Energy Logistics of the North Sea

A crowded industrial void

Couling, Nancy; Hein, Carola

Publication date
2019

Document Version
Final published version

Published in
Lo Squaderno- Explorations in Space and Society

Citation (APA)
Couling, N., & Hein, C. (2019). Energy Logistics of the North Sea: A crowded industrial void. *Lo Squaderno-Explorations in Space and Society*, (51), 21-25.

Energy Logistics of the North Sea

A crowded industrial void

Nancy Couling
Carola Hein

Introduction[1]

Since the mid-twentieth century, a territorial configuration shaped by energy logistics has been steadily emerging in the North Sea. The structures of this system are both invisible – linear, frictionless, automated or buried, and cut off from public access; and omnipresent – vast, ubiquitous, and controlling increasing areas of both land and sea. The result is a crowded industrial void characterised by the paradox of continuous circulation and the emptyness of its spaces. As the spatial supremacy of energy logistics increases, the sea's cultural value and social status is being evacuated in the process. Public access to sea space is restricted by the risk of entanglement in industrialised zones and the successive elimination of slow-moving passenger ferries. Alan Sekula has poignantly documented the "disappearance of the sea" through container shipping in his photography and film essays.[2] Seafarers now lead a marginalised existence and contemporary maritime workers in other sectors stem from steel, not from sea.

Spaces of ocean-borne energy logistics and their landside extensions around the North Sea have developed into specialised, impermeable structures of energy extraction, transportation, transformation and storage. Despite the irregular dispersal of artefacts, the combination of both fixed and mobile infrastructure weaving through the North Sea has tied single sites together into a viscous territory of logistics – both solid and liquid and therefore hard to decipher. We argue that it is precisely the traits of invisibility, seclusion, operationalization and intersecting cycles of movement in time, that identify the North Sea as a site of unfolding processes of extended urbanisation (as identified by Nancy Couling[3]), and the most expansive layer of the global petroleumscape (as defined by Carola Hein[4]).

Emergence of a liquid logistical territory

Historically, highly skilled North Sea navigators knew the seasons and the North Sea tides and currents; their logistical space was a kinetic, topographical zone filled with human activity and the nar-

1 The project "Oceanurb- the unseen spaces of extended urbanisation in the North Sea" has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 753682.".

2 Ilan Sekula and Noël Burch, The Forgotten Space- *a Film Essay Seeking to Understand the Contemporary Maritime World in Relation to the Symbolic Legacy of the Sea*, 2010, http://www.theforgottenspace.net/static/notes.html.

3 Nancy Couling, 'Formats of Extended Urbanisation in Ocean Space', in *Emerging Urban Spaces- a Planetary Perspective*, ed. Philipp Horn, Paola Alfaro d'Alençon, and Ana Claudia Duarte Carduso, The Urban Book Series (Springer International Publishing, 2018), XII, 219.

4 Carola Hein, 'Between Oil & Water: The Logistical Petroleumscape', in *The Petropolis of Tomorrow* (New York: Actar Publishers and Architecture at Rice, 2013), 228–37.

Nancy Couling is a Marie Curie Research Fellow at the History of Architecture and Urban Planning Chair at Delft University of Technology, with the research project *Oceanurb- the unseen spaces of extended urbanization in the North Sea.* She gained her doctorate at EPFL, Switzerland in 2015 and co-editing the prize-winning Barents Lessons- Teaching and Research in Architecture with Prof. H. Gugger, A. Blanchard & graphic art by Typography Cabinet Basel. In spring 2019 she will take up an Associate Professorship at Bergen Architecture School (NO).

nancycouling@hotmail.com

Carola Hein is Professor and Head, History of Architecture and Urban Planning Chair at Delft University of Technology. Among other major grants, she received a Guggenheim Fellowship to pursue research on The Global Architecture of Oil, an Alexander von Humboldt fellowship to investigate large-scale urban transformation in Hamburg in an international context between 1842 and 2008 and a Volkswagen Foundation grant for a mixed method digital humanities project ArchMediaL. Her current research interests focus specifically on port cities and the global architecture of oil. She has curated *Oildam: Rotterdam in the oil era 1862-2016* at Museum Rotterdam.

c.m.hein@tudelft.nl

ratives of first-hand experience. Frequent exchange across the sea meant coasts had more in common with their opposite shores than with their hinterlands. Traditionally a trading ground for the exchange of furs, grain, timber, and luxury goods, today the North Sea is characterised by the generation and exchange of energy – an indispensable, shapeshifting, and often invisible commodity.

Since the first major offshore oil discovery in 1969 at the Ekofisk field, North Sea oil and gas production has made a vital contribution to global energy supplies, occupying second place in combined offshore oil/gas quantities in 2006 after the Persian Gulf[5] and the location of the most offshore rigs world-wide (184 in 2018).[6] Yet despite this production, the EU as a whole is marked by a significant energy gap between supply and demand and is still 80 percent dependent on oil imports.[7] Energy logistics therefore not only laces through and around the North Sea extraction sites, but also carries out the functions of transport, storage, and relocation of oil and gas from external sources. In Europe's top port of Rotterdam, crude oil, mineral oil products and liquified natural gas accounted for 40 percent of port throughput by weight in 2017[8], therefore more tons of liquid bulk goods travel through North Sea ports than containers.

The North Sea has also been earmarked by the EU as a favourable site for the rapid expansion of the next generation of energy production; offshore wind. This sector's activities create additional logistical networks around the North Sea between specialised sites of component production (turbines, blades, transformers, monopoles, cables, foundations), assembly, construction, servicing and the transport of workers.

Surface shipping movement is mirrored on the seafloor by an invisible template of cables and pipelines. According to the UN Convention on the Law of the Sea, all states are entitled to lay or maintain cables and pipelines on the continental shelf, and coastal states cannot impede such activities.[9] Oil and gas pipelines of differing sizes connect satellite platforms to each other as well as to the main facility on land, while fluids and 'umbilicals' – a combined string of steel pipes – deliver further fluids, power, and communication from the land side. Unlike installations, pipelines are not subject to a legal requirement of disposal after use.[10] Removing this infrastructure can often cause more harm to the marine habitat than leaving it in place, therefore it frequently remains attached to the North Sea floor as a permanent fixture, unseen from above and evolving into new cyber seascapes as they are taken over by marine life. This logistic nervous system is threaded through the seafloor's very composite matter- together the sea-surface and floor comprise the double 'motherboard' of northern European energy transactions.[11]

Consolidating territory

How does energy logistics construct territory?

---

5 Lucien Chabason, 'Toward International Regulation of Offshore Oil Drilling?' in *Oceans: The New Frontier,* (Delhi: TERI Press, 2011), 216–19.

6 Number of Offshore Rigs Worldwide as of January 2018 by Region', Statistica (website), 2018, https://www.statista.com/statistics/279100/number-of-offshore-rigs-worldwide-by-region/.

7 North Sea Commission, 'CPMR North Sea Commission – Integration Approach to Sustainable Development in the North Sea Region' (Brussels & Gothenburg: North Sea Commission, 27 November 2017), http://cpmr-northsea.org/download/cpmr-north-sea-commission-integration-approach-to-sustainable-development-in-the-north-sea-region/.

8 Port of Rotterdam, 'Throughput Port of Rotterdam 2017', press release, 15 February 2018), https://www.portofrotterdam.com/en/news-and-press-releases/container-throughput-drives-growth-in-rotterdam.

9 UN, 'UNCLOS 1982', 1982, http://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm.

10 D. G. Gorman and June Neilson, eds., *Decommissioning Offshore Structures* (London; New York: Springer, 1998).

11Nancy Couling and Carola Hein, 'Blankness: The Architectural Void of North Sea Energy Logistics', *Footprint* 12, no. 23 (2018).

Offshore oil and gas operations are embedded into an expansive, rigid, abstract ordering system which was swiftly established in response to the demands of the oil industry . Following significant onshore gas finds in Groningen (NL) in 1959, the petroleum industry pressured the UK and Norwegian governments to proceed with national legislation on sovereignty over the seabed and natural resources, eager to explore the hydrocarbon potential of the continental shelf. In March 1965, the Norwegian and UK governments jointly agreed on their mutual maritime boundary and to divide the North Sea into quadrants of one degree latitude by one degree longitude, which were subsequently further subdivided into and thirty smaller blocks in the UK and twelve blocks of 15' latitude by 20' longitude (roughly 10 x 25 km) in Norway. The subdivision of the sea into blocks was deemed practical for further North Sea countries (excluding Germany), who subsequently followed suit in the interests of rapid petroleum exploration.[12] This continuous extraction grid across the North Sea formalised the offshore petroleumscape. It "operationalized" the sea into a productive territory – a term used by Neil Brenner & Nikos Katsikas to describe the extremely rational design, management & coordination of landscapes at an unprecedented scale in the service of capitalist urbanisation.[13] The petroleum grid became the state's framework for issuing licenses to exploration companies anywhere on the continental shelf and set the circulation of rigs, workforce, supplies and construction in motion.

The third UN Convention on the Law of the Sea of 1982 then established a 200-nautical mile offshore Exclusive Economic Zone for all coastal nations – a radical new spatial feature of unprecedented global proportions that consumes around 36 percent of the world oceans and that unleashed further planning activity as coastal nations began to organise this new offshore territory. The EU now requires all littoral nations to produce Maritime Spatial Plans by 31 March 2021.[14] Within these plans, logistical space is the first priority.

Perpetual Circulation

In addition to the fixing of offshore borders, which have legally partitioned the sea space, the North Sea territory is articulated by intersecting cycles of movement over differing temporal dimensions. As discussed by Hein, "Time is a major site of competition" in relation to logistical demands on ports and their cities.[15] All biological, mechanical or chemical North Sea protagonists are in motion. The sea itself is kinetic and in a constant state of transformation. Ancient cycles from 10,000 years ago delivered high seas that flooded "Doggerland" in the central North Sea - a fertile plain of rivers, forests supporting a thriving population. Monitored fish populations demonstrate the recent northward movement of cod as the southern North Sea waters slowly increase in temperature – a movement observed and pursued by UK fishermen.

Energy logistics circulates around the multiple nodes of intense technological, financial and human activity offshore – the clusters of accommodation & production platforms and drilling rigs that make up an operating oil or gas field. The highest concentration of offshore installations and flowlines/ pipelines in the whole North Sea was the Ekofisk complex, located at the southernmost extremes of the Norwegian continental shelf, with water depths of 70–75 metres[16]. This complex of platforms,

12 Keith Chapman, *North Sea Oil and Gas: A Geographical Perspective, Problems in Modern Geography* (Newton Abbot a.o: David & Charles, 1976).

13 Neil Brenner and Nikos Katsikis, 'Is the Mediterranean Urban?', in *Implosions/Explosions. Towards a Study of Planetary Urbanization* (Berlin: Jovis, 2014), 248–59.

14 The European Parliament and the Council of the European Union, 'Directive 2014/89/EU' (2014), http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.257.01.0135.01.ENG%20

15 Carola Hein, 'Temporalities of the Port, the Waterfront and the Port City | PORTUS – Port-City Relationship and Urban Waterfront Redevelopment', *PORTUS: RETE Online Magazine* 29 (June 2015), http://portusonline.org/temporalities-of-the-port-the-waterfront-and-the-port-city/

16 Harald Tønnesen and Gunleiv Hadland, *Oil and Gas Fields in Norway- Industrial Heritage Plan* (Stavanger: Norwegian

wells, and pipelines became an international centre of work, recreation, and wealth production, around which uninterrupted global activity has revolved. Called Ekofisk City[17], partly due to this complexity and partly due to a shift from temporary installations to more permanent facilities and structures, this complex is exemplary of a new type of extended urban format which developed offshore and with which two generations have engaged intensively. At the height of its construction phase (1972), between 7-8000 workers were based at the Ekofisk field, circulating on "rig-tours" of 2 weeks on, four weeks off, and making up a population four times larger than most Norwegian coastal towns.

North Sea oil and gas "nodes" are however also temporary. Both windparks and offshore extraction & production platforms are given a preliminary license of around 25 years. After 50 years of North Sea oil , many mature wells are dry and over the next few decades, 600 oil and gas installations are up for decommissioning and up to 25,000 offshore wind turbines due for construction and decommissioning through "repowering".

Despite the irregular dispersal of artefacts, the combination of both fixed and mobile infrastructure weaving through the North Sea has tied single sites together into a viscous territory of logistics.

Decommissioning of offshore platforms is a huge logistical exercise. In April 2017 after ten years of preparation, the "topside" of the Brent Delta platform- a Shell-operated platform located 115 miles north-east of the Shetland Islands - was lifted onto the world's largest ship, the "Pioneering Spirit", to be transported to the UK port of Hartlepool for dismantling and recycling. Brent Delta weighed 24,000 tons, was 131m tall, provided accommodation and recreational facilities for 161 workers and included drilling equipment and a production plant; "all the facilities that were needed to produce and export oil and gas".[18]

A shifting, relational territory

The space of sea-borne energy logistics is continually reorganised by nations and corporations in what Harvey and Brenner discuss as a process of 'creative destruction'.[19] This process produces differential, uneven spatial development in ongoing sequences at different rhythms determined by resource availability and managerial decision-making in collaboration with the state at the industrial scale. Giant infrastructural components are delivered back to land, new windparks laid out and installed, and frequently trafficked maritime highways are defined by the IMO. The sea space is now planned, monitored, excavated, mobilised for transport, and operationalised for energy production. These developments consume space and create an unstable territory of shifting relations, which while in constant movement, has lost its public dimension.

The North Sea has developed historically as a vital logistical space, first filled then emptied of large-scale human interaction, narratives, and imagery. It has become a territory of extended

---

Petroleum Museum, 2011).

17 Stig Kvendseth K, Giant Discovery. A History of Ekofisk through the First 20 Years. (Norway: Phillips Petroleum Company, 1988).

18 David Wilkes, 'How Do You Dismantle "the Mother of All Meccano Sets"?', *Daily Mail Online*, 10 May 2017, http://www.dailymail.co.uk/~/article-4493586/index.html

19 David Harvey, The Urban Experience (Oxford: Blackwell, 1989); Neil Brenner, 'Theses on Urbanization', *Public Culture* 25, no. 1 (69) (1 January 2013): 85–114, https://doi.org/10.1215/08992363-1890477

urbanisation[20], and a sprawling, palimpsestic petroleumscape[21] with limited, specialised access. As environmental considerations become urgent and fish stocks collapse, as the climate changes and new generations of offshore infrastructure are both installed and dismantled, this logistical seascape calls for a new phase of development steered by a major conceptual shift. Relational territories of sea-borne circulation require holistic, flexible planning methods which are capable of incorporating the time-scales inherent in the sea itself and the imposed rhythms of human intervention. Incorporating the public dimension implies embracing the rusting petroleumscape into new post-oil spatial strategies – or as Rania Ghosn calls it "Living with Frankenstein".[22] Two generations of human labour have been invested into the North Sea energy industry and cultures around the North Sea have been profoundly affected by this sector. The sea has been urbanised physically and socially, it contains artefacts classified as Industrial Cultural Heritage (Ekofisk field) and therefore requires urgent consideration as a complex, constructed, contingent public realm.

20 Neil Brenner and Christian Schmid, 'Towards a New Epistemology of the Urban?', *City* 19, no. 2–3 (4 May 2015): 151–82, https://doi.org/10.1080/13604813.2015.1014712.

21 Carola Hein, 'Analysing the Palimpsestic Petroleumscape of Rotterdam', *Global Urban History Blog*, 28 September 2016, https://globalurbanhistory.com/2016/09/28/analyzing-the-palimpsestic-petroleumscape-of-rotterdam/

22 Rania Ghosn, El Hadi Jazairy, and Design Earth, *Geostories: Another Architecture for the Environment* (New York: Actar, 2018).