European flagship Action for coLd ironING in ports

EALING Studies Project: general overview, objectives and results

EOPSA - ONSHORE POWER SUPPLY & ELECTRIFIED MULTIMODALITY

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16th September 2022

1 EALING Studies Project

2 OPS questionnaire to Ports (Activity 1)

3 FEED studies (Activity 3)

4 Current status and Next steps

1

EALING Studies Project

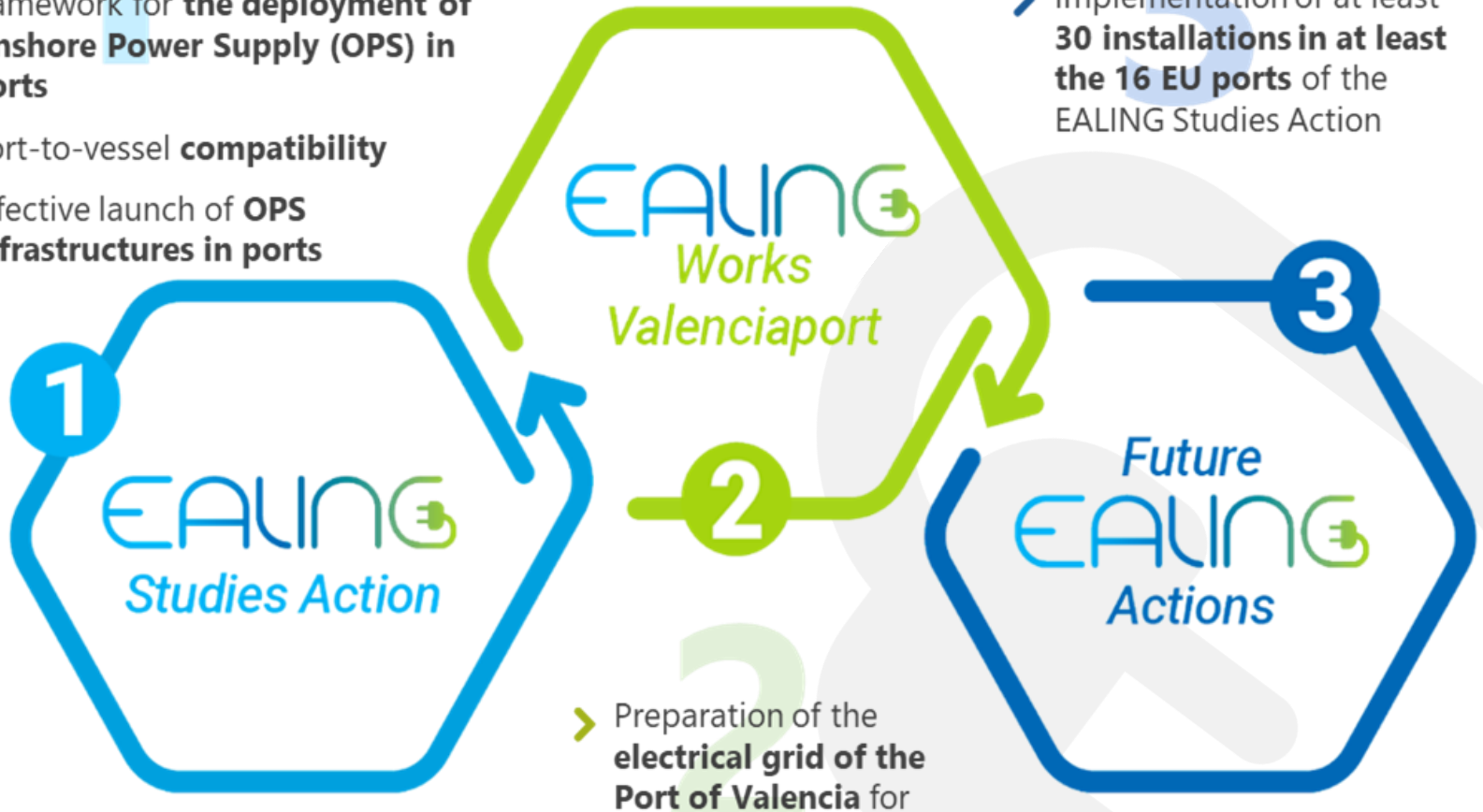
Overview of EALING Global Project

"European flagship Action for coLd iroNING in ports"

MAIN OBJECTIVE: To accelerate the effective deployment of OPS solutions in EU maritime ports

1

- Common EU harmonized, interoperable and sustainable framework for **the deployment of Onshore Power Supply (OPS) in ports**
- Port-to-vessel **compatibility**
- Effective launch of **OPS infrastructures in ports**



3

- Implementation of at least **30 installations in at least the 16 EU ports** of the EALING Studies Action

2

- Preparation of the **electrical grid of the Port of Valencia** for Onshore Power Supply

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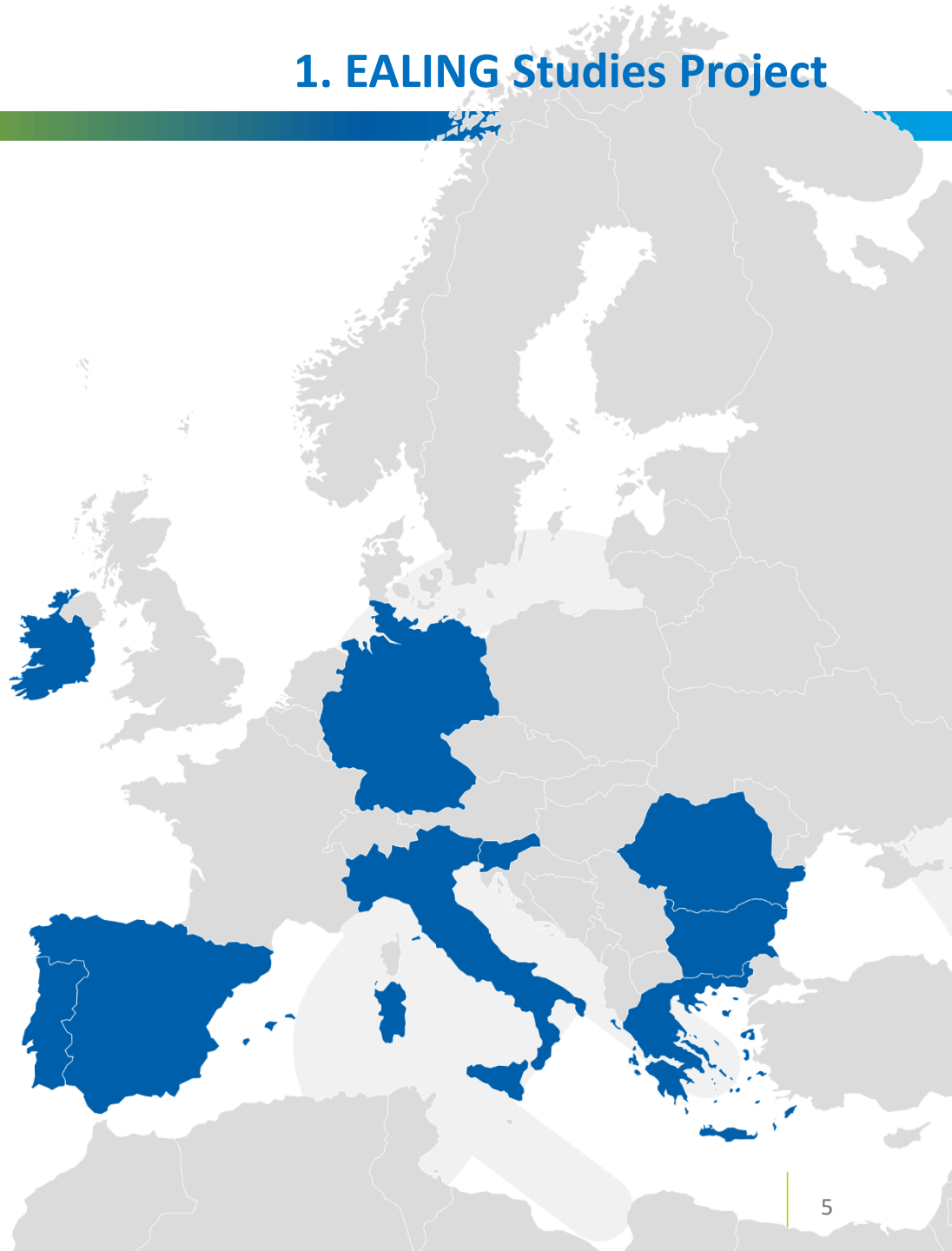
EALING Studies Project: Partners and location of the Action

22 Beneficiaries from 9 EU Member States:

- **13 Port Authorities** (Valencia, Barcelona, Huelva, Gijón, Venice&Chioggia, Trieste&Monfalcone, Ancona, Piraeus, Koper, Rafina, Constanta, Leixoes, Açores)
- **2 Port & Maritime Public Institutions** (Bulgarian Ports Infrastructure Company; Marine Institute)
- **7 Port & Shipping related entities** (Fundación Valenciaport, Circle, Ocean Finance, Symbios Funding & Consulting, Protasis, Hydrus Engineering, Fincantieri SI)



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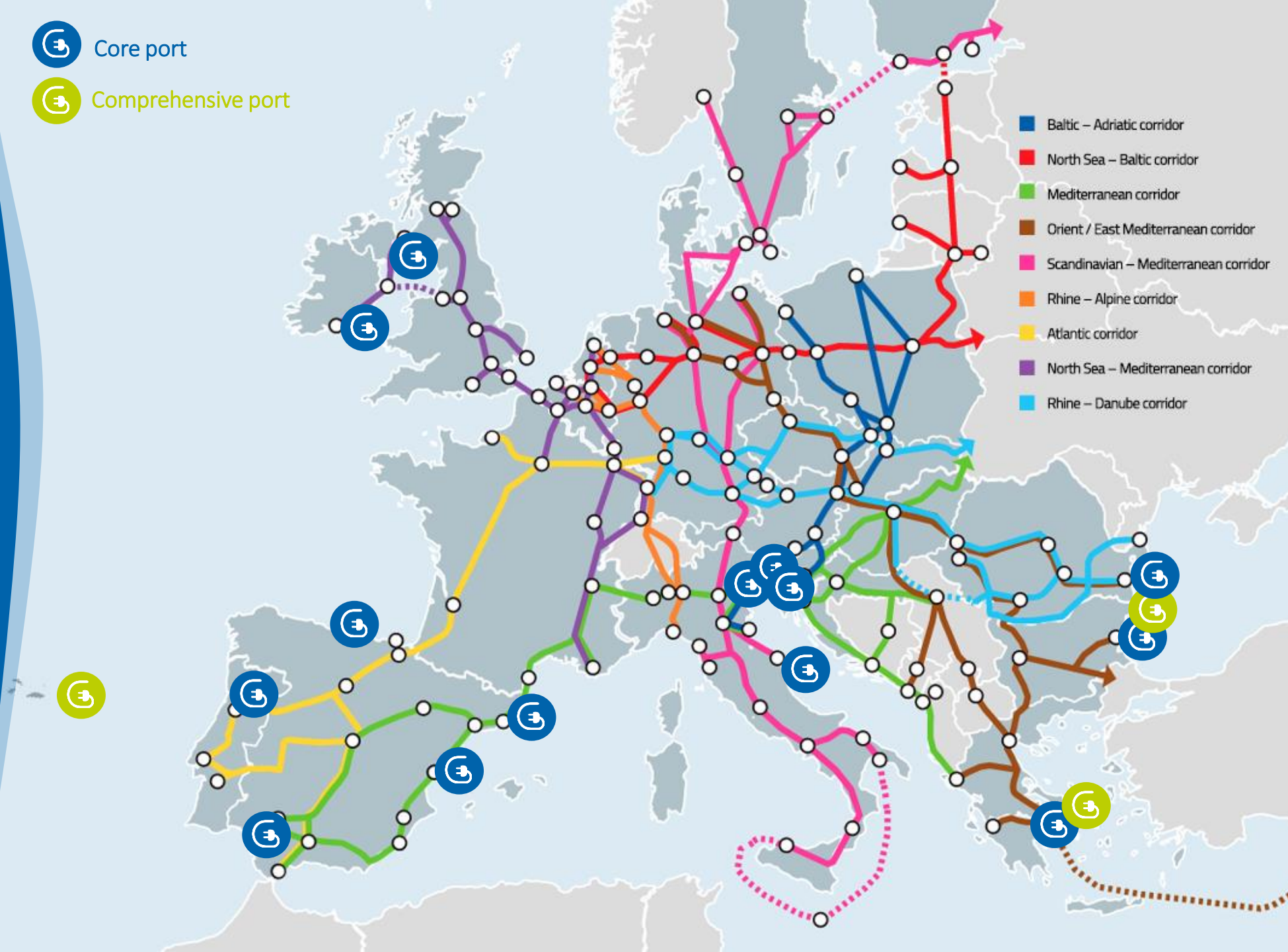
EALING

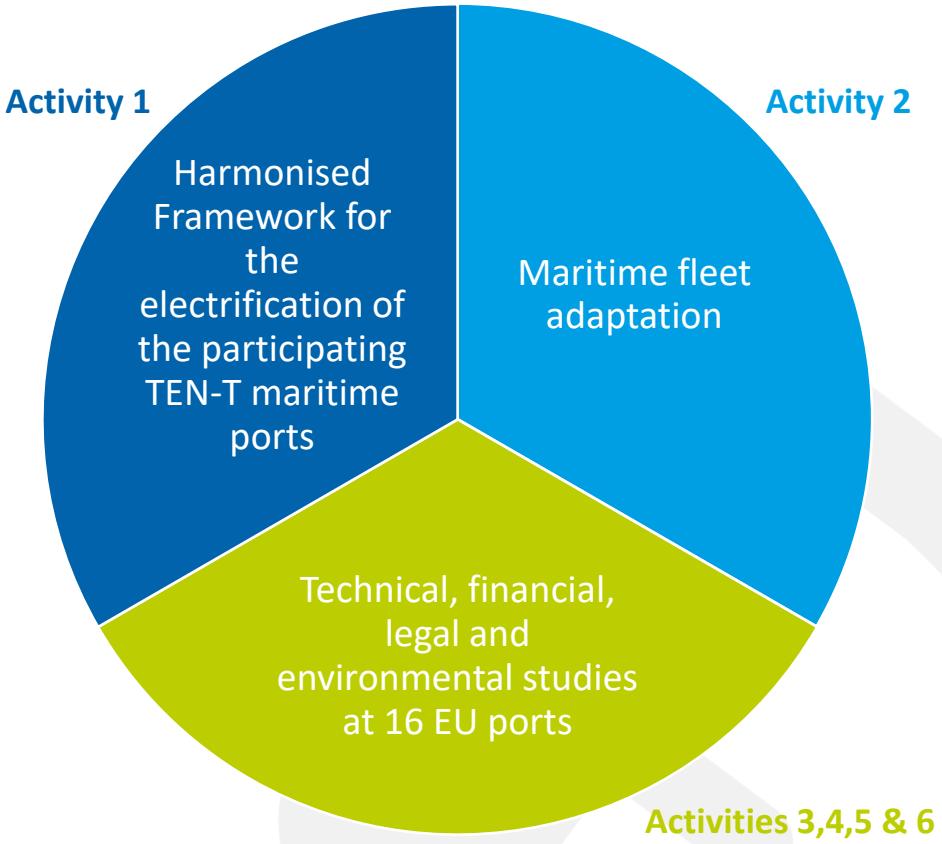
16 ports:

- Port of Valencia (Spain)
- Port of Barcelona (Spain)
- Port of Huelva (Spain)
- Port of Gijon (Spain)
- Port of Venice & Chioggia (Italy)
- Port of Ancona (Italy)
- Port of Trieste & Monfalcone (Italy)
- Port of Burgas (Bulgaria)
- Port of Varna (Bulgaria)
- Port of Constanta (Romania)
- Port of Piraeus (Greece)
- Port of Rafina (Greece)
- Port of Koper (Slovenia)
- Port of Leixoes (Portugal)
- Portos dos Açores (Portugal)
- Port of Dublin and/or Cork (Ireland)



EALING Studies Action objectives & structure

- **ACTIVITY 1:** Ensuring that a **common harmonised and interoperable framework** is brought forward, in line with the EU technical, legal and regulatory framework, in order to facilitate the implementation phase of OPS infrastructure in the ports of the consortium
- **ACTIVITY 2:** Ensuring the **port to vessel compatibility in the TEN-T Maritime Network,** for vessels calling at the ports of the consortium
- **ACTIVITIES 3 TO 6:** Leading all the **technical, financial, legal and environmental studies** necessary to launch the works for OPS equipment and infrastructure after the end of the Action



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2

OPS PORTS QUESTIONNAIRE (ACTIVITY 1)

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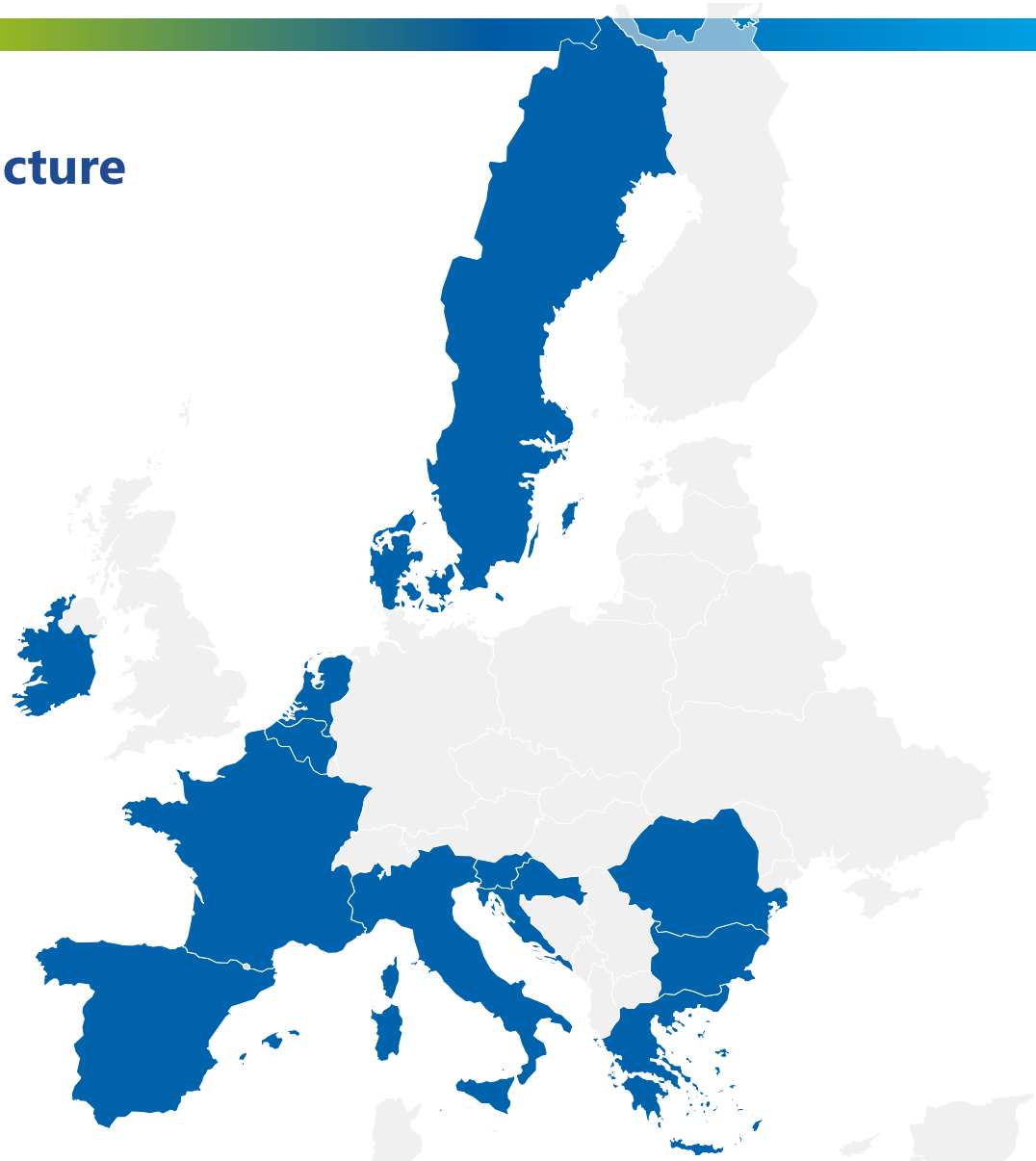
Discovering the Port Questionnaire - structure

The objective has been to gather information on the status of OPS infrastructure in EU ports and on the technical, regulatory, administrative, and other related aspects that affect its implementation.

The questionnaires were sent through different channels to more than 200 EU ports. They were completed between May and June 2021, although the process was reopened in September to allow additional ports to collaborate.

In total, **54 EU ports participated in this activity**.

The analysis presented in this executive summary is based solely and exclusively on the responses of the participating ports.



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List of the surveyed ports

NAME OF THE PORTS	COUNTRY	TOTAL SURVEYED PORTS
ALGECIRAS, BARCELONA, CEUTA, FERROL, GIJÓN, HUELVA, LAS PALMAS DE GRAN CANARIA, MÁLAGA, MOTRIL, PALMA, SANTANDER, VALENCIA	SPAIN	12
ANCONA, BARI, BRINDISI, CHIOGGIA, LA SPEZIA, LIVORNO, MONFALCONE, NOGARO, ORTONA, PESARO, TRIESTE	ITALY	11
ALEXANDROUPOULIS, CHANIA, IGOUMENITSA, MYKONOS, PATRAS, PIRAEUS, RAFINA	GREECE	7
AVEIRO, CANIÇAL E PORT SANTO, FIGUEIRA DA FOZ, FUNCHAL, LEIXOES, LISBON, PORTOS DOS AÇORES	PORTUGAL	7
CONSTANTZA, MANGALIA, MIDIA	ROMANIA	3
BOURGAS, VARNA	BULGARIA	2
AARHUS, RONNE	DENMARK	2
SETE, TOULON	FRANCE	2
DUBLIN, GALWAY	IRELAND	2
ANTWERPEN	BELGIUM	1
PLOCE	CROATIA	1
MALTA FREEPORT	MALTA	1
AMSTERDAM	THE NETHERLANDS	1
KOPER	SLOVENIA	1
KAPELLSSKAR, NORVIK, NYNASHAMN, STOCKHOLM	SWEDEN	1

54 ports surveyed, from 15 EU Member States

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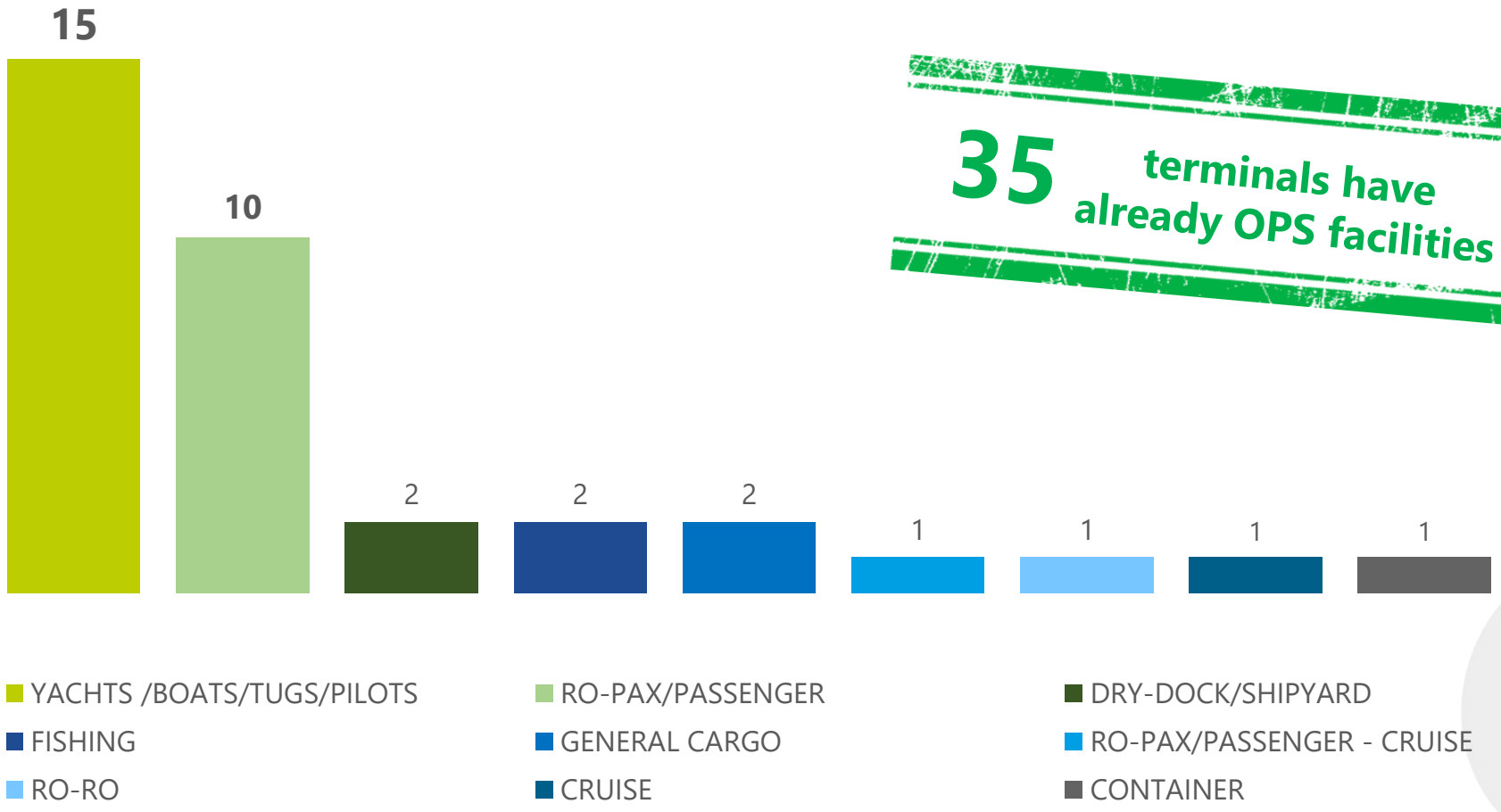
Number of TERMINALS where OPS is available



35 terminals have already OPS facilities

Note: Question addressed to ports with OPS. 12 replies, multiple choice.

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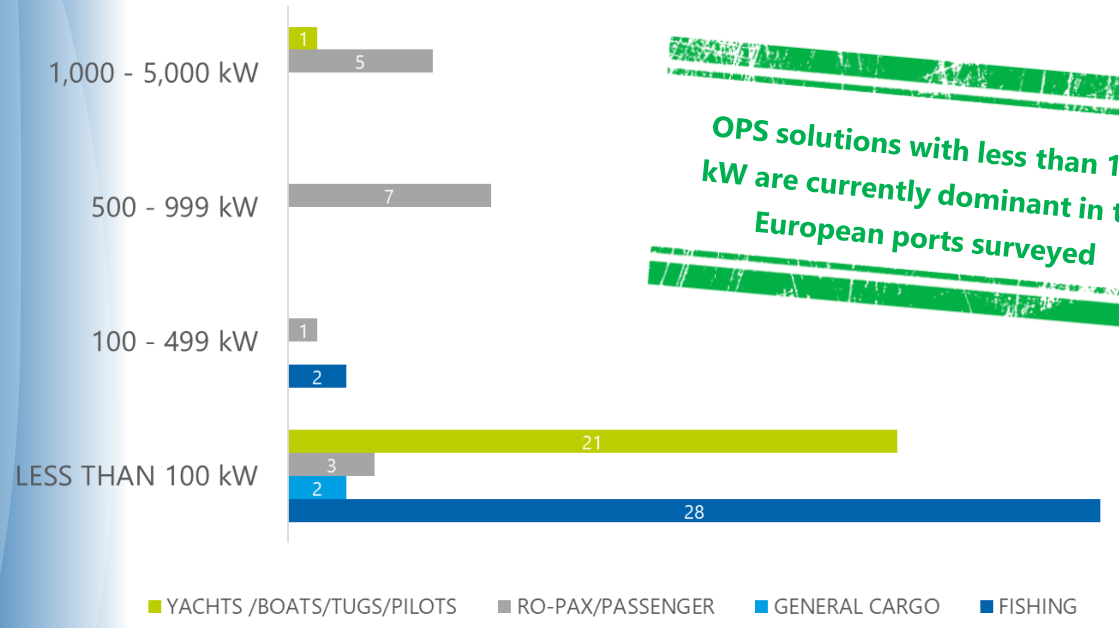
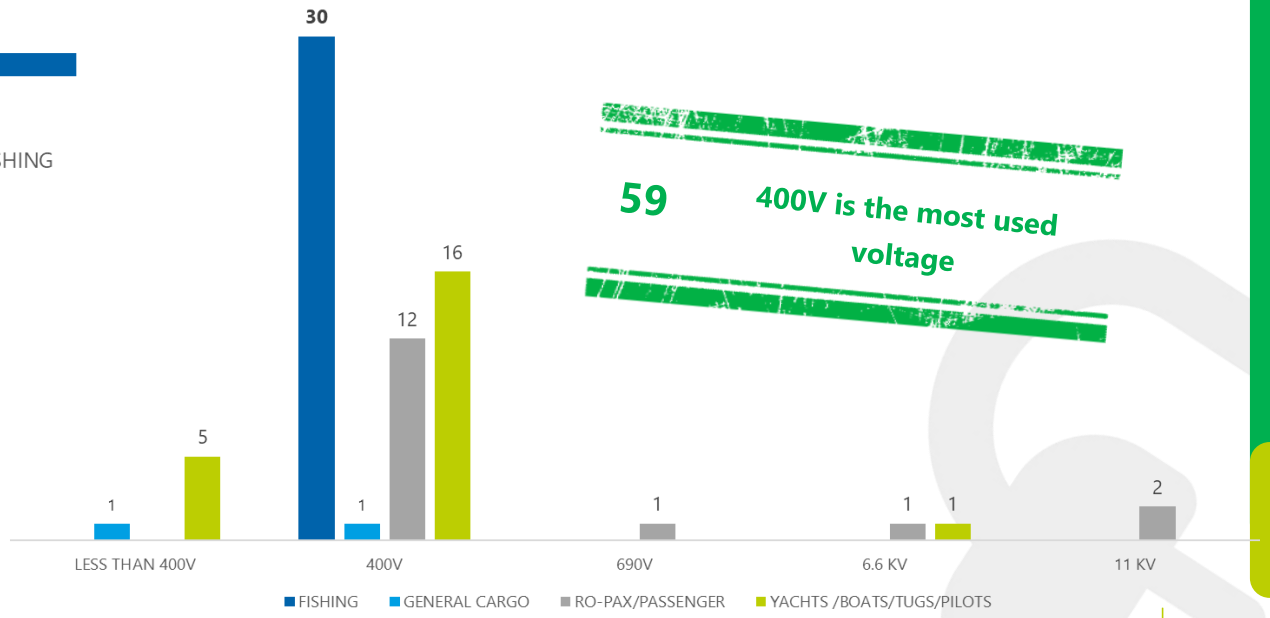
Power in kW per type of terminal with OPS



OPS solutions with less than 100 kW are currently dominant in the European ports surveyed

Average Voltage per type of terminal with OPS



59 **400V is the most used voltage**

Note: Question addressed to ports with OPS. 13 replies, multiple choice.

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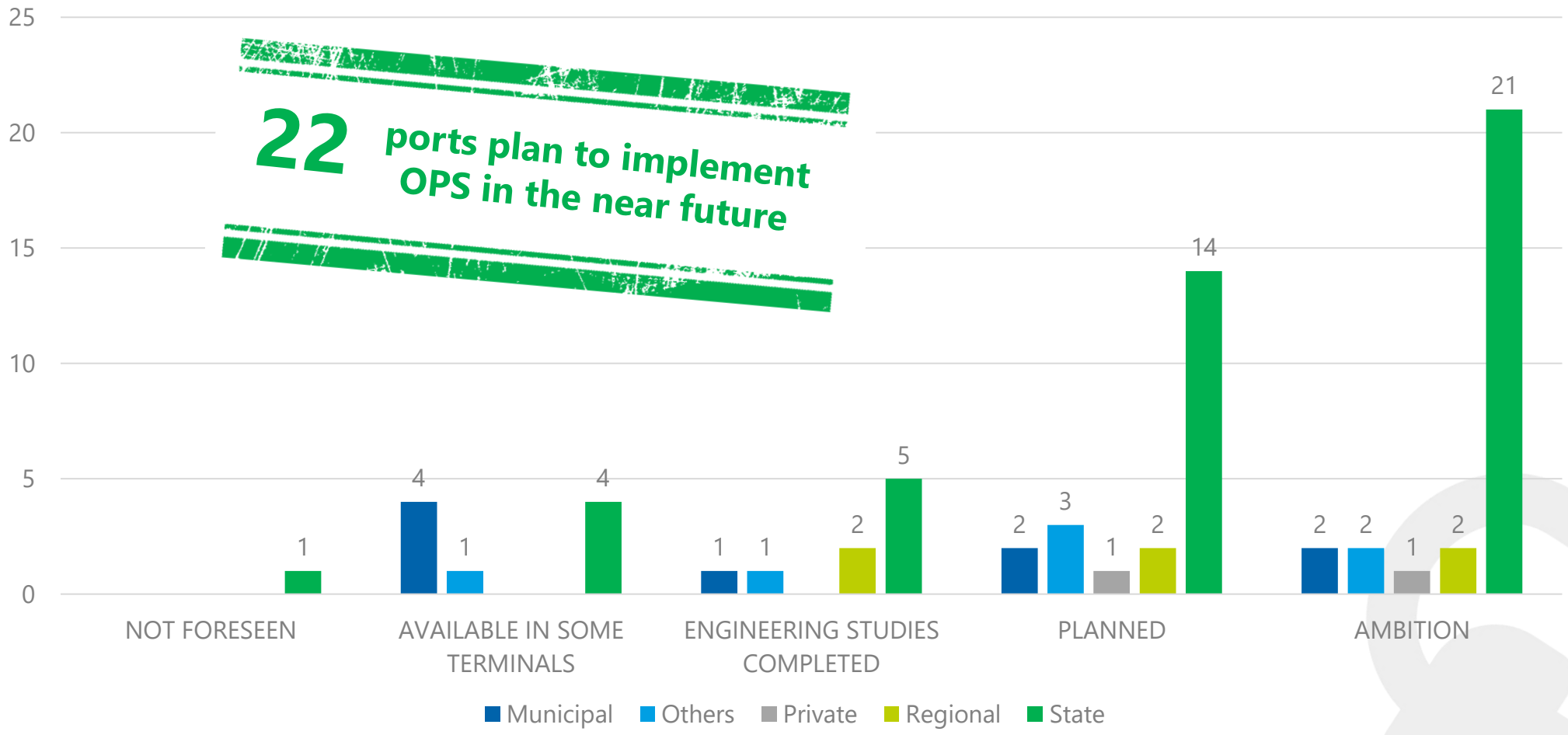
Maturity level of implementation in terms of OPS according to port ownership



Note: Question addressed to all the participating ports. 54 replies, multiple choice.

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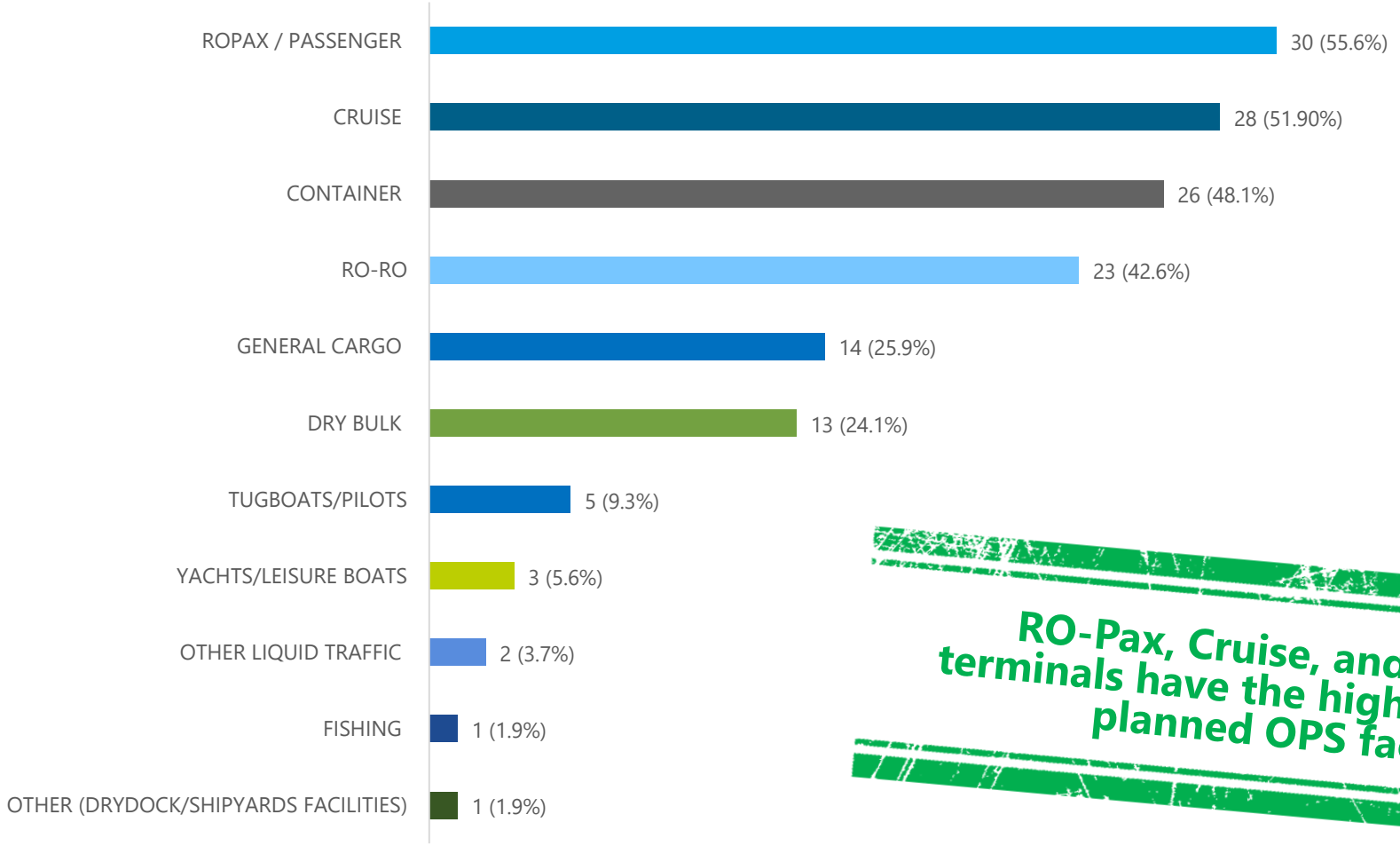
Type of terminal where OPS is planned/expected to be installed



RO-Pax, Cruise, and Container terminals have the highest number of planned OPS facilities

Note: Question addressed to all the participating ports. 51 replies, multiple choice.

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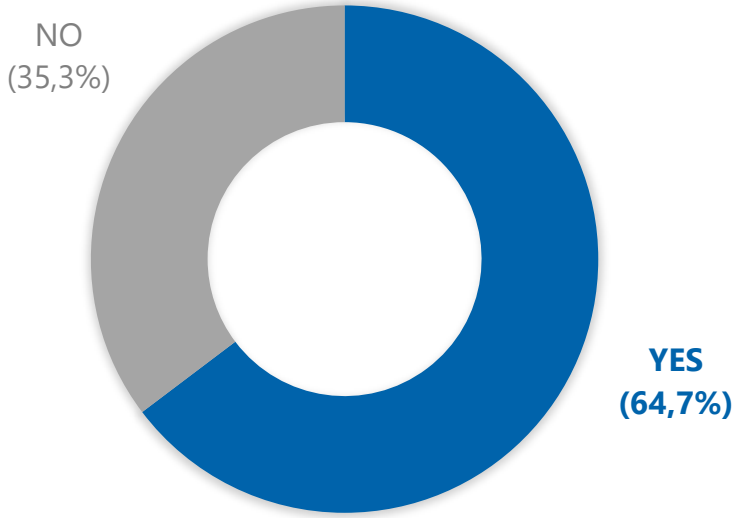
- Ports with OPS:

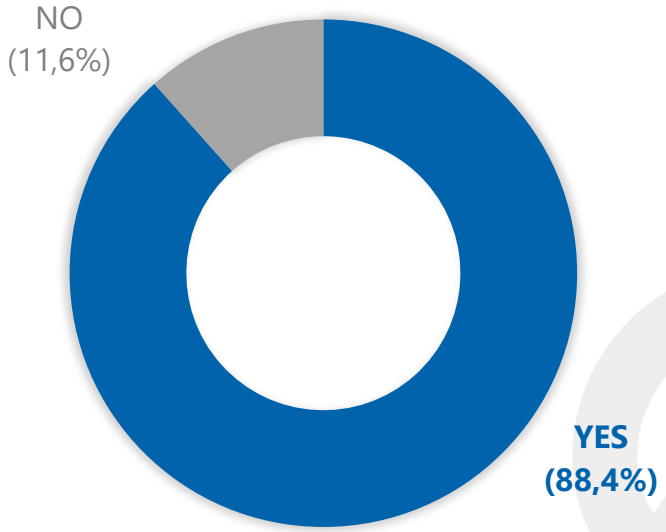
The ports participating in the questionnaire were asked whether they had **to upgrade and/or invest in the electricity network** to meet the expected demand.



Note: 17 replies

- Ports with planned OPS:

The ports participating in the questionnaire were asked whether they will have **to upgrade and/or invest in the electricity network** to meet the expected demand.



Note: 43 replies

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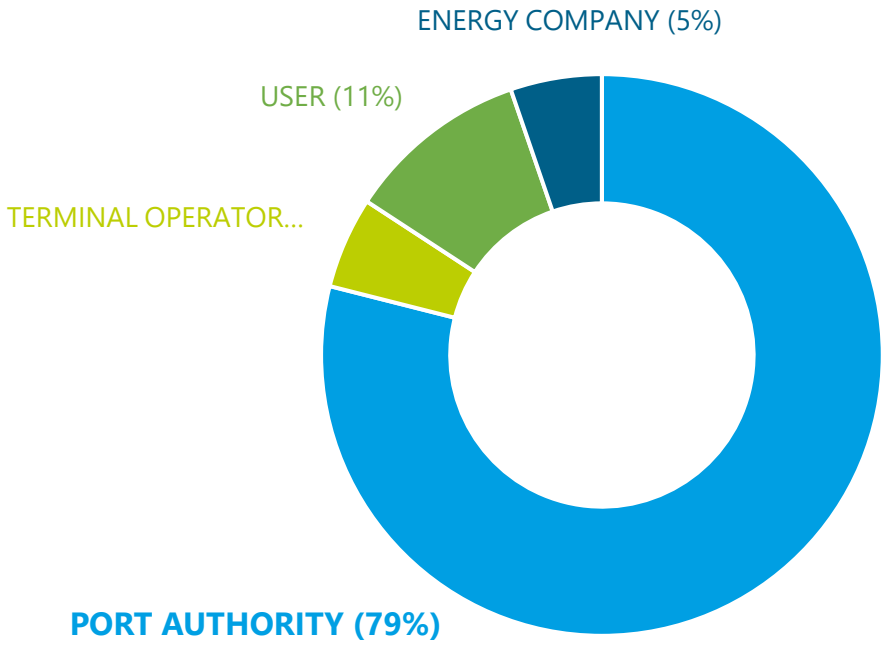
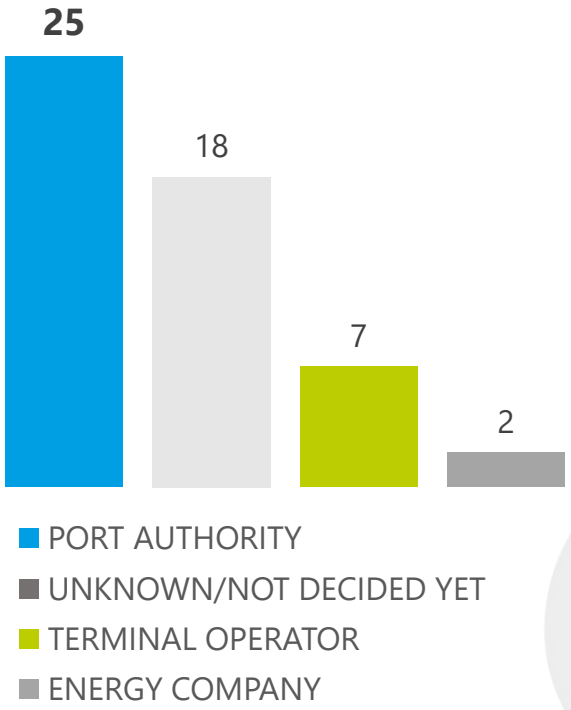
Management of the service in the ports with existing OPS facilities



Management of the service in the ports with future OPS facilities



Note: Question addressed to ports with OPS facilities.

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Main technical/operational/financial difficulties in planning and implementing OPS solutions

1. **Cost of installations** compared with cost of operation, cost of electrical power and economic viability of the service, lack of pricing and taxing framework
2. Status and **capacity of the port electricity grid** (power constraints, etc.)
3. **Lack of technical and operational expertise** about shore side electricity for ports (implementation). Estimation of the power demands in the ports, in particular per hours for different size of ships (different technical solutions and standards (i.e. 50 Hz or 60 Hz, 11 kV or 6.6 kV) for different types of berths/ships)
4. Defining role / responsibility / expectations of stakeholders, and split incentives
5. Lack of legislative drivers for OPS installation and operation (regulation of the service)
6. Selection of the service operator

Note: Open question.

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Main training needs for OPS operations

For Port Authorities (management)

- Financing of the installation
- Regulatory standards
- Safety and security
- Other aspects related to OPS systems and connections onboard the ship

For the operator of the OPS facilities (operations)

- Safety and security
- Electrical knowledge (including risk assessment, electrical loading)
- Synchronization between shore and ship [plug-in/plug-out]
- Maintenance and efficient use of OPS facilities

Note: Question addressed to all the participating ports. 26 replies.

3

FEED STUDIES (ACTIVITY 3)

Objectives

- Execute the detailed technical design studies for the electrification infrastructure necessary for the ports of the consortium.
- The implementation of front-end engineering design (FEED) studies providing the fully defined engineering package needed to enable ports launching the works phase right after the end of the Action.
- FEED studies will include:
  - ✓ specifications for equipment
  - ✓ cost estimation for procurement and erection of the future cold ironing infrastructure
  - ✓ technical design studies providing planning design, final specifications for equipment and infrastructure, and final budget.

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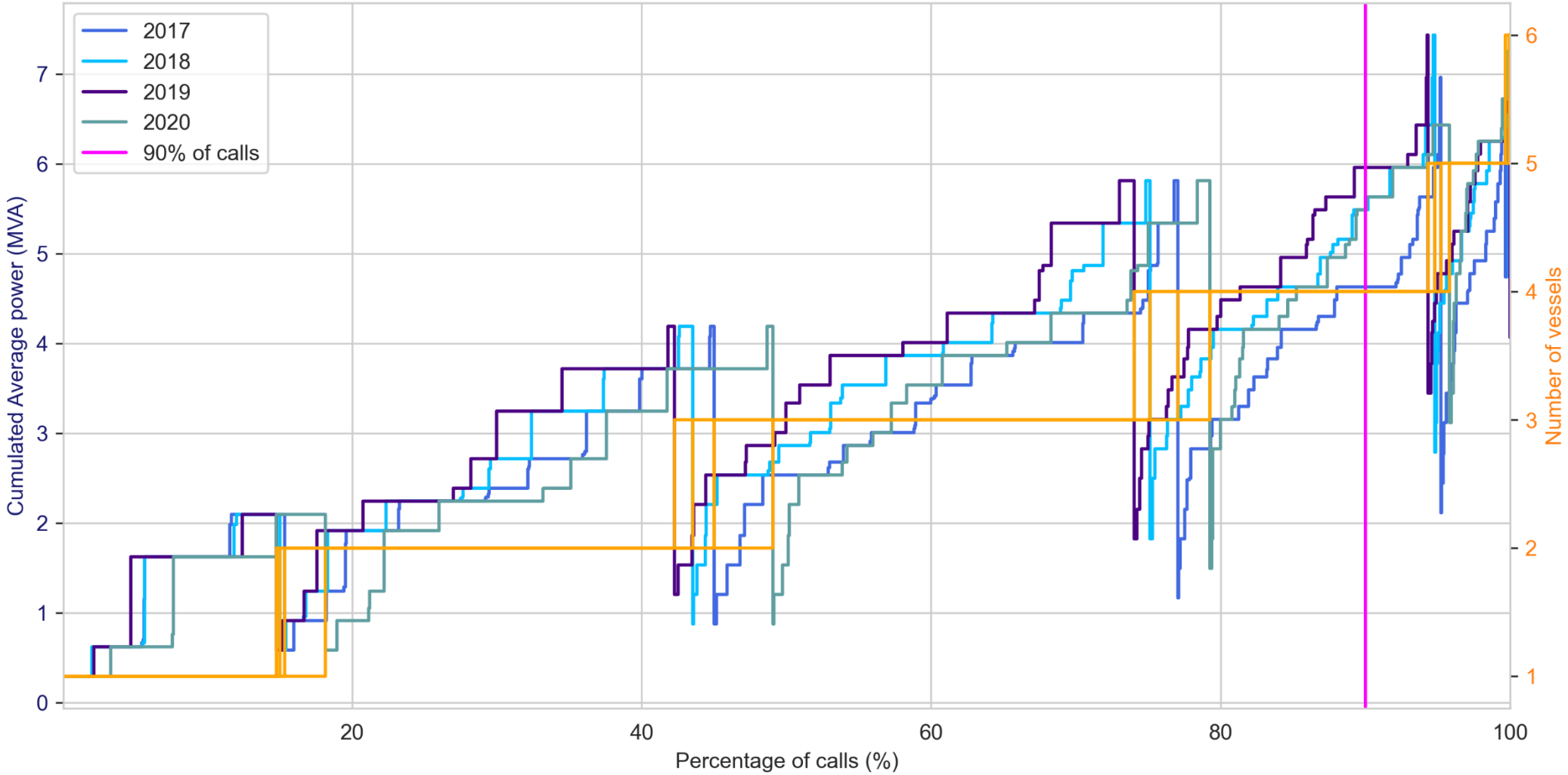
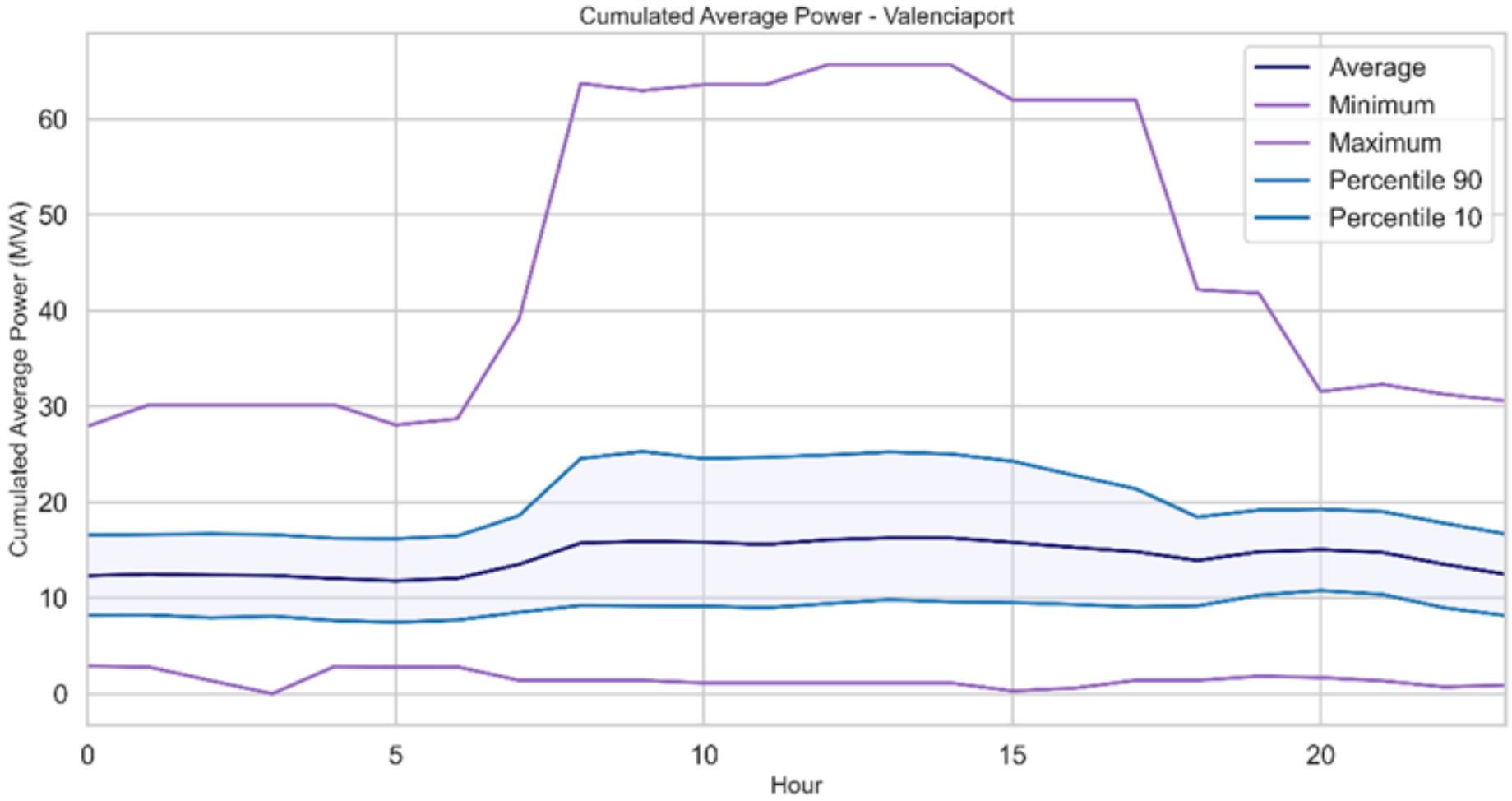
Port of Valencia OPS FEED Studies
Assessment of demand and simultaneity of calls



Port of Valencia OPS FEED Studies
Assessment of demand and load curves



Port of Valencia OPS FEED Studies

Primary Substation 2
132 / 20 kV, 60 to 90 MVA

OPS pilot: Passenger terminal TRASMED
1 connection for cruise (16 MVA) and
1 connection for ferry (4 MVA)

OPS pilot: Passenger terminal Baleària
1 connection for cruise (20 MVA) and
1 connection for ferry (4 MVA)

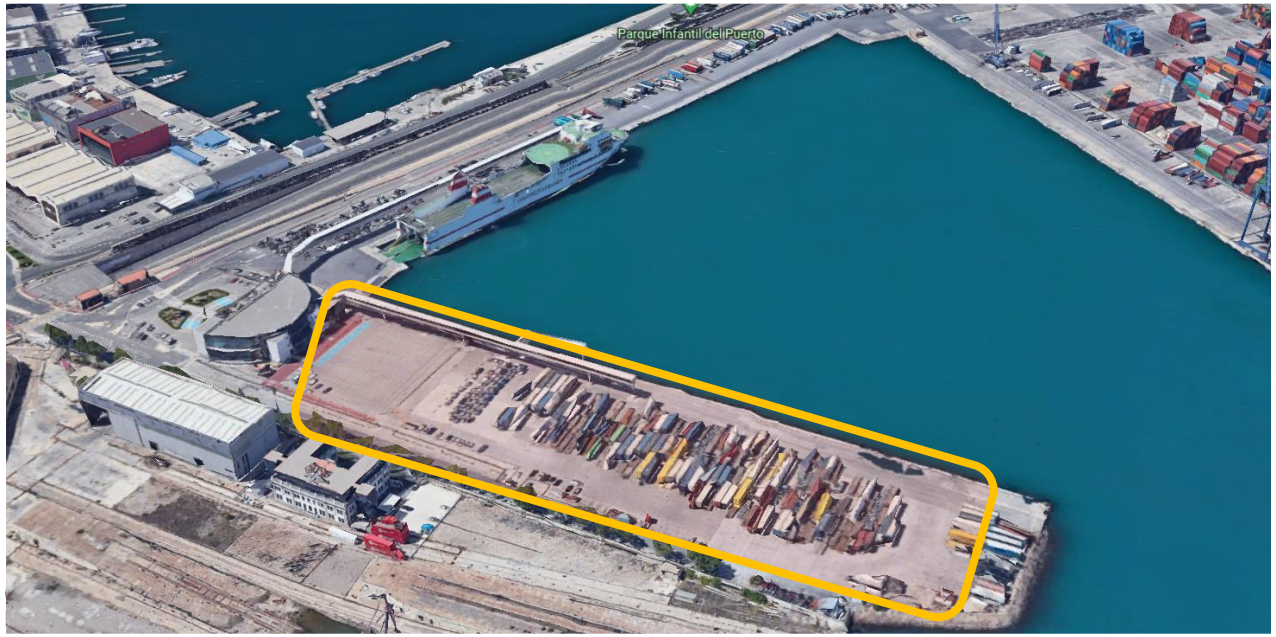
OPS pilot: container terminal MSCTV
2 connection points, up to 4-5 MVA each
for simultaneous connection

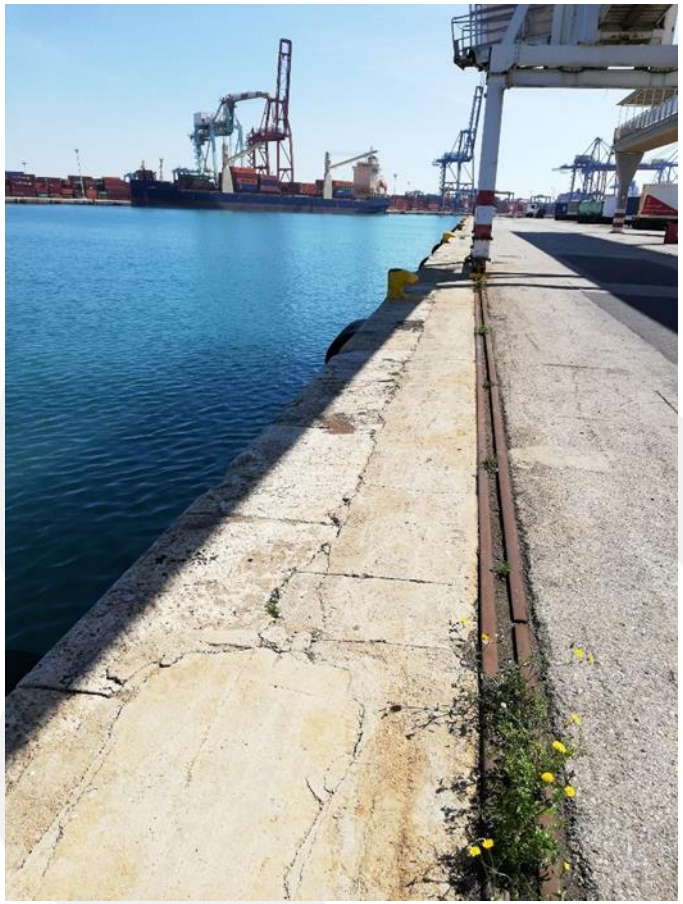
Primary Substation 1
132 / 20 kV, 60 to 90 MVA
Co-financed by EALING Works

Co-financed by the Connecting Europe Facility of the European Union

Port of Valencia OPS FEED Studies
Passenger Terminal TRASMED

- Poniente quay
- HVSC, compliant with ISO/IEC/IEEE 80005
- 1 OPS supply for cruise ships, up to 16 MVA
- 1 OPS supply for ferries, up to 4 MVA





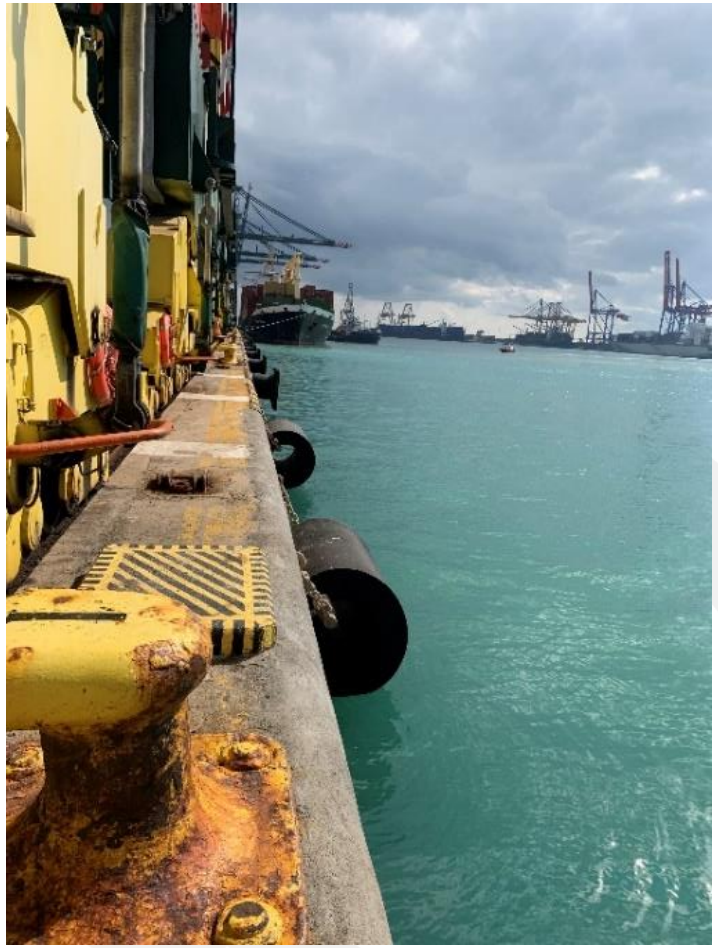
Port of Valencia OPS FEED Studies
Passenger Terminal Baleària

- Perfecto Palacio quay
- HVSC, compliant with ISO/IEC/IEEE 80005
- 1 OPS supply for cruise ships, up to 20 MVA
- 1 OPS supply for ferries, up to 4 MVA

Co-financed by the Connecting Europe Facility of the European Union

Port of Valencia OPS FEED Studies
Container Terminal MSCTV

- Brownfield terminal with limited space. Dedicated solution needed
- HVSC, compliant with ISO/IEC/IEEE 80005
- Two supply points with simultaneous connection of up to 4-5 MVA each
- 7.5 MVA available in case of a single connection



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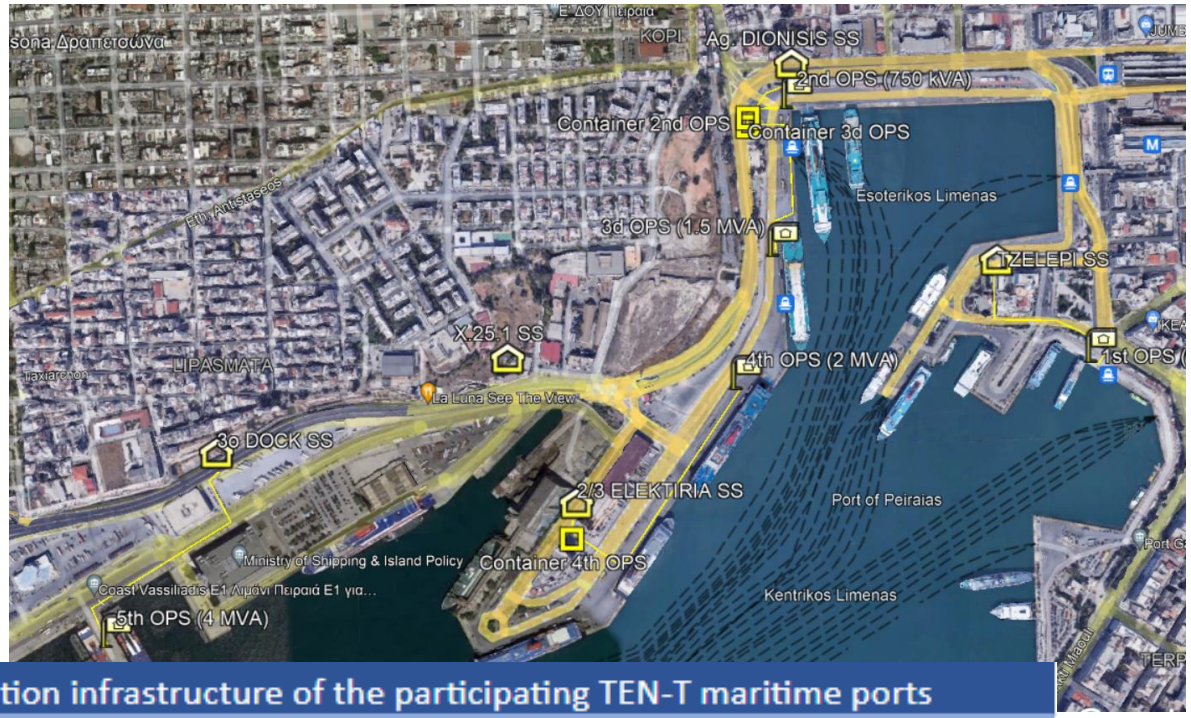
FEED studies for the port of Piraeus

- Total Power: 13.5 MVA



ACTIVITY 3.- Technical studies for the electrification infrastructure of the participating TEN-T maritime ports		
OPS points	Power (MVA)	Serving Vessels
1	0.5	Passenger - RoRo
2	1	Passenger - RoRo
3	4	Passenger - RoRo
4	4	Passenger - RoRo
5	4	Passenger - RoRo

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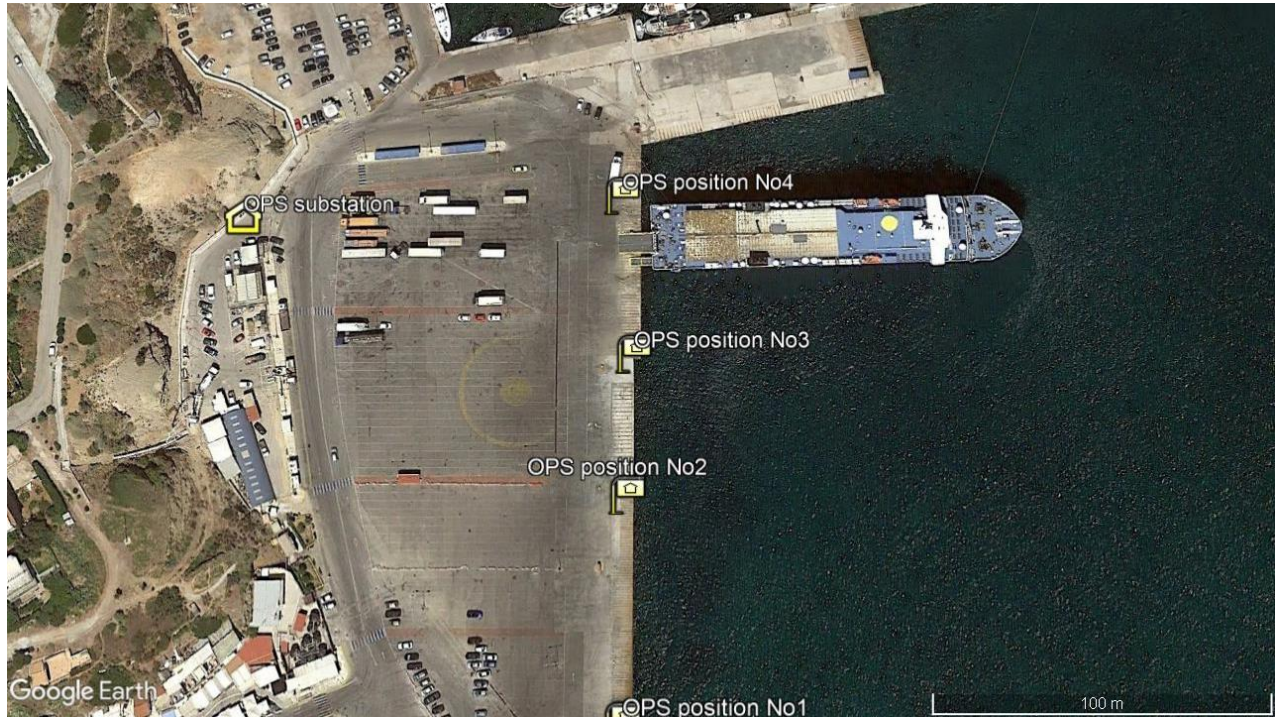
FEED studies for the port of Rafina

- Main cold ironing Substation
- Building 200 m2
- Total Power 4 MVA
- 2 HVSC positions (1.5 MVA)
- 2 LVSC positions (0.5 MVA)



ACTIVITY 3.- Technical studies for the electrification infrastructure of the participating TEN-T maritime ports		
OPS points	Power (MVA)	Serving Vessels
1	1.5	Passenger - RoRo
2	1.5	Passenger - RoRo
3	0.5	Passenger - RoRo
4	0.5	Passenger - RoRo

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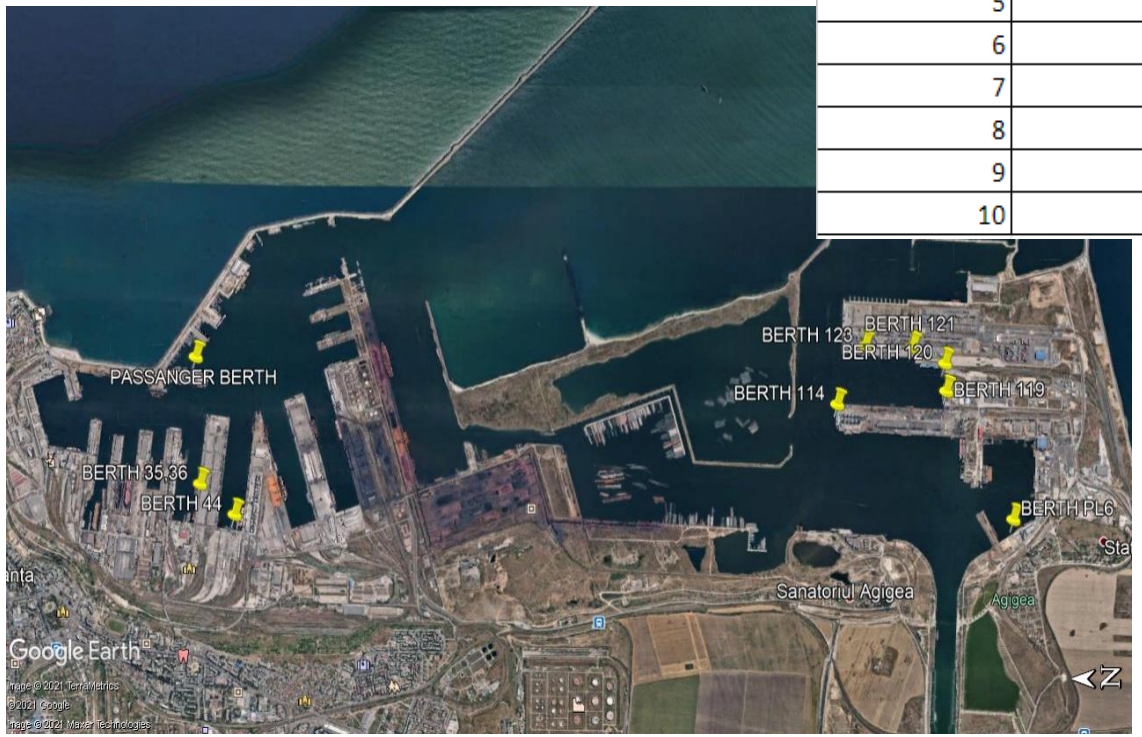
FEED studies for the port of Constanta

ACTIVITY 3.- Technical studies for the electrification infrastructure of the participating TEN-T maritime ports		
OPS points	Power (MVA)	Serving Vessels
1	5	Container
2	1	Ro-Ro
3	1	Ro-Ro
4	5	Passenger
5	3	Bulk
6	5	Container
7	1	Multipurpose
8	1	Multipurpose
9	1	Multipurpose
10	5	LNG



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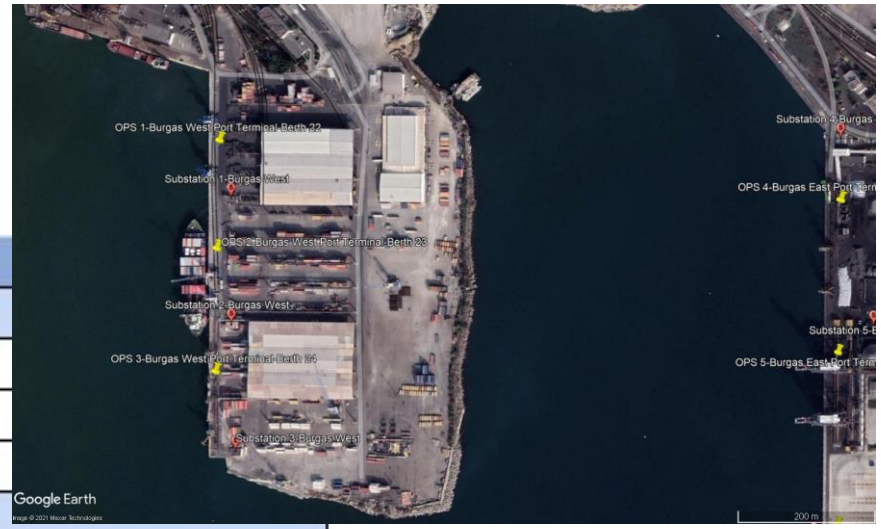
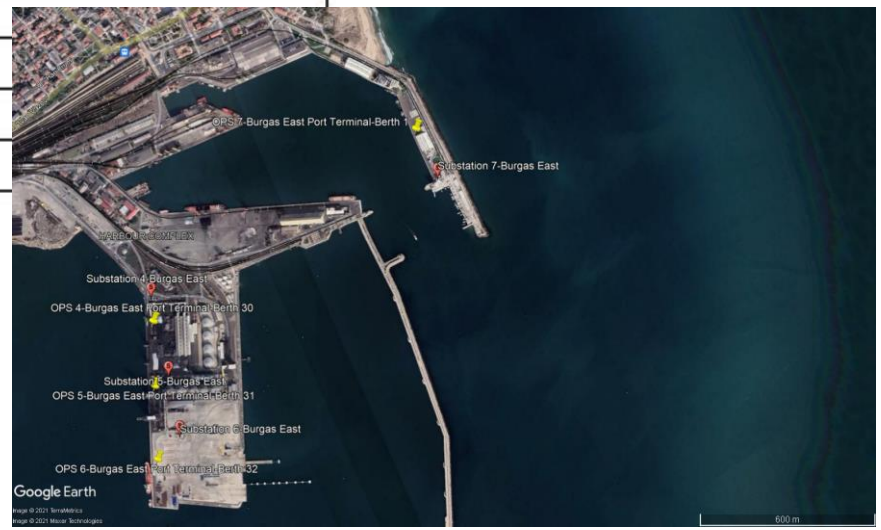
FEED studies for the port of Burgas

OPS points	Power (MVA)	Serving Vessels
Burgas West		
1	3	General Cargo/Container
2	3	General Cargo/Container
3	1	General Cargo
Burgas East		
1	1	General Cargo/Crude Oil tanker
2	1.5	General Cargo/Crude Oil Tanker
3	2	Crude Oil Tanker
4	2	Passenger





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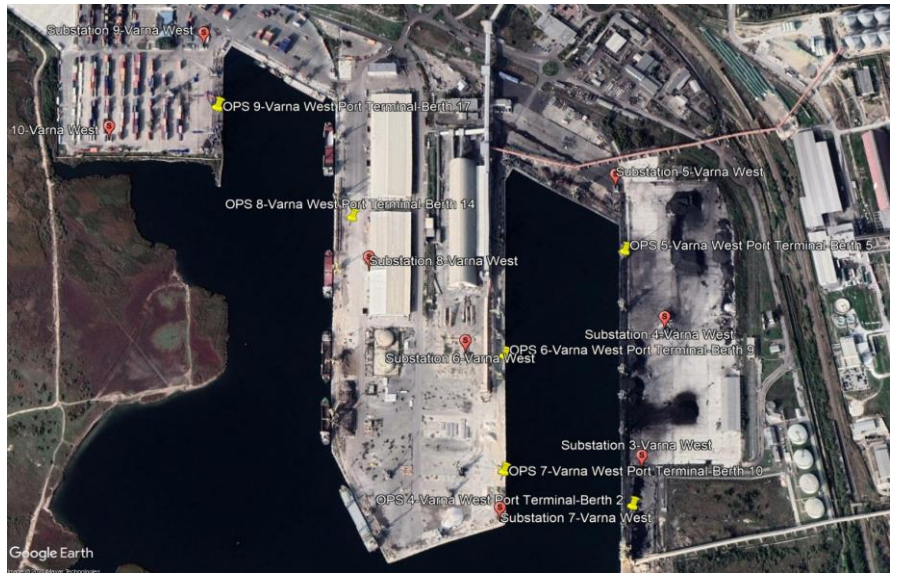
FEED studies for the port of Varna

OPS points	Power (MVA)	Serving Vessels
Varna West		
1	3	Chemical Tanker
2	1	Bulk carrier
3	1.5	Chemical Tanker
4	1	General Cargo/Bulk carrier
5	1.5	General Cargo
6	3	Container/General Cargo
Varna East		
1	2	Passenger
2	2	General Cargo
3	1.5	Bulk carrier



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FEED studies for the port of Dublin

ACTIVITY 3.- Technical studies for the electrification infrastructure of the participating TEN-T maritime ports		
OPS points	**Power (MVA)**	**Serving Vessels**
1	0.5 (estimate)	RoRo and Container
2	0.5 (estimate)	Container
3	0.5 (estimate)	Liquid Bilk
4	0.5 (estimate)	general cargo
5	5 (estimate)	Passenger
6	0.5 (estimate)	general cargo

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FEED studies for Portos dos Açores

ACTIVITY 3.- Technical studies for the electrification infrastructure of the participating TEN-T maritime ports			
OPS points	**Power (MVA)**	**Serving Vessels**	**Terminal**
1	3.5	Containership	Port of Ponta Delgada - Commercial quay
1	3.5 or 7	Containership	Port of Ponta Delgada - Commercial quay
1	16	Passenger	Port of Ponta Delgada - Cruise quay
1	3	Ropax/Ferry	Port of Ponta Delgada - Ferry quay
1	3.5 or 7	Containership	Port of Praia da Vitória - Commercial quay
1	3.5 or 7	Containership	Port of Praia da Vitória - Commercial quay
1	16	Passenger	Port of Praia da Vitória - Commercial quay
1	3	Ropax/Ferry	Port of Praia da Vitória - Ferry quay
1	3.5 or 7	Containership	Port of Horta - Commercial quay
1	3	Ropax/Ferry	Port of Horta - Commercial quay
1	16	Passenger	Port of Horta - Cruise quay
2	3	Ropax/Ferry	Port of Horta - Ferry quay

Co-financed by the Connecting Europe Facility of the European Union

FEED studies for the port of Koper

ACTIVITY 3.- Technical studies for the electrification infrastructure of the participating TEN-T maritime ports		
OPS points	Power (MVA)	Serving Vessels
1	2	RO-RO (Car Carrier)
2	2	RO-RO (Car Carrier)
3	2	RO-RO (Car Carrier)

Co-financed by the Connecting Europe Facility of the European Union

FEED studies for the port of Ancona

ACTIVITY 3.- Technical studies for the electrification infrastructure of the participating TEN-T maritime ports		
OPS points	Power (MVA)	Serving Vessels
1	70 kW	offshore supply vessels
2	70 kW	offshore supply vessels
3	70 kW	offshore supply vessels
4	28 kW	research boat
5	3-4	pilot units
6	3-4	tug boats
7	3-4	service boats (eg boats dedicated to waste collection)

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FEED studies for the port of Barcelona

ACTIVITY 3.- Technical studies for the electrification infrastructure of the participating TEN-T maritime ports		
OPS points	Power (MVA)	Serving Vessels
1	3.5	Containership
2	3.5 or 7	Containership
3	16	Passenger
4	16	Passenger
5	16	Passenger
6	16	Passenger
7	16	Passenger
8	3	Ropax/Ferry

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FEED studies for the port of Trieste

Name of the FEED / technical study
Detailed technical studies for OPS at Pier no. 5 in Trieste
Detailed technical studies for OPS at the Logistics Platform in Trieste
Detailed technical studies for OPS in Monfalcone

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FEED and other technical studies for the port of Leixões

Name of the FEED / technical study
Determination of electricity demand by pier and type of vessel, at the docks and perspective of vessel retrofit
FEED study for ro-ro vessels
Electrical Network – new substation

Co-financed by the Connecting Europe Facility of the European Union

FEED and other technical studies for the port of Huelva

Name of the FEED / technical study
FEED study for Container - Ro-pax Terminals
Preliminary project FEED study for Container - Ro-pax Terminals
Capacity analysis of the network

Co-financed by the Connecting Europe Facility of the European Union

FEED and other technical studies for the port of Gijón

Name of the FEED / technical study
Determination of the demand for electrical energy by dock and type of vessel, in the docks: 7th Alignment of the Docks of the Osa and Marcelino León.
Identification of the technological solution that best suits each dock.
Analysis of the economic and environmental viability of the estimated investment for the different docks under study.
Analysis of existing infrastructures and network capacity.
Study on the potential of energy generation from renewable energy sources for self-consumption.

Co-financed by the Connecting Europe Facility of the European Union

FEED studies for the port of Venice

Name of the FEED / technical study
Technical study on OPS in Fusina MoS terminal , Marghera (future new cruise terminal), on yachts berthing places and Marittima Cruise Terminal in the city of Venice

Co-financed by the Connecting Europe Facility of the European Union

Main Concerns

1. The existing **grid infrastructure** of the ports is not capable to meet the energy demands. Existing, old substations, as well as spatial planning problems.
2. The points that are supplied with 1MVA are between **low and high voltage** recommended implementation. Low voltage requires more cables, whereas medium voltage requires retrofitting from the side of the ships.
3. Spatial planning problems regarding the **CMS**.
4. **Cable routing from the OPS Substation** to the shore connection pits and the interference with the existing port infrastructure.

4

CURRENT STATUS AND NEXT STEPS

Activity 1

Milestone 6: Recommendations for a harmonised framework on OPS in EU ports. **Ongoing.**

Technical scope:

- OPS connection at vessels: standardization, or at least some common rules, are needed
- To continue working and improving the 80005 standard
- Need for common procedures and methods to assess OPS power demand estimation

→ Date of completion: June 2023

Activity 2

Milestone 10: Analysis of the standards relevant to shipside installation for OPS for the vessels operating in the ports of the consortium. **Ongoing** → Date of completion: December 2022

Milestone 12: Identification of the relevant technical and regulatory elements to facilite adaptation/connectivity of ships to shore side electricity → Date of completion: June 2023

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Activity 3

Milestone 16. FEED and other necessary technical studies feeding directly the tender specifications in the ports of the consortium. **Ongoing.**

→ Date of completion: June 2023

Activity 4

Milestone 19. Environmental studies (tailored to each port specific). **Ongoing.**

→ Date of completion: June 2023

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Activity 5

Milestone 22. Clean Power Supply Plans for the ports of the consortium. **Ongoing.**

→ Date of completion: June 2023

Milestone 23. Tender documents for the ports of the consortium. **Ongoing.**

→ Date of completion: June 2023

Activity 6

Milestone 26. CBAs and Financial blending schemes in the ports of the consortium. **Ongoing.**

→ Date of completion: June 2023

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ACTIVITY 7: Communication & Dissemination

Large-scale communication events

- Mid-term event (1st half of 2022) ✓
- Final event (June 2023)

Local public demonstrations

16 local public demonstrations in the participating ports (June 2023)

Stakeholders workshops

3 Stakeholders workshops:

- 30 September 2021 ✓
- 10 June 2021 ✓
- First half 2023

Dissemination tools & materials

- Stakeholders Platform ✓
- Project website ✓
- Social networks & other dissemination channels
- Project Brochure & Video ✓
- Executive summaries
- Specific marketing campaign (shipping)

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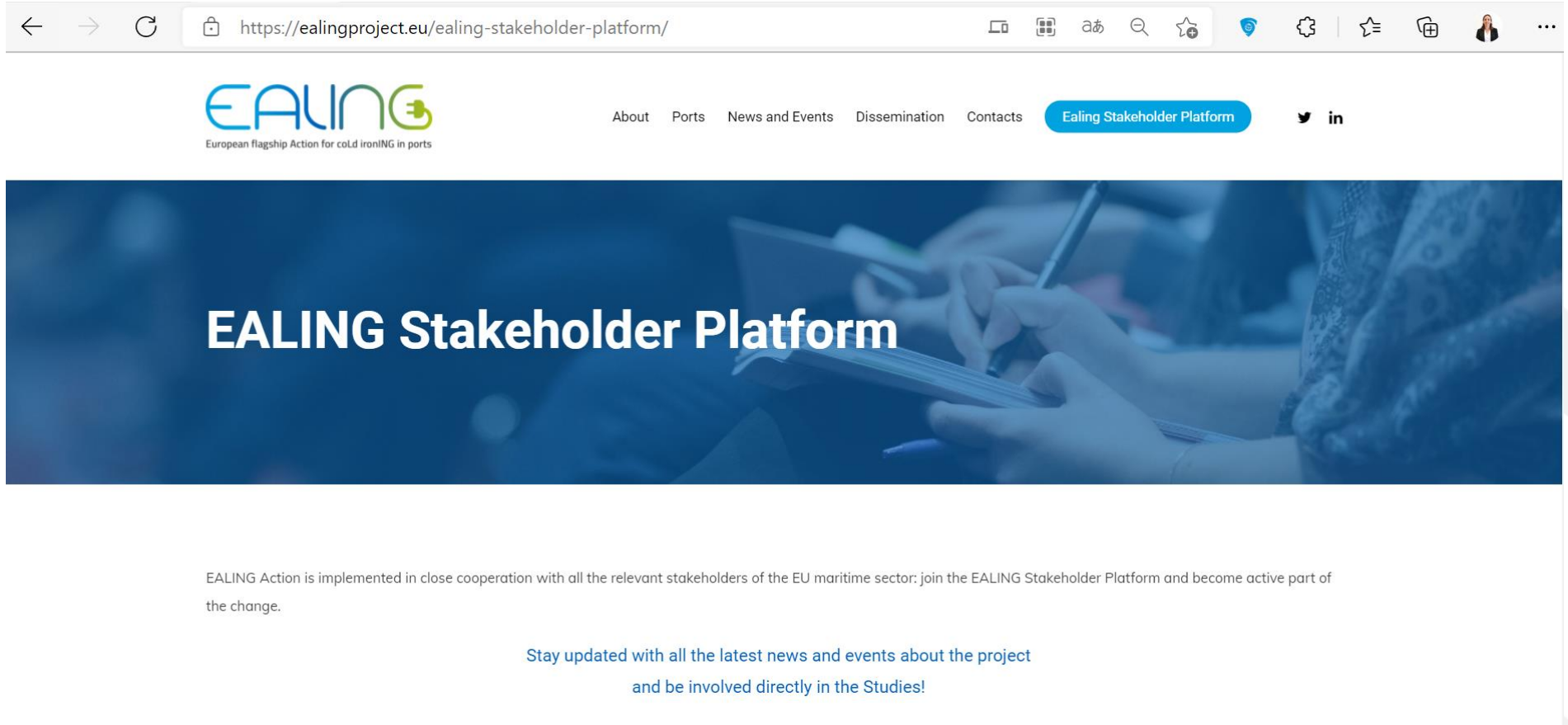
CONTACT US !



Ealing Stakeholder Platform – Ealing Project

Thanks!

European flagship Action for coLd ironING in ports

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Discover more at

www.ealingproject.eu

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