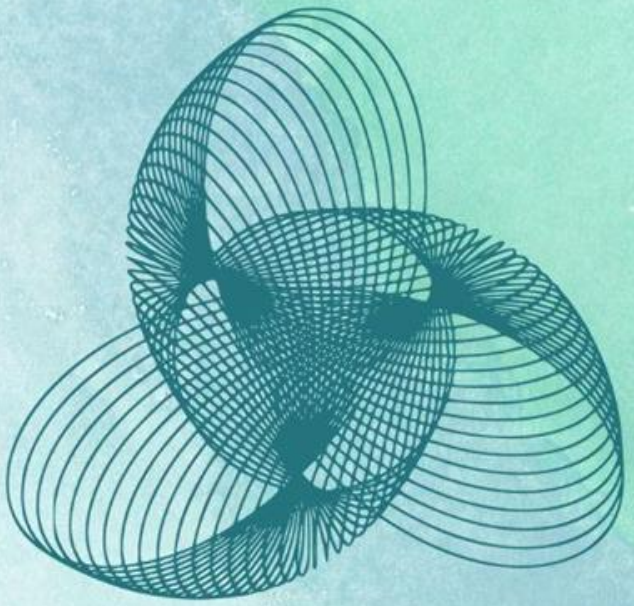

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the Sustainability EducationAI programme for greeNER fuels and enerGY on ports

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Module 4:
Ports as Integrated Hubs for Energy Transition

Course coordinator(s):

World Maritime University/ Sweden

DAFNI / Greece

Email: Asa@wmu.se

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Learning objectives of the course

I. Understand the general concepts of sustainable and green ports
II. Recognize the strategic role of ports in global supply chains
III. Evaluate port governance implications for the port energy transition
IV. Analyse the best port management practices for the implementation of port decarbonisation and energy transition
V. Illustrate the relationship of port with surroundings and near-port areas
VI. Develop knowledge and skills related to the management of stakeholders engaged in the port energy transition

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Introduction

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- **Introduction to ports as integrated entities**
  - Overview of port functions and their role in the supply chains
  - Port governance and its implication on energy transition
  - The relationship of port areas with surroundings and near-port areas
  - The port as an integrated area within an island settlement
- **Introduction to port management tools and instruments**
  - Barriers and solutions to port energy transition
  - Policy and management tools for implementation of port energy transition
- **Stakeholders' management**
  - Mapping port stakeholders
  - Life cycle management of stakeholders engaged in port energy transition

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Introduction to ports as integrated entities

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Port functions

- Ports are a multifunctional maritime infrastructure located in canals, waterways, or coasts that connect hinterland and sea transport, thereby enabling streamlined cargo handling, storage, and transshipment of cargo and passengers (Alamoush, 2024).
- Ports have a role in local and regional economic development because they are strategic nodes in the whole supply chain (hub-and-spoke networks) that function as gateways facilitating trade, commerce, and cultural exchange (Alamoush, 2024).

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Port functions

- Ports act as connectivity nodes where multimodal transports converge and diverge. Ports additionally integrate various economic activities that add value to logistics chains, including assembly and disassembly and local industries and free zones (Alamoush, 2024).
- It is worth noting that ports differ in geography, location, throughput, size, institutional setting, governance, and management, which influence their sustainability implementation and technological innovations, including zero-emission technologies, digitalisation, and smart and automated equipment utilisation (Alamoush, 2024).

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Port importance

For the mariner, a port is a safe place where ships can load and unload cargo and passengers. The emphasis is on safety from wind and weather and from damage to the hull and bottom. The commercial business of loading, unloading, and replenishing the ship is accomplished within a safe place. This can be done either at a quay or at an anchorage using barges and tenders.

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Port importance

- **For governments,** a port is a gateway to international trade that provides benefits for the national economy. Therefore, governments support and even subsidise their important ports. On the other hand, ports may be a gateway to undesirable issues such as smuggling, terrorism, and pollution, which all concern the national government.

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Port importance

- **For the port manager**, the port is a business for making a profit. Thus, poor management leads to loss. Nationally, there are number of financial objectives that the port management needs to achieve to meet strategic objectives.

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Port importance

- **For society**, ports remain a technical intensive industry that provides direct and indirect employment for labour and business and other enterprises (multiplier effect).
- Ports act as a social caretaker for employees and communities, enhancing and supporting socioeconomic priorities. In Europe, 2,200 port operators employ more than 110,000 workers who are engaged in the loading and unloading of ships and in port-based services such as warehousing and logistics.

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Port energy transition

Port Energy Transition (ET) is defined as the process of changing port status from being high energy consumers, dependent on fossil fuels to being efficient consumers that depend on green fuels and renewable energy. At the same time, they should develop to become energy hubs (for production and bunkering) that facilitate the ET of transport logistics chains, e.g., ships and land transport (Alamoush et al., 2024)

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Port energy transition

While port ET depends on the installation of various technologies such as onshore power supply (OPS), renewable energy, electrification and hybridisation of port equipment, including providing supplies of green fuels (e.g. hydrogen, ammonia, methanol, ethanol, and bio diesel) for powering port equipment or for bunkering ships, it also requires policy and management tools to facilitate implementation

(Alamoush et al., 2024)

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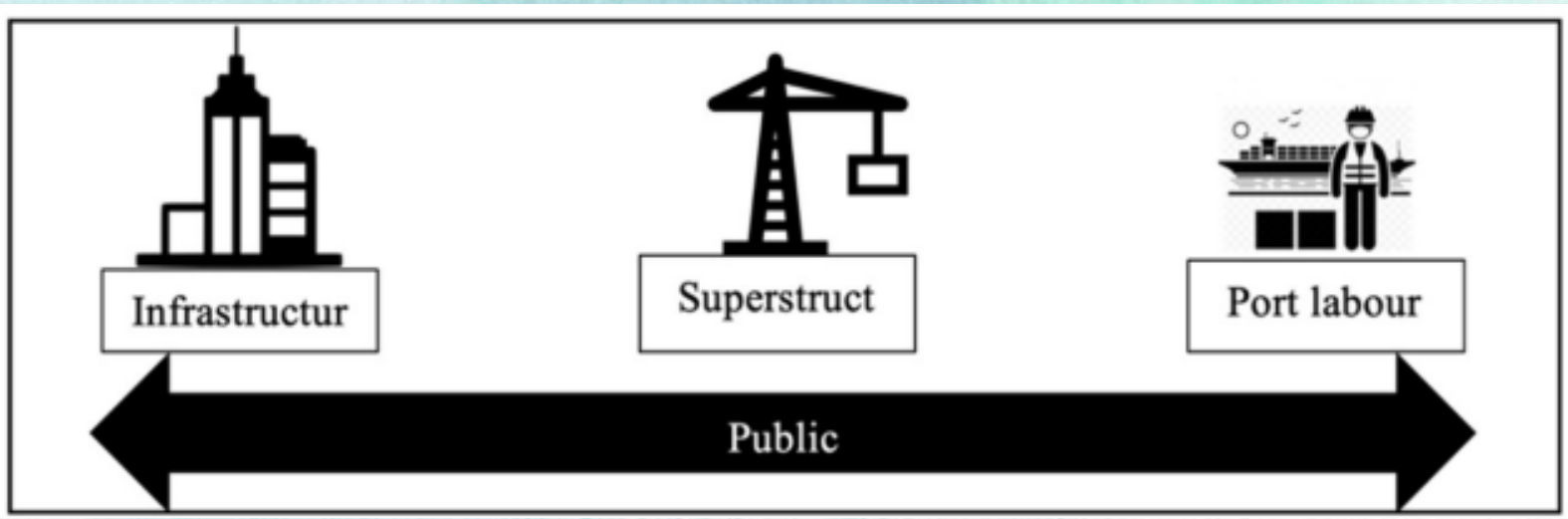
Port governance and ET

- Public Service Port



(Isamial et al., 2024)

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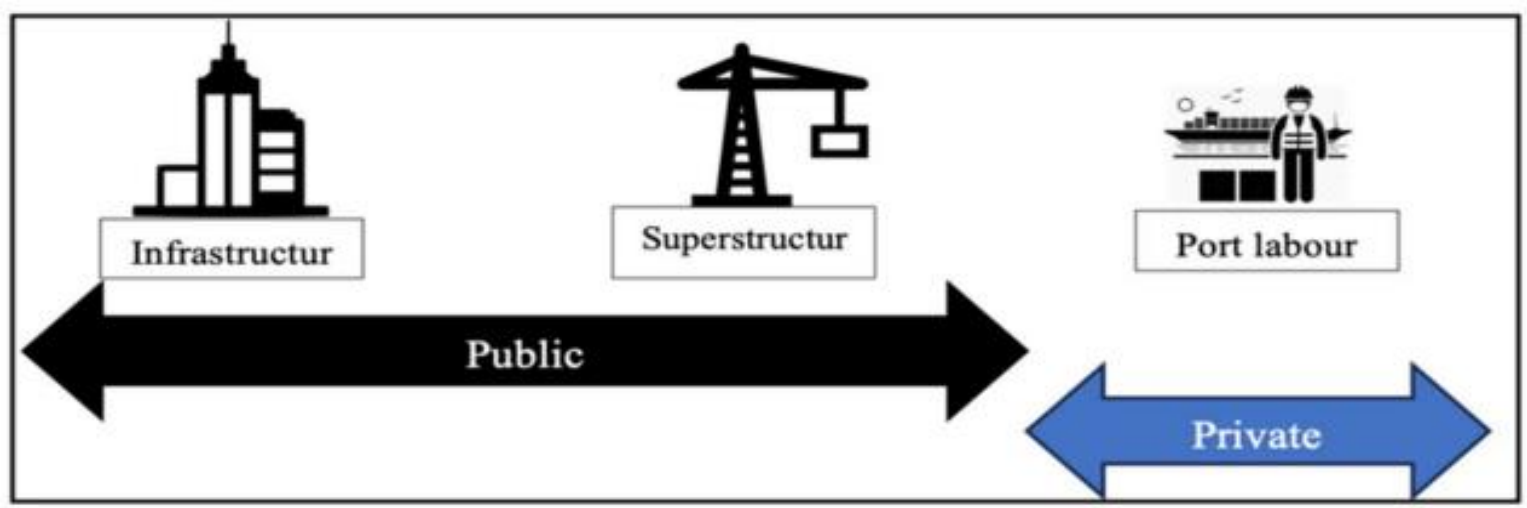
Port governance and ET

- Tool Port



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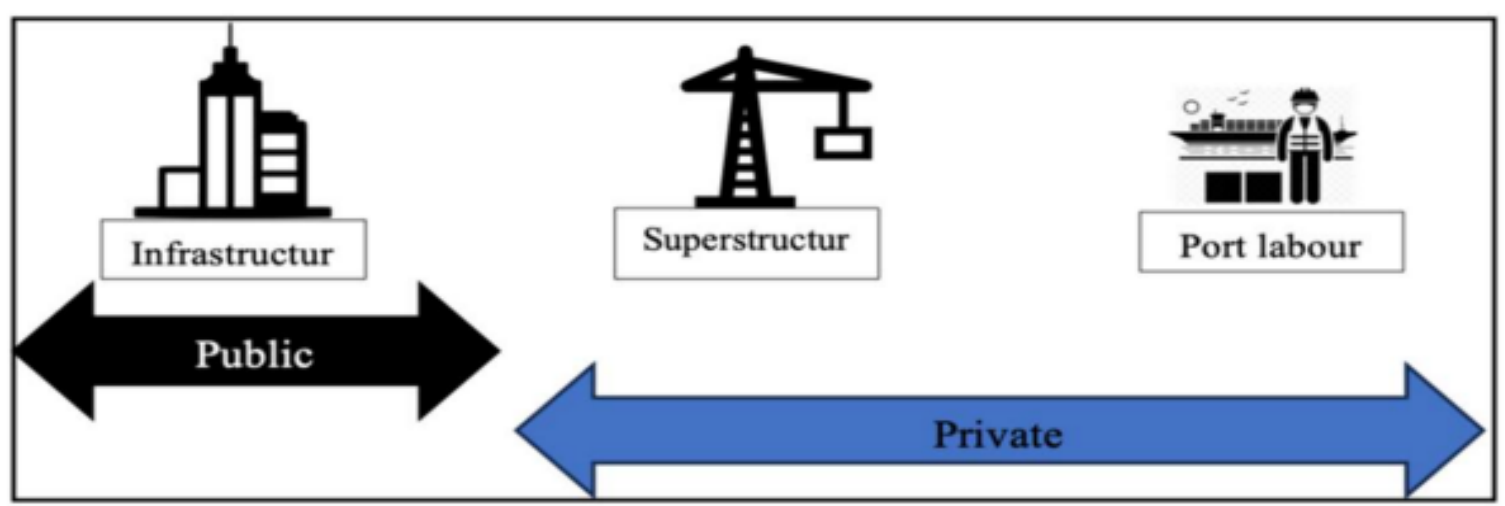
Port governance and ET

- Landlord Port



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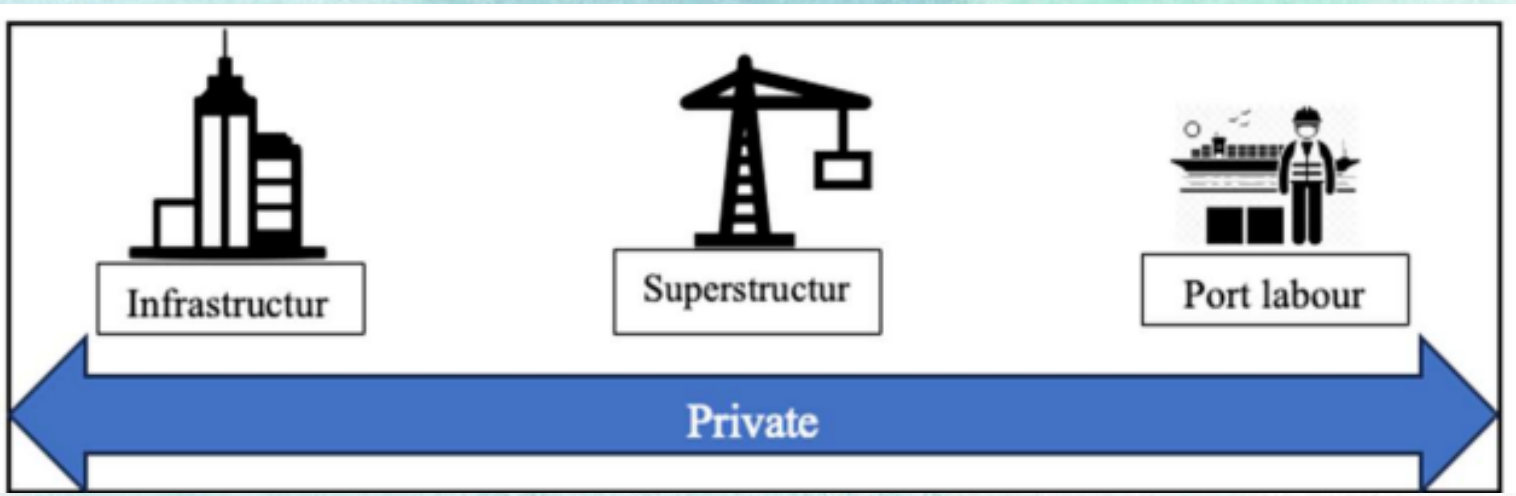
Port governance and ET

- Private Port



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Port Governance Model and Green Policies

Using the Container Port Performance Index 2022 data, for the top 50 container ports, assessment of the applicability of three variables across all port governance models was conducted

Key variables	*Involving stakeholders*	*Enacting green policies*	*Conducting scientific monitoring*
Public service port	Low	Medium/High	Medium/High
Tool port	Low	Low	Low
Landlord port	Hight	Medium/High	Medium/High
Fully privatised	Low	Low/Medium	Low/Medium

(Isamial et al., 2024)

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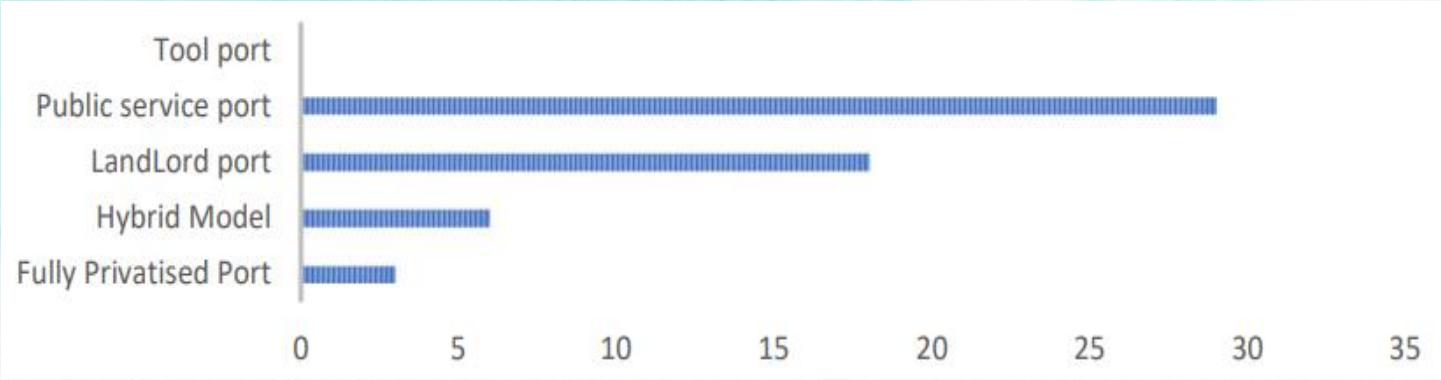
Port Governance Model Corelated To ESI Initiative

The Environmental Ship Index (ESI) initiative targets ships and thus provides financial incentives based on the criteria for assessment, including emissions of SOx, NOx, CO2, and the utilization of Onshore Power Supply (OPS) by visiting ships



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Relationships of port areas and near-port areas

Benefits

- Economic growth
- Infrastructure development
- Industrial growth

Challenges

- Environmental impact
- Social impact
- Economic disparities

(Notteboom et al., 2022)

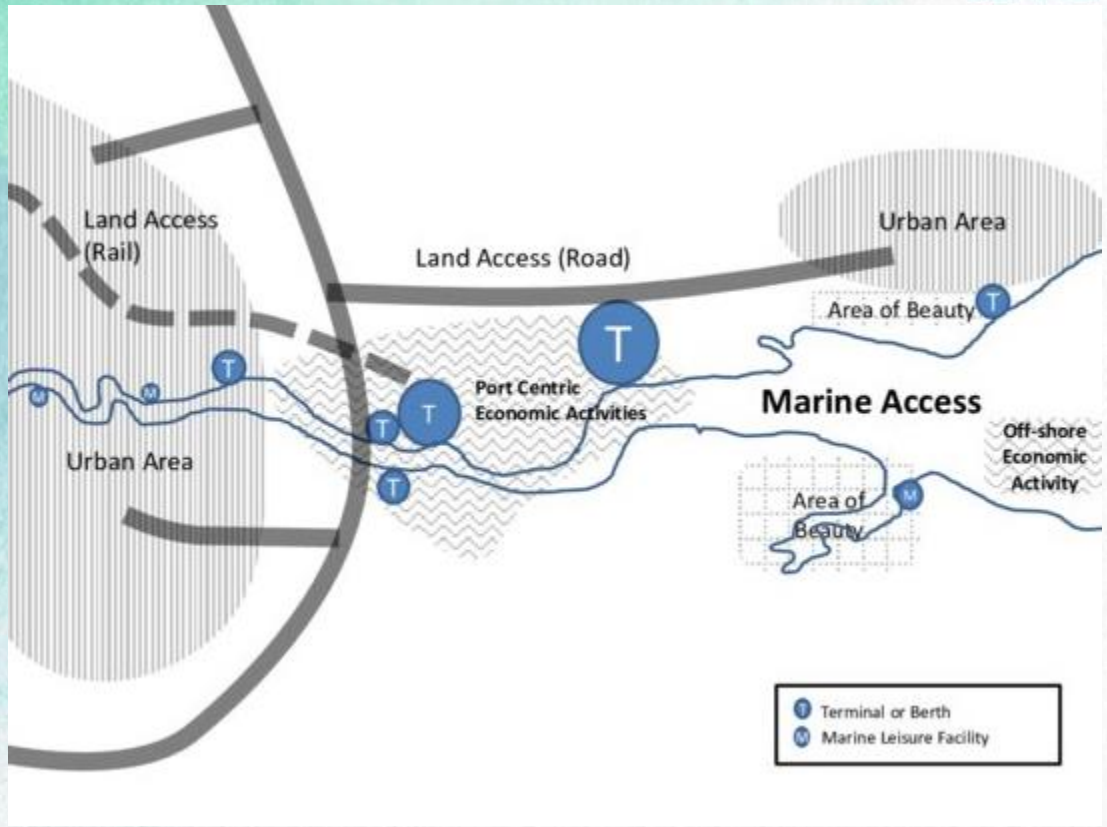

Fig.: Illustrative map of the geography of a port system located on a river (Grainger & Achuthan, 2014)

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Main Benefits

- Economic growth
  - Job creation
  - Trade facilitation
- Infrastructure development
  - Improved transportation
  - Urban development
- Industrial growth
  - Cluster formation
  - Supply Chain efficiency

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Main Challenges

- Environmental impact
  - Pollution
  - Habitat destruction
- Social impact
  - Displacement
  - Health risks
- Economic disparities
  - Uneven development
  - Dependency

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Case study

Port of Rotterdam, Netherlands

- Benefits: Facilitates trade and creates many employment positions. It serves as a center for industrial clusters, mainly in the logistics and petrochemical industries.
- Challenges: Environmental issues like water and air pollution. Rotterdam has put in place several green initiatives, such as investments in renewable energy and shore power for ships.

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Integrating ports within island settlements

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Challenges

- Geographical and spatial constraints
- Environmental concerns
- Logistics and mobility issues
- Social and cultural concerns

Effective integration requires a balance between development and sustainability, contributing positively to the island's economy and community

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Challenges

- Geographical and spatial constraints

Geographical limitations frequently result in island ports having limited room for expansion, Port operations and growth plans may be limited by the proximity to residential areas.

- Environmental concerns

Port operations can lead to habitat loss and water/air pollution, affecting marine and coastal ecosystems. Efficient green infrastructure and waste management are crucial to prevent environmental deterioration.

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Challenges

- Logistics and mobility issues

Ensuring seamless connectivity between the port and the island's mainland can be challenging due to limited mobility infrastructure. Island ports face seasonal peaks in demand, particularly during tourist seasons, straining existing infrastructure and resources.

- Social and cultural concerns

Integrating port activities with island communities requires careful management to address concerns. Maintaining the cultural and historical integrity of island settlements is challenging.

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Case study

Port of Palma de Mallorca, Spain

- Challenges: Balance between commercial shipping and tourism. Environmental issues with pollution and the effects on marine life.
- Solutions: Investments in green port infrastructure, such as shore electricity for docked ships, and the implementation of environmental rules, such as lowering sulfur emissions from ships. Additional initiatives in place to support sustainable tourism.

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Case study

Port of Syros, Greece

- Challenges: Limited capacity to handle large vessels and the increased tourist traffic, that raises worries about environmental deterioration.
- Solutions: Integrating the port with regional economic activity and promoting sustainable tourism. Investments in environmentally friendly technologies, like cleaner fuels and shore electricity, as well as initiatives to enhance green transportation and e-mobility.

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Introduction to port management tools and instrument

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Barriers to port energy transition

- Economic Market Failure
- Economic Non-Market Failure
- Behavioural Barriers
- Organizational Barriers
- Institutional Barriers
- Technological Barriers
- Time & Administrative Barriers

(Alamoush et al., 2023)

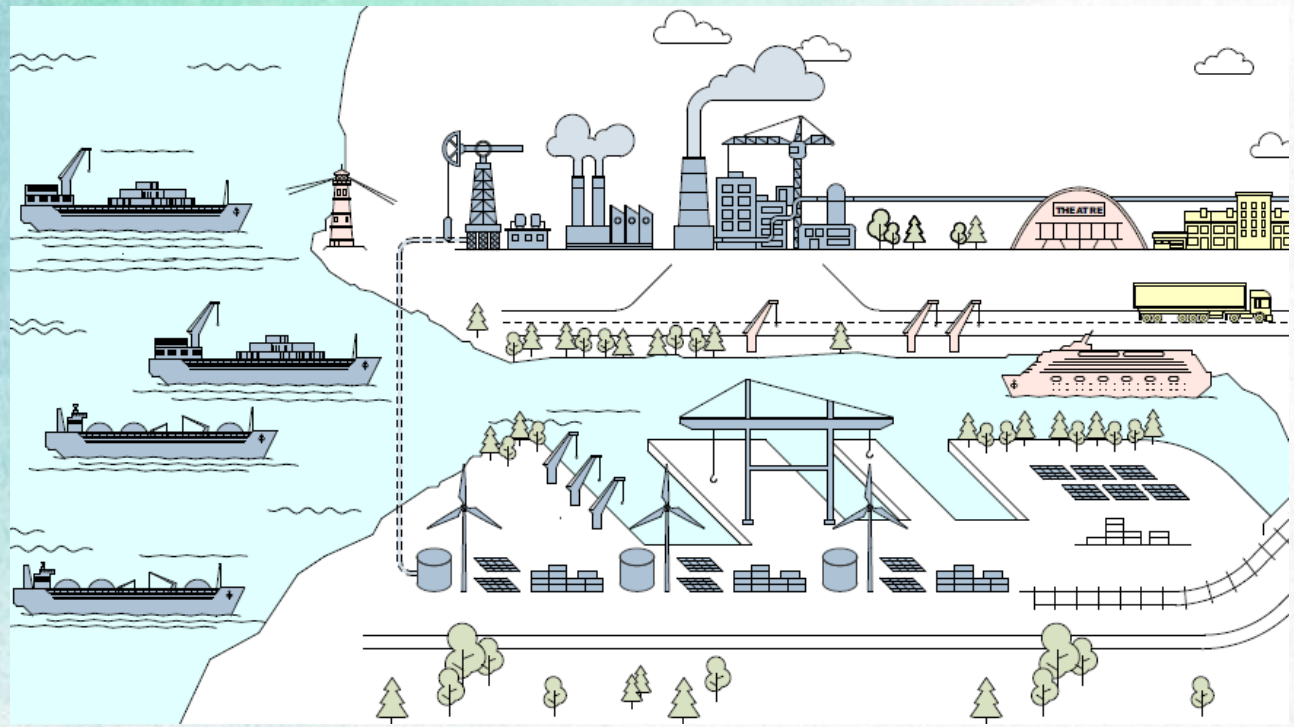

Fig: Using Value Deliberations to Explore Solutions for the Energy Transition of Port City Cultures (2018-2019),TU Delft, Design for value

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Economic Market Failure

- **Imperfect information**

Lack of right and proper information about decarbonisation technologies

- **Adverse selection**

Selection of technologies and measures based on price rather than performance

- **Principle agent relationship**

Port authority closely oversees and regulates the port operator

- **Split incentive**

Arises when two parties have goal conflict and asymmetric information

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Economic Non-Market Failure

- **High costs and access capital issues**

Decarbonization solutions come at a considerable expense

- **Hidden costs**

Resulting from life cycle costs, transactional costs, commissioning, operation, maintenance

- **Risks**

Implementation with no suitable return on investment

- **Heterogeneity**

Operational and consumer variety of ports

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Behavioral Barriers

- **Form of information**

Suboptimal information exchange and reluctance to share data

- **Credibility and trust & Values**

Lack of credibility and trust, absence of environmental concerns, moral commitment and ambition

- **Inertia**

Resistance to change

- **Bounded rationality**

Lack of expertise in conducting proper investment appraisals

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Organizational and Institutional Barriers

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- **Power & Culture**

Governance model and port's cultural commitment to environmental respect

- **Political roles**

Overlapping port governance

- **Governmental regulations**

Lack of strict decarbonisation regulations in ports leads to uncertainty

- **Industrial norms and mimetic actions**

Port norms, including training and technical skills, play a critical role

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Technological Barriers

- **Incompatibility**

Compatibility issues with port types and operations

- **Interference with ports' main processes**

Smart grid faults, logistics inefficiency, potential corruption of perishables

- **Complexity of measures**

Complex process due to new infrastructure

- **Technology readiness and abatement potential**

Alternative fuels are limited in availability, and some technologies are not mature or have a potential market

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Time and Administrative Barriers

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- **Outdated or long lead times**

Decision-making and deployment of technology, often involving multiple government agencies and ministries, lead to outdated or long lead times

- **Lack of awareness, resources, staff, and technical skills**

Administrative barriers due to lack of awareness, resources, staff, and technical skills

- **Administrative conflicts**

Within different departments, such as finance, procurement, and environment

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Implementation Policy and management tools

- Regulation & standards
- Incentives
- Capacity building
- Information sharing
- Strategic plans
- Inventory, Monitoring, Reporting
- Miscellaneous solutions

(Alamoush et al., 2023) Fig. The Paris Climate Agreement goals (Tree Aid)

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Regulations and Standards

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- The Paris Agreement and environmental regulations are crucial for port authorities
- National governments play a crucial role in empowering ports by implementing climate change mitigation provisions and domesticating environmental regulations.
- Decarbonisation regulations and liability standards are used to ban fossil-fuels-run cargo handling equipment
- Regulations are vital for developing energy-efficient ports

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Incentives

- Environmentally differentiated port fees, grants, subsidies, and tax exemptions
- Examples of incentives: the Environmental Shipping Index (ESI), Clean Shipping Index (CSI), Green Award (GA), and GHG Emission Rating (GHG ER)
- Vessel speed reduction, Onshore Power Supply (OPS), energy audits
- Specific programs, like the Hamburg Port incentives for railways and the clean truck programs

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Capacity building

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- Port Authority Partnerships (PPAs) can implement capacity building programs by educating and training tenants, stakeholders, and employees to reduce their carbon footprint.
- Training includes handling alternative fuels, eco-efficient driving, and encouraging car and van pooling, public transportation, and cycling.
- PPAs can also act as community and port cluster managers, facilitating activities like information technology training and education, supporting researchers and technologists in developing decarbonization measures.

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Information sharing

- This lack of information on energy efficiency measures benefits, including costs, is a significant barrier
- Sharing information is crucial to mobilize port polluters' attention towards decarbonisation
- Ports can also be innovation drivers by housing knowledge hubs, incubators, smart labs, and software and hardware solutions.
- Digitalization, through IT and ICT, improves port efficiency, monitoring emissions, data collection and information sharing

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Strategic plans

- Ports' strategic planning aims to optimize operations and improve sustainability by focusing on environmental aspects, including planning for decarbonisation and environmental sustainability targets.
- Ports can also develop policies and tools to transition towards sustainability, such as designing green ports, reducing shipping emissions, and reducing CO2 emissions in expansion projects.
- Examples: EU ports planning for alternative fuel bunkering, San Pedro Bay Ports preplacing older equipment with cleaner ones, and Los Angeles and Long Beach planning for zero-emission ports.

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Inventory, Monitoring, Reporting

- Environmental Ship Index (ESI): assesses the environmental performance of ships based on their emissions.
- Port Emissions Inventory Tool (PEIT): Developed by the World Ports Climate Initiative (WPCI), it helps ports measure and manage their GHG emissions.
- Global Reporting Initiative (GRI): Offers guidelines for sustainability reporting across industries, including ports.
- European Seaport Organisation (ESPO): Provides sustainability reporting frameworks specifically for European ports

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Inventory, Monitoring, Reporting

World Port Climate Initiative (WPCI): Promote efforts among ports to reduce their carbon footprints & Provides tools and frameworks to help ports manage their GHG emissions.

Segmentation of GHG Emissions into Three Scopes:

- Scope 1: Direct emissions from port-owned or controlled sources.
- Scope 2: Indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the port.
- Scope 3: All other indirect emissions that occur in the port value chain, including tenant operations, cargo handling, and ships at berth.

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Miscellaneous solutions

- Ports must conduct feasibility studies and life cycle costing to assess carbon footprints and reduce investment risks
- Certifications and audits, such as ISO 50001, ISO 14001, EMAS, ESPO SDM, and PERS
- Stakeholder mapping and management are crucial for port energy transition and decarbonization, fostering trust, collaboration, better decision-making, resource allocation
- New business models involving third-party investors in technology solutions and cost-sharing among stakeholders

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Stakeholders' Management

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Who are port stakeholders

The stakeholders of the port energy transition project (ETPs) are the individuals, groups, organizations, who have interests, rights, or ownership on the ETPs. Thus, stakeholders may contribute to, be affected by (benefit or loss) the energy transition work (construction), and outcome (operations), taking into consideration that these stakeholders may accelerate or decelerate the ETP and thus influence the outcome (Alamoush et al., 2024)

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Port energy transition (PET)

PET is the process of changing port status from high energy consumer and dependency on fossil fuels to efficient consumer that depends on green fuels and renewable energy, while at the same time developing to become energy hubs (for production and bunkering) that facilitate the energy transition of transport logistics chains, e.g., ships and land transport (Alamoush et al., 2024)

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PET pillars

- PET depends on the installation of various technologies such as onshore power supply (OPS), electrification, and hybridization of port equipment, including providing supplies of green fuels (e.g. hydrogen, ammonia, methanol, ethanol, and biodiesel) for powering port equipment or ships bunkering (Alamoush et al., 2024)
- PET also requires policy and management tools to facilitate implementation (Alamoush et al., 2024)

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Why we ports need stakeholder management

- There is a slow uptake of energy transition and decarbonization technologies due to various barriers (including the stakeholders' issues)
- Most energy transition projects, such as alternative fuel bunkering and production, Carbon Capture and Storage (CCS), on- and off-shore wind power generation, and circular economy projects, are expansion projects that not only include ports but others outside the port. Failure to address stakeholders'' concerns may result in project failure (Alamoush et al., 2024)

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Why we ports need stakeholder management

- Involving stakeholders early in the planning process and incorporating them throughout the project helps prevent and resolve issues such as conflicts and controversies that hinder progress (Alamoush et al., 2024)

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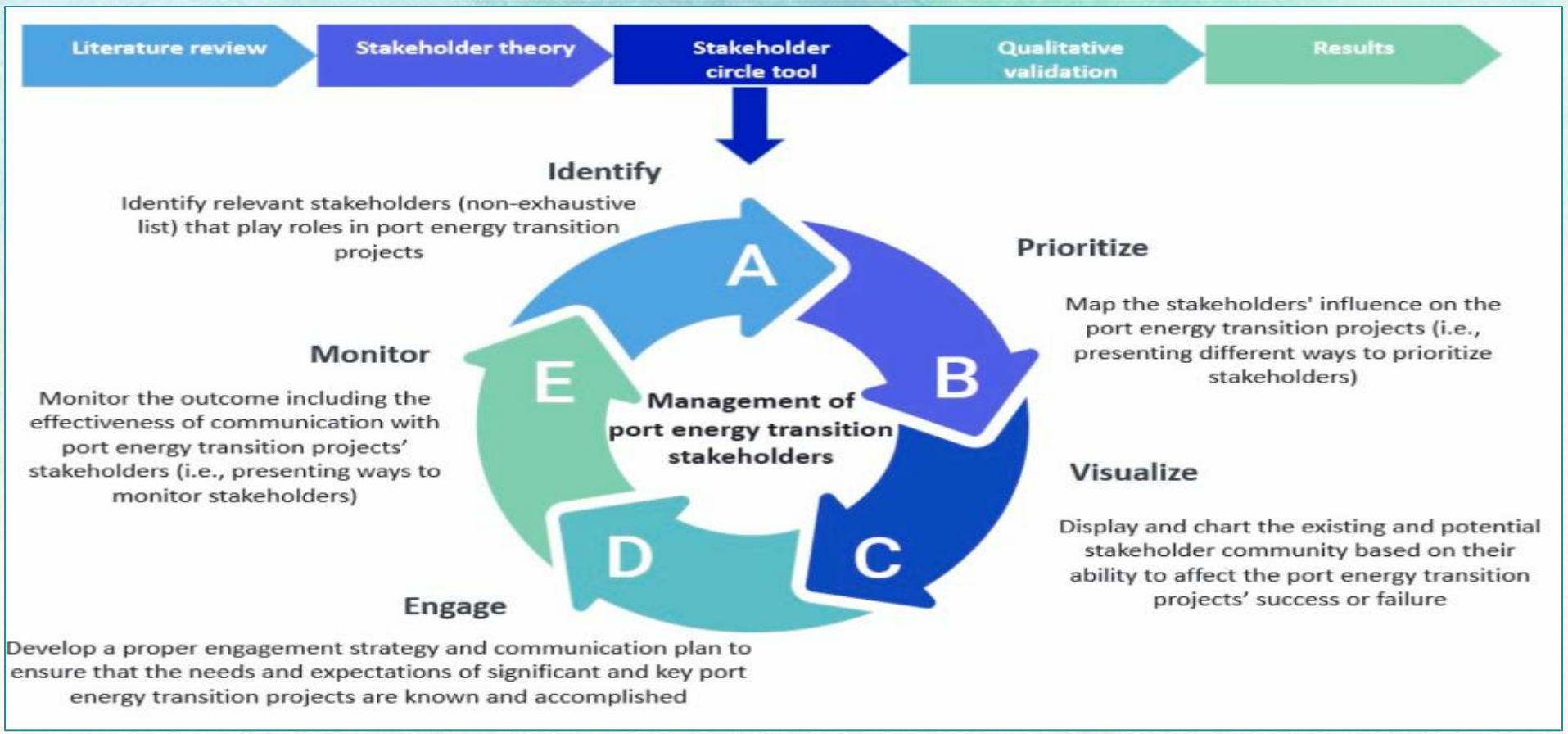
Stakeholders management



(Alamoush et al., 2024)

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Step one: Identify

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Stakeholders mapping

- The stakeholder group is the main group, which is broken into different stakeholder subgroups that can be agencies or participants
- In total, 22 stakeholder groups including several subgroups that comprise many stakeholders were identified

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Stakeholders' Groups

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	Stakeholders' groups	Subgroups (agencies/participants)
1	**Port managing body**	Public authority, Board of directors, port authority, port operating companies
2	**Shareholders**	Public or private organizations, firms holding an equity share in the port
3	**Port services providers**	Pilots, mooring and towage operators, customs, waste management, the coast guard, bunkering barge operators, carbon traders, carbon absorption promoters
4	**Concessionaires**	Terminal operators, warehouses, depots, industrial areas, logistics platforms, malls, and commercial areas
5	**Maritime authority**	Maritime authorities, commissions or administration, touristic cruise authorities
6	**Carriers**	Shipping lines (containers) and tramp operators and owners, inland waterway (ILW), RoRo, Cruise ships, passenger ships, Ropax,
7	**Employees and trade unions**	People working in the port authority and companies, labor pools, and port-related firms, such as forwarders, ship agents, and customs brokers
8	**Port users**	Freight forwarders, ship agents, brokers, road haulers, railway companies, and logistics providers
9	**Passengers**	People using port facilities for commuting, travel (ferries), and tourism (cruising and yachting)

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Stakeholders' Groups

	Stakeholders' groups	Subgroups (agencies/participants)
10	**The financial community**	Banks, insurance companies, stock exchange, credit institutions, and investors, ministry of finance, public funds (EU Horizon, EU-industry partnership)
11	**Local community and societal groups of interest**	People and individuals affected by port energy transition projects, city residents, port tenants, None Governmental Organizations (NGOs), tourism-related business associations in islands
12	**Regulators Local**	City, municipality, local courts, police, fire services, local emergency services, and environment, health, food, and agricultural authorities
13	**Regulators national**	Government agencies (Judiciary, transport, environment, mobility, planning, maritime ministries)
14	**Regulators regional**	Eu commission
15	**Regulators international**	International Maritime Organization (IMO),
		World Customs Organization (WCO) World Trade Organization (WTO) United Nations Conference on International Trade Law (UNCITRAL) United Nations Conference on Trade and Development (UNCTAD)

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Stakeholders' Groups

	Stakeholders' groups	Subgroups (agencies/participants)
16	**International organizations and trade associations**	International Association of Ports and Harbors (IAPH), World port Sustainability Program (WPSP), Classification societies, auditors, certification enterprises, European Sea Ports Organization (ESPO), Federation of European Private Port Companies and Terminals, Worldwide Industrial & Marine Association, carbon registries, innovation hubs
17	**Media**	Press, online and social media, TV, Radio, Newspapers
18	**Research and education**	Universities, training institutions, tertiary education
19	**Technology Developers and Manufacturers**	Manufacturers, equipment suppliers/maintenance such as material suppliers, hardware and software manufacturers, shipyards, energy management system developers, engines manufacturers, naval engineering companies, renewable energy companies (installation and production), other local industries
20	**Energy providers**	Utilities, offshore, national, and international grids operators, bunkering companies, fuel producers,
21	**Energy transition facilitators and third parties**	Designers, Architects, Contractors, Construction workers, port project managers, project teams, consultants , other service providers
22	**Consumers**	The general public, industrial sectors

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Step Two: Prioritize

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Stakeholders' salience attributes (power, proximity, and urgency)

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- The first dimension is the **power** of stakeholders (either alone or operating as a group) to kill the ETP. Which indicates stakeholders' capacity to influence actions.
- Second is the **proximity**, how close (closeness) the stakeholder is associated (association) to the day-to-day running of the ETP. i.e., how they are prepared to fulfill their outcome in the ETP either through direct involvement or remote operation
- Third is **urgency**, which refers to the degree to which stakeholders' claims necessitate urgent attention

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Prioritisation

Attributes	Rating and ranking
Power	(1) The stakeholder has a relatively **low level** of power (i.e., cannot generally cause much change)
	(2) The stakeholder has **a significant** informal **capacity** to cause change (e.g., a supplier with input to design or unions with respect to working conditions)
	(3) The stakeholder has **some capacity** to formally instruct change (i.e., the key element is a formal right to be consulted or a right to approve elements of the design or works)
	(4) The stakeholder has a **high capacity** to formally instruct change (i.e., can have the activity stopped)
Proximity	(1) The stakeholder is **relatively remote** from the project and does not have direct involvement with the project processes (e.g., shareholders)
	(2) This stakeholder is **detached from** the project but has regular contact with, or input to, its processes (e.g., maritime authorities, city)
	(3) The stakeholder is **routinely working** on the project (e.g., part-time members of the project team and external suppliers)
	(4) The stakeholder is **directly working** on the project (e.g., full-time team members and contractors working as a part of the team)

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Prioritisation

Attributes	Rating and ranking
Urgency (Importance & and action)	**Importance**
	(1) The ETP's importance to this stakeholder is **very low**
	(2) The ETP's importance to this stakeholder **is low**
	(3) The ETP's importance to this stakeholder **is medium**
	(4) The ETP's importance to this stakeholder **is high**
	(5) The ETP's importance to this stakeholder **is very high**
	Action
	(1) The stakeholder is **unlikely** to attempt to influence the project
	(2) The stakeholder **has** the potential to attempt to influence the project
	(3) The stakeholder **may be prepared** to make an effort to influence the project
	(4) The stakeholder is **likely** to make a significant effort to influence the project
	(5) The stakeholder **will go to almost** any length to influence the project

The final result (Stakeholders' salience attributes (power, proximity, and urgency) can be accumulated to give a priority index about the stakeholders' salience

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Step three: Visualize

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Visualisation

- The visualization is important because it is key to targeting the right stakeholders at the right time, using the right resources, and the right level of engagement during ETP life
- It also facilitates further information gathering and designating proper communications

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Visualization

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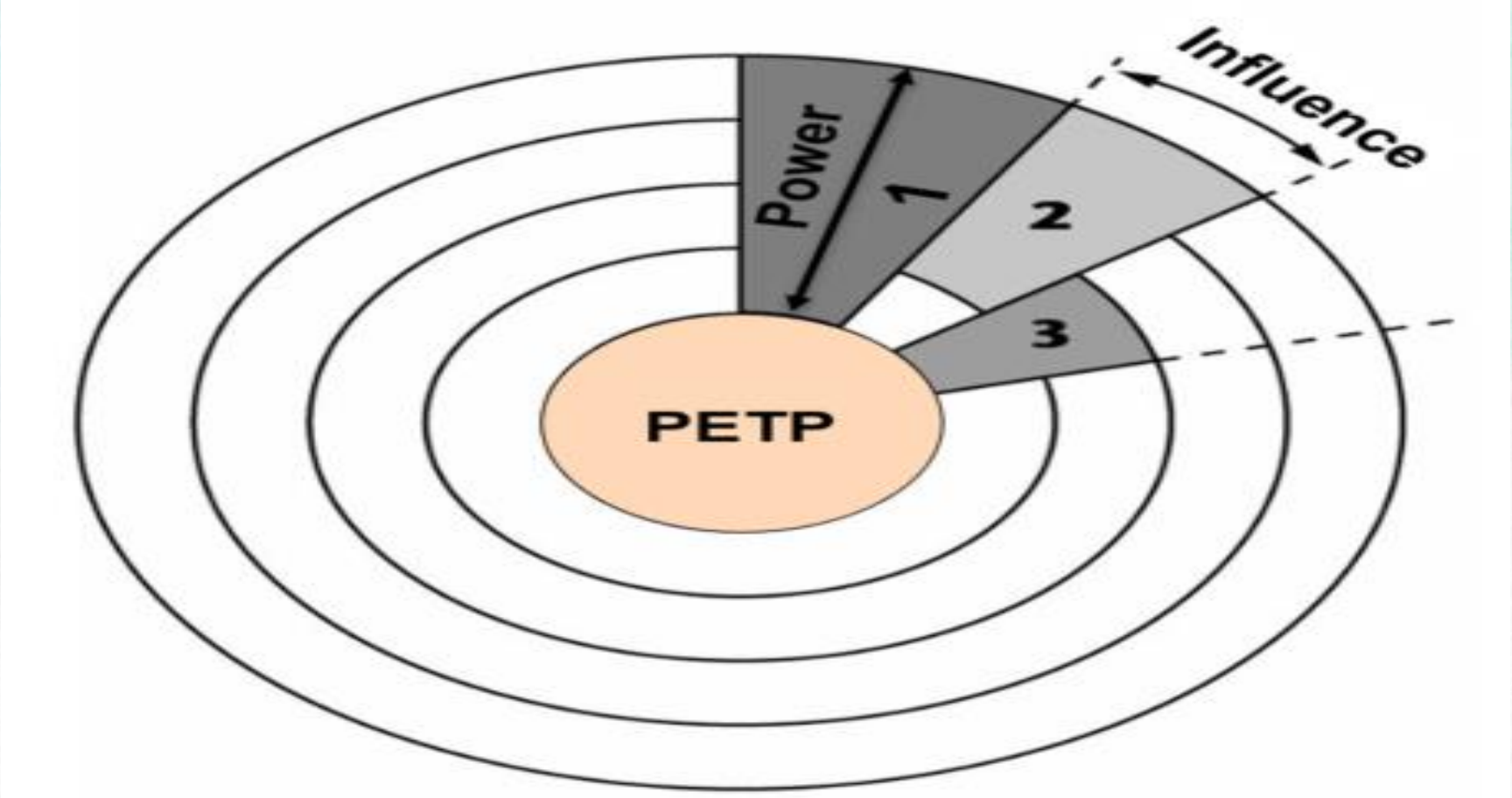

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Step Four: Engage

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Topic title

- Stakeholders' engagement refers to engaging relevant stakeholders to achieve accepted outcomes.
- The engage step is based on three pillars:
  - identifying engagement tactics and approaches which are customized based on the demands needs, power and interests of the stakeholders who were identified and categorized in the preceding three processes,
  - evaluation of stakeholders' engagement which builds profiles of stakeholders' engagement, including an engagement index, after data is collected, which leads to a focused communication plan for effective stakeholder engagement,
  - building a communication plan to engage stakeholders.

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Engagement

Engagement approach	Description
Partnership	Shared accountability and responsibility. Two-way engagement joint learning, decision making, and actions
Participation	Part of the team, engaged in delivering tasks or with responsibility for a particular area/activity. Two-way engagement within limits of responsibility
Consultation	Involved but not responsible and not necessarily able to influence outside consultation boundaries. Limited two-way engagement: organization asks questions, and stakeholders' answer.
Push communications	One-way engagement. Organization may broadcast information to all stakeholders or target particular stakeholder groups using various channels e.g., email, letters, webcasts, podcasts, videos, and leaflets.
Pull communications	One-way engagement. Information is made available stakeholders choose whether to engage with it

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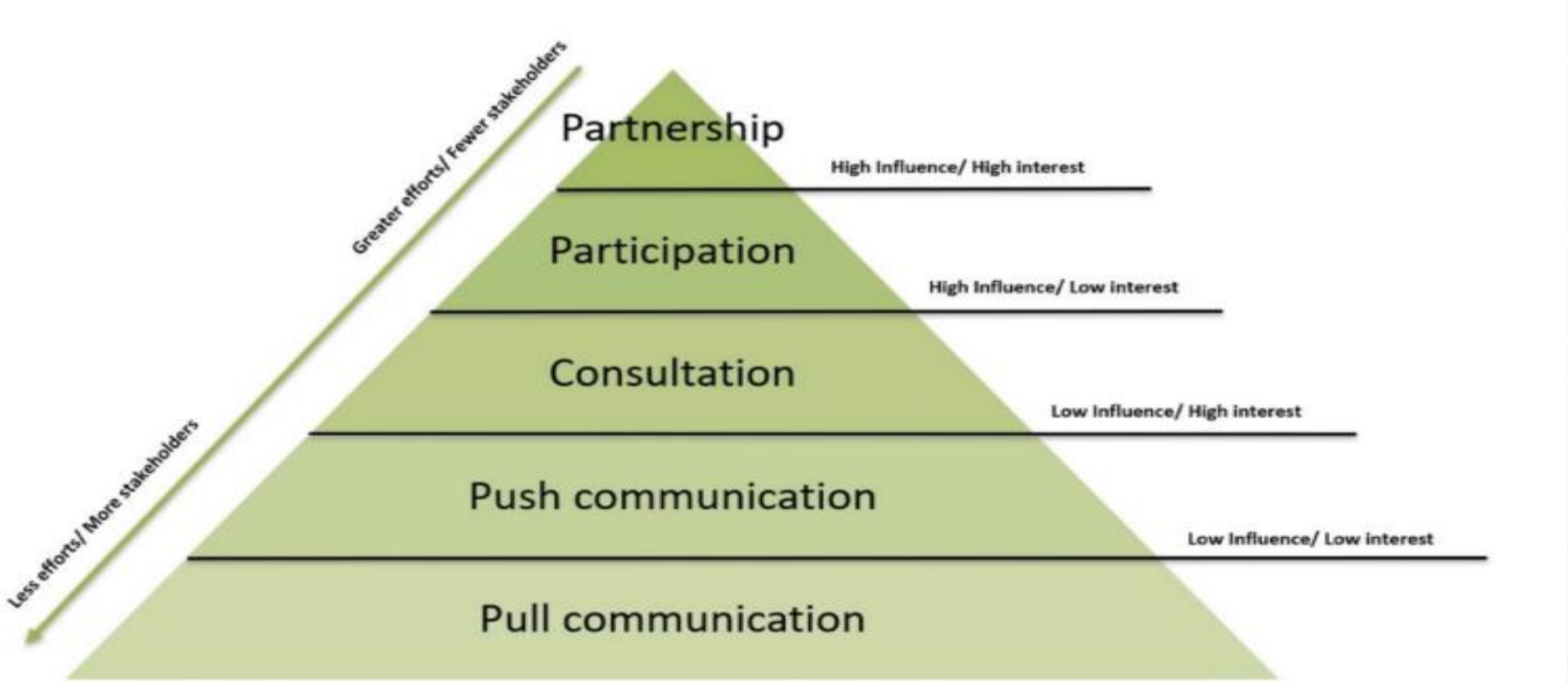
Engagement



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Communication types

Communication Type	Examples
Audio/visual	Podcasts, video, webinars, video conferencing, teleconferencing
Face to face	Project meetings/briefings, answering individuals with specific questions, presentations to a wide audience, targeted presentations to particular groups
Online	Blogs, e.g., Blogger, WordPress, intranet/internet, email, forums, communities, and online groups, e.g., Google groups or LinkedIn groups, online collaboration area/workspace e.g., eRooms or Quick Place, social media, e.g., Facebook, Twitter, Google +
Printed materials	Magazines, newsletters, leaflets, memos, letters, display boards

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Step five: monitoring

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Monitoring

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- Monitoring is essential to keep current information about the stakeholders, which also allows the stakeholders to be re-assessed, re-prioritized and re-developed
- Monitoring observes the stakeholder's perceptions, expectations, and requirements, which change over time due to their being subject to change or unsuccessful engagement strategy, though sometimes stakeholders don’t change, and their attributes remain constant.
- Monitoring revives the feedback mechanism and provides early warning signs when issues arise in stakeholders' management

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Monitoring

- Therefore, a review can be conducted regularly (ideally at a maximum interval of three months), or in response to an arising or unplanned issue. The review assesses if previous communications succeeded or not
- Monitoring and reviewing results can provide the port with an update on the status of the stakeholders, evaluate if previous communication strategies were efficient or not, and accordingly provides correction actions if required

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Monitoring

- Of course, if the monitoring indicates that communications with stakeholders were effective and their attitudes were positive, the communication plan can be maintained; otherwise, it has to be changed or updated

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Key takeaways

- It is worth noting that stakeholders are dynamics, i.e. they change, their power and interest change, and even their role change over the life cycle of the port ETP.
- The steps mentioned above, the stakeholders' management cycle – identification, prioritization, engagement, and communication plans – should not be a one-time event.
- It may become necessary to repeat these steps totally (proactive or reactive repetition), or repeat some parts while taking into consideration new changes due to the dynamics of the stakeholders

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Note of caution

- A note of caution here is that while the stakeholders' list is very comprehensive and inclusive of all those who might fall in the stakeholder category for the port energy transition, each port should re-configure this list based on the port status and situation, which differs from one port to another and from one energy transition project to another

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References

- Alamoush, A. S. (2023). *The transition to low and near zero carbon emission ports : extent and determinants* (WORLD MARITIME UNIVERSITY PH.D. DISSERTATIONS). WORLD MARITIME UNIVERSITY PH.D. DISSERTATIONS. https://doi.org/10.21677/phd230606
- Alamoush, A. S., Ballini, F., & Dalaklis, D. (2021). Port supply chain management framework: Contributing to the United Nations' sustainable development goals. *Maritime Technology and Research*, *3*(2). https://doi.org/10.33175/mtr.2021.247076
- Alamoush, A. S., Ballini, F., & Ölçer, A. I. (2020). Ports' technical and operational measures to reduce greenhouse gas emission and improve energy efficiency: a review. *Marine Pollution Bulletin*, *160*(2020), 1–21. https://doi.org/10.1016/j.marpolbul.2020.111508

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References

- Alamoush, A. S., Ballini, F., & Ölçer, A. I. (2024a). Investigating determinants of port decarbonisation implementation using the lens of Implementation Theory. *Transport Economics and Management*, *2024*. https://doi.org/https://doi.org/10.1016/j.team.2024.04.002
- Alamoush, A. S., Ballini, F., & Ölçer, A. I. (2024b). Management of stakeholders engaged in port energy transition. *Energy Policy*, *188*(March). https://doi.org/10.1016/j.enpol.2024.114074
- Alamoush, A. S., Dalaklis, D., Ballini, F., & Ölcer, A. I. (2023). Consolidating Port Decarbonisation Implementation : Concept , Pathways , Barriers , Solutions , and Opportunities. *Sustainability*, *15*(14185). https://doi.org/https://doi.org/10.3390/ su151914185
- Alamoush, A. S., Ölçer, A. I., & Ballini, F. (2021). Port greenhouse gas emission reduction: Port and public authorities' implementation schemes. *Research in Transportation Business & Management*, (July), 100708. https://doi.org/10.1016/j.rtbm.2021.100708

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References

- Alamoush, A. S., Ölçer, A. I., & Ballini, F. (2022). Ports' role in shipping decarbonisation: A common port incentive scheme for shipping greenhouse gas emissions reduction. *Cleaner Logistics and Supply Chain*, *3*(December 2021), 100021. https://doi.org/10.1016/j.clscn.2021.100021
- Ismail, A. M., Attia, M. M., & Alamoush, A. S. (2024). Comparative Analysis of Port Governance Models for Green Energy Transition. *The International Maritime Transport and Logistics Conference "MARLOG 13,"* (1), 394–403. Retrieved from https://marlog.aast.edu/files/marlog13-proceedings.v2.pdf
- Notteboom T., Pallis A., Rodrigue J.P. (2022) Port Economics, Management and Policy, New York: Routledge, ISBN 9780367331559
- Grainger A., Achuthan K. (2014) Port resilience: a primer. Technical report. Available at: https://www.researchgate.net/publication/294737031_Port_resilience_a_primer

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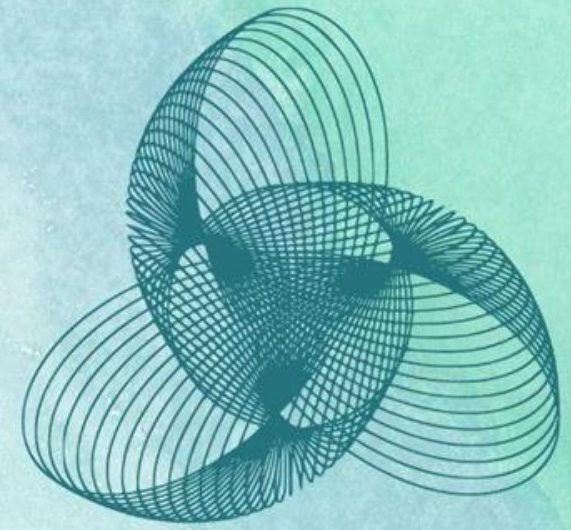

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