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As a model for further research**

Hein, C.M.

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Chapter 9

THE GLOBAL PETROLEUMSCAPE OF
THE ROTTERDAM/THE HAGUE AREA:
AS A MODEL FOR FURTHER RESEARCH*

Carola Hein

Flows of petroleum have shaped the built environment of industrial, retail, administrative, and ancillary spaces, of infrastructures and buildings, as well as their representation. Carola Hein analyses the spatial impact of petroleum on the sea-land continuum through the lens of the port city region of Rotterdam/The Hague.

Carola Hein is Professor and Chair, History of Architecture and Urban Planning at Delft University of Technology. Among other major grants, she received a Guggenheim and an Alexander von Humboldt fellowship. Her current research interests include the transmission of architectural and urban ideas, focusing specifically on port cities and the global architecture of oil. Her books include: *Adaptive Strategies for Water.Heritage: Past, Present and Future*, *The Routledge Planning History Handbook* (2017), *Uzo Nishiyama, Reflections on Urban, Regional and National Space* (2017), *Port Cities: Dynamic Landscapes and Global Networks* (2011), *The Capital of Europe. Architecture and Urban Planning for the European Union* (2004), *Rebuilding Urban Japan after 1945* (2003), and *Cities, Autonomy and Decentralisation in Japan* (2006), *Hauptstadt Berlin 1957–58* (1991). She has also published numerous articles in peer-reviewed journals, books, and magazines.

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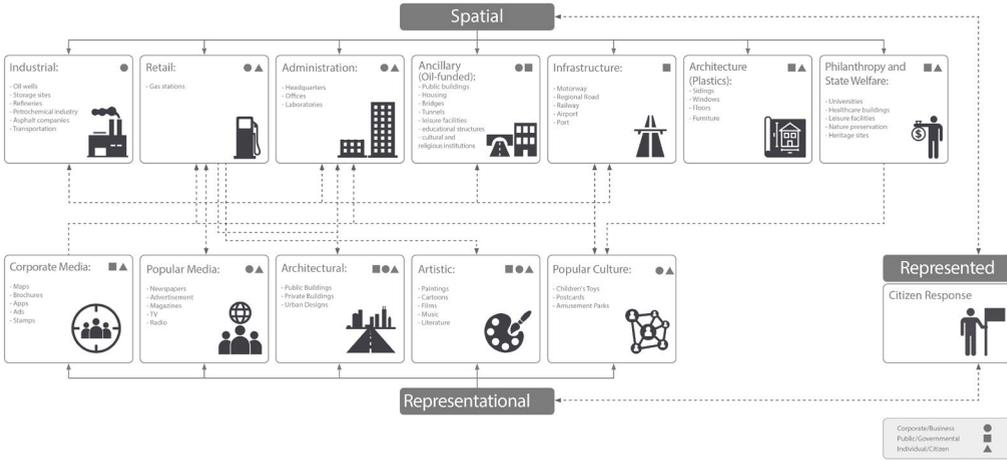


Fig. 1
The hybrid, multiple, shifting, and uneven ways in which many actors collaborate to create the global petroleumscape (Hein)

The emergence of global petroleum networks between producers and consumers around the world has been a key element in the development of shipping, the urbanisation of the sea, and in the construction of new landside structures. The discovery of petroleum in diverse corners of the world has led to the construction of new types of ships and has promoted the use of canals, such as the Suez and Panama canals. The use of petroleum as fuel for the military since the early twentieth century has helped drive the growth of maritime empires, for example, British control over Iranian petroleum. Petroleum has floated on oil for some 150 years, and ports, cities, and regions have thrived on that mixture starting in the mid-nineteenth century.

Petroleum, shipped from many parts of the globe, has shaped port city regions around the world. In the case of petroleum, this dynamic is particularly evident. The landscapes around the North Sea, connected by sea to a flexible maritime foreland, are exemplary of this shipping-based petroleum network. The historic development of ports and cities in the Amsterdam-Rotterdam-Antwerp area offers an example of the opportunities for port cities due to the particularities of the sea, its industrial exploitation, and constructed blankness.⁽¹⁾ Amsterdam, home for refined petroleum products; Rotterdam, the center for crude; and, crossing the Belgian border to the south, Antwerp, the petrochemical hub, the second-largest petrochemical industrial complex in the world (after Houston), have emerged as major entrance gates to the hinterland, notably the German Ruhr area. The land-side development of production spaces of oil is combined with places of administration where decision-makers who control the urbanisation of land and sea, and spaces for consumption of petroleum products.

Once established, these spaces of oil are not only a place of production, but as Henri Lefebvre argues, “also a means of control, and hence of domination, of power.”⁽²⁾ Spatial practices (the life of

inhabitants in a space on sea or land) and representations of space (the approaches of built environment professionals and other actors) intersect with spaces of representation (the images and associations of the users)(3); they are multiple (palimpsestic) layers of physical space and professional and public representation. Together the physical, represented, and everyday practices form what I call the *global palimpsestic petroleumscape*.(4) Each of these layers has similar functions and typologies (style, location, or architectural form) and these layers interconnect to form a single landscape. The concept of the petroleumscape starts with the insight that the diverse spatial emanations of oil—including offshore platforms and pipelines, refineries and storage sites, office buildings and gas stations—are connected through their relation to this single commodity and its group of industrial players. Connecting the actual places where oil is transported, stored, refined or even administered with the representation of these spaces and practices involving petroleum products enables a better understanding of the ways in which oil shapes behaviors and secures continuous demand [Fig. 1].

To highlight how different layers of the petroleumscape have emerged in an exemplary North Sea location, a series of analytical maps shows the various phases in which the industrial, infrastructural, administrative, retail, and ancillary spaces that comprise the spatial layer of the petroleumscape have grown in the Rotterdam/The Hague area in several periods related to the era of the car, comparing 1910, 1940, 1970, and 2000 [Fig. 2 & Fig. 3, p. 177]. The next section follows the maps to explore the emergence of the petroleumscape on the shores of the Dutch North Sea, pointing to the intersection between public/private actors and to the spaces of oil becoming new actors themselves. Progressing in steps of thirty years—examining the end of the lighting oil period, the early years of car development up to the Second World War, the postwar period, and recent decades in which criticism of oil has started to gain ground—this section shows how different layers of the petroleumscape have grown and supported each other in response to maritime flows of oil, while public, private, and citizen actors used

Fig. 2
The Rotterdam/
The Hague area in
the Amsterdam-
Rotterdam-
Antwerp (ARA)
region



petroleum products and also promoted and depicted their use.

As the series of maps shows, from the earliest locations in the city to the port's extension to the tip of the Maasvlakte in the 1970s, petroleum refining, storage, and transportation have occupied enormous spaces in the port. The growth of the petroleum port did not occur in a vacuum. It was closely linked to petroleum-fueled developments in other parts of the region, notably the construction of administrative and research buildings, retail, and infrastructure. It was also closely linked to representations of these developments.

BLACK GOLD IN THE DUTCH RANDSTAD: ESTABLISHING ROTTERDAM AS A HUB FOR GLOBAL PETROLEUM FLOWS, 1862–1910

The petroleumscape of the Dutch Randstad is anchored in the industrial spaces of the port cities: Amsterdam, Antwerp, and Rotterdam. While Antwerp was initially the biggest importer of petroleum from the United States, Rotterdam has emerged over the last 150 years as the main petroleum hub. It serves as an example of the transformation of a port with multiple local players to a global hub dominated by petroleum interests. The analytical map of the city of Rotterdam illustrates how petroleum storage shifted from its initial location in the city toward the south side of the river and then westward, just as the city constructed new sea spaces, ports, and otherwise expanded, a clear indication of the viscous, shifting territories between sea and land.

In Rotterdam and in other cities around the world, it rapidly became clear that this highly flammable and harmful substance needed special storage—away from structures that could easily be destroyed by fire and away from the city's supply of drinking water. Making sure that it could be transported to and from the port was another challenge, and one that required collaboration among various partners. The construction of water, rail, and road infrastructure at the national scale and the extension of the city borders became key factors in the development of the Rotterdam port, and in turn they facilitated petroleum trade. The opening of the shipping canal, the Nieuwe Waterweg, connected Rotterdam directly to the North Sea in 1872 and facilitated access for the growing number of steamships that transported petroleum. The construction of railway lines to the border, lines that would also come to serve the oil industry, was a second step. The quick growth of the petroleum trade and the need for dedicated facilities flowed from a close collaboration between elite merchants and the municipality and solidified relationships between them.

The construction of new infrastructure and the growth of the city on the sea-land continuum created the foundation for Rotterdam's development as an oil node just as new global players in oil entered the European market. At the end of the nineteenth

century, these players were interested in the port of Rotterdam as a turntable and transit point for oil on its way to the rapidly industrializing areas in western Germany. By 1891, several major oil companies had settled in the port, and by 1901, the Koninklijke Olie — one of the predecessors of Royal Dutch Shell — had built there as well. The city on the Maas had emerged as the main entrance gate for global petroleum, outpacing Amsterdam. The advent of major companies that gained control of the entire production and distribution chain — one that was mostly maritime based — had extensively reshaped the port and the oil business. Their interests and commodity flows connected various parts of the world, putting their imprint also on the Randstad.

If demand for lighting oil established Rotterdam as a major oil port, the rapidly growing new demand for benzene as a car fuel triggered its explosive growth. The construction of new refineries related directly to the needs of petroleum produced abroad: in 1907, the company installed a trial distillation facility for petroleum from Borneo, and a trial facility for asphalt followed in 1918.

The multinational setup of companies such as Royal Dutch Shell required close contact between the different headquarters in the Netherlands and the United Kingdom and also had an impact on travel connections across the North Sea. In parallel with the infrastructure created for oil itself, newly emerging aerial connections facilitated the travel of decision-makers among different sites and facilities. The Waalhaven Airport in the Rotterdam port next to the oil facilities opened in 1920 and allowed companies to bring in executives from London as the oil trade expanded.⁽⁵⁾

Pre-war development of oil infrastructures in the port and the capital city had a major impact on post-war rebuilding of bombed-out Rotterdam, illustrating the importance of the path dependencies of oil. In May 1940, on the eve of the Rotterdam Blitz, The Hague was known as petroleum administration headquarters and Rotterdam was the third-largest port in the world after New York and London, and a major entrance gate from the North Sea to the European continent. ⁽⁶⁾ The port city's leading role in petroleum storage and refining made it a target in the Second World War. Despite extensive destruction, taking advantage of its existing networks, the port rapidly returned to its leading position after the war ended. And the existence of industrial oil structures in the port of Rotterdam was a major factor in establishing a continuity of oil transportation and transformation even as production centres shifted in the postwar era. In the early 1960s, with decolonization in Asia and Africa, most of the oil started coming from the Middle East — the flexible maritime foreland put Rotterdam in contact with global oil producers.

The key role of Rotterdam as a petroleum hub was consolidated through the construction of structures beyond the port and the expansion of the cities of the Randstad; the development of the Dutch

highway network in conjunction with the construction of new gas stations alongside them; the rapid growth of traffic; the increasing number of headquarters and research institutions in The Hague, and in neighboring Delft and Zoetermeer; and the construction of the Shell Tower on Weena in Rotterdam, part of the reconstruction effort.

The oil industry's need for access to the port and its hinterland continued to be key to planning and land allocation in the Rotterdam area; several studies document the overlapping interests of Shell and the Rotterdam Port Authority. By the 1950s, the consumer had become an important participant in the petroleumscape. Company publicity promoted the use of their products, highlighting freedom of travel and the beauty of historical landscapes. They produced and handed out many promotional documents—maps, brochures and booklets—that focus on features of the Dutch landscape. Maps can be powerful tools to help users understand space (as shown in the analytical maps made of the Rotterdam port), but they can also create imagined new geographies, and corporations have used them for this purpose for decades.⁽⁷⁾ Since the 1930s, oil companies had used free maps to fuel the general public's desire to explore the Dutch landscape (Shell 1931, Texaco 1935). Throughout the twentieth century, oil companies sold or freely distributed road maps that tied the company name to the experience of driving and visiting. The covers of these maps tie company colors and logos to traditional landscapes, to tourist destinations, to historical, scientific, or cultural explorations.⁽⁸⁾ They show icons of gas stations in a landscape dotted with oversized windmills and traditional Dutch houses with tulips, enticing the user to explore neighboring cities and regions. Tying the oil companies to traditional landscapes, rather than the industrial ones that petroleum generates, covers like this also promote the car as a vehicle of freedom and discovery.

Company publications geared at the general public continued to construct an imagined landscape different from the one that they were actually building: their focus remains on accessibility of select natural, historical, and cultural spaces. Their focus was primarily on a national and terrestrial scale, one that largely ignored the maritime spaces that served as industrial extensions. While the representational petroleumscape constructs space and identity as well as culture in and for spaces far beyond the ones that they actually occupy, it largely ignored the necessity of shipping for its construction. For the general public, these publications constructed a feedback loop that clearly tied the petroleum actors to the freedom of driving across the land and the joy of leisure.

The oil crises of the 1970s, when major industrial countries faced oil shortages, could have challenged the prominent role of petroleum actors in shaping the built environment. Car-free Sundays in the Netherlands allowed citizens to reclaim highways. The memory of the public was short, and few long-lasting changes occurred. But by that

time, Rotterdam was firmly established as a leading oil port, serving consumers notably in the German hinterland. The production sector is huge in scale (with some 5300 ha for industrial sites and 1500 km of pipelines within the port) and its impact on planning decisions is high, but its visibility to the general public in everyday life is low.⁽⁹⁾ The pipeline network that links Rotterdam with Antwerp (where the big ships can no longer dock and where the petrochemical industry needs petroleum) and with Germany is largely out of sight.⁽¹⁰⁾ The oil companies share other parts of the infrastructure, such as important rail and highway networks, with general users, who do not easily identify them as part of oil networks either. Recent headquarter buildings such as the one for BP erected in the port area, feature a green roof and advertise a stated turn toward environmental friendliness.

Oil infrastructures have become part of the area's collective imaginary. Heritage debates in the Netherlands document the ways in which spaces of oil have entered the wider public's imagination. Public attitudes about the companies, and about the history of oil in the Netherlands more broadly, affect debates on the selection of monuments for the historic preservation register, which protects some buildings and structures as official parts of the country's history. Historical oil landscapes, including remnants of industrial drilling such as the oil pumpjack Ja-knikker in Schoonebeek, are already included in the register of monuments. As citizens and public decision-makers decide which structures count as heritage, they also decide on a narrative of oil modernity, one that is not usually openly debated. These heritage stories need to be carefully prepared considering both local and global contexts and in line with shared developments around the North Sea.

Changes in the refining business will affect ports, cities, and transportation infrastructure, and those entities will have to formulate planning strategies in response. Places where oil is still physically present will require more extensive clean-up and transformation investment than the headquarters and research buildings or the ancillary buildings that are part of everyday usage. As refineries and storage areas around the North Sea disappear, they will require extensive and specialized cleanup. Even cleaned up, the refineries will be difficult to integrate into their neighboring cities: they will remain valuable to the oil industry due to the extensive specialised networks that they are integrated in and that continue being used, and they are often located in specialized areas of the port that are difficult for ordinary people to access.

This history shows that oil industry, in close collaboration with national governments, has materially not only shaped the port and its links to the sea, but the entire Randstad and its hinterland, through headquarter buildings, retail, infrastructure, and ancillary buildings. Other port cities around the North Sea have experienced similar pressures. They have pursued their own urban, port, and coastal

development, ones that still need to be mapped. The petroleumscape, fed by maritime traffic and oil extraction, is an excellent example of the urbanisation of the sea. Using the petroleumscape as an analytical lens allows for a multi-disciplinary investigation of planetary urbanisation as well, allowing us to transcend disciplinary and sectorial borders, to unpack entanglements and relations that cross maritime spaces, and to develop new design approaches that include not only land-based, but also sea-based, spaces and that recognize the viscous nature of the territories at the edge between land and water.

Oil has taken hold of our built environment and corporate and public actors as well as independent artists and citizens who have celebrated it. Citizens and politicians must gain an awareness of the enormous scale of oil's presence and its representation in order to support new energy values in line with a post-oil society, and to create new imaginaries of that post-oil life. We need to recognize the importance of the built environment and its representation—whether established through petroleum or not—in the construction of power systems. A single but world-encompassing industry has created path dependencies in multiple nations and locations; that is, the long lifespan of built things perpetuates oil dependency. This industry continues to shape our value systems, imaginaries, and decision making. All of this makes it particularly difficult for societies to overcome oil dependency and promote new energy practices.

Dominic Boyer and Imre Szeman argued in a 2014 article, “The Rise of Energy Humanities” that “today’s energy and environmental dilemmas are fundamentally problems of ethics, habits, values, institutions, belief, and power.”⁽¹¹⁾ They also argue that the failure to imagine new solutions is partly due to a lack of understanding of how oil works in culture and to examine the difficulties we now face in overcoming oil dependency.⁽¹²⁾ Studying the spatial and representational layers of the petroleumscape can help us take on the many challenges in replacing them, including cleaning and redeveloping polluted areas, redeveloping and reimagining former oil sites, developing and preserving infrastructure (such as highways) from the oil age, rethinking gas stations and headquarters, and designing new sustainable spaces with as ubiquitous and with as strong an affective character as the spaces of oil.

If the represented layer of the petroleumscape influences how people generate a new physical petroleumscape and its buildings and urban forms, then this inclusive approach to oil is fundamental to any rethinking of energy usage and sustainable architecture and to breaking up the feedback loop.⁽¹³⁾ Changing it is perhaps the second step (after understanding history) in creating fossil-free energy landscapes. We also need to generate new imaginaries of fossil-free technologies, images, and practices that allow the general public to embrace these technologies and create new landscapes. Architectural

and urban design can help implement such changes, including through studio design at universities. After all, traditional windmills and canals were also originally engineering devices and have now become part of the national imagination and a tourist attraction. Couldn't we achieve the same for new technologies? In the design studio *Beyond Oil* at the TU Delft, students explore future scenarios and propose transition strategies. In 2018, for example, Ege Cakir proposed large autonomous 'animals' that will roam the site of the former TOTAL refinery in Dunkirk, a port city in Northern France, to clean up the soil and to make the changing remediation landscape a recreational park. Select oil structures—refinery elements and storage tanks—remain as sculptures in the landscape, a strong reminder of the industrial petroleumscape and its negative impact on the environment and health [Fig. 4, p. 178]. History, both its writing and its remnants in the built environment, is a powerful tool in relation to design: we can help shape the future by carefully re-reading and re-presenting the past.

- (1) Nancy Couling and Carola Hein, "Blankness: The Architectural Void of North Sea Energy Logistics," *Footprint*, no. 23 (2018).
- (2) Henri Lefebvre, *The Production of Space* (Blackwell, 1991), 26–27
- (3) Lukasz Stanek, *Henri Lefebvre on Space: Architecture, Urban Research, and the Production of Theory* (University of Minnesota Press); Lefebvre, *The Production of Space*; Henri Lefebvre, *A Critique of Everyday Life* (London: Verso, 1991).
- (4) Carola Hein, "Analyzing the Palimpsestic Petroleumscape of Rotterdam," *Global Urban History Blog* (2016); "Port Cities: Nodes in the Global Petroleumscape between Sea and Land," *Technosphere Magazine* (2017); "Between Oil and Water: The Logistical Petroleumscape," in *The Petropolis of Tomorrow*, ed. Neeraj Bhatia and Mary Casper (New York: Actar / Architecture at Rice, 2013); "Global Landscapes of Oil," *New Geographies* 2 (2009).
- (5) Ferry de Goey, *Comparative Port History of Rotterdam and Antwerp (1880–2000): Competition, Cargo and Costs* (Amsterdam: Aksant, 2004); Reginald Loyen, Erik Buyst, and Greta Devos, *Struggling for Leadership: Antwerp-Rotterdam Port Competition between 1870–2000* (New York: Springer, 2003).
- (6) Ferry de Goey, *Ruimte Voor Industrie. Rotterdam en ee Vestiging Van Industrie in de Haven 1945–1975* (Rotterdam 1990). Gerard J. Borghuis, *Veertig Jaar NAM: de geschiedenis van de Nederlandse aardolie maatschappij 1947–1987* (Aardolie Maatschappij B.V., 1987)
- (7) Denis Wood, *Power of Maps* (New York City: Guilford Press, 1992).
- (8) For map covers and the Rotterdam refinery map by BP from 1970, see "Oil Company Roadmaps from the Netherlands," <http://www.petrolmaps.co.uk/country/maps-nl.htm> (last visited 15 July 2015).
- (9) Port of Rotterdam, Netherlands, "Port of Rotterdam" <http://www.ship-technology.com/projects/portofrotterdam/> (accessed 15.7.2015)
- (10) There is also an extensive NATO pipeline system; see "Central Europe Pipeline System (CEPS)" (http://www.nato.int/cps/en/natolive/topics_49151.htm?selectedLocale=en) (accessed 15.7.2015)
- (11) Dominic Boyer and Imre Szeman, "The Rise of Energy Humanities: Breaking the Impasse," *University Affairs* (2014), <http://www.universityaffairs.ca/opinion/in-my-opinion/the-rise-of-energy-humanities/> (accessed July 4 2017).
- (12) See, e.g., Jo Clarke, Mel Evans, Hayley Newman, Kevin Smith, Glen Tarman, eds., *Culture Beyond Oil: Not If but When* (London: Platform, 2011), <http://platformlondon.org/cbo.pdf> (July 10th 2017); Imre Szeman, Sheena Wilson, and Adam Carlson, eds., *Petrocultures: Oil, Energy, and Culture* (Montreal: McGill-Queen's University Press, 2017); Imre Szeman and Dominic Boyer, *Energy Humanities-an Anthology*, (Baltimore: Johns Hopkins University Press, 2017).
- (13) Dominic Boyer, "Special Collection: Energypower and Biopower in Transition," *Anthropological Quarterly* 87, no. 2 (2014).