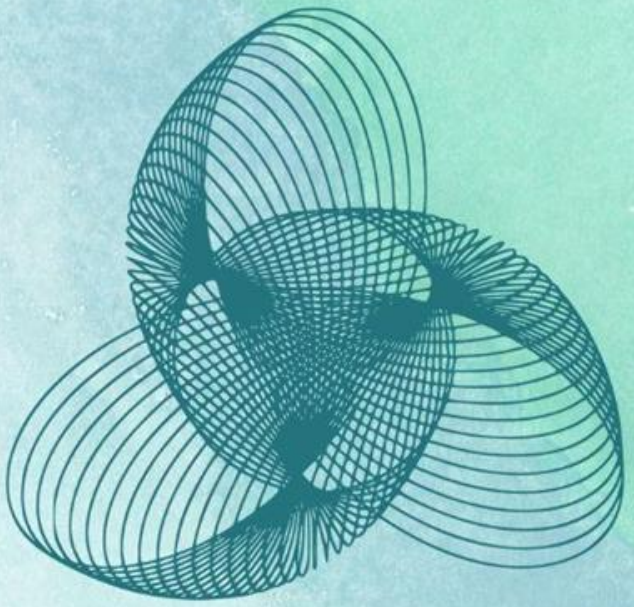

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the Sustainability EducationAl programme for greeNER fuels and enerGY on ports

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Module #1: Energy management in ports - PART 2

Course coordinator:

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Contents

- Key concepts
- EU Directives & Standards
- Energy transition definition, context and solutions

PART 2

- Energy management in ports
- Energy transition in ports
- Case study – Port of Valencia

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Introduction

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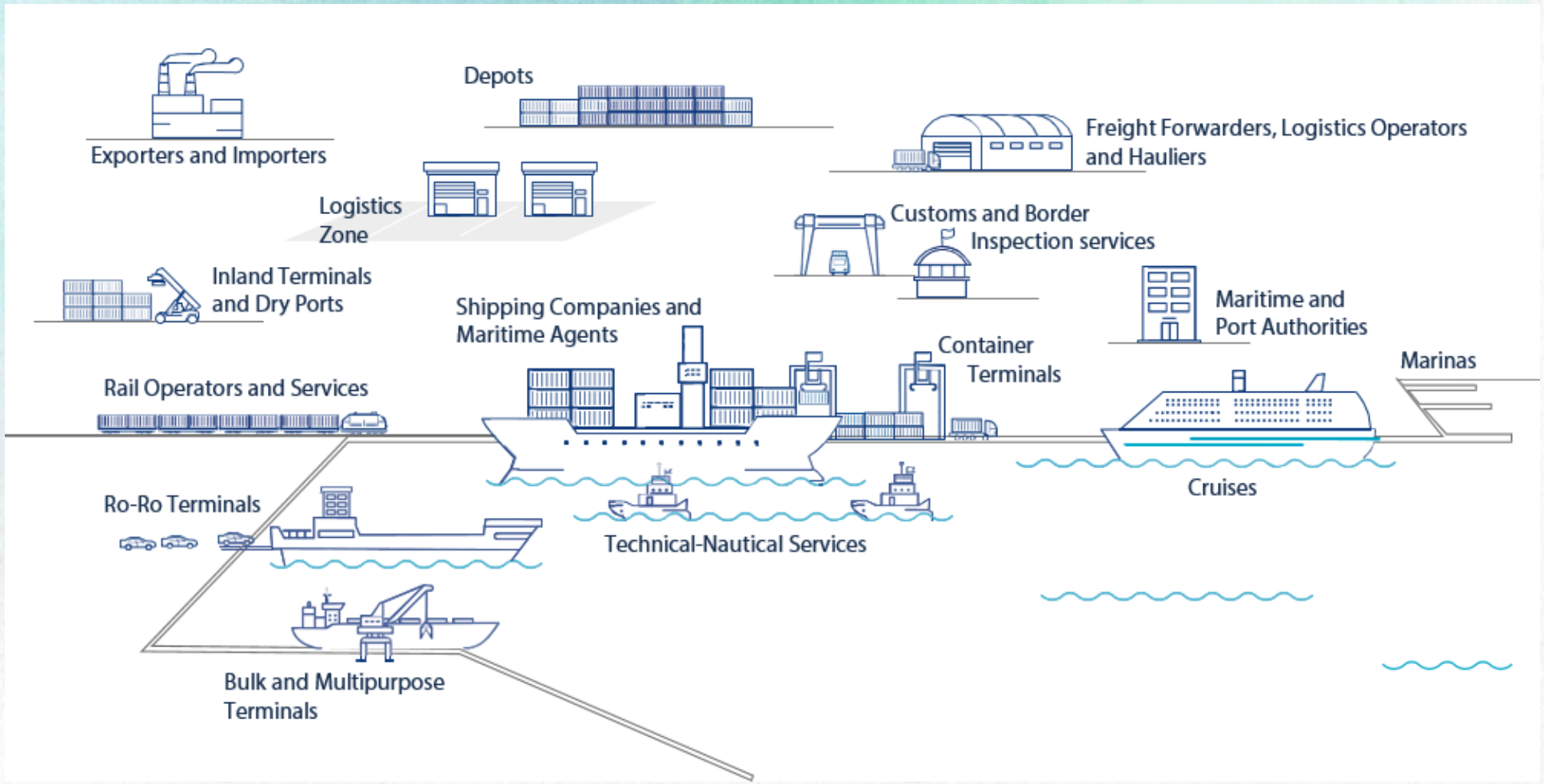
Port structure



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Energy management in ports

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Energy consumption elements in ports

- Passive elements:
  - Envelopes
  - Lighting
  - Climate control

- Active elements:
  - Thermal or refrigeration generation systems
  - Fluid distribution systems
  - Vertical or horizontal communication systems
  - Office equipment
  - Other

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Types of energy supplies used in ports

- Electricity: widely used, some port authorities act as distributors
- Natural gas: thermal production systems, cogeneration…
- Diesel: thermal production systems, diesel engines…
- Propane and butane: boilers, stoves, ovens…
- Biomass: heating, domestic hot water production

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Energy control and monitoring systems

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- Meters: utilities, fuel tanks, distinction of electrical consumption…
- Estimation systems: readings, balances…
- Network analyzers: buildings and highly consuming systems
- Measuring equipment: integration in control systems
- Billing management: external companies

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Energy management system in ports

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- Challenges:
  - Many different key consumers
  - Port Authorities lack control over energy performance of concessionaires

- Initiatives:
  - Common policies
  - Contract clauses
  - Bonus mechanisms
  - Tariff systems

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Energy transition in ports

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Context

- Environmental impact: maritime transport 3-4% EU's GHG…
- Regulatory pressure: IMO, Paris Agreement, EU ETS, national laws…
- Concerns with public health: air and noise pollution…
- Economic benefits: energy efficiency, self-supply…
- Technological advancements: innovation, improved efficiency…

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Energy transition measures in ports

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- Energy efficiency: LED lighting, high efficiency conditioning systems…
- Renewable energies: photovoltaic panels, wind turbines, tidal…
- Electrification of port equipment: replace diesel-powered machinery
- Onshore Power Supply: provide shore power to ships while docked
- Alternative fuels: hydrogen and fuel cells, LNG…

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Energy transition technologies in ports

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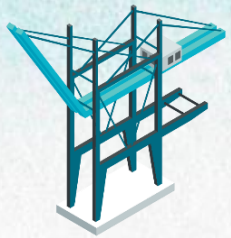
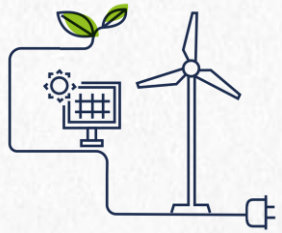
Vessels	Terminals	Road transport	Infrastructure
• OPS • Alternative fuels	• Electrification • H2 cell	• Alternative fuels • Electric batteries	• Renewable energies • Energy efficiency





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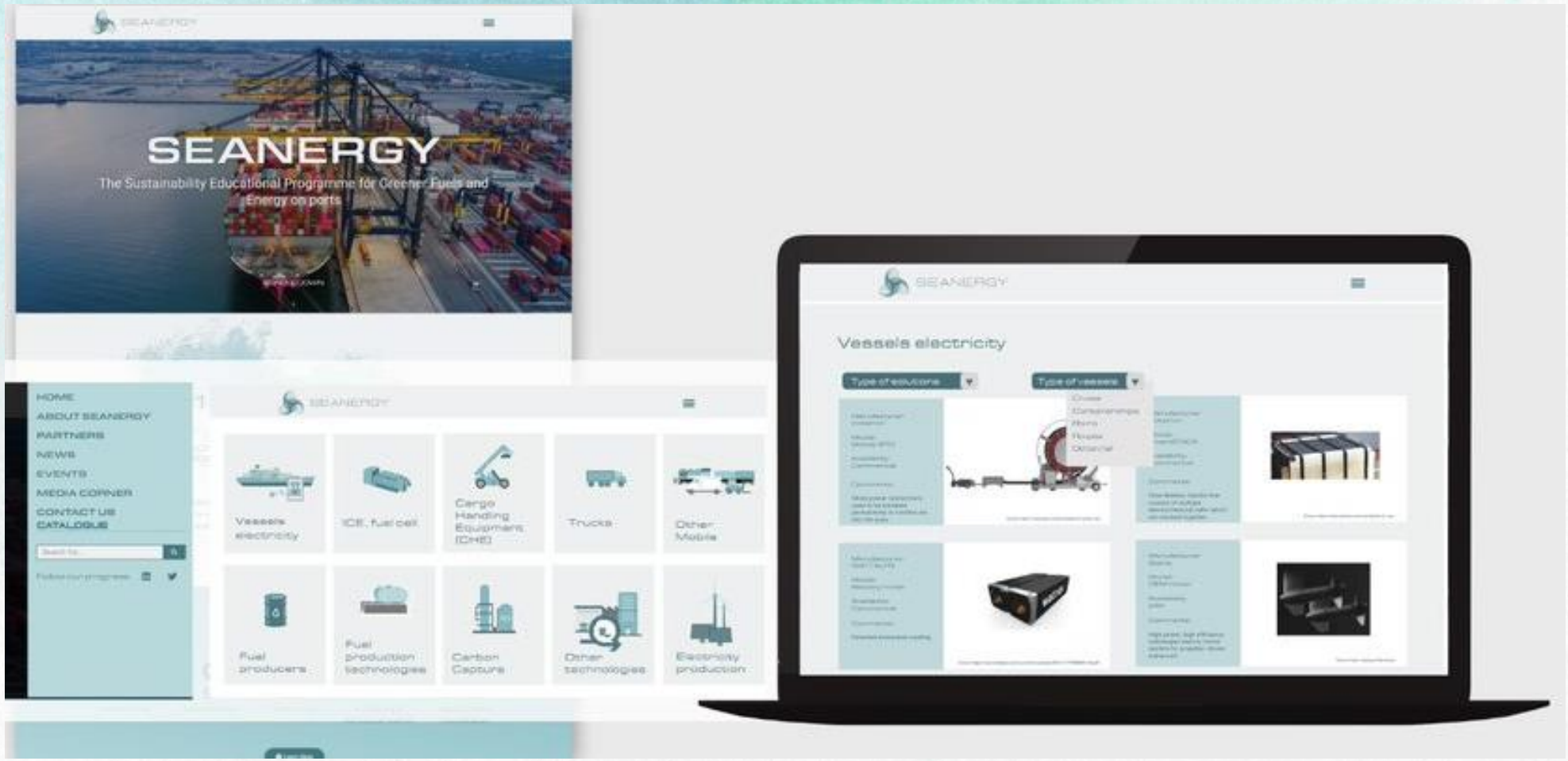
SEANERGY Catalogue of Technologies



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Case study – Port of Valencia

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Port of Valencia

69.75 M ton. Total **traffic**

5 M **TEU** Containers

38,866 direct or indirect **jobs**

2,500 billion € in **economic** impact

7,000 annual **vessel** calls

2-3 **tugboats** per call

5,000 **trucks** on weekdays

>90 **trains** per week

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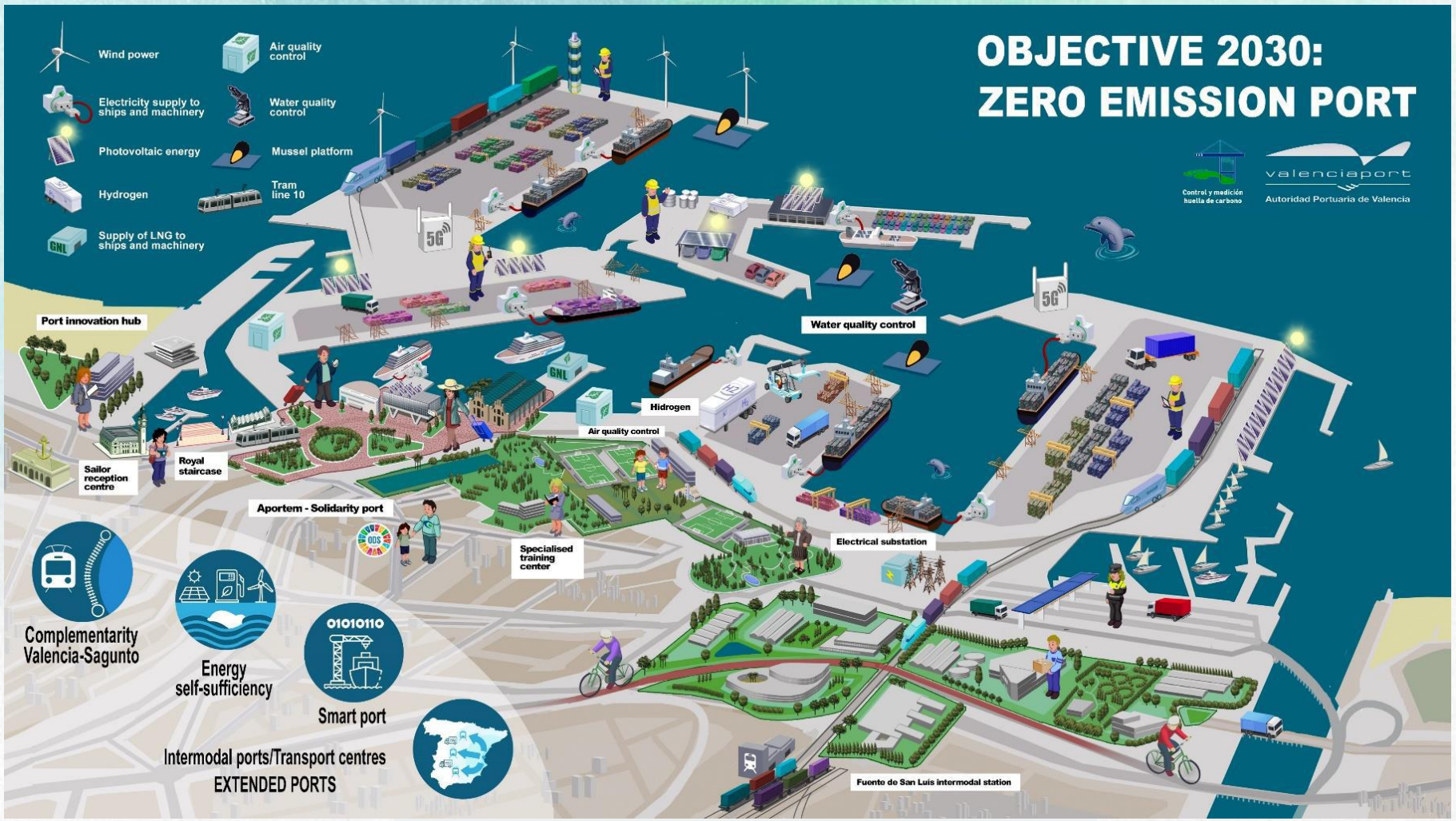
Energy transition Port of Valencia



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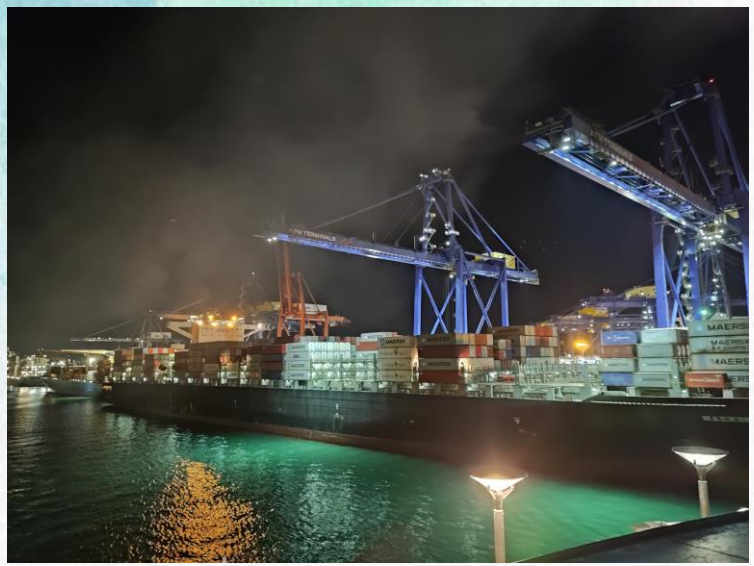
Energy efficiency – Port of Valencia

- Automatic lights in buildings
- LED lighting in buildings and roads
- Modification of hydraulic system



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Renewable energies – Port of Valencia

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- Onshore Photovoltaic panels
- Under consideration: wind turbines, offshore photovoltaic, wave power

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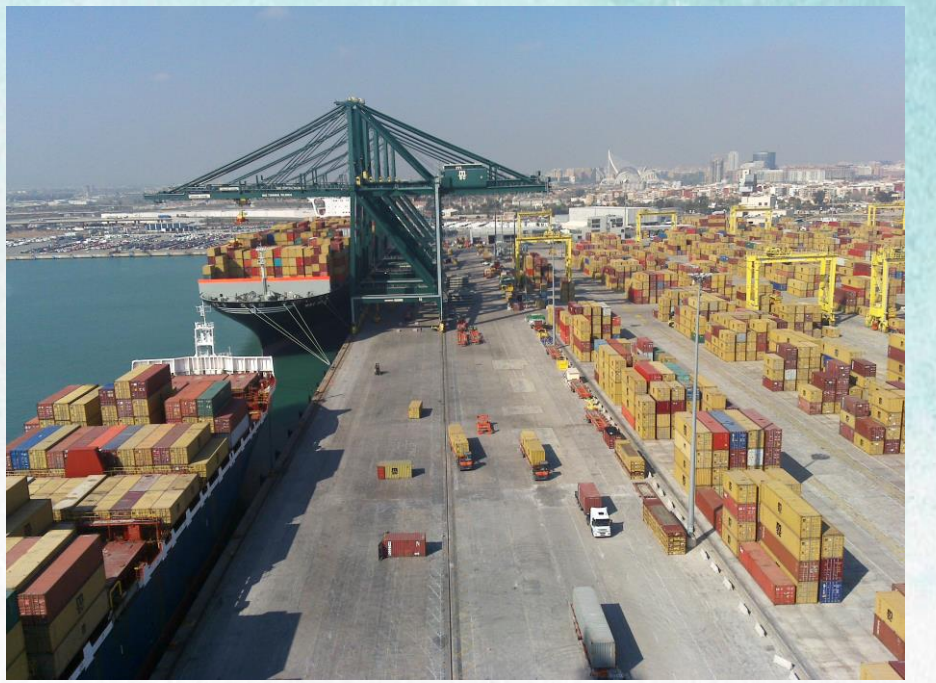
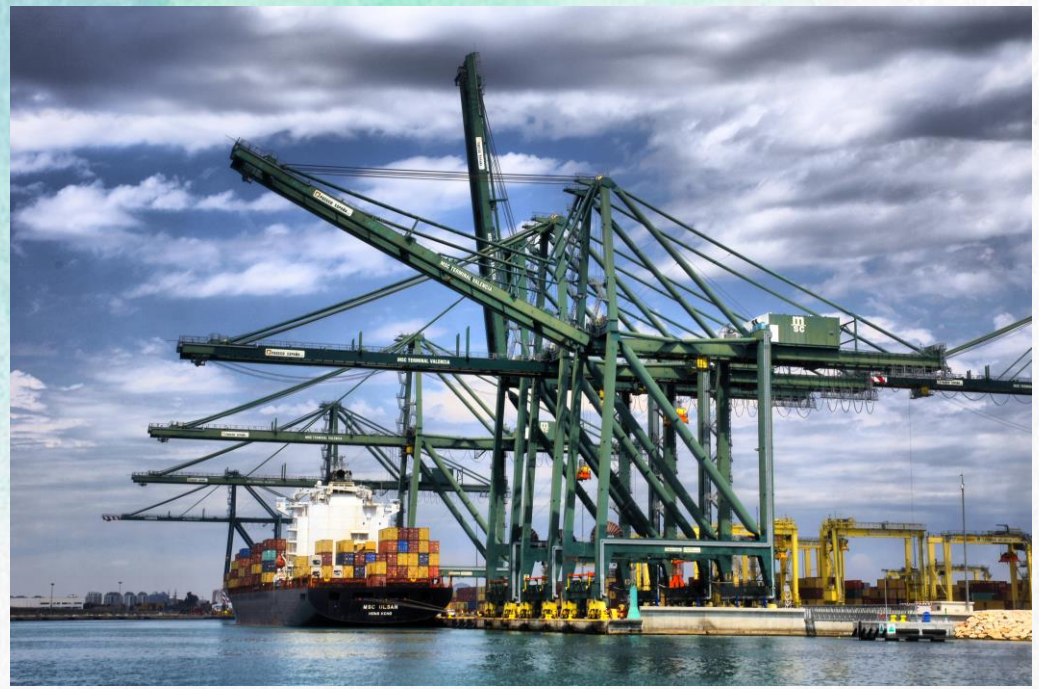
Electrification – Port of Valencia

- Electrification of MSCTV RTG cranes





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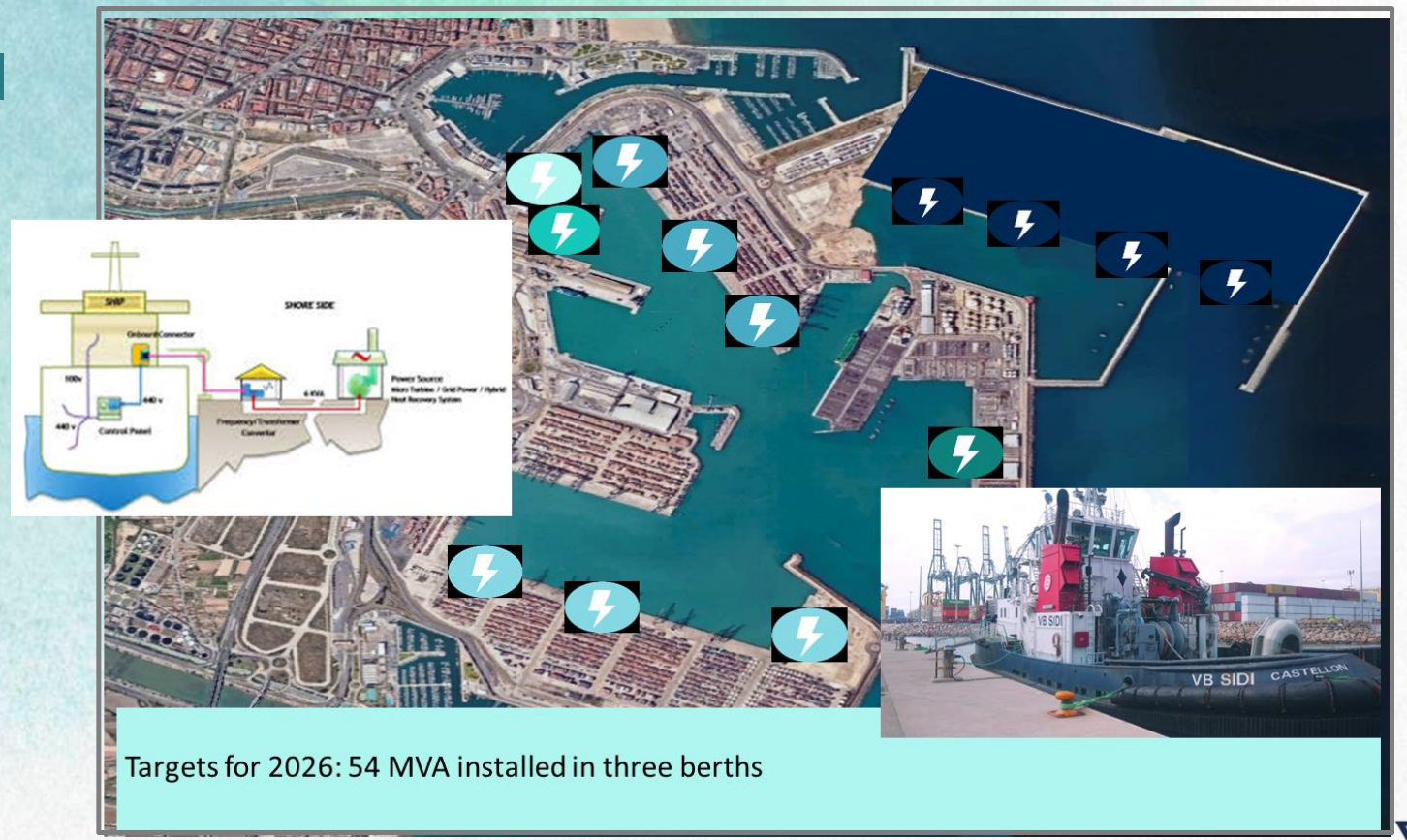
OPS – Port of Valencia

- Installation of electrical supply to ships at berth
- Prevent the use of auxiliary engines on vessels when they are docked



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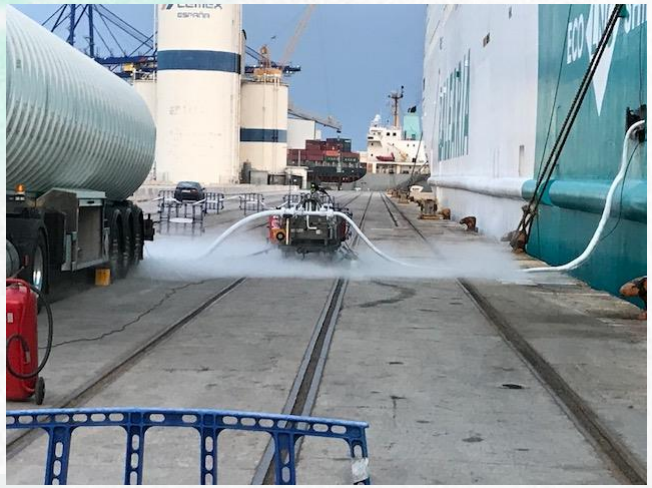
Alternative fuels – Port of Valencia



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Conclusions

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Conclusions and take home message

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Learning objective #5 – Recognize the different areas of energy consumption within a port and identify options and measures to support energy transition

- Main elements of energy consumption in ports
- Types of energy suppliers used in ports
- Examples of control and monitoring systems
- Challenges and initiatives in port energy management
- Principal energy transition measures in ports

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Conclusions and take home message

Learning objective #6 – Learn from case studies of ports that have successfully carried out energy transition measures.

- Case study of the Port of Valencia, Spain
- Objective 2030: Zero emission port
- Energy transition measures

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References

- Catalogue of Technologies: https://seanergyproject.eu/catalogue/
- Ealing: https://ealingproject.eu/
- H2Ports: https://h2ports.eu/
- Port of Valencia: https://www.valenciaport.com/en/

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Additional reading materials

- Guía de Gestión Energética en Puertos: https://www.puertos.es/es-es/Documents/guia_gestion_energetica_puertos_firmada.pdf
- Ports: Green gateways to Europe: https://sustainableworldports.org/wp-content/uploads/PORTS_GREEN_GATEWAYS_TO_EUROPE_FINAL29JUNE.pdf
- The new energy landscape - Impact on and implications for European ports: https://www.espo.be/media/The%20new%20energy%20landscape.pdf

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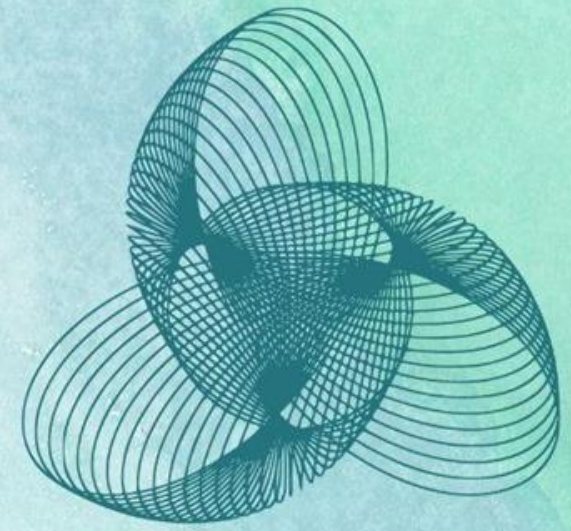

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