



Future of Ports

**The changing
relationships
between ports
and cities**

Stefano Recalcati, Arup

Evolution

Schematizing the interpretation given by B. S. Hoyle in "Revitalizing the waterfront", it is possible to identify four key moments in the evolution of port functions and urban areas.

(PHASES)

CITY



PORT



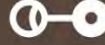
1.



2.



3.



4.



1. SHARING

From its origin until the end of the nineteenth century, the city and the port constitute a single entity sharing the same urban spaces.

2. SEPARATION

During the twentieth century, ports required more space and ever-greater depths to meet renovated production and logistical needs. This led to the physical separation of port functions from urban areas.

3. UNDERUSE

From the sixties to the eighties, original port areas close to the city centre were abandoned because they were unable to fulfil the productive functions required by technological development.

4. REGENERATION

Since the seventies, there began a process of regeneration of abandoned waterfront spaces, which revives cities' relationship to water.

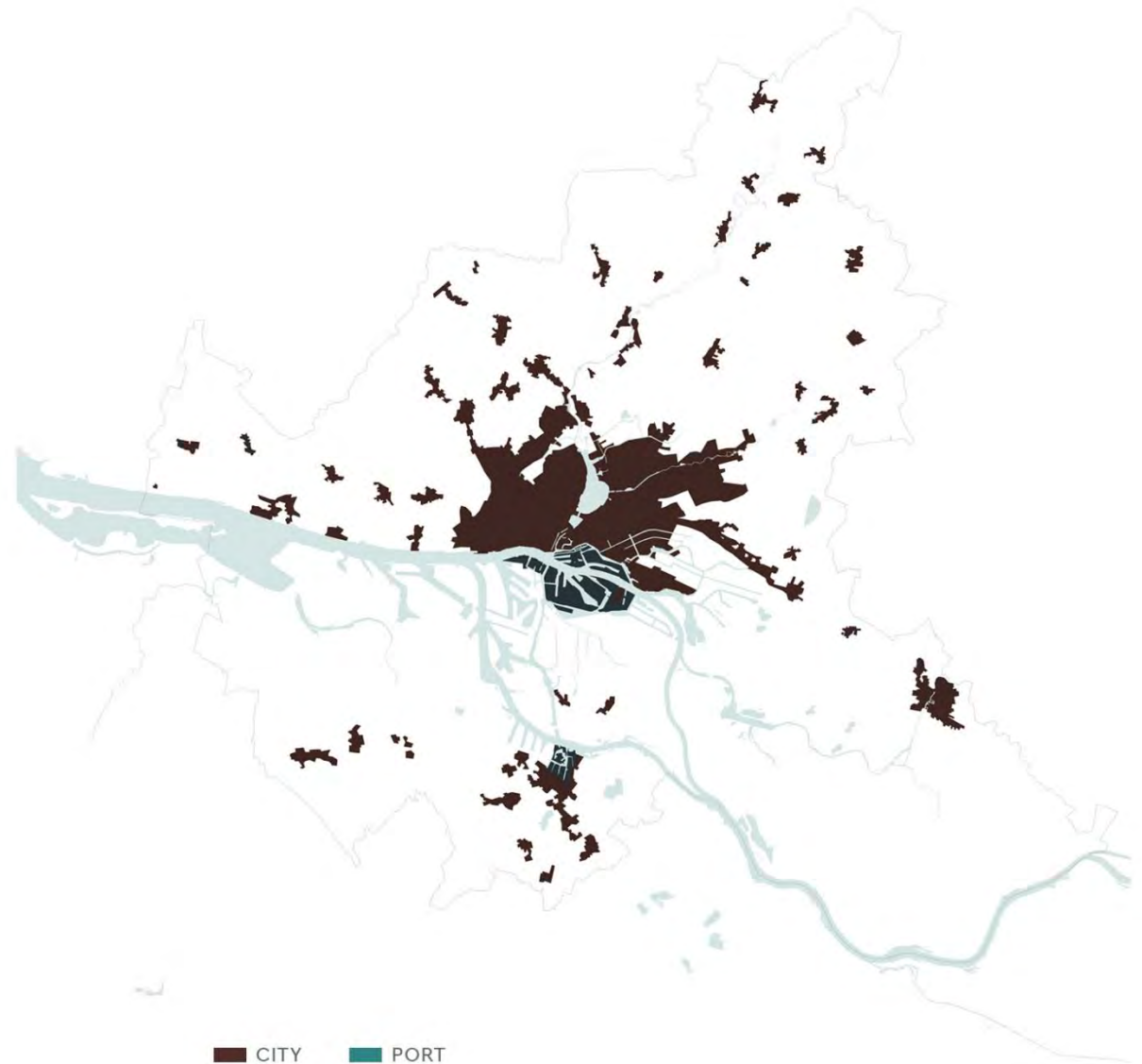
Hamburg

Coordinates / 53° 33' 55''N 10° 00' 05'' E

1. SHARING



before 1900



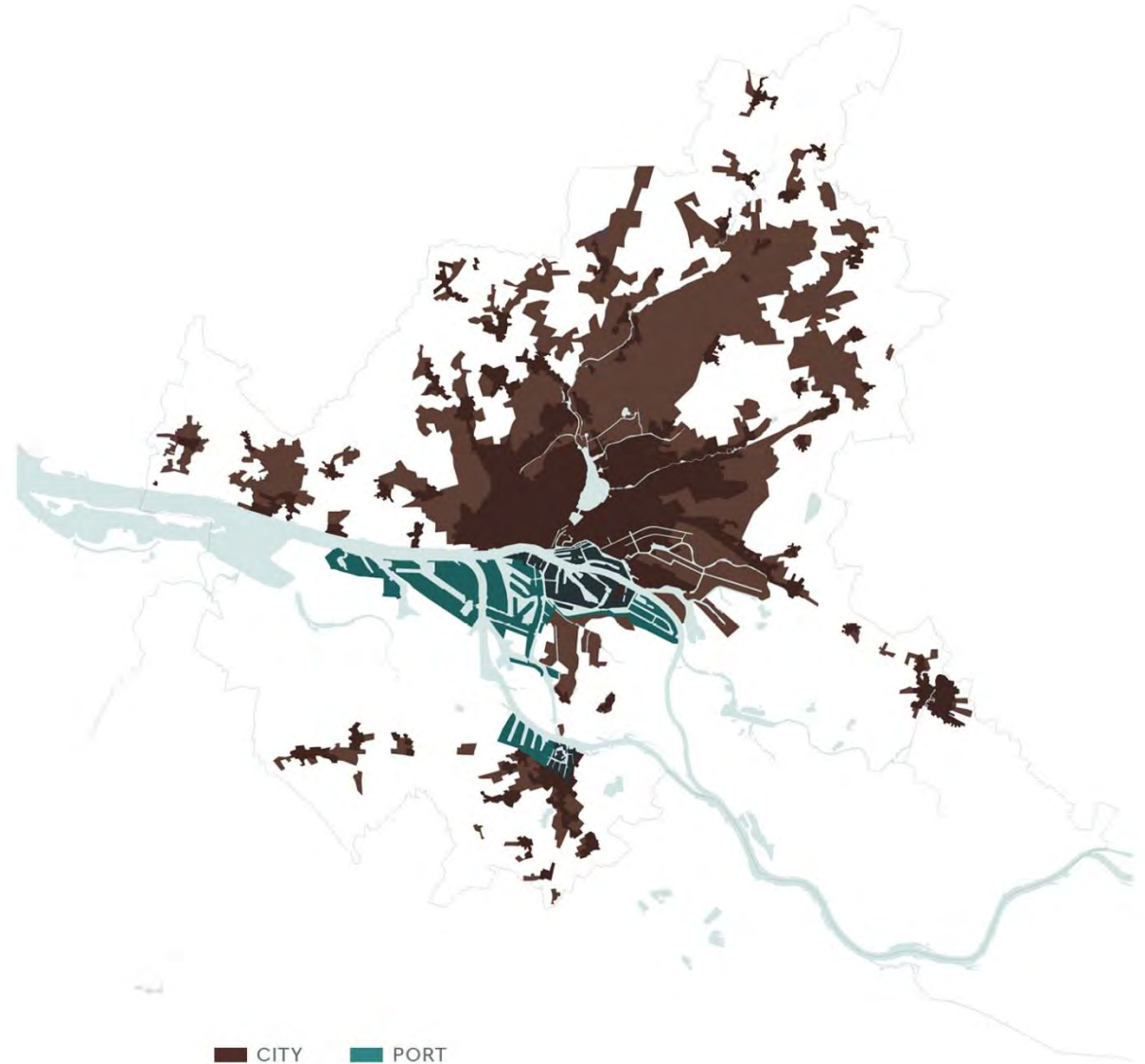
Hamburg

Coordinates / 53° 33' 55''N 10° 00' 05'' E

2. SEPARATION



1900-1960



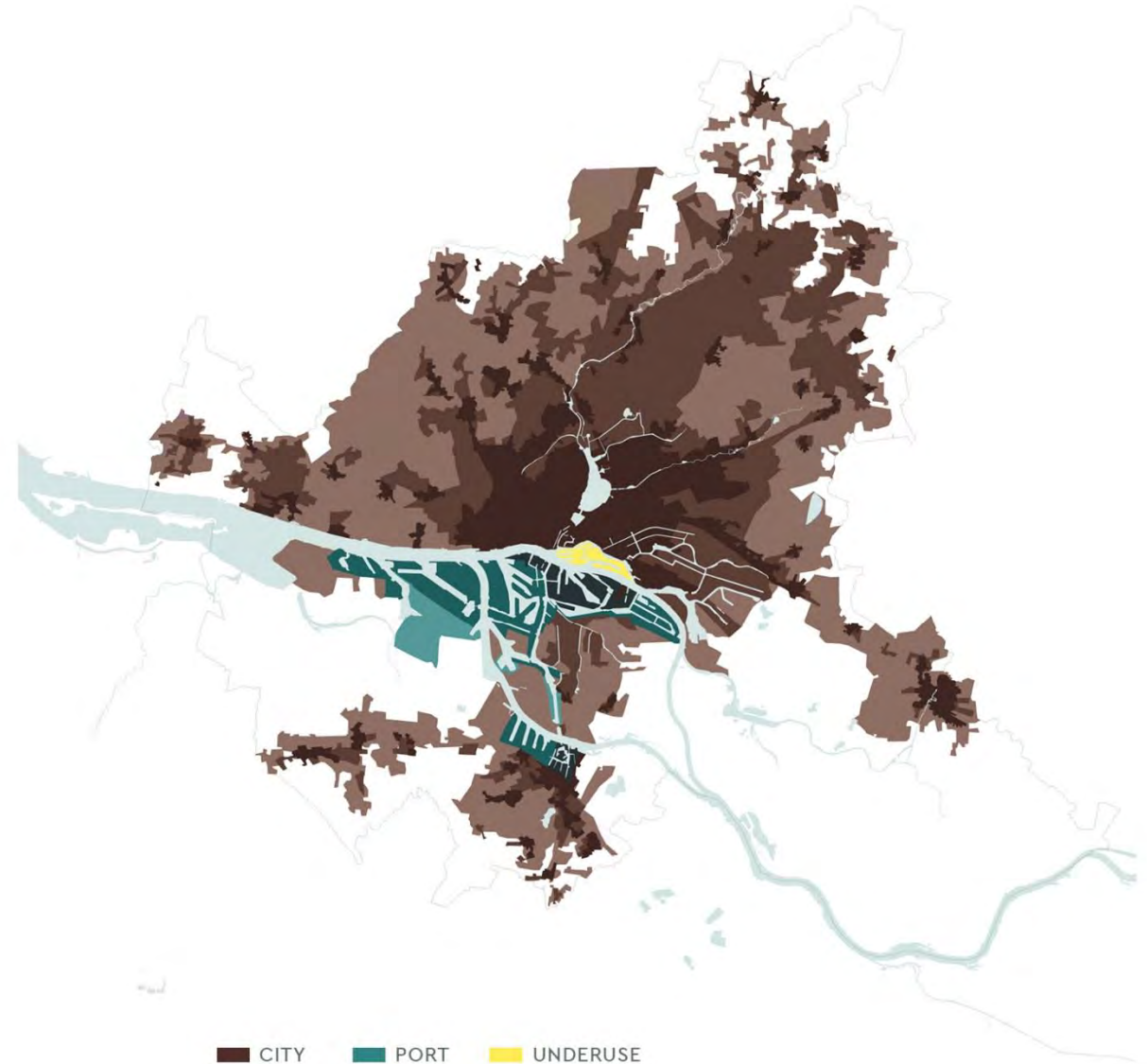
Hamburg

Coordinates / 53° 33' 55''N 10° 00' 05'' E

3. UNDERUSE



1960-1980



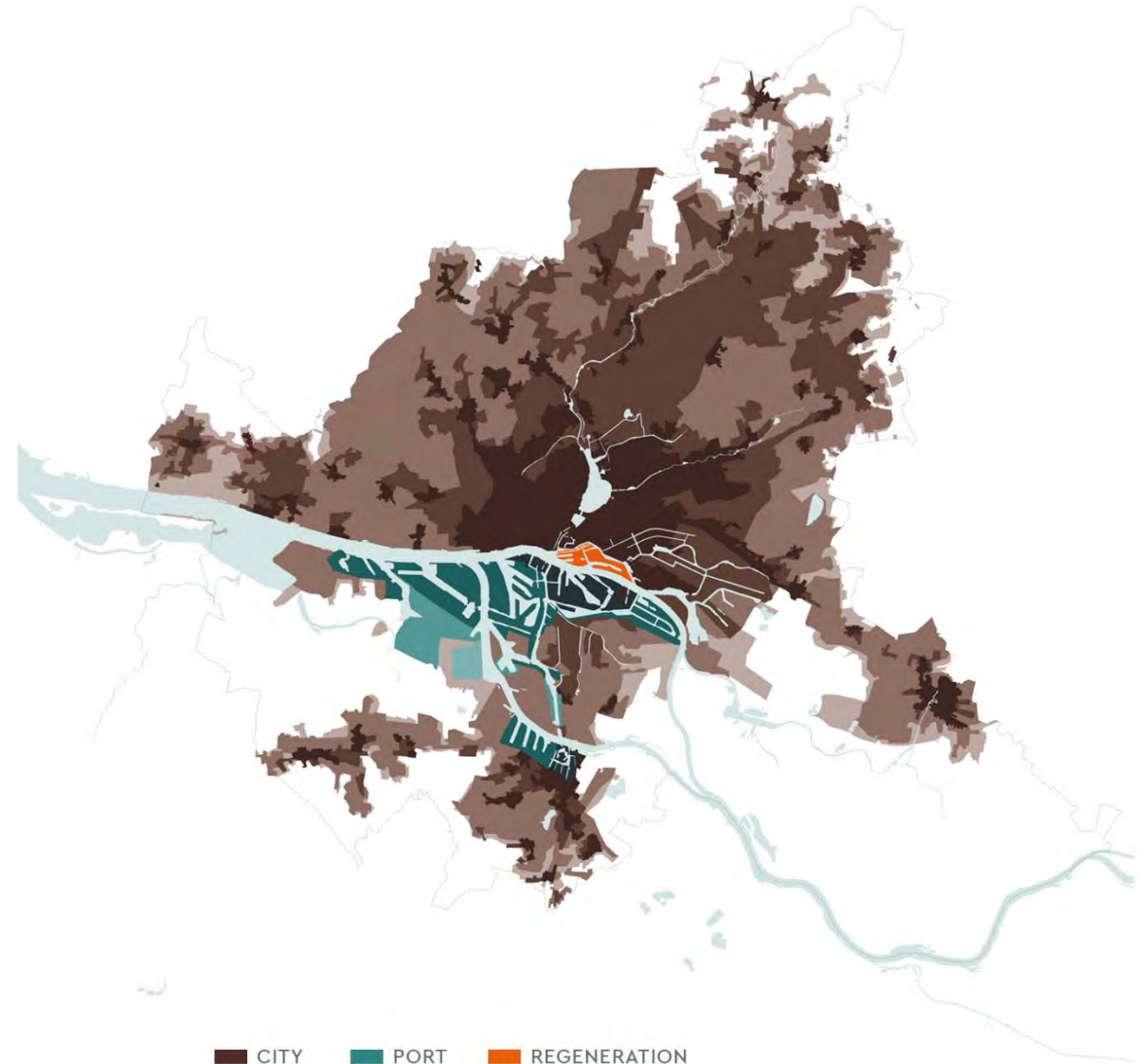
Hamburg

Coordinates / 53° 33' 55''N 10° 00' 05'' E

4. REGENERATION



1980-on going



Rotterdam

Coordinates / 51° 55' N 4° 30' E

VIS



PRO



COM



ENV



QUA



INN



/ Kop van Zuid /



Rotterdam

Coordinates / $51^{\circ}55'N$ $4^{\circ}30'E$.

/ Kop van Zuid /



Rotterdam

Coordinates / 51° 55' N 4° 30' E

REUNITING A DIVIDED CITY

/ Kop van Zuid /



Dublin

Coordinates / 53° 20' 52" N 6 ° 15' 35" W

VIS



PRO



COM



ENV



QUA



INN



/ Docklands /



Dublin



Coordinates / $53^{\circ} 20' 52''$ N $6^{\circ} 15' 35''$ W

/ Docklands /

An aerial photograph of the Dublin Docklands area, showing a mix of modern glass-fronted buildings, older brick structures, and a large body of water (the River Liffey) with a bridge and a marina. The text 'Dublin' is overlaid in the top left, and 'CREATING A DIGITAL INNOVATION CLUSTER' is at the bottom. The word 'Docklands' is also visible at the bottom.

Dublin

Coordinates / 53° 20' 52" N 6° 15' 35" W

CREATING A DIGITAL INNOVATION CLUSTER

/ Docklands /

(PHASES)

CITY



PORT



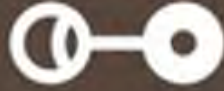
1.



2.



3.



4.



before 1900

1900 - 1960

1960 - 1980

1980 - today

SHARING

SEPARATION

UNDERUSE

REGENERATION

(PHASES)

CITY



PORT



1.



before 1900

SHARING

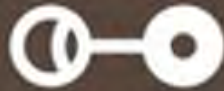
2.



1900 - 1960

SEPARATION

3.



1960 - 1980

UNDERUSE

4.



1980 - today

REGENERATION

5.



after 2020

SHARING



Ports and cities face similar challenges but often express them differently

| | Themes | City | Ports |
|-------------------------------------------------------------------------------------|---------------------------|-------------------------------------------------------|----------------------------------------------------|
|  | Environment | Cut emissions | Reduce negative blight and environmental footprint |
|  | Connectivity | Road congestion | Poor hinterland connectivity |
|  | Land use | Provide quality places | Find optimal land location |
|  | Local economy | Improve city competitiveness | Enhance port business |
|  | Strategic planning | Increase powers and engage with relevant stakeholders | Promote interest in long-term strategic planning |
|  | Digital | Become a smart city | Prepare for digital transformation |

Many of these challenges could be tackled jointly to unlock shared benefits



Reduce gas emissions from transport and industries, and achieve cleaner and more liveable environments for people, including high quality waterfronts.



Develop sustainable, intermodal transportation systems. Offer transport and logistic solutions to cities, for cargo and people.



Mixed-use developments with a role for port functions.
Optimal land use for city centres, waterfronts and port infrastructures



Innovative and more productive businesses.
Efficient logistic and trade operations providing highly productive jobs for a skilled and qualified workforce.



Integrated governance structures able to deliver strategic planning and to unlock investment for infrastructure.



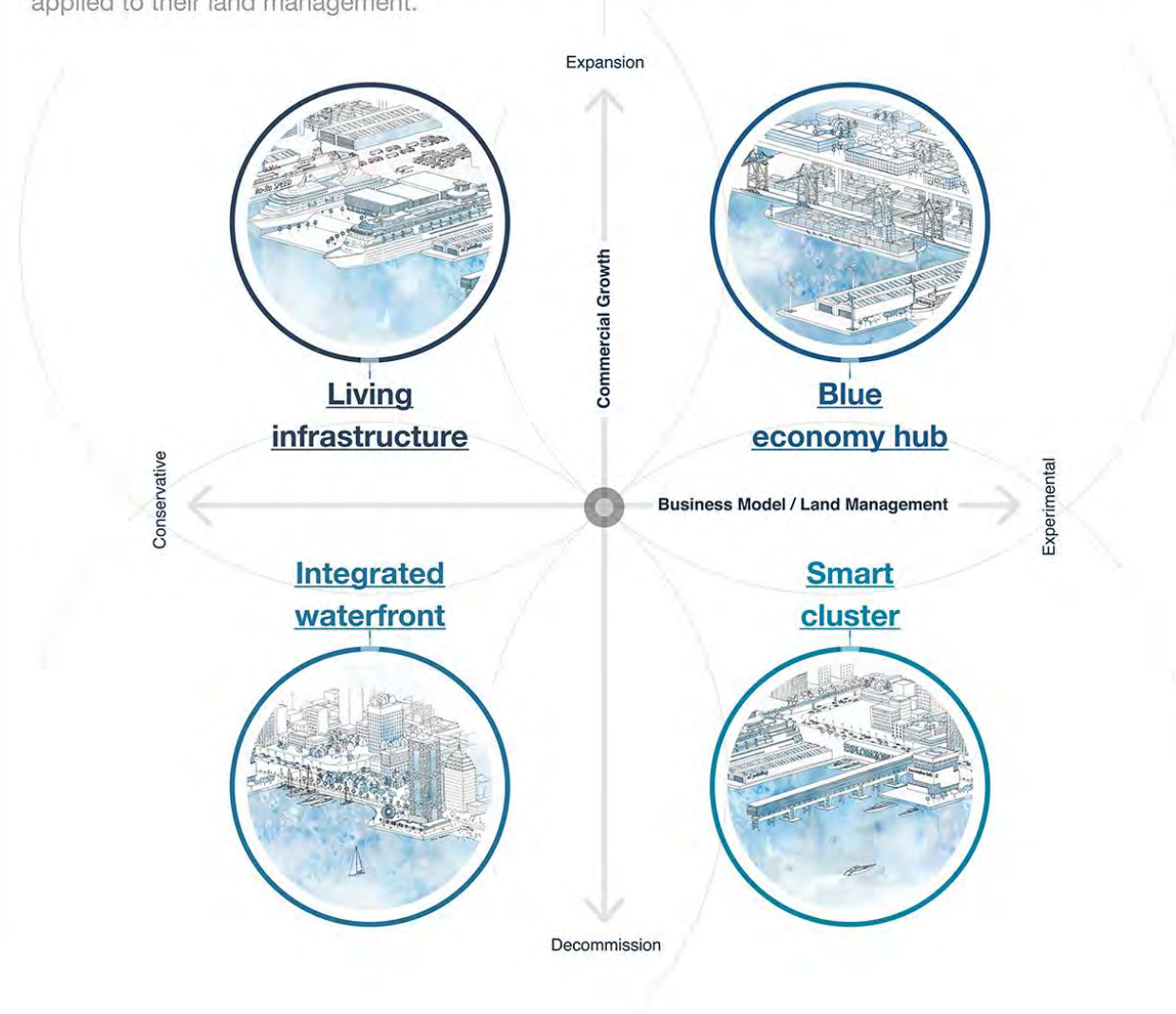
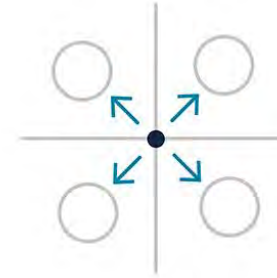
Smart cities and port growth strategies, making the best use of advanced technologies and innovative digital solutions.

6 key common objectives for ports and cities



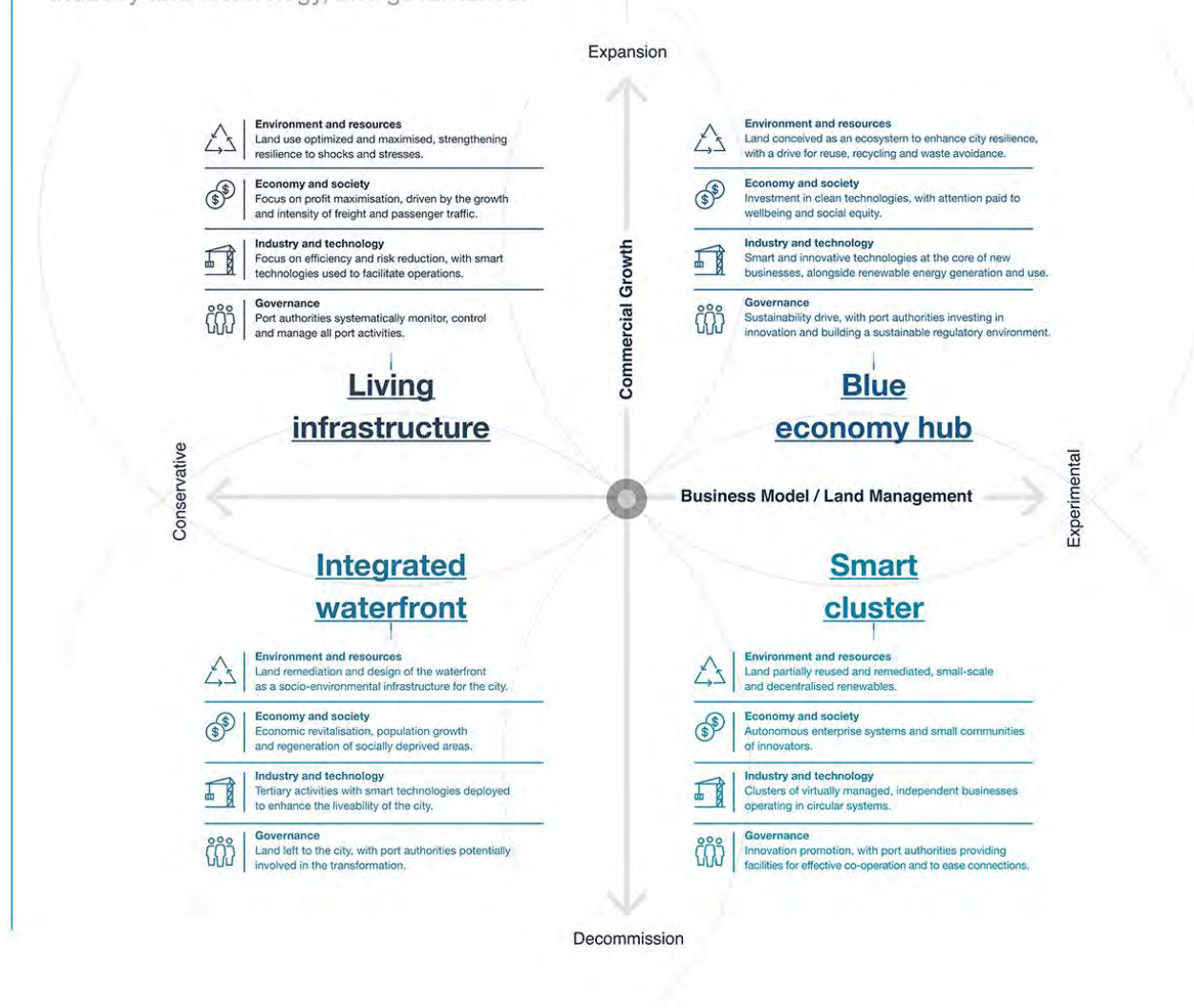
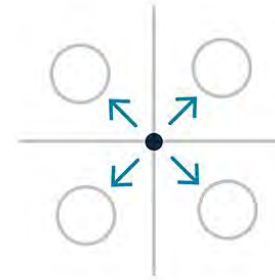
Future Scenarios

Four scenarios reveal the dynamics that are influencing the future of ports, according to their commercial growth trends and the business models applied to their land management.



Characteristics of the Scenarios

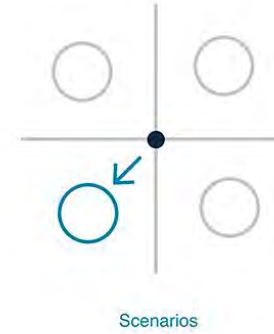
Each of the scenarios performs differently, with their specific characteristics shown in relation to environment and resources, economy and society, industry and technology, and governance.



Integrated waterfront

Conservative decommissioning

The change of technological requirements for shipping and the pressure of urban development on port boundaries often result in the decommissioning or delocalisation of ports, leading in turn to waterfront regeneration. The redevelopment of 127 hectares of HafenCity in Hamburg is an example of a new urban area with a mix of uses including residential, commercial, retail and cultural. **Which placemaking principles and governance processes will lead waterfront regeneration in the future?**

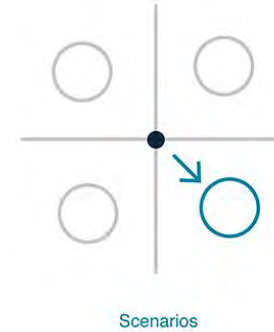


— Courtesy of HafenCity Hamburg GmbH

Smart cluster

Experimental decommissioning

Even if decommissioned, most ports are central, secure and well-served by infrastructure, so adaptable for innovative industrial sectors such as technology-related businesses. For instance, the Embarcadero in San Francisco, a former commercial and then passenger pier, became a desirable location for technology, design and biotech companies, including a campus for informal education. **How will ports be able to attract innovative industries onto decommissioned land?**

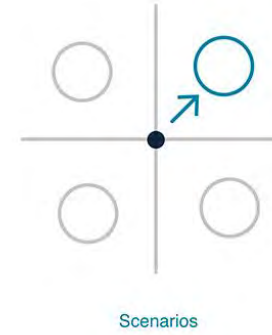


— Courtesy of Chibi Moku

Blue economy hub

Experimental expansion

Ports offer opportunities to converge social and environmental awareness within a so-called Blue Economy approach, a vision for "improved wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP 2013). Rotterdam is improving its environmental performance by fostering sustainable enterprises (e.g. wind turbines) and by encouraging sustainable innovation (e.g. bio-based industrial clusters and innovation hubs). **Which strategies are beneficial for ports to improve their resilience while having a positive influence on the marine ecosystem?**

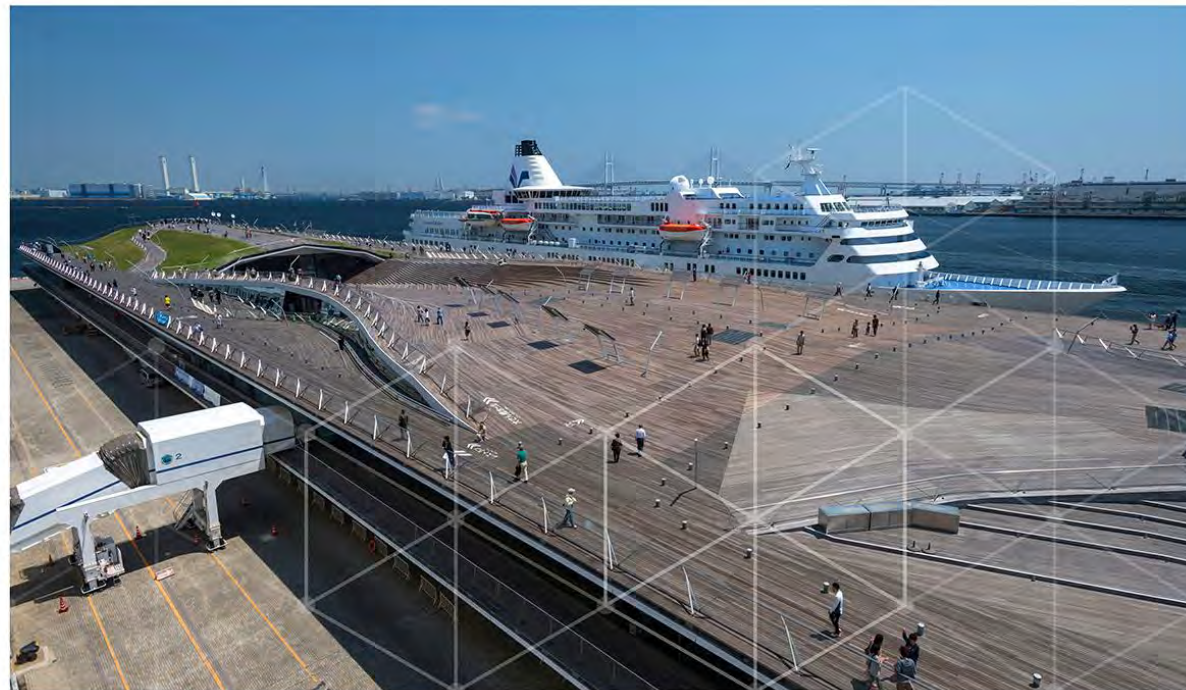
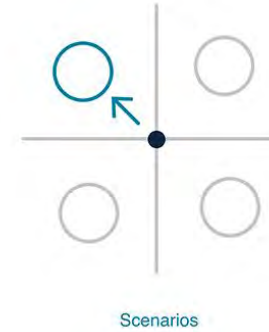


— Courtesy of Port of Rotterdam

Living infrastructure

Conservative expansion

Booming cruise tourism and the intensification of commercial port activities mean that a systematic approach and hi-tech smart solutions are needed to fully exploit secure port land. Yokohama turned its former commercial port, Osanbashi, into a renowned cruise terminal. The new terminal functions within a well-designed public space that is able to accommodate intense passenger fluxes. **How will the ports of the future design their facilities to embrace the concept of living infrastructure rather than focusing purely on logistics or practicality?**



— Photo by David Parker / Alamy Stock photo

A view of what the future could look like ...



On-site smart energy micro-grid including solar, wind and tidal power



Offices and laboratories sit above the cargo port



Multi-modal autonomous connectivity to roads, rail and aviation via pods/tunnels



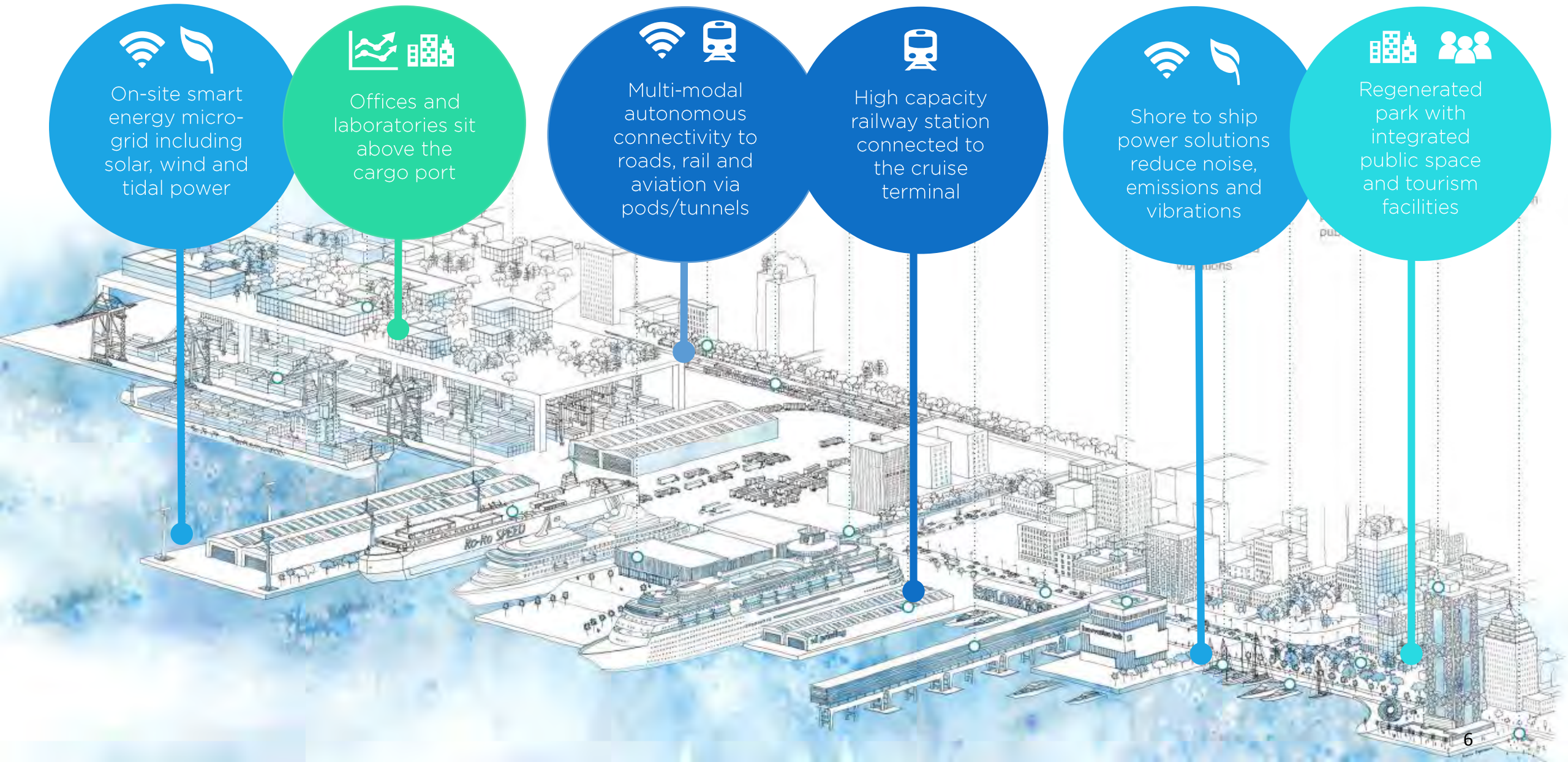
High capacity railway station connected to the cruise terminal

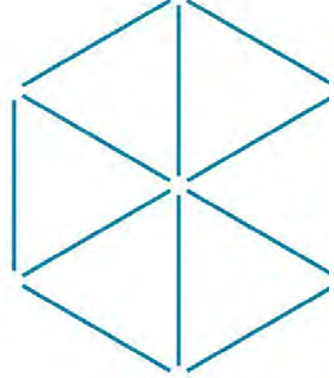
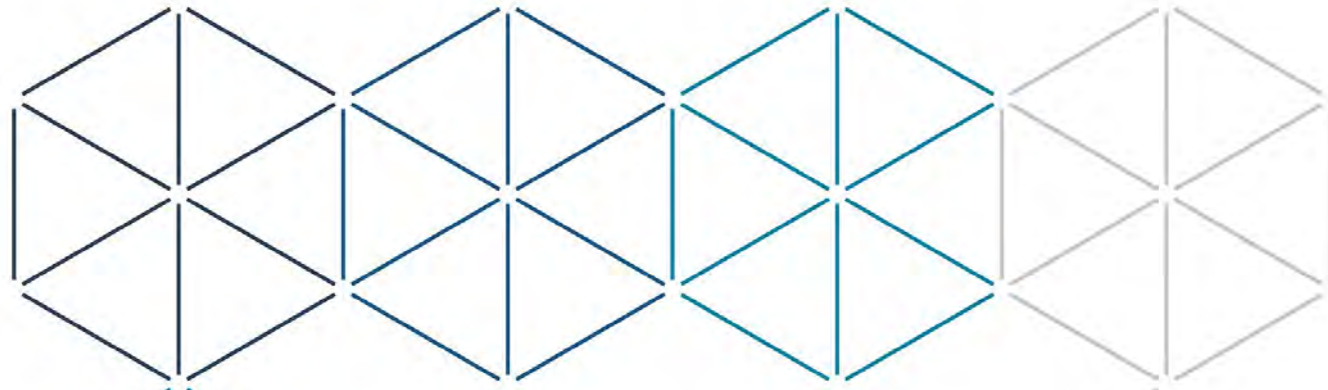


Shore to ship power solutions reduce noise, emissions and vibrations



Regenerated park with integrated public space and tourism facilities





Thank you!

stefano.recalcati@arup.com

