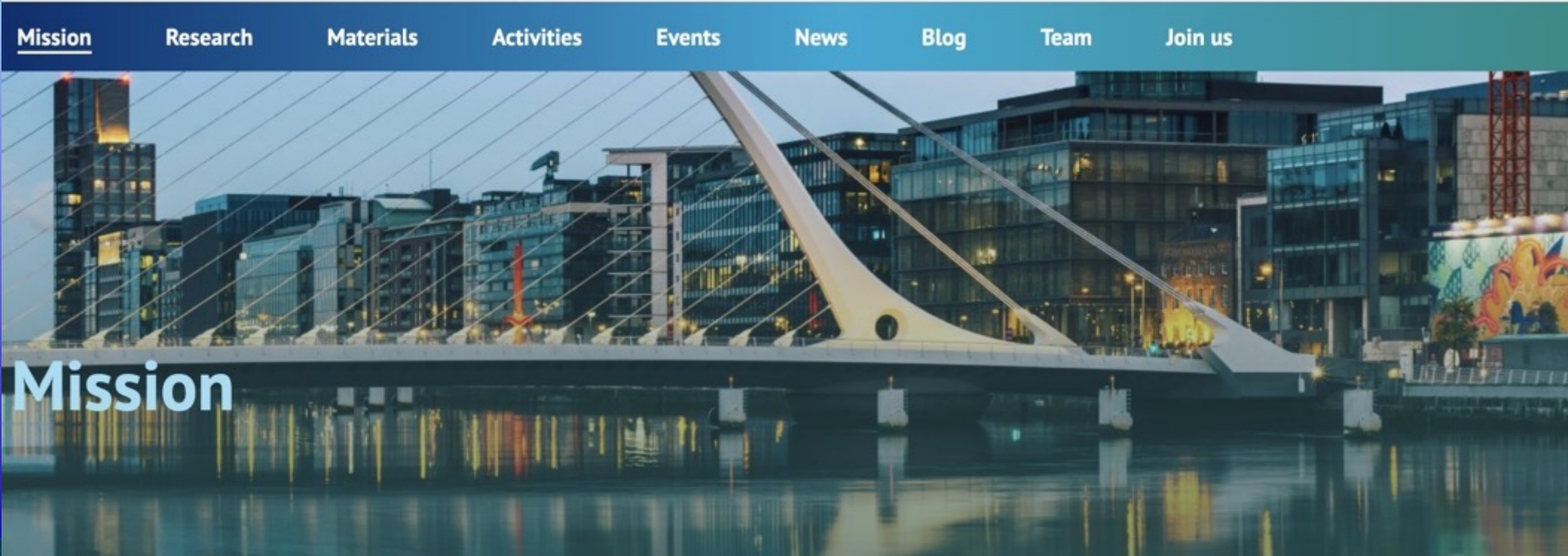


# The Port City Atlas: European Sea Ports and Transition Challenges

Carola Hein, History of Architecture and Urban Planning, TU Delft, PortCityFutures





## Mission

### The PortCityFutures mission

PortCityFutures contributes to the new LDE strategy in multiple ways. It brings together researchers from humanities, social and design sciences in the LDE who are eager to collaborate. It focuses on the particularities of the port city region where these three universities are located.

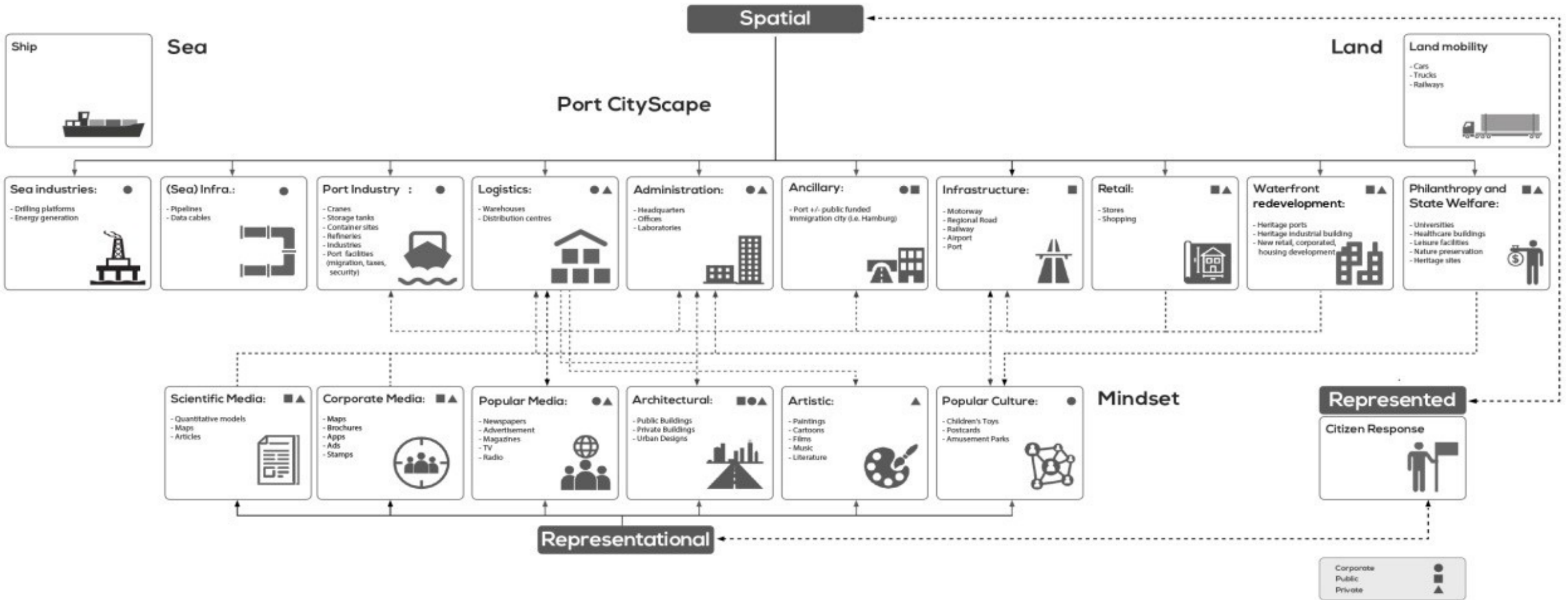
# Port cities territories as ecosystems

- Concepts
  - Port city territories
- Methods
  - Mapping
- Interventions
  - Scenarios

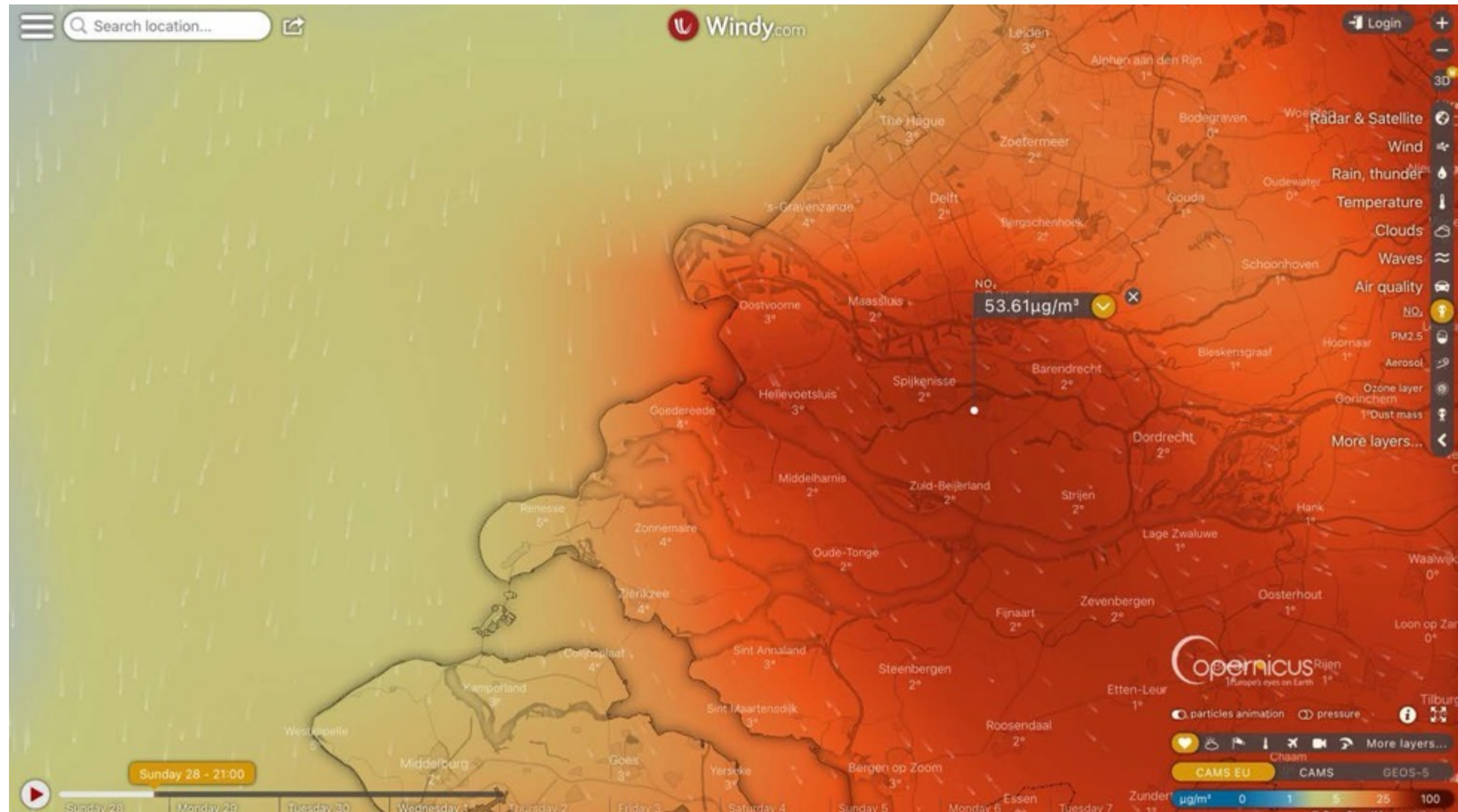
# Port cities territories as ecosystems

- Concepts
  - Port city territories (water, ports, city/cities, territory)

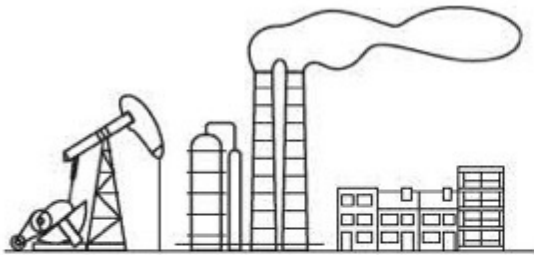
# PortCityScape



# Port, city and public health: NO<sub>2</sub> level

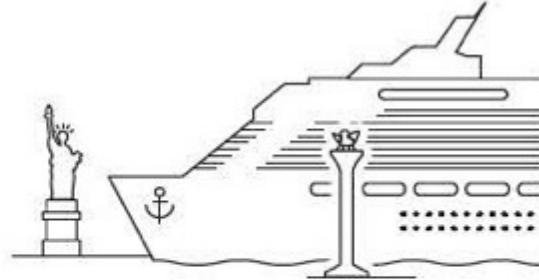


# Mobility in Port City Territories is Global and Local



## Pollution | Urban Development

How can policy makers, urbanists and architects help mitigate the spatial impact of highly polluting industries in line with sustainable urban development?



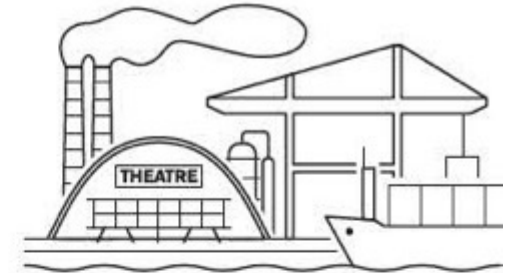
## Heritage | Migration

How can historical cultural diversity and the values embedded in the built heritage meet the needs of citizens and migrants currently living in, working in, and traveling through port cities.



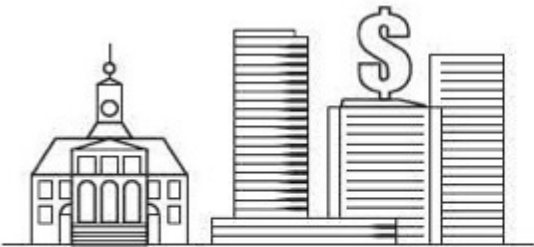
## New Technologies | Happiness

How will new industrial technologies and services in the port affect living conditions for all citizens?



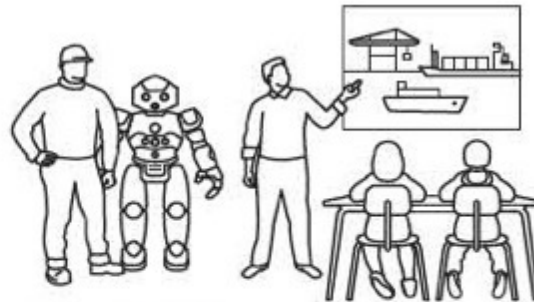
## Culture | Production

How can all local stakeholders create a port city culture that critically supports (port-related) spatial development needs?



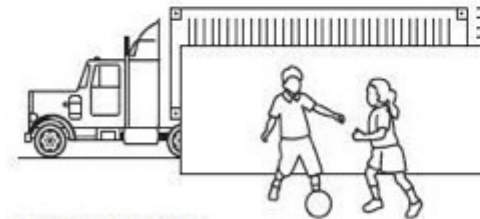
## Governance | Global Trade

How can local governments engage with and regulate a port that is intimately linked to global trade flows?



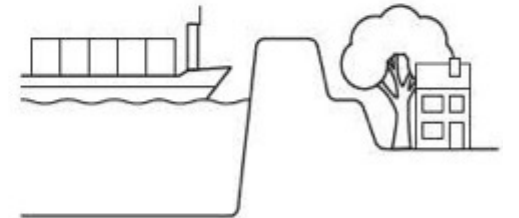
## Education | Automation

How will automation of technology, services and administration affect a port's spatial economy (jobs and spaces) and how can we educate children to be ready for the port city regions of the future?



## Logistics | Liveability

How can cities and port authorities guide daily freight traffic flows in a way that they can deliver goods to city and port but do not impede city livability?



## Economy | Climate Change

How can economic benefits for a modern port city and the construction of (publicly funded) infrastructure, be combined with a climate adaptation strategy, which pays attention to flood risk reduction by 'building with nature' and ecological restoration?

# Port City Territories: Transport

ROTTERDAM

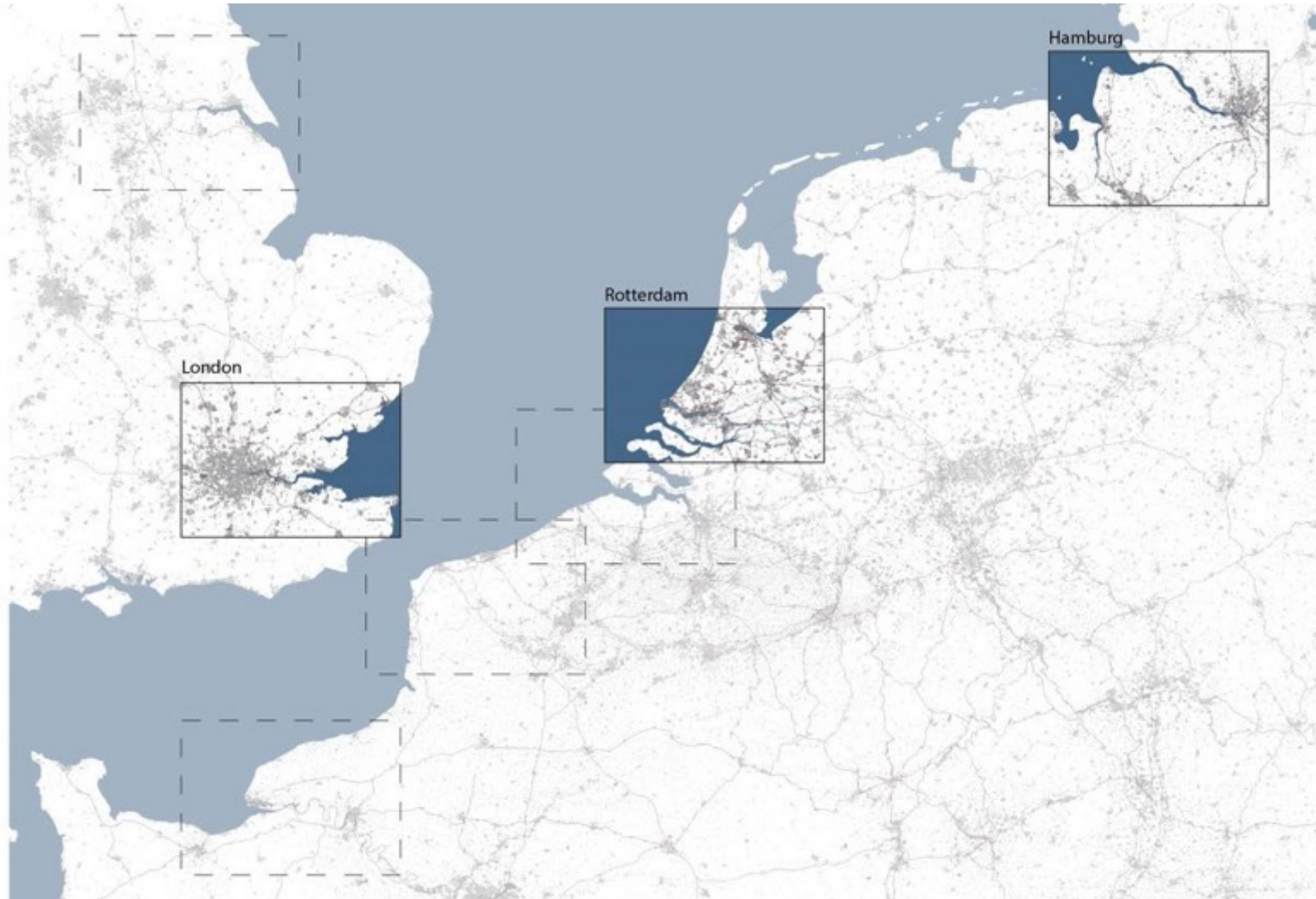




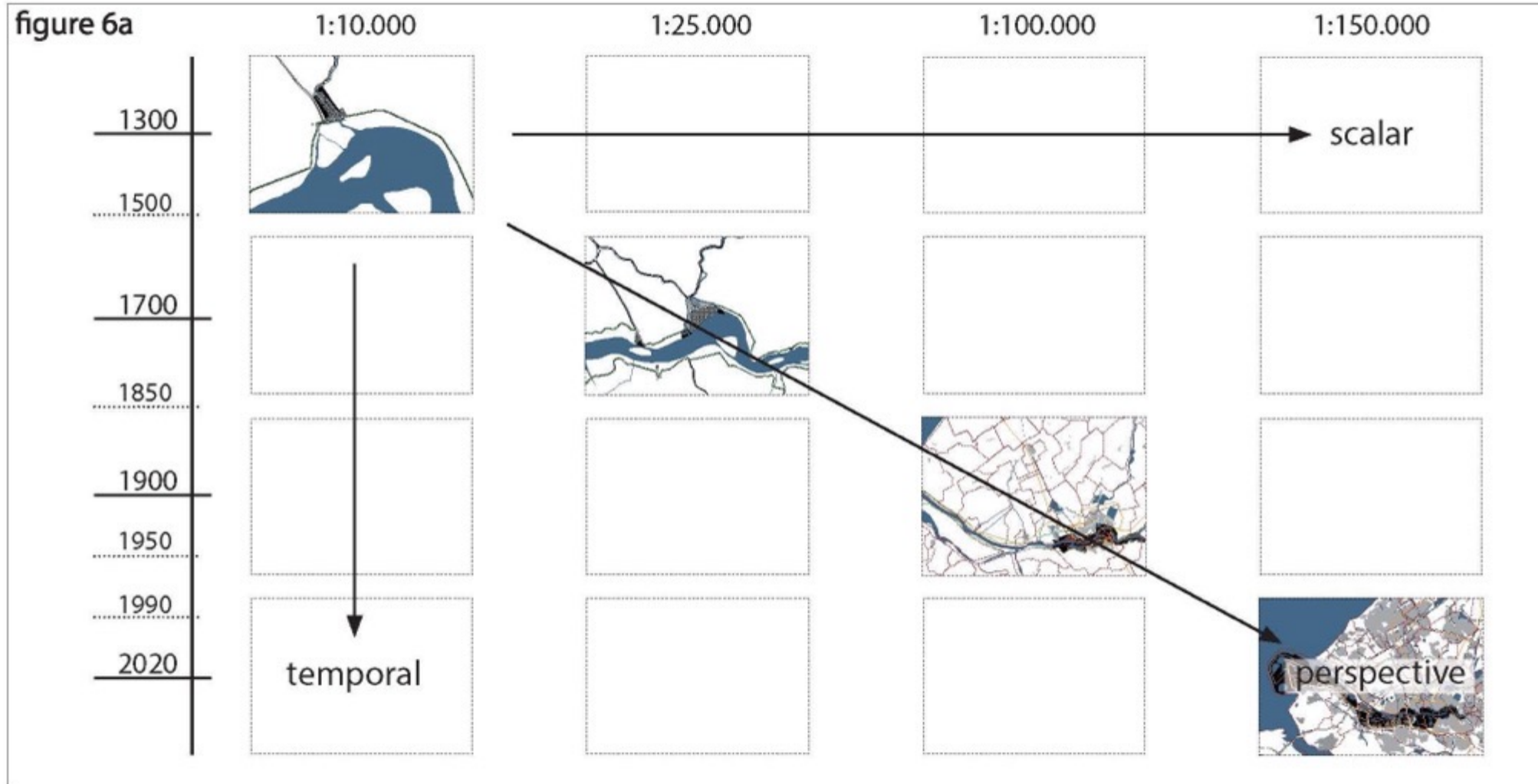
# Port cities territories as ecosystems

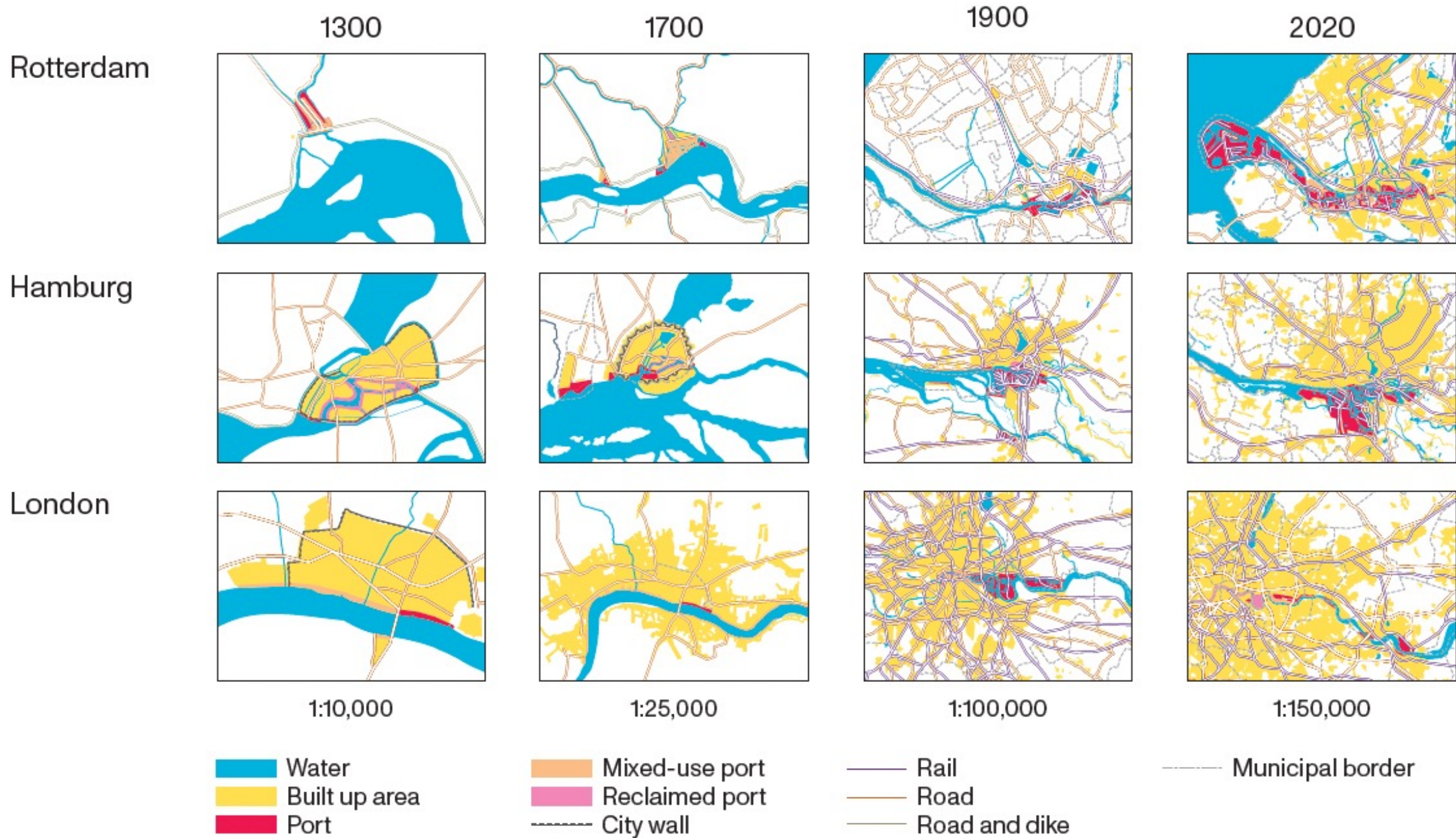
- Methods
  - Mapping (geospatial, stakeholder, culture)

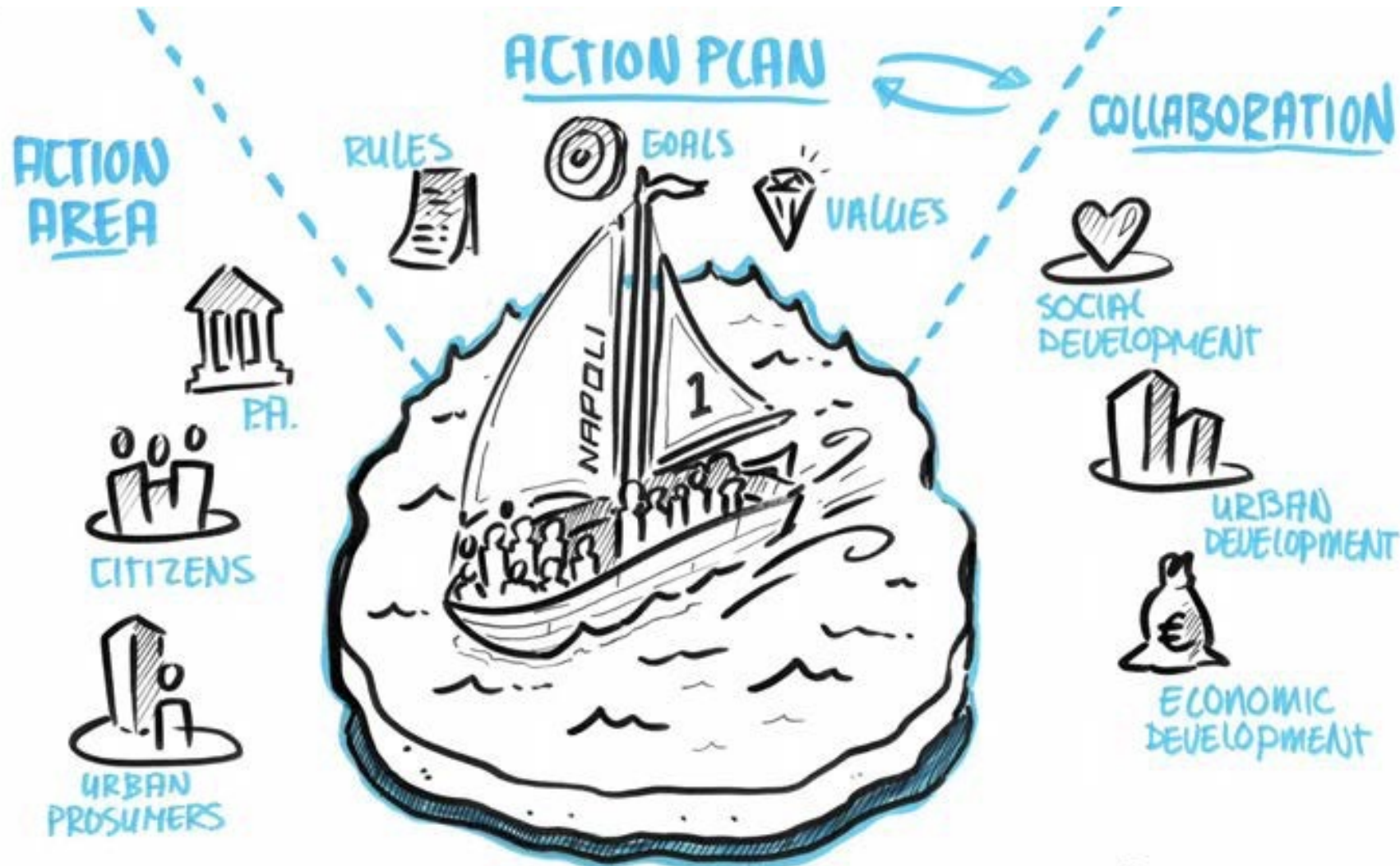
# Port Cities: The North Sea



# Port Cities: Deep Mapping







THE SEA AS A COMMON GOOD



# ARA: SECOND BIGGEST PETROCHEMICAL HUB AFTER HOUSTON









# OIL & THE ROTTERDAM PORT 1862

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## OIL & THE ROTTERDAM PORT 1882

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## OIL & THE ROTTERDAM PORT 1930

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## OIL & THE ROTTERDAM PORT 1936

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## OIL & THE ROTTERDAM PORT 1950

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# OIL & THE ROTTERDAM PORT 1964

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# OIL & THE ROTTERDAM PORT 1972

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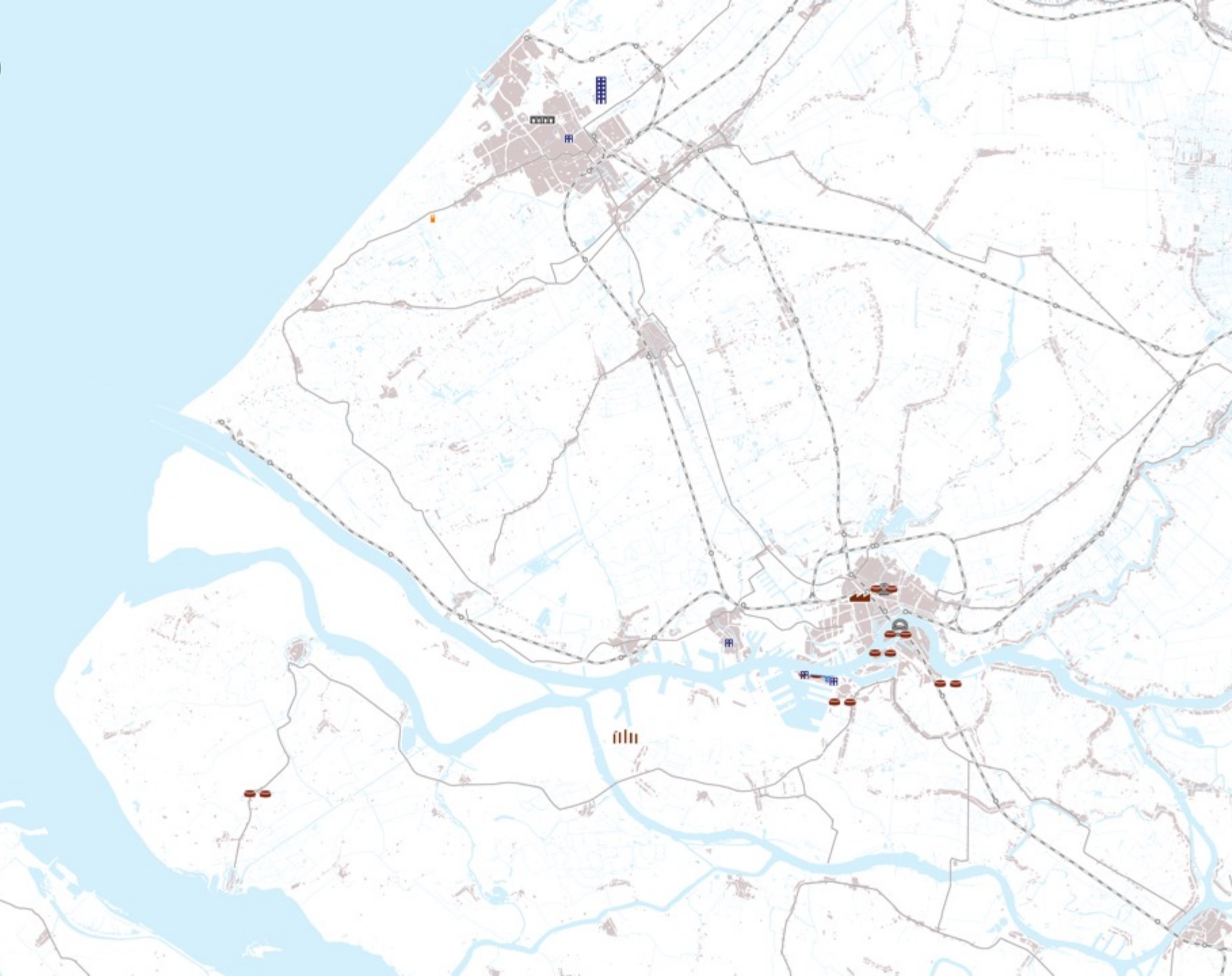


# OIL & THE ROTTERDAM PORT 2015










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## Industrial

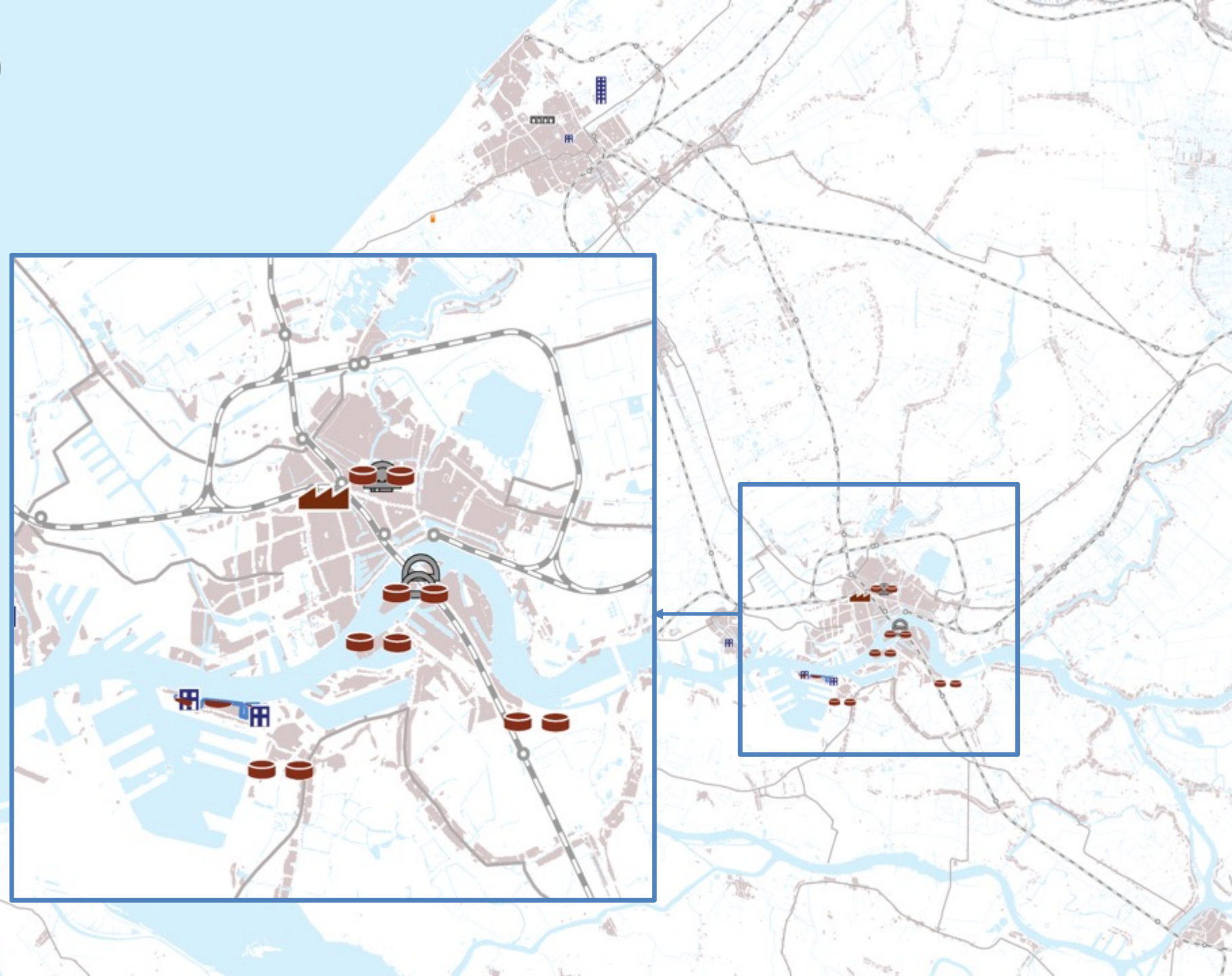
-  Oil well
-  Oil refinery
-  Oil storage unit
-  Processing unit
-  Oil dedicated port
-  Oil pumping station
-  Oil pipeline
-  Oil dedicated railway
- 

## Retail










-  Gas station

## Administrative

-  Headquarters
-  Office
-  Laboratory



## Industrial

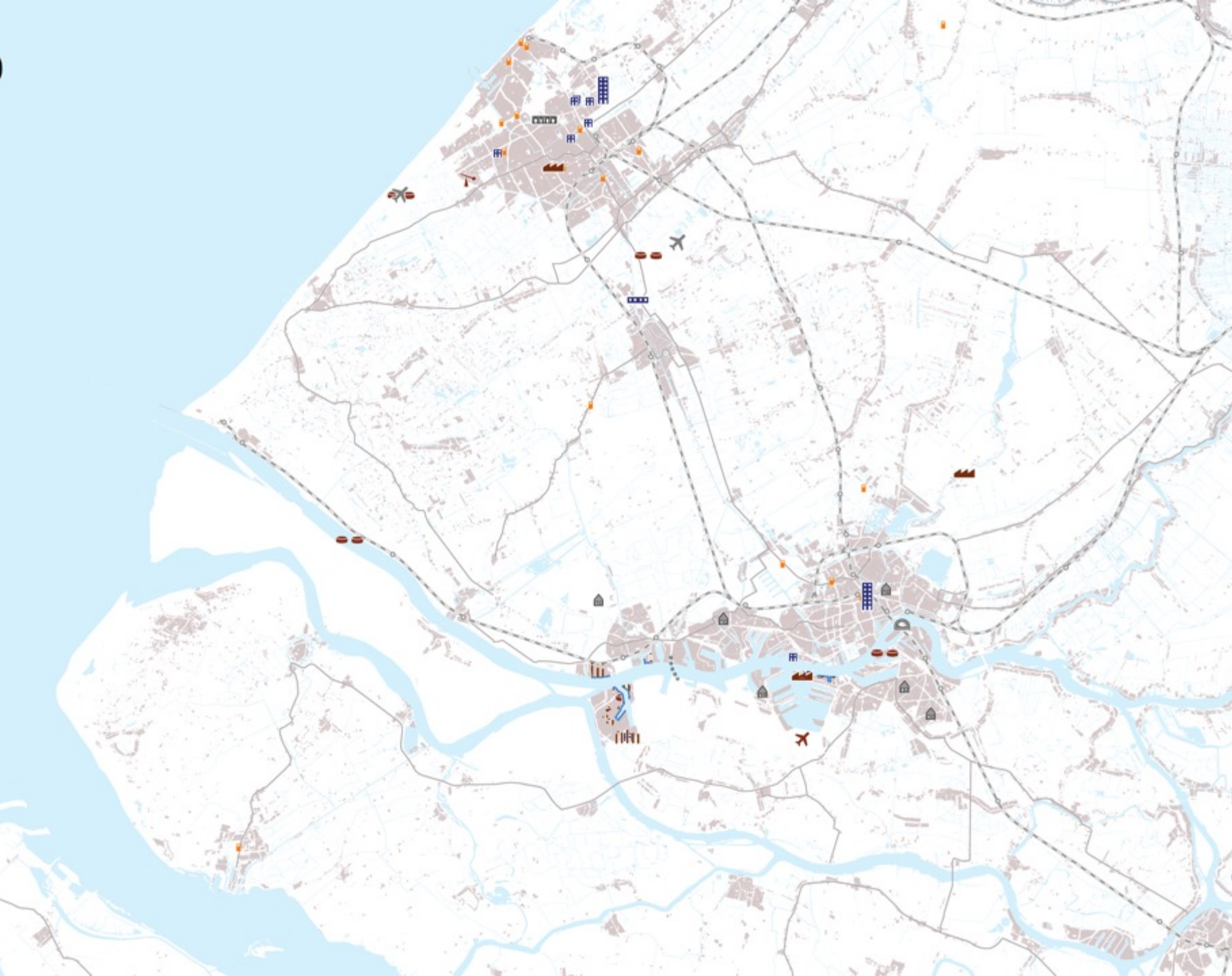
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-  Processing unit
-  Oil dedicated port
-  Oil pumping station
-  Oil pipeline
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-  Oil dedicated airport

## Retail










-  Gas station

## Administrative

-  Headquarters
-  Office
-  Laboratory






## Industrial

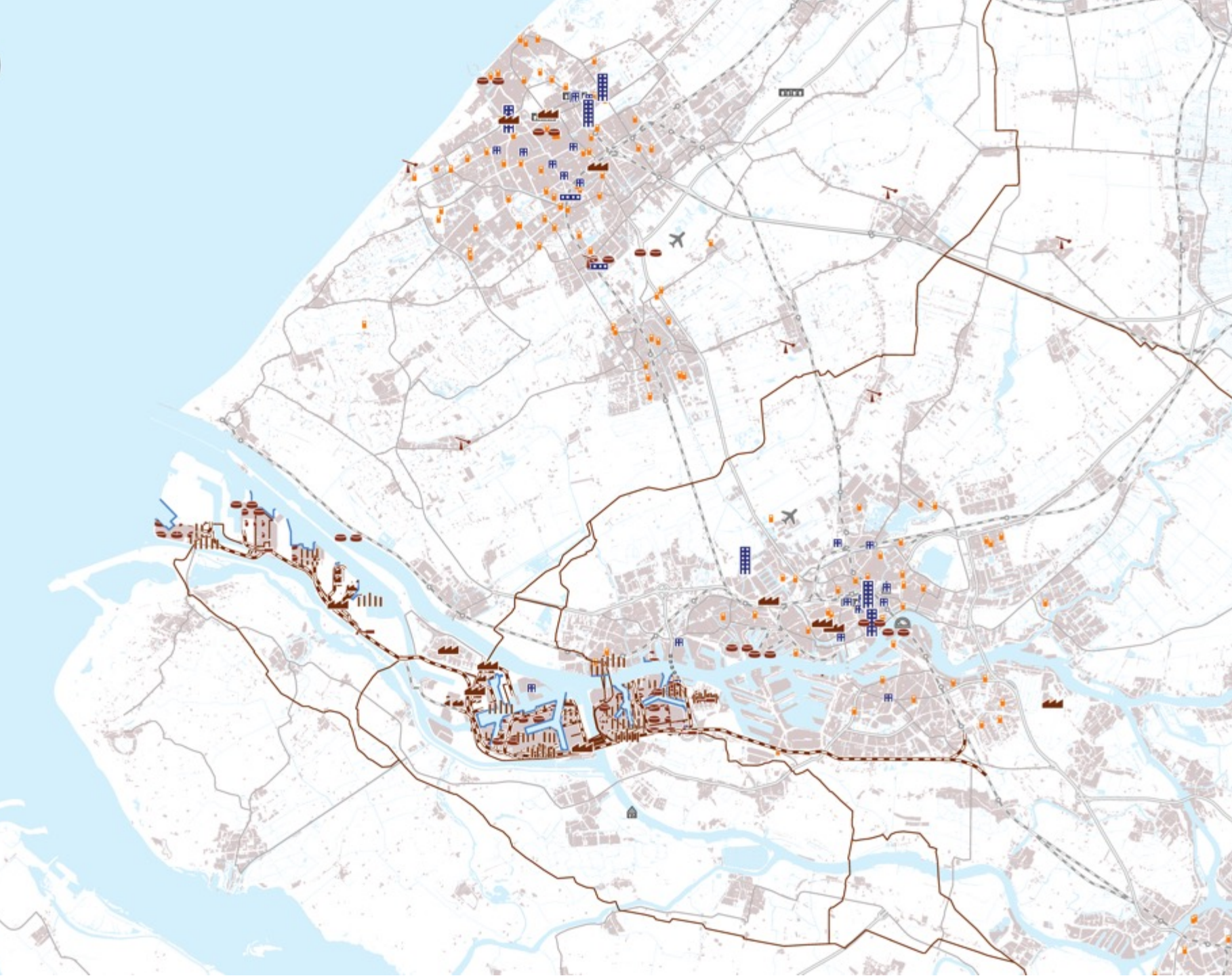
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## Retail










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## Industrial

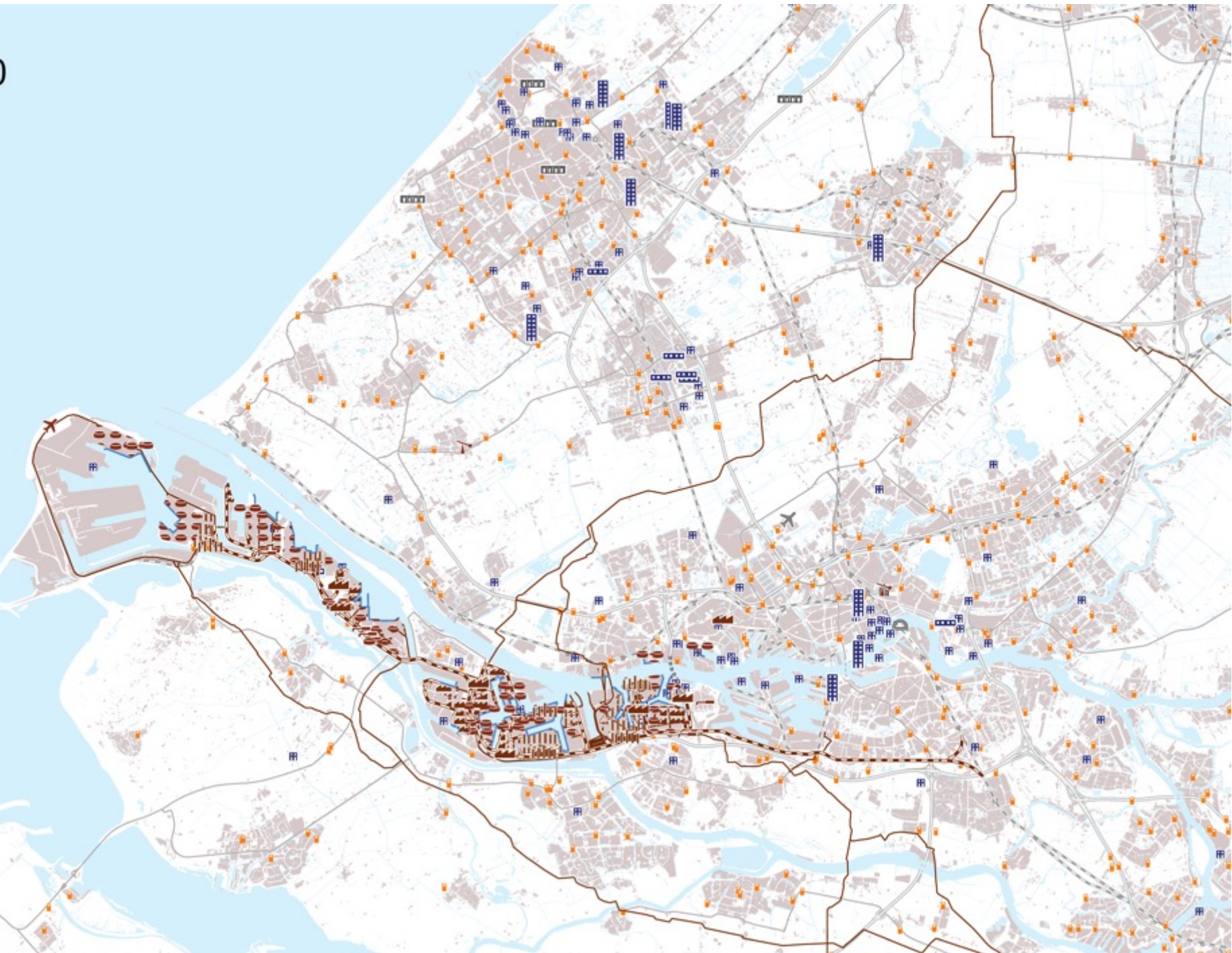
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-  Oil refinery
-  Oil storage unit
-  Processing unit
-  Oil dedicated port
-  Oil pumping station
-  Oil pipeline
-  Oil dedicated railway
- 

## Retail










-  Gas station

## Administrative

-  Headquarters
-  Office
-  Laboratory






## Industrial

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## Retail

-  Gas station

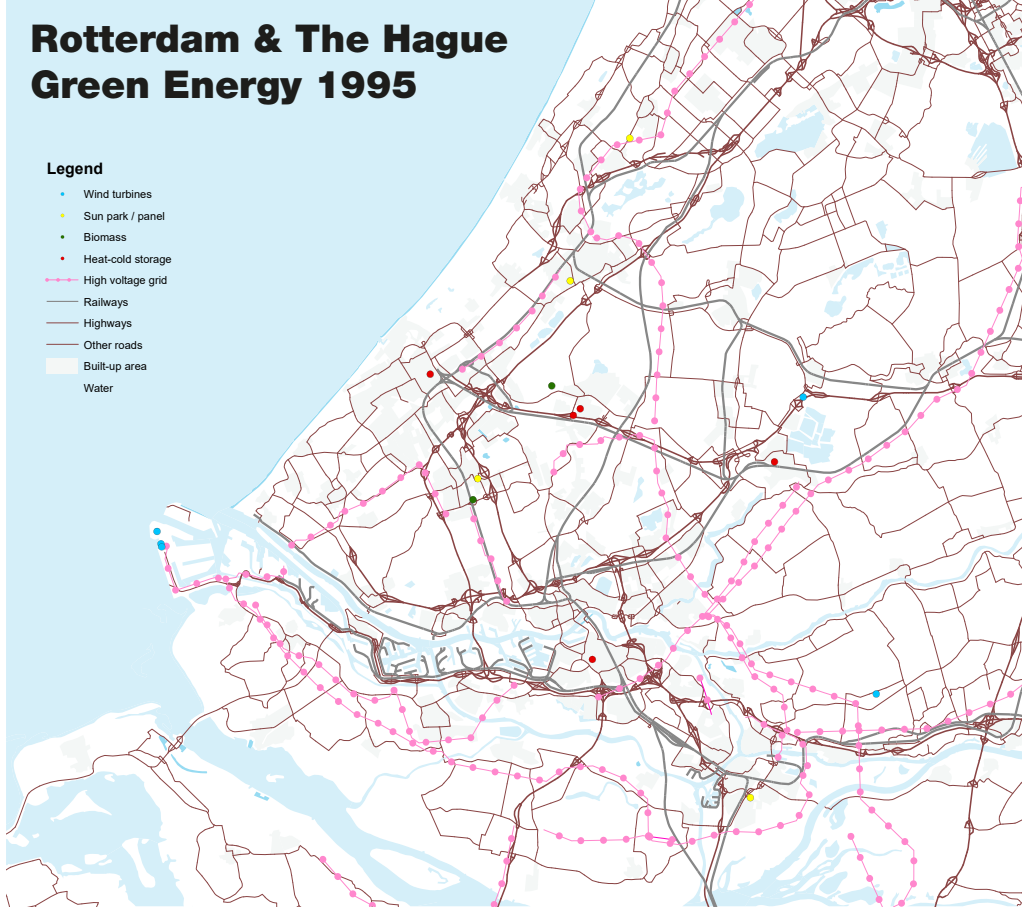
## Administrative

-  Headquarters
-  Office
-  Laboratory

# Rotterdam & The Hague Green Energy 1995

## Legend

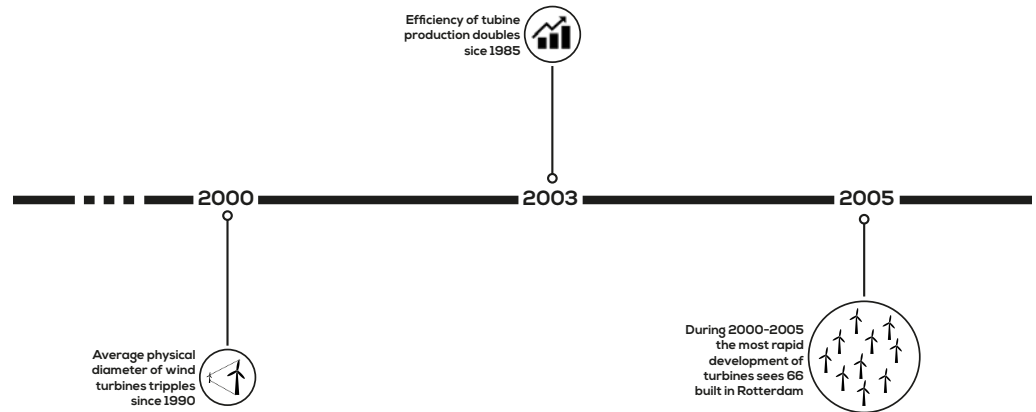
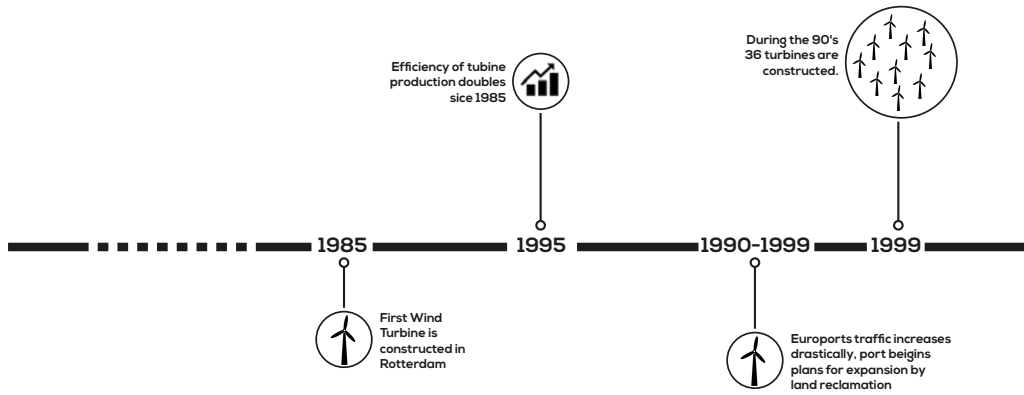
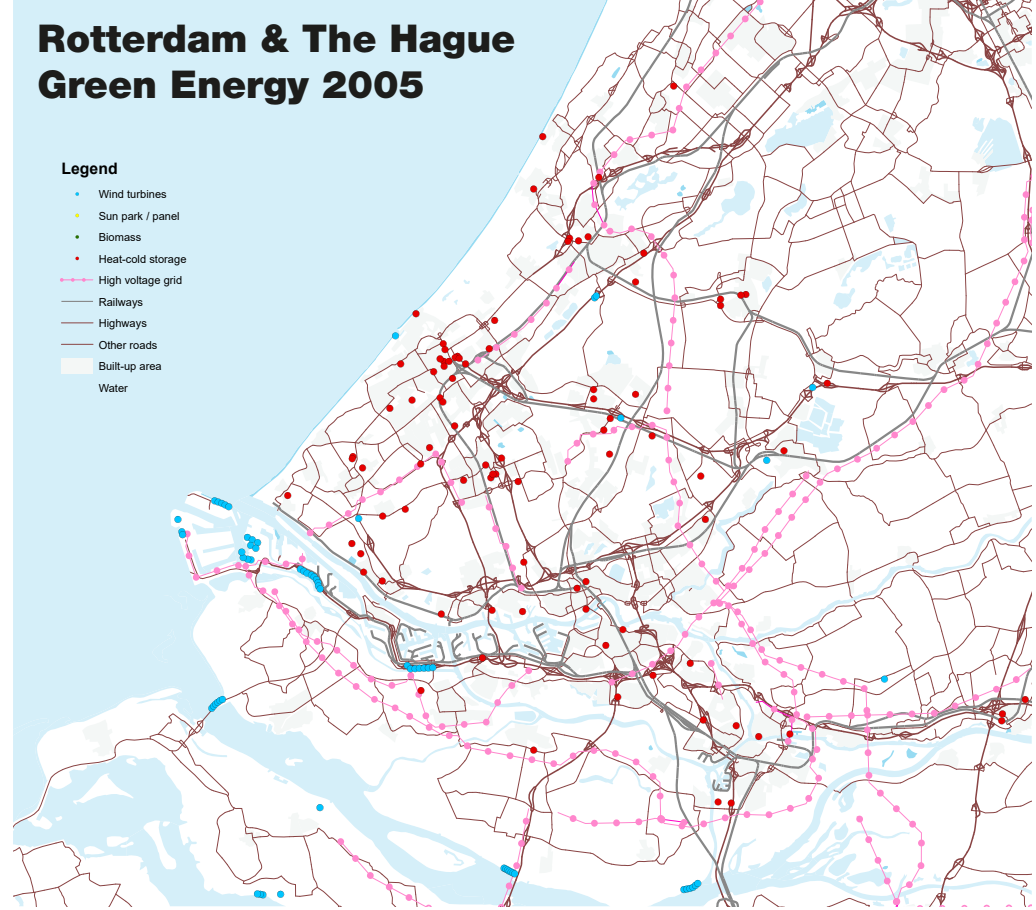
- Wind turbines
- Sun park / panel
- Biomass
- Heat-cold storage
- High voltage grid
- Railways
- Highways
- Other roads
- Built-up area
- Water



# Rotterdam & The Hague Green Energy 2005

## Legend

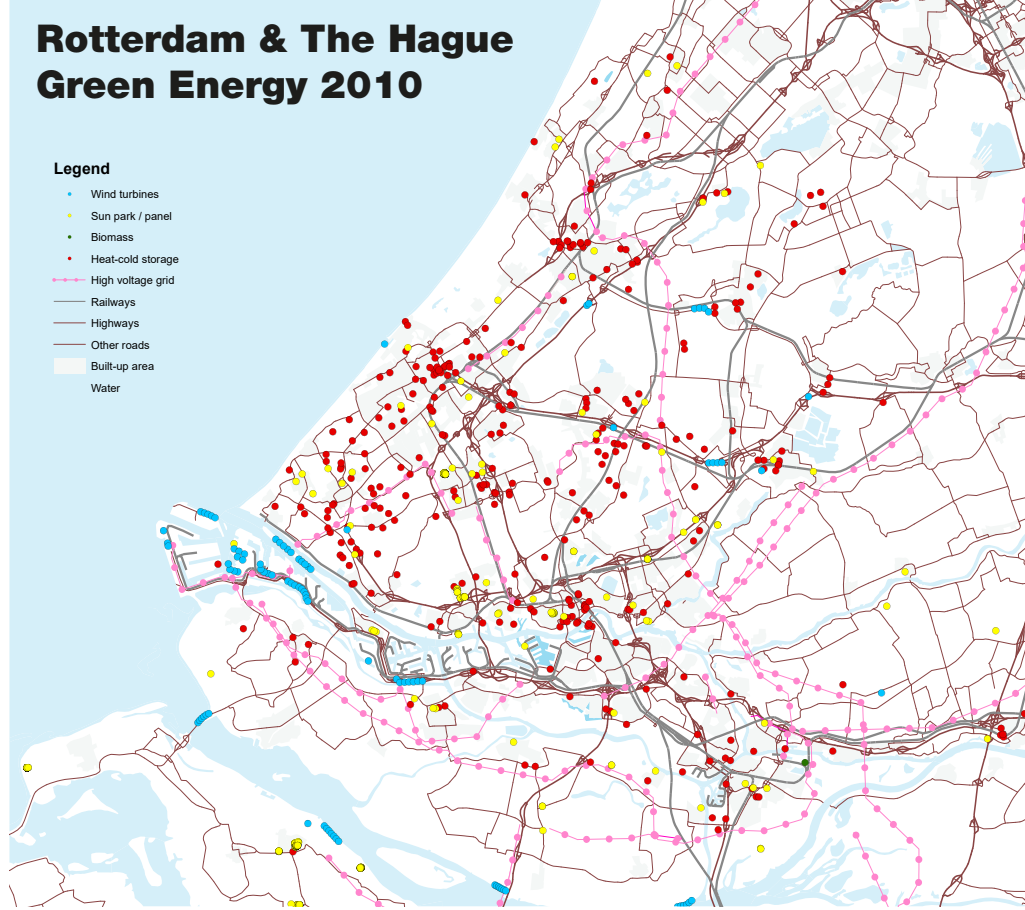
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- High voltage grid
- Railways
- Highways
- Other roads
- Built-up area
- Water



# Rotterdam & The Hague Green Energy 2010

## Legend

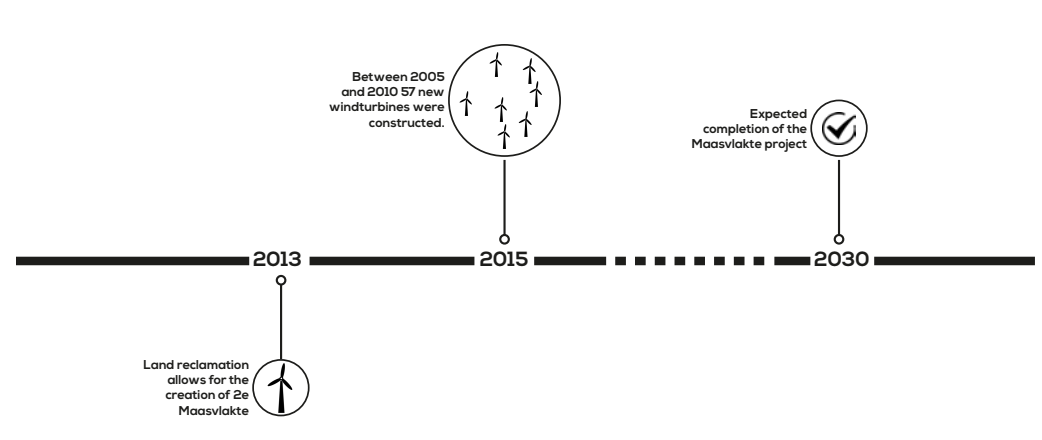
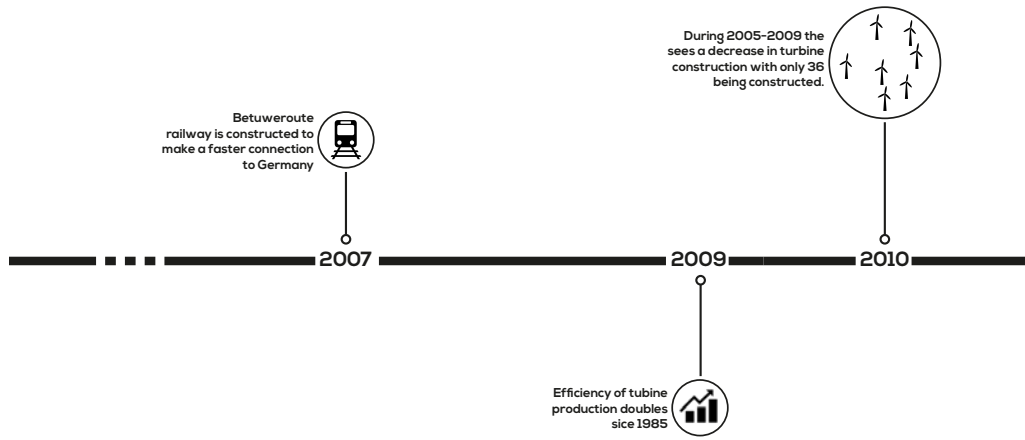
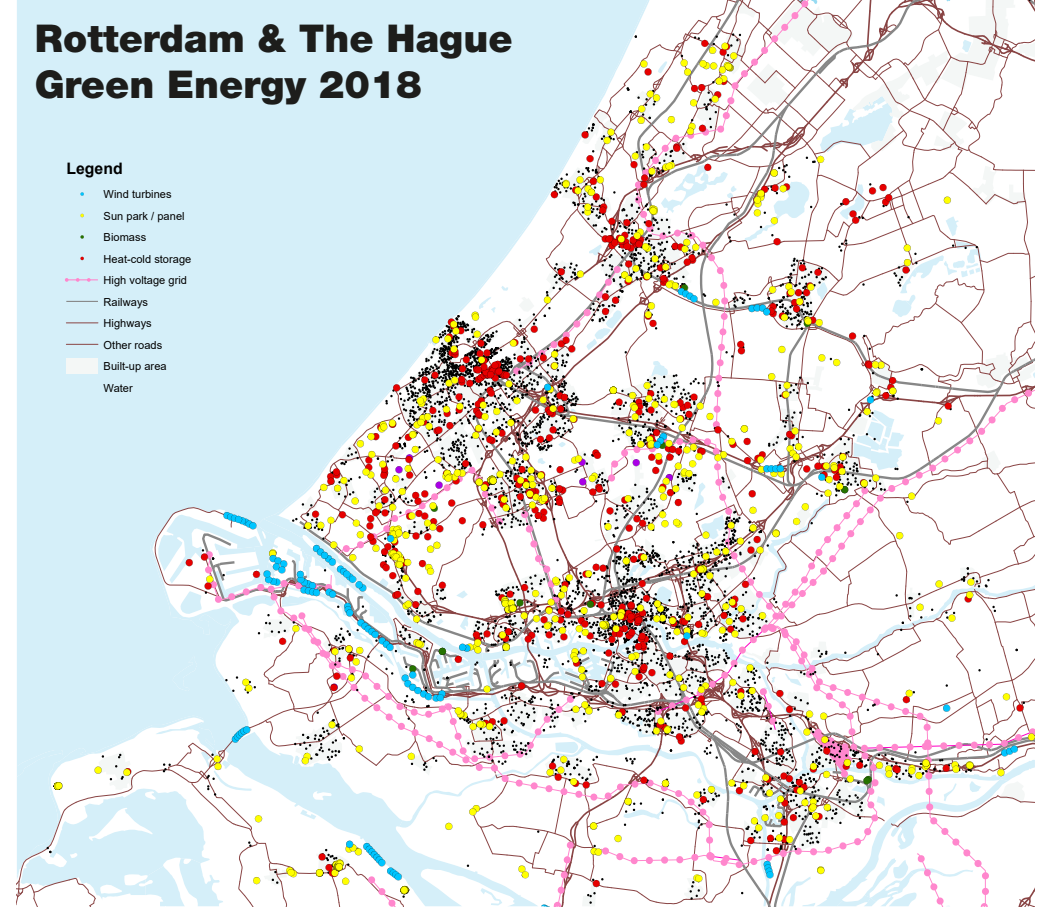
- Wind turbines
- Sun park / panel
- Biomass
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- High voltage grid
- Railways
- Highways
- Other roads
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# Rotterdam & The Hague Green Energy 2018

## Legend

- Wind turbines
- Sun park / panel
- Biomass
- Heat-cold storage
- High voltage grid
- Railways
- Highways
- Other roads
- Built-up area
- Water





PORT  
CITY  
ATLAS

Mapping European Port City Territories:  
From Understanding to Design  
nai010 publishers



Port City Atlas  
Mapping European Port City Territories:  
From Understanding to Design

Baltic Sea Århus, Fredericia, Gdansk/Gdynia, Helsingborg/Helsingør, Helsinki, Kiel, Klaipeda/Butinge, Københavns, Liepaja, Luleå, Lübeck, Riga, Rødby/Puttgarden, Rønne, Rostock, Sillamäe, Sköldvik, Statoil-Havnen/Sjaellands Odde, Stockholm, Swinoujscie, Szczecin, Tallinn, Trelleborg/Malmö, Turku/Naantali, Ventspils North Sea Aalborg, Amsterdam, Antwerp, Bergen, Bremen, Brunsbüttel, Delfzijl/Emden, Dover/Calais, Dunkirk, Esbjerg, Felixstowe/Harwich/Ipswich, Forth, Frederikshavn/Hirtshals, Ghent, Göteborg, Hamburg, Immingham/Hull, London, Medway, Oslo, Rotterdam, Tees & Hartlepool/Tyne, Tonsberg, Wilhelmshaven/Bremerhaven, Zeebrugge Atlantic Belfast/Larne, Bilbao, Bordeaux, Bristol, Cádiz, Cairnryan, Clydeport, Cork, Dublin, Gijón, Heysham, Holyhead, Huelva, La Coruña/Ferrol, La Rochelle, Las Palmas, Le Havre, Leixões, Limerick, Lisboa/Setúbal, Liverpool, Milford Haven, Nantes Saint-Nazaire, Santa Cruz de Tenerife, Southampton/Portsmouth, Algeciras/Ceuta Mediterranean Sea Barcelona, Cartagena, Civitavecchia, Genova/Savona, Gioia Tau/Reggiodi Calabria, La Spezia, Livorno, Marseille, Messina/Milazzo, Napoli, Palermo, Peiraias/Perama/Elefsina, Porto Foxi/Cagliari, Ravenna, Rijeka, Siracusa, Split, Taranto, Tarragona, Thessaloniki, Toulon, Trieste/Koper/Monfalcone, Valencia/Castellón, Venezia

TU Delft, LDE PortCityFutures  
UNESCO Chair Water, Ports and Historic Cities

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From Understanding to Design

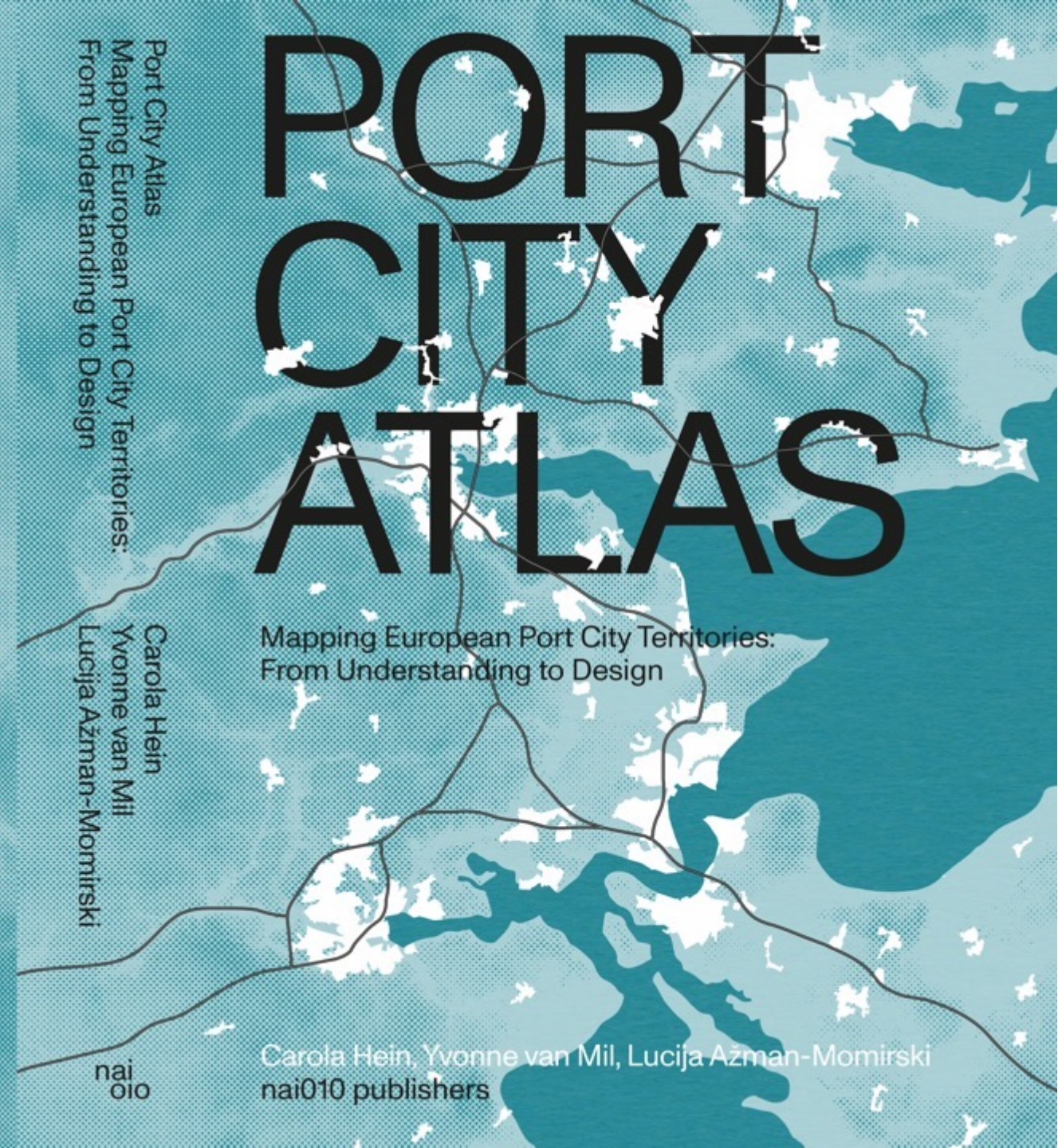
Carola Hein  
Yvonne van Mil  
Lucija Azman-Momirski

nai  
010

# PORT CITY ATLAS

Mapping European Port City Territories:  
From Understanding to Design

Carola Hein, Yvonne van Mil, Lucija Azman-Momirski  
nai010 publishers



## 100 European Port City Territories

### BALTIC SEA

ID	Port Name
HEL	Helsingborg, SE
HLS	Helsingør, DK
CPH	København, DK
TRG	Trelleborg, SE
MMA	Malmö, SE
RNN	Rønne, SE
STO	Stockholm, SE
LLA	Luleå, SE
TRU	Turku, FI
NLI	Naantali, FI
HEL	Helsinki, FI
SKV	Sköldvik, FI
TLL	Tallinn, EE
RIX	Riga, LV
VNT	Ventspils, LV
LFX	Liepāja, LV
KLJ	Klaipėda, LT
BOT	Butinge, LT
GDN	Gdansk, PL
GDY	Gdynia, PL
SZZ	Szczecin, PL
SKT	Swinoujście, PL
RSK	Rostock, DE
ROF	Rødby, DK
PJT	Puttgarden, DE
SLM	Sillamäe, EE
LBC	Lübeck, DE
KEL	Kiel, DE
FRC	Fredericia, DK
AAR	Århus, DK
SST	Statoil-Havnen, DK
SJO	Sjællands Odde, DK

### NORTH SEA

AAL	Aalborg, DK
FDH	Frederikshavn, DK
HJR	Hirtshals, DK
EJB	Esbjerg, DK
BRB	Brunsbüttel, DE
HAM	Hamburg, DE
BRE	Bremen, DE
WVN	Wilhelmshaven, DE
BRV	Bremerhaven, DE
DZL	Delfzijl, NL

EME	Emden, DE
AMS	Amsterdam, NL
RTM	Rotterdam, NL
ANR	Antwerp, BE
GNE	Ghent, BE
ZEE	Zeebrugge, BE
DKK	Dunkirk, FR
DVR	Dover, UK
COF	Calais, FR
MED	Medway, UK
LOW	London, UK
FXT	Felixstowe, UK
HRW	Harwich, UK
IPS	Ipswich, UK
IMM	Immingham, UK
HUL	Hull, UK
HME	Tees & Hartlepool, UK
TYN	Tyne, UK
FOR	Forth (Edinburgh), UK
BGO	Bergen, NO
TOS	Tønsberg, NO
OSL	Oslo, NO
GOT	Göteborg, SE

### ATLANTIC

CYP	Clydeport (Glasgow), UK
CYN	Cairnryan, UK
BEL	Belfast, UK
LAR	Larne, UK
DUB	Dublin, IE
LMK	Limerick, IE
ORK	Cork, IE
HYM	Heysham, UK
LTV	Liverpool, UK
HLY	Holyhead, UK
MLF	Millford Haven, UK
BRS	Bristol, UK
SOU	Southampton, UK
PME	Portsmouth, UK
LEH	Le Havre, FR
NTE	Nantes Saint-Nazaire, FR
LRH	La Rochelle, FR
BOD	Bordeaux, FR
BIO	Bilbao, ES
GIJ	Gijón, ES
LCG	La Coruña, ES

FRO	Ferrol, ES
LEI	Leixões (Porto), PT
LIS	Lisboa, PT
SET	Setúbal, PT
HUV	Huelva, ES
LPA	Las Palmas, ES
SCT	Santa Cruz de Tenerife, ES
CAD	Cádiz, ES

### MEDITERRANEAN SEA

ALG	Algeciras, ES
CEU	Ceuta, MA
CAR	Cartagena, ES
VLC	Valencia, ES
CAS	Castellón, ES
TAR	Tarragona, ES
BCN	Barcelona, ES
MRS	Marseille, FR
TLN	Toulon, FR
GOA	Genova, IT
SVN	Savona, IT
SPE	La Spezia, IT
LIV	Livorno, IT
CVV	Civitavecchia (Roma), IT
NAP	Napoli, IT
PFX	Porto Foxi, IT
CAG	Cagliari, IT
PMO	Palermo, IT
SZR	Siracusa, IT
MSN	Messina, IT
MLZ	Milazzo, IT
GIJ	Gioia Tauro, IT
REG	Reggio di Calabria, IT
TAR	Taranto, IT
RAN	Ravenna, IT
VCE	Venezia, IT
TRS	Trieste, IT
KOP	Koper, SI
MON	Monfalcone, IT
RJK	Rijeka, HR
SPU	Split, HR
PIR	Peiraia (Athens), GR
PER	Perama, GR
EEU	Elefsina, GR
SKG	Thessaloniki, GR



Multiple scales of analysis:

- The European Continent
- Four maritime waters
- 100 port city territories
- 129 port or port cities

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planning



mapping



conceptualizing



drawing lessons from the atlas

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Europe →

Sea →

Port City Territory →

# Ranking European Ports by Type of Throughput

Mapping ports based on their throughput of goods or passengers in relation to their vessel density produces two different patterns on the map (pages 68 – 69). Ports have multiple types of throughput and can appear in both cargo and passenger-based rankings. Cargo ports are scattered all over the European coastline, while passenger ports are concentrated on island regions. Cargo ports are gateways for global flows of containers and bulk goods, and vessels docking at these ports often travel long distances. Passenger ports serve as a base for ferries (travel) and cruise ships (holidays); these vessels travel short distances, often as scheduled services. The function of the ports also determines their relation to the city and territory. Cargo ports are largely automated nowadays and can be located outside the city, often in the less densely built territory and closer to the hinterland dryports and logistics centres. Passenger ports remain more connected to urban areas.



1 Natural Earth.  
 2 EEA EuroGeographics EuroDEM, 2022.  
 3 EMODnet Human Activities, Vessel Density Map 2019.  
 4 Eurostat/Natural Earth.  
 5 Eurostat Maritime transport data, 2019.







# Europe through its Four Waters

The west coast of Europe is surrounded by water: the Baltic Sea, the North Sea, the Mediterranean Sea and the Atlantic. Each maritime water has its own unique character, shaped by its geographical landscape and maritime history. They provide a common, sheltered base for port cities to emerge and develop in. The map shows that we selected our 100 port city territories based on the ranking of the largest European ports in terms of passenger and cargo throughput and the population density of local administrative areas (LAU). Although the selected ports are all leading ports in Europe, the inter-individual differences in volume of transit are significant, both within a maritime water and between maritime waters. This becomes clear when studying the list of selected ports attached to the maps of the four maritime waters (p. 81, 133, 185, 236 – 237). Although almost all port cities are located in densely populated areas, the combination of maps and data also makes it clear that high population density is not necessarily a prerequisite for high throughput.



1 EMODnet Human Activities: Regional Advisory Councils, 2014.  
 2 EEA EuroGeographics EuroDEM, 2022.  
 3 Based on Eurogeographics, (2020). EuroGlobalMap. Version 2020 Eurogeographics. Retrieved from <https://eurogeographics.org/maps-for-europe/open-data>.  
 4 Eurostat NUTS 1 data.  
 5 Eurostat Maritime transport data, 2019.  
 6 Natural Earth  
 7 Eurostat, GISCO LAU, 2019.

# Baltic Sea Map and Statistics

ID	Port name	 <sup>1</sup>	 <sup>2</sup>
NEL	Helsingborg, SE	8,839	7,153
NLS	Helsingør, DK	5,052	7,105
CPH	København, DK	6,659	1,213
TRG	Trelleborg, SE	11,798	1,814
MMA	Malmö, SE	7,813	329
RNN	Rønne, SE	1,393	1,860
STO	Stockholm, SE	4,726	8,349
LLA	Luleå, SE	7,355	0
TKU	Turku, FI	2,134	3,137
NLI	Naantali, FI	7,589	194
NEL	Helsinki, FI	14,370	11,619
SKV	Skövde, FI	25,198	0
SJM	Sillamäe, EE	10,492	0
TLL	Tallinn, EE	19,636	9,961
RIX	Riga, LV	30,628	799
VNT	Ventspils, LV	19,600	232
LFX	Liepāja, LV	7,025	40
KLJ	Klaipėda, LT	42,705	343
BOT	Butinge, LT	9,542	0
GDN	Gdansk, PL	45,520	289
GDY	Gdynia, PL	20,551	791
SZZ	Szczecin, PL	9,583	6
SKT	Swinoujście, PL	15,937	1,170
RSK	Rostock, DE	19,993	3,394
ROF	Rødby, DK	8,394	0
POT	Puttgarden, DE	5,375	6,007
LBX	Lübeck, DE	16,022	458
KEL	Kiel, DE	4,819	2,331
FRC	Fredericia, DK	6,869	0
AAR	Århus, DK	8,617	3,385
SST	Statøil-Havnen, DK	7,900	0
SLJ	Sjællands Odde, DK		3,493

1 Total tonnage of cargo in thousands and in relation to the other selected European ports. Eurostat, 2019.  
 2 Total number of passengers in thousands and in relation to other selected European ports. Eurostat, 2019.  
 3 EMODnet Human Activities: Regional Advisory Councils, 2014.  
 4 EEA EuroGeographics EuroDEM, 2022.  
 5 EMODnet Human Activities, Vessel Density Map 2019.  
 6 ———, Environment, Natura 2000, 2015.  
 7 Based on Eurogeographics, (2020). EuroGlobalMap. Version 2020 Eurogeographics. Retrieved from <https://eurogeographics.org/maps-for-europe/open-data>.  
 8 Eurostat NUTS 1 data.  
 9 Eurostat Maritime transport data, 2019.  
 10 Natural Earth.  
 11 Eurostat, GISCO LAU, 2019.



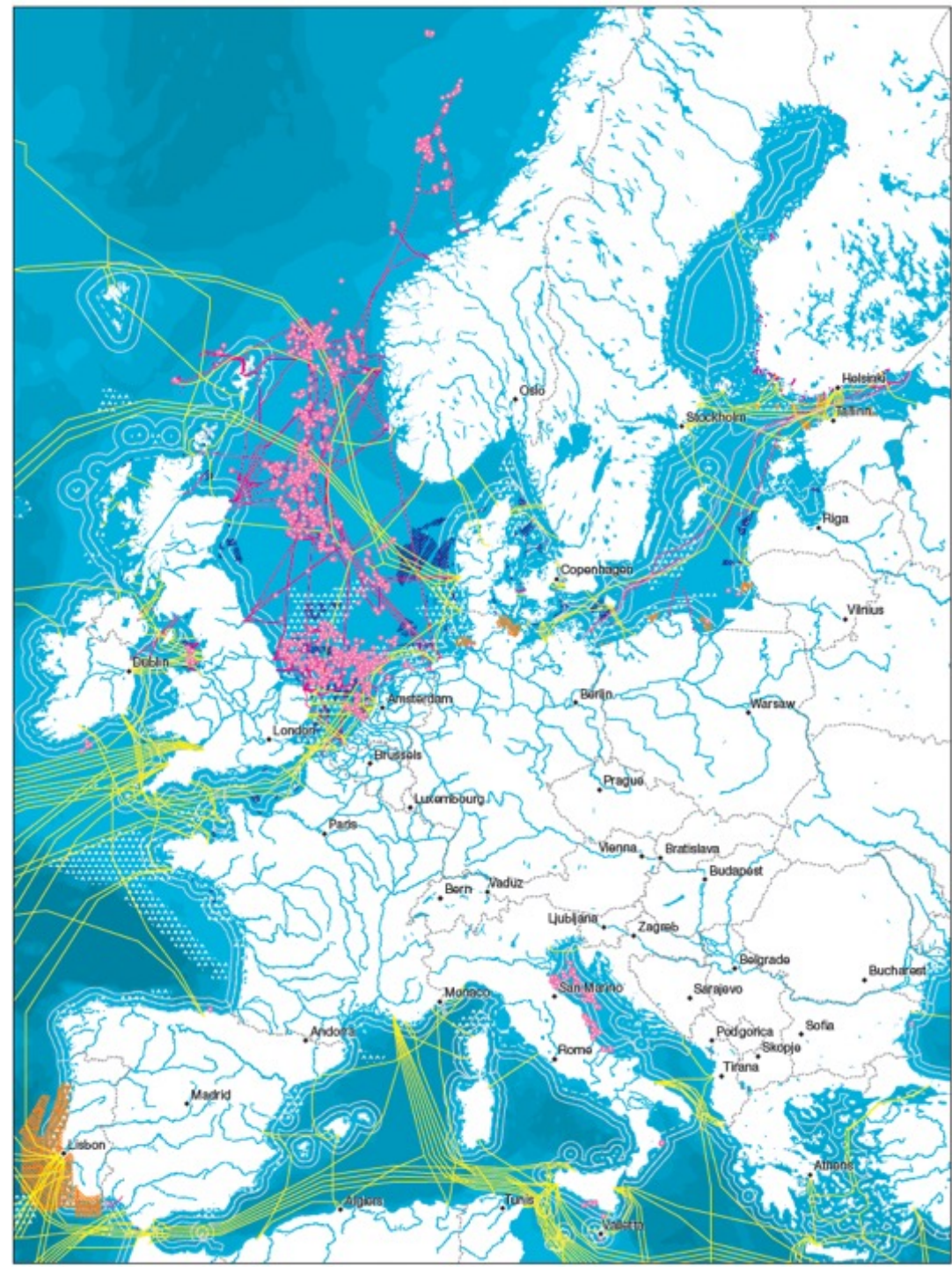
BALTIC SEA

ID	Port Name	W	P	C	N
HEL	Helsingborg, SE/	✓	🏠	🏢	🏠
HLS	Helsingør, DK	✓	🏠	🏢	🏠
CPH	København, DK	✓	🏠	🏢	🏠
TRG	Trelleborg, SE/	✓	🏠	🏢	🏠
MMA	Malmö, SE	✓	🏠	🏢	🏠
RNN	Rønne, SE	✓	🏠	🏢	🏠
STO	Stockholm, SE	✓	🏠	🏢	🏠
LLA	Luleå, SE	✓	🏠	🏢	🏠
TKU	Turku, FI	✓	🏠	🏢	🏠
NLI	Naantali, FI	✓	🏠	🏢	🏠
HEL	Helsinki, FI	✓	🏠	🏢	🏠
SKV	Sköldvik, FI	✓	🏠	🏢	🏠
TLL	Tallinn, EE	✓	🏠	🏢	🏠
RIX	Rīga, LV	✓	🏠	🏢	🏠
VNT	Ventspils, LV	✓	🏠	🏢	🏠
LPZ	Liepāja, LV	✓	🏠	🏢	🏠
KLJ	Klaipėda, LT/	✓	🏠	🏢	🏠
BOT	Butinge, LT	✓	🏠	🏢	🏠
GDN	Gdansk, PL	✓	🏠	🏢	🏠
GDY	Gdynia, PL	✓	🏠	🏢	🏠
SZZ	Szczecin, PL	✓	🏠	🏢	🏠
SWI	Swinoujście, PL	✓	🏠	🏢	🏠
RSK	Rostock, DE	✓	🏠	🏢	🏠
ROF	Redby, DK/	✓	🏠	🏢	🏠
PUT	Puttgarden, DE	✓	🏠	🏢	🏠
SLM	Sillamäe, EE	✓	🏠	🏢	🏠
LBC	Lübeck, DE	✓	🏠	🏢	🏠
KEL	Kiel, DE	✓	🏠	🏢	🏠
FRC	Fredericia, DK	✓	🏠	🏢	🏠
AAR	Århus, DK	✓	🏠	🏢	🏠
SST	Statøil-Havnen, DK	✓	🏠	🏢	🏠
SJO	Sjælland Odde, DK	✓	🏠	🏢	🏠

Waterside  
Port main typology  
City typology  
NUTS 3 territory typology

NORTH SEA

ID	Port Name	W	P	C	N
AAL	Aalborg, DK	✓	🏠	🏢	🏠
FDH	Frederikshavn, DK/	✓	🏠	🏢	🏠
HDR	Hirtshals, DK	✓	🏠	🏢	🏠
EJB	Esbjerg, DK	✓	🏠	🏢	🏠
BRB	Brunsbüttel, DE	✓	🏠	🏢	🏠
HAB	Hamburg, DE	✓	🏠	🏢	🏠
BRE	Bremen, DE	✓	🏠	🏢	🏠
WVN	Wilhelmshaven, DE/	✓	🏠	🏢	🏠
BRV	Bremerhaven, DE	✓	🏠	🏢	🏠
DZL	Delfzijl, DE/	✓	🏠	🏢	🏠
EME	Emden, NL	✓	🏠	🏢	🏠
AMS	Amsterdam, NL	✓	🏠	🏢	🏠
RTM	Rotterdam, NL	✓	🏠	🏢	🏠
ANR	Antwerp, BE	✓	🏠	🏢	🏠
GHE	Ghent, BE	✓	🏠	🏢	🏠
ZEE	Zeebrugge, BE	✓	🏠	🏢	🏠
DKK	Dunkirk, FR	✓	🏠	🏢	🏠
DVR	Dover, UK/	✓	🏠	🏢	🏠
COF	Calais, FR	✓	🏠	🏢	🏠
MED	Medway, UK	✓	🏠	🏢	🏠
LON	London, UK	✓	🏠	🏢	🏠
FXT	Felixstowe, UK/	✓	🏠	🏢	🏠
HRW	Harwich, UK/	✓	🏠	🏢	🏠
IPS	Ipswich, UK	✓	🏠	🏢	🏠
IMK	Immingham, UK/	✓	🏠	🏢	🏠
HUL	Hull, UK	✓	🏠	🏢	🏠
HKE	Tees & Hartlepool, UK/	✓	🏠	🏢	🏠
TYN	Tyne, UK	✓	🏠	🏢	🏠
FOR	Forth (Edinburgh), UK	✓	🏠	🏢	🏠
BGO	Bergen, NO	✓	🏠	🏢	🏠
TON	Tonsberg, NO	✓	🏠	🏢	🏠
OSL	Oslo, NO	✓	🏠	🏢	🏠
GOT	Göteborg, SE	✓	🏠	🏢	🏠

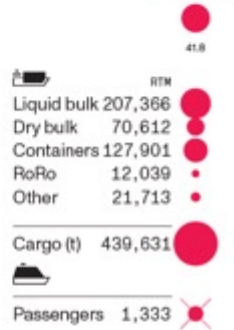
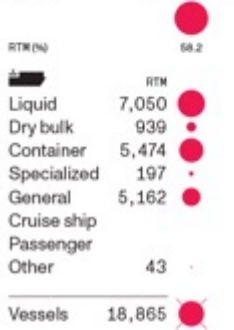


RTM

# Rotterdam, NL

 New Waterway

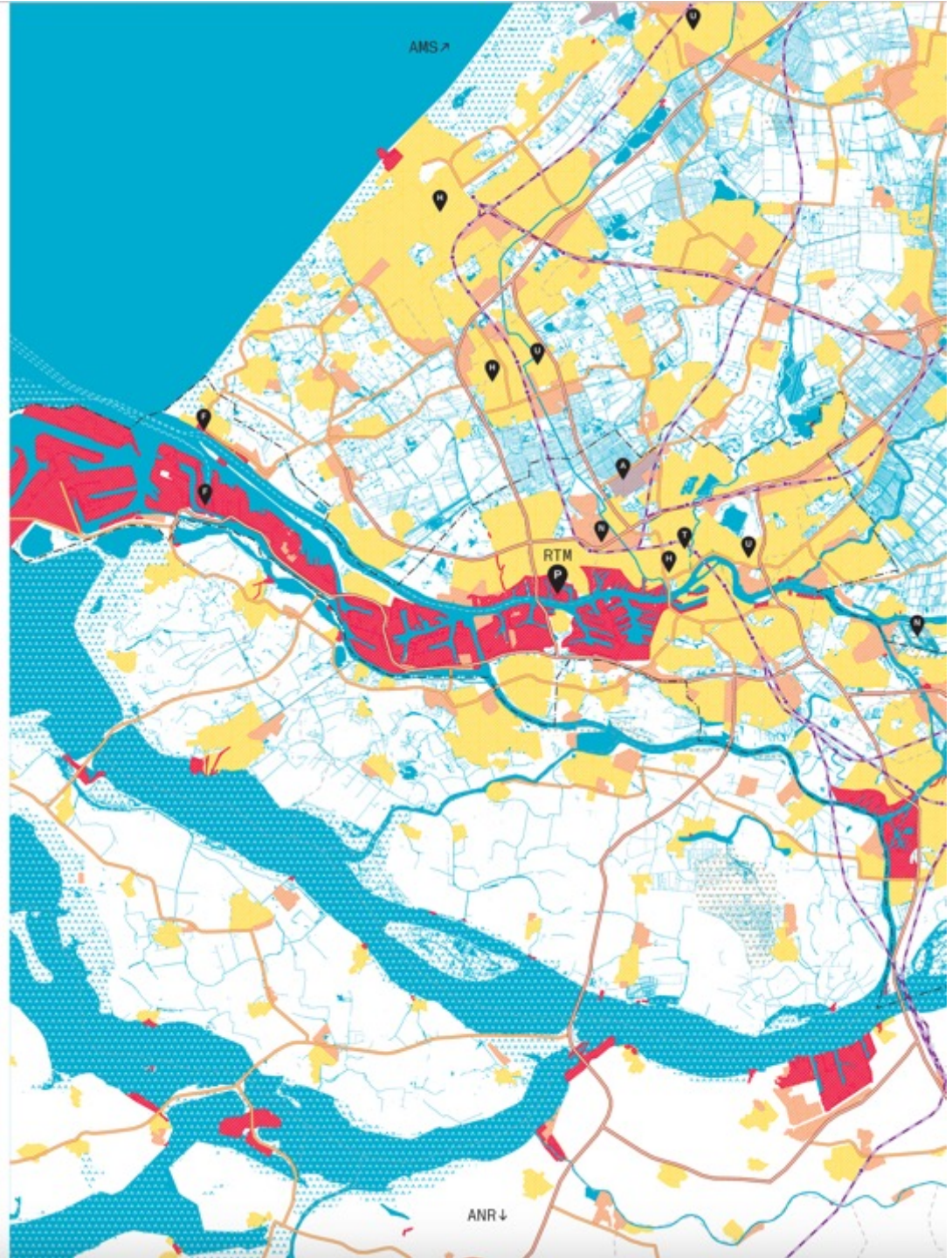
## PORT



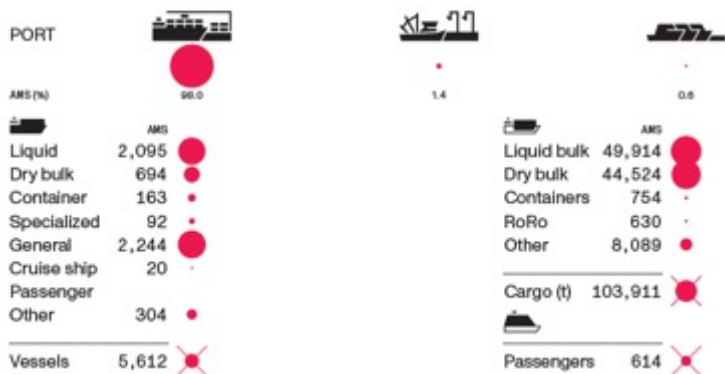
## CITY



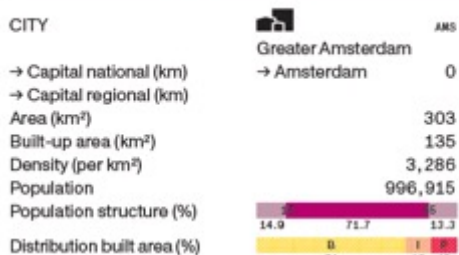
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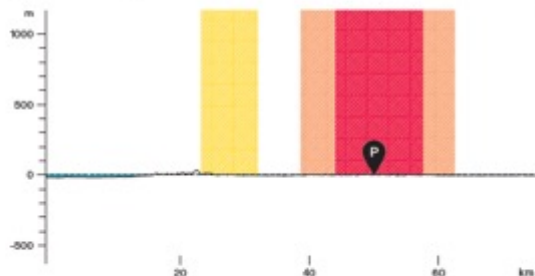
## PORT



## CITY



## TERRITORY



ANR

# Antwerp, BE

Scheldt

## PORT



ANR (%)



ANR

Liquid	5,419	
Dry bulk	14	
Container	4,616	
Specialized	1,246	
General	3,134	
Cruise ship		
Passenger	41	
Other	93	
Vessels	14,563	

ANR

Liquid bulk	71,089	
Dry bulk	13,727	
Containers	114,573	
RoRo	6,351	
Other	8,285	
Cargo (t)	214,025	
Passengers	61	

## CITY



ANR

- Capital national (km)
- Capital regional (km)
- Area (km<sup>2</sup>)
- Built-up area (km<sup>2</sup>)
- Density (per km<sup>2</sup>)
- Population
- Population structure (%)
- Distribution built area (%)

Antwerpen	
→ Brussels	45
→ Rotterdam	75
Area (km <sup>2</sup> )	204
Built-up area (km <sup>2</sup> )	108
Density (per km <sup>2</sup> )	2,580
Population	526,439
Population structure (%)	
Distribution built area (%)	

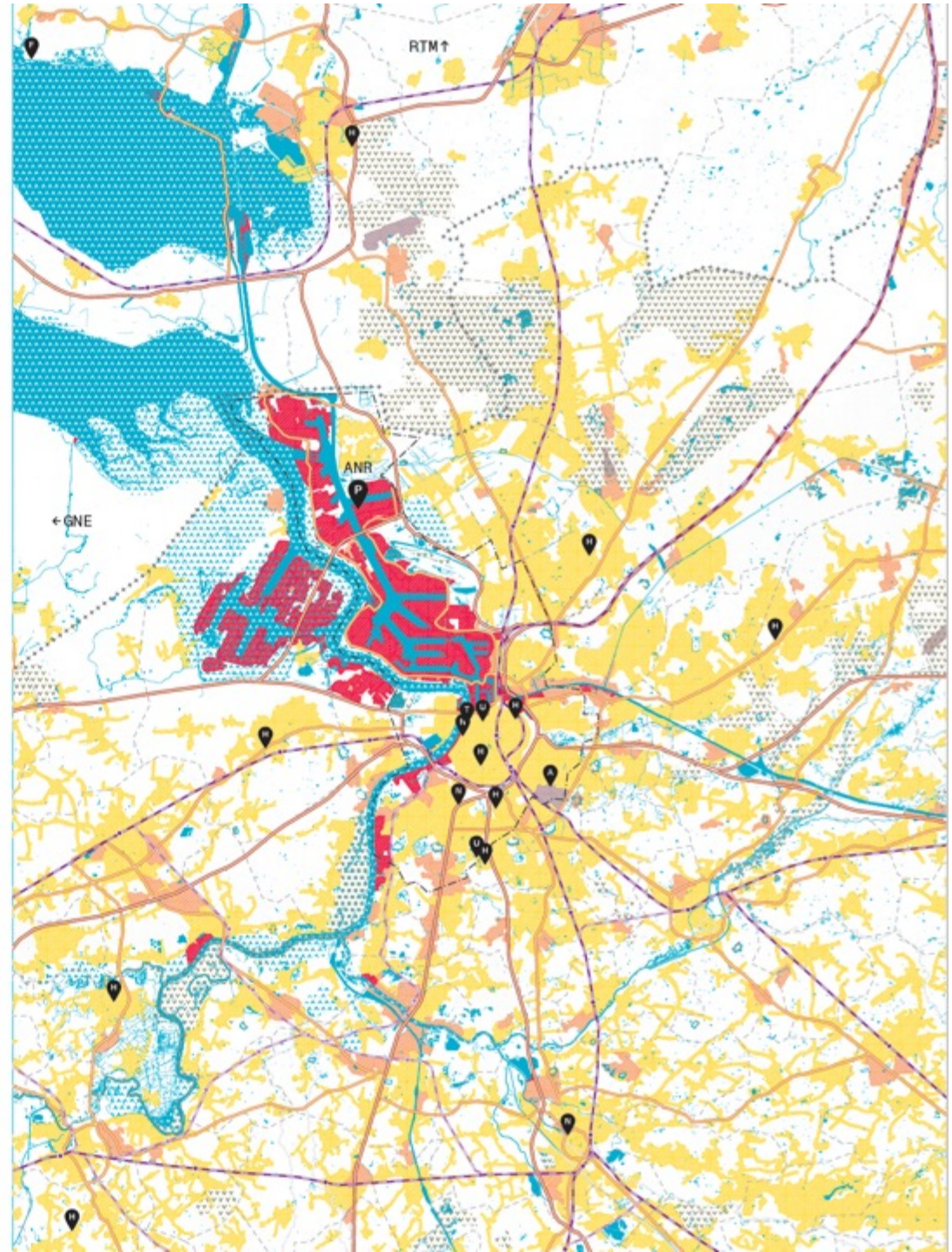
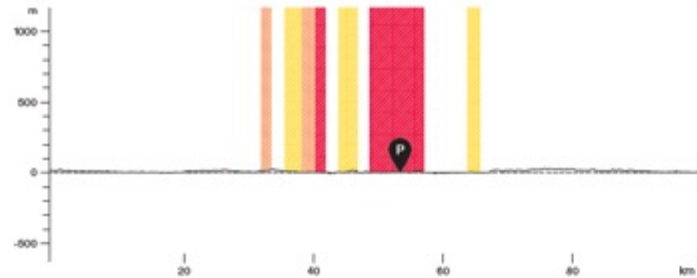
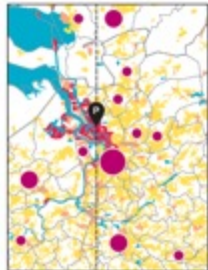
## TERRITORY

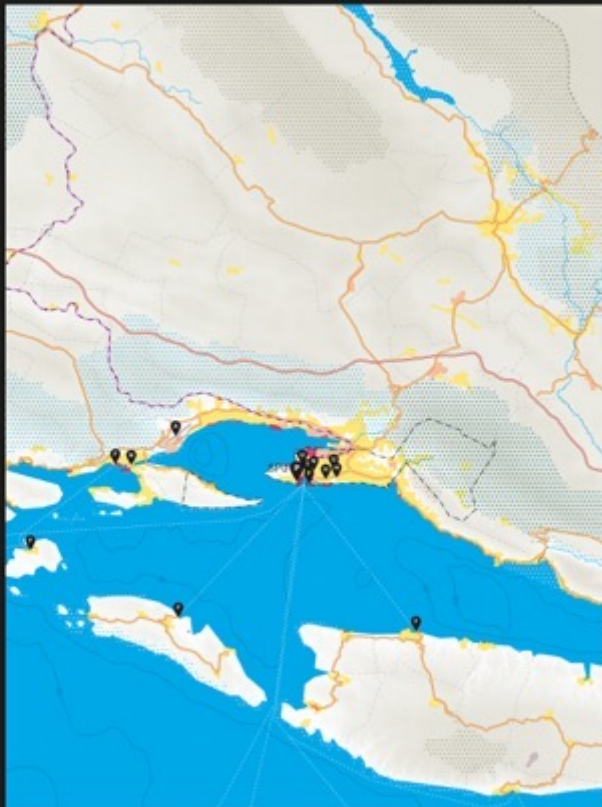
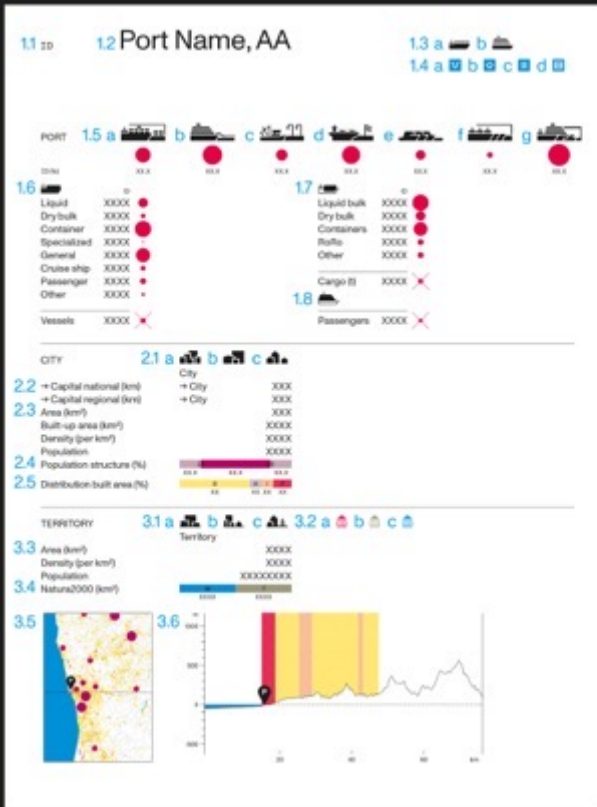


ANR

- Area (km<sup>2</sup>)
- Density (per km<sup>2</sup>)
- Population
- Natura2000 (km<sup>2</sup>)

Arr. Antwerpen	
Area (km <sup>2</sup> )	1,003
Density (per km <sup>2</sup> )	1,050
Population	1,053,033
Natura2000 (km <sup>2</sup> )	



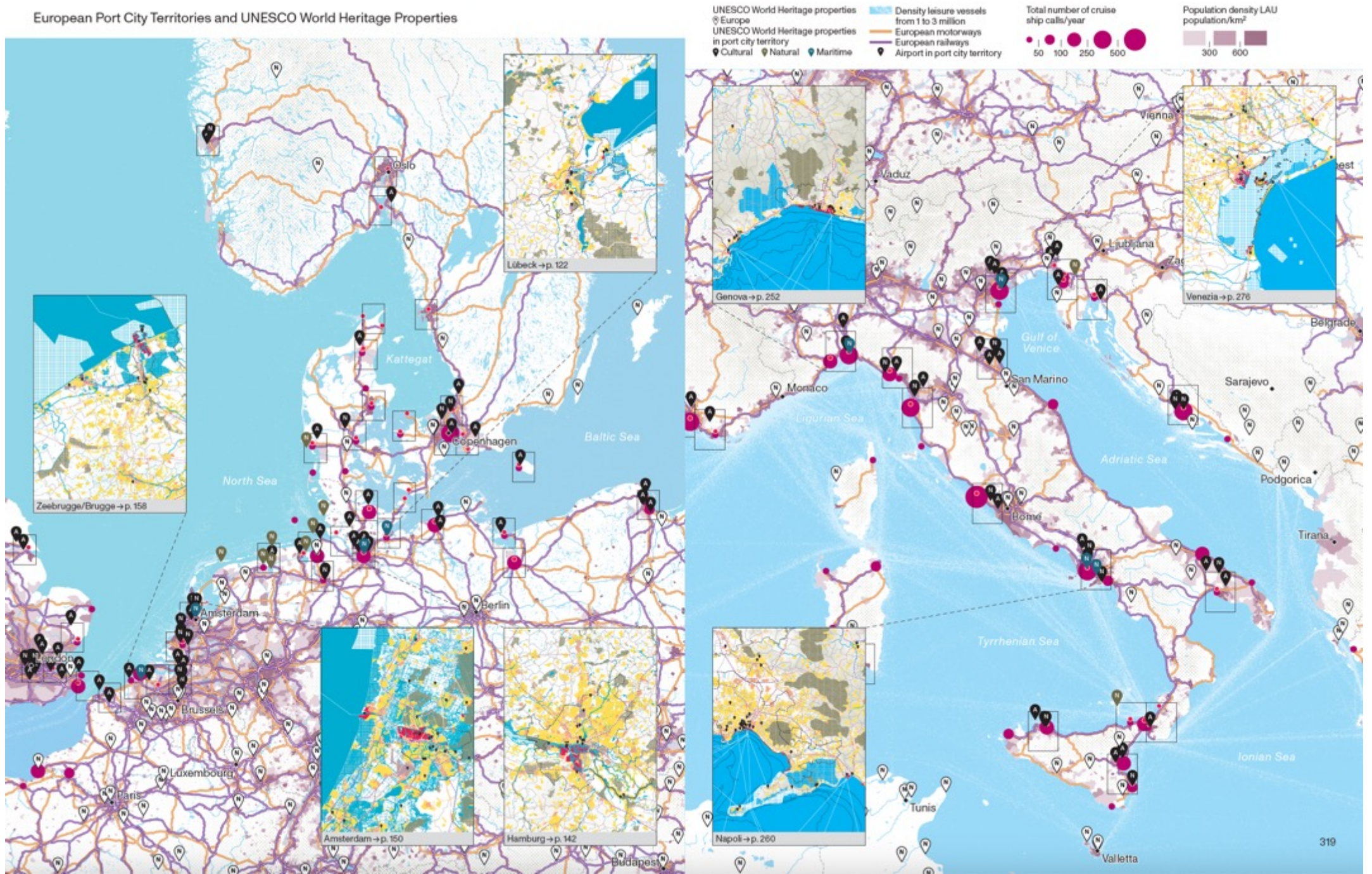


extensive legends in the front of the book

condensed legend as bookmark



# European Port City Territories and UNESCO World Heritage Properties





# Port Cities: Design project Rotterdam 2080



08-10-2022

LDE Port City Futures

# Port Cities: Utopias and Dystopias



08-10-2022

LDE Port City Futures

# Culture | History | Porosities



Architecture and Urbanism Beyond oil – Design Studio at TU Delft 2018 – Mercati napoletani by Marijn Heijnis

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## (Re)Imagining Port Cities: Understanding Space, Society and Culture

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In this course we will analyze examples of port cities from a multi-disciplinary, cross-cultural perspective. You will develop the skills to identify and address the challenges port cities face now and into the future.



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# IS WATER ACTION NEGOTIABLE?

Not at all



Very much

# WATER VALUES

*'This game has  
opened my eyes. It is  
time to act. Now!'*



[portcityfutures.nl/unesco-chair/watervalues-a-serious-board-game](http://portcityfutures.nl/unesco-chair/watervalues-a-serious-board-game)







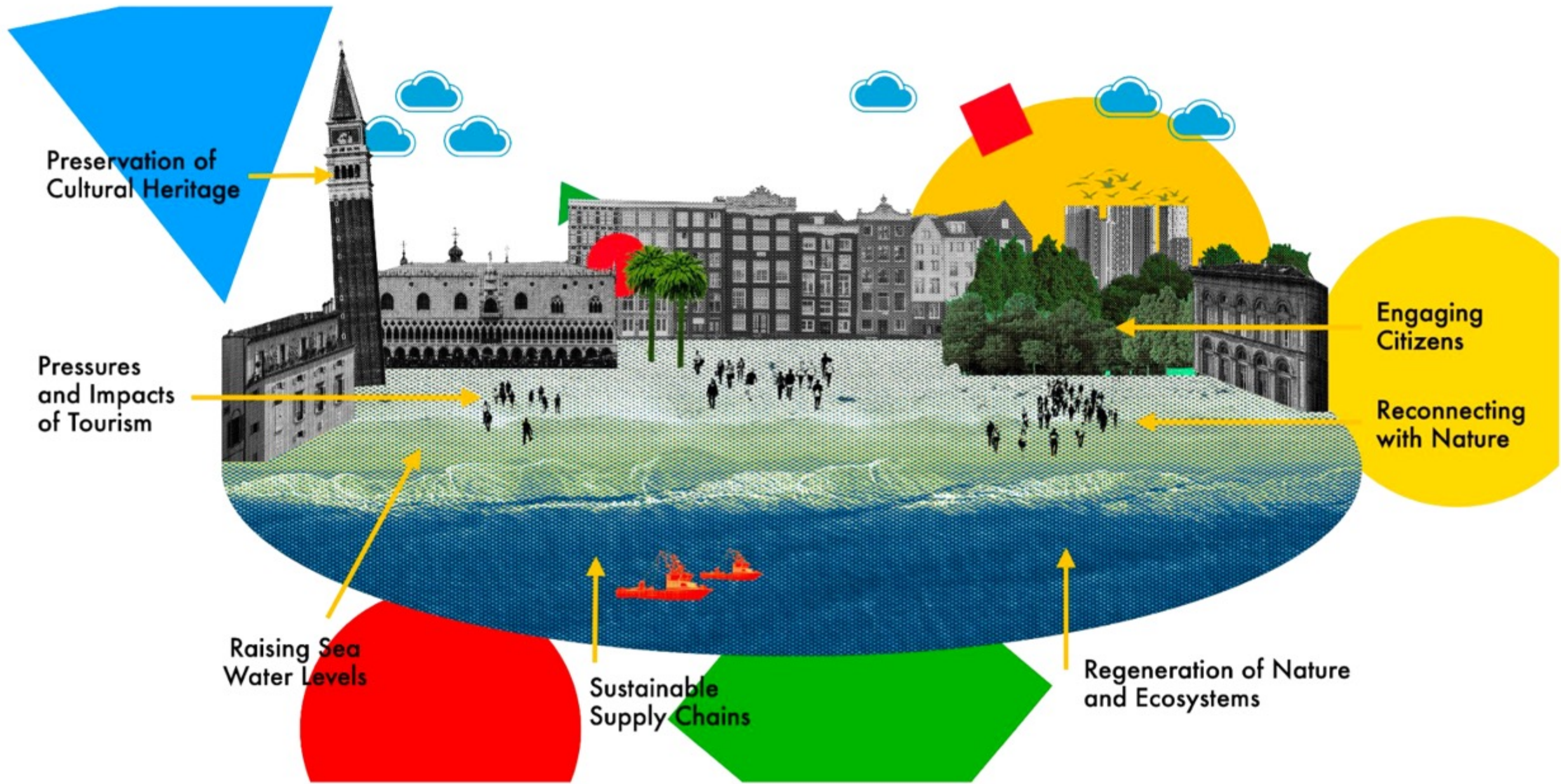






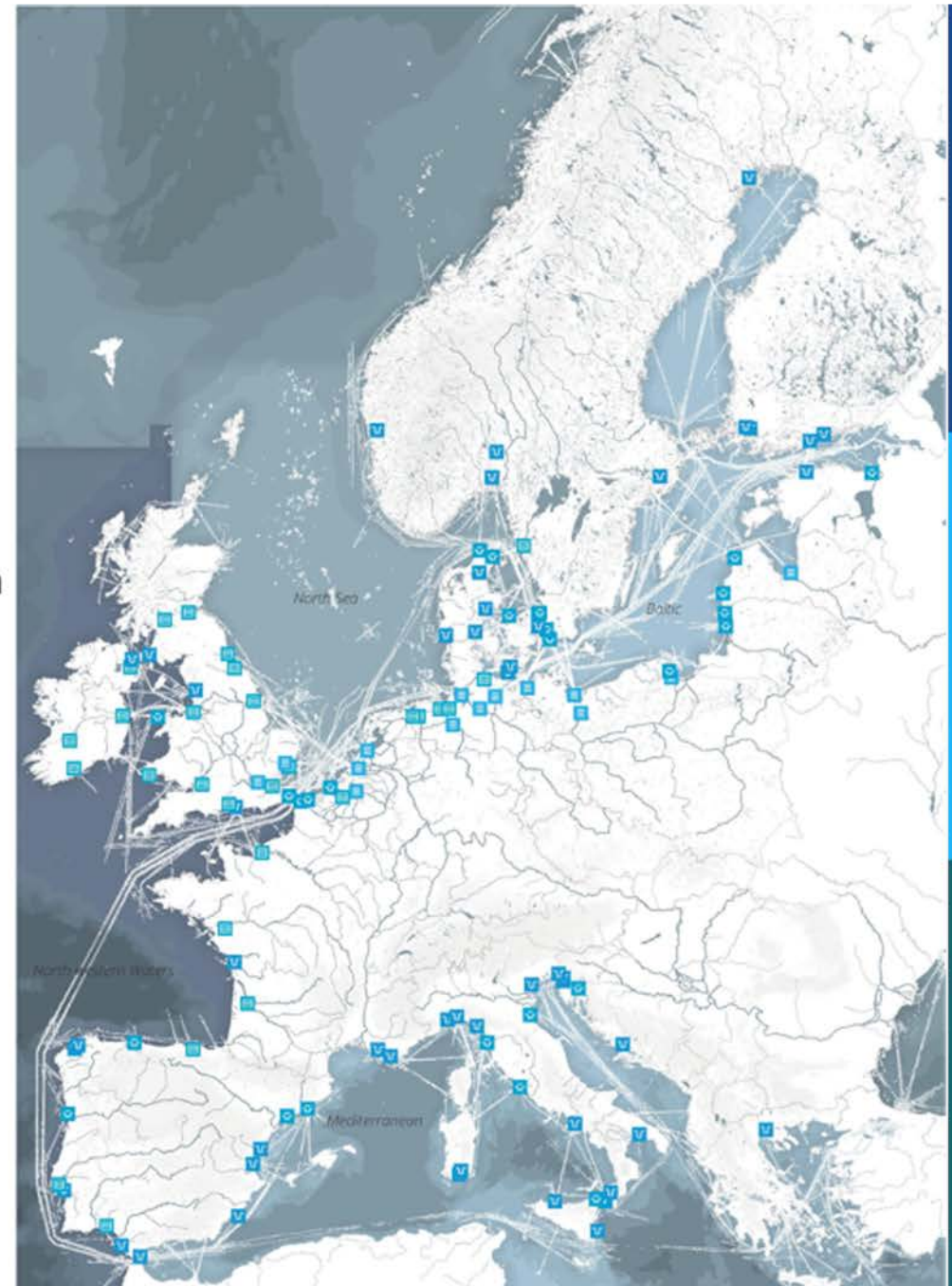
Figure 1 - Challenges faced and addressed on the BoSS

# Interpreting – port location

- In the North Sea, most ports are located on rivers and estuaries, and in the Mediterranean on engineered coastlines and natural embayments.

Baltic Sea	North Sea	Atlantic	Mediterranean
 13	 5	 9	 27
 12	 6	 5	 8
 6	 8	 0	 0
 1	 14	 15	 0

-  Embayment, Protected Coast or Marine Inlet
-  Engineered Coastline
-  River
-  Estuary

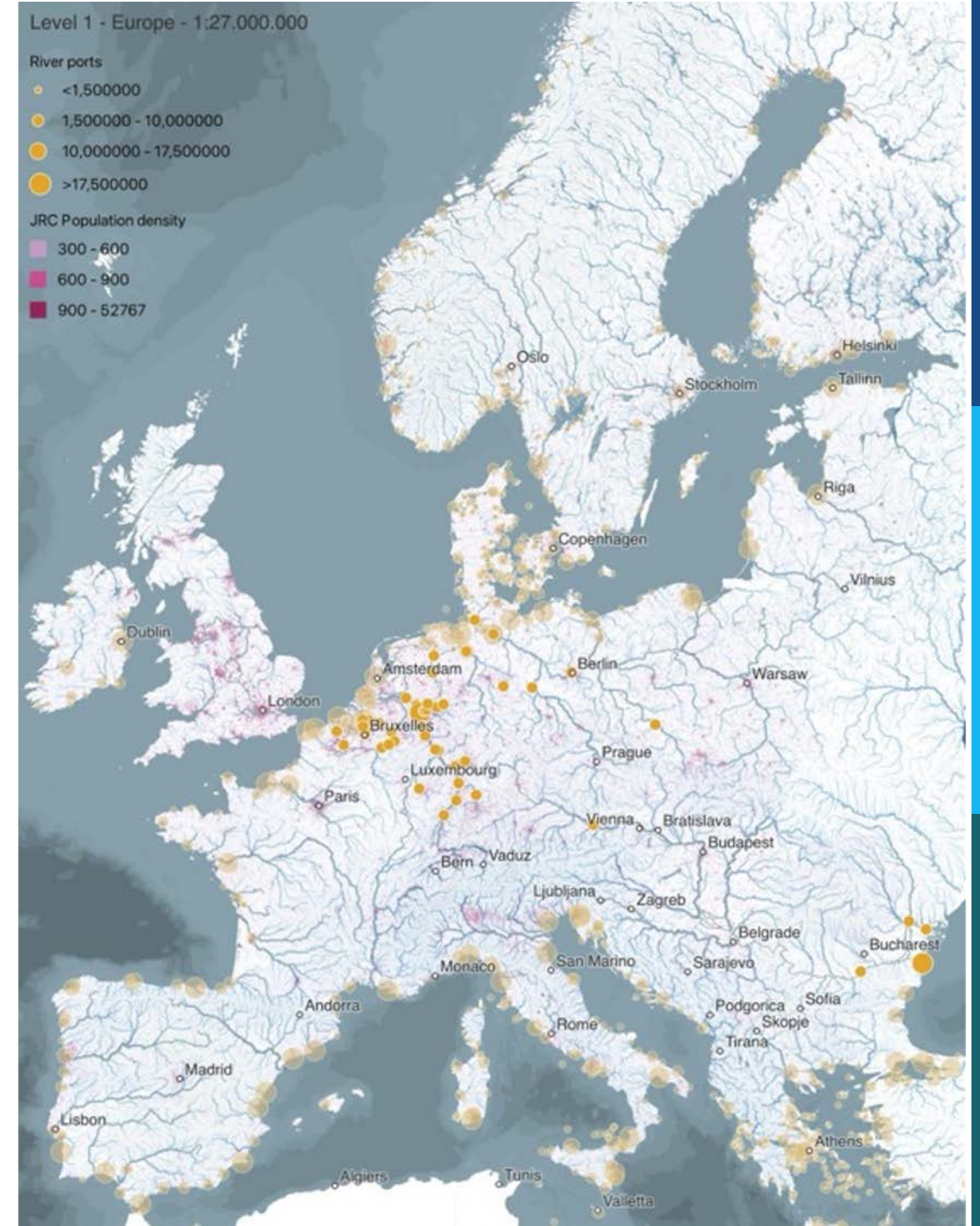


# Interpreting – 25 North Sea port city territories



# River Port Atlas

- River and inland ports are understudies.
- Inland ports vary greatly in terms of geographical coverage, actors, regulations and functions.
- River ports are more likely to be privately owned by companies/industries and are more often located in urban and peri-urban areas as well as in rural areas.





# DESIGN4 *EXTREMES*

## *Heritage Strategies to Sea Level Rise Adaptation in The Hague*

International  
Workshop

17<sup>th</sup>-21<sup>st</sup> Jun '24

9-17h CET  
The Hague

nx  
r

netherlands  
exchanges  
recife

TU Delft



Cultural Heritage Agency  
Ministry of Education, Culture and Science



IHE  
DELFT Institute for  
Water Education



UNIVERSIDADE  
FEDERAL  
DE PERNAMBUCO

RUFFEK



1

# Thank you!

Carola Hein, [c.m.hein@tudelft.nl](mailto:c.m.hein@tudelft.nl)



GLOBAL TRADE GOVERNANCE HAPPINESS HERITAGE LIVEABILITY LOGISTICS MIGRATION NEW TECHNOLOGIES POLLUTION PRODUCTION URBAN DEVELOPMENT



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