

Projects on Shore-Side Electricity – challenges and lessons learnt

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01. INTRODUCTION



Our goal is to reduce GHG emissions in the Port of Barcelona up to 50% by 2030.

Becoming a climate-neutral port by 2050.



Energy transition plan



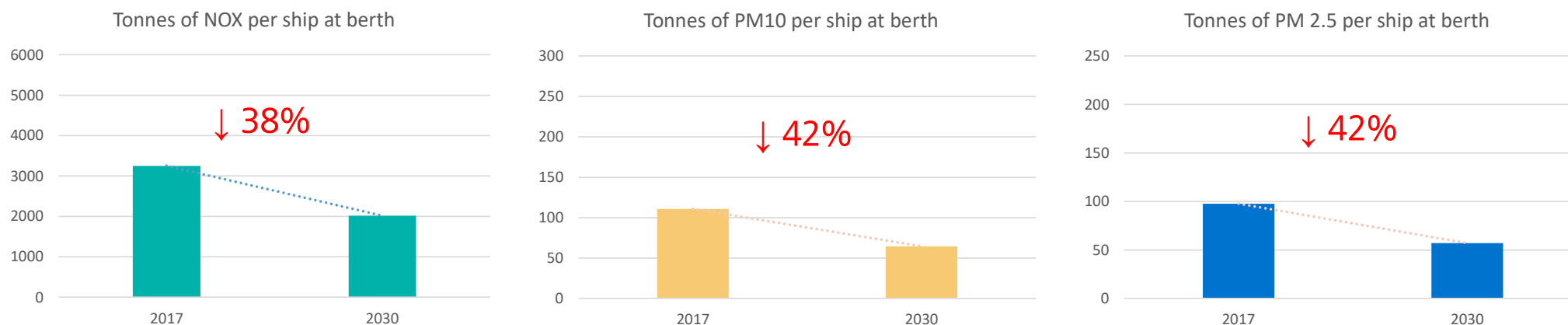
Map of emissions generated by vessels at berth

72% of total NOX emissions occurring when vessels are at berth, mainly container ships, ferries and cruise ships.



Source: Emissions model for the Port of Barcelona in 2017 and future scenarios for 2025 and 2030. Reginal Barcelona study.

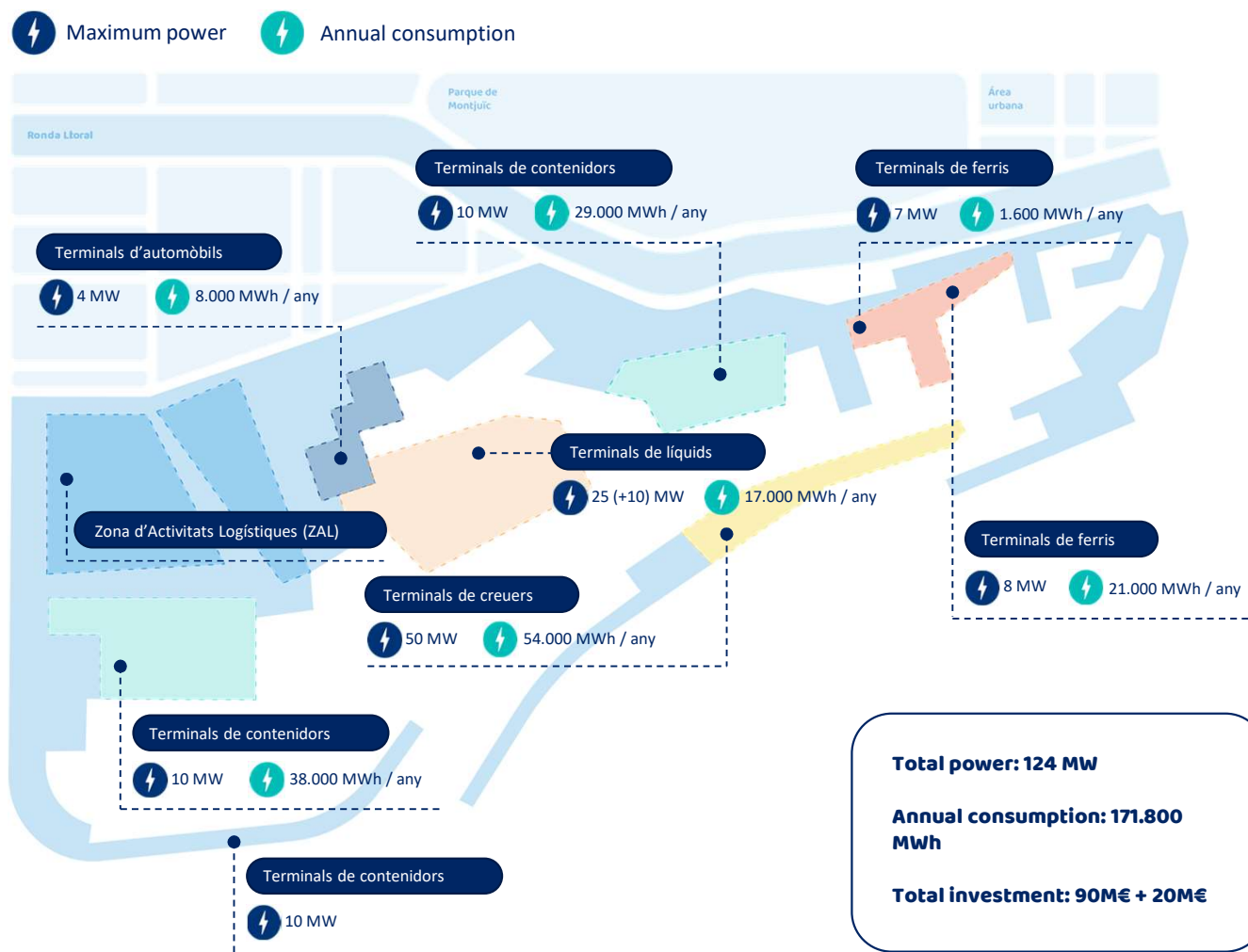
Expected emissions reduction with OPS implementation



Source: Barcelona Regional. Emissions and immissions model of the Port of Barcelona reference year 2017 and future scenarios 2025/2030.

02. About the electrification project

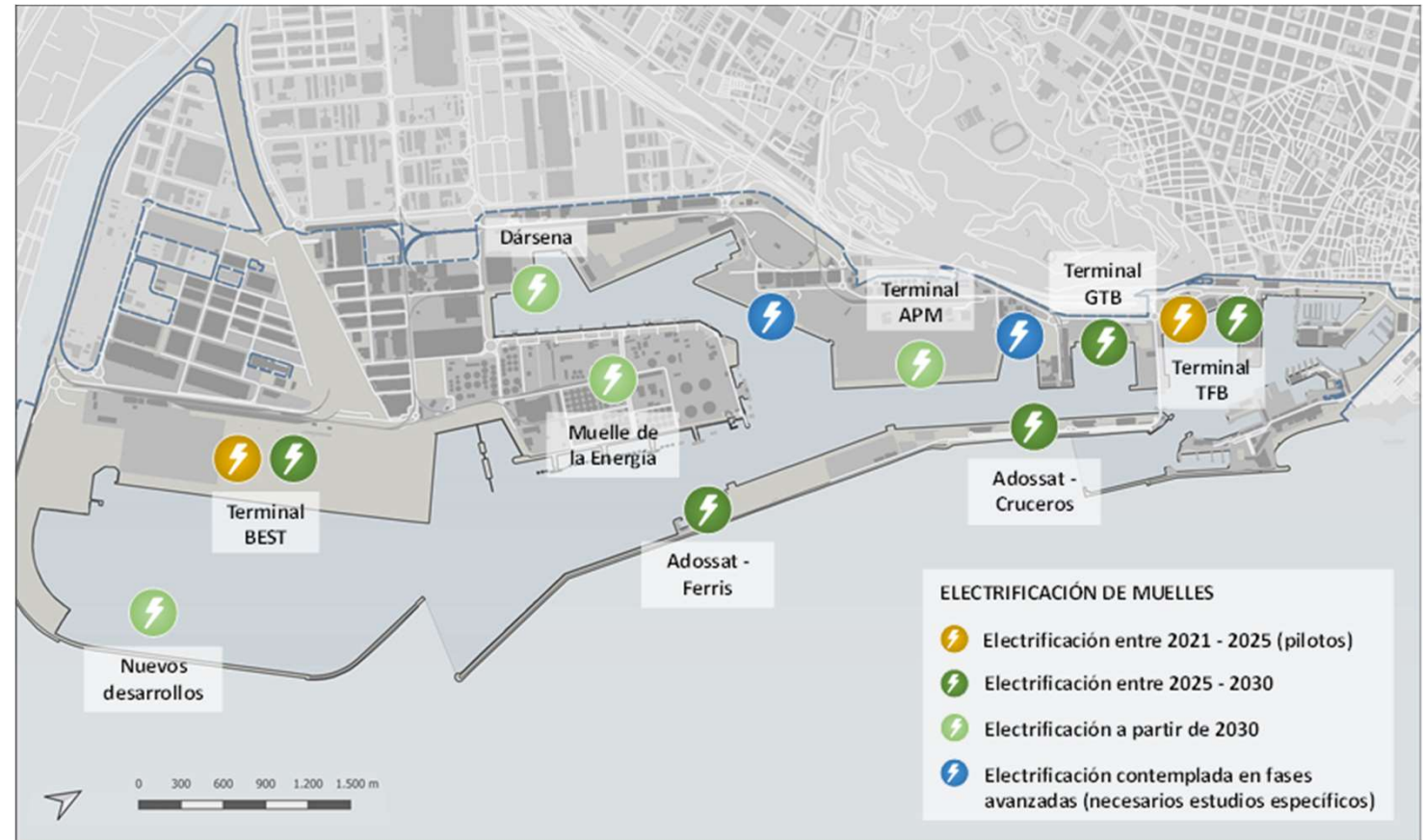
Demand forecast



02. About the electrification project

Progressive implementation of the different OPS systems, prioritizing:

- A. Vessels generating the highest emissions at berth.
- A. Berths closest to the city



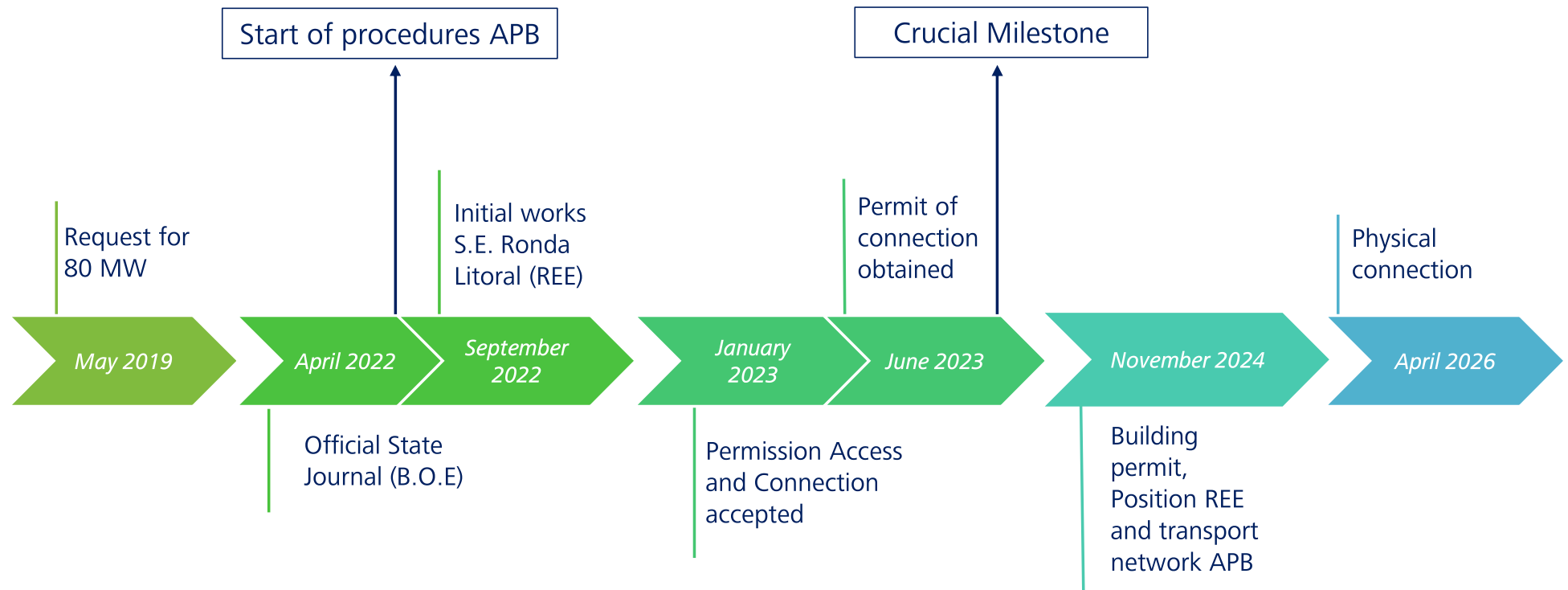
Deployment of the SMART grid



02. About the electrification project

Development of the electrification project: Energy acquisition

Timeline



Phase 0: Development of pilot projects

Two pilot projects:

A.

Pilot project at the BEST
container terminal

B.

Pilot Project at Terminal
Ferry de Barcelona

Complete solutions, scalable for the future.

Phase 0 : Pilot in BEST

Status: contract awarded

Charging:
25 kV from supplier

Flexibility:
2 small vessels or 1 ship

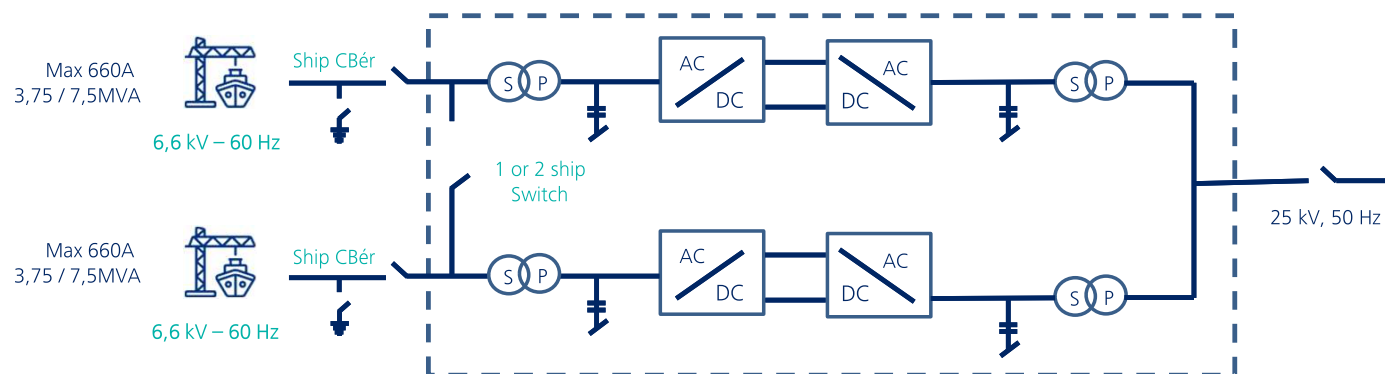
Power:
9 MW from UFD (utility)

OPS supply vessel:
6,6 kV and 50-60 Hz

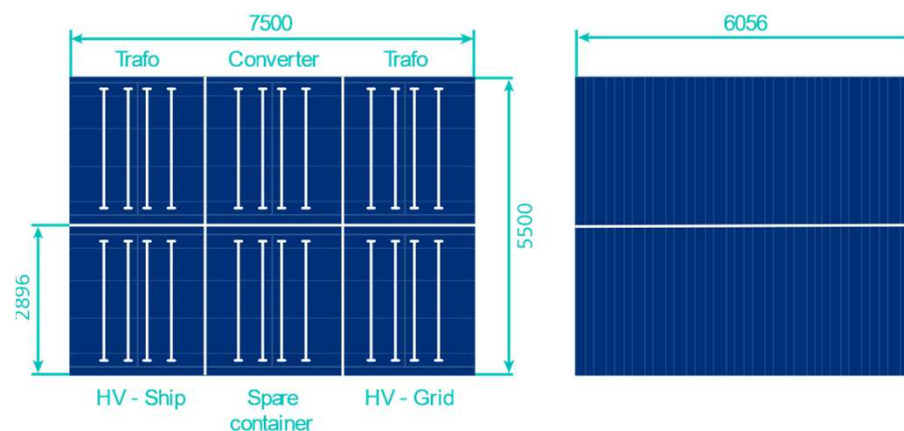
There are vessels OPS ready.



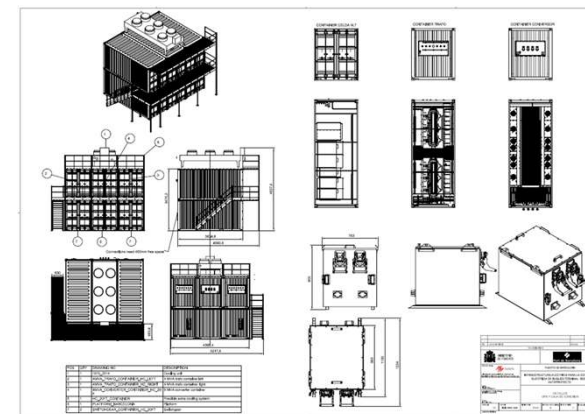
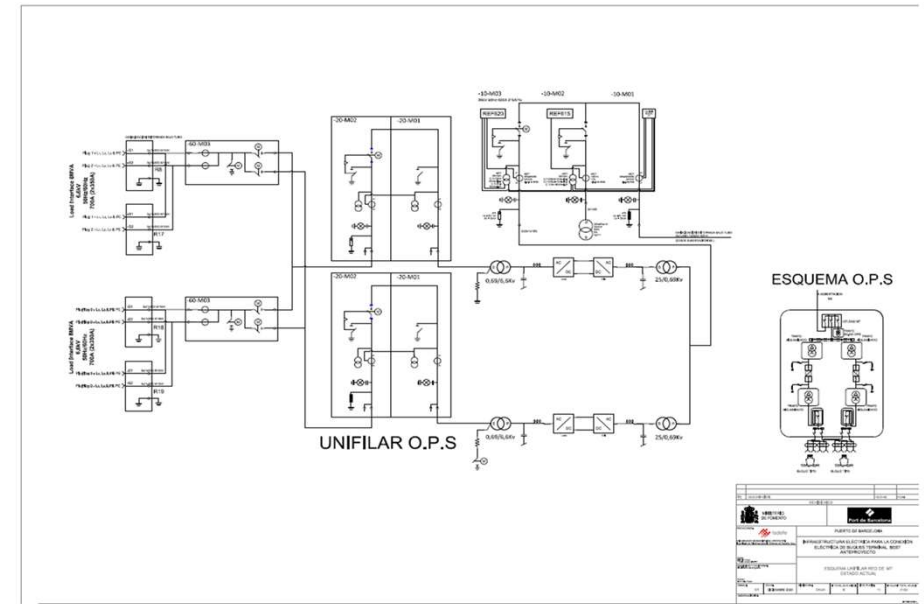
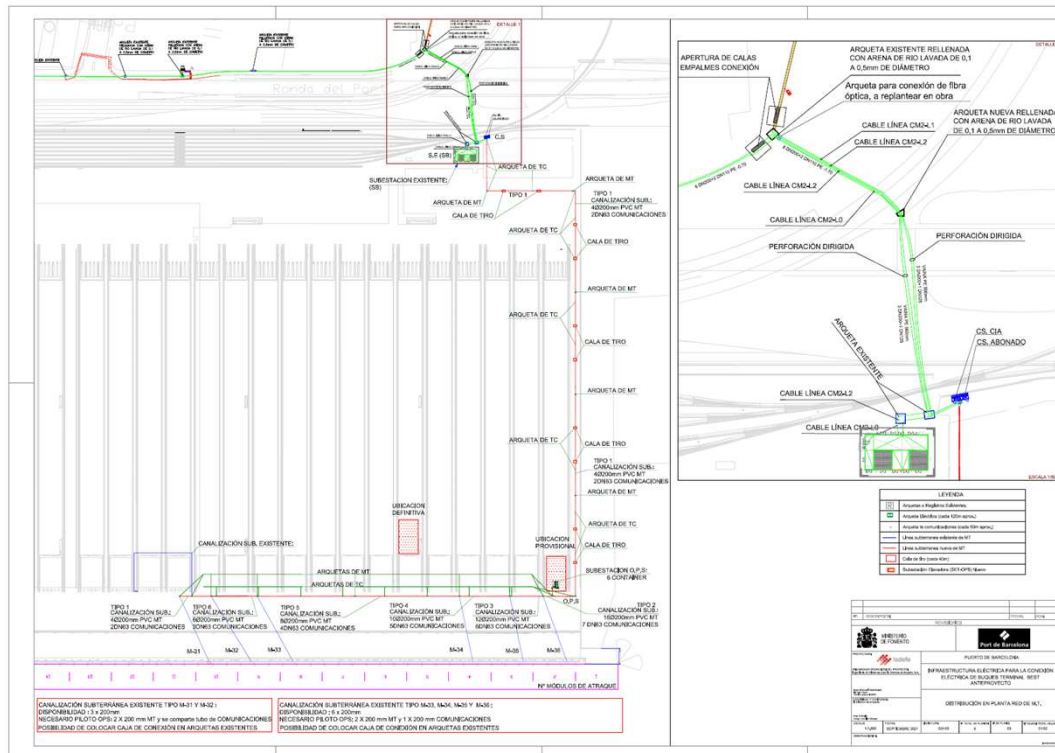
Phase 0 : Pilot in BEST



Example of a **container solution** to host the necessary electrical components of the OPS system for the simultaneous operation of 2 container ships:



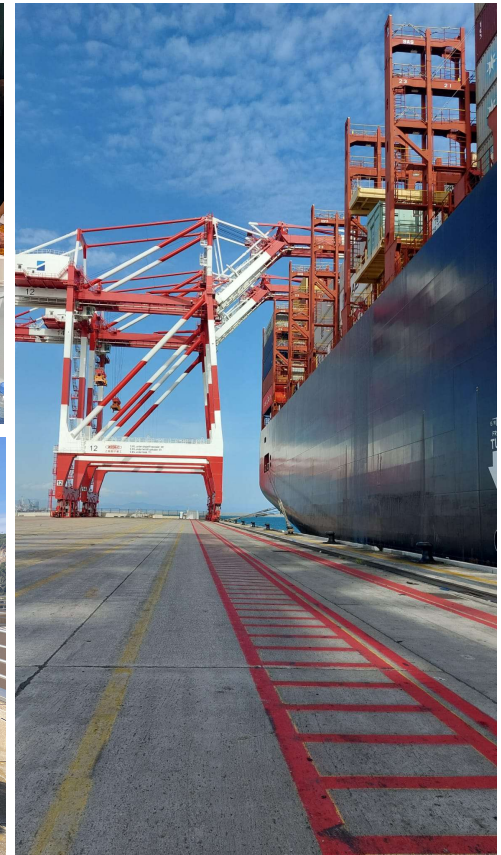
Several **technical challenges** to solve during the tender process and the project.



Phase 0 : Pilot in BEST



Source: Fotos APB



Phase 0: Pilot FERRY

Status: in tendering process.

Charging:
25 kV from supplier

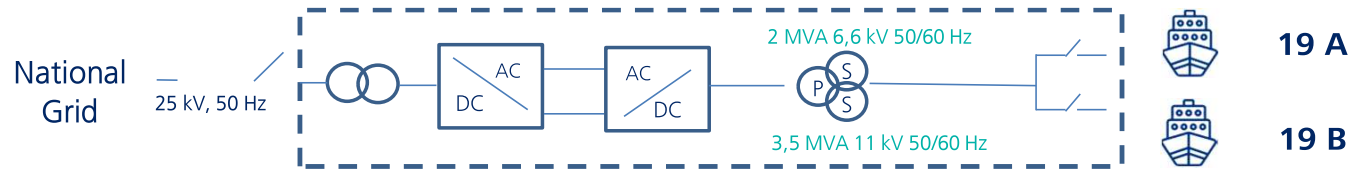
Simultaneity:
1 single vessel

Power:
2,5 MW from ENDESA (utility)

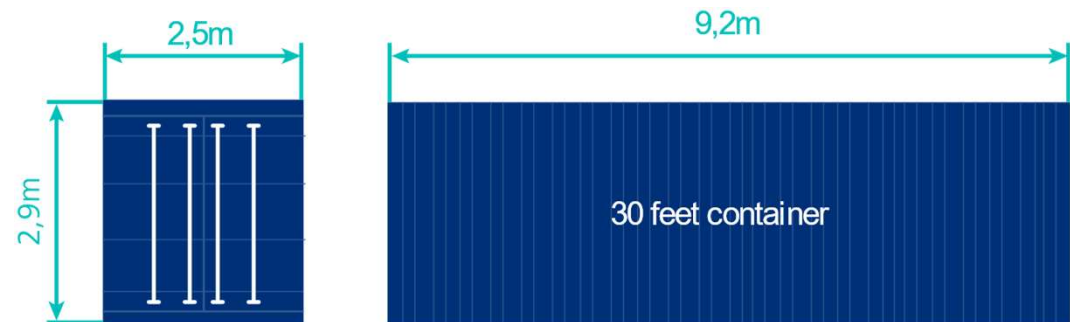
OPS supply vessel:
11 kV (50 and 60 Hz)

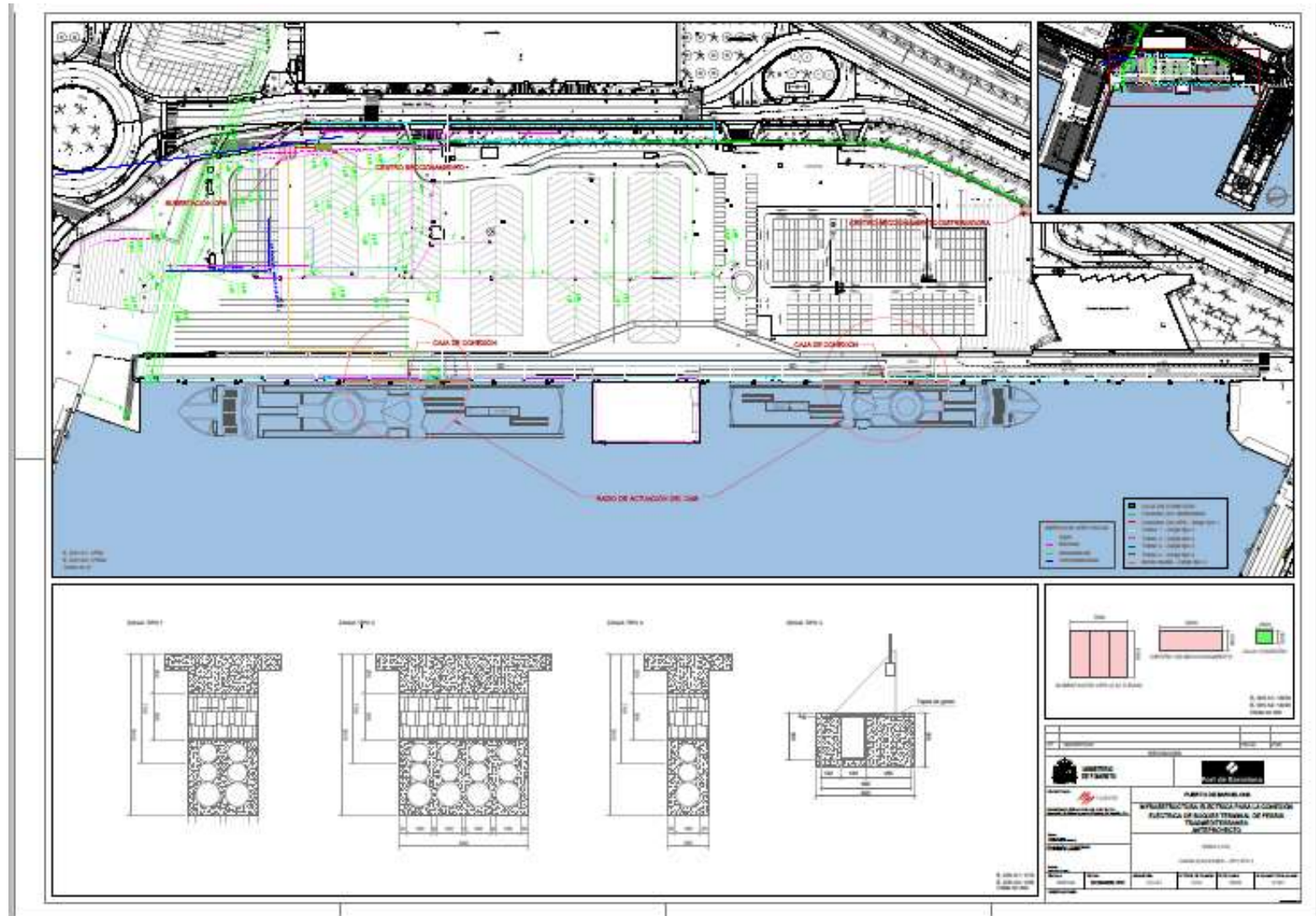


Phase 0: Pilot FERRY



Example of a **container solution** to host the necessary electrical components of the OPS system for one ferry vessel:





02. About the electrification project

Phase 0: Pilot FERRY



Source: [APB](#)

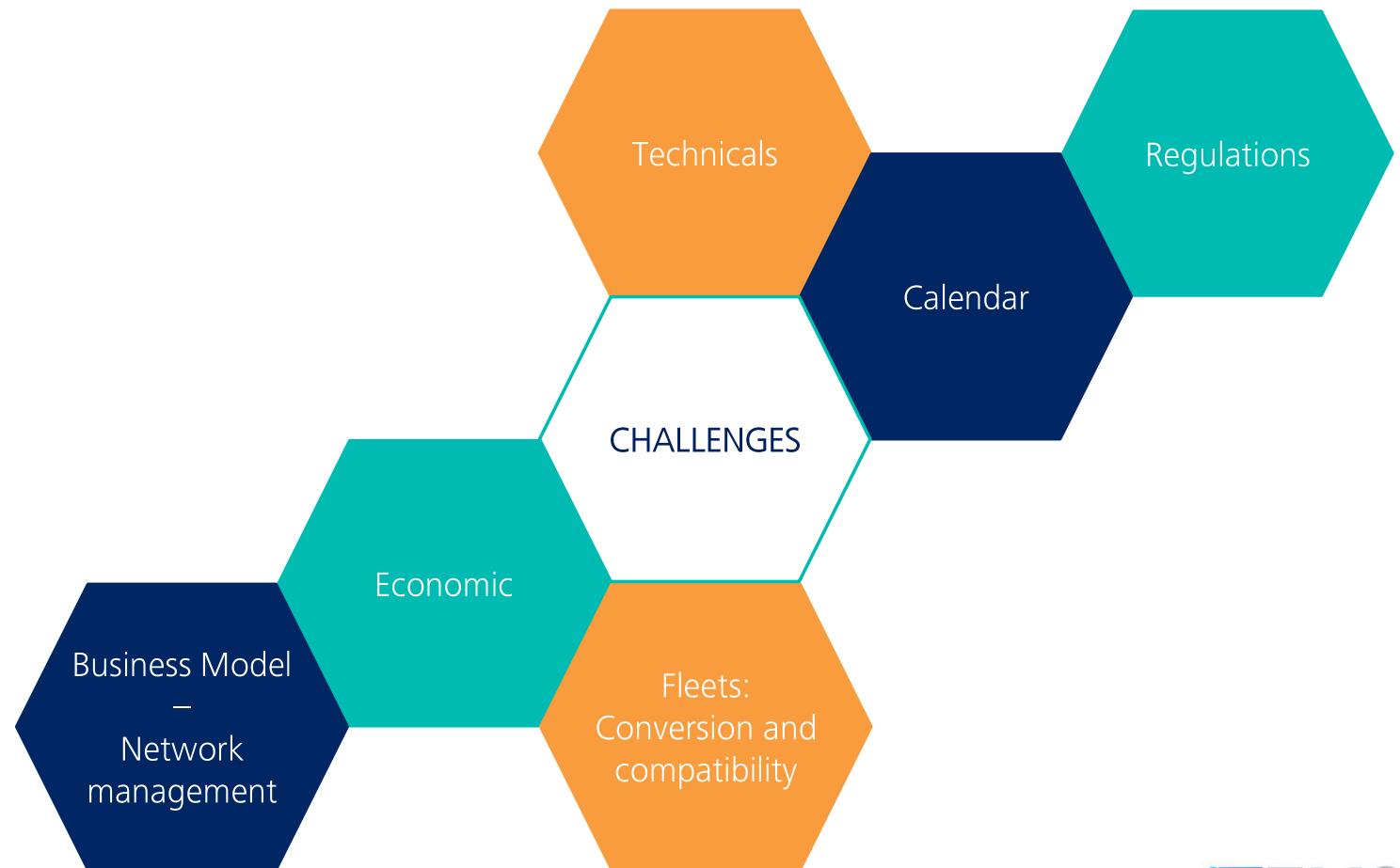


Source: [Stemmann-Technik](#)

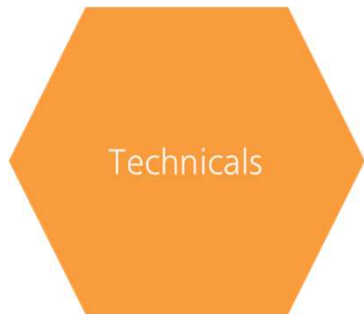
03. Challenges



Challenges



Technical dimension



- Procuring the estimated energy
- Civil works in existing terminals
- Civil works in new terminals: catalogue of technical specifications (trenches,..)
- Technical requirements according to type of vessels
- Flexibility



Fleet dimension



- Need for fleet real data
- Develop a specific normative / requirements for conversion on board
- Automated communication processes



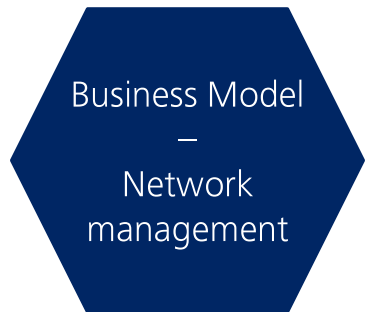
Regulatory dimension



- Restrictiveness of the regulation of the electricity system
- National electrical regulation versus Port regulation
- Harmonization of applying the regulation to develop an operate OPS systems in the different ports efficiently



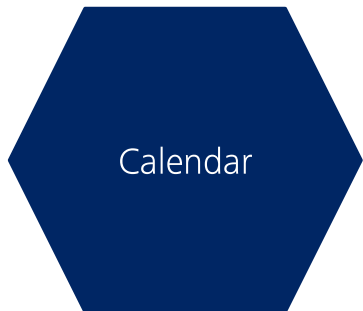
Business model dimension



- What is the most appropriate business model?
- Is there a single business model? How many models can be applied in one port?
- Some successful cases are based on creating a joint venture between the port and the utility and OPS service provider; agreement between the port and the terminal, etc.



Calendar dimension



- Fit for 55 : Are we going to reach the goal in 2030?
- How to simplify administrative burdens ?
- Are the fleet going to be ready?



Economical dimension



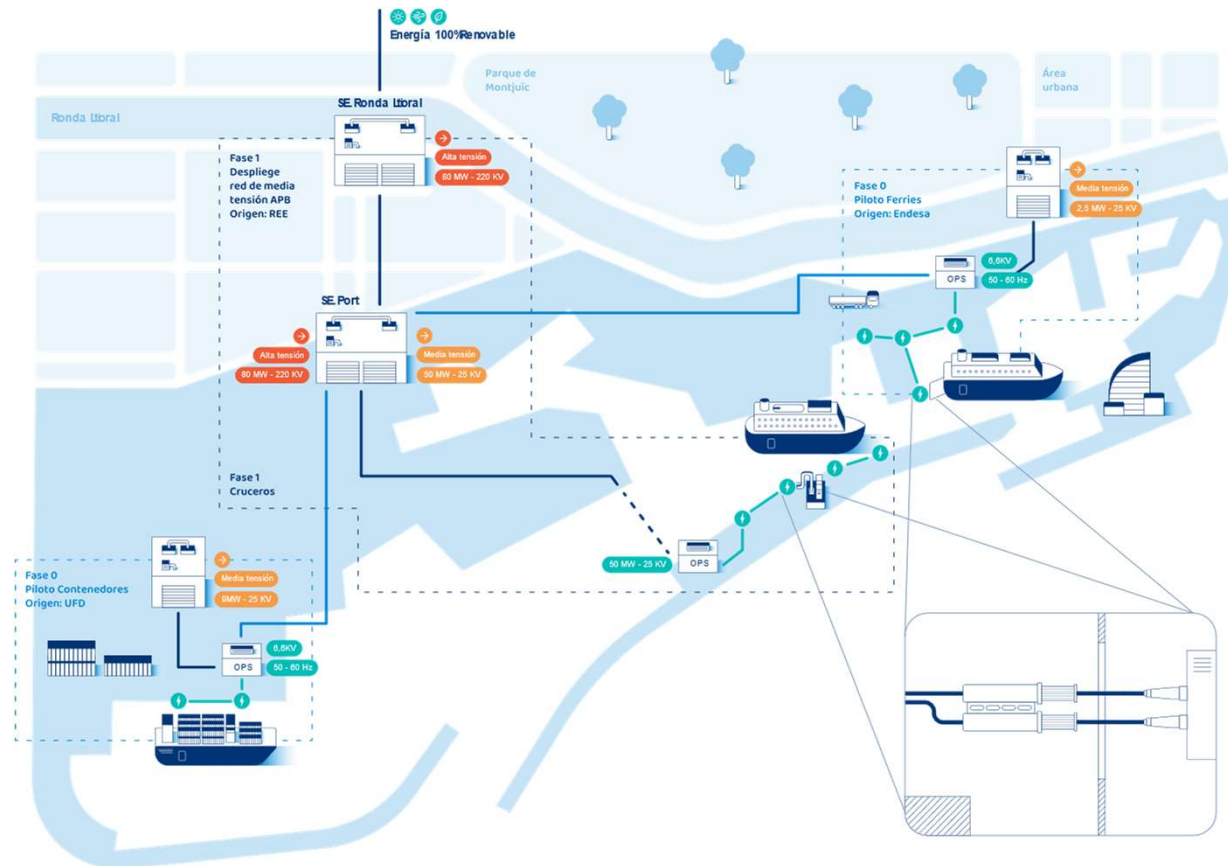
- Is the implementation of OPS economically viable?
- Mechanisms to support OPS implementation:
 - Funding from public entities
 - Developing incentives for the users
 - Exceptionalities in composition of electricity prices for OPS
 - Standardized billing model



04. Conclusions and lessons learnt

Conclusions and lessons learnt

- OPS is a strong tool for help in the decarbonization
- The engagement of the key actors is compulsory at local level
- Strategical alliances are required at worldwide level
- There are several challenges to develop OPS such as:
 - existing power
 - price of electricity
 - OPS availability in vessel
 - Civil work adaptation in existing terminals
 - fully standardization at the different levels: shore, board, operation....
 - OPS legislation should be developed
 - Technical fleet information is necessary
 - Financial funds are necessary



Thank you very much for your attention