Designing Transformation: The Port of Rotterdam and the Petroleumscape of the Randstad

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Publication date
2016

Citation (APA)

Important note
To cite this publication, please use the final published version (if applicable).
Please check the document version above.
INTERNET CONTRIBUTION

Carola Hein is Professor and Head, Chair History of Architecture and Urban Planning at Delft University of Technology. She has published widely in the field of historical and contemporary architectural, urban and planning. Among other major grants, she received a Guggenheim Fellowship to pursue research on “The Global Architecture of Oil” and an Alexander von Humboldt fellowship to investigate large-scale urban transformation in Hamburg in international context between 1842 and 2008. Her current research interests include the transmission of architectural and urban ideas, focusing specifically on port cities and the global architecture of oil. The exhibition “Oildam: Rotterdam in the oil era 1862-2016” co-organized by Museum Rotterdam and TU Delft features her research. She serves as IPHS Editor for Planning Perspectives and as Asia book review editor for Journal of Urban History.

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The Randstad, a polycentric conurbation in the northwest of the Netherlands, has evolved over centuries and overlaps with numerous economic spaces, including ones for oil. It is home to the ARA (Amsterdam Rotterdam Antwerp) oil spot market that includes Amsterdam, home for refined petroleum products; Rotterdam, the center for crude; and, crossing the Belgian border to the South, Antwerp the petrochemical hub, the latter being the second largest petrochemical industrial complex in the world after Houston. The port of Rotterdam is a motor of these oil flows, their transportation, storage, refining and resale (Fig. 1). It is also a key player in the transformation of financial, administrative and retail premises throughout the Randstad. Understanding the long history and interconnected ways in which oil has shaped port, neighboring city and region is important to prepare for the future challenges of oil transformation if and when it will no longer be a major player in port development.

The industrial footprint of oil is clearly visible from the air in the port of Rotterdam (Fig. 2). Port facilities, storage tanks, refineries, pipelines and other infrastructure span from the inner city to the tip of the port, the Maasvlakte II. The production sector is huge in scale (with some 5300 ha for industrial sites and 1500 km of pipelines within the port) and very costly. Its impact on planning decisions is high, but its visibility for the general public is low and mostly hidden from everyday experience. Some of its infrastructure, notably pipelines, is underground, and not visible to the bare eye—unless a careful observer traces pipeline markers or observes patterns of melted snow across agricultural areas. Other parts of the infrastructure, such as important rail and highway networks, are shared with general users, and not easily identifiable as part of oil networks either.
In most instances, oil companies and stakeholders are not planning agents per se, but the flows and the interests related to petroleum have influenced planning practice, directly and indirectly in response to the changing urban environment. Through careful reading of analytical maps of the petroleumscape of the Randstad and based on extensive archival research, the presentation explores the impact of oil transformation in the port of Rotterdam and its relation to the creation of spatial patterns in the cities and landscapes of the Randstad (Fig. 3a-3h).

The port of Rotterdam, the focus of this contribution, is largely built upon fossil fuels (including also coal). Oil companies and the public sector established the foundations for the Randstad oil cluster in the early years of the industry (from 1862 to World War II). Early installations of oil storage, refining and transportation had “standing power” once established: public and private leaders collaborated and compromised to maintain and expand them after World War II. As flows of oil have increased or decreased in the Rotterdam port, both the port installations, the city and the hinterland changed extensively.

Oil companies and the public sector established the foundations for the Randstad oil cluster in the early years of the industry (from 1862 to World War II). It is in the port that American oil entered the European market. The use of kerosene to light lamps was growing, creating a market for newly available petroleum. Oil firms were small at the time and focused transport, storage, and resale as they searched for the fastest and safest transportation chains and refining processes. This first shipment of oil was stored by the company Pakhuismeesteren in the heart of Rotterdam, paying little attention to its explosive qualities. Only a year later, in 1863, petroleum imports had reached 17500 barrels of direct and 7200 of indirect import.
Competition among the port cities in the Randstad and Belgium was fierce in this early period. In 1865, Rotterdam received 533,000 gallons, but this was less than half the amount shipped to Bremen or Hamburg, and much less than the over 4 million shipped to Antwerp. But demand in the German and Swiss hinterland spurred the import of oil through Rotterdam in competition with these other ports. The amount shipped to Rotterdam increased rapidly. The storage facilities had to be expanded and improved (stone) and by 1867 import (107,000 barrels) was double that of 1866. The opening of the shipping canal, the Nieuwe Waterweg, connecting Rotterdam directly to the North Sea in 1872 facilitated access for the growing number of steamships that transported petroleum and brought about the request for a petroleum port with rail and road connections to the German hinterland.

The quick growth of the petroleum trade, and the need for dedicated facilities, necessitated a close collaboration between elite merchants and the municipality. The economic elite was closely associated with the main political forces, including ones driving Rotterdam’s annexation of Charlois. After several years of negotiations in February 28th 1895 Charlois became officially part of Rotterdam and the core of the oil storing and trading. By that time, the Randstad, where railways had first connected the main cities on the Western shore, saw the construction of railway lines towards the border, lines that would also come to serve the oil industry. These choices created the foundation for the long-term development of Rotterdam as oil port just at a time when new global players in oil emerged.
Advances in shipping, transporting, refining and the advent of major companies who gained control of the entire production and distribution chain, extensively reshaped the port and the oil business. Their interests connected various parts of the world through their commodity flows, putting their imprint also on the Randstad. These companies, at the example of the American Standard Oil Company that monopolized oil interests at the time intervened also in Europe. The foreign companies challenged the 23-year monopoly of Pakhuismeesteren and started to compete for land allocation in the Rotterdam petroleum port. By 1891, Standard Oil, together with four companies from Antwerp and Rotterdam, set up the American Petroleum Company (APC), with headquarters in both cities. Around the same time, several other oil companies settled in the port, including in 1901, the Koninklijke Olie - one of the predecessors of the Royal Dutch Shell (created in 1890 and consolidated in 1907). The city on the Maas had emerged as the main Dutch petroleum center, outpacing Amsterdam.

If demand for lighting oil established Rotterdam as a major oil port, the rapidly growing new demand for benzine as a car fuel triggered its explosive growth. Royal Dutch quickly picked up on the new oil age geared towards cars and built a gasoline refinery in Pernis in 1902. But it took more than a decade and pressure from the Royal Dutch to finish what would be called the 1st petroleum harbor. By 1940, Rotterdam was the third largest port of the world, after New York and London. The oil storage was a major price in the Second World War. The warfaring parties tried to keep the German enemy from getting their hands on oil, destroying storage tanks, that hadn’t been bombed.
In the post-war period, the oil industry brought new demands and opportunities to Rotterdam as the port expanded with the city. The Rotterdam port grew in size and Pernis, Botlek and Europoort stand out as the main areas under control by six multinational oil-companies. America lost its status as primary oil supplier; with de-colonization in Asia and Africa, oil companies (and their home countries) no longer had access or control over oil resources and had to rearrange their business. Most of the oil started coming from the Middle East; with nationalization of oil there and the creation of OPEC in 1960, demand increased, supply was reduced, and prices rose. The post-war development took the expanse of oil to a new scale.

The Rotterdam port grew rapidly in the post war period, thanks to its geographical advantage, seaport infrastructure, collaboration among its corporations, subventions promoting investment, a sufficient labor market as well as growing demand. Meanwhile new types of refining processes created diverse novel products and further demand for them, notably in the field of plastics. Since the 1960s the chemical industry blossomed, indicating another major change in the petroleum industry. In 1961-62 the three existing refineries produced 24 million tons of oil per year.
The demands of the oil industry continued to be key to planning and land allocation in the Rotterdam area. A regional plan for West Brabant established around 1969 allowed for a new Shell refinery in Moerdijk and provided space for future expansion. The port continued to grow, separating it from the city and several studies document the overlapping interests of Shell and the Rotterdam Port Authority. Cargo ships grew in size and some ports, such as Antwerp, accessible only through an estuary, (or Amsterdam, a closed port) could no longer accommodate them, much unlike Rotterdam with direct access to the sea. From the 1970s, pipelines became the main carrier for oil, notably crossing borders towards Antwerp in Belgium and the Germany Ruhr area (cheaper than train or ship) long before the Schengen agreement provided for the free circulation of people.

![Fig. 3g: OIL & THE ROTTERDAM PORT 1972, Source: Oil and the Rotterdam Port | By Carola Hein, Alexander Koutamanis, Bernard Colenbrander, | CC BY NC SA 4.0](image)

Today, the BP refinery in Rotterdam, which started production in 1967, includes facilities at Europoort and Pernis (480 acres). Its production capacity of 400,000 barrels of crude per day with a storage capacity of 4.5 million cubic meters illustrates the growth of the industry. Three other refineries for ExxonMobil, Koch HC Partnership and Q8 Kuwait Europoort are situated in the port. Climate change and growing popular interest in renewable energies, as well as (European) laws on air pollution, and its aging refining facilities will influence the consumption of fossil fuels and its distribution. Nonetheless, an end of the oil era doesn’t seem in immediate sight. The existence and “staying power” of the Rotterdam oil port may mean that fossil fuels from other locations will be directed there unless the port players opt for a different strategy.

![Fig. 3h: OIL & THE ROTTERDAM PORT 2015, Source: Oil and the Rotterdam Port | By Carola Hein, Alexander Koutamanis, Bernard Colenbrander, | CC BY NC SA 4.0](image)
The contribution also explores how oil transportation and transformation in the port intersected with the erection of administrative and research buildings close to centers of power, notably in The Hague, demonstrating the close interaction between port and neighboring cities. It also shows how the location of gas stations coincided with the growth of the road infrastructure, connecting the port to the development of the hinterland. It further analyzes how the development of the spatial petroleumscape in the Randstad intersected with the development of cultural mindscapes, both corporate and independent. Rather than featuring the actual industrial development in the port, through free road maps, ads and apps, oil companies have associated oil with national pride and security, depicting the car as a vehicle of freedom and the gas station as a haven of security, and have thus claimed rural and traditional spaces far beyond the ones that companies actually occupy. The contribution thus connects the industrial landscape of the port to that of other layers of the spatial and represented petroleumscape and explores the ways in which they reinforce each other mutually. An exhibition in Museum Rotterdam, entitled “OLIEDAM Rotterdam in the oil era 1862 – vandaag (19 juli - 23 November 2016),” based on research by the author further illustrates this development and displays analytical maps from the years 1910, 1940, 1970 and 2000 depicting the industrial, retail, administrative and ancillary components of the petroleumscape of the Randstad. The analysis demonstrates how changes in actors, places and technologies of production and consumption of oil coincided and intersected with the construction of new road and rail infrastructure throughout the Randstad that served both oil and public interests.

Climate change and growing popular interest in renewable energies, as well as (European) laws on air pollution will influence the consumption of fossil fuels and its distribution. Strategic planning for ports, but also administrative and research buildings, gas stations, and ancillary structures ranging from bridges and tunnels to schools and leisure facilities partly sponsored by oil, will have to acknowledge the ways in which new energy sources can reshape this environment. The existence and “staying power” of the Rotterdam oil port may mean that fossil fuels from other locations will be directed there. It may also mean extensive land use changes in the port area. In any case, changing petroleum streams will also transform the city and hinterland and planners will have to collaborate across different institutions to facilitate or even to encourage post-petroleum transformation.

As refineries and storage areas around the world disappear, they will require extensive and specialized cleanup and careful planning for port and city. Petroleum has polluted the ground for decades and sometimes even longer, often with noxious impacts on neighboring housing districts. The long-term environmental challenges and high costs of such a cleanup are evident in places such as Greenpoint (Philadelphia), where some 50 refineries polluted the ground over decades and where more than 64,000 m³ spilled into the ground. This contribution establishes the long-term historical interconnections for port, city and region through the lens of oil networks in the Randstad, providing the foundation for planners to develop new strategies for the complex present of the petroleumscape of the Randstad, and the future of the port-city interface.

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