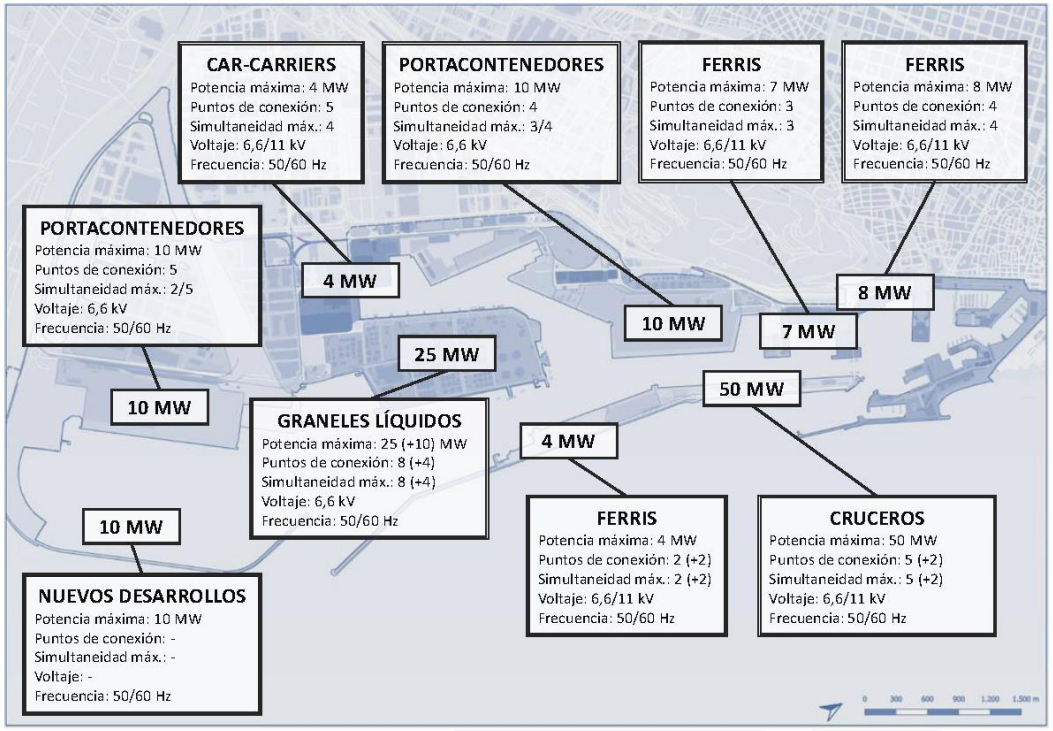
Activity 3 (FEED and other technical studies)

1. ACTION PLAN FOR THE ELECTRIFICATION OF THE PORT OF BARCELONA QUAYS

Description:
Strategic study on the implementation of OPS systems in the Port of Barcelona. In particular the study covered 1) current status and trends of the latest technologies available for the electrical connection of ships berthing; 2) analysis of demand, the estimation of which has made it possible to determine the electricity supply requirements of ships operating at berth; 3) Technical study of OPS implementation, which included the sizing and design of the system needed to design of the system necessary to connect the ships; 4) Economic analysis; 5) Environmental analysis; 6) Definition of the roadmap for the docks' electrification.



Status of the study: Finalised

Actual date of completion: 09/2023 (including the executive summaries in English)

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

Activity 3 (FEED and other technical studies)

2. OPERATION MODELS FOR THE OPS SYSTEMS IN THE PORT OF BARCELONA

Description:
The port of Barcelona intends to develop all the necessary electrical infrastructure to carry the energy, from the connection point provided by the distributor to the electricity supply points for ships on the quayside. To this end, it has been necessary to analyse the interpretation of the electricity sector regulations within the public port domain, and their possible application within the activity of distribution and commercialisation in the supply of electricity to ships.
A legal assessment of the different business models for the first phase implemented throughout the pilots has also been carried out.

Operation and business model

Energy production and supply

Pilot projects

Infrastructure development

Deployment at terminals

Status of the study: Finalised

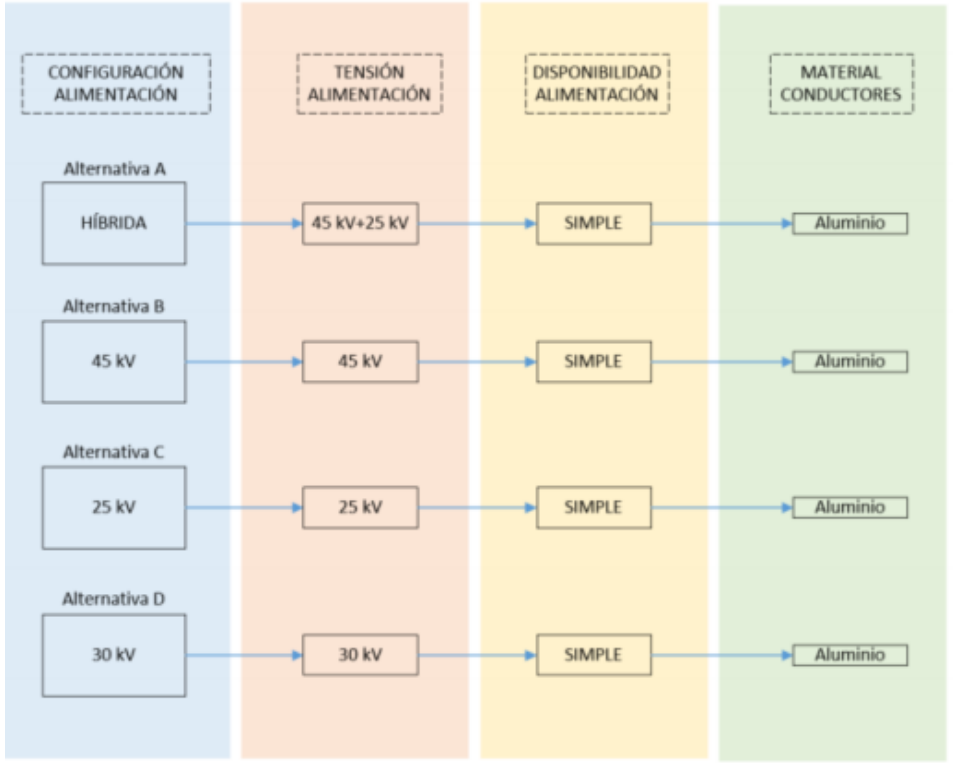
Actual date of completion: 09/2023 (including the executive summaries in English)

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

Activity 3 (FEED and other technical studies)

3. STUDY OF ALTERNATIVES OF THE MEDIUM VOLTAGE NETWORK OF THE PORT OF BARCELONA:

Description:
A study of alternatives has been developed to define the Medium Voltage (MV) network throughout the port . The study has evaluated four alternatives and selected the most suitable for the design of the MV network to be implemented in the Port of Barcelona (according to different types of ships and docks): a 25kV distribution scheme from the future substation Port to the distribution centres located in the different docks.



Status of the study: Finalised

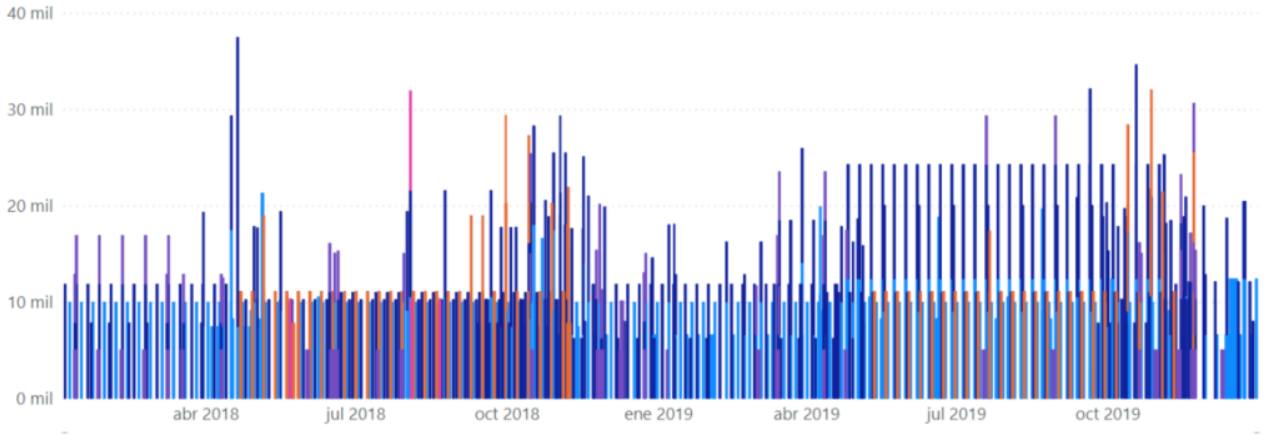
Actual date of completion : 09/2023 (including the executive summaries in English)

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

Activity 3 (FEED and other technical studies)

4. CONTAINER AND CRUISE FLEET STUDY FOR THE OPS IMPLEMENTATION IN PORT BARCELONA

Description:
This study provides information on two of the priority traffic categories: container ships and cruise ships. In both cases, the main shipping companies operating in the Port of Barcelona have been contacted to identify both the forecast demand and the technical requirements that will contribute to planning and design the OPS infrastructures in the short term.



Status of the study: Finalised

Actual date of completion : 09/2023 (including the executive summaries in English)

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

Activity 3 (FEED and other technical studies)

5. BASIC PRELIMINARY DESIGN FOR THE PILOT FOR OPS IN THE CONTAINER TERMINAL BEST

Description:
The study consisted to define the requirements of the OPS pilot at terminal BEST and to draw up the basic preliminary project for its construction. The basic preliminary project was part of the tender documents for the "turnkey" tender launched and awarded during 2022.

Status of the study: Finalised

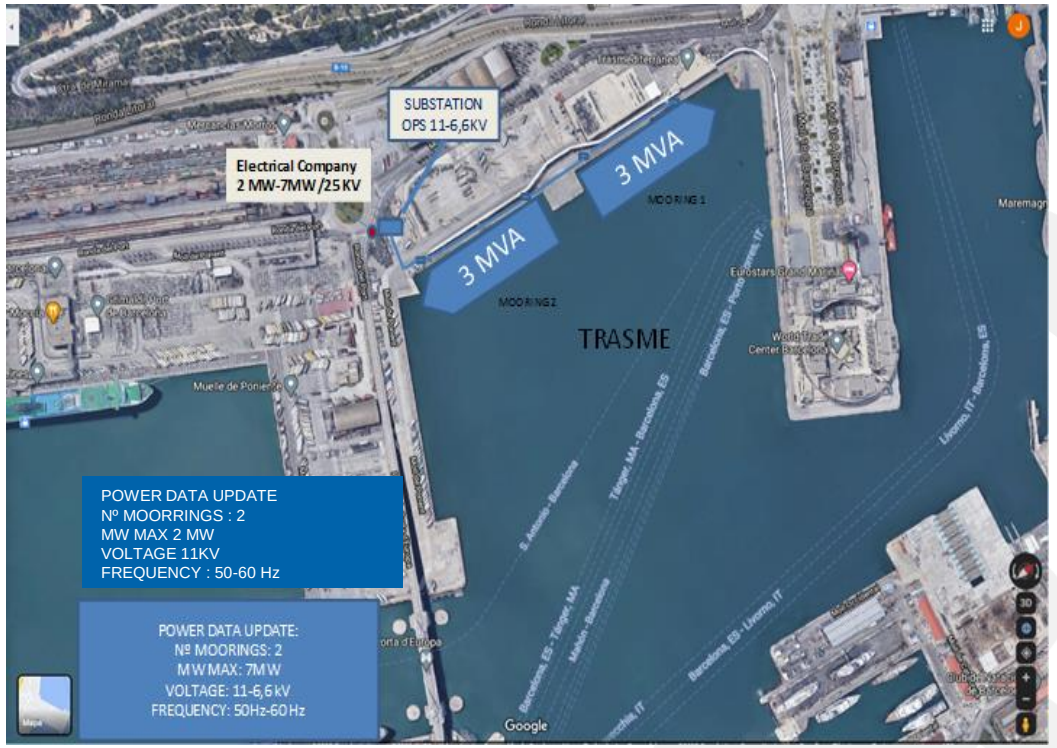
Actual date of completion: 09/2023 (including the executive summaries in English)

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

Activity 3 (FEED and other technical studies)

6. BASIC PRELIMINARY DESIGN FOR THE PILOT FOR OPS IN THE FERRY TERMINAL TFB

Description:
The study consisted to define the requirements of the OPS pilot at terminal TFB and to draw up the basic preliminary project for its construction. The basic preliminary project was part of the tender documents for the "turnkey" tender launched during 2022 and awarded in 2023.



Status of the study: Finalised

Actual date of completion: 09/2023 (including the executive summaries in English)

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

Activity 3 (FEED and other technical studies)

7. BASIC PRELIMINARY DESIGN FOR THE CONSTRUCTION OF A NEW POWER SUBSTATION (SS PORT)

Description:
The preliminary design consisted to define the SE Port and the High Voltage line requirements and to draw up the basic preliminary project for its construction. This preliminary design is part of the technical specifications of for the "turnkey" tender launched in August 2023.

Status of the study: Finalised

Actual date of completion: 09/2023 (including the executive summaries in English)

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

Activity 4 (Environmental studies)

Name of the study: Environmental studies at the Port of Barcelona

Description: Electrical power installations shall be subject to an environmental impact assessment where required by applicable legislation (Spanish Law 21/2013, 9th of December, which completes the legal framework of the European legislation on environmental assessment - Directive 2014/52/EU). Accordingly, three technical studies carried out in EALING by the port of Barcelona, involving the construction and/or upgrading of electricity facilities, have been subject to an environmental analysis to determine whether or not it is necessary an environmental impact assessment.

Status of the study: Finalised

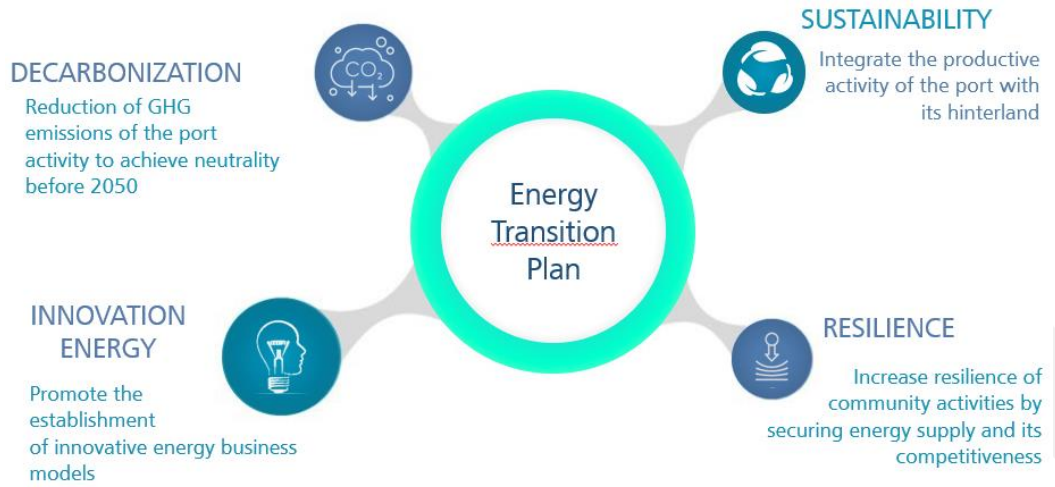
Actual date of completion: 09/2023 (including the executive summaries in English)

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

Activity 5.1 (Clean Power Supply Plans)

Description: The Port of Barcelona has begun the process of energy transition to achieve an energy model based on three axes: the electrification of wharves, the generation of renewable energies and the commitment to clean fuels when these will be an operationally, financially and commercially viable alternative to fossil fuels. The deepening of multimodality is also a high priority.

The energy transition plan will stablish an energy focused mission and vision revolving around sustainability (environmental, economic and social) from which four objectives will derive.



Status of the study: Finalised

Actual date of completion: 09/2023 (including the executive summaries in English)

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

Activity 5.2 (Tender documentation)

Number of tender dossiers: 3 tenders dossiers have been prepared

Status of the preparation of the tender dossier/s:

1. "OPS pilot at the container terminal BEST: Drafting, execution of the project and implementation of the service " - Published and awarded in 2022
2. "OPS pilot at the ferry terminal TFB: Drafting, execution of the project and implementation of the service" - Published in 2022 and awarded in 2023
3. Construction of the Port substation and the HV line and the maintenance and operation service for the HV line, the Port substation and the MV network associated with the substation – Published in August 2023

Status of the preparation of the tender dossier/s: Finalised

Actual date of completion: 09/2023 (including the executive summaries in English)

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

Activity 6 (CBA)

Has the CBA been outsourced? No, it has been prepared internally

Status of the CBA: Finalised

Actual date of completion (including the report in English): November 2023

Main results	Terminal BEST	Terminal TFB
APB own resources	3,405,201.44	2,422,429.18
National Grant received – NextGeneration funds	2,270,134.29	1,614,952.79
Total Investments (€)	5,675,335.73	4,037,381.97
Timeline (years)	2023-2047	2023-2047
Nº of calls requesting SSE for the full period studied	10,912	10,990
Financial Net Present Value (FNPV)	- 11,501 €	-703,971
Total CO2eq emissions saved (tonnes)	355,209	85,512
Total NOx emissions saved (tonnes)	6,149.70	1,497.40
Total SOx emissions saved (tonnes)	221.4	54.80
Total PMx emissions saved (tonnes)	154	37.10
Total noise emissions saved (€)	48,134	45,518

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

Activity 3 (FEED and other technical studies)

Name of the study: *Analysis of the state and capacity of the electricity transmission and distribution networks around the Port of Huelva.*

Description: Analysis of the situation of the Port of Huelva's electricity distribution grid and future demand forecasts, including OPS infrastructure, with the aim of being able to ensure electricity supply in the medium and long term.

Status of the study: Done (pending update)

Actual date of completion (including the executive summaries in English): December 2023

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

Activity 3 (FEED and other technical studies)

Name of the study: *Construction Projects for the for the installation of electrical connections for supplying ships at the South Wharf and Levante Wharf of the Port of Huelva.*

Description: Technical Assistance for the drafting of the Construction Projects for the OPS infrastructure at the Port of Huelva. The contract is divided in three chapters:

- Ro-Ro terminal (South Wharf)
- Container terminal (South Wharf)
- Multipurpose terminal (*Levante Wharf)*

Status of the study: In progress

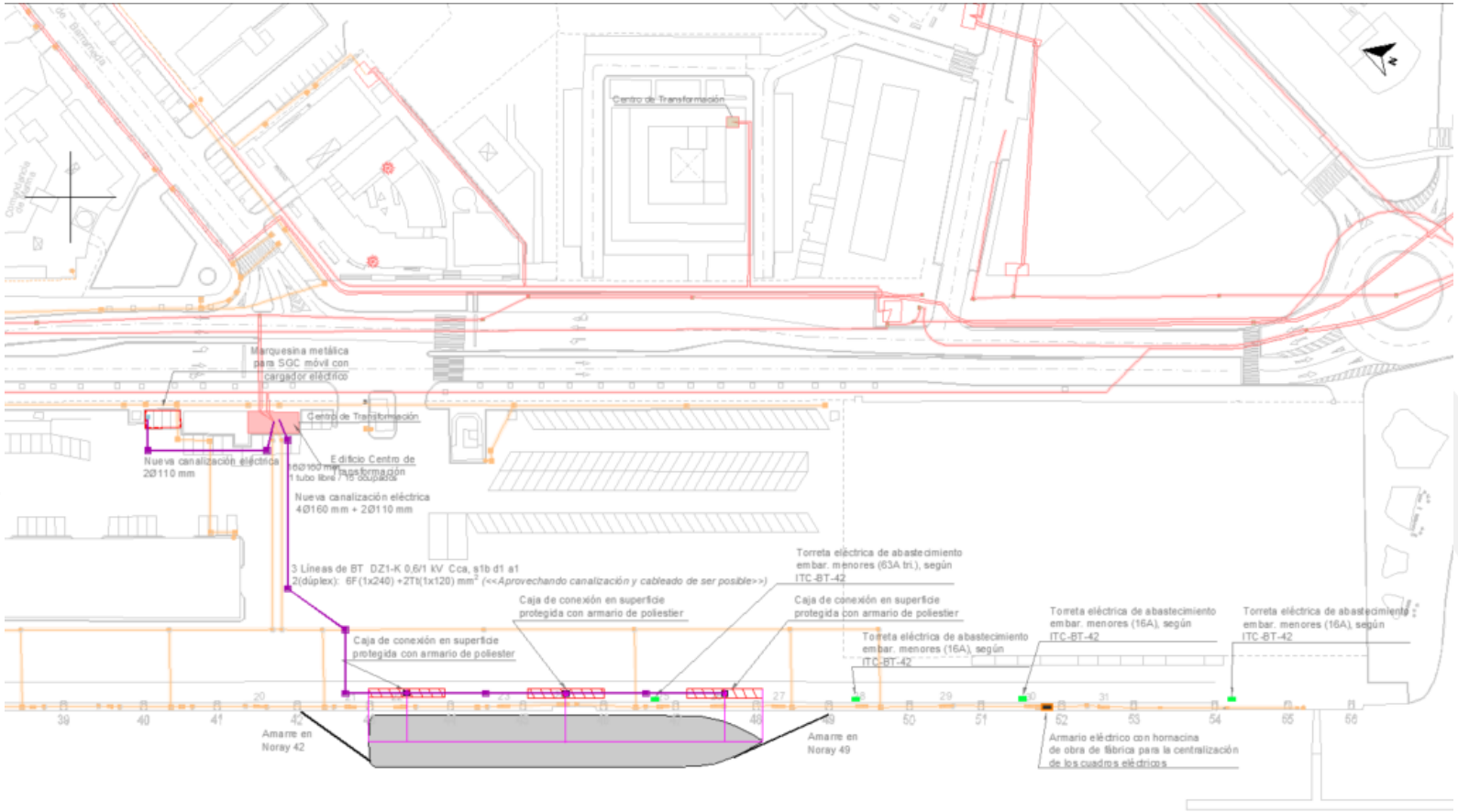
Actual date of completion (including the executive summaries in English): December 2023

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

Activity 3 (FEED and other technical studies)

Levante wharf

- 630 kVA
- Multipurpose vessels
- 50 Hz
- Low voltage
- Possibility of simultaneous supply points

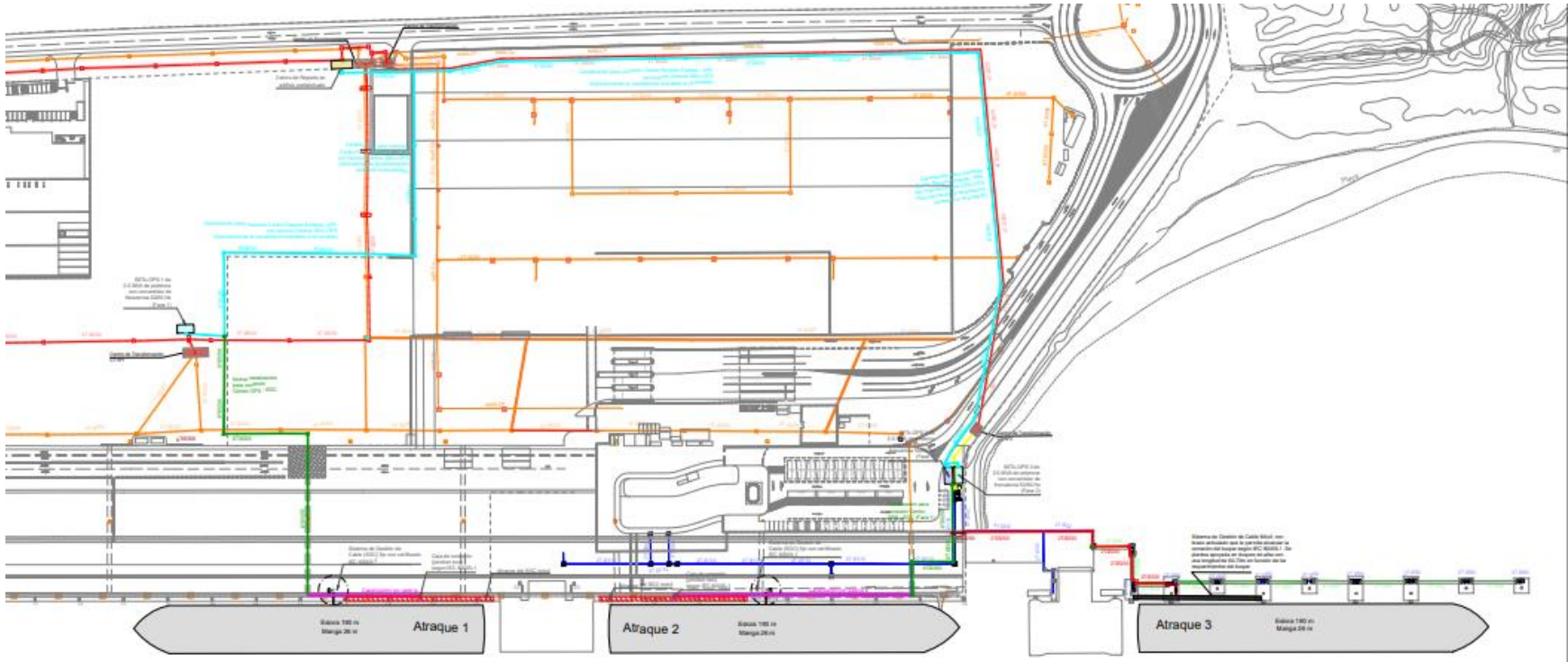


Co-financed by the Connecting Europe Facility of the European Union

Activity 3 (FEED and other technical studies)

Ro-Ro South wharf

- 7 MVA
- Ro-Ro & Ro-Pax & Con-Ro vessels
- 50/60 Hz
- 11 kV
- 3 simultaneous supply points

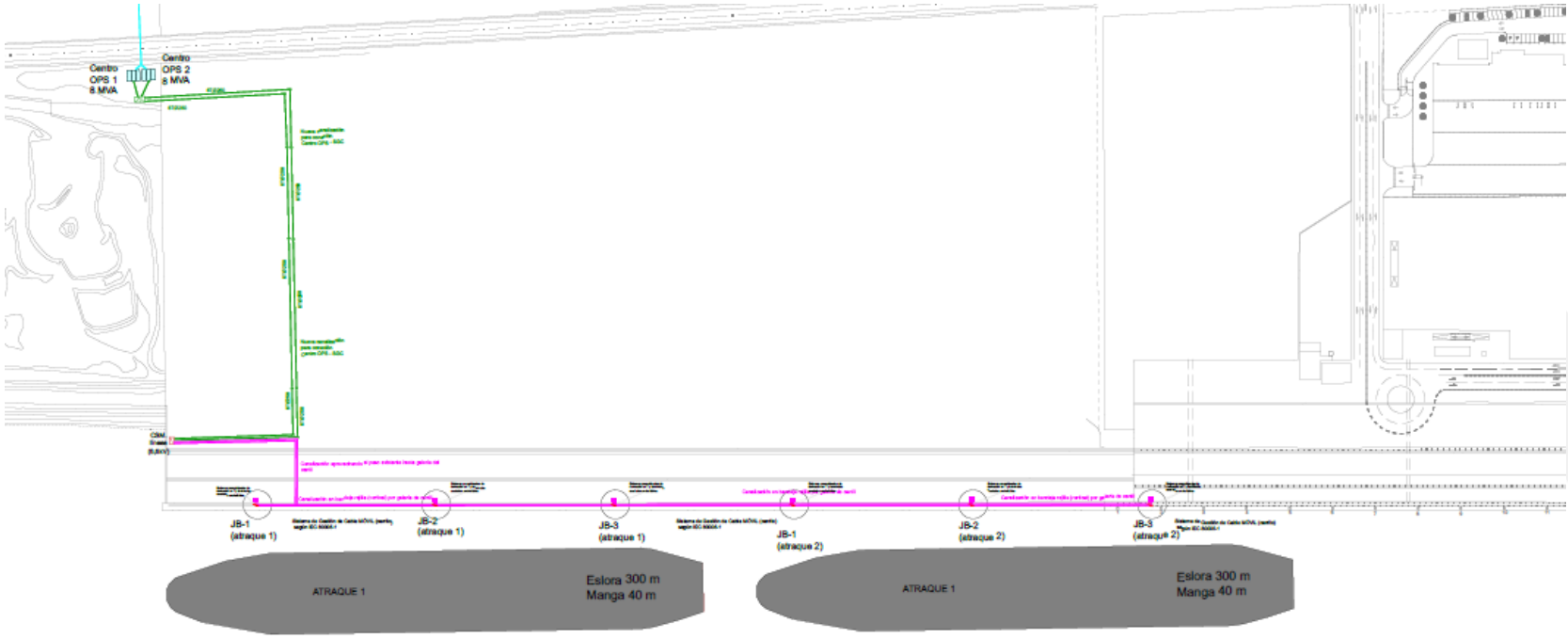


Co-financed by the Connecting Europe Facility of the European Union

Activity 3 (FEED and other technical studies)

Containers South Wharf

- 18.75 MVA
- Container vessels
- 50/60 Hz
- 6.6 kV
- 2 simultaneous supply points



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Activity 3 (FEED and other technical studies)

Location	Total power	Vessel type	Characteristics
Levante Wharf	630 KVA	Multipurpose vessels	Low Voltage Shore Connection (400 V). 250 KVA available in case of a single connection. Possibility of simultaneous supply points with up to 0.6 MVA in total. 50 Hz available.
Ro-Ro (South Wharf)	7 MVA	Ro-Ro & Ro-Pax & Con-Ro vessels	High Voltage Shore Connection (11 kV). 3 OPS supply for Ro-Ro and Ro-Pax with a maximum power each of 2.5 MVA. 50 or 60 Hz available.
Container (South Wharf)	18.75 MVA	Container vessels	High Voltage Shore Connection (6,6 kV). 2 OPS supply for containers with a maximum power each of 7.5 MVA. 50 or 60 Hz available.

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

Activity 4 (Environmental studies)

Name of the study: Including in the engineering project

Description:.
- No environmental impact assessment is required.
- Environmental integration and waste management.

Status of the study: Done

Actual date of completion (including the executive summary in English): November 2023

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

Activity 5.1 (Clean Power Supply Plans)

Description:

The Port of Huelva has drawn up an energy strategy document for the Port, which includes the need to develop OPS infrastructures in order to comply with the decarbonisation objectives. OPS infrastructures are estimated to have the following total powers:

- *Containers: 18,75 MW*
- *Ro-Ro: 7 MW*
- *Multipurpose: 630 KVA + Multiple connections*

Status of the study: Done

Actual date of completion (including the executive summary in English): November 2023

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

Activity 5.2 (Tender documentation)

Number of tender dossiers: 3 different Projects will be developed (Ro-Ro, container and multi-purpose vessels)

Status of the preparation of the tender dossier/s: In progress

Actual date of completion (including the executive summary/ies): December 2023

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

Activity 6

Has the CBA been outsourced? No, *the CBA is being prepared by OF.*

Status of the CBA: First version done. Pending review.

Actual date of completion (including the report in English): Pending to confirm with OF.

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

Activity 3 (FEED and other technical studies)

Name of the study: OPS installation in La Osa (7th and 8th alignment), Moliner and Marcelino León Docks

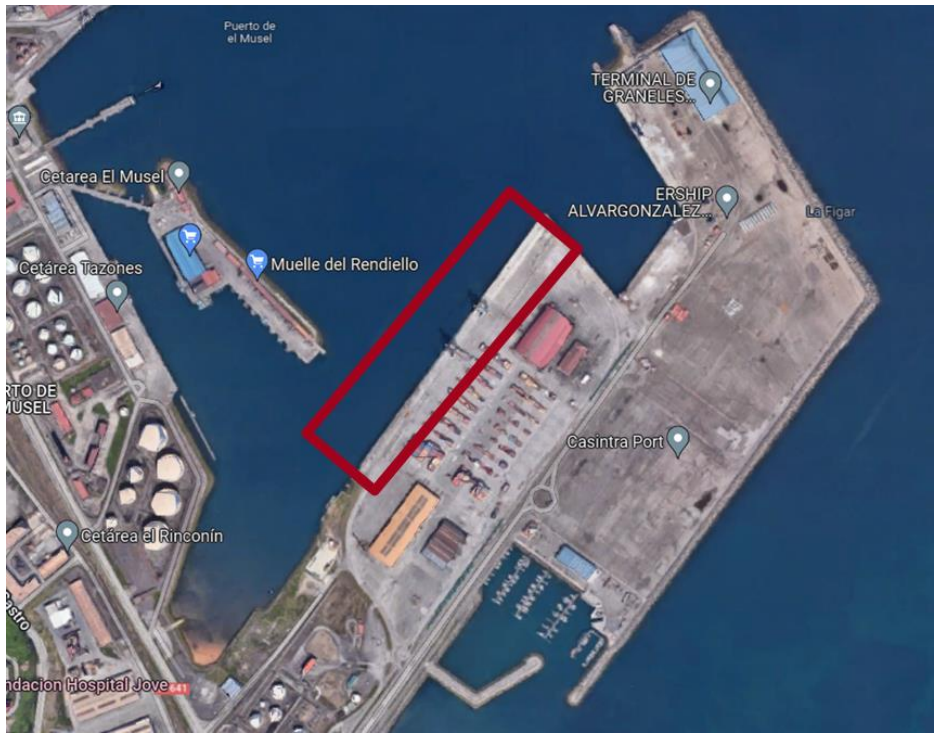
Description: This study focuses on servicing four types of ships: container ships, ferries, cruise ships and bulk carriers:

- Container ships operate in the 7th alignment of the Osa Dock
- Bulk carriers in the Marcelino León Dock.
- Ferry traffic is not currently operating; however, the possible reopening of the Motorway of the Sea is planned. Ferries will usually dock at the Moliner Dock and occasionally at the 8th Alignment of the Osa Dock.
- Cruise traffic is distributed between different docks depending on the needs of the port's operations. Some do have the docking dock defined in advance. In this study we are interested in the scales that dock in the 7th and 8th alignments of la Osa and the Moliner docks.

Status of the study: Finished

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

Activity 3 (FEED and other technical studies)



Location La Osa Dock, 7th Alignment – Container Ships and Cruises

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

Activity 3 (FEED and other technical studies)

Location Marcelino León
Dock – Bulk carrier

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

Activity 3 (FEED and other technical studies)

Location La Osa Dock, 8th Alignment, and Moliner Dock- Ferries and Cruises

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

Ferris y cruceros. Muelle Moliner y 8ª Alineación muelle de la Osa

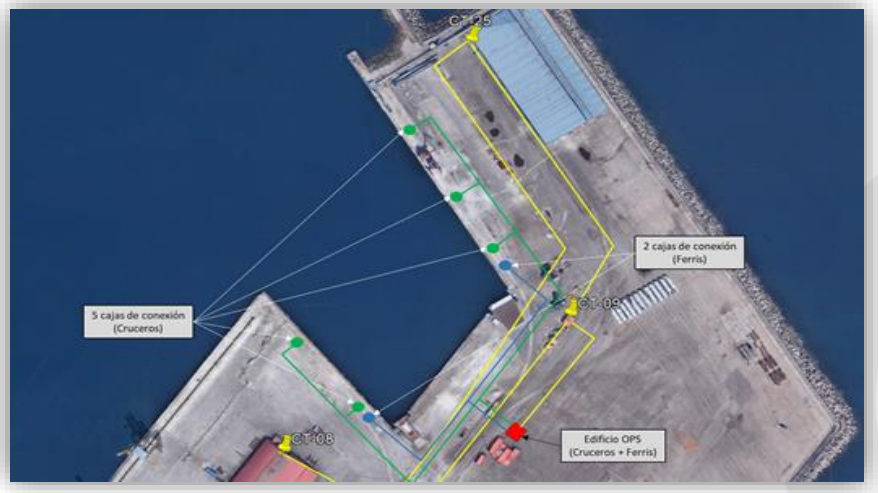
Edificio OPS para ferris y cruceros.
Dos etapas de 2MVA cada una de ellas

2 etapas en paralelo

2MVA

ferri y crucero pequeño

Acople de las 2 etapas
4MVA
cruceros medianos.



- Requisitos de potencia y conexión distintos, se plantean dos circuitos en paralelo (uno para ferris y otro para cruceros).
- Una caja en cada línea para ferris al atracar siempre en la rampa dispuesta a tal efecto;
- Para cruceros se instalarán cajas de conexión a lo largo de cada línea de atraque.
- Asimismo, se dispondrá de un sistema de gestión de cables para cada tipo de buque que facilite la conexión

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

Activity 4 (Environmental studies)

Name of the study: Environmental Studies for the OPS in the Port of Gijon

Description: Analysis of the studies and permits required for the development of the selected OPS options in the Port of Gijón.

Status of the study: Ongoing

Actual date of completion (including the executive summary in English): 31/12/2023

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

Activity 5.1 (Clean Power Supply Plans)

ISO 80005 ADDITIONAL REQUIREMENTS	CONTAINER	CRUISES	FERRIS
MAXIMUM POWER (MVA)	7,5	16	6,5
VOLTAGE (kV)	6,6	11 / 6,6	11 / 6,6
FREQUENCY (Hz)	50 / 60	50 / 60	50 / 60

Requerimientos adicionales ISO 80005

The power needs of ships calling at the port of Gijón is lower than that set by these regulations.

Estimated average powers for each type of vessel in a demand study carried out in the AP Gijón

Type of vessel	Length	Power demanded (kW)	Estimated Power (MVA)	Design Power (MVA)
Container	<160 m	500	0,625	**2**
	160<E<245 m	1.383	1,729	
Cruises	< 250 m	6.607	8,259	**12**
	> 250 m	10.412	13,015	**16**
Ferris	186 m	1.400	1,750	**2**
Bulk Carrier	< 175 m	500	0,625	**3**
	> 175 m	2.000	2,500	

It is proposed to install OPS Centers adjusted to the needs of the fleet and current traffic.

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

Activity 5.1 (Clean Power Supply Plans)

Available power

CT 14. Delivery point → 4 MVA available → Infrastructure built → **Ferris Container 7th, 8th La Osa and Moliner**

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

Activity 5.1 (Clean Power Supply Plans)

Power not available

HC Energía Substation → Option 16MVA AP Gijon → Cruises 7th, 8th Osa and Moliner → **Perform infrastructure for MT (CT expansion, civil works, cabling, ...)**

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

Activity 5.2 (Tender documentation)

Number of tender dossiers: 3 (Containers, ferries, cruisses)

Status of the preparation of the tender dossier/s: Finished

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

Activity 6

Has the CBA been outsourced? Yes

Status of the CBA: Ongoing

Actual date of completion (including the report in English): 31/12/2023

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

European flagship Action for coLd ironING in ports

North Adriatic Sea Port Authority
Ports of Venice & Chioggia

James Orlandi

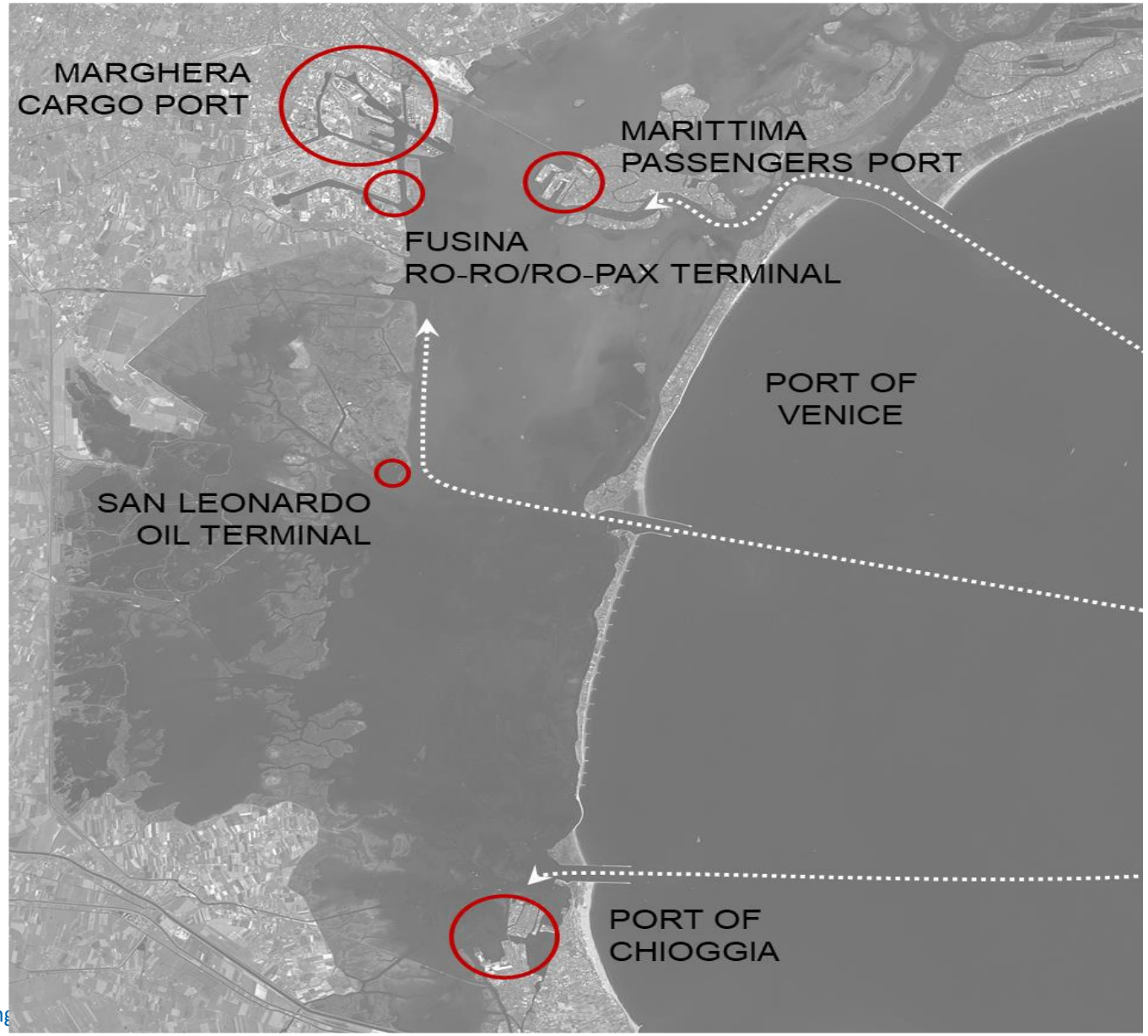
FINAL EVENT

30th November 2023

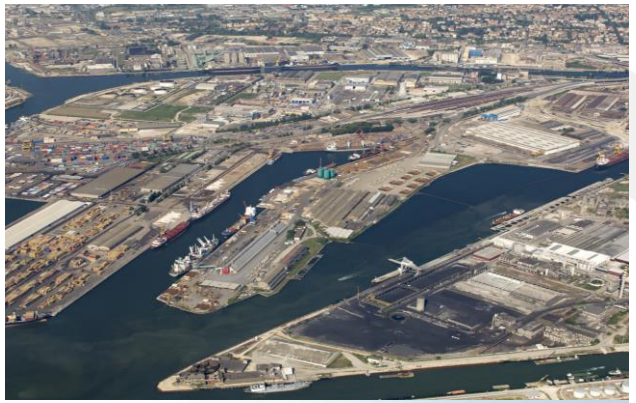
1 Situation before EALING

2 Activities developed and results obtained

3 Next steps



Venice



Marghera

Chioggia

State of facts and events

May 2021

Study to assess the propedeutic information needed to proceed with FEED studies in Venice

July 2021

The Italian Governament banned large cruise ships from the city centre (Venice) as from August 1st

2021 - 2022

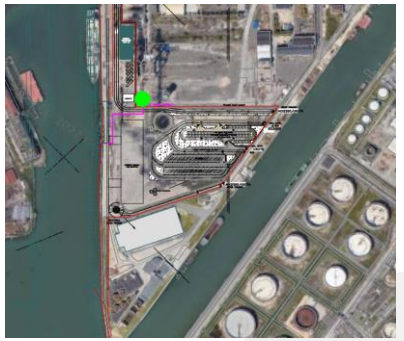
NASPA plans other berthing places in Marghera and in Chioggia

2022 - 2023

NASPA is granted **90 million €** Next Generation EU funds for OPS in **Marghera** (commercial and industrial terminals) and **Venice** (not in Chioggia)

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

OPS beeing constructed in the port of Venice



- **Passenger port - Venice** San Basilio and Riva 7 Martiri
  32 M €

- **Commercial port – Marghera**
  New cruise terminal in North Industrial channel
- **MoS Terminal – Fusina**
  57.5 M €

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

Activity 3 (FEED and other technical studies)

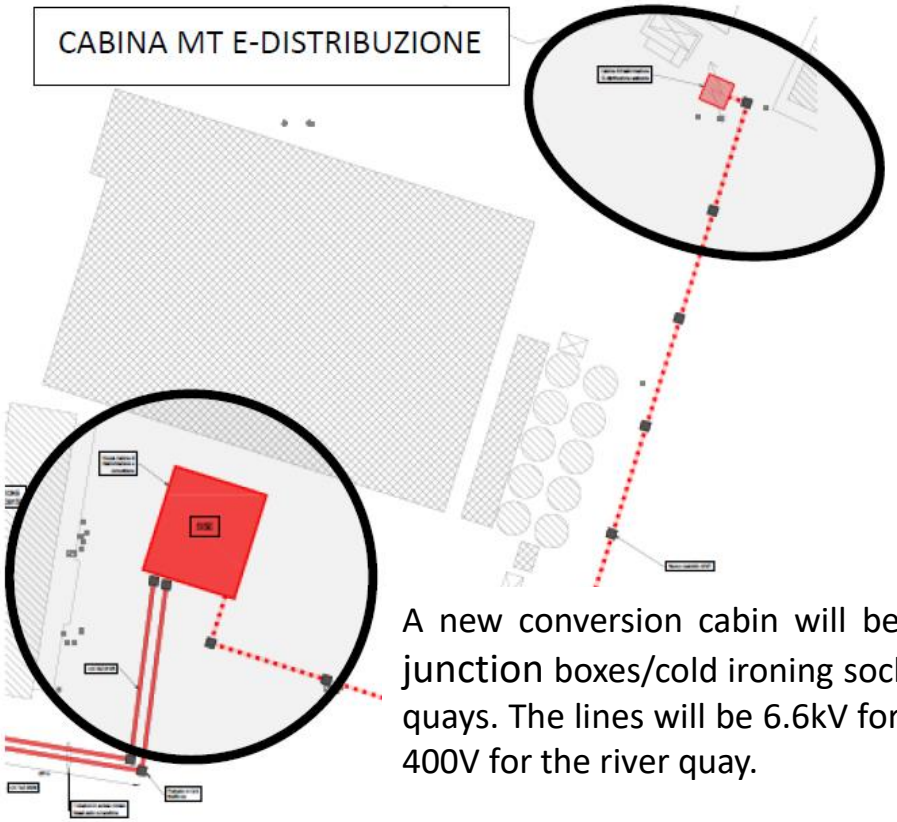
FEED relates to the **electrification of "Saloni dock"** in the Port of Chioggia **for small cruises and river barges serving the IWW system** composed by the Po river and its channels.

It counts on high voltage network and connection points to ships and comply with the IEC 80005-1:2019 utility connections in port regulation.

Part I High voltage shore connection (HVSC) systems.

Activity 3 (FEED and other technical studies)

The medium voltage connection point will be taken from the existing substation of the distributor.



A new conversion cabin will be built to power the junction boxes/cold ironing sockets provided on the quays. The lines will be 6.6kV for the cruise quay and 400V for the river quay.

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

Activity 4 (Environmental studies)

Environmental studies involve :

1. **The upgrade of DEASP for the port of Chioggia** (the assessment of GHG emissions in Chioggia);
2. **The evaluation of 4 scenarios related to energy supply**

Sub-activity 4.2. 4 scenarios

- **Case 0**: No cold ironing;
- **Case 1**: Cold Ironing with power supply only from the energy distribution company;
- **Case 2**: Cold ironing using power supply network on the cruise berth side and with fuel-cell power supply on the river berth side ;
- **Case 3**: Cold Ironing with integration of the power supplied from the network and the energy produced by a photovoltaic system.

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Sub-activity 4.1

DEASP - PORT OF CHIOGGIA – SHIP's EMISSIONS

GHG emissions distribution charts

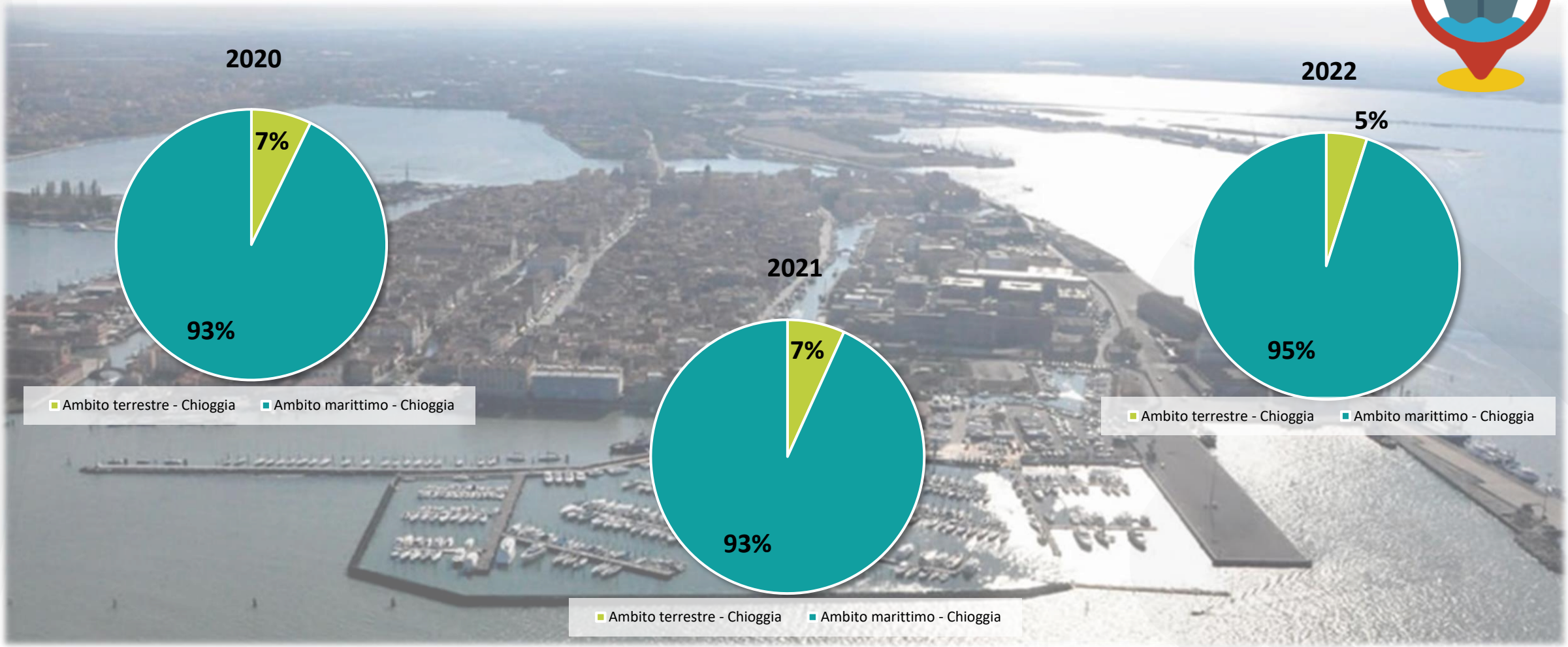
Emission	2020		2021		2022	
	Emissions [tCO2]	Emissions [%]	Emissions [tCO2]	Emissions [%]	Emissions [tCO2]	Emissions [%]
At berth phase emission	9.467,00	**99,0%**	9.641,00	**98,8%**	12.336,00	**98,9%**
Manouvering and navigation phase emission	98,00	**1,0%**	113,00	**1,2%**	134,00	**1,1%**
TOTAL EMISSION PER YEAR	9.565,00	100,00%	9.754,00	100,00%	12.470,00	100,00%

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

Sub-activity 4.1

PORT OF CHIOGGIA –VESSELS VS TERMINAL ACTIVITIES EMISSIONS

GHG EMISSION COMPARISON



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Sub-activity 4.1 PORT of CHIOGGIA – VESSEL'S EMISSION

Proposal for emission reduction

Commissione europea

COLD IRONING SYSTEM FOR CRUISE AND RIVER BARGES

REPowerEU

The proposal relates to the electrification of "Saloni dock" in the Port of Chioggia for **small cruises and river barges** serving the IWW system composed by the Po river and its channels.

6 MW total power supply:

- 4,5 for cruise and
- 400 kW for river barges.

6.000.000 €	TOTAL COSTS
About 5 Months	TIMING
UNDER EVALUATION	CO2 AVOIDED PER YEAR

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

Activity 5.1 (Clean Power Supply Plan)

The plan is based on the application of an extensive choice of technologies for the production of renewable energy. The technologies include the production of energy from

- **green hydrogen fuel cells**,
- installation of **photovoltaic panels** on port terminals and car parking areas.
- Green **hydrogen charging points** for cars and boats.

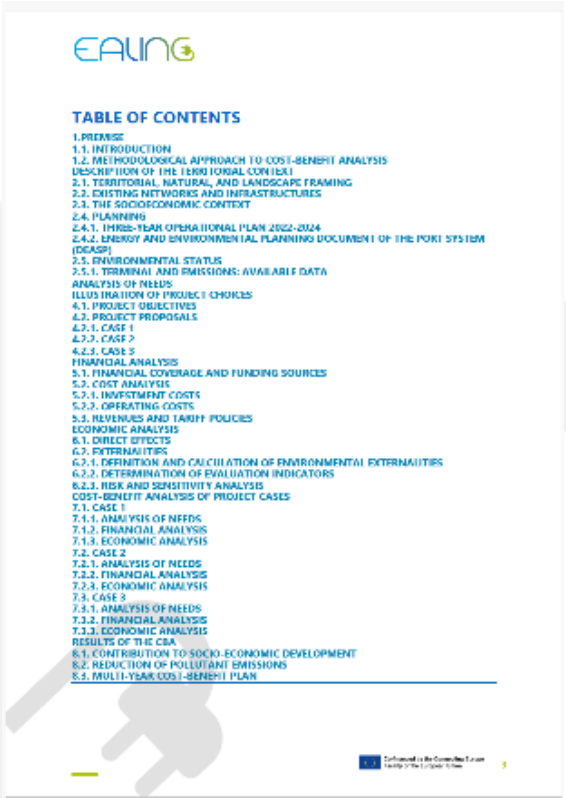
The current situation in term of **Energy Consumption (2022) is 73.398 TOE**.
The future energy demand due to cold ironing system implementation will increase of **2.821 TOE** (first step, to be increased in relation to Regulation (EU) 2023/1805 on the use of renewable and low-carbon fuels in maritime transport obligation, in 2030).
Action to cover first step energy needs are related to **FV plants and Fuel Cell for 566 TOE**.

Clean Power Supply plan is due for **15.12.2023**

Activity 6 -CBA Status: progress and planning

Color code: green=done, blue=ongoing, black=planned, red=delayed

1. Data Collection and Storage: Organize available data per scenario.
2. Scenario Detailing: Define specific scenarios and analysis criteria.
3. KPI Definition: Establish key performance indicators
4. Externality Quantification Criteria: Develop criteria to quantify externalities.
5. Scenario-Based KPI Analysis: Process and analyze KPIs for each scenario.
6. Business Case Development: Draft business cases for scenarios.
7. Document Drafting: Begin the drafting process of the document.
8. Financial, Technical, and Economic Analysis Completion: Finalize all analyses.
9. Business Case Finalization: Complete the development of business cases.
10. Document Review and Finalization: Conduct final reviews and edits of the document.
11. Pre-Final Presentation of Results: **7th December 2023.**
12. Feedback Analysis: Review feedback received after the last progress update.
13. Corrections and Enhancements: Implement necessary corrections, improvements, and further analysis.
14. Delivery due for **23rd December 2023.**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Co-financed by the Connecting Europe Facility of the European Union

Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the Port of Burgas

Description:
In the framework of the EALING project, for the Port of Burgas, the FEED studies are performed for totally 10 (ten) HV SSE berthing positions.

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Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the Port of Burgas

SSE berthing position	Location	Power (MVA)	Voltage (kV)	Vessel Type
SCP 1.1	Berth 22 (West)	2.5	6.6	Container/General Cargo
SCP 1.2	Berth 23 (West)	2.5	6.6	Container/General Cargo
SCP 1.3	Berth 24 (West)	2.5	6.6	General Cargo
SCP 1.4	Berth 24 (West)	7.5	6.6	General Cargo
SCP 2.1	Berth 30 (East)	2.5	6.6	Crude Oil/General Cargo
SCP 2.2	Berth 31 (East)	2.5	6.6	General Cargo
SCP 2.3	Berth 32 (East)	2.5	6.6	Crude Oil/General Cargo
SCP 2.4	Berth 31 (East)	7.5	6.6	General Cargo
SCP PAS	PAS (East)	16	11	Cruise
SCP 3.1	Berth 11	4	11	Passenger
SCP 3.2	Berth 12	2	6.6	General Cargo

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Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the Port of Burgas

Status of the study:
Completed

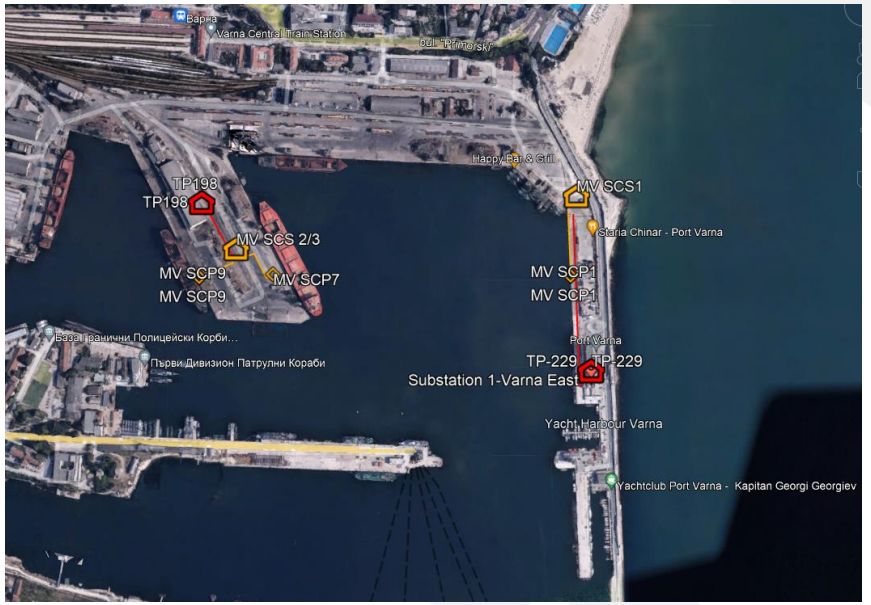
Actual date of completion (including the executive summary in English):
04/2023

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

Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the Port of Varna

Description:
In the framework of the EALING project, for the Port of Varna, the FEED studies are performed for totally 8 (eight) HV SSE berthing positions.



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Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the Port of Varna

SSE berthing position	Location	Power (MVA)	Voltage (kV)	Vessel Type
2	Berth 2/Varna West	3	6.6	Chemical Tanker/Tanker
5	Berth 5/Varna West	1	6.6	Bulk Carrier Dry
10	Berth 10/Varna West	1	6.6	Bulk Carrier Dry/ General Cargo
10a	Berth 10a/Varna West	1	6.6	Bulk Carrier Dry/ General Cargo
17	Berth 17/Varna West	3	6.6	General Cargo Ship/Container
1	Berth 1/Varna East	2	11	Passenger
7	Berth 7 Varna East	2	6.6	General Cargo Ship
9	Berth 9 Varna East	1.5	6.6	Bulk Carrier Dry/ Chemical Tanker

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Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the Port of Varna

Status of the study:
Completed

Actual date of completion (including the executive summary in English):
04/2023

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

Activity 4 (Environmental studies)

Name of the study: Environmental studies for the Port of Burgas and Port of Varna

Description: For the implementation of this activity, the results of previous activities carried out under the EALING project were used, such as FEED and other technical studies and the Clean Power Supply Plans for the Port of Burgas and for Port of Varna. According to the current legislation, the competent environmental authority determines the applicable procedure - assessment of the need for an EIA or a mandatory EIA. At the same time, the necessity to carry out a joint procedure for assessing the compatibility of the investment proposal with the object of conservation in protected areas under the Biodiversity Act is also determined. So the following documents have been prepared:

- Notification in accordance with the Ordinance on the conditions and procedure for carrying out an environmental impact assessment – one for the Port of Burgas and one for Port of Varna and
- Notification in accordance with the Ordinance on the conditions and procedure for assessing the compatibility of plans, programmes, projects and investment proposals with the subject matter and objectives of conservation of protected areas – one for the Port of Burgas and one for Port of Varna.

Statement of the competent institution on the necessity of conducting a procedure under Chapter Six of the Environmental Protection Act has not been received yet.

Status of the study:

Completed

Actual date of completion (including the executive summaries in English):

31/08/2023

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Activity 5.1 (Clean Power Supply Plans)

Description: The plans are aligned with the current strategic, regulatory and spatial planning documents in order to include all infrastructure that is necessary for the development of the project. From the analysis carried out in the preparation of the plans for the both ports, actions are planned to meet future energy needs. The terminals built in Port of Burgas and Port of Varna were not designed and constructed for the electrical supply of ships. For the implementation of the SSE systems, a serious restructuring of the power supply systems of the individual port terminals is necessary, which must be carried out in the following directions.

- Construction of additional "feed-in infrastructure" providing the necessary amounts of electricity for the vessels.
- Construction of facilities and systems for renewable energy, guaranteeing the supply of ships with clean energy (without emissions);
- Construction of energy storage facilities and systems, guaranteeing efficient, economical and balanced obtaining of energy generated from renewable sources.

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Activity 5.1 (Clean Power Supply Plans)

The plans also include technical proposals for the construction of cover FVCs at the Port of Burgas and Port of Varna.

- Based on the analysis of the characteristics of the building roof infrastructure of the Port of Burgas and Port of Varna, it is proposed to use monocrystalline photovoltaic panels, inverters with different power grid and metal structures tailored to the characteristics of the buildings.

- **The share of green energy in the energy mix of the Port of Burgas for powering moored ships is expected to be 24%.** This is higher than the current national average (17-18%).

- For Port of Varna is expected the green energy in the energy mix to reach 56%.

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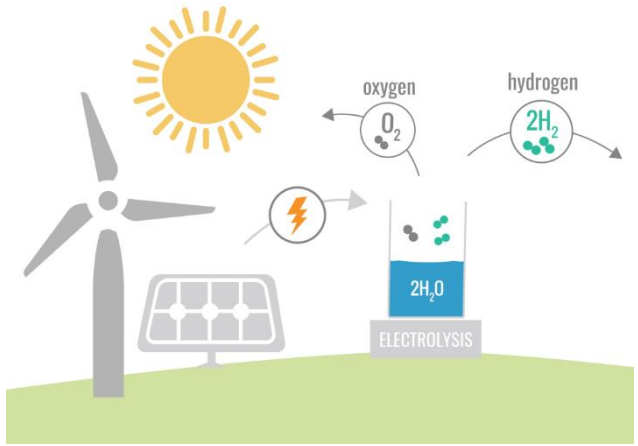
Activity 5.1 (Clean Power Supply Plans)

Options for future additional alternative solutions are also presented.



The alternative proposal is based on hydrogen technology, with the hydrogen storage system consisting of a 1MW electrolyser, 8.3 MWh of hydrogen storage and a 0.5 MW fuel cell.

Energy storage technologies for an expedient and effective addition to renewable energy sources, respectively photovoltaics, etc. they enable a balance between energy supply and demand. Through this approach, possible losses are avoided when we have an excess supply of energy and the necessary energy is provided at times of reduced production. There are literature sources that claim that combining this approach with the application of SMART GRID technologies and systems with artificial intelligence, savings of up to 40% can be realized.

Status of the study:
Completed

Actual date of completion (including the executive summaries in English):
31/08/2023

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

Activity 5.2 (Tender documentation)

Number of tender dossiers: 2 tender documentations for design & execution of works – one for the project for Port of Varna and one for Port of Burgas

The tender documentations includes:

- Technical specifications
- Methodology for determining the complex evaluation of the offers with indicators and their relative weight
- Draft contract
- Template of the technical offer
- Template of the financial offer
- Requirements for participants and instructions for preparation of the offers

Status of the preparation of the tender dossier/s:
Completed

Actual date of completion (including the executive summaries):
31/08/2023

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Activity 6

Has the CBA been outsourced? The CBAs and Financial Blending Schemes were carried out by Ocean Finance, but the collection of the necessary information in the Excel file for Activity 6 was outsourced.

Port of Burgas

Financial Analysis	Socio-Economic Analysis
Net Present Value (NPV) = € -18,970,513.36	Economic Rate of Return (ERR) = 6%
Internal Rate of Return (IRR) = -4.8%	Economic Net Present Value (ENPV) = € 1,650,427.52
Funding Rate = 85%	Corrected Net Present Value of Costs (C) = € 14,002,190.24
After EU Grant Net Present Value of Investment = € 107,334.27	Corrected Net Present Value of Benefits (B)= € 15,652,617.76
After EU Grant Internal Rate of Return (IRR) = 4%	Benefit – Cost Ratio (B/C) = 1.12

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Activity 6

Port of Varna

Financial Analysis	Socio-Economic Analysis
Net Present Value (NPV) = -8.828.588 €	Economic Rate of Return (ERR) = 7%
Internal Rate of Return (IRR) = -3%	Economic Net Present Value (ENPV) = 4.213.981 €
Funding Rate = 85%	Corrected Net Present Value of Costs (C) = 11.406.654 €
After EU Grant Net Present Value of Investment = 28.984 €	Corrected Net Present Value of Benefits (B)= 15.620.635 €
After EU Grant Internal Rate of Return (IRR) = 4%	Benefit – Cost Ratio (B/C) = 1.37

The above results have shown a financially sustainable project; the project's cumulated net cashflows during operations are positive resulting into a positive NPV and IRR after EU Grant by presenting simultaneously a positive ENPV with obvious economic benefits demonstrating the competitiveness of electricity as a marine fuel for the shipping and depicting that the project requires EU assistance.

Status of the CBA:
Completed
Actual date of completion (including the report in English):
31/08/2023

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

Activity 3 (FEED and other technical studies)

Name of the study:
TECHNICAL STUDIES FOR THE PORT OF TRIESTE AND MONFALCONE (executive summary)

In the framework of the EALING project, PNAEAS has performed the final project design studies for three berthing positions at the Pier no. 5/Riva Traiana (SSE1), at the Logistic Platform (SSE2) and at the Port of Monfalcone (SSE3), in accordance with the provisions of the IEC EEE 8000-5-1 Ed.1:Utility connections in port-Part 1: Hight Voltage Shore Connection (HVSC) Systems-General requirements.

Figure 1: Overview of the port of Trieste

Figure 1: Overview of the port of Monfalcone

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

Activity 3 (FEED and other technical studies)

Name of the study:

DETAILED TECHNICAL STUDIES FOR OPS OF THE PIER V AND PIER «RIVA TRAIANA» OF THE PORT OF TRIESTE.

PROJECT IDENTIFICATION NO. 1931 – CIG 8674604DAA - CUP C91F20000140002

Description: SSE 1 position will serve the **Ro-Ro vessels** that are berthing at the Pier n. 5, coming the from the eastern part of the Mediterranean, and dedicated specifically in importing goods from Turkey. The project provides the **electrification of berths 31 and 31bis, pertaining to the Riva Traiana, and berth 32 pertaining to Pier V**. The system envisages, for each berth, the installation of a cable dispenser in a fixed position on the quay.

Network Voltage (kV)	Vessel Type	OUTPUT			
		Voltage levels (kV)	Frequency (Hz)	Power (MVA)	Total Power (MVA)
6 kV (later 27.5 kV)	Ro-Ro vessels	6,6kV / 11kV	50Hz or 60Hz	0,6 – 2,25 MVA	3,5 MVA

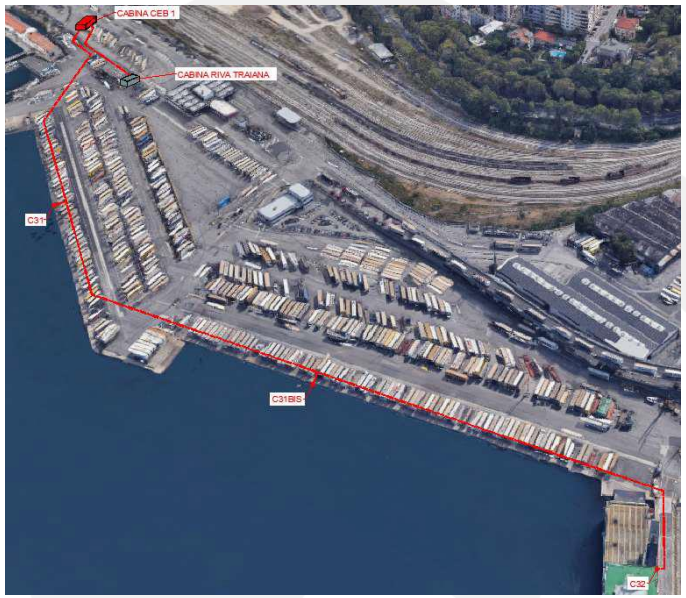

Figure 1 : SSE 1 position

Status of the study: **Completed**

Actual date of completion (including the executive summary in English): **June 2023**

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

Activity 3 (FEED and other technical studies)

Name of the study:
DETAILED TECHNICAL STUDIES FOR OPS AT THE LOGISTICS PLATFORM OF THE PORT OF TRIESTE. PROJECT IDENTIFICATION NO. 1943 - CIG: 884680566F - CUP: C49G20000540002 - C99J21020720001.

Description: SSE 2 position will serve the **Container vessels** that are berthing at the Logistic Platform/Scalo Legnami.

The works consist in the construction of **four shore connections capable of simultaneously supplying power to four container ships** moored at the Logistics Platform and Scalo Legnami berths.

Network Voltage (kV)	Vessel Type	OUTPUT			
		Voltage levels (kV)	Frequency (Hz)	Power (MVA)	Total Power (MVA)
27,5 kV	Container carriers	6,6kV / 11kV	50Hz or 60Hz	2 MVA	4 MVA

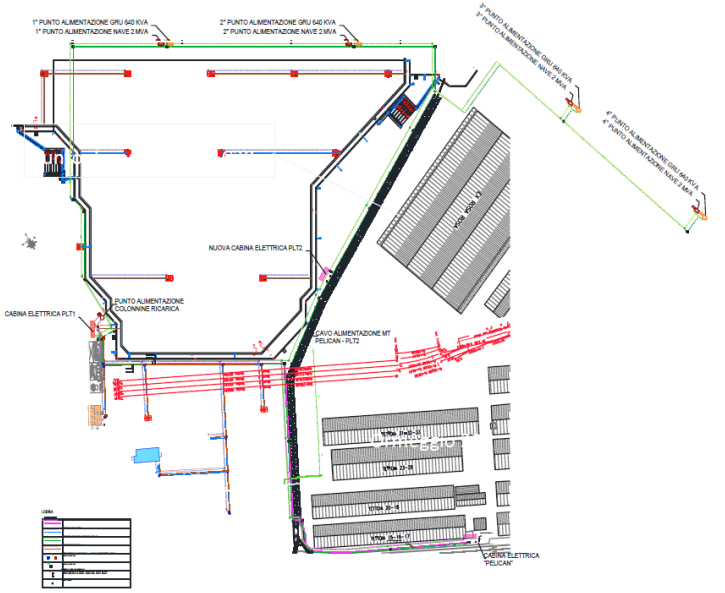

Figure 1: SSE 2 scheme

Status of the study: **Completed**

Actual date of completion (including the executive summaries in English): **June 2023**

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

Activity 3 (FEED and other technical studies)

Name of the study:

DETAILED TECHNICAL STUDIES FOR OPS OF THE PORT OF MONFALCONE. PROJECT IDENTIFICATION NO. 1938 PROJECT – CIG 8853465E6E - CUP C49G20000540002 - C49J21033120001

Description: SSE project 3 consist in the construction of the electrification network of the **Portorosega quay in the Port of Monfalcone**, for the **medium voltage power supply** of **cruise** ships berthed at berths 1-2-3, **merchant ships (Ro-Ro, General Cargo or bulk carriers)** berthed at berths 4-5-6, and the related preparations for berths 7-8-9. Due to a subdivision of the financing of the entire intervention, the project is designed as a whole, but divided into two LOTS, technically complementary, but economically and accounting-wise separate.

Network Voltage (kV)	Vessel Type	OUTPUT			
		Voltage levels (kV)	Frequency (Hz)	Power (MVA)	Total Power (MVA)
20 kV - 132 kV	Pure Car Carriers, Bulk, Cruises carriers, General dry cargo ships	6,6kV / 11kV	50Hz or 60Hz	20MVA	5 MVA

Status of the study: **Completed**

Actual date of completion (including the executive summaries in English): **June 2023**

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

Activity 4 (Environmental studies)

Name of the study:
ENVIRONMENTAL STUDIES FOR THE PORTS OF TRIESTE AND MONFALCONE (executive summary)

Description: The European Directive "on the implementation of an infrastructure for alternative fuels" – DAFI 2014/94/EU" foresee the installation**, by 2025**, of **electricity supplies along the coasts of member states "as a priority in the ports of the core network of the TEN-T".**

In order to define the possible impacts induced by the project action**s, environmental studies were carried out to**:

- provide a description of the **status and trends of environmental factors** against which significant effects can be comparted and evaluated;
- form the **basis** on which **ex-post monitoring** can be used to measure change once the Project has been initiated;
- **evaluate and estimate potential impacts**, both at the construction phase and during operation.

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Activity 4 (Environmental studies)

The results assured that:

• the impact of the interventions on the environmental matrices of the area, both during the construction and operation phases are globally sustainable, as they do not significantly alter appreciably the context of the moorings, nor do they produce harmful effects on the environment and the human presence;
• the interventions do not require the activation of an Environmental Impact Assessment procedure.

Status of the studies: **Completed**

Actual date of completion (including the executive summary in English): **July 2023**

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

Activity 5.1 (Clean Power Supply Plans)

Description (1/4):
In accordance with the indications of the Italian Legislative Decree No. 169 of 4 August 2016, **PNAEAS drew up the Port System Energy and Environmental Planning Document (DEASP)** with the aim of pursuing appropriate objectives, with reference to the reduction of CO2 emissions.

The DEASP collected all the development and transformation indications that constitute the core document for the definition of the PNAEAS energy policy in the short and medium term, and the necessary planning annexes.
Starting from the analysis of the actual state of emissions, the document represent a strategic guideline for the implementation of interventions to improve energy efficiency and the use of renewable energy in ports.

The **DEASP refers to the "Port Area" as defined and delimited by the Port System Master Plan in force**, which in the case under consideration consists of the Port of Trieste Master Plan adopted in 2014 and the Monfalcone Port Master Plan of 1979.

Within this territories, **the DEASP involves** the **activities directly connected to PNAEAS**, **plus** all those **activities connected to the operation of the port in general**, carried out by both the Concessionaires and the Lessees, as well as the Institutional Bodies and all the other subjects that have a contractual relationship with the AdSPMAO

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Activity 5.1 (Clean Power Supply Plans)

Description (2/4):

Current situation:

	Electrical end-use	Natural gas	Heating fuel oil	LPG	Diesel for vehicles	Gasoline for vehicles	Natural gas for vehicles	Biomass	Heavy Fuel Oil	TOTAL	%
Port of Trieste	36,20	2,00	2,90	0,10	88,20	2,60	0,00	0,10	149,00	281,20	86,5%
Port of Monfalcone	1,10	0,00	0,20	0,20	27,60	0,00	0,00	0,00	14,90	44,00	13,5%
Total (GWh)	37,30	2,00	3,10	0,30	115,80	2,60	0,00	0,10	163,90	**325,20**	100%

Future energy demand:

	YEAR														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
TOTAL (GWh)	**325**	**327**	**328**	**330**	**331**	**333**	**334**	**336**	**337**	**339**	**341**	**343**	**344**	**346**	**348**

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Activity 5.1 (Clean Power Supply Plans)

Description (3/4):

Planned actions to cover the energy needs

- Electricity:

o **smart grid** aimed at the rational use of energy, sharing of distributed generation plants from renewable sources (**photovoltaic systems; wind turbine**)
o **LED technology** lighting systems to replace standard lighting systems

- Fossil fuels used for heating and hot water production in buildings:

o increase the **thermal insulation** of buildings (e.g. thermal coats);
o more **efficient heat generators**;

- Fossil fuels used to power light and heavy vehicles:

o light- and heavy-duty **vehicles powered by electricity** to replace fossil fuels;
o vehicles fueled by **hydrogen** gas produced by means of an electrolyser;

- Fossil fuels from ship traffic during manoeuvring, mooring and parking:

o alternative system to self-generating power inside ships / **cold ironing**

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Activity 5.1 (Clean Power Supply Plans)

Description (4/4):

SUPPORTING DOCUMENTS

- DEASP - Energy and Environmental Planning Document of the Port System of the Eastern Adriatic Sea, Ports of Trieste and Monfalcone;
- DEASP - Energy and Environmental Planning Document of the Port System of the Eastern Adriatic Sea, Ports of Trieste and Monfalcone – Annex A

Status of the study: **Completed**

Actual date of completion (including the executive summaries in English): **November 2022**

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

Activity 5.2 (Tender documentation)

Number of tender dossiers: 3

PNAEAS completed the tender documentation of the 3 SSE, the tenders have been published and are currently ongoing (one per SSE site):

Pier no. 5/Riva Traiana in Trieste (SSE1);
Logistic Platform/Scalo Legnami in Trieste (SSE2);
Portorosega in Monfalcone (SSE3).

Status of the preparation of the tender dossier/s: **Completed**

Actual date of completion (including the executive summary/ies): **October 2023**

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

Activity 6 (Cost-Benefit Analysis and Blending Schemes)

Has the **CBA** been **outsourced**? **Yes,** PNAEAS assigned the tender for the Cost Benefit Analysis of the 3 Shore Side Electricity sites in Trieste and Monfalcone

Status of the CBA: **ongoing.**

Actual date of completion (including the report in English): **November 2023**

The **funds for the realisation of the 3 SSE** are assured by a **mix of financial resources:**

Total investment	**16.293.869,89**
National Recovery and Resilience Plan	15.000.000,00
National Public funds	178.545,80
EU funds	279.352,42
Own resources.	835.971,67

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

Thank you for your kind attention!

Port Network Authority of the Eastern Adriatic Sea – Ports of Trieste and Monfalcone

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

Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the port of Constanta

Description: For the port of Constanta, the FEED studies are performed for totally 10 (ten) LV and HV SSE berthing positions

SSE berthing position	Location	Power (MVA)	Voltage (kV)	Vessel Type
SSE 1	PAS	5	11	Ro-Pax
SSE 2	Berth 35/36	1	0.44/0.4	Bulk
SSE 3	Berth 44	1	0.44/0.4	Bulk
SSE 4	Berth CL	5	6.6	LNG Carriers
SSE 5	Berth PL6	1	0.44/0.4	Ro-Ro
SSE 6	Berth 114	1	0.44/0.4	Bulk
SSE 7	Berth 119	1	0.44/0.4	Bulk
SSE 8	Berth 120	1	0.44/0.4	Car carriers
SSE 9	Berth 121	5	6.6	Container
SSE 10	Berth 123	5	6.6	Container

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

Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the port of Constanta

Status of the study: Completed

Actual date of completion (including the executive summaries in English): 02/2023

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

Activity 4 (Environmental studies)

Name of the study: ENVIRONMENTAL STUDY REGARDING THE ASSESSMENT OF THE ENVIRONMENTAL IMPACT OF THE WORKS REQUIRED FOR THE "OPS" INSTALLATION IN THE PORT OF CONSTANTA

Description: The study was carried out by SC MULTIDIMENSION SRL

Status of the study: Completed

The Agency for Environmental Protection Constanta classified the project regarding the execution of the OPS ,,not subject to environmental impact assessment" and the authority responsible for monitoring the Natura 2000 sites established that the works have no impact on the ROSPA site – 0076-Black Sea.

Actual date of completion (including the executive summaries in English): October 2022

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

Activity 5 (Clean Power Supply Plans)

Activity 5.1 (Clean Power Supply Plan for the Port of Constanta)

Status of the study: Completed

Activity 5.2 (Tender documentation)

Number of tender dossiers: 1 tender documentation for design & execution of works
Status: The award documentation is finalized and uploaded to SICAP (the National Electronic Public Procurement System)
Completion date of executive summary: December 2023

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

Activity 6

Has the CBA been outsourced? No, it was carried by Ocean Finance with the data provided by the port.

Status of the CBA: Completed

Financial Analysis	Socio-Economic Analysis
Net Present Value (NPV) = € -18,498,140.57	Economic Rate of Return (ERR) = 17%
Funding Rate = 85%	Economic Net Present Value (ENPV) = € 48,343,345.83
After EU Grant Net Present Value of Investment = € 62,280.56	Corrected Net Present Value of Costs (C) = € 53,095,953.83
After EU Grant Internal Rate of Return (IRR) = 8%	Corrected Net Present Value of Benefits (B)= € 101,439,299.66
	Benefit – Cost Ratio (B/C) = 1

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

Activity 3 (FEED and other technical studies)

Name of the study: electrification of quay 17

Description: technical studies for the installation of electric recharging points in the quay 17 of the port of Ancona, with the aim to reduce emissions and noise in a sensitive area for proximity to the city. Traffic addressed: offshore supply vessels, research vessels. Number of supply points: 4 recharging points, of which 3 at 50 Hz and 1 at 60Hz.

Status of the study: completed
Works realized with own funds of ADSPMAC

Actual date of completion (including the executive summaries in English): October 2023

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

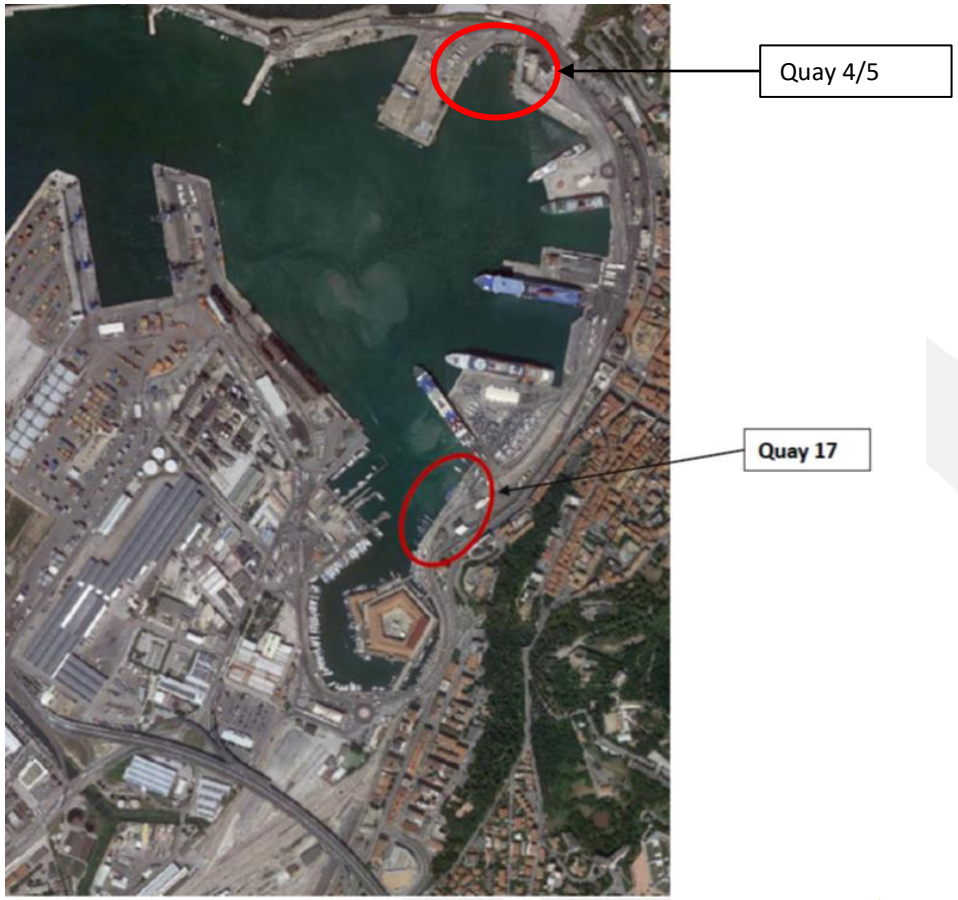
Activity 3 (FEED and other technical studies)

Name of the study: electrification of quay 4/5

Description: technical studies for the installation of electric recharging points in the quay 4/5 of the port of Ancona, with the aim to reduce emissions and noise in the old port area, characterized by historical monuments (Roman period). Traffic addressed: technical nautical vessels (pilot vessels, tugboats, ….) .
Number of supply points: 3 recharging points at 50 Hz.

Status of the study: completed
Works will be realized with own funds of ADSPMAC

Actual date of completion (including the executive summaries in English): October 2023



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

Activity 4 (Environmental studies)

Status of the activity: completed in October 2023

Name of the study: Environmental study - OPS installations in the port of Ancona

Description: Despite the limited dimension of the two interventions, a framework of the environmental and climate effects caused by the project has been carried out for the purpose of EALING initiative.

ENVIRONMENTAL	• Due to their nature and limited scope, the 2 OPS technical studies implemented under EALING Project are excluded from EIA procedure and screening, according to the current national legislation and not involving protected natural areas or Natura 200 Network areas. They therefore fulfill with the European and national environmental obligations; • The impacts that may emerge during the construction phase, as a consequence of the limited works, on the environmental components of soil and subsoil, atmosphere, climate, water, biodiversity and ecosystem, can be classified as scarce or not significant; • During the operation phase, the 2 cold ironing interventions will have a positive impact on the environmental component of atmosphere, climate and biodiversity: by allowing the ships to turn off the engines during the mooring phase they contribute to reduce some of the negative impacts on air pollution, noise and GHG emissions and to positively affect factors as population, biodiversity and material assets.

CLIMATE	• Climate impacts have been assessed according to the Guidelines for the preparation of Documents of Environmental Energy Planning of Port Systems (DEASP) drafted at national level; • The climate impacts of the two interventions was calculated in terms of reduction of air pollution and contribution of climate change, and were estimated in 40,7 tonnes of CO2 emissions avoided and 535 Gj of energy saved.

Activity 5.1 (Clean Power Supply Plans)

Status of the activity: completed in October 2023

Description: the Clean Power Supply Plan reflects the content of the Deasp – Energy and environment planning document, recently approved by ADSPMAC port committe.

To promote the reduction of energy consumption to meet the future energy needs, the *DEASP defines strategic guidelines* for the implementation of specific actions aimed at *improving energy efficiency and promoting the use of renewable energies in the port area.* The solutions identified cover three types of intervention:

- *Interventions promoted both by public and private subjects,* which involve works, facilities, structures, as a result of investments made with the aim of improving energy efficiency and producing energy from renewable sources;
- *Green Ports interventions*, that comprise project proposals of the Port Authority for the environmental sustainability of ports (green ports) of the National Recovery and Resilience Plan (PNRR)
- *PNIC interventions*, that comprise project proposals of the Port Authority within the framework of the National Plan for Complementary Investments (PNIC).

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

Activity 5.2 (Tender documentation)

Status of the activity: completed in November 2023

Number of tender dossiers: 2

Status of the preparation of the tender dossier/s: completed for quay 17 and 4/5

Actual date of completion (including the executive summary/ies): November 2023

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

Activity 6

Status of the activity: completed in November 2023

Has the CBA been outsourced? Yes, the collection of data to fill in the excel table for Ocean Finance was outsourced

Status of the CBA: completed by Ocean Finance in November 2023

	Quay 17	Quay 4-5
Total investment	300.000 €	70.000 €
Timeline (years)	2023-2047	2023-2047
N° of calls requesting SSE for the full period studied	900	1095
Financial Net Present Value (FNPV)	FNVP (before Eu Grant): € 15,751.61 FNVP (after Eu Grant): € 124,682.82	
Total CO2 emissions saved (tonnes)	38	2,7
Total NOx emissions saved (tonnes)	0,07	0,01
Total PMx emissions saved (tonnes)	0,02	0

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

Activity 3 (FEED and other technical studies)

Name of the study: Technical Design Studies for the connecting points “Perikleous”, “Ietionia” & “Poseidonos”

Description:
Technical design studies for five (5) berthing positions at the Passenger Terminal as follows:

SSE berthing position	Location	Power (MVA)	Voltage (kV)	Vessel Type
SSE 1	Poseidonos Coast	0.5	0.44/0.4	Ro-Pax
SSE 2	Ag. Dionisiou Coast	1	11	Ro-Pax
SSE 3		4	11	Ro-Pax
SSE 4	Ietionia Coast	4	11	Ro-Pax
SSE 5	Perikleous Coast	4	11	Ro-Pax

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

Activity 3 (FEED and other technical studies)

Name of the study: Technical Design Studies for the connecting points “Perikleous”, “Ietionia” & “Poseidonos”

Description:

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

Activity 3 (FEED and other technical studies)

Name of the study: Technical Design Studies for the connecting points “Perikleous”, “Ietionia” & “Poseidonos”

Status of the study:
Completed

Actual date of completion (including the executive summaries in English):
01/2023

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

Activity 4 (Environmental studies)

Name of the study: Environmental Assessment

Description:
- Environmental Report for the construction of 5 SSES positions, in accordance to Article 6/Paragraph 1a of National Law 4014/2011.
- Reports assessing the compliance of the interventions with the Habitats Directive (92/43/EEC), NATURA 2000 and the Water Framework Directive 2000/60/EC

Status of the study:
Completed
Submitted to the competent authority and approval has been issued

Actual date of completion (including the executive summary in English):
12/2022

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

Activity 5.1 (Clean Power Supply Plans)

Description: Integration of SSES in port strategy, expectations in traffic growth and new concepts for port users

1) **Current situation** in terms of energy consumption in Piraeus Port

Main consumer types	Current power demands
Ships (car/passenger ferries, speed passenger ferries)	0
Other facilities (buildings, cranes, lights etc)	10 MW
Total	10 MW

2) **Total future energy demand** is summed up to 130 MW. In terms of apparent power, the corresponding amount is 162.5 MVA.

Main consumer types	Current power demands
Ships	120 MW
Other facilities	10 MW
Total	130 kW

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

Activity 5.1 (Clean Power Supply Plans)

Description: Integration of SSES in port strategy, expectations in traffic growth and new concepts for port users

3) **Planned actions to cover the energy needs**. Use of green energy (i.e. clean power) sources installed

- locally - within or nearby the port
- main National Grid of Greece
- additional energy savings will be attained by building and energy management systems

4) **Supporting documentation**

- Updated Masterplan of the Port of Piraeus
- National Plan for Energy and Climate (NECP)
- RAE Report (November 2021) - National Regulatory Authority for Energy (November 2021)
- HEDNO Report on Estimation of future power demands of Piraeus Port - Hellenic Electricity Distribution Network Operator

Status of the study:

Completed

Actual date of completion (including the executive summary in English):

11/2023

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

Activity 5.2 (Tender documentation)

Number of tender dossiers:
Five (5). One per SSES position.

Status of the preparation of the tender dossier/s:
Completed

Actual date of completion (including the executive summary/ies):
12/2023

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

Activity 6

Has the CBA been outsourced?
Partially. The CBA was implemented by OF, however a subcontracting was required for the internal analysis of data and the assessment of the scenarios.

Status of the CBA:
Completed

Actual date of completion (including the report in English):
10/2023

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

European flagship Action for coLd ironING in ports

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

LUKA KOPER
Port of Koper

Onshore Power Supply in European Ports

EALING Project

EALING General Assembly
Presentation of activities and results of Luka Koper

Jurij Mirnik
Luka Koper, d.d. / Port of Koper

Valencia, 30/11/2023

Activity 3 (FEED and other technical studies)

Name of technical studies (project documentation):

„Izdelava projektne dokumentacije DGD in PZI za dvojni privez, transformatorsko postajo in ureditev skladiščnih površin, vključno s projektantskim nadzorom (JN 57/2023)“

Description:

Project documentation refers to the implementation of technical studies, namely the documentation for obtaining a building permit and the project design for the execution of works. When both studies are completed, a public tender will follow for construction interventions in the Port of Koper - in Basin III, which will include:

- construction of a new double RO-RO berth in Basin III, including dredging works
- improvements to the existing RO-RO berth in Basin III
- **implementation of OPS infrastructure and systems at RO-RO berths in Basin III**
- **construction of a new transformer station, connection to main power grid, electric cable network**
- **the OPS power infrastructure (converters, transformers, protections...)**

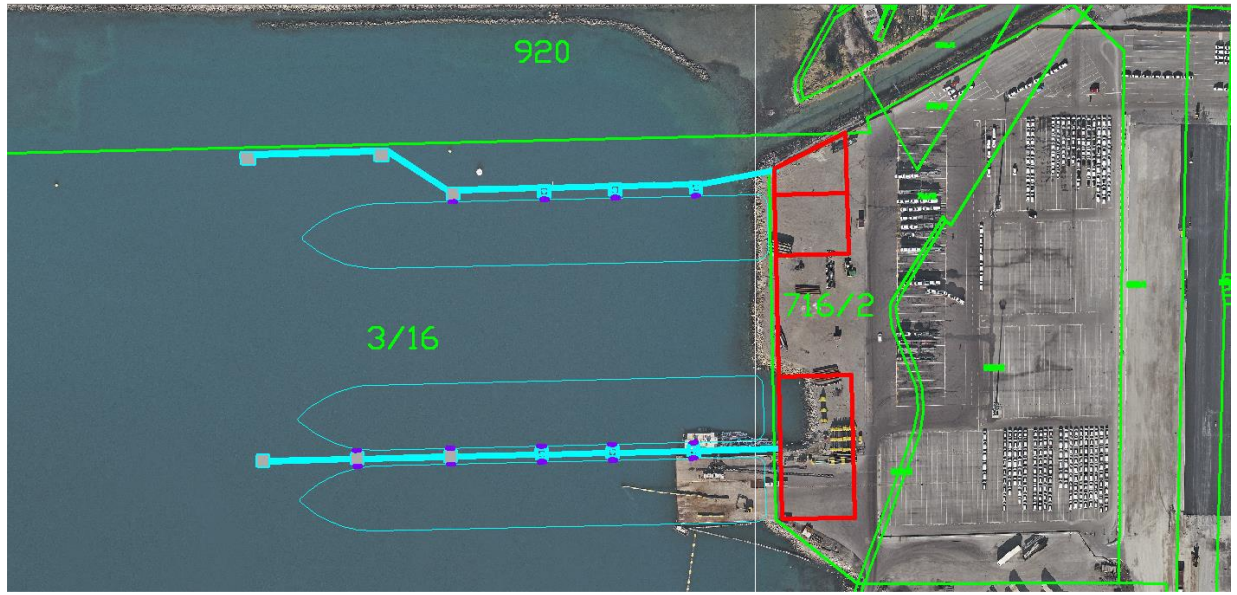
Type of traffic addressed: RO-RO vessel (Car carrier)

Number of SSE supply points: 3

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

Activity 3 (FEED and other technical studies)

Aerial view of the location of the future OPS facility and the proposed location of the future substation.



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Activity 3 (FEED and other technical studies)

Objectives:

To produce the project documentation, including the technical and maritime studies, conceptual design study and construction reports, which, depending on the type of construction, are necessary for the execution of the works and the acquisition of administrative permits (building permit, operating permit, etc.). The project documentation should be prepared in such a way that it enables the acquisition of permits and the implementation of construction in phases. The environmental impact assessment has already been prepared and the environmental consent is already legally binding.

Status of the technical studies:

- tender published on **11/5/2023** (TED contract notice: 2023/S 092-281065)
- the contract with the selected contractor signed on **21/8/2023**

Planned date of completion: **October 2024**

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Activity 3 (FEED and other technical studies)

Reasons for delay:

In 2022, two tenders were announced / launched for the preparation of project documentation for OPS at RO-RO berths in Port of Koper. Both tenders were later suspended and finally terminated due to exceeding the price ceiling, and above all due to the unclear status regarding responsibility for the costs of investment in OPS systems in the Port of Koper, which resulted in an accumulated **15-months delay.**

Legal framework:

In 2008, company Luka Koper concluded with the Republic of Slovenia the Concession Agreement for the performance of port activity, management, development, and regular maintenance of the port infrastructure in the area of Port of Koper. The concession area includes the entire area of Port of Koper. Throughput and warehousing are carried out at 12 specialized port terminals where all terminals are operated by Luka Koper.

The company Luka Koper thus manages the entire Port of Koper – from terminal operations to the development and maintenance of the port infrastructure – but the company Luka Koper is not a Port Authority. Investments in basic port infrastructure are usually the responsibility of port authorities, which is not the case for Port of Koper, where Luka Koper is responsible for the construction and development of infrastructure. When the concession agreement was drawn up in 2008, the OPS systems were not envisaged.

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Activity 3 (FEED and other technical studies)

New legal framework:

During the EALING project, it was established that the costs of investment in OPS systems in the port could easily be estimated at tens of millions of euros, which was considered as an obligation outside the scope of the concession agreement. To avoid interference with decisions that could in any way prejudge final legal solution, all activities related to OPS have been suspended until the new legal framework comes into force.

From 21 June 2023, the *Act on Infrastructure for Alternative Fuels and Promotion of the Transition to Alternative Fuels in Transport* (Official Gazette of the Republic of Slovenia, No. 62/23) came into force, which eliminates the legal dilemma about who bears the burden of OPS costs in the Port of Koper.

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Activity 3 (FEED and other technical studies)

In March 2023, when the new *Act on Infrastructure for Alternative Fuels* was prepared and went into the adoption process, Luka Koper immediately continued the implementation of all the necessary measures related to OPS, which were stopped for the previously explained reasons, namely:

State of play:

- April 2023 – preparation of an internal project assignment, which is intended for the project designer as a technical input for the preparation of project documentation
- May 2023 – tender published on TED
- June 2023 – bids obtained; negotiations carried out
- July 2023 – selection process completed; contract awarded
- August 2023 – signed contract with the selected contractor
- October 2023 – commencement of maritime study revision

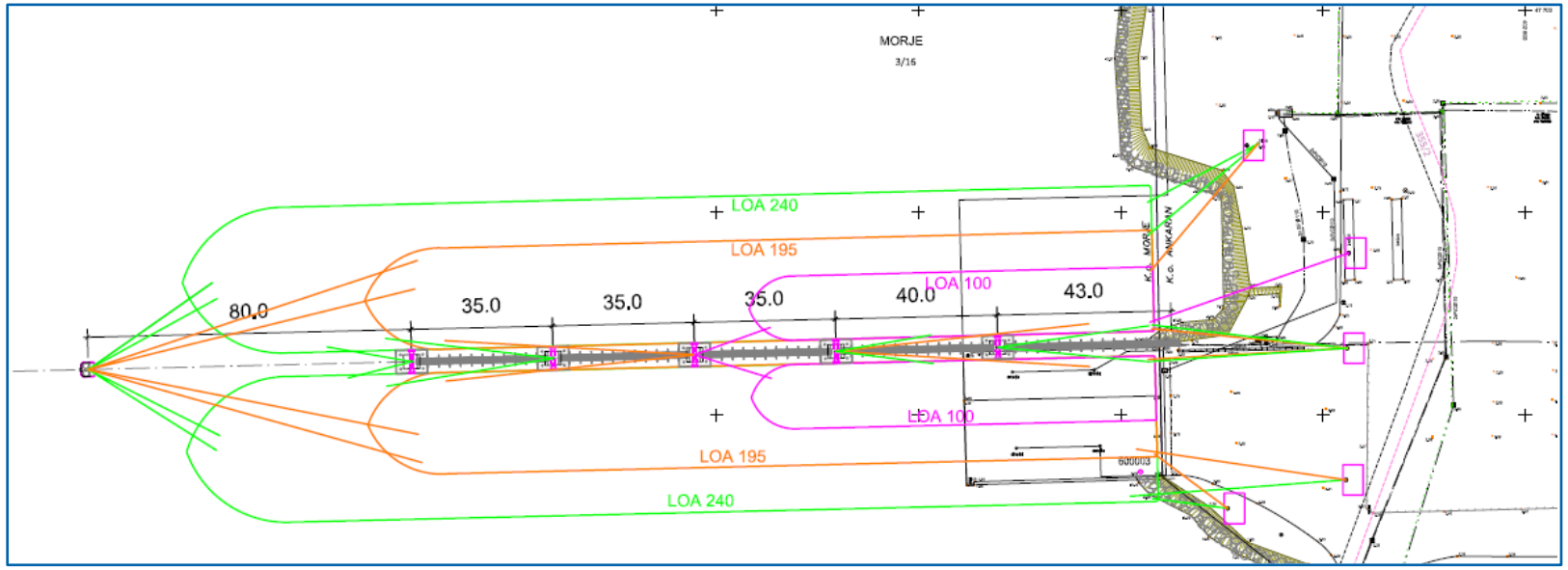
Further plan:

- December 2023 – maritime study revised
- May 2024 – documentation for obtaining Building permit acquired
- October 2024 – executive design obtained (the time can be shortened by one month with timely approval of the ministry)

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

Activity 3 (FEED and other technical studies)

Drawing of the future new berth in Basin III including the OPS system.



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

Activity 4 (Environmental studies)

Name of the study:
Izdelava okoljske študije in energetskega podnebnega načrta podjetja Luka Koper d.d. do leta 2030 s pogledom do leta 2050 (JN 145/2022)

Status of the study: **completed**

The Environmental study is composed of two parts:

1. Carbon footprint calculation
2. Comprehensive Environmental study

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

Activity 4 (Environmental studies)

Executive summary - Carbon footprint calculation

The calculation of the carbon footprint specifies in more detail the principles, methodology, assumptions and various factors that the company Luka Koper d.d. used in the preparation and reporting of carbon footprint and greenhouse gas (GHG) emissions. The basic goal of the calculation is to define the method of data collection, data analysis and calculation, with which the company provides sufficiently accurate and internationally comparable data on the Group's carbon footprint in accordance with the principles of the Greenhouse Gas Protocol (hereinafter: GHG Protocol) and its effective and comprehensive measurement, management and reporting.

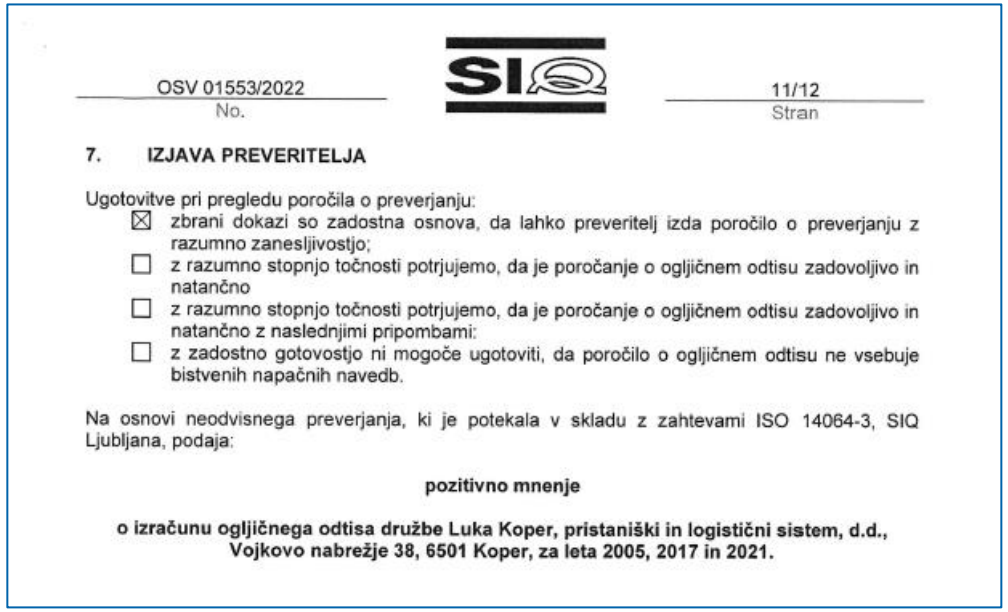
Status of the study: **completed**

Actual date of completion: **21/12/2022**

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

Activity 4 (Environmental studies)

Carbon footprint calculation and verification report



OSV 01553/2022
No.

SIQ

11/12
Stran

7. IZJAVA PREVERITELJA

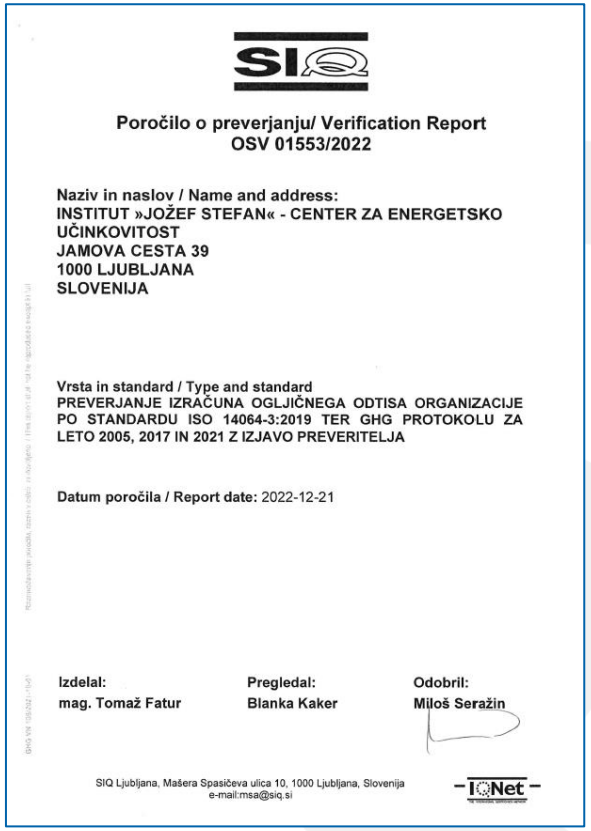
Ugotovitve pri pregledu poročila o preverjanju:

- ☒ zbrani dokazi so zadostna osnova, da lahko preveritelj izda poročilo o preverjanju z razumno zanesljivostjo;
- ☐ z razumno stopnjo točnosti potrjujemo, da je poročanje o ogljičnem odtisu zadovoljivo in natančno
- ☐ z razumno stopnjo točnosti potrjujemo, da je poročanje o ogljičnem odtisu zadovoljivo in natančno z naslednjimi pripombami:
- ☐ z zadostno gotovostjo ni mogoče ugotoviti, da poročilo o ogljičnem odtisu ne vsebuje bistvenih napačnih navedb.

Na osnovi neodvisnega preverjanja, ki je potekala v skladu z zahtevami ISO 14064-3, SIQ Ljubljana, podaja:

pozitivno mnenje

o izračunu ogljičnega odtisa družbe Luka Koper, pristaniški in logistični sistem, d.d., Vojkovo nabrežje 38, 6501 Koper, za leta 2005, 2017 in 2021.



SIQ

Poročilo o preverjanju/ Verification Report
OSV 01553/2022

Naziv in naslov / Name and address:
INSTITUT »JOŽEF STEFAN« - CENTER ZA ENERGETSKO UČINKOVITOST
JAMOVA CESTA 39
1000 LJUBLJANA
SLOVENIJA

Vrsta in standard / Type and standard
PREVERJANJE IZRAČUNA OGLJIČNEGA ODTISA ORGANIZACIJE PO STANDARDU ISO 14064-3:2019 TER GHG PROTOKOLU ZA LETO 2005, 2017 IN 2021 Z IZJAVO PREVERITELJA

Datum poročila / Report date: 2022-12-21

Izdelal:	Pregledal:	Odobril:
mag. Tomaž Fatur	Blanka Kaker	Miloš Seražin

SIQ Ljubljana, Mašera Spasičeva ulica 10, 1000 Ljubljana, Slovenija
e-mail:msa@siq.si

IQNet

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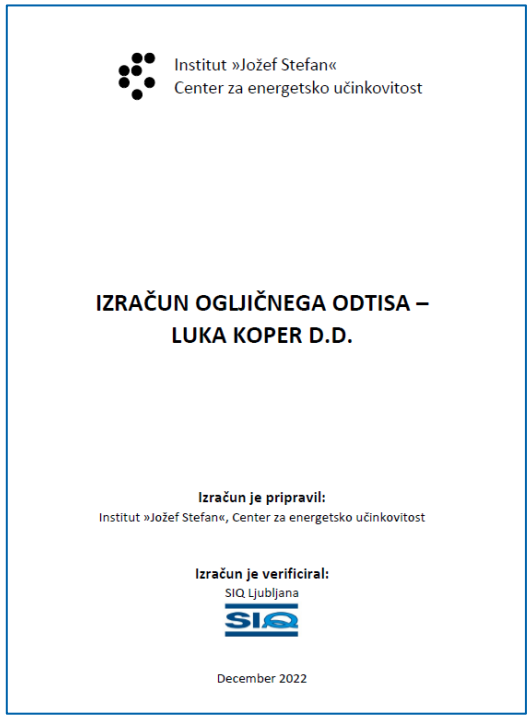
Activity 4 (Environmental studies)

Carbon footprint calculation - Table of content



Institut »Jožef Stefan«
Center za energetsko učinkovitost

IZRAČUN OGLJIČNEGA ODTISA – LUKA KOPER D.D.

Izračun je pripravil:
Institut »Jožef Stefan«, Center za energetsko učinkovitost

Izračun je verificiral:
SIQ Ljubljana

December 2022

Institut "Jožef Stefan", Ljubljana, Slovenija
Center za energetsko učinkovitost (CEU)

DELOVNO POROČILO IJS: IJS-DP - 14234
ŠT. POGODBE:
NAROČNIK: LUKA KOPER D.D.
KOORDINATOR NA STRANI NAROČNIKA: DAVID KRMAC

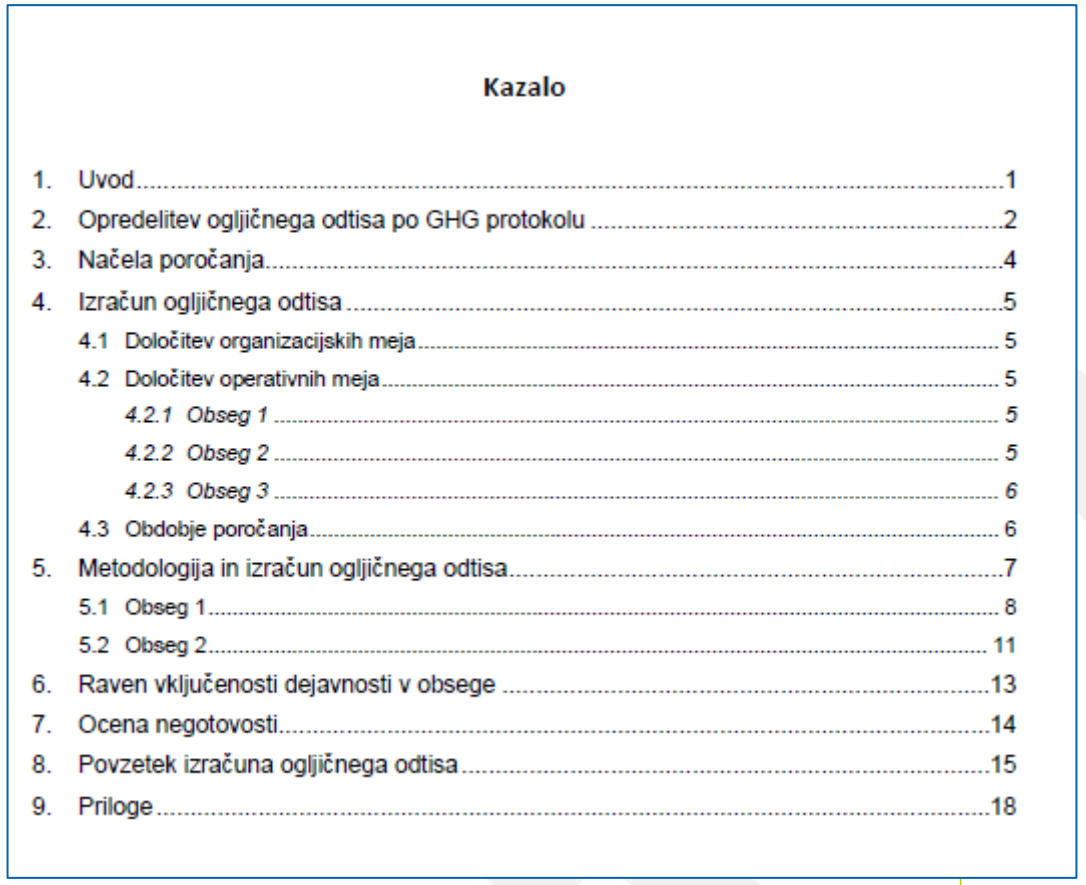
IZVAJALEC: INSTITUT »JOŽEF STEFAN« CENTER ZA ENERGETSKO UČINKOVITOST (IJS CEU)

KOORDINATOR NA STRANI IZVAJALCA: DR. BORIS SUČIĆ

AVTORJI: DR. BORIS SUČIĆ, MATJAŽ ČESEN

VERZIJA POROČILA: KONČNO POROČILO
KOPIJE POROČILA: NAROČNIK – V ELEKTRONSKI OBLIKI, ARHIV IJS CEU

Ob dokumentu izračuna ogljičnega odtisa je bila pripravljena tudi preglednica za izračun ogljičnega odtisa v MS Excel datoteki »Izračun ogljičnega odtisa Luka Koper 2005-2017-2021.xlsx«.



Kazalo

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

Activity 4 (Environmental studies)

Executive sumarry - Comprehensive Environmental study

Efficient energy management and continuous care for the environment are mandatory conditions for the sustainable development of each country and for each business entity. The transition to a climate-neutral society requires new and innovative approaches with high added value and aims to increase both technological and economic competitiveness. The short and long-term objectives of national energy policies are aimed at reducing carbon dioxide emissions, reducing energy use, material resources and reducing costs. In accordance with sustainability principles, all business entities should develop their own policies and establish an effective system for monitoring the state of the environment, energy and water use, including specific indicators (use of energy and water, other raw materials, etc.). Transport and logistics infrastructure has a huge impact on our way of living since the decisions on transport and logistics infrastructure that we are making today will have effects for at least the next decade. New challenges, such as the use of new technologies in transport, the use of renewable energy sources, the development of new transport and logistics management applications and the planning of new infrastructure and logistics projects, represent an important challenge for policy makers.

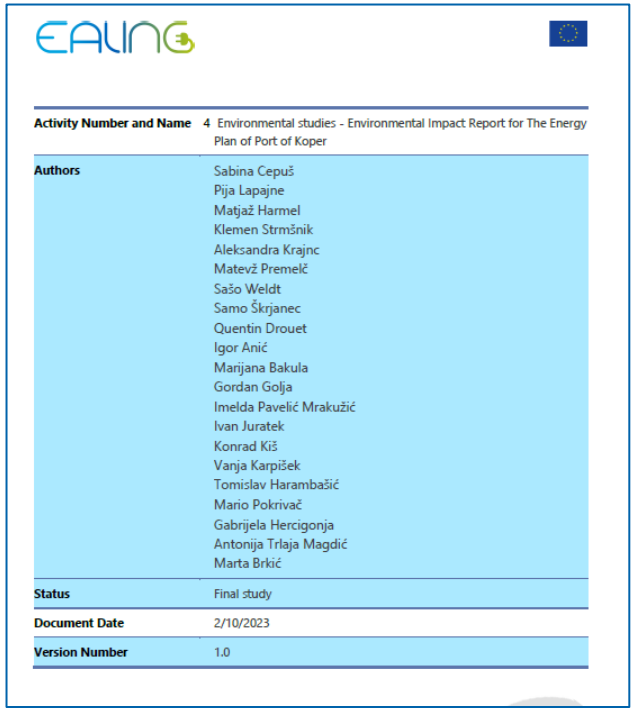
Status of the study: **completed**

Actual date of completion: **31/5/2023** (translated into English in **October 2023**)

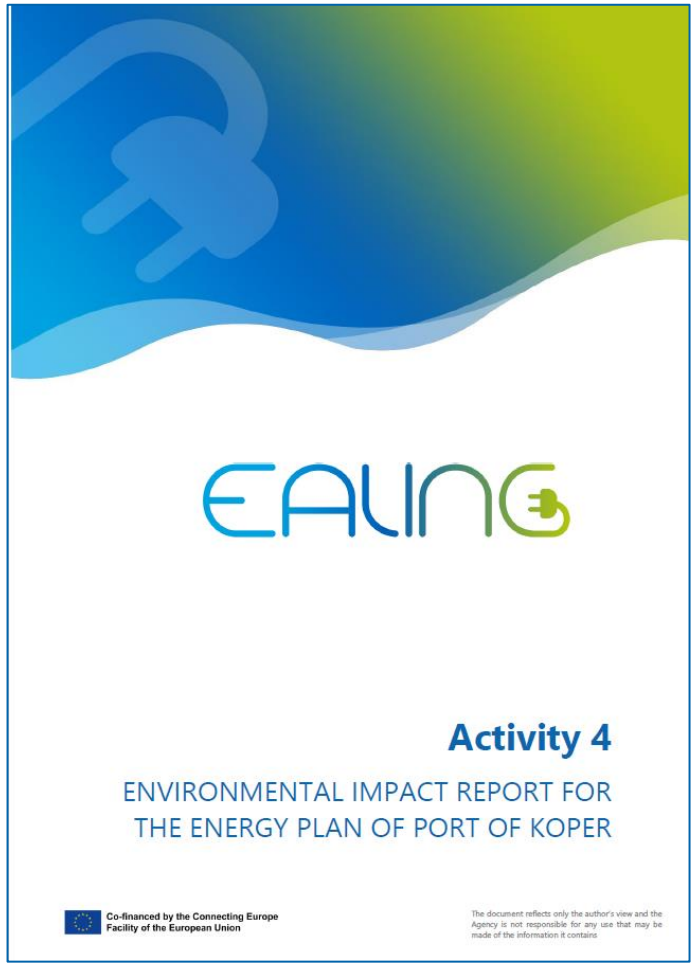
Co-financed by the Connecting Europe Facility of the European Union

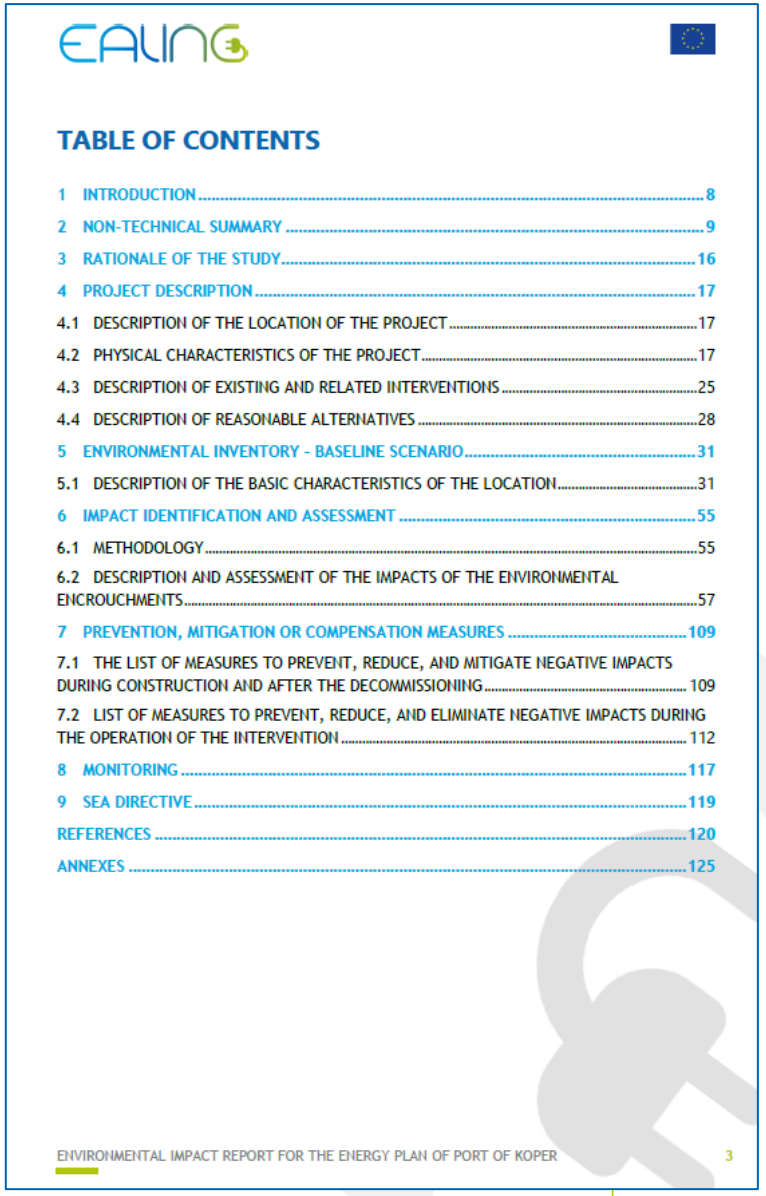
Activity 4 (Environmental studies)

Comprehensive Environmental study



Activity Number and Name	4 Environmental studies - Environmental Impact Report for The Energy Plan of Port of Koper
Authors	Sabina Cepuš Pija Lapajne Matjaž Harmel Klemen Strmšnik Aleksandra Krajnc Matevž Premelč Sašo Weldt Samo Škrjanec Quentin Drouet Igor Anić Marijana Bakula Gordan Golja Imelda Pavelić Mrakužić Ivan Juratek Konrad Kiš Vanja Karpišek Tomislav Harambašić Mario Pokrivač Gabrijela Hercigonja Antonija Trlaja Magdić Marta Brkić
Status	Final study
Document Date	2/10/2023
Version Number	1.0





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

Activity 5.1 (Clean Power Supply Plans)

Name of the study:
Izdelava okoljske študije in energetskega podnebnega načrta podjetja Luka Koper d.d. do leta 2030 s pogledom do leta 2050 (JN 145/2022)

Status of the study: **completed**

Actual date of completion: **2/10/2023**

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

Activity 5.1 (Clean Power Supply Plans)

Summary:

Based on the premise that reference energy models are used to assess various energy efficiency measures and RES integration on the national level and can provide much needed support to decision makers, the same methodology was adapted and transposed to the level of Port of Koper. To quantify the effects of the measures under consideration, it was necessary to develop a reference energy model that would allow an objective and consistent assessment of the planned development of the Port of Koper. During the preparatory works, technology and sector-oriented bottom up reference energy and environmental system model of the Port of Koper has been developed. The central tool, for calculating energy balances, emissions and costs of final energy consumption and energy supply, is a reference energy and emission model called REES-LUKA KOPER. The model was developed in the MESAP environment in a form of linear network model of processes and connections, enabling consistent modelling of energy use, based on energy service needs, emission calculations and other effects. Similar tools and models are used to evaluate the macroeconomic effects of different national GHG emission reduction scenarios in Slovenia. The resulting projections of energy consumption and emissions rely on the model assumptions and estimates set out in the new Integrated National Energy and Climate Plan (NECP), Slovenia's Long-Term Climate Strategy by 2050 and Long-term energy renovation strategy for buildings by 2050. The REES-LUKA KOPER model is calibrated on the available data for 2021. Three different scenarios have been analysed, namely: Business as Usual (BAU) Scenario, Scenario with additional measures to achieve a 80% reduction in GHG emissions compared to 2005 and Sustainable Excellence Scenario - Climate neutrality by 2050.

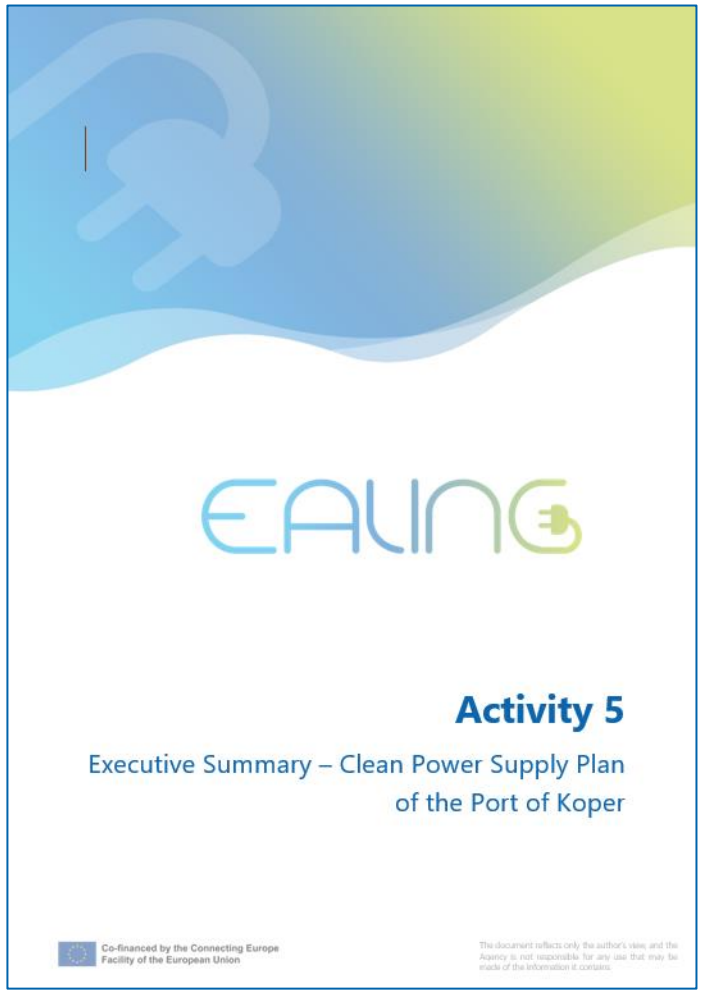
Co-financed by the Connecting Europe Facility of the European Union

Activity 5.1 (Clean Power Supply)

Activity Number and Name	5 Clean Power Supply Plans and tender documents
Authors	Boris Sučić Matevž Pušnik Edvard Košnjek Marko Kovač Matjaž Česen Gašper Stegnar Ana Marija Udovič Stane Merše
Dissemination Level	Internal
Status	Final
Document Date	02/10/2023
Version Number	1.0

Quality Control

	Name	Organisation	Date



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

Activity 5.2 (Tender documentation)

Number of tender dossiers: 1

Status of the preparation of the tender dossier: **completed**

Actual date of completion: **November 2023**

The tender documentation will be revised in 2024 and updated accordingly when WP3 is completed.

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

Activity 6 (Cost Benefit Analysis)

Name of the study:
Cost Benefit Analysis and Financial Blending Schemes

Status of the study: **completed**

Actual date of completion: **10/10/2023**

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

Activity 6 (Cost Benefit Analysis)

Summary:

Onshore Power Supply, also known by a variety of names such as Alternative Maritime Power (AMP) or Cold Ironing, enables ships at berth or in drydock to use shoreside electricity (SSE) to power onboard electrical systems, such as lighting, ventilation, communication, cargo pumps, and other critical equipment, while turning off their auxiliary engines during port calls. These ships can be connected to SSE facilities, so ship operations can proceed uninterrupted while eliminating fuel emissions resulting from auxiliary engines.

Although the technology for SSE facilities is available and fully mature, European ports currently face difficulties in implementing these facilities due to the lack of a harmonized framework concerning the respective regulations and standards both on ship and shore sides as well as the lack of the appropriate financial instruments and of the detailed financial and economic analysis for the investment of the required SSE infrastructure in EU ports. The graph below indicates the growth in the deployment of shore power technology in ports across Europe in past years. The dip in the year 2020 is due to COVID which has impacted all maritime sectors.

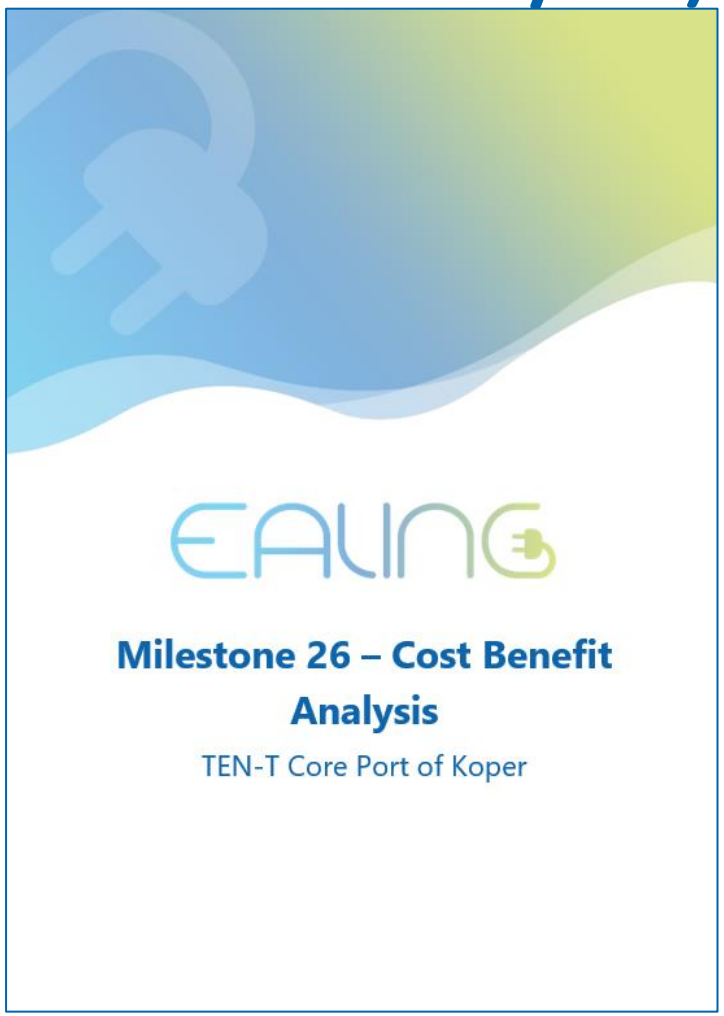
Co-financed by the Connecting Europe Facility of the European Union

Activity 6 (Cost Benefit Analysis)

Activity	6
Task	Activity 6 – Cost Benefit Analysis and Financial Blending Schemes
Milestone	26
Authors	Nikolaos Moutsios, Elpida-Eirini Chatira, Oktavianos Gkeorgke, John Gabrias, Michael Zacharioudakis, Jason Zacharioudakis, Panayotis Zacharioudakis, Reza Karimpour (Circle), Rocio Garcia & Jorge Lara (Fundacion Valenciaport)
Dissemination Level	Private
Status	Final Report
Document Date	10/10/2023
Version Number	1.0

Quality Control

	Name	Organisation	Date



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

Thank you for your attention

EALING

LUKA KOPER
Port of Koper

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www.zivetispristaniscem.si

jurij.mirnik@luka-kp.si

Področje strateškega razvoja | Strategic development department
Luka Koper, d.d. | Vojkovo nabrežje 38 | SI – 6501 Koper
Tel: +386 5 66 56 643

Rafina port

Presentation for General Assembly

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

Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the port of Rafina

Description:
The port of Rafina, makes the next steps towards the implementation of Shore Side Electricity (SSE) technology via the EALING project. In the framework of the EALING project, the port of Rafina has performed the Front – End Engineering Design Study (FEED) for four (4) berthing positions at the Passenger Terminal

SSE berthing position	Location	Power (MVA)	Voltage (kV)	Vessel Type
SSE 1	Rafina port	1.5	11	Ro-Pax
SSE 2	Rafina port	1.5	11	Ro-Pax
SSE 3	Rafina port	1.5	11	Ro-Pax
SSE 4	Rafina port	1.5	11	Ro-Pax

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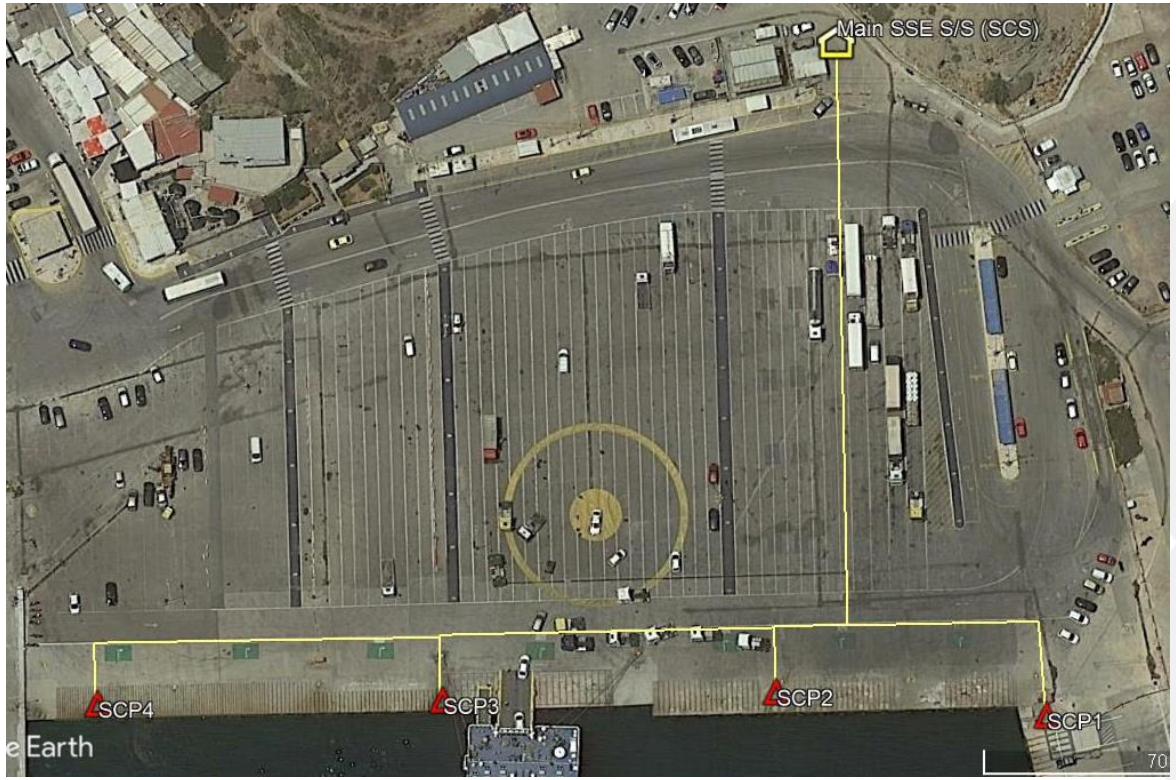
Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the port of Rafina



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Activity 3 (FEED and other technical studies)

Name of the study: FEED Studies for the port of Rafina

Status of the study: Completed

Actual date of completion (including the executive summaries in English):02/2023

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

Activity 4 (Environmental studies)

Name of the study: Environmental Studies for the port of Rafina

Description: With reference to the EALING Project and the relevant studies regarding the installation of SSE technologies at the port of Rafina, Rafina port has outsourced the execution of the Environmental studies where it was concluded that the inclusion of Shore Side Electricity service in the port of Rafina will have several positive effects on the local area and environment while the works will have negligible impact and Will be of short duration.

Status of the study: Completed

Actual date of completion (including the executive summary in English): 13/6/2023

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

Activity 5.1 (Clean Power Supply Plans)

Description:

The current situation in terms of energy demand for the passenger ships terminal is 0 kW while the as-is fishing boat terminal power demand do not exceed 300kW. Rafina port's other facilities demand around 250 kW. In total the electricity energy demand is 550kW. It has to be noted that for port's other facilities in certain distribution lines in an unlikely scenario the power demand can reach up to 40kW and result in other facilities load of 1MW.

Regarding future energy demand, the Car-Passenger Ships terminal is estimated to demand 10.44 MVA (8.350MW) including loads of ferries, lighting, fire pump station and fuel station. After the expansion of Rafina's port small boats and leisure boats sector the energy demand is calculated to be 2925MV (2340kW). The seaplane station that will be constructed according to the masterplan will demand 130kW. Finally, other facilities mean energy loads will remain at the level of 250 kW with the unlikely scenario of 1MW. The summary of these loads is 10920 kW.

The planned actions to cover Rafina's port energy needs is the supply of clean power via RES and the extensión of the Power supply from the National Grid.

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Activity 5.1 (Clean Power Supply Plans)

Description:

The supporting documents of the study are

1. *National Plan for Energy and Climate (NECP)*
2. *Rafina port Master Plan*
3. *Updated Statute of Rafina port*
4. *RAE document*
5. *NTUA report to Hellenic Electricity Distribution Netwrok Operator*

Status of the study: Completed

Actual date of completion (including the executive summary in English): 20/9/2023

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

Activity 5.2 (Tender documentation)

Number of tender dossiers: 4

Status of the preparation of the tender dossier/s: In progress

Actual date of completion (including the executive summary/ies): End of year

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Activity 6

Has the CBA been outsourced? No (It is prepared by OF)

Status of the CBA: In progress – Review phase

Actual date of completion (including the report in English): end of the year

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End of presentation

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Activity 3 (FEED and other technical studies)

Name of the study: ***Onshore Power Supply in Irish Ports***

The IMDO appointed RPS, a technical consultant, to undertake technical studies for a selected terminal in the Port of Cork in order to provide a case study to provide relevant information for key considerations in the provision of OPS at their terminals.

The Ringaskiddy East - Cork Container Terminal/ Ferry Terminal in Port of Cork was selected for this study.
The study advised on the current and future regulatory requirements; determined the existing electrical demands and requirements for ships that will berth at the terminal; Determined the electrical & civil works required for the connection of OPS to ships; Provided budget costs for various options for providing OPS at the terminal.

Status of the study: The study was completed at the end of October 2023

Next steps: The results of the study are being used to assess OPS requirements in other Irish Ports and a study on this is expected to be completed before the end of 2023.

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Activity 4 (Environmental studies)

Name of the study: ***Onshore Power Supply in Irish Ports***

Description: The study undertaken by RPS for the Ringaskiddy East - Cork Container Terminal/ Ferry Terminal in Port of Cork included an assessment of the current and future regulatory requirements. (Irish, EU & International Maritime Regulations).

Status of the study: The study is completed

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

Activity 6

Has the CBA been outsourced? No - the CBA will be prepared by the Port of Cork and assisted by the IMDO

Status of the CBA: The work on the CBA is ongoing and will be completed in December 2023.

Actual date of completion (including the report in English): Due to be completed in December 2023.

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Activity 3 (FEED and other technical studies)

Name of the study

- Front-end engineering design (FEED) study for the Onshore Power Supply installation on the Roll-on/Roll-off Terminal of the Port of Leixões

Description

- The Roadmap for Energy Transition towards Carbon Neutrality in the Port of Leixões established an Action Plan with 7 measures, including the installation of OPS (Onshore Power Supply).
- The objective is to allow ships operating in the port to connect to the power grid while operating, thus avoiding the need to keep generators active (powered by fossil fuels), with the consequent emissions of polluting gases. This measure is expected to allow the annual elimination of 38,000 tons per year of GHG.

The FEED Studies must gather the necessary elements to subsequently be able to proceed with the OPS installation procedure, namely:

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Activity 3 (FEED and other technical studies)

Description

- OPS technical requirements and related connections
- Connections' location
- Tracing of the network to the OPS connections
- Type of connection system
- Available powers and network requirements
- Map of Quantities and respective Budget Estimate

Status of the study

- The study was awarded in August of 2023
- The technical study is ongoing

Actual date of completion (including the executive summaries in English)

- November 30th, 2023

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Activity 4 (Environmental studies)

Name of the study

- Minimalist Environmental Impact Assessment report related to the installation of OPS in Port of Leixões

Description

- Minimalist Environmental Impact Assessment related to the installation of OPS in Port of Leixões, using the information and the outputs obtained in APDL's "Roadmap for Energy Transition towards Carbon Neutrality in the Port of Leixões
- Includes: the description of the Project; the reasonable alternatives including a comparison of the environmental effects; and the measures to prevent or mitigate the adverse effects on the environment of the Project

Status of the study

- The Environmental report is in final revision

Actual date of completion

- 17th November, 2023

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Activity 5.1 (Clean Power Supply Plans)

Description

- APDL's "Roadmap for Energy Transition towards Carbon Neutrality in the Port of Leixões" will be included as the Clean Power Supply Plan
- A short document with some updates on clean power supply in relation to the Roadmap will be concluded

Clean Power Supply Plans summary:

1) Current situation in terms of energy consumption

- The energy consumed at the Port of Leixões in 2019 was **106,867.59 MWh/year**, of which 86.5% of the total was generated from fuel, while the remaining 15.6% corresponded to electricity consumption

Table 1. Total Consumption in the Port of Leixões. Source: APDL's Roadmap

TOTAL CONSUMPTION (2019)			
CONSUMER	FUEL (MWh)	ELECTRICITY (MWh)	TOTAL ENERGY (MWh)
APDL	6,086	4,970	11,056
Concessionaires	17,679	9,439	27,117
Maritime traffic	53,604	0	53,604
Road traffic	14,912	0	14,912
Rail traffic	178	0	178
TOTAL	92,459	14,409	106,868

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Activity 5.1 (Clean Power Supply Plans)

2) Future energy demand

- With the implementation of the Clean Power Supply solutions, **there is no estimated impact on energy consumption**
- An annual increase of 0.05% has been considered in the concepts of energy demand

3) Planned actions to cover the energy needs

ACTION PLAN	MAIN OBJECTIVE
ONSHORE POWER SUPPLY (OPS)	Decarbonisation of maritime traffic during its stay at the Port of Leixões.
ONSHORE POWER SUPPLY (OPS)	Use the resources of the port to produce clean energy and become a self-sufficient port.
ALTERNATIVE FUELS	Support the energy transition of the Port of Leixões through the implementation of new digital technologies.
ELECTRIFICATION OF PORT ACTIVITIES	Decarbonisation of port activity and land traffic.
DIGITALISATION	Support the energy transition of the Port of Leixões through the implementation of new digital technologies.
AIR QUALITY	Monitoring of the real impact of the implemented measures on the improvement of air quality.
ELECTRICAL GRID	Availability of an electrical network with sufficient capacity to supply the new demands foreseen for the port.

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Activity 5.1 (Clean Power Supply Plans)

Status of the study

- The report is in final revision

Actual date of completion (including the executive summary in English)

- Date of completion of the study: November 30th, 2023
- Date of Completion of the executive summary: December 2023

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

Activity 5.2 (Tender documentation)

Number of tender dossiers

- 1 for all the installations

Status of the preparation of the tender dossier/s

- In progress

Actual date of completion (including the executive summary/ies)

- December 2023

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

Activity 6

Has the CBA been outsourced?

- It is being prepared by Ocean Finance

Status of the CBA

- The first version of the CBA was received on October 31st, 2023
- APDL has to provide some inputs that depend on the FEED studies, which will be concluded in November

Actual date of completion

- December 2023

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

Activity 3 (FEED and other technical studies)

Name of the study: TECHNICAL STUDY FOR IMPLEMENTATION OF SHORE CONNECTION

PRESTAÇÃO DE SERVIÇOS DE ESTUDO DE VIABILIDADE TÉCNICA PARA A IMPLEMENTAÇÃO DE UMA SOLUÇÃO DE FORNECIMENTO DE ENERGIA ELÉCTRICA A NAVIOS NOS PORTOS DE PONTA DELGADA, PRAIA DA VITÓRIA E HORTA

Description: The study aims to propose a technical solution for implementing an Onshore Power Supply (OPS)system at three ports, including shore stations and supply pits, to accommodate simultaneous connection of two vessels to shore (excluding Horta). Type of traffic address is mainly containers vessels. The planned solution involves three land connections in Ponta Delgada, two in Praia da Vitória and one in Horta.. The aerial images will be shown in the following three slides, as well as the estimated costs associated with it, to each port.

Status of the study: The study has already been delievered and presented on 27/11/2023 at public sesión, created for this porpose. The study was coondducted by Wärtsillä and SEGMA, with site visits. The tudy, besides the start point, presents an overview of the terminals, the port needs, technical solution, LVSC cable managment quest of viability sent to energy provider (EDA). Civil construction works costs calculated.

Actual date of completion (including the executive summaries in English): Delivered

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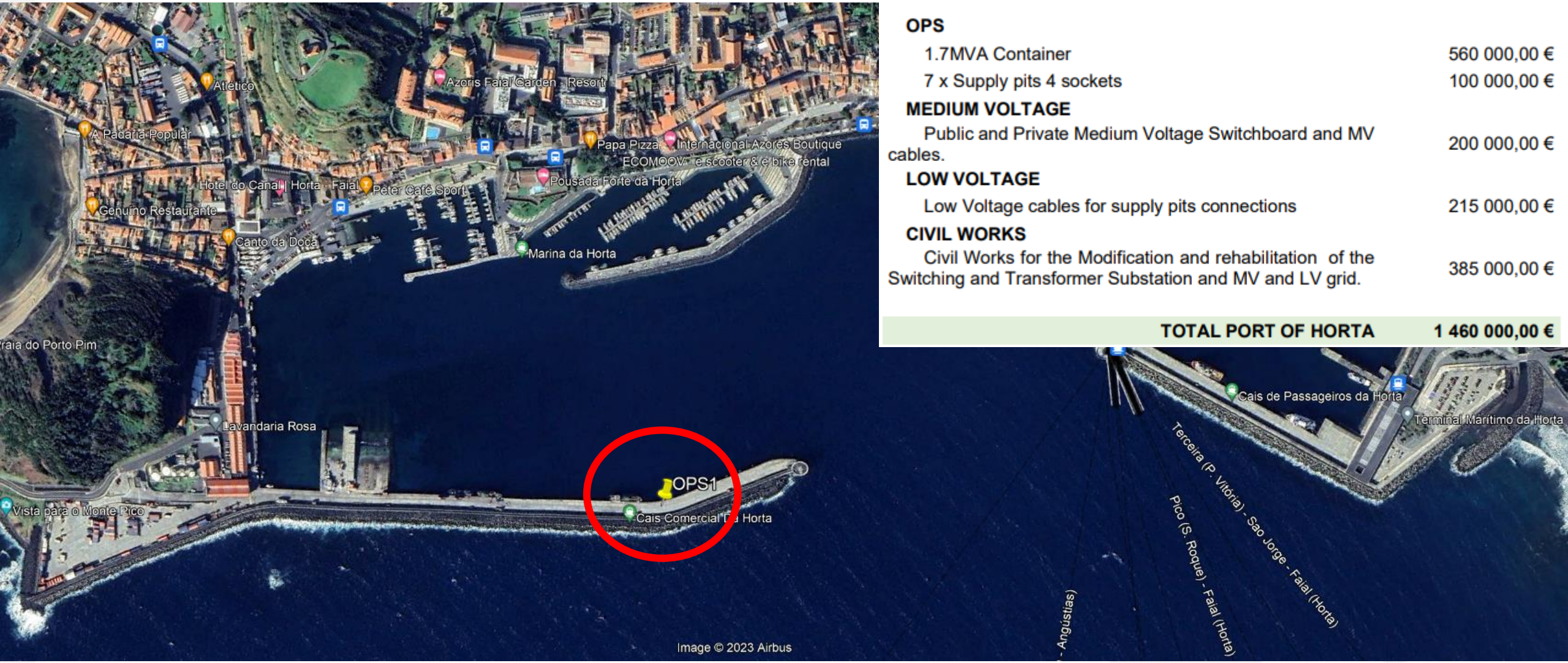
PORTS OF AZORES – PONTA DELGADA PORT

OPS	
1.2MVA Container	420 000,00 €
1.7MVA Container	560 000,00 €
7 x Supply pits 4 sockets	350 000,00 €
MEDIUM VOLTAGE	
Public and Private Medium Voltage Switchboard and MV cables.	370 000,00 €
LOW VOLTAGE	
Low Voltage cables for supply pits connections	820 000,00 €
CIVIL WORKS	
Civil Works for the Modification and rehabilitation of the Switching and Transformer Substation and MV and LV grid.	175 000,00 €
TOTAL PORT OF PONTA DELGADA	**2 695 000,00 €**

PORTS OF AZORES – PRAIA DA VITÓRIA PORT

OPS	
1.2MVA Container	420 000,00 €
1.7MVA Container	560 000,00 €
7 x Supply pits 4 sockets	250 000,00 €
MEDIUM VOLTAGE	
Public and Private Medium Voltage Switchboard and MV cables.	285 000,00 €
LOW VOLTAGE	
Low Voltage cables for supply pits connections	950 000,00 €
CIVIL WORKS	
Civil Works for the Modification and rehabilitation of the Switching and Transformer Substation and MV and LV grid.	175 000,00 €
TOTAL PORT OF PRAIA DA VITÓRIA	**2 640 000,00 €**



OPS	
1.7MVA Container	560 000,00 €
7 x Supply pits 4 sockets	100 000,00 €
MEDIUM VOLTAGE	
Public and Private Medium Voltage Switchboard and MV cables.	200 000,00 €
LOW VOLTAGE	
Low Voltage cables for supply pits connections	215 000,00 €
CIVIL WORKS	
Civil Works for the Modification and rehabilitation of the Switching and Transformer Substation and MV and LV grid.	385 000,00 €
TOTAL PORT OF HORTA	**1 460 000,00 €**

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Activity 4 (Environmental studies)

Name of the study: Environmental impact study.

Description: Study about how civil construction works needs to implement OPS will impact the environment.

Status of the study: Provider selected (VCF). Has already started (been waiting for activity 3 study.)

Actual date of completion (including the executive summary in English): 31-12-2023.

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Activity 5.1 (Clean Power Supply Plans)

Description: Final stage.

Status of the study: Provider selected (MARLO). Already delivered the DRAFT and is in the final stage of completion.

Actual date of completion (including the executive summary in English): 04-12-2023.

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

Activity 5.2 (Tender documentation)

Number of tender dossiers: 3.

Status of the preparation of the tender dossier/s: Not started. Internal.

Actual date of completion (including the executive summary/ies): 15-12-2023.

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

Activity 6

Has the CBA been outsourced? No (the CBA is being prepared by OF)

Status of the CBA: Information sent.

Actual date of completion (including the report in English): 15-12-2023.

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

Activity 3 (FEED and other technical studies)

Name of the study: PRELIMINARY PROJECT FOR THE SUPPLY OF ELECTRICAL ENERGY TO SHIPS (OPS) IN THE QUAYS “TRANSVERSAL DE PONIENTE” AND “PERFECTO PALACIO” OF THE PORT OF VALENCIA

Description: Front-end engineering design study for the installation of OPS in the passenger terminals of the Port of Valencia.

- Muelle Transversal de Poniente: It will be possible to connect either a cruise ship of up to 16 MVA or a ferry of 4 MVA, without simultaneity between the two.

- Muelle Perfecto Palacio: Either a cruise ship of up to 20 MVA or a ferry of 4 MVA may be connected, without simultaneity between the two. simultaneity between the two.

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Activity 3 (FEED and other technical studies)

Status of the study: completed

Actual date of completion: November 2023 (studies + executive summary in English)

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

Activity 3 (FEED and other technical studies)

Name of the study: PRELIMINARY PROJECT FOR THE SUPPLY OF ELECTRICAL ENERGY TO SHIPS (OPS) IN THE QUAY "TRANSVERSAL DE COSTA" OF THE PORT OF VALENCIA

Description: Front-end engineering design study for the installation of OPS in the MSC container terminal of the port of Valencia.

The requirements to be met are to provide the terminal with two supply points each with its own cable management system.

Each supply or connection point will be capable of supplying electricity to a vessel of up to 7.5MVA, however, if two vessels were simultaneously berthed and demanding electricity, up to 5MVA could be supplied to each of them simultaneously.

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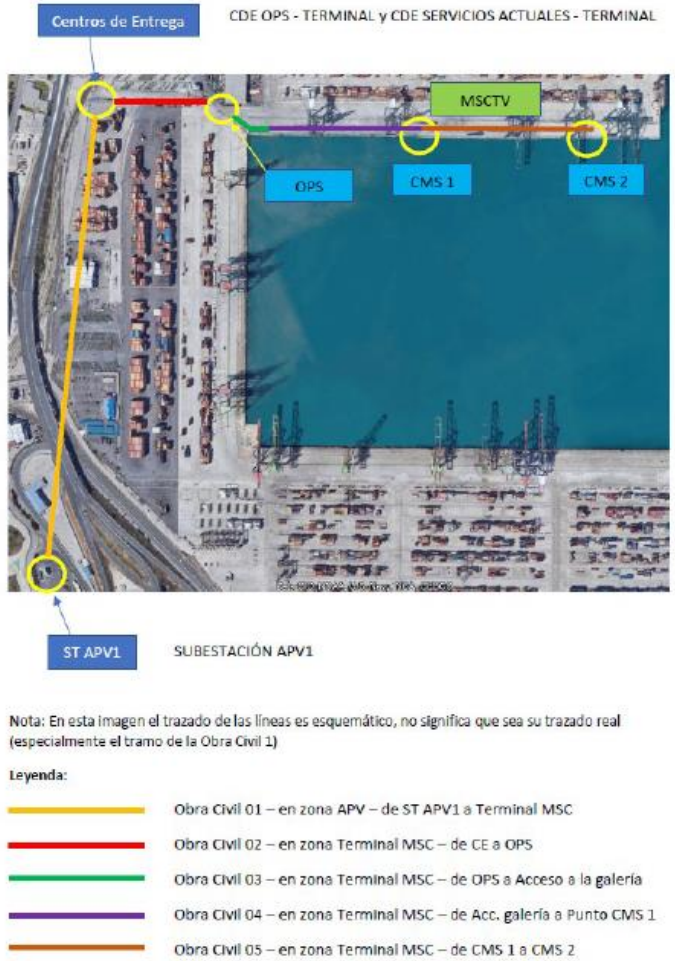
Activity 3 (FEED and other technical studies)

Status of the study: completed

Actual date of completion: November 2023 (study + executive summary in English)



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

Activity 3 (FEED and other technical studies)

Name of the study: DEFINITION OF VALENCIAPORT OPS REQUIREMENTS

Description: Definition of port system requirements (elaborated by Fundación Valenciaport).
1. Assessment of the current port situation
2. Description of future scenarios including OPS (short and medium term), taking into account the expected evolution of port calls and the reorganisation of terminals in the Port of Valencia, with the projection of new passenger and container terminals.

Status of the study: completed

Actual date of completion: November 2023 (study + executive summary in English)

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Activity 4 (Environmental studies)

Name of the studies:

1) ENVIRONMENTAL, CLIMATE AND SOCIAL CHECK REPORT (Project to supply electricity to ships in the Quay "Transversal de Costa" of the Port of Valencia → passenger terminals Baleària and Trasmed
2) ENVIRONMENTAL, CLIMATE AND SOCIAL CHECK REPORT (Project to supply electricity to ships in the Quay "Transversal de Poniente" and "Perfecto Palacio" of the Port of Valencia → MSC container terminal

Description: The aim of these reports is to assess the environmental, climate and social impact of the Investments planned (compliance with InvestEU for projects over EUR 10 million)

Status of the study: completed

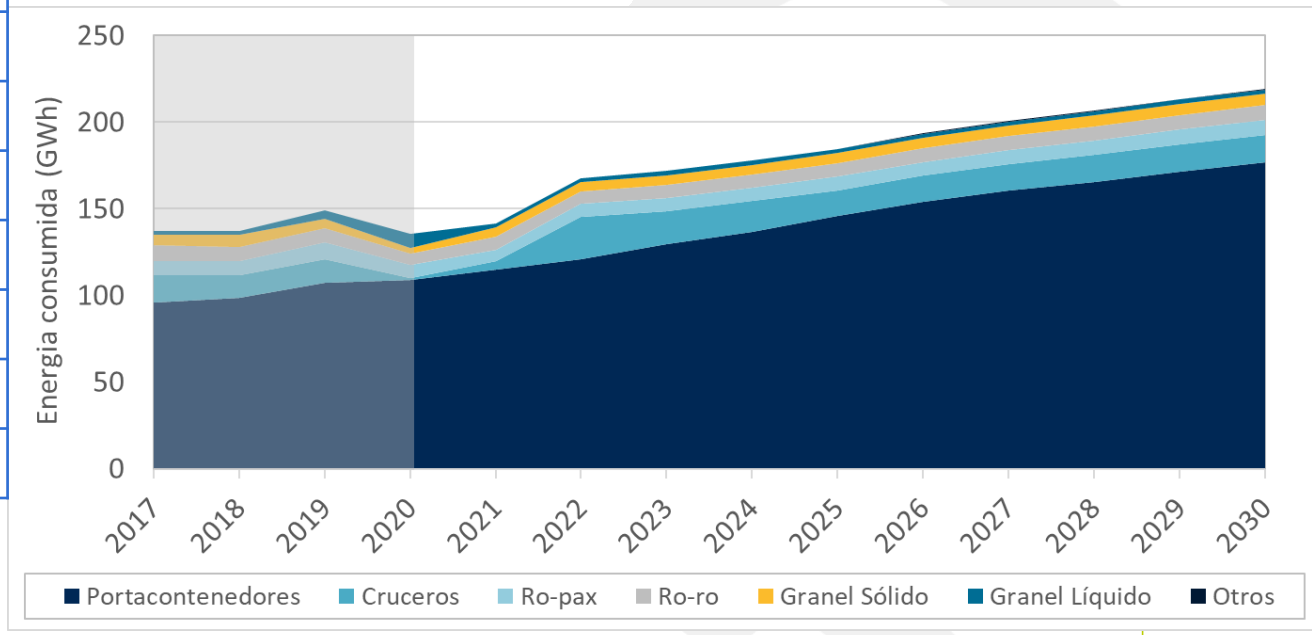
Actual date of completion: November 2023 (studies + executive summaries in English)

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

Activity 5.1 (Clean Power Supply Plans)

Description: Net-Zero Emissions Plan 2030.
Energy Demand:

Type of vessel	Energy required (GWh)					
	2017	2018	2019	2020	2021	2022
Container	96.2	98.6	107.4	108.8	111.6	114.2
Cruise	15.4	13.2	13.8	1.1	5.5	22.2
Ro-Pax	8.3	8.2	9.4	7.8	11	12.2
Ro-Ro	9.1	8.1	8.2	6.4	6	5.8
Solid bulk	6.0	6.9	5.4	3.3	4.3	5.3
Liquid bulk	2.0	2.2	5.0	8.2	8.5	6.6
Other	0.2	0.1	0.1	0.2	0.2	0.2
Total	**137.2**	**137.3**	**149.3**	**135.7**	**147.1**	**166.6**



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Activity 5.1 (Clean Power Supply Plans)

Renewable energy sources capacity at the port area:

Technology	Capacity (MW)	Annual generation (GWh)
Photovoltaic	50,8	76,67
Wind	60,0	104,42
Waves	3,0	6,06
TOTAL	**113,82**	**187,15**

Status of the study: completed
Actual date of completion: executive summary to be drafted in December 2023

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

Activity 5.1 (Clean Power Supply Plans)

Type	Name	2023	2024	2025	2026	2027	2028	2029	2030
Container terminals	Current MSC Valencia Terminal								
	CSP								
	APMT								
	Future North container terminal								
Passenger terminals	Future Passenger terminal - Perfecto Palacio quay - ferry and cruise								
	Future Passenger terminal - rest of quays - ferry and cruise								
	Trasmed terminal - Poniente quay - ferry and cruise								
	Trasmed terminal - rest of quays - ferry and cruise								
	Espigón Turia Sur quay - ferry and cruise								
Ro/ro and car carrier	Valencia Terminal Europa								
Power distribution grid									

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Activity 5.2 (Tender documentation)

Number of tender dossiers: 3 (one per terminal)

Status of the preparation of the tender dossier/s: 1 finalised, 2 ongoing

Actual date of completion (including the executive summary/ies): December 2023

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

Activity 6

Have the CBAs been outsourced? No, they have been carried by Fundación Valenciaport

Status of the CBA: Finalised

Actual date of completion: September 2023 (minor updates in November 2023)

Main results	Transversal de Costa Quay	Poniente Quay	Perfecto Palacio Quay
Total Investments (€)	10,164,650	12,318,187	12,528,034
Timeline (years)	2023-2047	2023-2047	2023-2047
Nº of calls requesting SSE for the full period studied	12,233	13,084	16,741
Financial Net Present Value (FNPV) (€)	(- 20,559,551)	(- 13,272,780)	(- 13,455,292)
Payback	---	---	---
Total CO_2eq emissions saved (tonnes)	662,349	75,918	156,113
Total NOx emissions saved (tonnes)	10,635	1,266	2,536
Total SOx emissions saved (tonnes)	294	40	73
Total PMx emissions saved (tonnes)	666	52	141
Total noise emissions saved (€)	84,642	308,719	460,858

Infrastructures to be funded by:

- Next Generation EU
- CEF programme
- Own resources

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