



European flagship Action for cold ironING in ports



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

EALING - European flagship action for cold ironing in ports

Executive Summary on Shipping Questionnaire

March 2022

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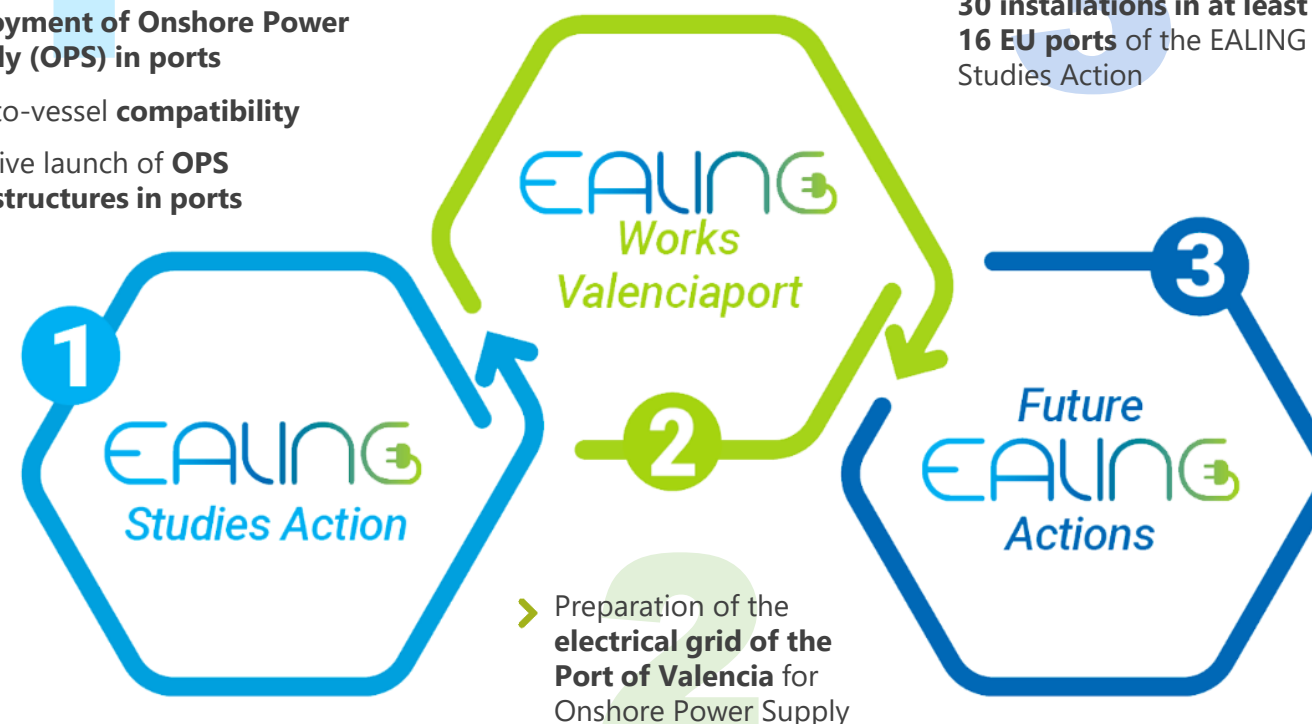


EALING Introduction – Global Project

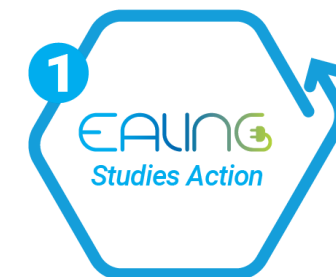
EALING Global Project expresses the need to accelerate the effective deployment of OPS solutions in the EU maritime ports. It consists of three components:

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

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



EALING Introduction – EALING Studies Action



A1

Harmonised Framework for the electrification of the participating TEN-T maritime ports

Detailed analysis on the current status of technical, legal and regulatory framework – at Member States level and at EU level – concerning the implementation of OPS in EU ports and recommendations focused on how to implement a workable and coordinated framework boosting the development of OPS in ports of the TEN-T Network.

A2

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 harmonised technical, legal and regulatory framework on maritime fleet adaptation for electrification.

A3

Technical studies for the electrification infrastructure of the participating TEN-T maritime ports

Technical design studies for the electrification infrastructure necessary for the ports of the consortium: this includes the development of front-end engineering design (FEED) studies and other necessary technical studies that will feed into the tender specifications of the future equipment and infrastructure.

A4

Environmental studies.

Environmental studies, the scope of which will depend on the needs of each port. They will take into account the provisions stated in the Strategic Environmental Assessment (SEA) Directive (2001/42/EC) and the Environmental Impact Assessment (EIA) Directive (2014/52/EU), contributing, if necessary, to obtain the permits on the projected works for the future OPS infrastructure in the ports of the consortium.

A5

Clean power supply plans and tender documents

Clean energy supply plans (preparation or update) of the consortium ports, based on the baseline identified for each port, in order to ensure the integration of OPS in the internal strategies of the Port Authorities; preparation of the tender documents for all proposed investments.

A6

Cost-benefit analysis and Financial blending schemes

Cost-benefit analysis (CBA) for each OPS project of the maritime ports involved in the EALING Action and suitable investment schemes design, which will allow the ports to proceed to the Financial Investment Decisions.





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 participated in the questionnaire.

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 - structure

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.

Shipping Companies Questionnaire - results

A - GENERAL INFORMATION

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

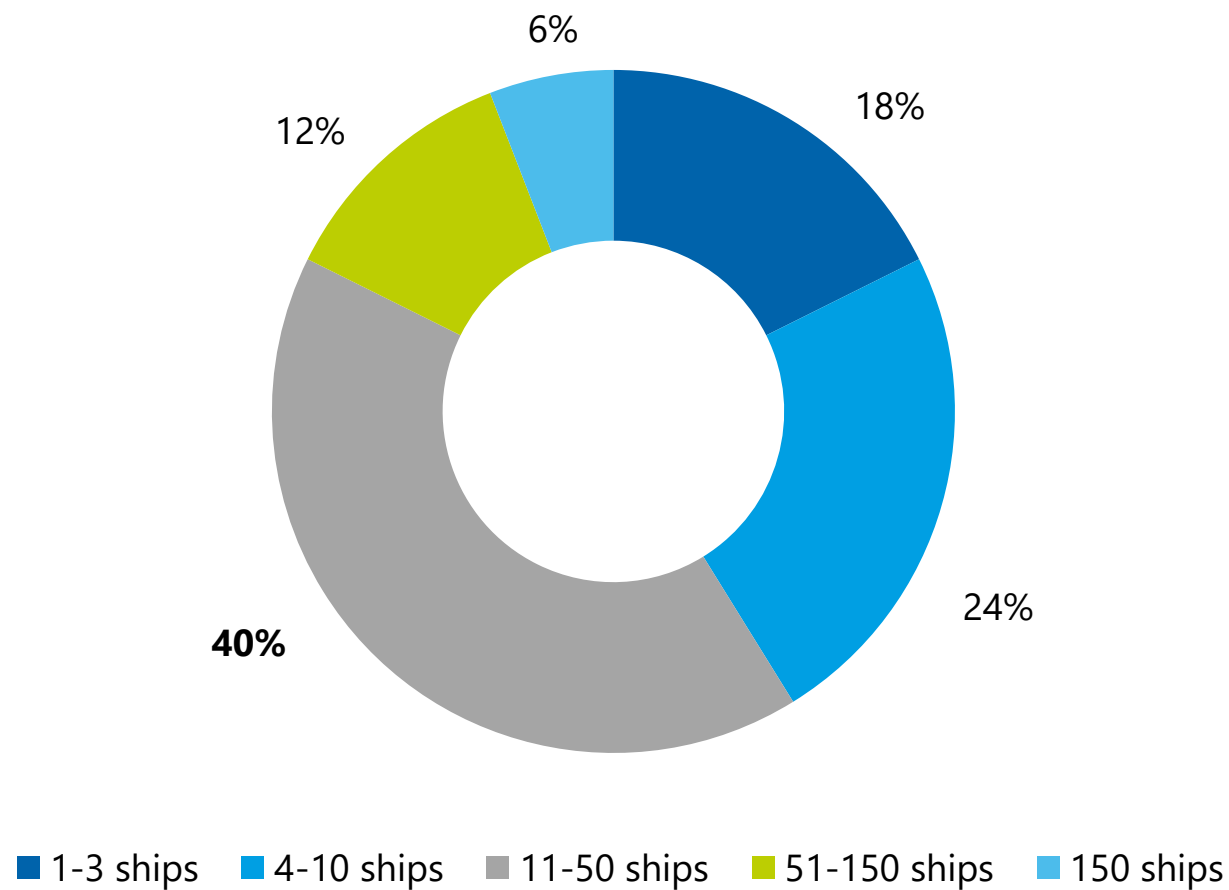
B - TECHNICAL ASPECTS RELATED TO OPS

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Characteristics of the fleet - Size of the shipping companies surveyed



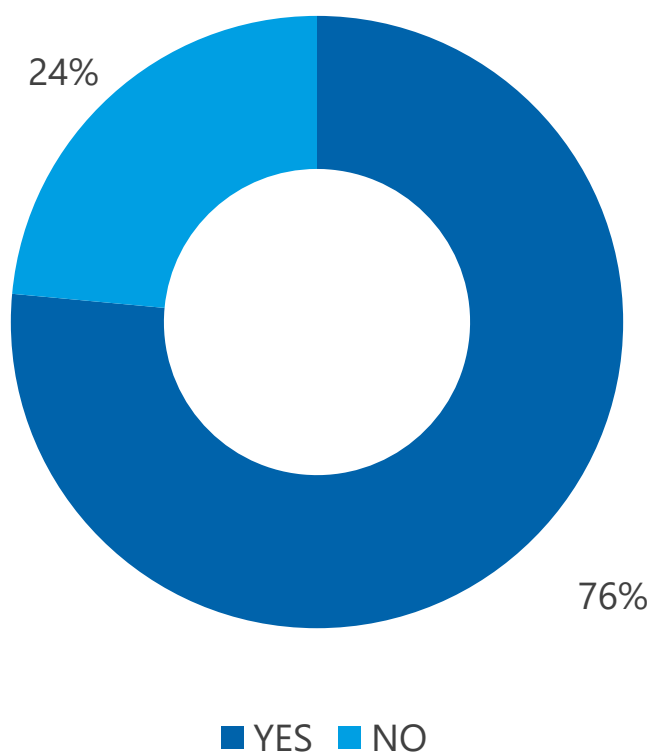
Note: 17/18 replies

C

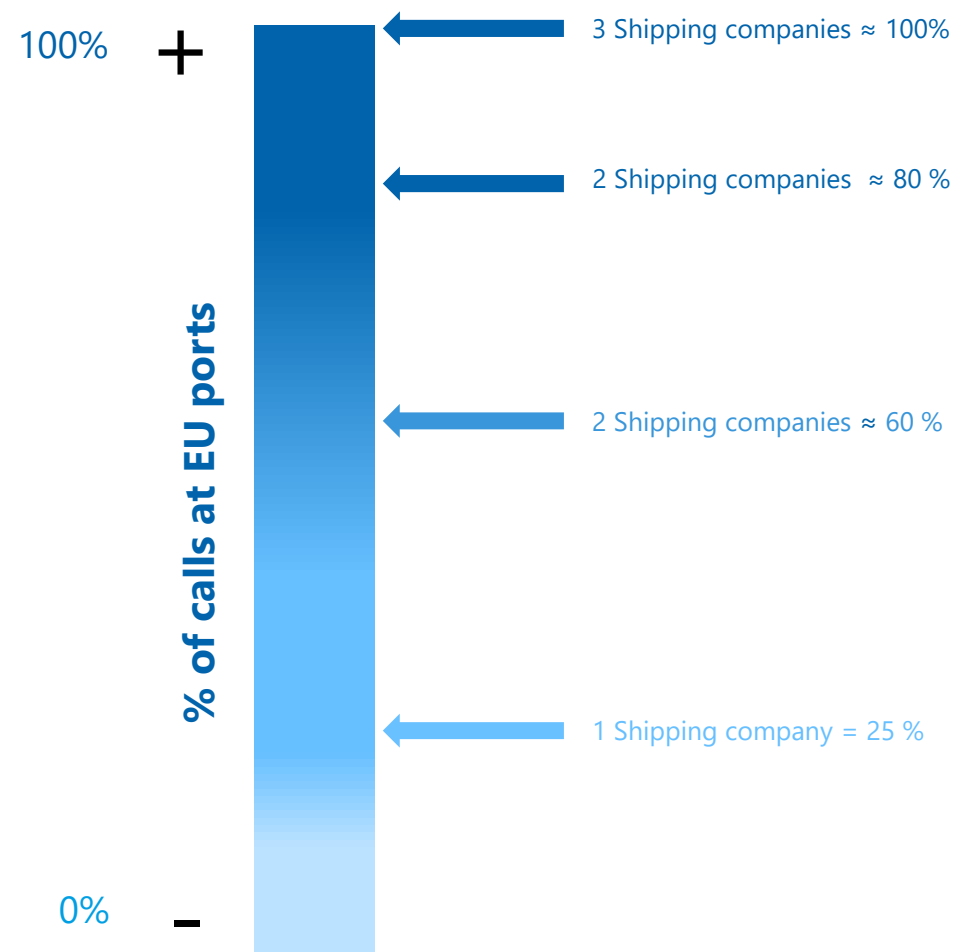
B

A - GENERAL INFORMATION

Characteristics of the fleet – Operating in the European Union Area

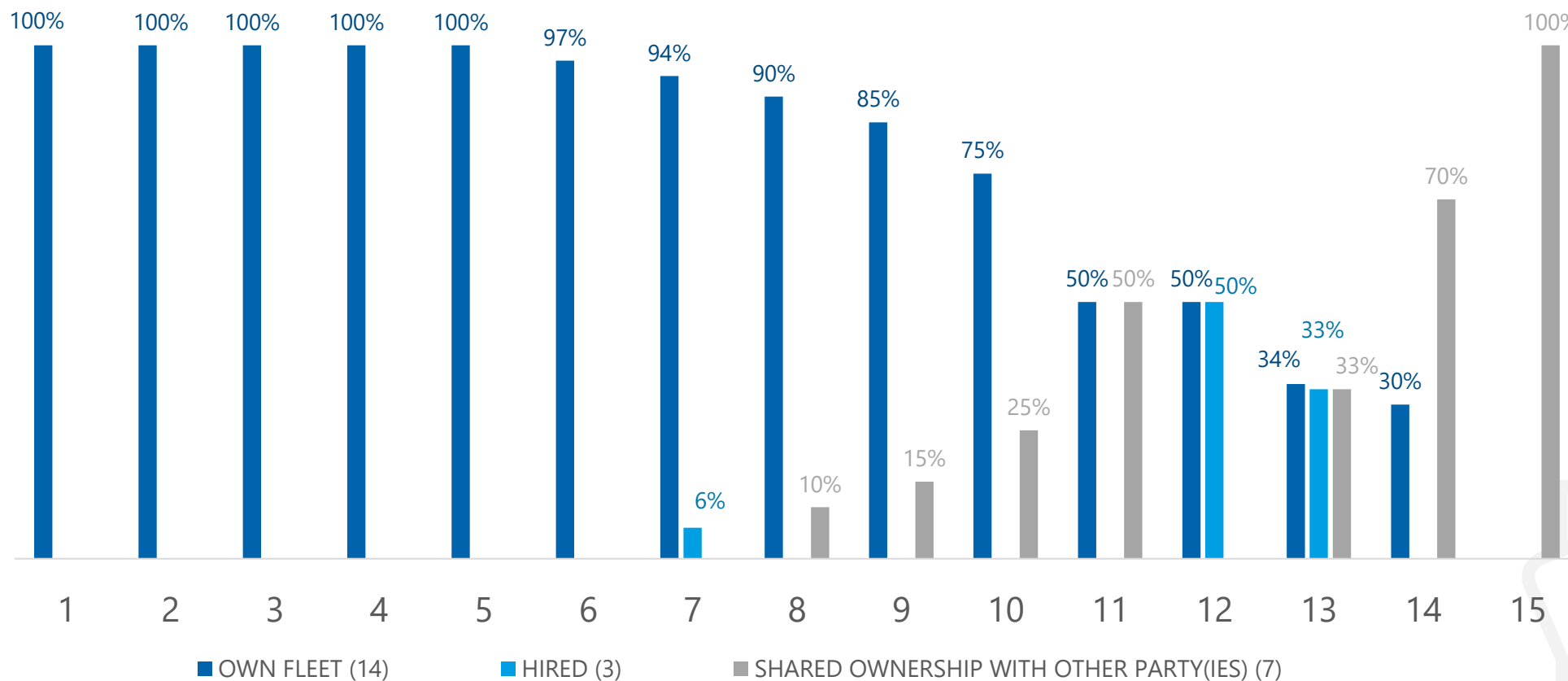


Note: 17/18 replies.



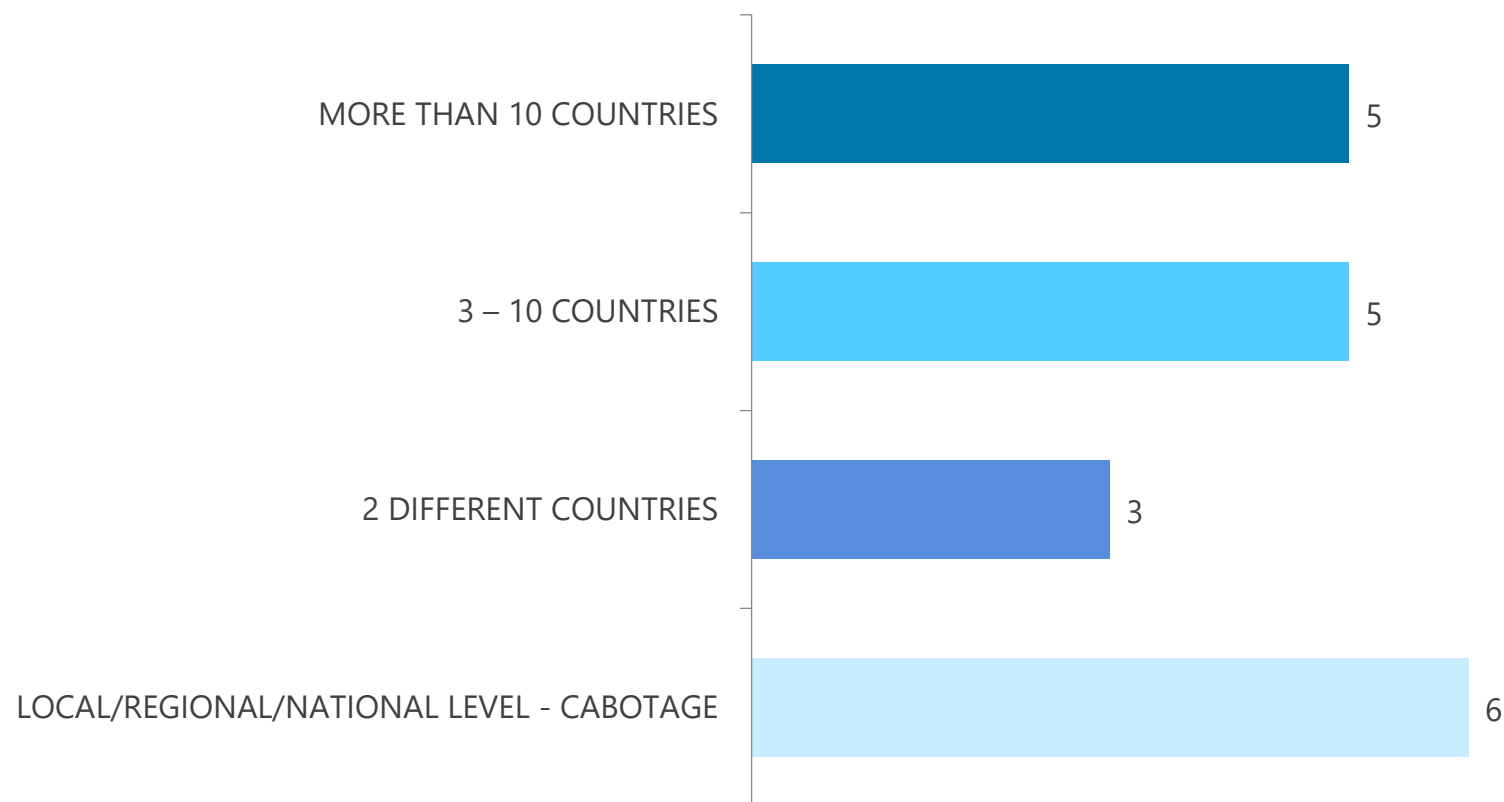
Note: 8/18 replies

Ship operating scheme



Note: 15/18 replies. Multiple choice.

Average number of countries where the ships are operating



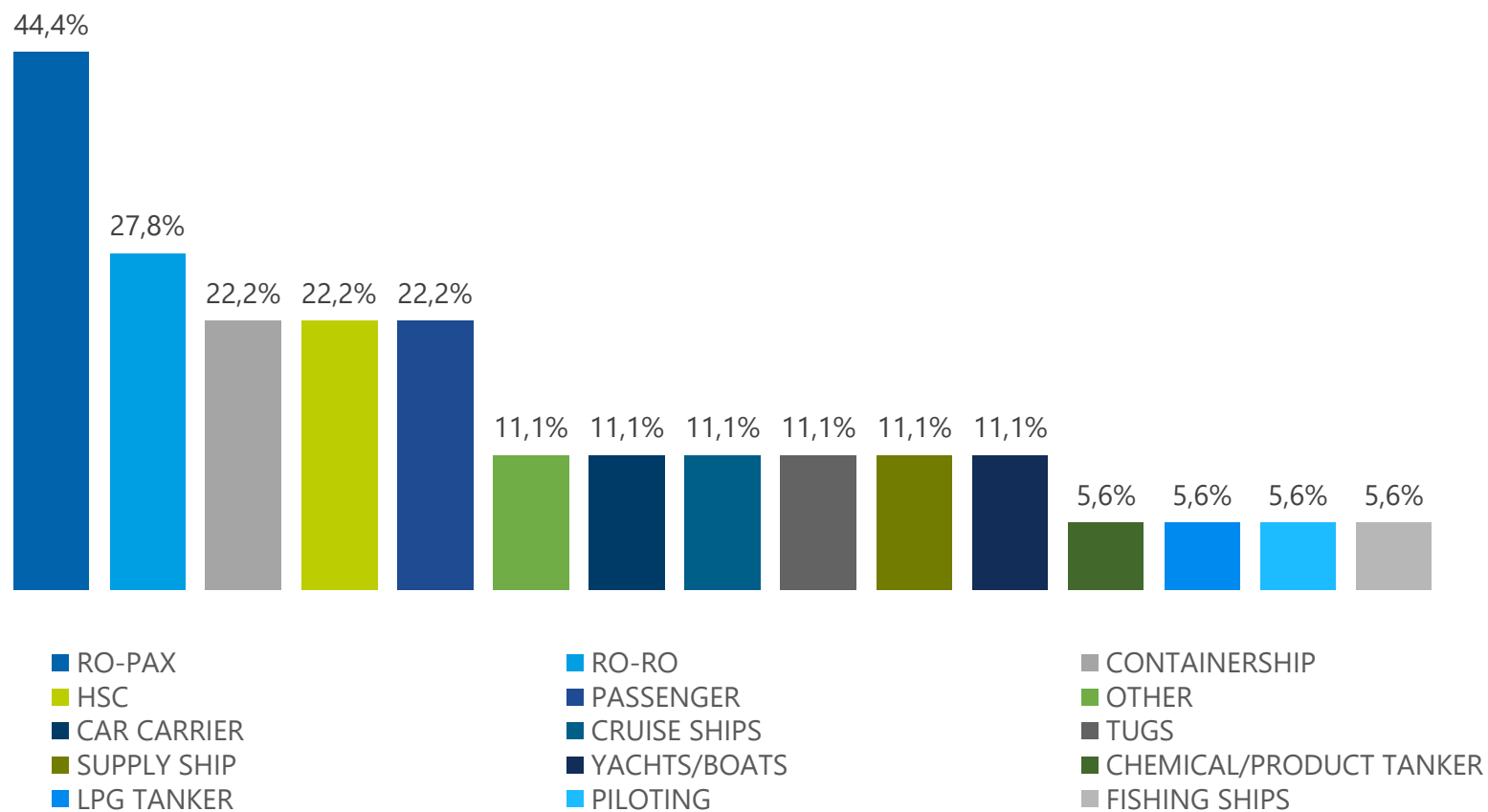
Note: 18/18 replies. Multiple choice.

C

B

A - GENERAL INFORMATION

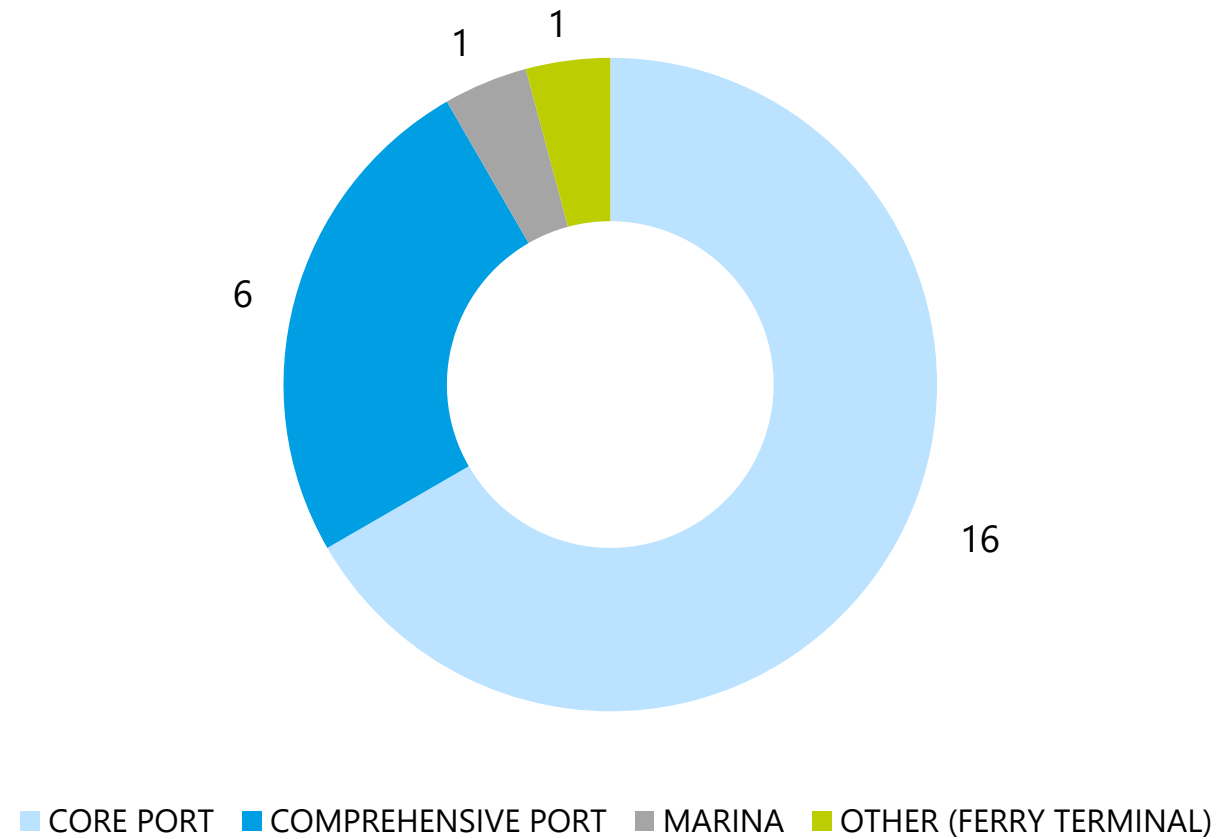
Type of services offered



Note: 18/18 replies. Multiple choice.

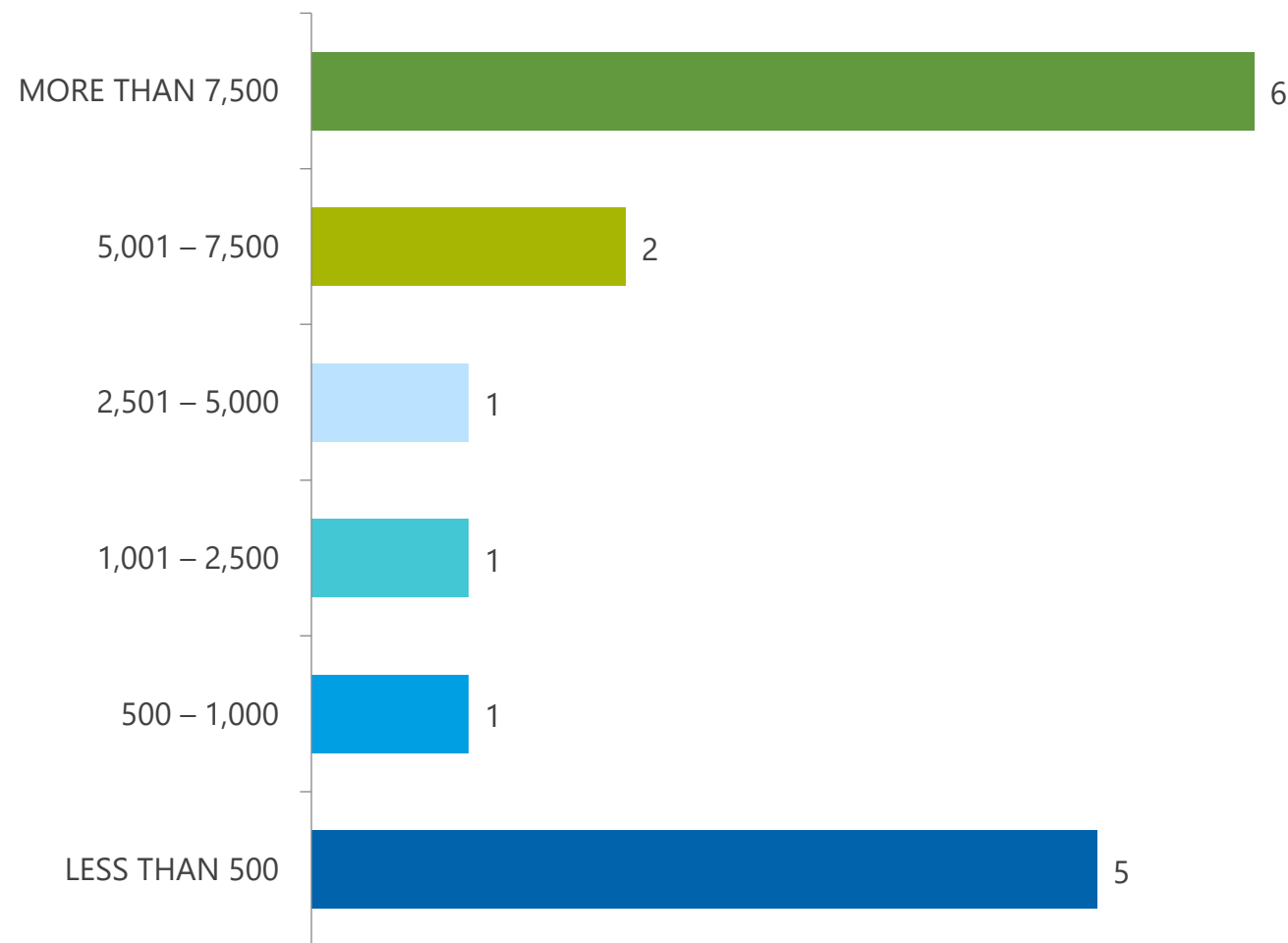
Note: Other corresponds to 2 replies that were Barges and Con-Ro services.

Type of ports where the fleet is calling



Note: 17/18 replies. Multiple choice.

Number of ship port calls per year (considering all the fleet per shipping company)



Note: 16/18 replies. Multiple choice.

Shipping Companies Questionnaire - results

A - GENERAL INFORMATION

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

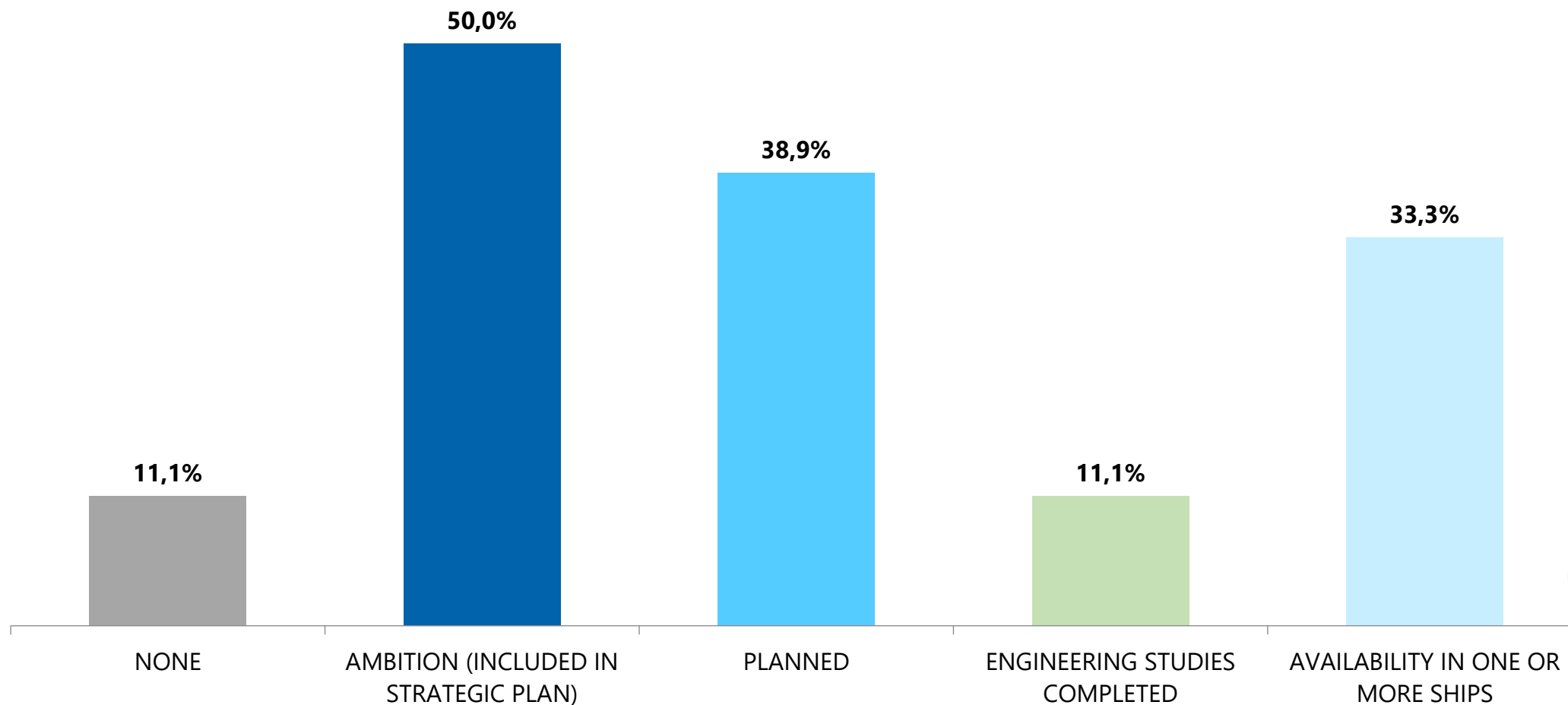
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Maturity level of OPS



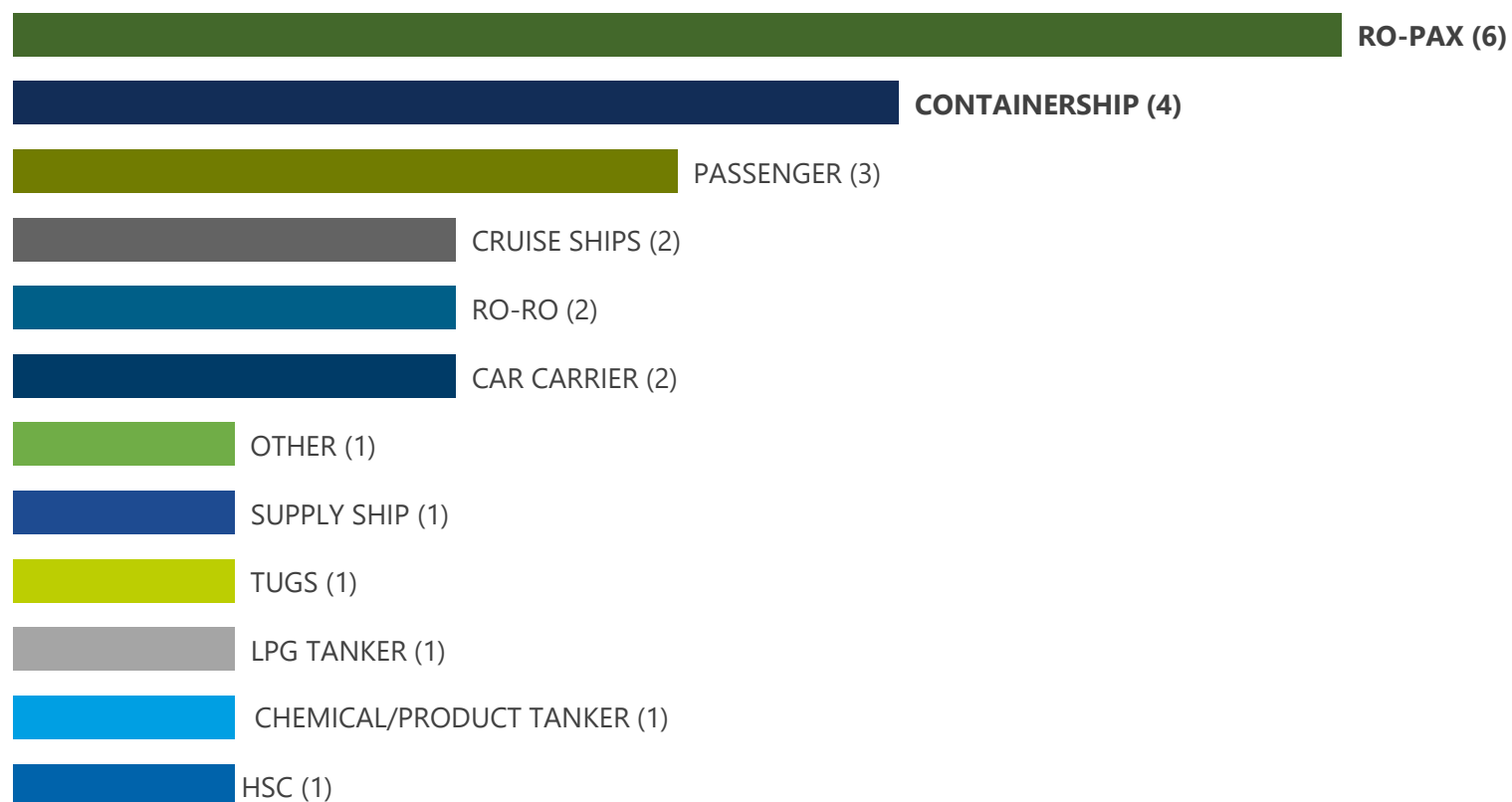
Note: 18/18 replies. Multiple choice.

C

B - TECHNICAL ASPECTS RELATED
TO OPS

A

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



Note: 15/18 replies. Multiple choice.

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

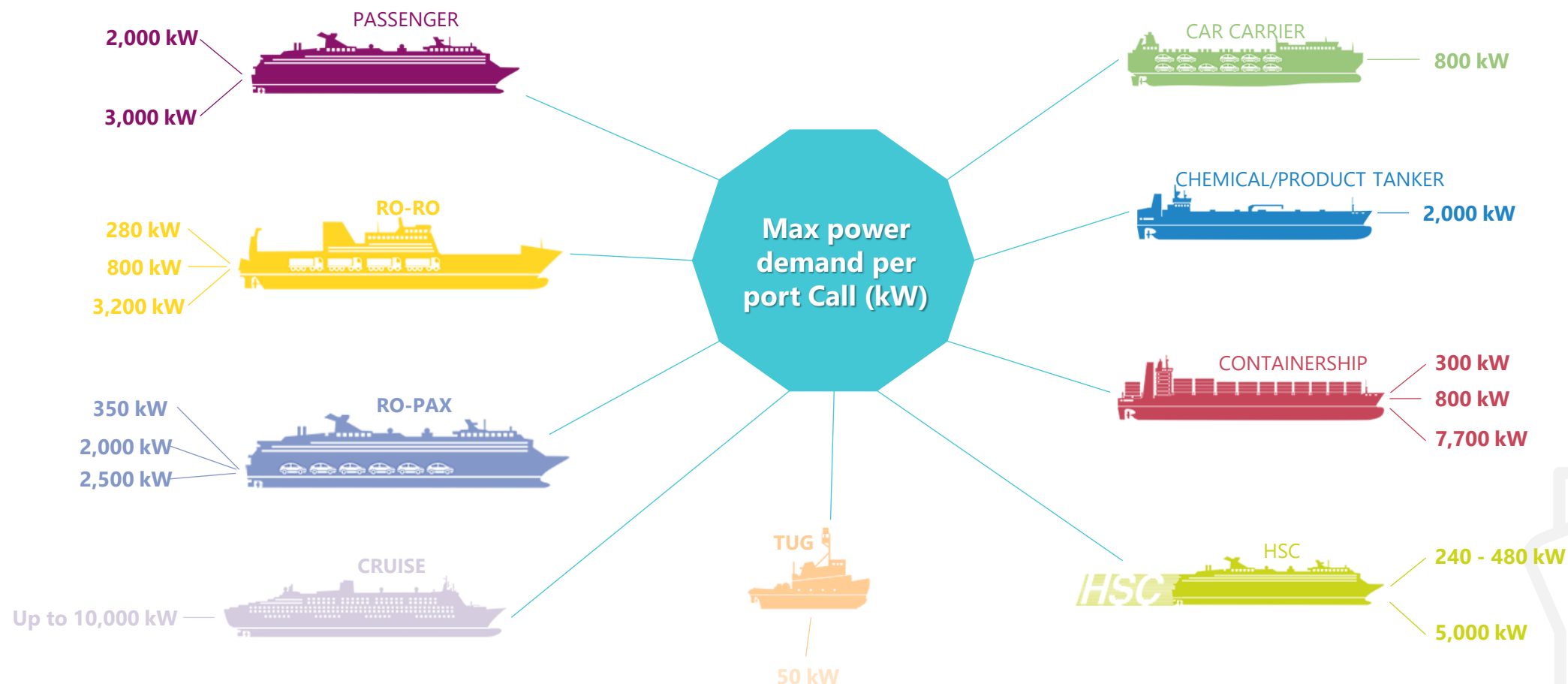
Note: () Reflects number of companies.

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.

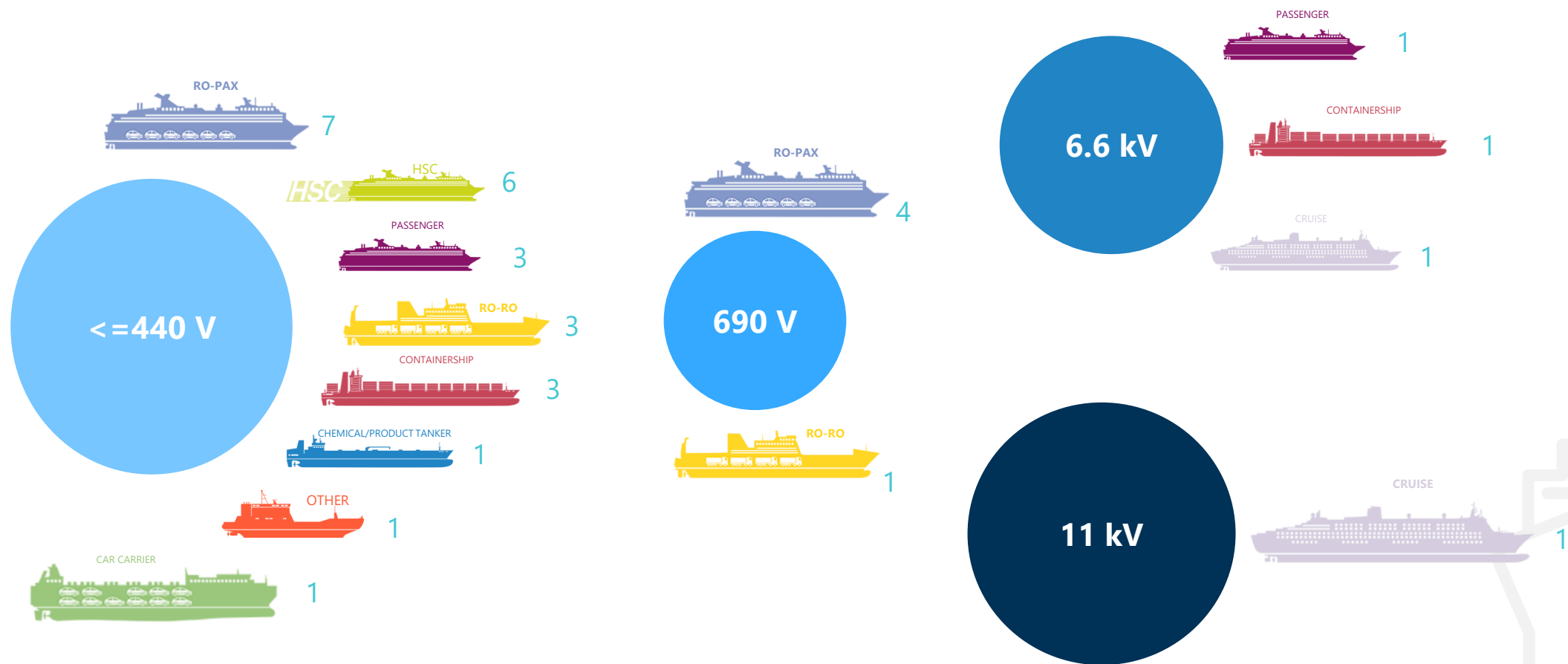
C

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.

Status of fleet available to be plugged with OPS per type of ship

220

NUMBER OF
UNITS WITH
OPS SOLUTION
AVAILABLE ON
BOARD

184

CONTAINERSHIP



26

CRUISE

9



HSC

1



147

NUMBER OF
UNITS ALREADY
USING OPS

CONTAINERSHIP

121



26













Note: 5/18 replies. Multiple choice.

C

B - TECHNICAL ASPECTS RELATED
TO OPS

A

Number of calls per type of ship in ports with OPS

TYPE OF SHIP	NUMBER OF ANNUAL CALLS	AVERAGE BERTHING TIME (HOURS) OF SHIP AT PORTS PER CALL (H/PORT CALL)	AVERAGE BERTHING FREQUENCY OF CALLS (N° OF PORT CALLS PER WEEK)
CAR CARRIER 	100	8	2
CHEMICAL/PRODUCT TANKER 	25	36	1
CONTAINERSHIP 	700	36	4
CONTAINERSHIP 	540	16	8
CONTAINERSHIP 	52	24	1
HSC 	365	3	7
PASSENGER 	1,040	1	20
PASSENGER 	NA	8	5
RO-PAX 	500	4	10
RO-PAX 	150	3	3
RO-RO 	350	6	7
TUGS 	365	-	-

Note: 11/18 replies. Multiple choice.

Note: NA – Not answered.

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

Shipping Companies Questionnaire - results

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



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"

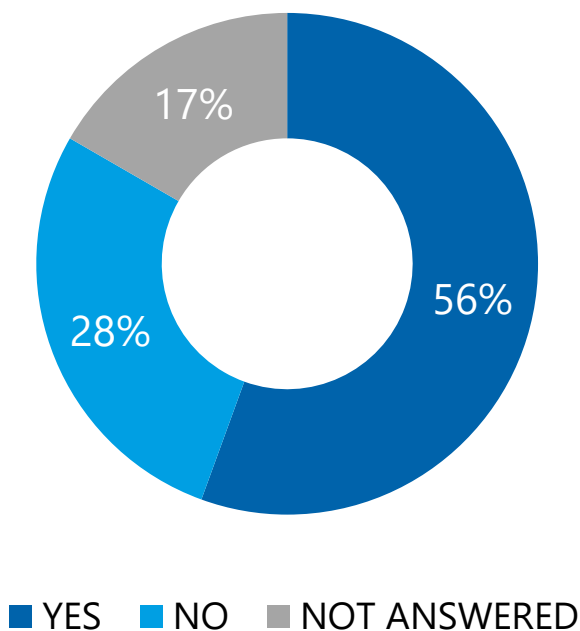
"Ships' age"

"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.)?



Note: Open question.

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".

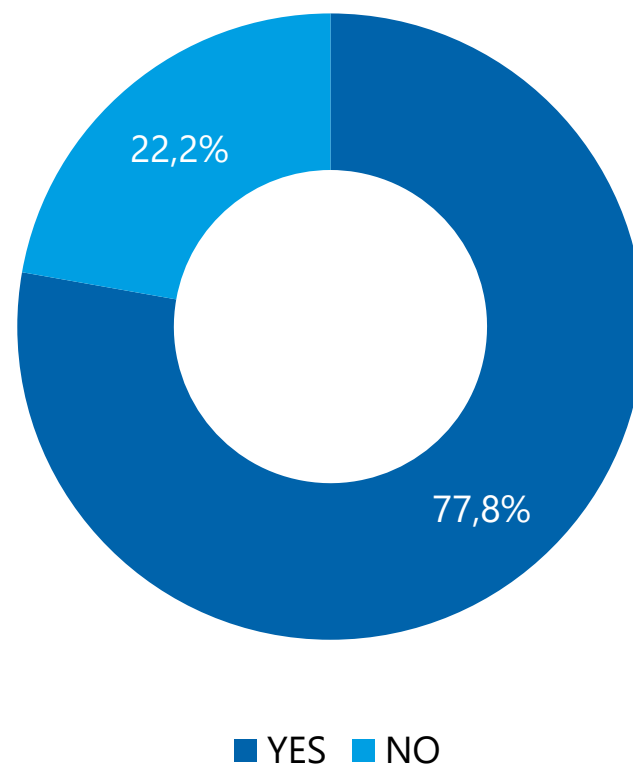
Who would be the best possible electricity supplier and OPS operator considering also the possibility of unbundling the market?

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.



Would you prefer the flexibility of choosing the electricity supplier when receiving OPS services?



Note: 18/18 replies. Multiple choice

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



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.



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.

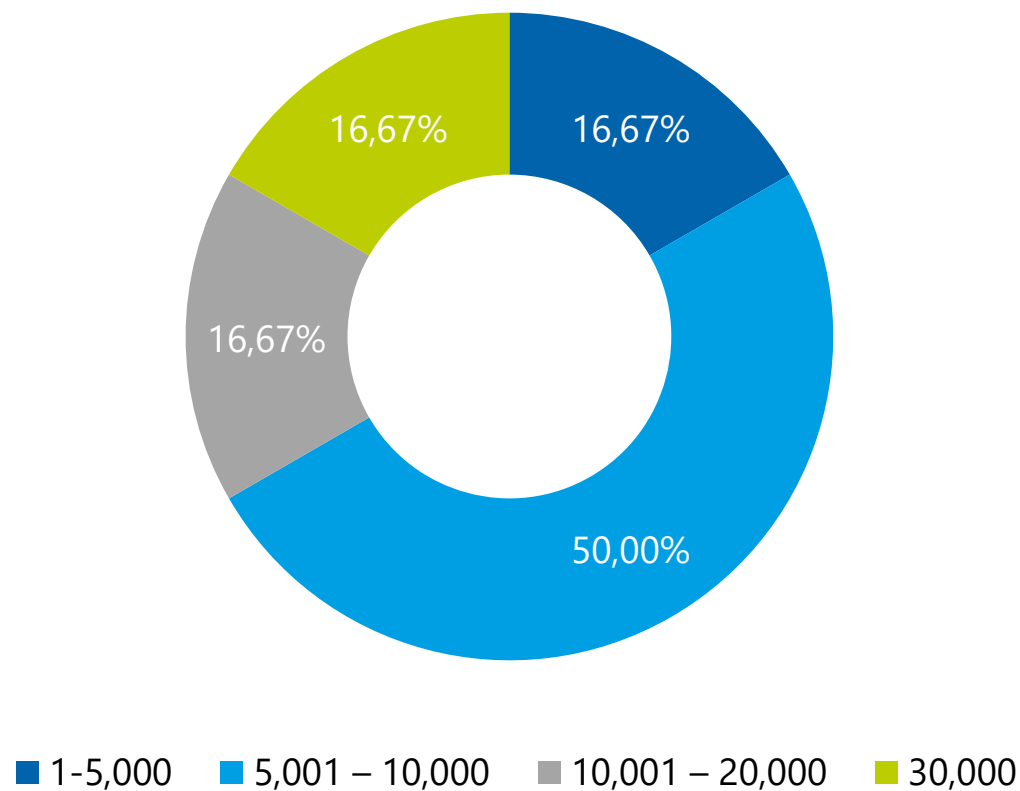
D - TRAINING

It collects aspects related to training.

E - ADDITIONAL INFORMATION

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

Number of ships classified/represented



Note: 6/6 replies

E

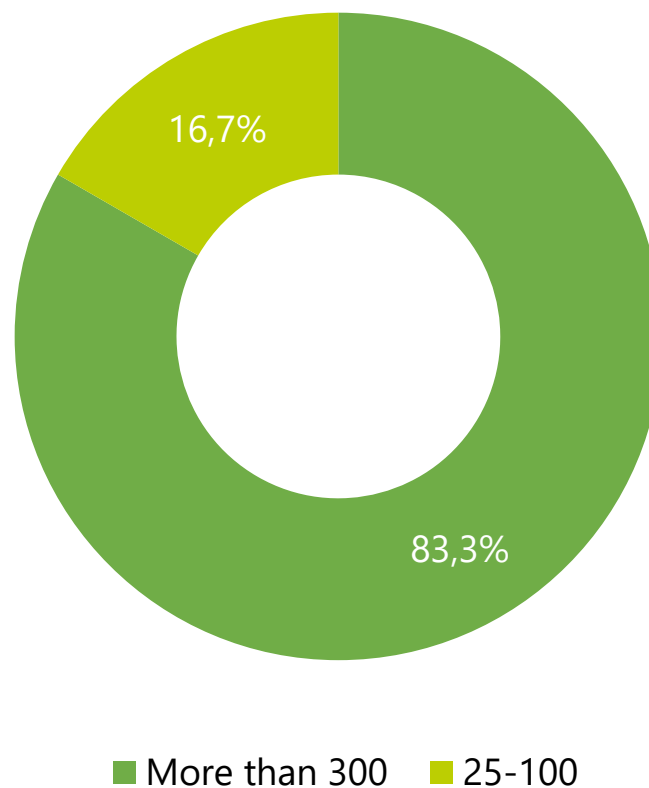
D

C

B

A - GENERAL INFORMATION

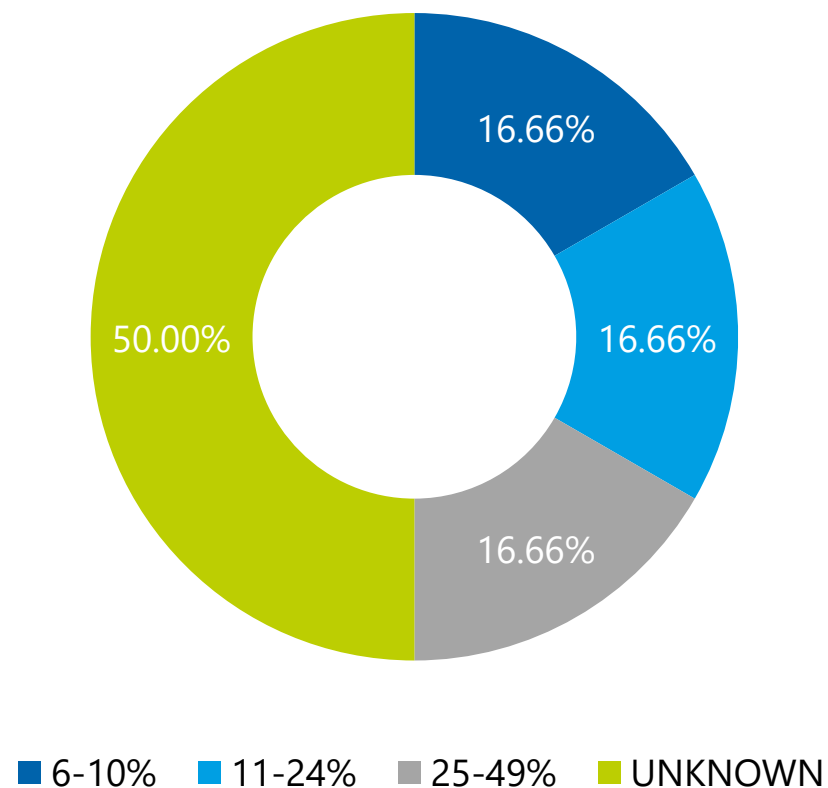
Number of shipowners/shipping companies assisted



Note: 6/6 replies

Note: None of the interviewees replied in the 101-300 range and less than 25

% of shipping companies within your client/members portfolio interested in OPS solutions in their fleet



Note: 6/6 replies

E

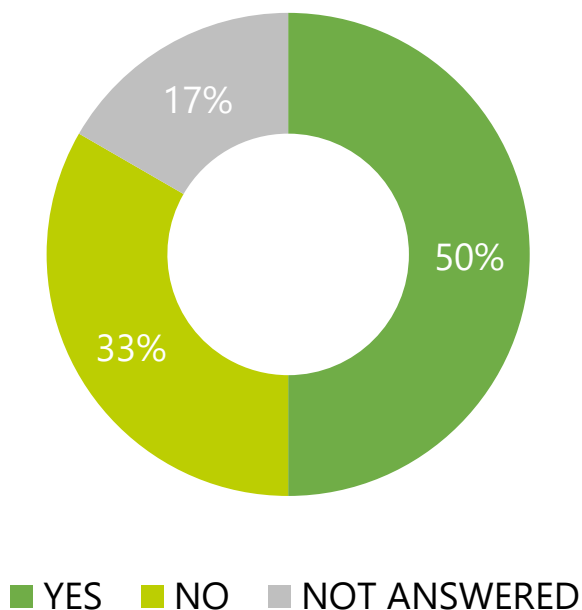
D

C

B

A - GENERAL INFORMATION

Is your classification society including OPS as part of your company/entity strategic planning?



Replies received:

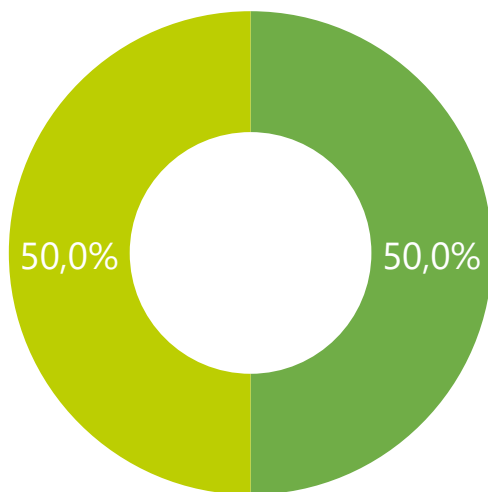
"Publication of Rules and Regulations".

"Requirements from IEC are also required in our rules".

"Broader focus on decarbonisation, hybridization and supporting the industry towards IMO 2050 goals. This includes a focus on Onshore Power Supply solutions".

Note: 5/6 replies

Does your classification society or flagship have a specific working group related to electrification or OPS solutions?



■ YES ■ NO

Replies received:

"Electrotechnical System Community".

"Our department in charge of the rules' developing are working in this. Additionally, in Spain we have collaborated in several working groups dedicated to the analysis of the OPS solutions in the Spanish harbors".

"Teams around the globe focusing on decarbonization and OPS solutions".

Note: 6/6 replies

E

D

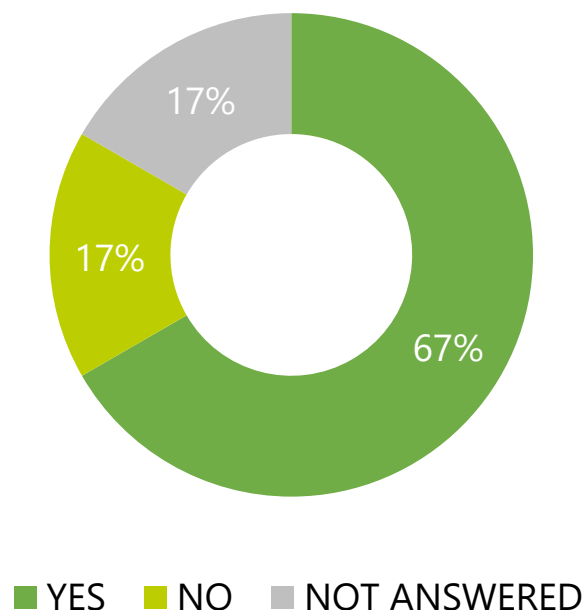
C

B

A - GENERAL INFORMATION



Is your entity involved to promote the use of OPS among your customers/registered ships?



Note: 5/6 replies

Replies received:

"Publication of Optional OPS notation".

"In the future it will be mandatory by the European legislation for a series of types of ships to connect to the electrical network from land".

"A new notation "Cleanship - HVSC" has been included in our rules, in order to grant support to our clients when OPS is used".

"We are considering OPS as one of the viable options for supporting decarbonization".

"Through its involvement at IMO and subsequent application of regulations promulgated there, the Registry would typically require or encourage its use as appropriate".



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.

What are the main issues to be considered when evaluating alternative OPS solution for ships?

TYPE OF SHIP	TECHNICAL SPECIFICATIONS	FEASIBLE COST BENEFIT ANALYSIS	STANDARDS AND REGULATIONS SUPPORTING THE FACILITIES	INCENTIVES AND FINANCING MECHANISMS	COLLABORATION BETWEEN STAKEHOLDERS INVOLVED	SOCIETY BENEFITS BOOSTING GREENER PORT CITIES	REQUESTS FROM PORTS
CAR CARRIER	3.00	2.00	3.67	3.50	3.50	3.50	3.00
CONTAINERSHIP	3.00	2.00	3.67	3.50	3.50	3.50	3.00
HSC	3.00	2.00	3.67	3.50	3.50	3.50	3.00
PASSENGER	3.67	2.00	3.67	3.50	3.50	3.50	3.00
RO-PAX	3.00	2.00	3.67	3.50	3.50	3.50	3.00
RO-RO	3.00	2.00	3.67	3.50	3.50	3.50	3.00
BULK CARRIER	2.67	2.67	3.00	3.67	3.00	3.00	2.33
CEMENT CARRIER	3.00	2.00	3.67	3.50	3.50	3.50	3.00
CHEMICAL/ PRODUCT TANKER	3.00	2.00	3.67	3.50	3.50	3.50	3.00
GENERAL CARGO	3.00	2.00	3.67	3.50	3.50	3.50	3.00
LPG TANKER	3.00	2.00	3.67	3.50	3.50	3.50	3.00
LNG TANKER	3.00	2.00	3.67	3.50	3.50	3.50	3.00
PILOT BOAT	3.67	2.00	3.67	3.50	3.50	3.50	3.00
TUGS	3.67	2.00	3.67	3.50	3.50	3.50	3.00
INSPECTION SHIP	3.00	2.00	3.67	3.50	3.50	3.50	3.00
OTHER	3.00	2.00	3.67	3.50	3.50	3.50	3.00

Note: 5/6 replies. Multiple choice 1(less relevant) / 5(more relevant)

E

D

C

B - TECHNICAL ASPECTS RELATED TO OPS

A

What are the best practices identified in OPS by the members of your association?

Replies received:

"OPS Rule requirements Part 7 Chapter 13 of Lloyd's Register Rules and Regulations".

"Standardization of the equipment and installations".

"Standardization of procedures and interfaces".

"No best practices yet identified".

Note: 5/6 replies.

E

D

C

B - TECHNICAL ASPECTS RELATED
TO OPS

A

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".

Note: 4/6 replies.

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."

Note: 4/6 replies.

E

D

C

B - TECHNICAL ASPECTS RELATED
TO OPS

A



Classification Societies' and Flagship Questionnaire

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

B - TECHNICAL ASPECTS RELATED TO OPS

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D - TRAINING

It collects aspects related to training.

E - ADDITIONAL INFORMATION

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

Main barriers at regulatory level which can affect the adoption of OPS

Replies received:

"None is foreseen".

"Utility companies' regulation at national and international level".

"No barrier. IEC/IEEE 80005-series provides the necessary requirements. Class Rules have been harmonized with it".

"Lack of common integration and application of regulations and guidelines with port and coastal state regulations".

Note: 4/6 replies.

E

D

C - REGULATORY AND
ADMINISTRATIVE ASPECTS

B

A



Could you point out the type of documentation in force or in-house now?

LIST OF ITEMS	DOCUMENTATION 1	DOCUMENTATION 2	DOCUMENTATION 3	DOCUMENTATION 4	DOCUMENTATION 5	DOCUMENTATION 6	DOCUMENTATION 7
OPS RULES/ GUIDES/ GUIDANCE NOTES/ STANDARDS	YES	Additional Notation	STANDARDS	RULES	STANDARDS	Guidance	Lloyd's Register Rules and Regulations for the Classification of Ships
TITLE OF DOCUMENTATION	Guide for High Voltage Shore Connection	Requirements stated on NR467	Electrical Shore Connections / Cold Ironing	SECTION 5 ELECTRICAL SHORE CONNECTIONS - SHORE POWER	Utility connections in port	ON-SHORE POWER SUPPLY	-
TYPE OF DOCUMENTATION (RULE, GUIDE, GUIDANCE NOTE, STANDARD, OTHER)	Rules, Guide	PtF, Ch9	DNV Standards for Certification (previously Certification Notes)	DNV RULE	NEK IEC/IEEE Standard	Guidance note	Rules
PUBLICATION NUMBER	-	-	No. 2.25	Part 6 Chapter 7 Section 5 Rules for classification: Ships — DNV-RU-SHIP Pt.6 Ch.7. Edition	80005-1:2019	MEPC.1/Circ.794	Part 7 Chapter 13
PUBLICATION DATE	-	-	JULY 2014	July 2021	2019	9 October 2012	2009
LAST UPDATE	July 2021	Rules ed. 07/21	-	-	-	MEPC.1/Circ.794/Corr.1	2021
TYPE OF VESSEL DOCUMENT APPLIES FOR	All	every vessel	All	All	All	All	Ships
GENERAL DESCRIPTION	Class requirements related to safety	-	-	-	-	-	Optional Notation deals with hazards onboard the ship and considers interface with shore equipment.

Note: 4/6 replies. Only Classification societies

E

D

C - REGULATORY AND
ADMINISTRATIVE ASPECTS

B

A



Future OPS provisions

LIST OF ITEMS	INFORMATION
OPS RULES/ GUIDES/ GUIDANCE NOTES/STANDARDS	YES
TITLE OF DOCUMENTATION	Continuous improvement of the Guide for OPS
TYPE OF DOCUMENTATION (RULE, GUIDE, GUIDANCE NOTE, STANDARD, OTHER)	Guide for High Voltage Shore Connection
PUBLICATION NUMBER	-

Note: 1/6 replies. Only Classification societies

E

D

C - REGULATORY AND
ADMINISTRATIVE ASPECTS

B

A



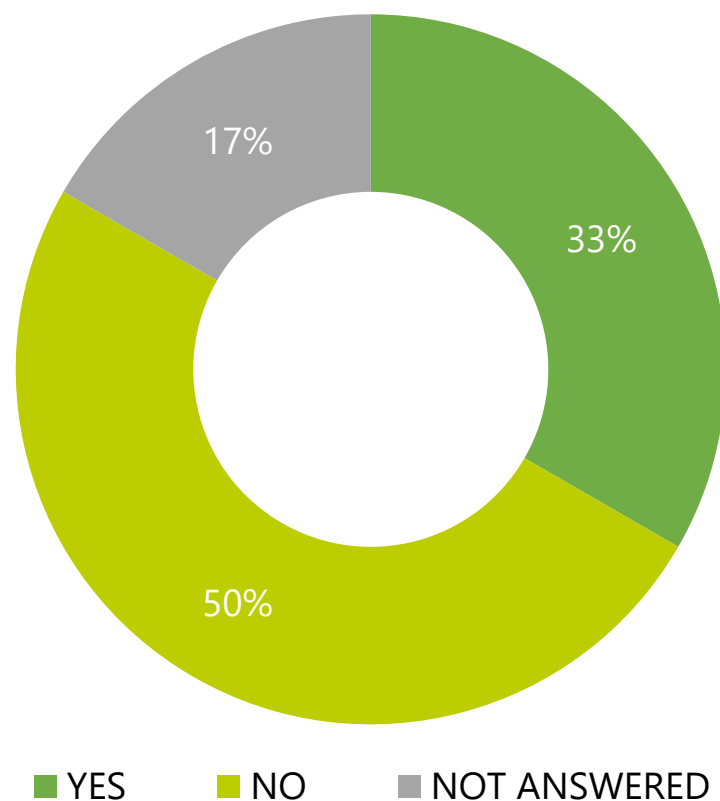
Please list and describe of any other initiative related to OPS, such as an emissions calculator, energy planning review and ETS compatibility.

Replies received:

"IMO MSC 103 discussed draft interim guidelines on the safe operation of onshore power supply (OPS) service in ports for ships engaged in international voyages. EMSA Guidance on Shore-Side Electricity to Port Authorities and Administrations and other publications are under consideration. IEC/IEEE 8005-1 and other national or international standards related to shore power connections".

"Our Classification Society has a wide range of activities ongoing regarding decarbonizations including the development of various tools such as Environmental Monitor".

**Do you recommend any regulatory advice, action or support for shipowners/
shipping companies to be adopted by the EU?**



Note: 5/6 replies.

E

D

C - REGULATORY AND
ADMINISTRATIVE ASPECTS

B

A



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.

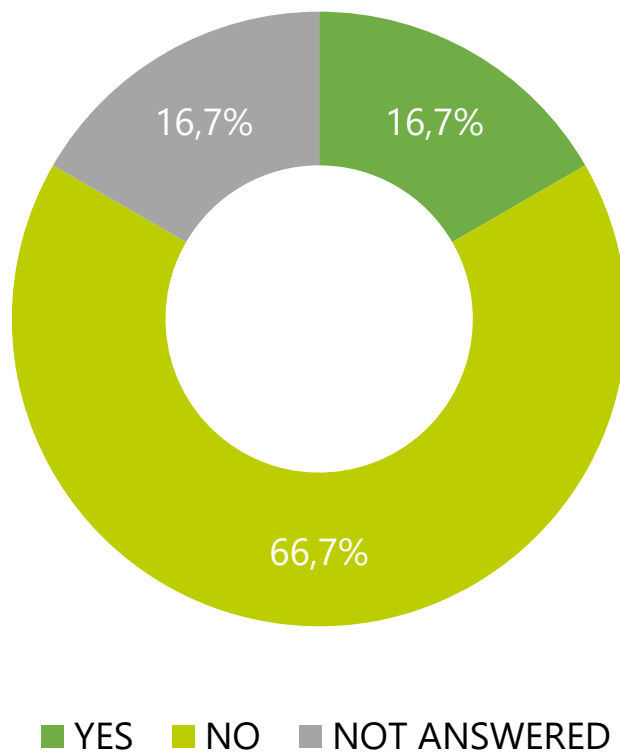
D - TRAINING

It collects aspects related to training.

E - ADDITIONAL INFORMATION

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

Is there any training specifications or standard procedures for this type of operations?



Additional comment received:

"In house company standards and best practices. Operational manual to be submitted for review and approval by class."

Note: 5/6 replies.

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".





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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.

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

Reply received:

"Stakeholders shall ensure that shore-based regulations to install OPS equipment and shipping regulatory requirements to install OPS capability are aligned."

Note: 4/6 replies.

Conclusions – Shipping Companies

- I. 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 (see slides 12 and 17).*
- II. 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 (see slides 16 and 21). Almost half of the already equipped vessels are not using OPS due to lack of infrastructures available in EU ports.*
- III. 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. (see slide 18).
→ need for case-by-case assessment
→ need to focus on each terminal, current and future vessels calling at EU ports.*
- IV. 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 (see slide 19).*

Conclusions – Shipping Companies

- V. Most responders claimed that the most important mechanism to support the OPS adaptation onboard their fleet is an electricity tax exemption scheme (see slide 25).*
- VI. Cost of retrofit for container ships is increased since cable management system is required to be placed onboard. Cruise ships and passenger vessels have the same problem due to size and complexity of installation (see slide 28).*
- VII. The study in general emphasizes the need for technical and regulatory harmonization in both on-board and shore-side infrastructures.*
- VIII. 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.*

Conclusions – Shipping Companies

- IX. 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.*
- X. An early engagement with all the various stakeholders across the supply chain is key.*
- XI. Training on safety aspects on shore-ship compatibility and an appropriate operations manual could help to speed-up the process onboard.*

130 Shipping Companies were contacted.



Conclusions - Classification Societies and Flagships

- I. The interest raised by customers or members of classification societies and flags is not only limited to OPS but relates to decarbonisation in general.*
- II. The range of options, coupled with the investments required, shows the difficulty shipping lines face in achieving the decarbonization of the sector.*
- III. The need of standards and regulations is, in their opinion, the most important driver to be considered when evaluating alternative OPS solutions for ships.*

32 Flags and 11 Classification Societies were contacted.



European flagship Action for coLd ironING in ports

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The analysis presented is based solely and exclusively on the responses of 18 Shipping Companies, 4 Classification Societies and 2 Flag Administrations. Inputs reflected can provide preliminary conclusions but may need to be enriched to provide the outcome of the analysis. The contents of this publication are the sole responsibility of the EALING consortium and do not necessarily reflect the opinion of the European Union.