



European flagship Action for cold ironING in ports



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

Results of EALING Activity 2 - Maritime Fleet Adaptation

EALING Mid-Term Event

29th April 2022



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Activity 2 - Introduction

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Activity 2 - Status so far / next actions

3

**Activity 2 - Questionnaires Results -
Executive Summary**

A large, bold, blue number '1' is positioned on the left side of the slide. The background is a gradient of blue and green, with a large, curved, light green shape on the right side.

Activity 2

Introduction

Activity 2 - Main tasks

- ▶ Focus on ensuring and facilitating the port to vessel compatibility for OPS adaptation
- ▶ Study several scenarios (various arrangements / different vessel types)
- ▶ Provide operational recommendations, taking IMO guidelines as a reference, for a harmonized technical, legal and regulatory framework on fleet electrification adaptation, leading to a final proposal to IMO.

Activity 2 - Milestones & Deliverables

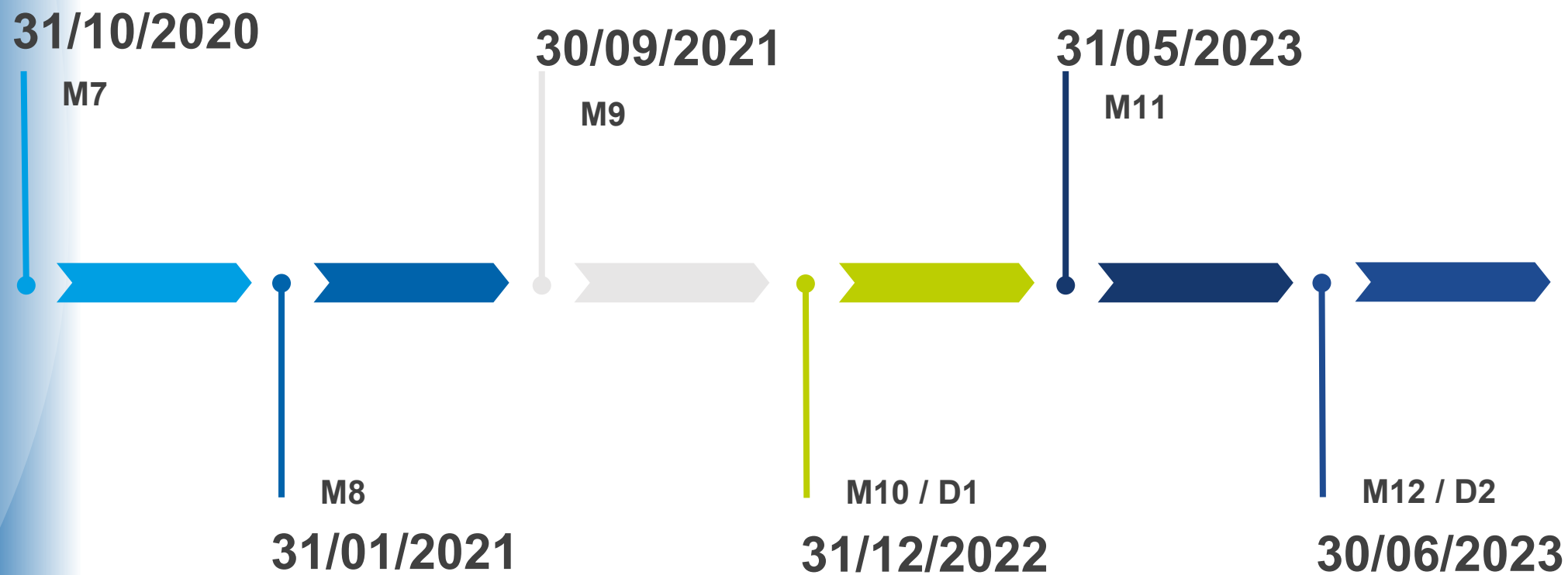
• Milestones

- *M7 - Activity 2 Kick-off Meeting* ✓
- *M8 - Workshop on the technical, legal and regulatory framework for maritime fleet adaptation, organized in cooperation with the EU MoS Coordinator* ✓
- *M9 - Activity 2 Progress Meeting* ✓
- M10 - Completion of the analysis of the standards relevant to shipside installation for shore side electricity supply for the vessels operating in the ports of the consortium
- M11 - Activity 2 Final Meeting
- M12 - Completion of the identification of the relevant technical and regulatory elements to facilitate adaptation/connectivity of ships to shore side electricity

• Deliverables

- D1 - Report on the analysis of the standards relevant to shipside installation for shore side electricity supply for the vessels operating in the ports of the consortium
- D2 - Report on the identification of the relevant technical and regulatory elements to facilitate adaptation/connectivity of ships to shore side electricity.

Activity 2 - Timeline



2

Activity 2

Status so far / next actions

Activity 2 - Details on the current / next steps

➤ QUESTIONNAIRES DISTRIBUTION & COLLECTION ✓

- Addressed to **Shipping Lines**
 - *Shipping lines visiting the Ports of the consortium have been contacted*
 - *More than 100 contacts*
- Addressed to **Classification Societies** and **Flag Registries**
 - *IACS members and Flags representing visiting Shipping Lines contacted*

➤ ACT. 2 WORKSHOP ✓

- More than 80 participants
- Organized by Circle and Hydrus with the contribution of the other EALING partners
 - *Project partners*
 - *Associations (CINEA, EU MoS, DG MOVE, EMSA, ECSA)*
 - *Shipping Lines representatives*

➤ PRELIMINARY ANALYSIS OF QUESTIONNAIRES RESULTS ✓

- Executive summary including preliminary results and conclusions to be presented

Activity 2 - Details on the current / next steps

➤ **BREAKDOWN & ANALYSIS OF STANDARDS → D1 - ONGOING**

Breakdown/identification and analysis of the existing Technical/Regulatory/Operational framework related to OPS for seagoing vessels that have been addressed by the IMO Guidelines on OPS and the international standard IEC/IEEE 80005. Enriched by the responses provided by the Flags/Classes questionnaire & the Workshop output.

➤ **CASE STUDIES - FUTURE**

Analysis of GA plans, electrical diagrams and other technical information, setup of several scenarios for vessels of different types and sizes, resulting in recommendations on best practices for their retrofitting under a CBA approach.

➤ **DETAILED ANALYSIS OF QUESTIONNAIRES / CASE STUDIES → D2 - FUTURE**

Operational / regulatory / technical recommendations, taking IMO guidelines as a reference, for a harmonized technical, legal and regulatory framework on fleet electrification adaptation, leading to a final proposal to IMO.



Activity 2

Questionnaires

Executive Summary

**The results of the Survey on OPS addressed
to Shipping Lines / Classification Societies /
Flag Administrations**



Discovering the Shipping Questionnaire - objective

This consultation is framed within Activity 2:



Maritime fleet adaptation

Study of the maritime electrification standards across the ports of the consortium and the vessels operating in these ports, providing operational recommendations - taking IMO guidelines as a reference - for a harmonized technical, legal and regulatory framework on maritime fleet adaptation for electrification.

The main objective of this questionnaire has been to gather information on the status of the shipping sector and its adaptation to be supplied by OPS infrastructures in EU ports and on the technical, regulatory, administrative and other related aspects that affect its implementation.

2 questionnaires were formulated and shared to participating entities:

- Questionnaire **1** was addressed to Shipping Lines
- Questionnaire **2** was addressed to Classification Societies / Flag Administrations.

The questionnaires were completed between June and December 2021. In total, 18 Shipping Companies, 4 Classification Societies and 2 Flagships responded to the questionnaire. 130 Shipping companies, 32 Flags and 11 Classification Societies were contacted in total.

The analysis presented in this executive summary is based solely and exclusively on the responses of the participating entities. The only intervention made by the EALING team was to correct or disregard some content errors detected during the processing of the data.

Discovering the Shipping Companies Questionnaire

A - GENERAL INFORMATION

It provides information to know more about the Shipping Company under study.

B - TECHNICAL ASPECTS RELATED TO OPS

It aims to understand how OPS solutions are or will be proposed in the maritime sector.

C - REGULATORY AND ADMINISTRATIVE ASPECTS

It collects the opinion of actual administrative and regulatory barriers including possible solutions to these problems that sway in the adoption of this solution.

Discovering the Classification Societies and Flagship Questionnaire

A - GENERAL INFORMATION

It provides information to know more about the Classification Society/Flagship under study.

B - TECHNICAL ASPECTS RELATED TO OPS

It aims to understand how OPS solutions are or will be proposed in the maritime sector.

C - REGULATORY AND ADMINISTRATIVE ASPECTS

It collects the opinion of actual administrative and regulatory barriers including possible solutions to these problems that sway in the adoption of this solution.

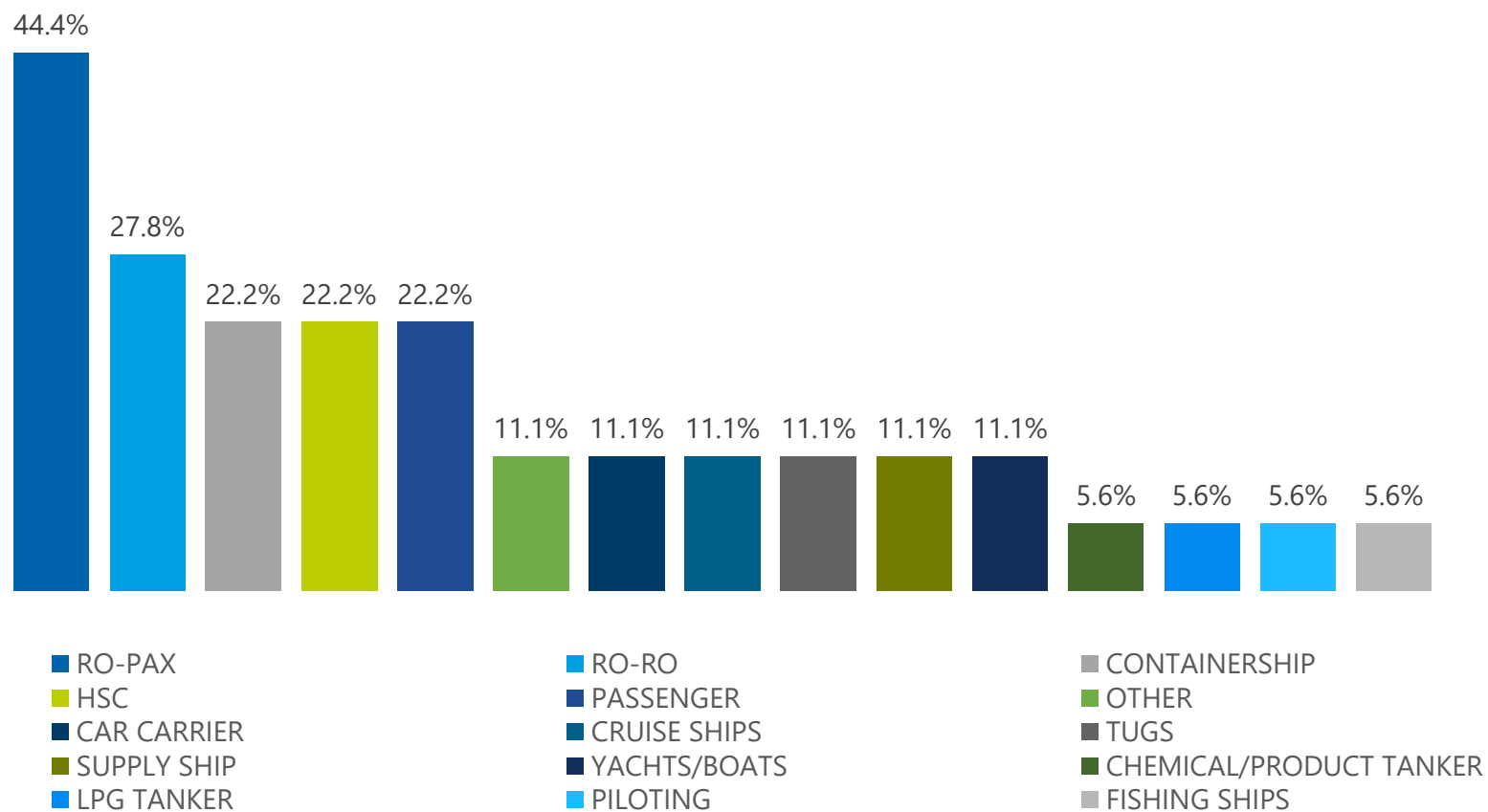
D - TRAINING

It collects aspects related to training.

E - ADDITIONAL INFORMATION

It presents further information that the surveyed wants to add to the interview.

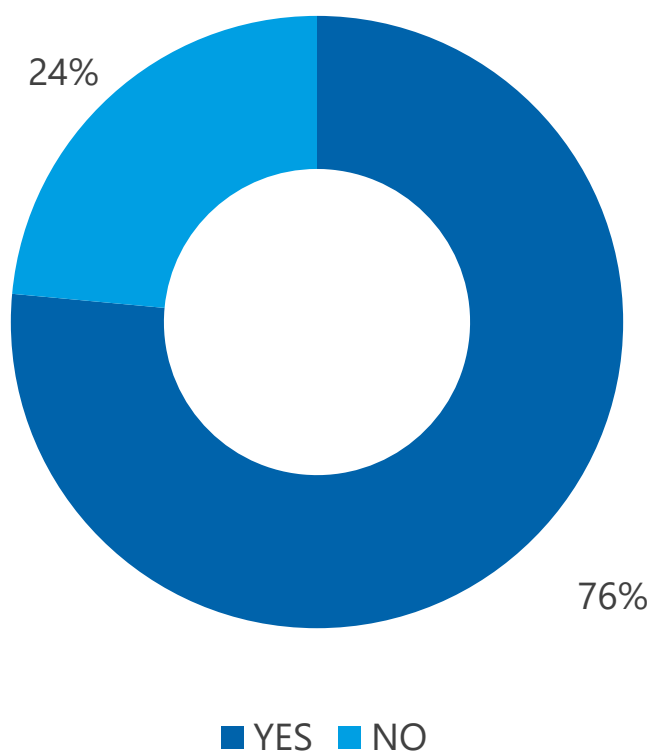
Type of services offered



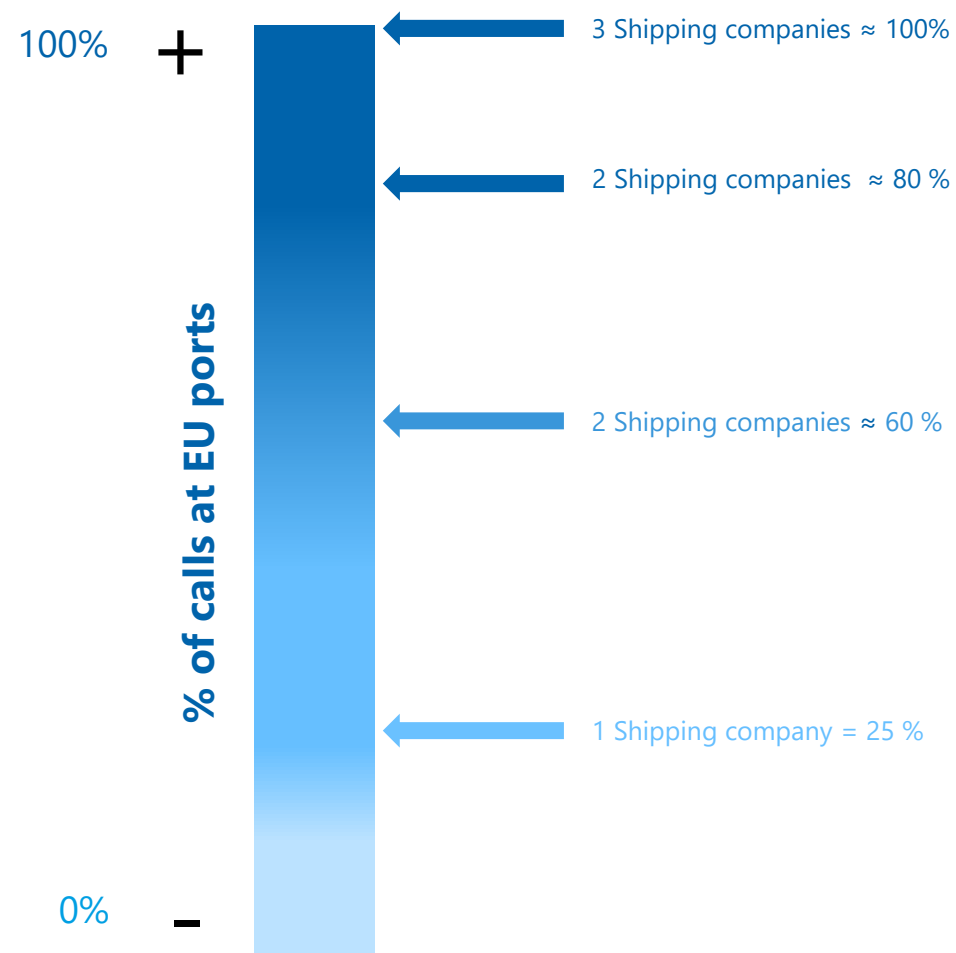
Note: 18/18 replies. Multiple choice.

Note: Other corresponds to 2 replies that were Barges and Con-Ro services.

Characteristics of the fleet – Operating in the European Union Area



Note: 17/18 replies.



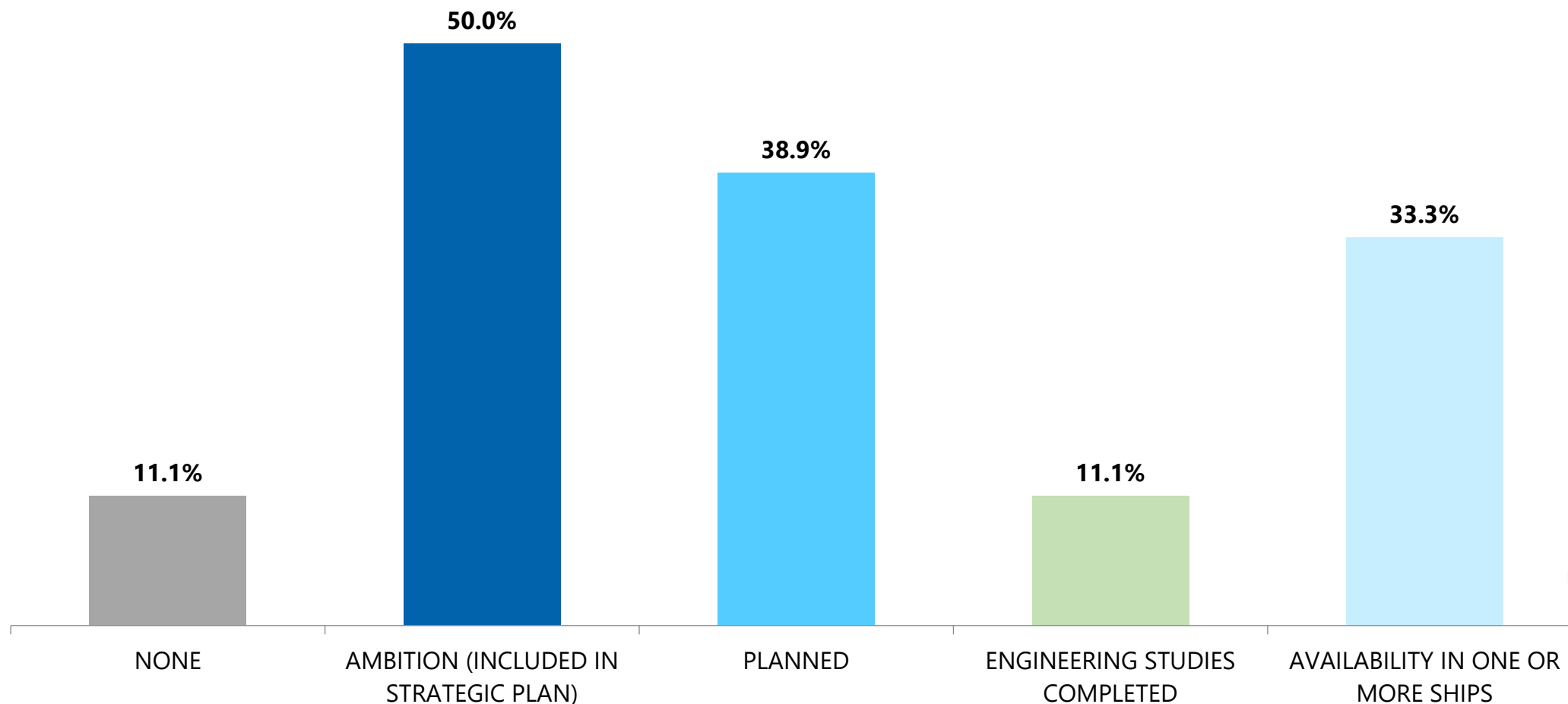
Note: 8/18 replies

C

B

A - GENERAL INFORMATION

Maturity level of OPS



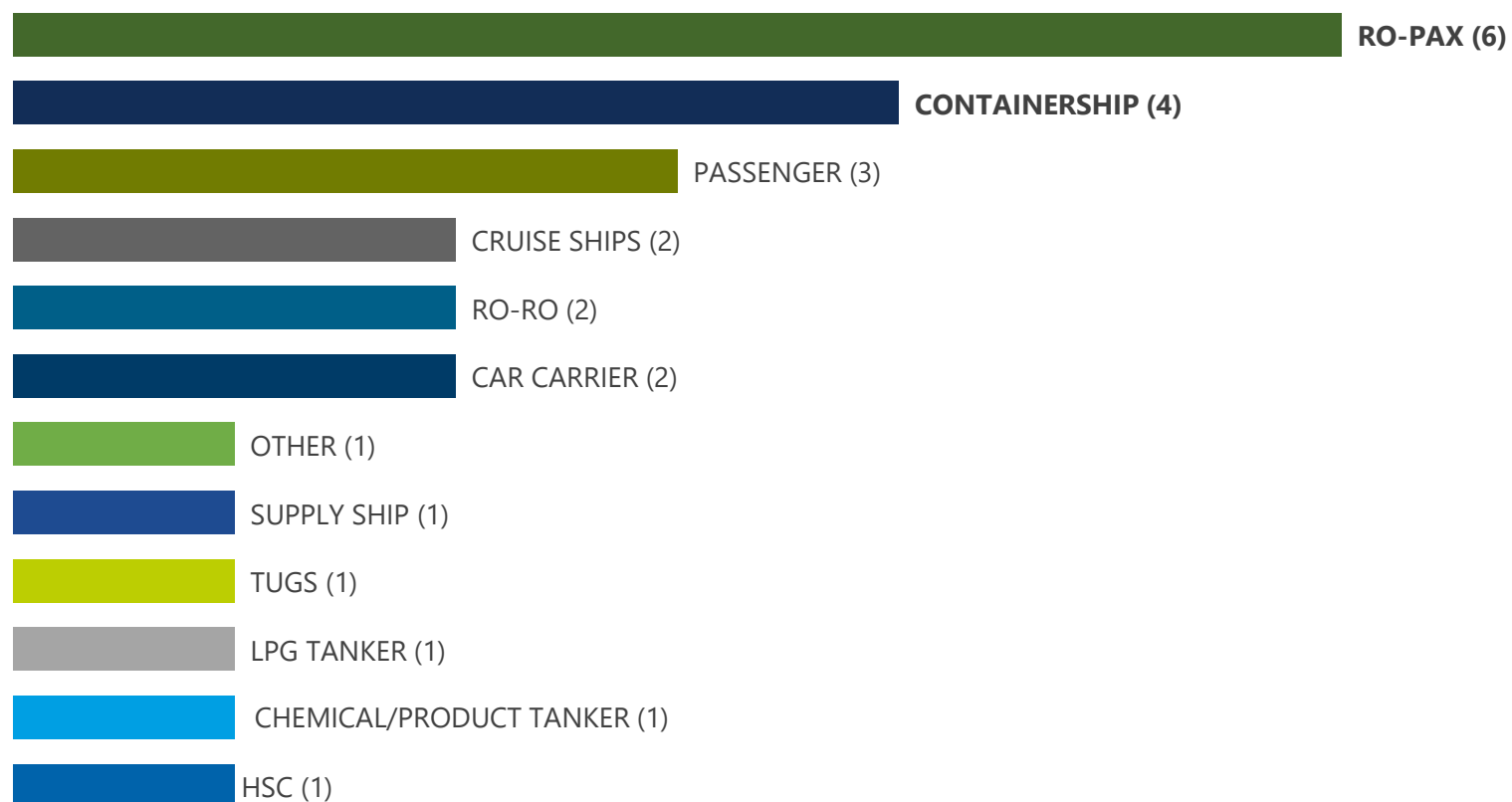
Note: 18/18 replies. Multiple choice.

C

B - TECHNICAL ASPECTS RELATED
TO OPS

A

Type of ship where OPS is ambitious/planned/piloted/available



Note: 15/18 replies. Multiple choice.

Note: Other corresponds to 1 reply that was Con-Ro ship.

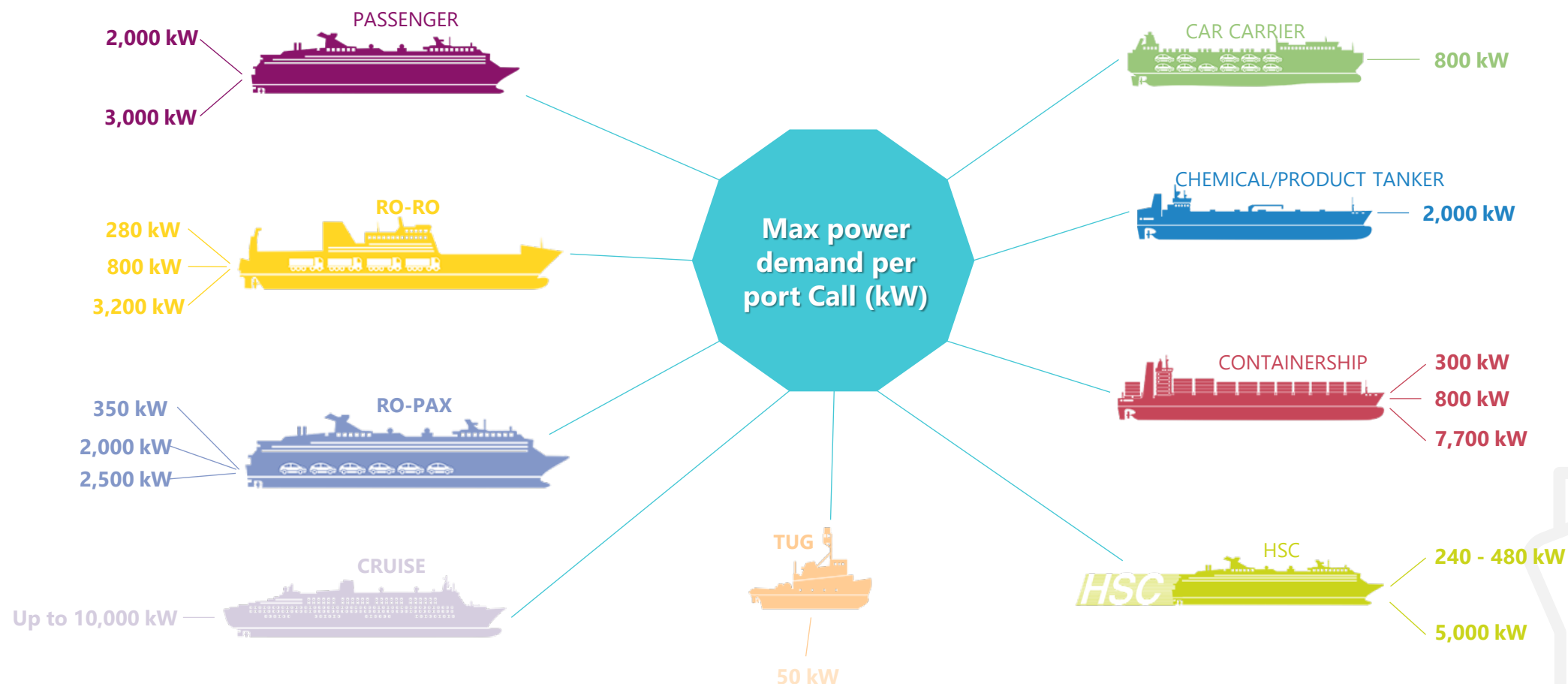
Note: () Reflects number of companies.

C

B - TECHNICAL ASPECTS RELATED
TO OPS

A

Overall load requirements at berth per type of ship according Max Power Demand per port call









Note: 14/18 replies. Multiple choice.




C

B - TECHNICAL ASPECTS RELATED
TO OPS

A

Overall load requirements at berth per type of ship according to % of ships with electrical frequency

TYPE OF SHIP	% FREQUENCY OF 50 Hz	% FREQUENCY OF 60 Hz
CAR CARRIER 	-	100%
CHEMICAL/PRODUCT TANKER 	-	100%
CONTAINER 	100%	-
	5%	95%
	66%	33%
HSC 	100%	-
	100%	-
	75%	25%
OTHER 	-	100%
PASSENGER 	50%	25%
	100%	-

TYPE OF SHIP	% FREQUENCY OF 50 Hz	% FREQUENCY OF 60 Hz
RO-PAX 	50%	50%
	60%	40%
	100%	-
	20%	80%
	-	50%
	100%	-
RO-RO 	100%	-
	100%	-
	-	100%
	-	100%
TUG 	100%	-
	100%	-

Note: 14/18 replies. Multiple choice.

Note: Each row corresponds to one shipping company's reply.

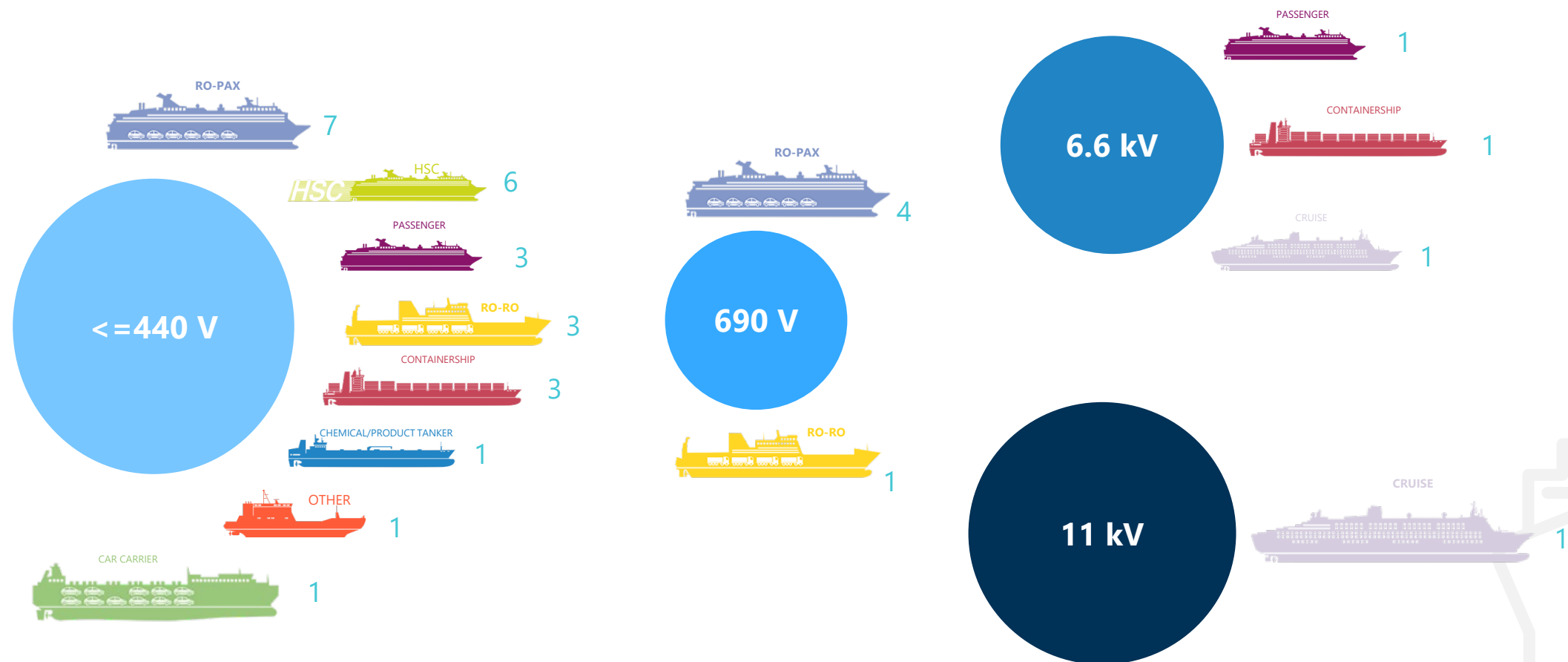
C

B - TECHNICAL ASPECTS RELATED
TO OPS

A



Overall load requirements at berth per type of ship



Note: 14/18 replies. Multiple choice.

Note: Each number corresponds to one shipping company reply.

Main barriers that can affect the adoption of OPS in the fleet

Replies received:

"Cost of the electricity provided and retrofit – Lack of regulation".

"Availability of facilities at ports"

"Carbon intensity accounting for shore power not yet in place is not enabling usage of OPS vs auto-production onboard"

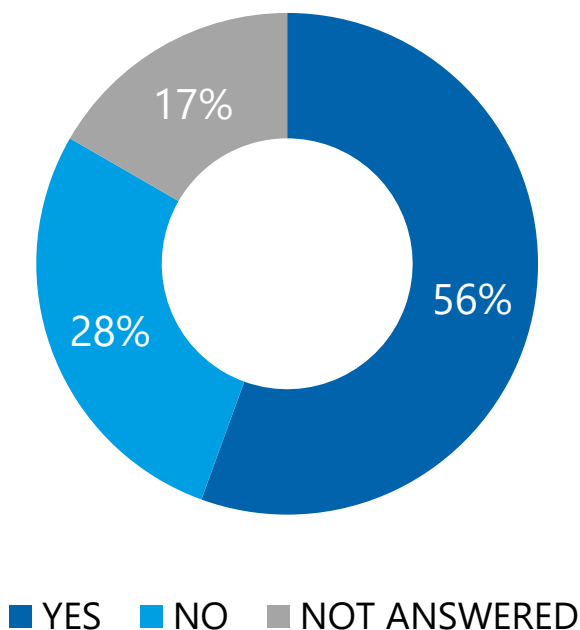
"Ships' age"

"Strict Class requirements and safety and security aspects"

"The doubts from the stakeholders involved"

Note: Open question.

Is there any valuable mechanism to support emissions reduction for shipping companies/shipowners through shore side electricity (tax exemptions, maritime or port mechanisms, rebates, etc.)?



Replies received:

"The responders talk about tax exemptions and incentive systems through rebates, port fees reduction and new finance projects but also EU finance and competitive cost of OPS to support the adoption".

"To support on board retrofit installation and to incentive the use of shore power, the cost of kWh should be lower than cost of kWh produced by ICE or tax reduction should be granted".

"Rebates to shipowner (due to investment of retrofit) and service cost at port to be covered/paid by the charters (Not shipowners). In addition, any delays/loss of time due to unavailability or failure of service, to be on charters account Or terminal/Port".

Note: Open question.

Who would be the best possible electricity supplier and OPS operator considering also the possibility of unbundling the market?

ACTORS	ROLES		
	ELECTRICITY SUPPLIER	OPS OPERATOR	BOTH
ENERGY COMPANY	8	-	4
PORT AUTHORITY OR MUNICIPALITY	2	4	6
TERMINAL	1	4	8

Note: 14/18 replies. Multiple choice.



What is the additional estimated OPS cost for an on-board solution, in case of a newbuilding or retrofitting vessel?

CAR CARRIER



300,000€ - 350,000€

CONTAINERSHIP



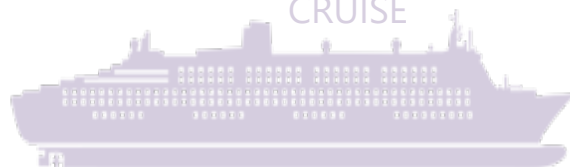
Small 75,000€
Big 1,000,000€ per side

HSC



200,000€ - 250,000€
Small pax – 50,000€

CRUISE



1,000,000€

RO-PAX



200,000€
350,000€
400,000€
Big: 1,100,000€

RO-RO



200,000€
300,000€ - 350,000€
500,000€

CHEMICAL/PRODUCT TANKER



530,000 €

SUPPLY SHIP



50,000 €

TUG



50,000 €

Note: 11/18 replies. Multiple choice

Note: Each row corresponds to one shipping company's reply

What are the lessons learned from the feedback of your customers regarding OPS?

Replies received:

"Use must be supported by the availability of appropriate port infrastructure".

"Early engagement with all the various stakeholders across the supply chain".

"The cost to provide the required hardware even for a ship under construction is extremely high (about half million USD)".

"No lessons so far learned by way of feedback".

E

D

C

B - TECHNICAL ASPECTS RELATED
TO OPS

A



What type of technical questions regarding OPS have to be taken into account to harmonise or homologate OPS in fleets?

Replies received:

"Interfacing voltage, frequency, connection type, load requirements, short circuit contribution".

"Power demand from the vessel, total carbon footprint including the electrical generation source".

"Protection, synchronization, breaker interlocks, undervoltage trips, emergency disconnection and remote-control circuits as relevant".

Adequacy of power supply; standardization of connection and voltage; etc.

E

D

C

B - TECHNICAL ASPECTS RELATED
TO OPS

A



What are the main needs regarding the training for OPS operations on board ships?

Replies received:

"Specific systems will have operational requirements and limitations of which crew must be aware".

"Operational manual focusing on safety aspects on shore-ship compatibility, including safety shutdown procedures".

"OPS should be provided with an operations manual and crew staff should be trained as part of the ISM".

"Update of appropriate parts of STCW as necessary".

E

D – TRAINING

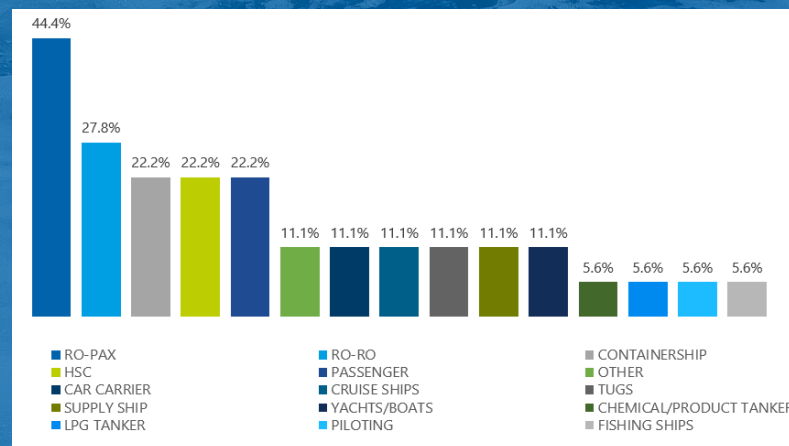
C

B

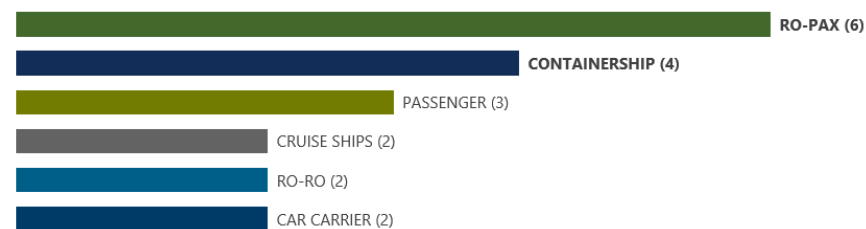
A

CONCLUSIONS – SHIPPING COMPANIES

Planning of retrofitting for OPS adaptation mostly focuses on passenger and container vessels, being in line with the first types of vessels that are expected to be obliged to install OPS under the forthcoming EU regulations.

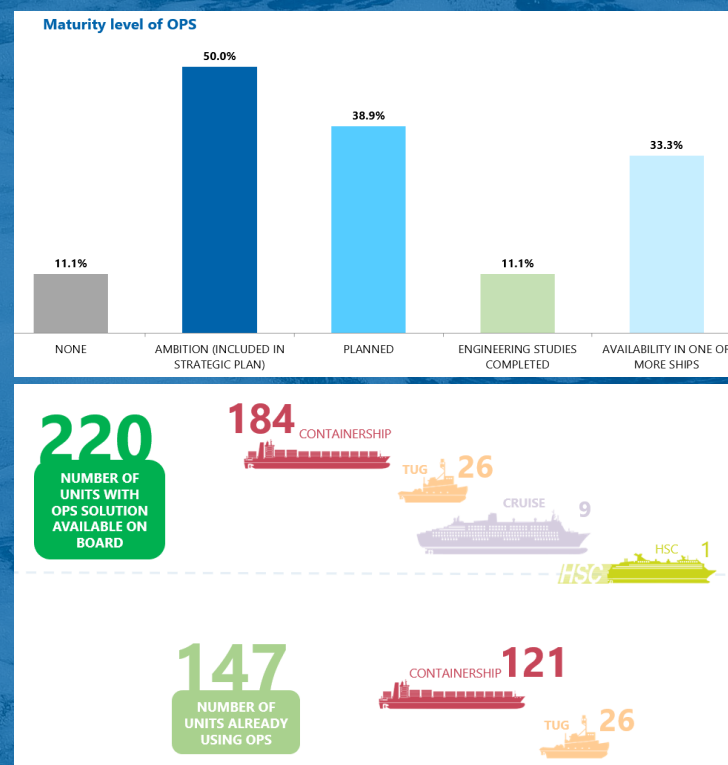


Type of ship where OPS is ambitioned/planned/piloted/available



CONCLUSIONS – SHIPPING COMPANIES

Level of readiness regarding OPS onboard shows that most responders are not yet ready (currently at ambition or planning stages) and need to speed-up the processes in order to meet the forthcoming EU regulations deadlines. Almost half of the already equipped vessels are not using OPS due to lack of infrastructure in EU ports.

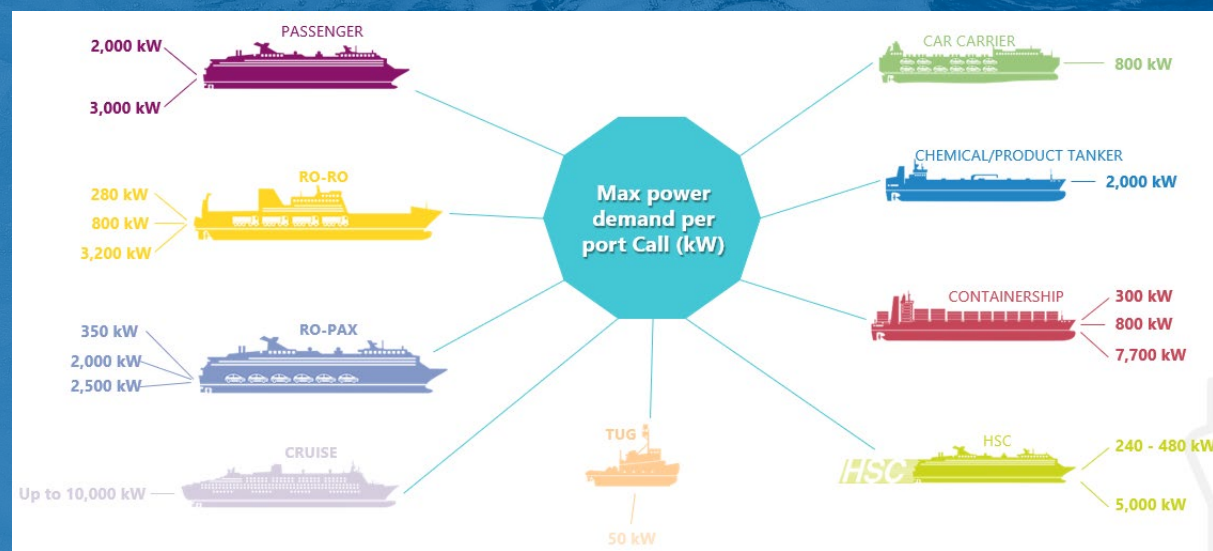


CONCLUSIONS – SHIPPING COMPANIES

It is concluded that a rule of thumb cannot be extracted regarding power requirement at port based on the vessel type, since there is a significant scatter affected by vessel size, particular characteristics etc.







→ need for case-by-case assessment




→ need to focus on each terminal, current and future vessels calling at EU ports.



CONCLUSIONS – SHIPPING COMPANIES

Vessels' frequency may be 50 Hz or 60 Hz, regardless of the type of ship. Therefore, frequency converters in most OPS positions need to be considered.

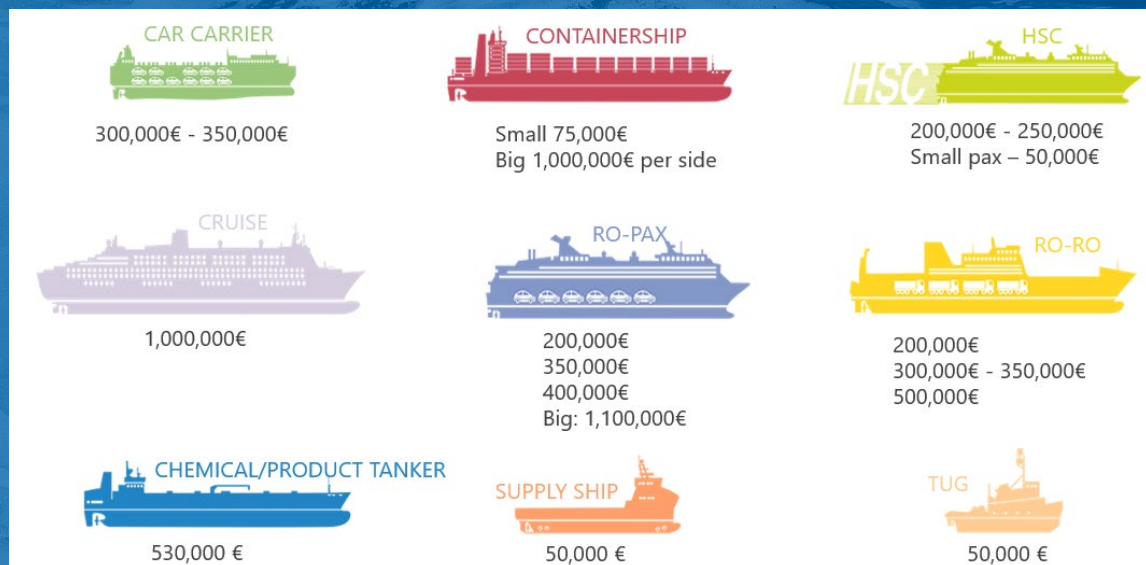
TYPE OF SHIP	% FREQUENCY OF 50 Hz	% FREQUENCY OF 60 Hz
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	5%	95%
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HSC 	100%	-
	100%	-
	75%	25%
OTHER 	-	100%
PASSENGER 	50%	25%
	100%	-

TYPE OF SHIP	% FREQUENCY OF 50 Hz	% FREQUENCY OF 60 Hz
RO-PAX 	50%	50%
	60%	40%
	100%	-
	20%	80%
	-	50%
	100%	-
RO-RO 	100%	-
	100%	-
	-	100%
	-	100%
TUG 	100%	-
	100%	-

CONCLUSIONS – SHIPPING COMPANIES

Most responders claimed that the most important mechanism to support the OPS adaptation onboard their fleet is an electricity tax exemption scheme.

Cost of retrofit for containerships is increased since Cable Management System is required to be placed onboard. Cruise ships and passenger vessels follow due to size and complexity of installation.



CONCLUSIONS – SHIPPING COMPANIES

The study in general emphasizes the need for technical and regulatory harmonization in both on-board and shore-side infrastructures.

There is a delay in the retrofitting of the OPS fleet, from the time it is included in the shipping companies' strategies until the engineering and construction planning process takes place. This will make it difficult to meet the deadlines set in the forthcoming regulations.

An important question raised is who pays for the installation and who operates it. It is not clear whether the terminal or the port authority should make the investment. What is clear is that, in their opinion, the energy company would be best positioned to be the electricity supplier directly to the ship and the competitiveness should be boosted to get the best value for money.

An early engagement with all the various stakeholders across the supply chain is a key.

Training on safety aspects on shore-ship compatibility and an appropriate operations manual could help to speed-up the process onboard.

CONCLUSIONS – CLASSIFICATIONS SOCIETIES AND FLAG ADMINS.

The interest raised by customers or members of classification societies and flags is not only limited to OPS but relates to decarbonisation in general. The range of options, coupled with the investments required, shows the difficulty shipping lines face in achieving the decarbonization of the sector.

The need of standards and regulations is, in their opinion, the most important driver to be considered when evaluating alternative OPS solutions for ships.

Thanks!



European flagship Action for coLd ironING in ports

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Discover more at

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