Development Within Dutch Territorial Waters

The previous section discussed which label should be attached to a floating city located in the different maritime zones of the Netherlands, based on the international law of the sea and presented the legal consequences of that according to international law. This section provides an overview of the legal issues that would arise if a floating city were to be located within Dutch territorial or internal waters.

Why using the Netherlands as a case study? The Netherlands and water are inextricably linked: almost one third of the country lies below sea level and the mills, polders and dikes are part of the national heritage. Large parts of the Netherlands were created by land reclamation: a large part of present-day Amsterdam used to be water, the Beemster (an area above Amsterdam) was reclaimed around 1600 to serve as agricultural land for fast-growing Amsterdam and at the beginning of the nineteenth century a whole new province, Flevoland, was created by reclaiming the Zuiderzee (now: IJsselmeer). Maasvlakte mentioned in the previous section is another example. And if you look at Schiphol Airport now, you can hardly imagine that this was once the largest lake in the Netherlands: the Haarlemmermeer.

²⁶So-called “Seasteads”, *i.e.* permanent dwellings at sea, have been defined as installations; but those are located on fixed platforms. See *e.g.*, Megan Binder, ‘Taking to the Sea: The Modern Seasteading Movement in the Context of Other Historical Intentional Communities’, in the *Indiana Journal of Global Legal Studies*, Vol. 23, No. 2 (Summer 2016), pp. 765–794, at p. 790. On seasteads more generally, see *e.g.* Surabhi Ranganathan, ‘Seasteads, land-grabs and international law’, in the *Leiden Journal of International Law*, vol 32 (2019), pp. 205–214.

²⁷Not everybody agrees with this distinction. See *e.g.*, James Grimmelman, ‘Sealand, Havenco, and the Rule of Law’, in the *University of Illinois Law Review*, vol. 2012, no. 2, 2012, p. 405–484. Somewhat confusingly, he refers to Sealand, situated on a gigantic platform, built during World War II for anti-aircraft defense purposes, resting on the seabed of the North Sea with the help of a pair of concrete legs, as artificial island.

Large parts of the Netherlands were therefore created by land reclamation. The image as water pioneers is also reflected in the fact that the Netherlands (together with Belgium) has the largest dredging fleet in the world and that they participated in large land reclamation projects, such as The Palm in Dubai. For this reason, it is perhaps not surprising that the Netherlands is also one of the frontrunners in the field of floating urbanization; presumably the land reclamation of the twenty-first century. One of the global leading companies on floating urban projects is based in the Netherlands: Blue21.²⁸ In recent years, they have conducted research into all kinds of different facets of floating urbanization: not only into the question of whether it is technically possible to build floating platforms on which several buildings—or even high-rise buildings²⁹—, but also, for example, into the influence of large floating platforms on water quality.³⁰ Although the issues mentioned above are all vital, they will not be further discussed in this analysis as we will focus on legal issues surrounding floating construction.

The central question in the section is: “Is it possible under current Dutch property law to legally design floating platforms holding several buildings?” It is evident that floating development would be hampered if the answer to this question would be negative.

To answer this main question, we will discuss: 1) whether a floating platform is movable or immovable property under Dutch law and why this qualification is relevant for the legal design of floating development. In Sect. 3.3 we will discuss whether it is possible to use existing limited real rights to legally design a floating platform: is it possible to divide ownership of different buildings on one floating platform? Can a floating platform be burdened by existing limited real rights? At the end of this section, an overview of the current legal challenges concerning floating development is presented and this section will be concluded with a recommendation.

3.1 The Location of Floating Platforms

As mentioned above, the analysis in this section assumes that the floating platforms are located within territorial or internal waters. The North Sea is legally divided into several maritime zones, each of which has its own legal regime.

On the basis of LOSC, the Dutch state has various sovereign rights and jurisdiction with respect to the EEZ. However, these rights are not so far-reaching that the seabed of the EEZ is property of the Dutch state. The Dutch Civil Code

²⁸www.blue21.nl

²⁹K.K.M. Ko, Realising a floating city, A feasibility study of the construction of a floating city, knowledge base Blue21.

³⁰Research shows that floating houses can have a positive impact on ecosystems: Boogaard, F.C.; de Graaf, R.E.; Foka, E.; Rutten, M.; de Lima, R.L.P.; Giessen, N. The effect of floating houses on water quality. In Proceedings of the Amsterdam International Water Week, Amsterdam, The Netherlands, 2–6 November 2015; p. 7.

(DCC) provides that the seabed in the EEZ is not an object of property. As a result, rules concerning accession and the distinction between movable and immovable property for example do not apply fully.³¹

Because the focus of this section is on Dutch property law, it is assumed that the floating platform is located in inland waters, such as lakes, canals or rivers, or at sea, as long as it is in territorial waters (i.e. up to 12 nautical miles from the coast).³²

Although the ultimate goal of floating developments is the creation of floating cities, it is expected that such a development goes in stages: first a few houses on one platform, then a block of houses, then a somewhat larger platform with perhaps an entire floating district, with the aim of creating entire floating cities. Because the size of the platforms will (probably) change over the years, the following will not always refer to floating cities, but to “floating development”.

As we will see below, the size of the platform is irrelevant to the legal qualification under current Dutch property law. Therefore, all that is discussed below with regard to the legal status of floating platforms applies equally to a small platform with only a single dwelling, as it does to platforms holding an entire neighborhood or city.

3.2 *Floating Houses: Movable or Immovable Property*

Living on water is not unknown in the Netherlands: the houseboats in Amsterdam’s canals are an integral part of the streetscape. Characteristic of floating houses in the Netherlands is that it is actually always a single dwelling and not, for example, a floating semi-detached house, floating terraced houses or a floating apartment complex. The reason for this has to do with the Dutch Supreme Court qualifying floating houses as movable property, a judgment that has (perhaps unexpectedly) major implications for the legal design of floating development, which will be explained in more detail below. But first the case that led to this judgment will be discussed.

In 2010, the Dutch Supreme Court was asked to rule on whether a houseboat is movable or immovable property. It concerned a houseboat located in a canal in the city of Almere. The houseboat consisted of a concrete foundation with a wooden structure. The houseboat was attached to a bollard by means of two metal brackets, which were anchored in the ground. It was located in a residential area, between two bridges, which were so low that the houseboat could not pass underneath. The houseboat also had no engine or other propulsion equipment.

³¹For a detailed discussion see: A.R.P.M. Davits & M.M.G.B. van Drunen, ‘Goederenrechtelijke aspecten van offshore windparken’, WPNR 2017/7135, F.J. Vonck & R. Bos, ‘Eigendom van offshore windparken’, WPNR 2018/7212, L.W.J. Hoppenbrouwers en K.A. de Groot, ‘Reactie op “Eigendom van offshore windparken” van mr. F.J. Vonck en R. Bos LL.B. in WPNR 2018/7212’, WPNR 2019/7224 en R.A.B. Cobussen, ‘Waardepapieren en windparken’, WPNR 2019/7223.

³²Article 2 LOSC.

It was assumed³³ that the Supreme Court would qualify houseboats as immovable property based on the Portacabin Decision of 1997.³⁴ In the Portacabin decision the Dutch Supreme Court ruled that a building or construction is immovable for the purposes of Article 3:3 DCC if according to its character and construction the object is destined to remain permanently in situ. Whether it is technically feasible for the building or construction to be moved is of no importance in answering the question of whether it is permanently attached to the land in the view of the Court. There was no doubt that the houseboat at issue was destined to remain permanently in situ. However, the Dutch Supreme Court ruled that floating structures fall under the statutory definition of a ship within the meaning of Article 8:1 DCC and for that reason is qualified as movable property. Article 8:1 DCC provides the definition of a ship: “In this Code ‘vessels’ are all things, other than aircraft, which, according to their construction, are destined to float and which float or have done so.”³⁵ The wording of Article 8:1 DCC is so broad that it actually includes every floating object, including the abovementioned floating villas, which at the first glance have little in common with a ship, apart from the fact that it floats.³⁶

As abovementioned, until the Supreme Court ruled its judgment in the Woonark Decision, there was discussion on the question of whether floating homes should be classified as movable or immovable property. In 2002, the Dutch Supreme Court had ruled another judgment on the question whether floating jetties located in a marina in The Hague should be regarded as movable or immovable property. This concerned various connected jetties on concrete floats, which were connected by braces to mooring posts anchored in the ground, or quay. At that time, the Dutch Supreme Court ruled that the floating jetties should be regarded as immovable property. Based on this, it is therefore not surprising that around the time that IJburg arose in the Amsterdam IJmeer lake, the “Tijdschrift Bouwrecht” (the Journal on Construction Law) stated that “it is plausible that these houses will be qualified as immovable property by the court”.³⁷

The Woonark Decision put an end to this legal uncertainty, however. All case law that has appeared since then has confirmed that everything that falls under the definition of a ship (on the purpose of Article 8:1 DCC) is regarded as movable property.³⁸

³³See e.g. A.R.G. van Dijk-Barkmeijer e.a., ‘Waterwoningen in IJburg: tussen wal en schip? Enkele privaatrechtelijke, fiscale en ruimtelijk bestuursrechtelijke aspecten van wonen op het water’, BR 2007, afl. 2, p. 111.

³⁴Dutch Supreme Court 31 October 1997, ECLI:NL:HR:1997:ZC2478 ‘Portacabin Decision’.

³⁵Translation derived from: Warendorf e.a., Warendorf Legislation/ Article 1 CC Bk 8.

³⁶See Sect. 2.1.5, where the meaning of a ship, or vessel, is discussed under LOSC.

³⁷A.R.G. van Dijk-Barkmeijer e.a., ‘Waterwoningen in IJburg: tussen wal en schip? Enkele privaatrechtelijke, fiscale en ruimtelijk bestuursrechtelijke aspecten van wonen op het water’, BR 2007, afl. 2, p. 111.

³⁸The Dutch Supreme Court confirmed its judgment once more on March 9, 2012, ECLI:NL:HR:2012:BV8198 ‘Marina Decision’.

3.3 *The Impact of the Woonark Decision on Floating Development*

The Woonark Decision, qualifying a houseboat as movable property, is an important complicating factor for floating development on a larger scale (more than one floating house per platform). Article 5:3 DCC lays down the principle of unity; one of the basic principles of Dutch property law.³⁹ On the basis of this principle, it is not possible to be the owner of a component part of a movable property. Exceptions to the rule that the owner of an item is also the owner of its component parts are provided for in our Civil Code are only for immovable property. Under Dutch law, any floating building is considered to be movable property.⁴⁰ As a result, if one intends to build several dwellings on one floating platform, this will be regarded as one (large) piece of movable property. Ownership of this cannot be divided. For this reason, it is not possible to transfer one of the dwellings to a third party. Nor is it possible to establish a right of mortgage or a right of pledge on one of dwellings on behalf of a bank or other financier. Only the entire platform can be encumbered with a right of pledge or mortgage. As a result, a floating platform with several houses on it is not or hardly financed. It goes without saying that this seriously hampers the floating development.

The qualification in movable or immovable property is not only important for the possibility of encumbering it with a security right; the qualification as movable excludes the application of other limited real rights. For example, a floating home cannot be encumbered with a right of superficies (in order to divide ownership vertically), it cannot be encumbered with a leasehold and on movable property a right of easement (e.g., a right of way) cannot be established. Finally, it is assumed that movable property cannot be divided into apartment rights.⁴¹

This means-in short-that all legal instruments that a real estate lawyer normally uses to design a real estate project do not apply to floating urbanization. In our opinion, this is a highly undesirable consequence.

³⁹It states: "To the extent that the law does not provide otherwise, the owner of a thing is owner of all its component parts." Translation derived from: Warendorf e.a., Warendorf Legislation/ Article 3 CC Bk 5.

⁴⁰Article 8:1 DCC provides that ships this Code 'vessels' are all things, other than aircraft, which, according to their construction, are destined to float and which float or have done so. The Supreme Court ruled that all things that fall under this definition are movable property. When a ship has floated once and is then moored it legally stays a ship and thus movable.

⁴¹In this contribution I have argued that according to current law it is possible to divide a houseboat into apartment rights: P.J. van der Plank, 'Rechtsvragenrubriek: Kan een drijvende woning in appartementen worden gesplitst?', *Weekblad voor Privaatrecht en Notarieel Recht*, 2017/7150.

3.4 A Necessary Legislative Amendment

As discussed above, current Dutch law qualifying all floating objects movable property is a major obstacle to the development of floating construction on a large(r) scale. The question is how this could be solved? One of the possible solutions is currently being worked on: a legislative amendment, which allows for floating platforms to be entered in the land registry, by which it then qualifies as immovable property. This would solve some of the problems described above: the floating platform could be encumbered with both a mortgage right and the other limited real rights mentioned. Furthermore, it allows floating platforms to be divided into apartment rights. The necessary legislative amendment is in the making and will hopefully come into force in the coming years.

However, this legislative amendment does not solve all problems: floating platforms with, for example, five houses on it will become immovable property but will not be treated in the same way as land. Land can be parcelled out, land can form public space and land is used as a starting point for almost all land registration systems. Preferably floating platforms referred to in this study would one day be put on an equal legal footing with land. For example, by adding the platforms as land to the land registration. In that case a floating platform would form “land”, and all references in the Dutch Civil Code to “land” would also apply on floating structures. In order to achieve this, however, the entire method of land registration will have to be redefined. After all, not all floating constructions need to be legally equated to land; the current legal system is working fine with regard to single houseboats. The legal challenges are particularly acute once we develop floating buildings on a larger scale (e.g., one platform containing several buildings).

When equating floating platforms to land, several questions arise: what criteria must be met in order to be considered as a floating plot? Can one actually have land (i.e. the floating building plot) on top of other land (i.e. the water plot)? Does the floating plot have to remain in place, what if it is moved? All highly relevant questions that require more research.

4 Permit Requirements and Spatial Planning of Floating Development in the Netherlands

In addition to the legal status of floating cities as seen from the perspective of international law and private law, it is also important to know how floating development fits within current policies, laws and regulations in the Netherlands, particularly regarding building requirements and spatial planning. In this section, permit requirements for floating structures have been described, followed by the status-quo of land use zoning plans and maritime spatial planning regarding floating development. The term “floating structure” is used here as it is commonly used in several governmental documents in the Netherlands. This section aims to provide

an overview of relevant regulations and the process of how some strategies and plans came to being.

To introduce floating development, it is compulsory to apply for permits for the floating structures and to make sure that such type of development fits into the local spatial planning. Land use zoning plans and maritime spatial planning are both made in order to promote the efficient, safe and sustainable use of water or land areas. Zoning plans are powerful spatial planning tools that include detailed rules on how a certain plot of land can be used, what type of buildings can be established and where; whereas, maritime spatial planning is a means of fostering sustainable use of the seas while simultaneously allowing for private sector initiatives. They are both relevant, depending on the location of the floating development. Sections 4.1 and 4.2 discuss permit requirements and zoning plan for floating development in internal waters; whereas, Sect. 4.3 explains permit requirements and maritime spatial planning for floating development in the territorial sea and Dutch EEZ.

4.1 Permit Requirements

According to the Informatieblad Drijvende Bouwwerken [Information sheet of floating structure], an environmental permit is required for building a floating structure or placing it at a specific location in the Netherlands, with the intention to use (or let it be used) for a long time. This permit is granted by the municipality under the condition that the floating structure fits into the zoning plan and meets the following regulations: the building regulations in Woningwet [Housing Act], de Wabo [General Provisions on Environmental Law], het Bouwbesluit 2012 [Building Decree 2012], de gemeentelijke bouwverordening [the Municipal Building Act], het gemeentelijk bestemmingsplan [the Municipal Zoning Plan] and de gemeentelijke welstandsnota [the Municipal External Appearance of Buildings Policy] [15].

In general, municipalities will include spatial rules for floating structures (if necessary) in their zoning plans and management regulations. The same environmental permit may be re-used if the floating structures have to be moved temporarily due to essential maintenance or dredging work on the waterway but returned to the original place. However, if a floating structure is permanently placed elsewhere in the water, an environmental permit for building is required again. Depending on the requirements set by the municipality, the province or the water board, a new berth permit may also be required for placing the floating structure at the new location, for example with a view to the efficient use of berth capacity, public order and smooth and safe passage. This is separate from the environmental permit for building a structure. This is apparent, for example, from the judgments of the Administrative Jurisdiction Division of the Council of State.

While there are still some uncertainties and the process of permit application for floating structures might not always seem clear, the Netherlands has endeavored to integrate many legislation and regulations on construction, the environment, water,

spatial planning and nature, into one Environmental Act which bundles and modernizes the laws for the living environment [16]. This is believed to be the largest legislative change since 1848 and will enter into force from 1 January, 2022 [17]. By then, an Environmental Desk will also be accessible for contractors, entrepreneurs, governments and local residents to inquire about what is allowed in the living environment and to apply for a permit. It is speculated that such integration could reduce bureaucracy and facilitate the process of permit application for floating structures as well.

In terms of building regulations that floating structures need to comply with, the Dutch government has created several documents over the years to provide supplementary information needed regarding particularly the safety of floating structures (see Deliverable 7.2 of Space@Sea) [18]. In 2017, Wet verduidelijking voorschriften woonboten [Act on the Clarification of Regulations for Houseboats] was even created with the purpose of amending the Housing Act and General Provisions on Environmental Law in order to make it clear on which rules apply to floating structures [15].

With regard to the technical requirements for a floating structure that will be built after the entry into force of the Act, it will have to comply with the requirements set out in the Building Decree 2012. A floating structure that meets these technical requirements may be moved to another location without having to be renovated. The building may be placed elsewhere in the existing technical state, if the requirements are met in areas such as prosperity and spatial planning. For more detailed overview on the development of building regulations of floating structures in the Netherlands, an overview can be found in the report that is publicly accessible from Living@Sea within Space@Sea, Deliverable 7.2 A catalogue of technical requirements and best practices for the design [18], and will not be discussed in this section.

4.2 Land-Use Zoning Plans for Urban Development

The competences for spatial planning lie on a national-, sub-national or local level of a coastal State. The EU itself has no general competence assigned within this field [19]. Spatial planning decisions are made at the national, regional, and local levels in the Netherlands. The national government, provinces and municipalities make a structural vision together, describing the spatial developments they expect for infrastructure and space, as well as how these developments will be directed or implemented. The municipalities for instance, further develop the vision into regional land-use zoning plans (Fig. 5). Such plans set down where construction may take place, what may be built, the size of the structure and what it may be used for. The fixed components of a land-use plan include the rules and regulations for the area concerned and an illustration (planning map) that indicates and explains the various zones. When the interests of both national and provincial governments are at stake, they could come up with an integration plan.



Fig. 5 The process of spatial planning for urban development come to being in the Netherlands

Land-use zoning plans allow for desired changes. In the face of increasing interests in floating development, the Municipality of Amsterdam, for instance, drafted a Bestemmingsplan Drijvende Bouwwerken [Zoning Plan Floating Structures], indicating a technical legal amendment to the Houseboat Clarification Regulations, which came into effect on 1 January, 2018 [20]. In the document, the Municipality of Amsterdam has assigned 59 prevailing zoning areas for building on water within the city of Amsterdam. In 2019, the Municipality of Amsterdam announced Vaststelling paraplubestemmingsplan Drijvende Bouwwerken [The Adoption of the Umbrella Zoning Plan Floating Structures], expressing that an umbrella zoning plan with an updated framework has been introduced to assess applications for environmental permits for the building activities with regard to floating structures. This was necessary in order to optimize the evaluation process [21]. It can be observed that there have been ongoing efforts from the local government to take into account development on water in its zoning plans.

4.3 Maritime Spatial Planning

When floating development will be situated in the territorial sea and the Dutch EEZ, it then becomes necessary to refer to maritime spatial planning. The competition for the use of maritime space has been ever-increasing and require nations to manage their waters more coherently. In 2014, the EU Directive 2014/89/EU on Maritime Spatial Planning was given to the coastal Member States of the European Union by the European Parliament and Council of the European Union. According to Lisbon Treaty Article 288, a directive shall be binding, as to the result to be achieved, upon each Member State to which it is addressed, but shall leave to the national authorities the choice of form and methods [22].

In response to the directive, the Netherlands updated the National Water Plan in 2015. The National Water Plan was firstly introduced in 2010 as a strategic framework based on the Dutch Spatial Planning Act, the Marine Strategy Framework Directive and the Water Framework Directive. It replaced certain policy sections of the National Spatial Strategy and included the spatial plan for the North Sea. In 2014, North Sea 2050 Spatial Agenda had been published [23]. In 2015, the Netherlands created the Policy Document on the North Sea 2016—2021, summarizing the long-term vision (2050) of the Netherlands and incorporated a maritime spatial plan [24]. In 2020, Het Akkoord voor de Noordzee [the North Sea Agreement] has also been drafted, indicating agreements between central government and stakeholders until 2030 with a view to the development of wind energy in the long term [25]. In short, the process of the development can be seen in Fig. 6.

One may be curious about the types of floating development have been included in these documents, and whether floating for living purpose was one of them. In the North Sea 2050 Spatial Agenda, floating constructions at sea for harvesting tidal and wave energy were included in the wind energy areas as a long-term energy solution since it is believed that combining energy generation technologies will offer financial, logistical and spatial opportunities. What is also interesting to note is that a group of primary school students were asked by the Ministry of Infrastructure and Water Management to think about the future of the North Sea. One of the ideas that the students came up with was to introduce “floating hotels” to the North Sea, showing that our next generation seemed to consider living on water a possible activity in the North Sea in the future.

Maritime Spatial Planning for Activities on Water

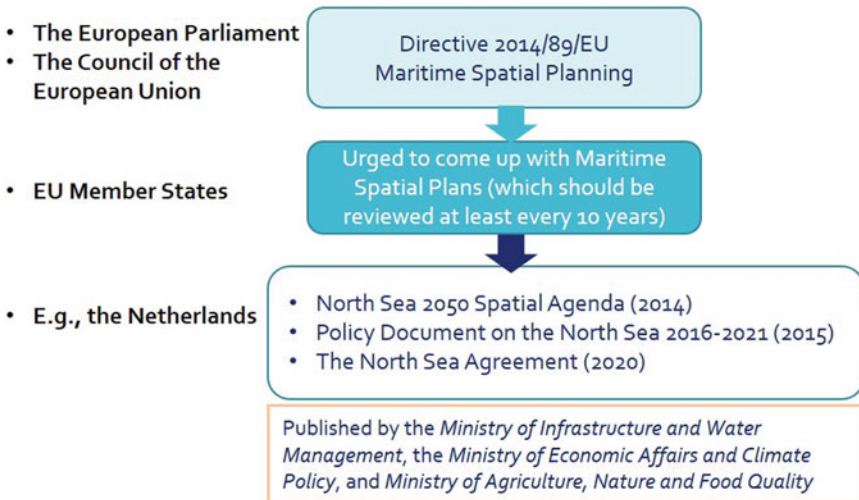


Fig. 6 Maritime spatial planning for activities on water, giving the example of the Netherlands

In the Policy Document on the North Sea 2016–2021, amongst all the policy choices laid down and detailed, various interests for marine activities were addressed, including shipping, defense, fishing, aquaculture and mariculture, underwater cultural heritage, tourism and recreation, etc. In terms of floating, only “floating trans-shipment” was included as a potential use in the shipping sector. Nothing related to living on floating platforms was ever mentioned.

It has been indicated that industrial freedom and market forces prevailed during discussions on marine spatial planning in the Netherlands for years [26]. With the new knowledge gained and in response to the urgent needs to create more space in a more sustainable manner, it might be high time that floating cities development be taken into account in the next round of revision of Maritime Spatial Plan. In the Policy Document, an assessment framework for activities in the North Sea has also been developed and outlined for central government to use for ascertaining whether activities at sea are permitted. The assessment framework is a policy regulation and obliges the competent authority to act in accordance with this framework when issuing permits [24]. It would be highly possible that floating cities would be evaluated under this framework if proposed to be included in the North Sea.

There are different approaches to address the needs of large-scale sustainable floating city development. For the European Union, according to Lisbon Treaty Article 188, to exercise the Union’s competences, the institutions shall adopt regulations, directives, decisions, recommendations and opinions to the Member States. For floating city development to be brought into the regional agenda of spatial planning, different interests groups must work together, express their interests and demonstrate the needs and urgency to regard floating city development as a serious option for future urbanization and as a better alternative to land reclamation. Such interests should be conveyed to the Council of the European Union and the European Parliament, who would then evaluate and make decisions upon. Depending on the sense of urgency and level of interests, in case the EU finds it necessary, it might address floating city development to its Member States in a certain format (e.g., regulation, directive, decision, recommendation or opinion) and have “living” or “urbanization” activities considered in maritime waters. It should, however, be noted that while promoting floating development is needed at all levels, not at least from international organizations like the EU, first and foremost attention should be paid to defining and circumscribing the concept/term of floating cities more clearly as discussed in Sect. 2.

5 Conclusions and Recommendations

Floating urban development is gaining ever-increasing recognition particularly for its climate adaptivity, flexibility (movability), feasibility and environmentally friendliness. Floating development at a building scale or neighborhood/community scale for residential purpose has been experimented all over the world. However, it has yet to be realized at a city scale, which has to do with several legal challenges.

While most countries still attempt to find out how to deal with regulations of floating structures, the Netherlands has become one of the frontrunners in floating urbanization. The country continues to clarify rules and regulations of floating structures over the years, making it an interesting country for a case study regarding the legal framework for floating city development. This study endeavored to investigate into different scales and levels of legislation and branches of law and identifies the knowledge gaps that still need to be filled, in order to facilitate the making of large(r)-scale sustainable floating cities.

5.1 A New Category to Be Defined in International Law?

The LOSC was analyzed, to gain an understanding of the governance of floating cities from the perspective of the international law of the sea. Different labels have been tentatively applied to floating cities situated in different maritime zones, such as internal waters, the territorial sea or the EEZ,⁴² where floating cities are most likely to be situated when expanding from existing coastal cities. These labels included artificial island, installation or structure, permanent harbor works, ship or vessel. It has been concluded that currently none of the abovementioned labels can be comfortably attached to floating cities, although installation or structure come close.

There is the possibility that floating cities may have different status when in different state. For instance, they can be qualified as vessels when being moved (towed), and qualified as installations when being fixed (moored) to the seabed. Floating cities can also be regarded as barge as they float; however, such term is not used in the LOSC, and thus this would mean that they are as yet unregulated.

Another highly relevant question that still needs to be answered in future research is when floating cities will be situated close to the coastline and artificially connected to land territory in various ways (e.g., by bridge, tunnel, or road), will they become an integral part of the mainland and artificially enlarge a coastal State's land territory? The answer can unfortunately not be found in the LOSC. More research is necessary to shed light on such complicated issues and the possibilities of experimenting innovative governance.

5.2 Floating Platforms: Revolutionize the Perception of "Land"

The legal status of floating platforms under Dutch law has also been investigated, with a focus on whether a floating platform is qualified to be a movable or

⁴²Floating cities situated on high seas are out of the scope of this analysis.

immovable property. The consequences of such status has to do with the possibility of ownership division, security rights and existing limited real rights. When the Woonark Decision came to being, all floating objects were determined to fall under the definition of a ship (on the purpose of Article 8:1 DCC) and would be qualified as movable property. This turned out to be a serious obstacle for larger floating development (more than one house per floating platform), making it impossible to divide ownership between floating platforms and buildings on top, or divide apartment rights, let alone applying for mortgage from a bank/financier.

A starting point to solve the abovementioned problems is a legislative amendment, which would allow floating platforms to be entered in the land registry and thus be qualified as immovable property. Nevertheless, only when floating platforms can be perceived as “land” (as parcels in the public registry), can floating development take a giant leap forward in urbanization on water.

For this to happen, it would require the Dutch land registration to be changed entirely. As there will be land (i.e., platform) above land (i.e., seabed), a way to survey water areas and to be able to register these platforms will have to be set up, e.g., register “water parcels” or introduce 3D land registry. How the cadastral registration will be transformed when floating platforms become equal to land still needs to be studied and tested in real life. Additionally, rules on the kind of people that can build or introduce floating platforms, or consequences after the service life of the floating platforms still all need to be investigated further.

5.3 Floating Cities on Global Urban Development Agendas

Like many other urban development projects, applying for a permit and fitting into the spatial plan are the very first steps of introducing floating development. For floating cities that will be situated in internal waters in the Netherlands, an environmental permit is required and under the condition that the floating structure meets the designated building regulations and policies. These developments generally need to fit into the land-use zoning plan of the municipality, which are developed based on the structural vision on infrastructure and space by the national government, the provinces and the municipalities. Evidence has shown that floating developments have been increasingly taken into account in zoning plans such as by the Municipality of Amsterdam.

Whereas when floating cities will be situated in territorial sea or EEZ, central government would need to evaluate the proposed activities using the assessment framework provided in the Policy Document on the North Sea 2016–2021, and give permits accordingly. Although different types of floating development have been taken into account in the Policy Document, North Sea 2050 Spatial Agenda and The North Sea Agreement, focusing on the energy and/or shipping sector, floating urbanization for living and working purposes is relatively new and has not yet been taken into account in the maritime spatial planning.

Findings from this study suggest that stakeholders join forces and demonstrate the needs and urgency of regarding floating city development as a serious and better alternative for expanding existing coastal cities in comparison to conventional land reclamation. Such climate adaptive spatial strategy contributes to solving 21 century challenges such as land scarcity, climate change, urbanization and overpopulation. As more floating city prototypes are being tested for the time being, it is paramount to put floating city development onto global urban development agendas and pour efforts into researching and developing a more robust legal framework that could provide guidance and facilitate sustainable floating city development.

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