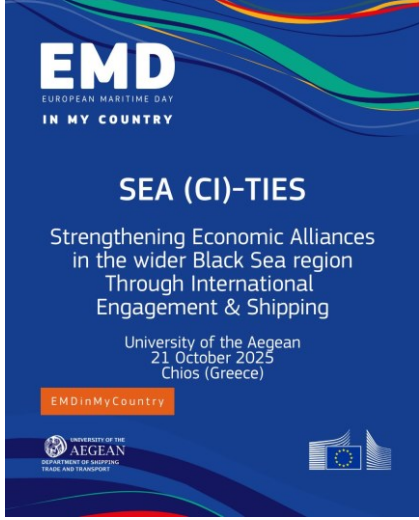

PORTS, SHIPPING, and CITIES & TERRITORIES: AN INCLUSIVE ENERGY TRANSITION

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MORE THAN 30 YEARS
UNIVERSITY OF PIRAEUS
DEPT. OF MARITIME STUDIES
OF MARITIME STUDIES EXCELLENCE

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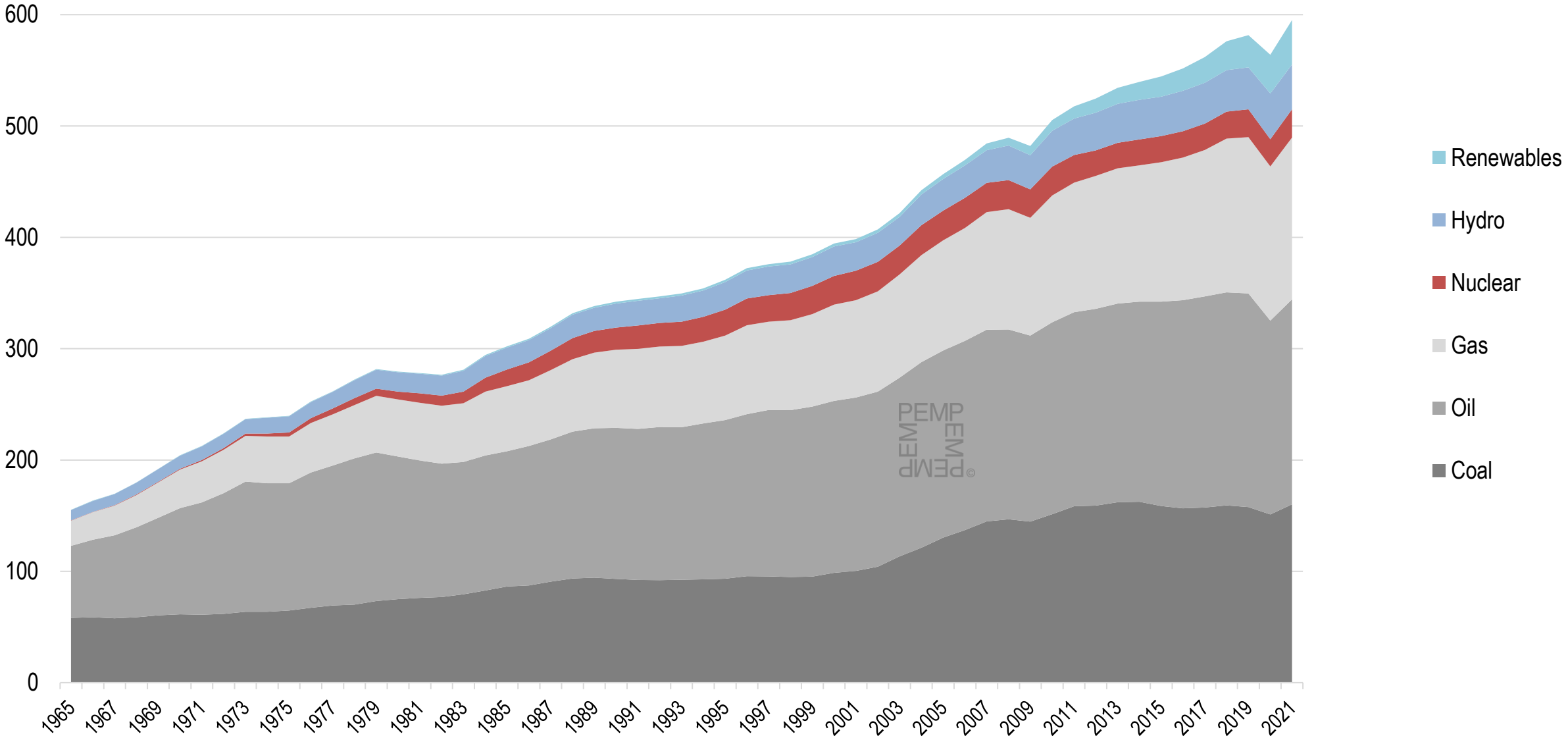
World Energy Consumption, 1965-2021



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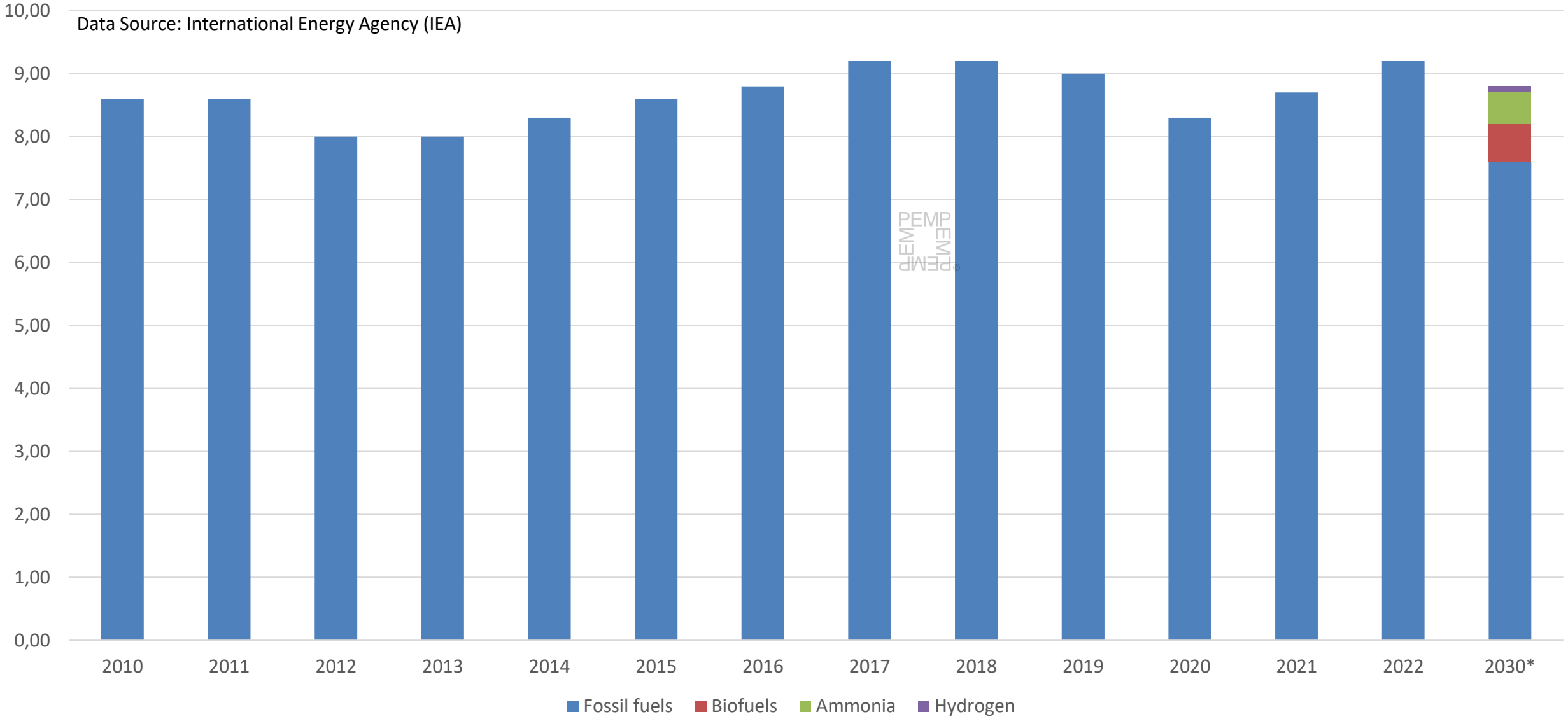
Energy consumption in international shipping by fuel in the Net Zero Scenario, 2010-2030



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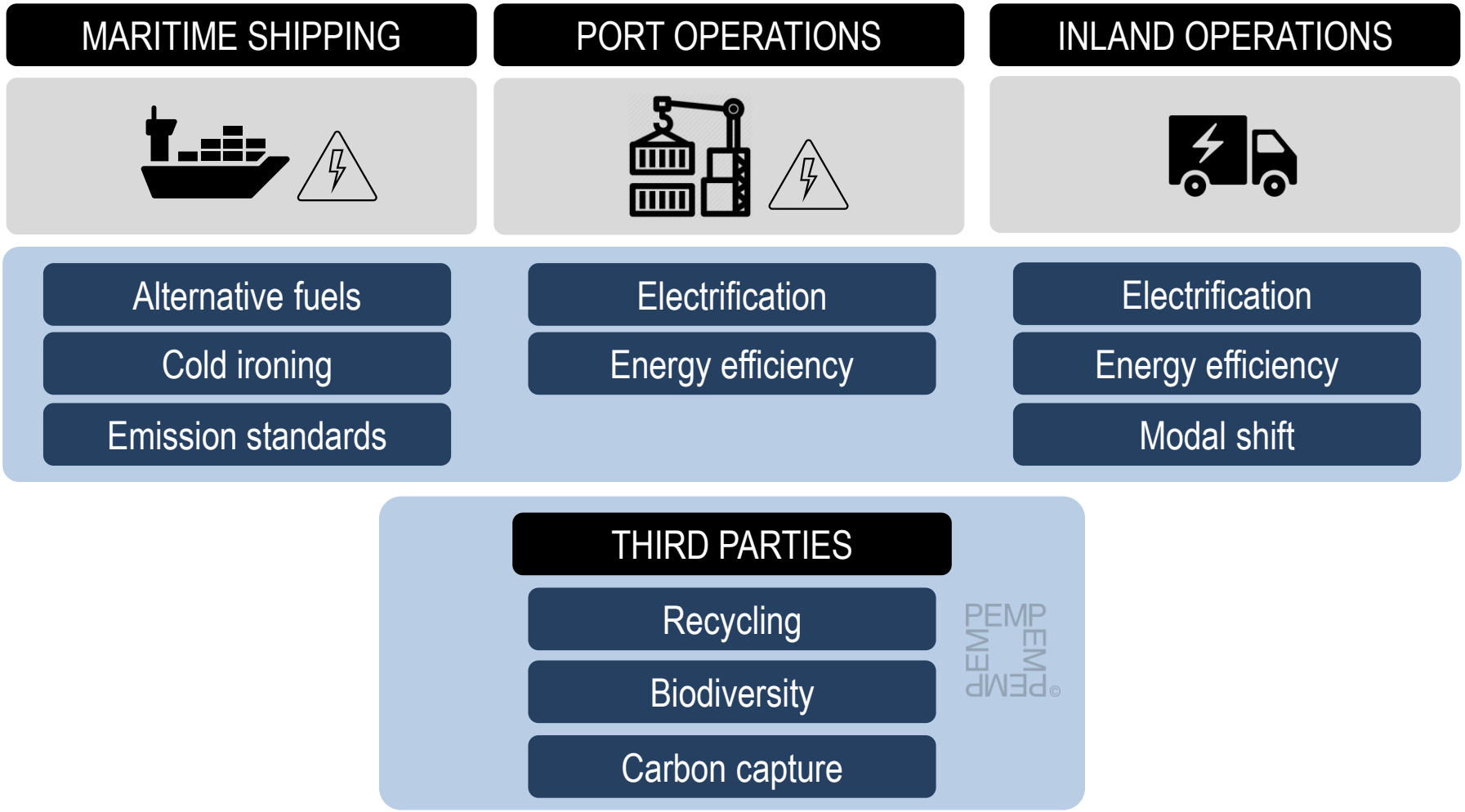
ENERGY TRANSITION: A MULTIDIMENSIONAL APPROACH

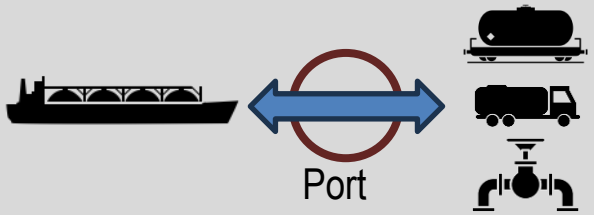
The Decarbonization of Ports and Maritime Supply Chains

A multi-dimensional exercise



Ports are the epicenter of the Energy Transition (ET)

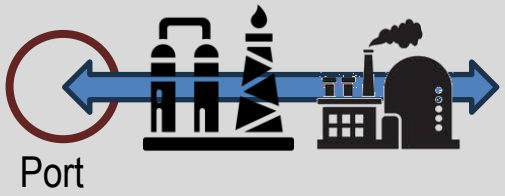
ENERGY TRANSPORT



Volume

- Gateways for the exports or imports of energy products.
- Temporary storage.

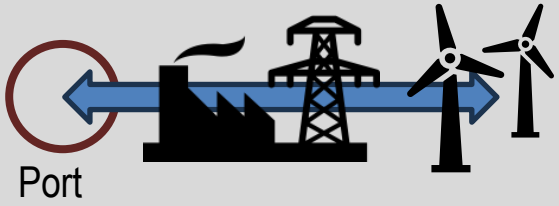
ENERGY TRANSFORMATION



Proximity

- Port-centric sites for energy activities.

ENERGY GENERATION



Diversity

- Provision of conventional and alternative energy products.

- So much uncertainty around future fuels, their upstream and downstream **supply chains** and related **investment decisions.**
- **Zero Carbon Fuels** to create tectonic shifts in global shipping routes for liquid bulk and gas tankers.
- Ports as hubs for energy production, import & carbon storage.

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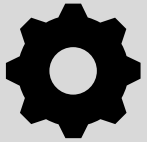
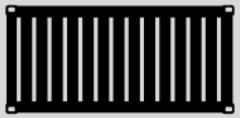
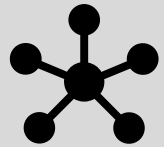
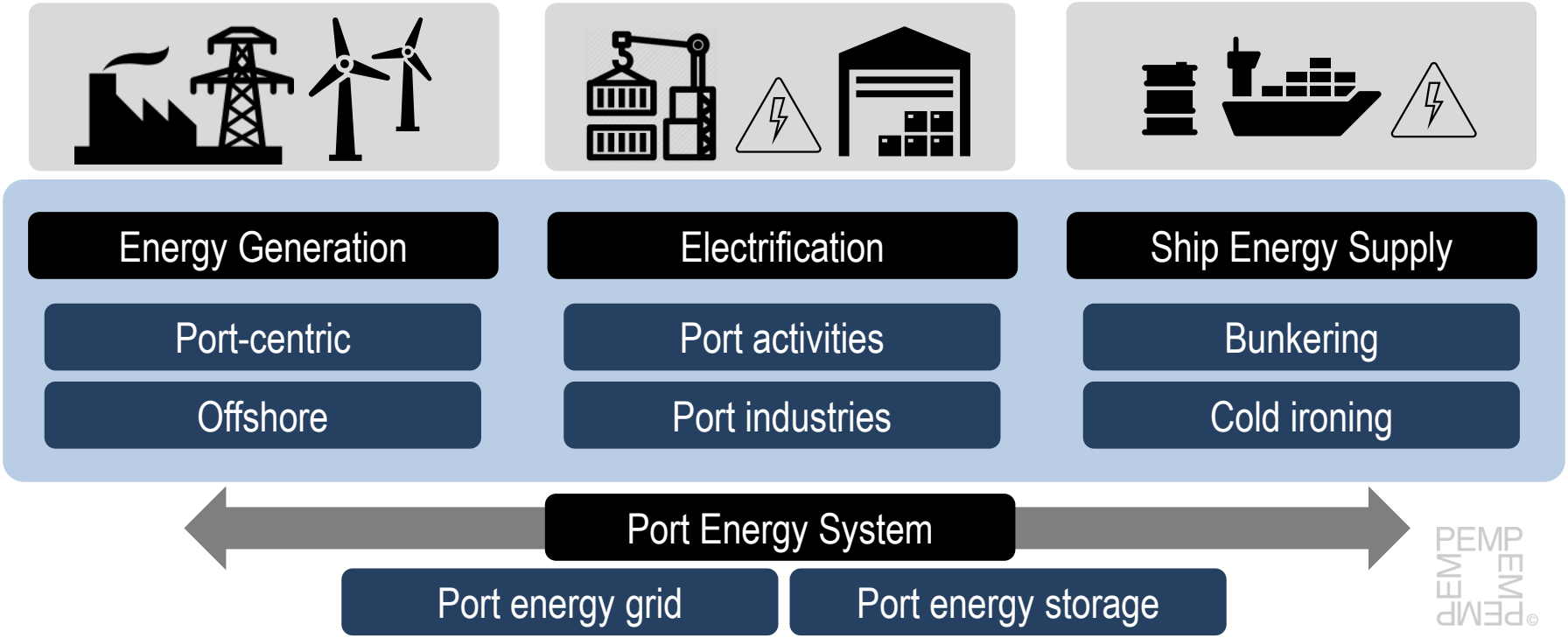
Ports and the Energy Transition (ET):
Realms of Engagement

FOOTPRINT	INFRASTRUCTURE	SUPERSTRUCTURE	CARGO FLOWS	INDUSTRY	HUBS
					
Land Use	**Enable**	**Support**	**Processes**	**Clusters**	**Connectivity**
• Land availability. • Land swaps. • Modal shift. • Spatial planning.	• Quays and terminals. • Power connection. • Energy conversion storage.	• Handling equipment. • Refueling facilities. • Energy transport.	• LNG. • Renewable energy. • Emission control.	• Energy demand changes. • Technology and process innovation.	• Hinterland access.

Port Energy Strategies

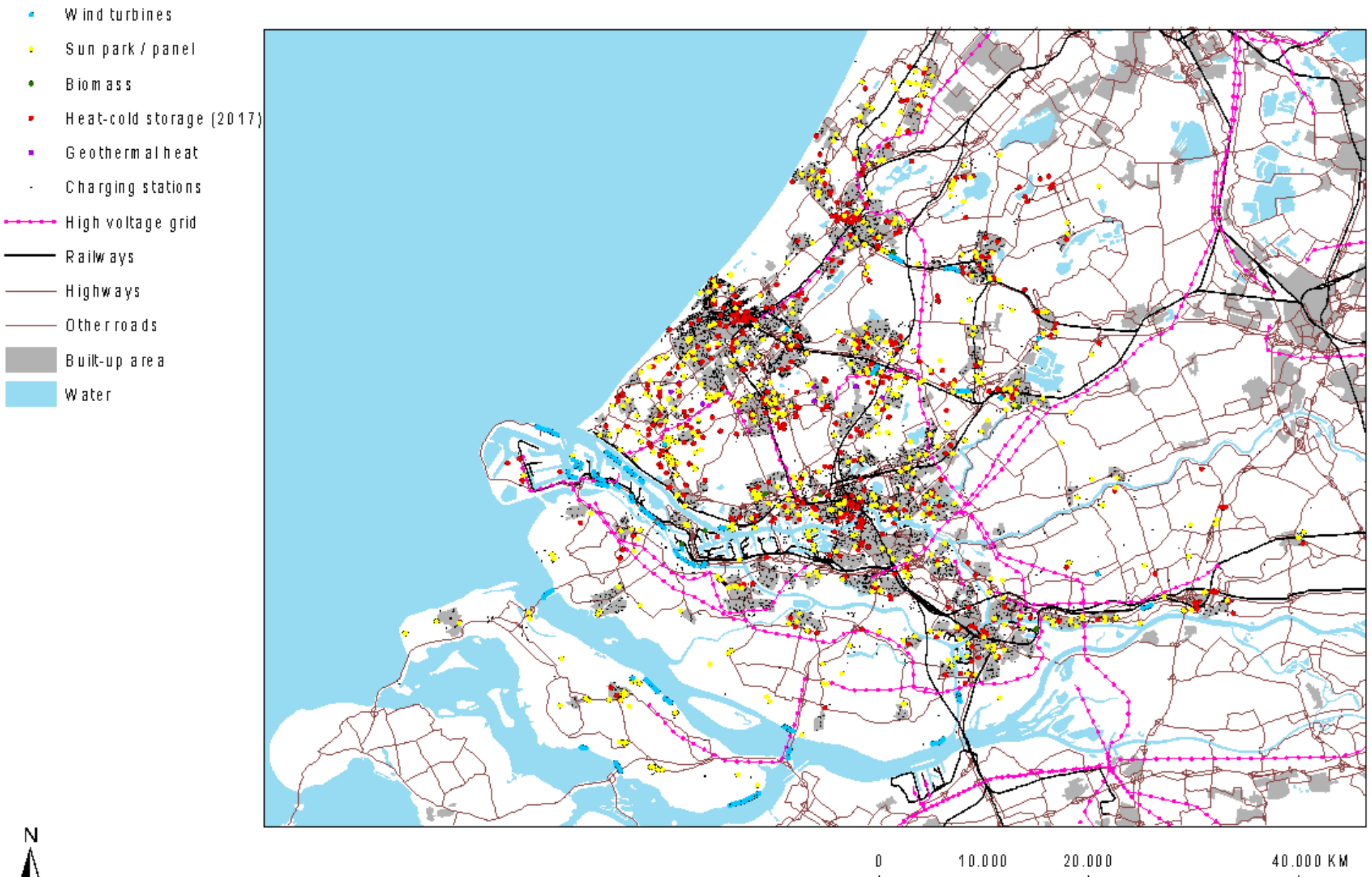


Ports in the New Energy Landscape

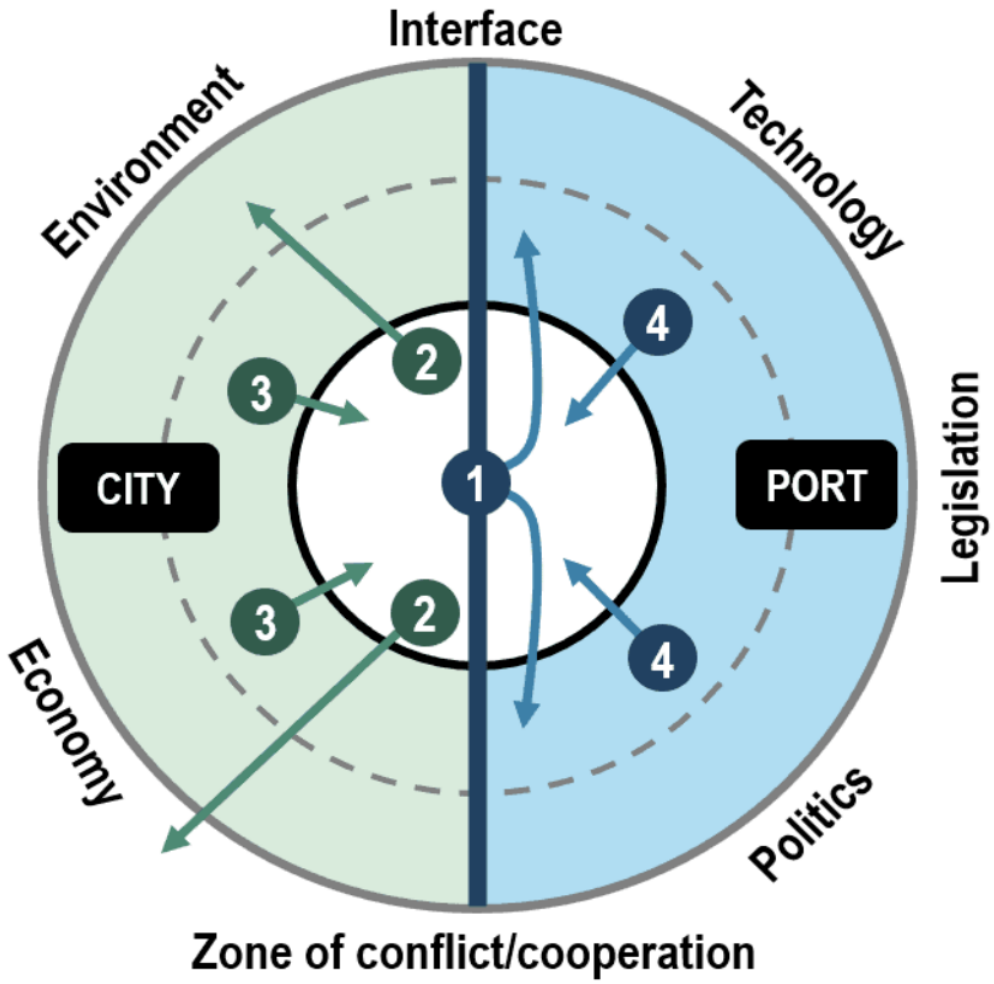
PORT	WIDER PORT AREA	ECONOMY AND COMMUNITY
		
Decarbonizing operations in / near ports	**Industrial clusters, port-city links and offshore**	**Green supply chains and business models**
Energy saving Decarbonization of port equipment Onshore power supply Clean fuel bunkering On-site renewable power	Energy and chemical waste Offshore energy Offshore industry Industry decarbonization Sustainable urban energy Energy conversion Energy storage hubs Carbon capture use/storage	Zero/low carbon fuel supply chains Zero/low carbon electron supply chains Decarbonization of transport © PEMP

The spatial consequences of the sustainable energy transition - 2010

The spatial consequences of the sustainable energy transition - 2018



Enεργυ Tranistion needs Space



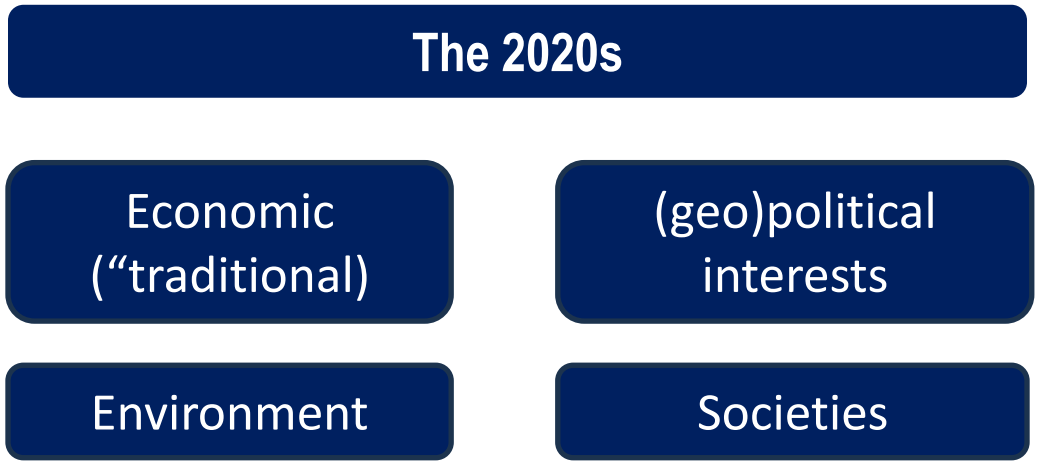
1. Port migration
2. Industrial migration
3. Land use competition
4. Water use competition

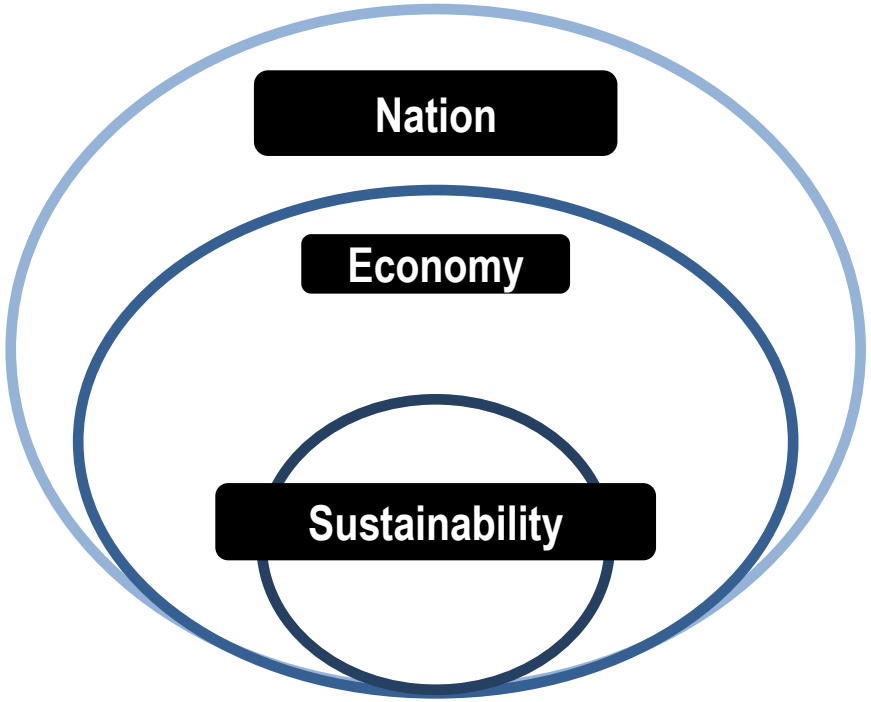
Implications
Symbiosis
Separation
Gap
Conflict

ENERGY TRANSITION AND GEOPOLITICS

ET: a changing context

- **(Geo)politics as an external shock**
- New perception of Space & Societies (*Cities & Territories*)
- Functional expansion, with spatial dimensions, and calls for new economic activities
- Social acceptance – license to operate





Source: Pallis-Wilmsmeier-Hadjikofinas (2025)

Entities involved in ET

	Private	PPP	State-Owned Enterprise (SOE)
Local	Very Unlikely	Unlikely	Unlikely
National	Likely	Very Likely	Very Likely
Multinational	Very Likely	Very Likely	Very Likely

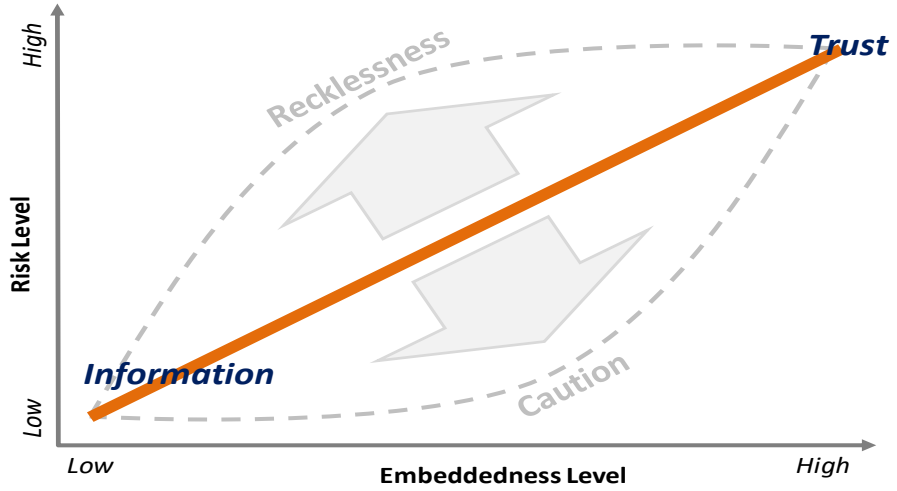
Ports are integral to the maritime energy transition if they can attract **public-private investments** to develop the infrastructure for zero-carbon fuels.

The pendulum between sovereign and private investment shifts

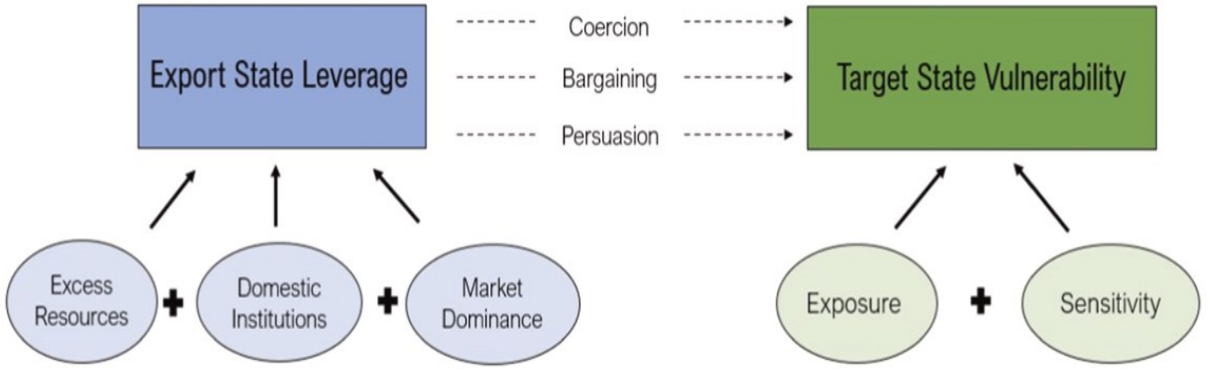
An industry and society unsure of its choice of zero-carbon fuels

Source: Pallis-Wilmsmeier-Hadjikofinas (2025)

• Low level of Embeddedness



• Geopolitical Leverage

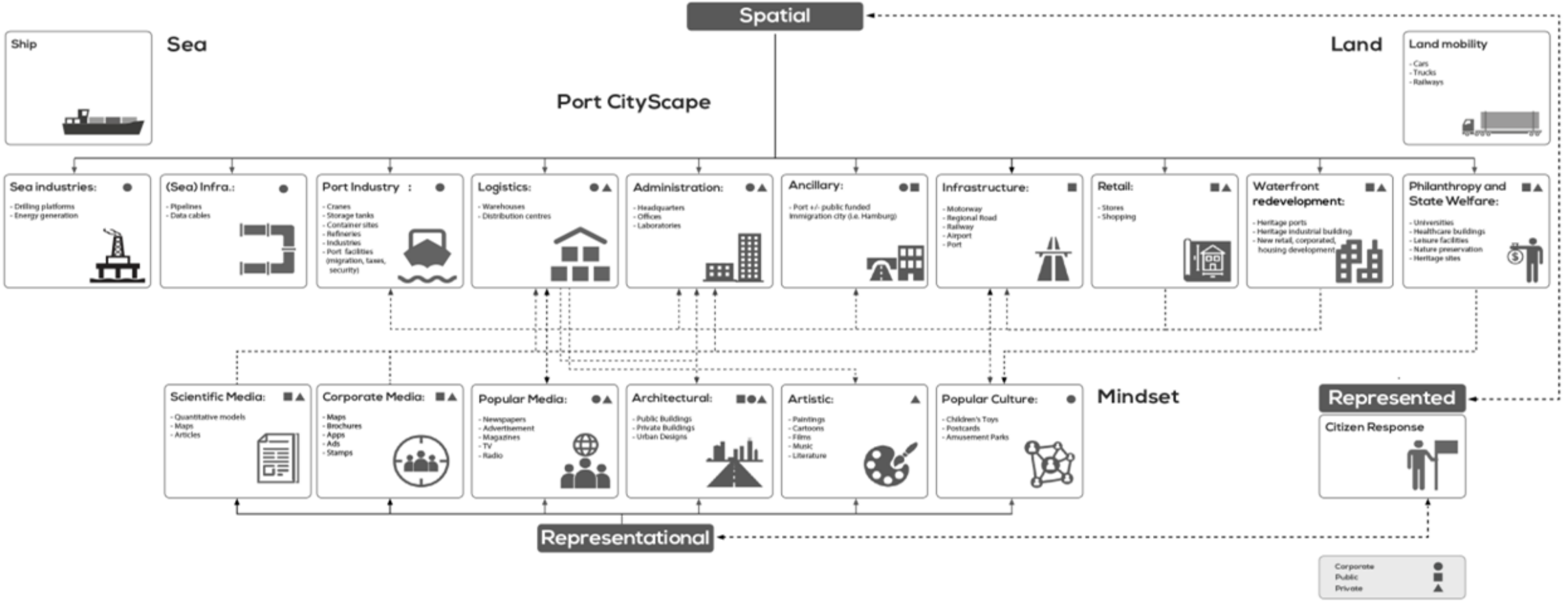


- Multiplying the levels of disconnection appeared in ports during modern globalisation (1990s -)
- **Disproportional risks**
- **Multipolar world** (Western/European values are re-assessed)
- **Gap / Conflict with societal preferences**: What is good for shareholders might not be the best for cities and territories.
- **The New Geopolitics**: Can You Choose the Best Shareholder?

Source: Pallis-Wilmsmeier-Hadjikofinas (2025)

INCLUSIVE ENERGY TRANSITION

Port City Scape

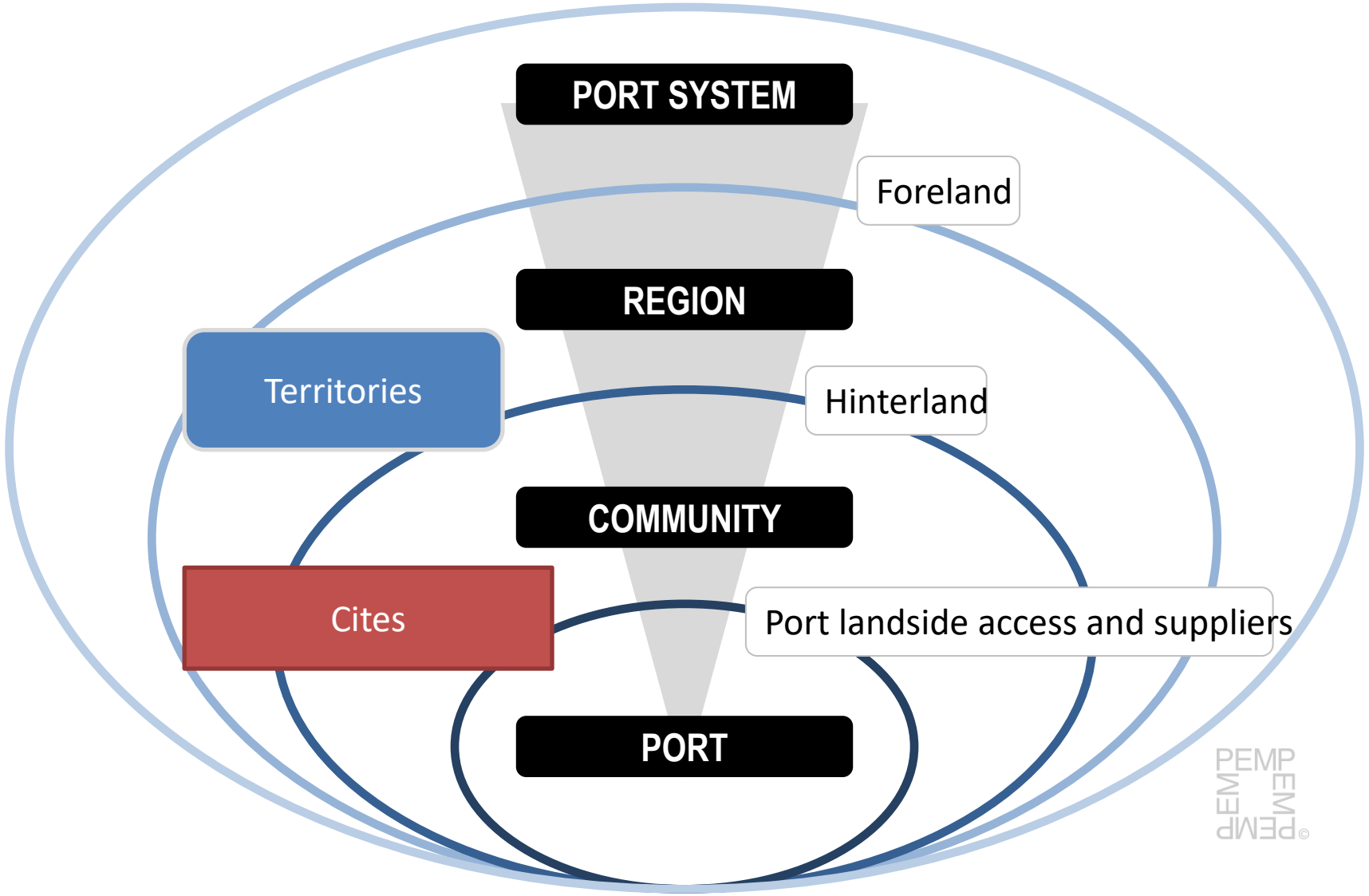


LDE Port City Futures

Spurce: LDE Port City Futures / UfM Strategic Action Plan: Axis of Intervention 2 (UfM Strategic Action Plan for Sustainable Port City Regions)

PortEconomics

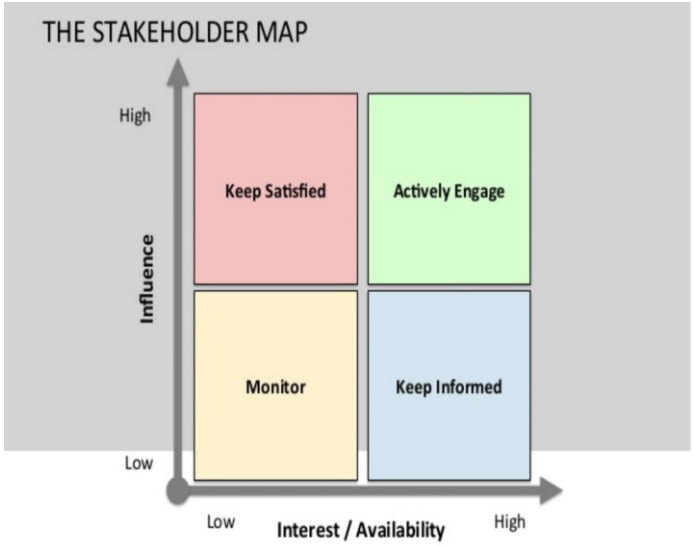
A Multi-Modal (and Multi-scalar) Governance Vision



Adapted from: Brooks and Pallis (2012)

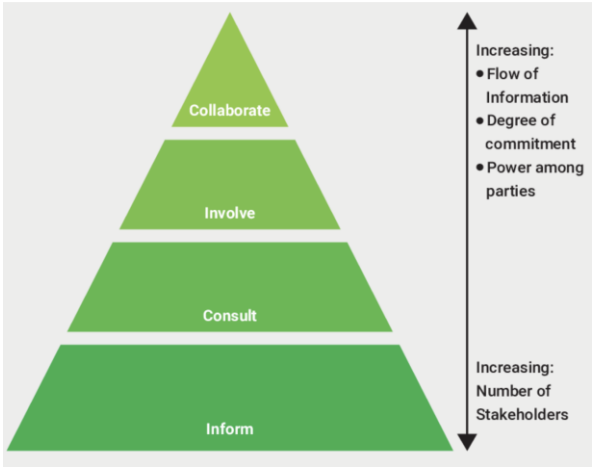
The ‘forgotten stakeholders’ : Local communities

Stakeholders Interests/Influence



- Societies in defense: NIMBY, NIABY, new populism...)
- Energy transition to reverse current energy trends is essential
- Energy initiatives as ‘seedbeds of innovation’

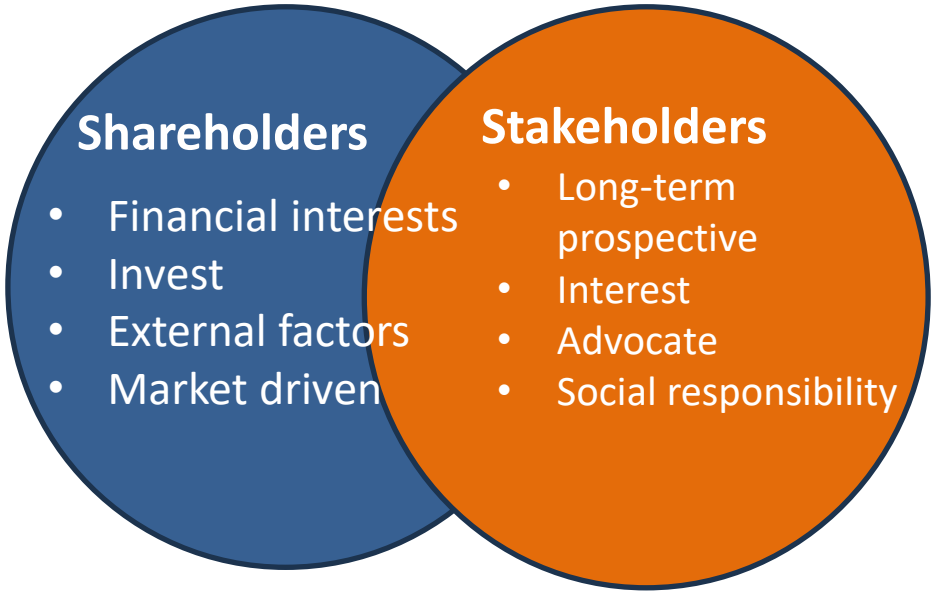
Stakeholders Engagement



Currently: Engagement with local communities is low: but cities are strategic parts of ET.

- Physical element of ET = space
- Functional element of ET =: new activities

Shareholders & Stakeholders



All Shareholders are Stakeholders,
But not all stakeholders are shareholders.

Sources: Scaled Agile, Inc, (2012); Zohbi et al. (2024)

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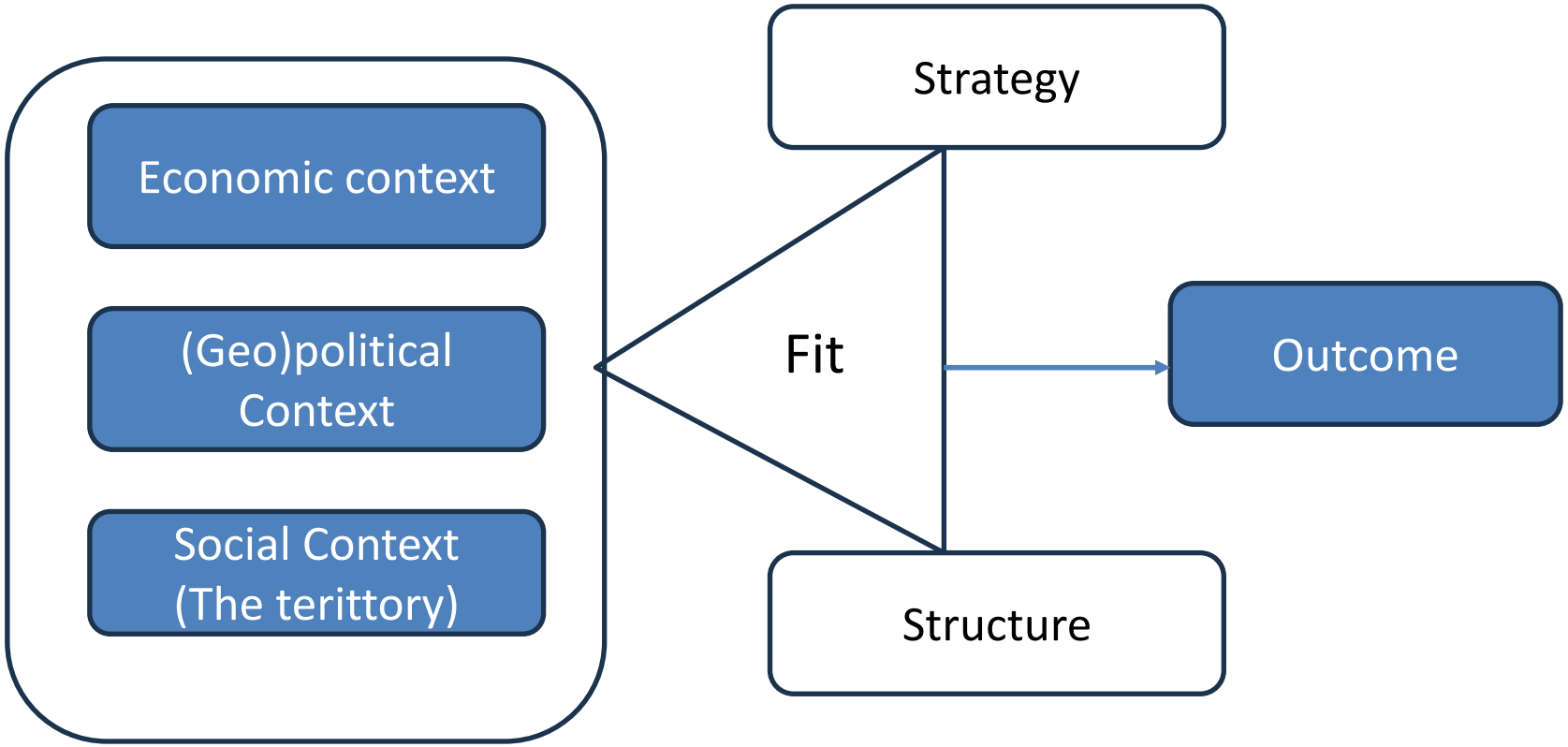
Search for a new "matching framework ’’ (for efficient ET in P&C&T)



Adapted from: Baltazar and Brooks (2001)

An adapted Matching Framework

Pillar I

Transition with measured impact:

- Strategic vision and long-term goals
- Beyond the local
- Broad scope
- Transformation
- Indirect impact
- Longevity of the infrastructure

Pillar II

Governance of the ecosystem.

- Institutions: Alignment of discourses across actors provides the stability & predictability necessary for communities to engage in ET.
- Mechanisms of meaningful stakeholder engagement.
- Transparency
- Collective action

As hubs of economic development, port city territories are developing new approaches to understanding, initiating, and coordinating sustainable and inclusive transitions that require more than technological responses. This transition necessitates a value-based approach and collaborative, multi-disciplinary action. The COST Action PACT – Port City Territories in Action: A Collaborative Laboratory for Inclusive Energy Transition, proposes new methodological responses for knowledge co-production and collaborative planning towards sustainable, inclusive futures by focusing on the spatial and socio-cultural implications of energy transition on port city territories. PACT builds on six main objectives: mapping, reframing, co-creating, including, envisioning, and transmitting.