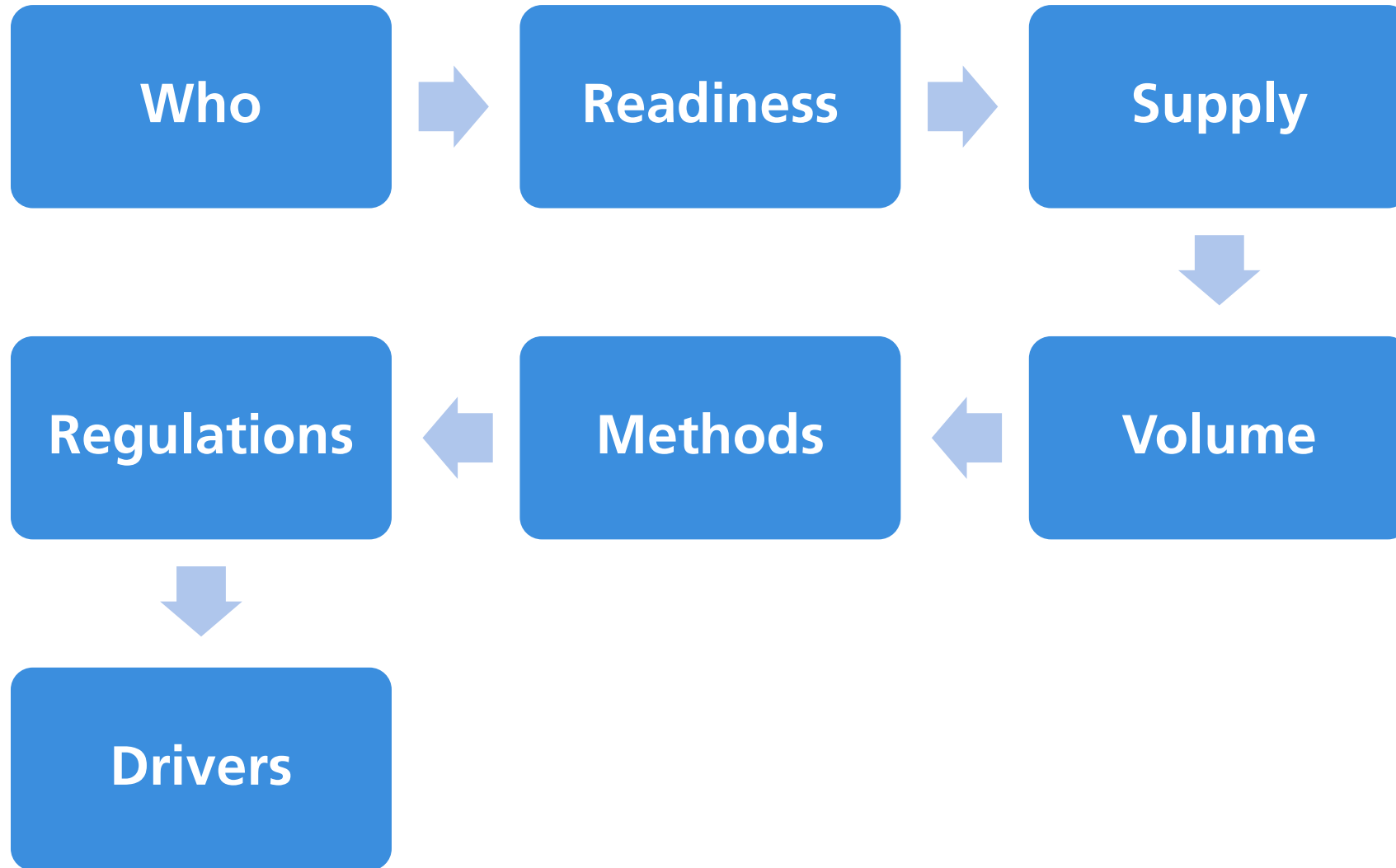




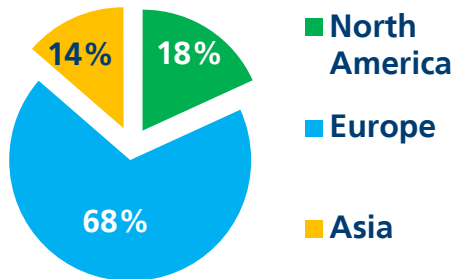
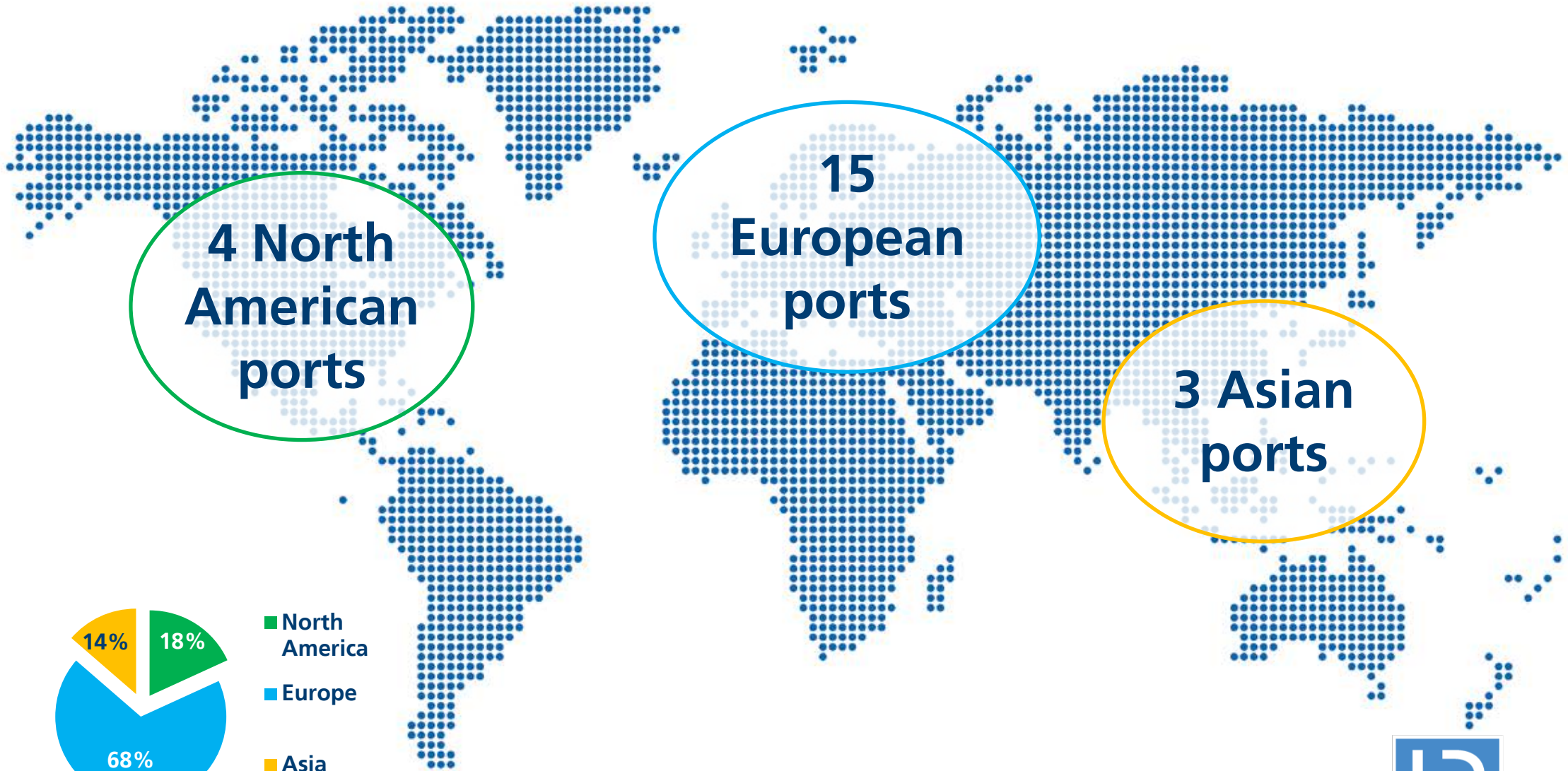
Lloyd's Register LNG Bunkering Infrastructure Survey 2014

The outlook of Ports on provision of LNG bunkering facilities

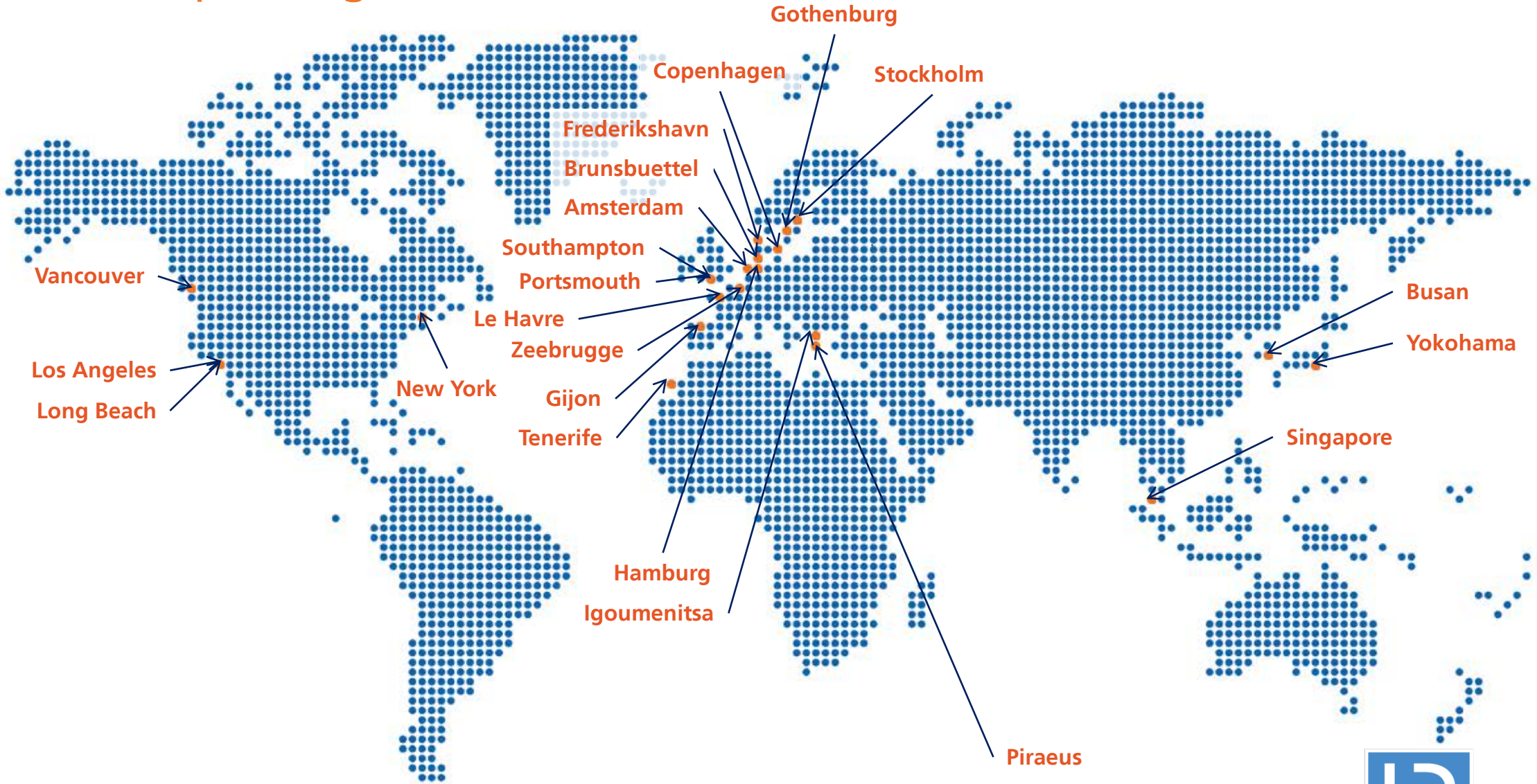
Flow



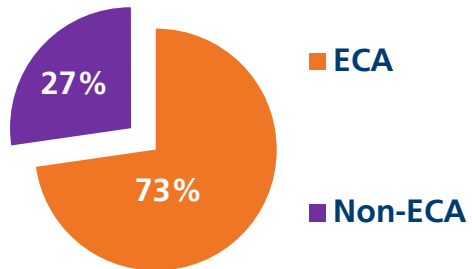
22 Responding Ports



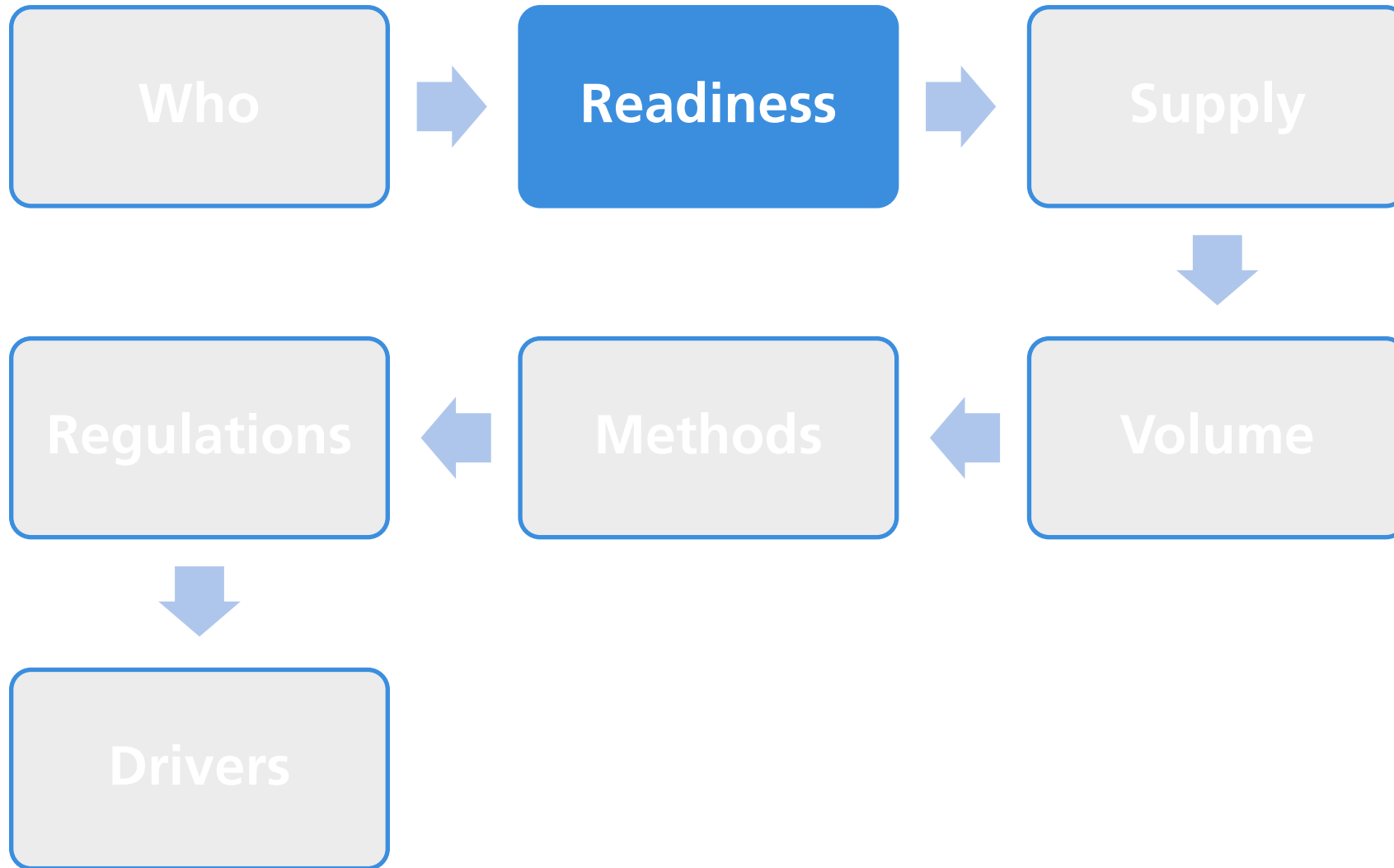
22 Responding Ports



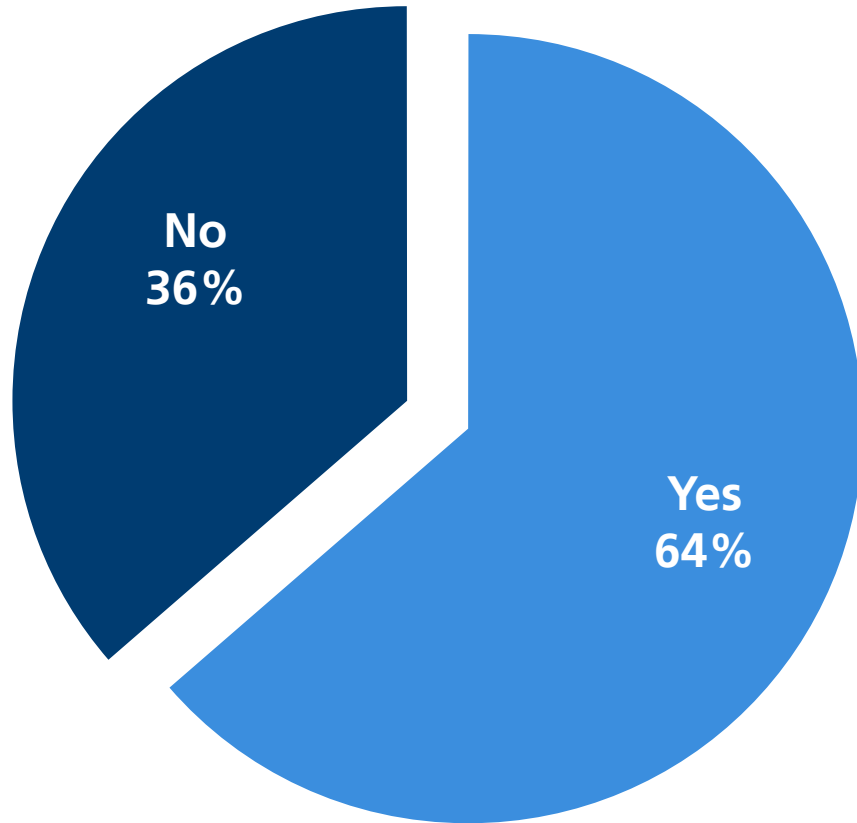
22 Responding Ports



Flow

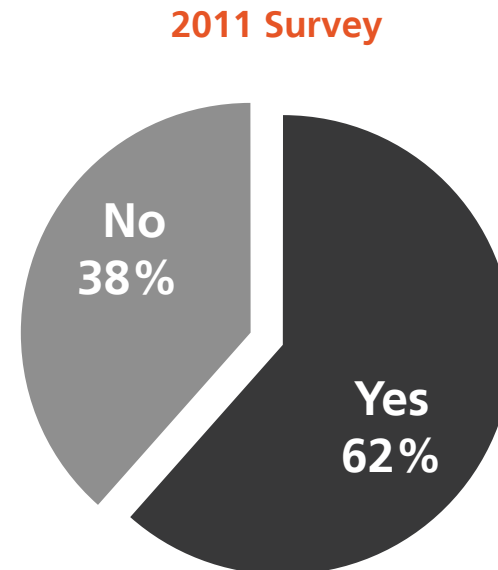


European Ports feel more in charge of making LNG as fuel happened than other Ports

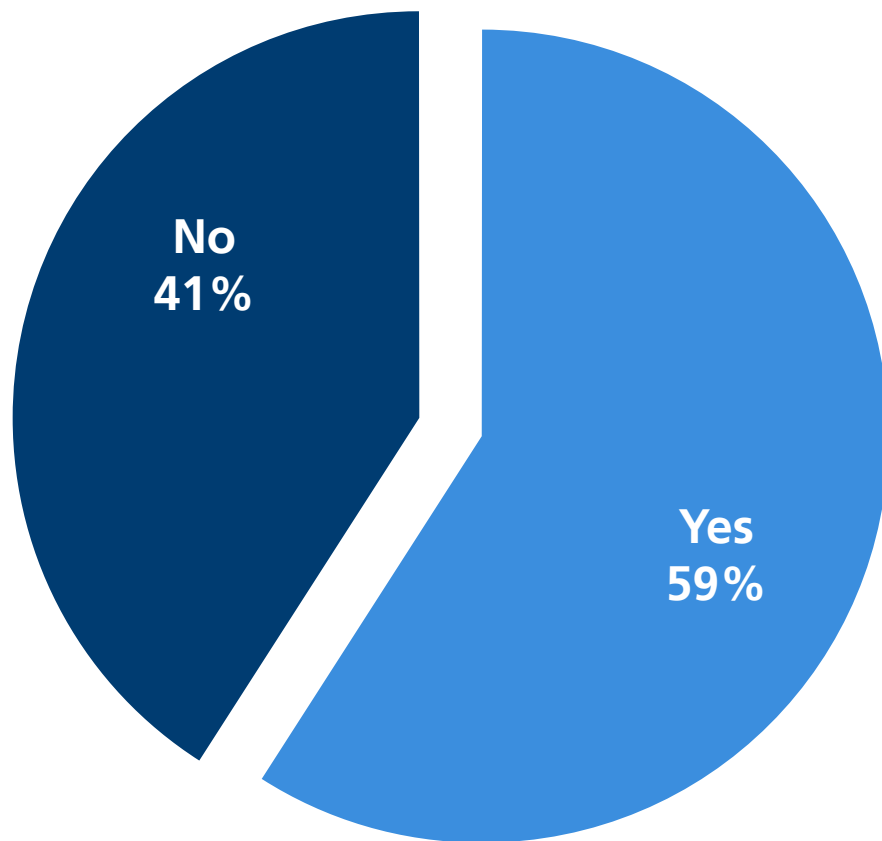


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Q2. Do you see yourself (the port) to be a driver of change with regard to the use of LNG as a fuel?

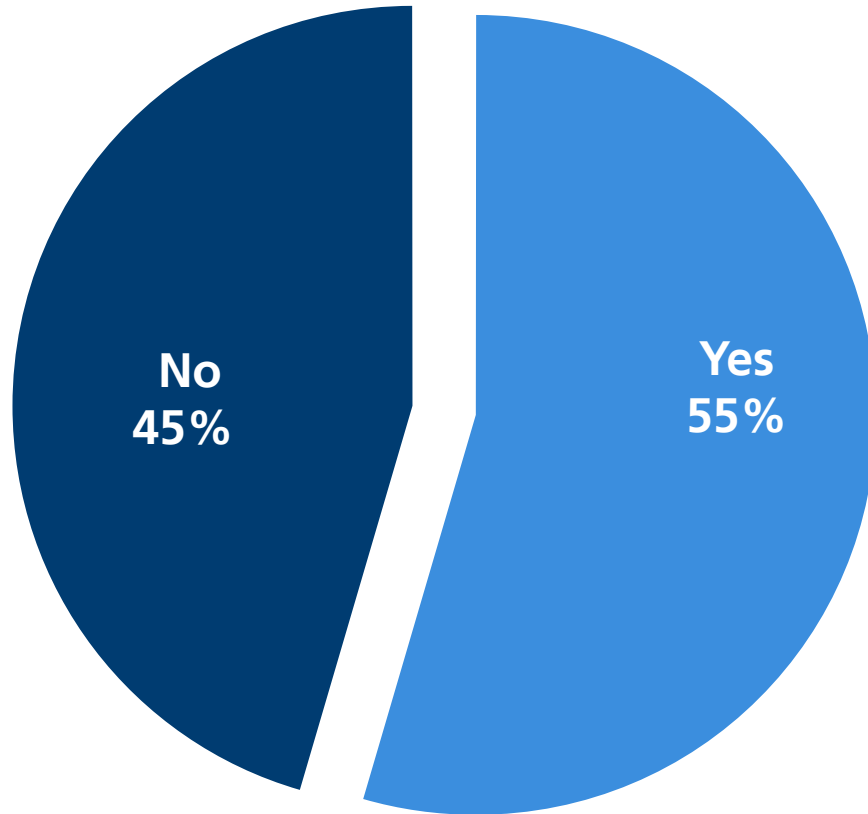


More than half responding Ports do have specific infrastructure plans for LNG bunkering

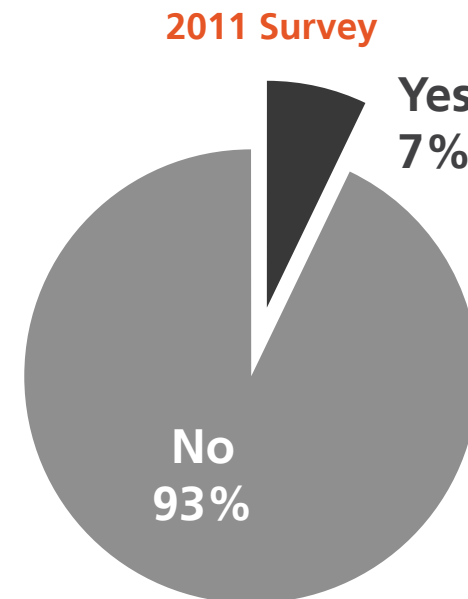


Q3. At present, does your port already provide or have plans to provide LNG bunkering infrastructure for the purpose of short-sea / local shipping?

Ports start to work together on LNG bunkering



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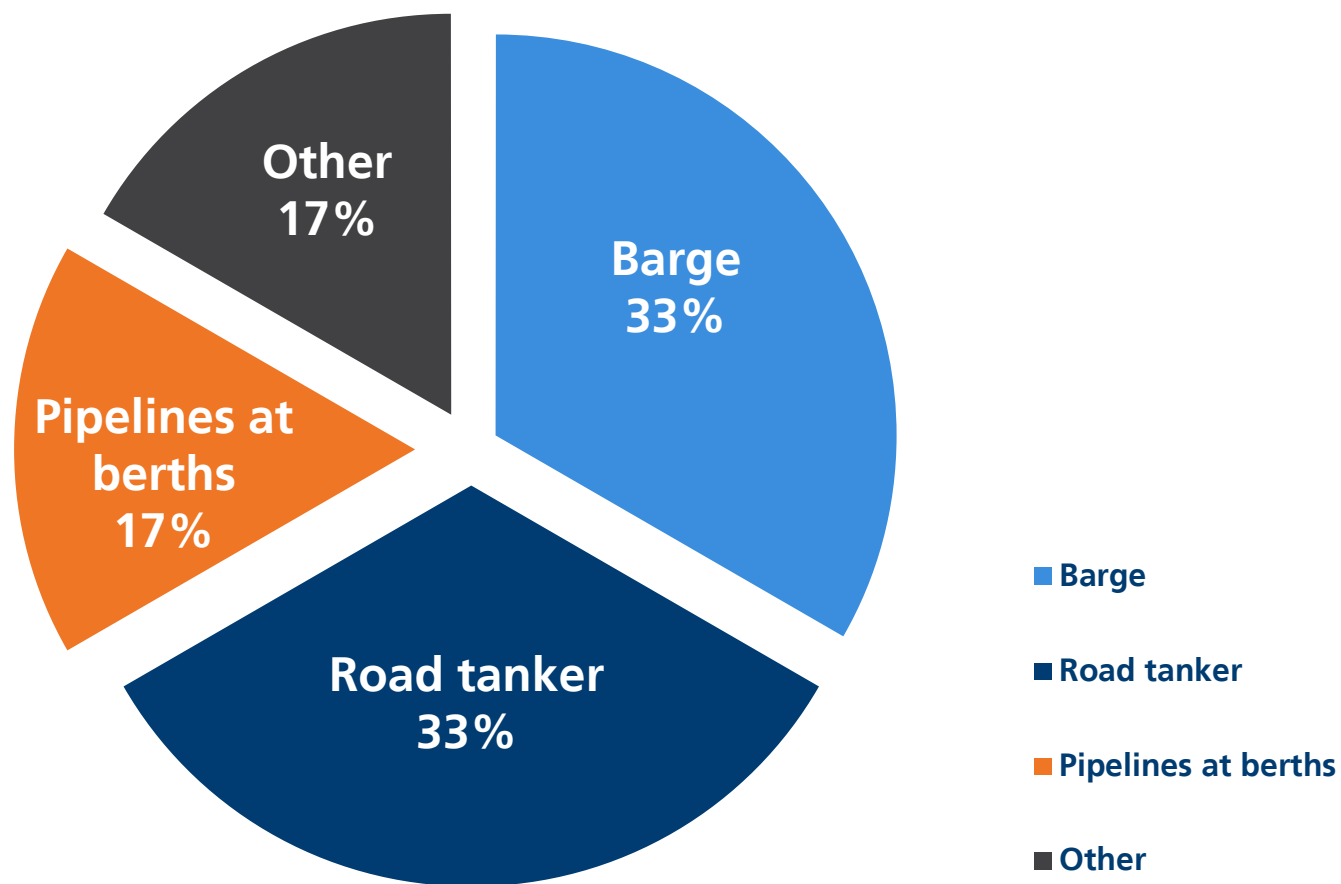


Q4. In July 2011, the International Association of Ports & Harbours (IAPH) launched a project to develop guidelines for LNG bunkering in ports, is your port participating in this project?

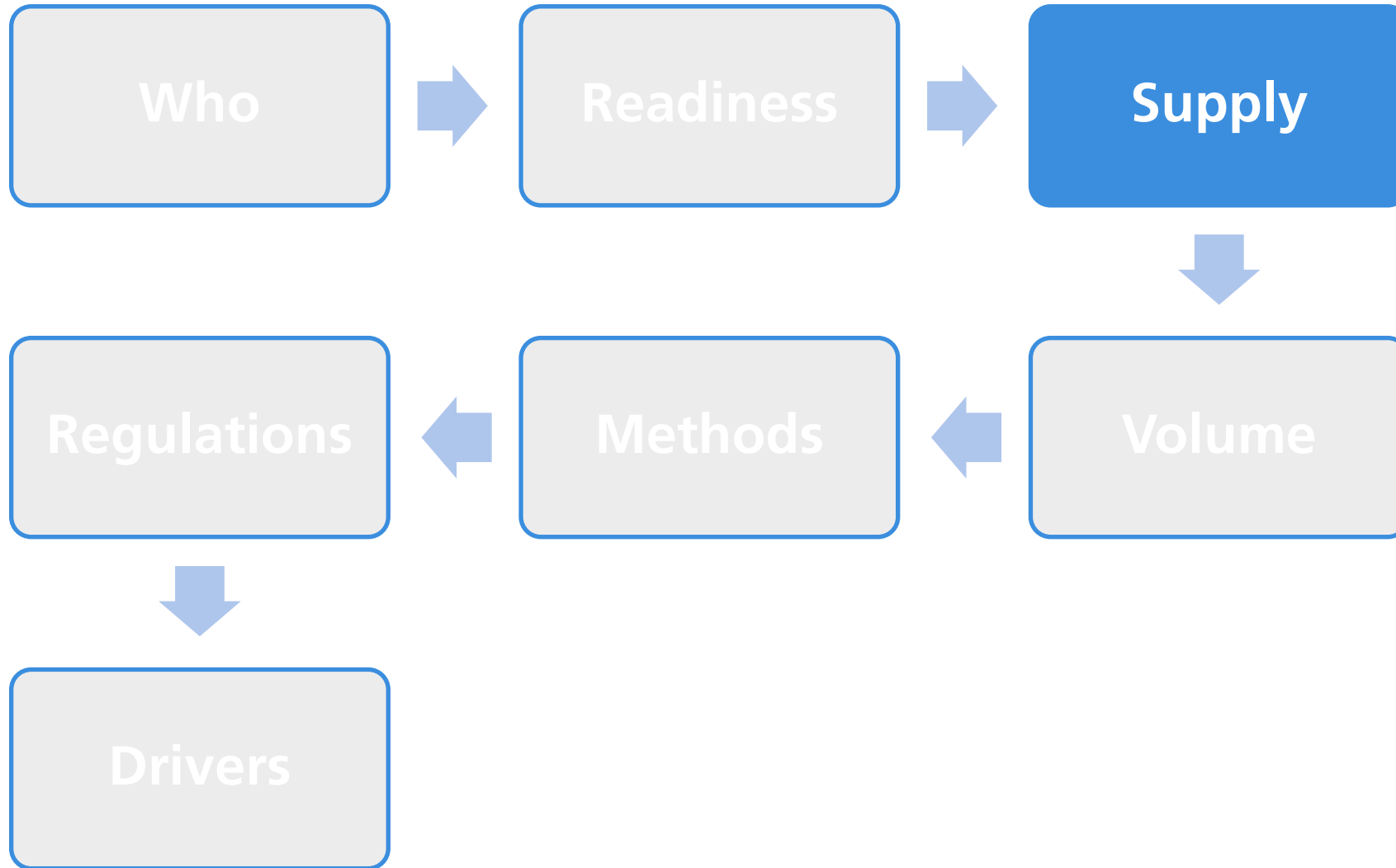


Lack of infrastructure will not stop Ports delivering gas as bunkering fuel

Q6. What type of bunkering facilities are currently provided / do you plan to provide in your Port for gas fuelled shipping? (not just deep sea)

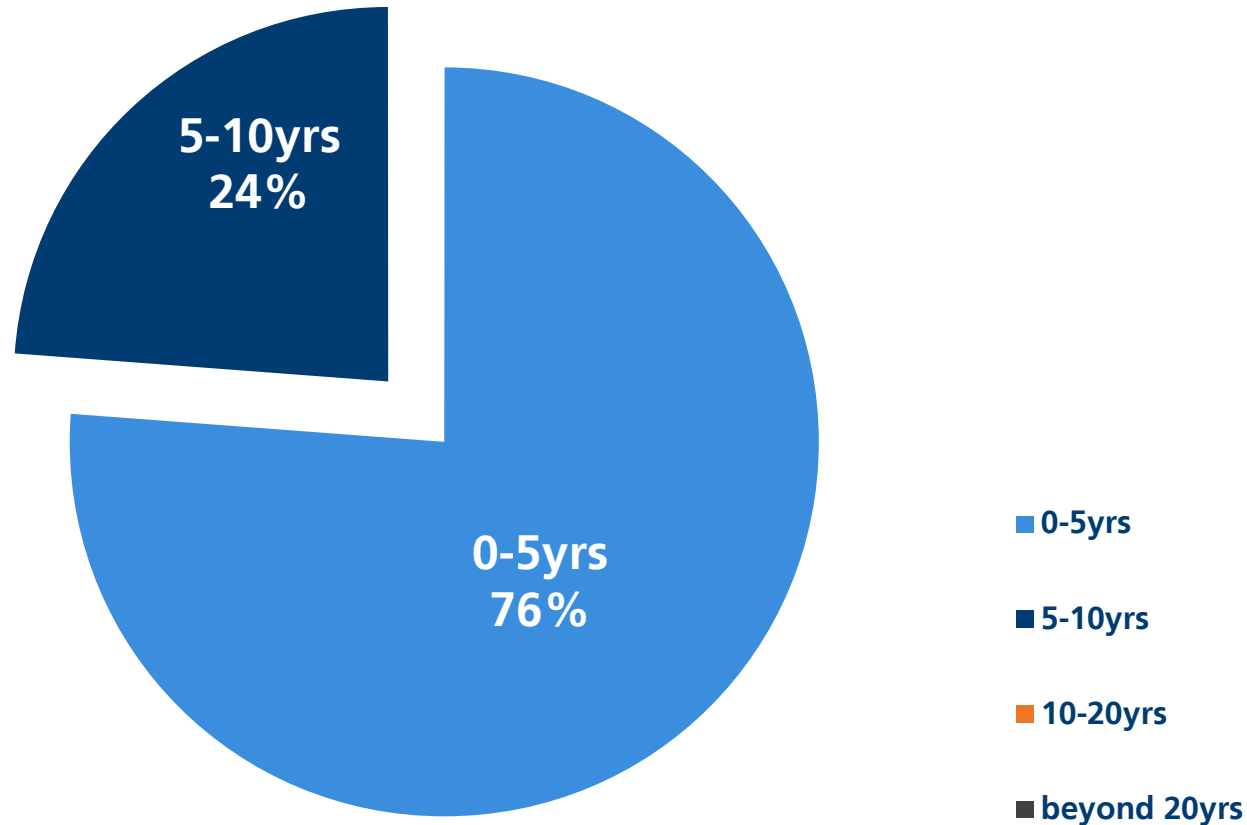


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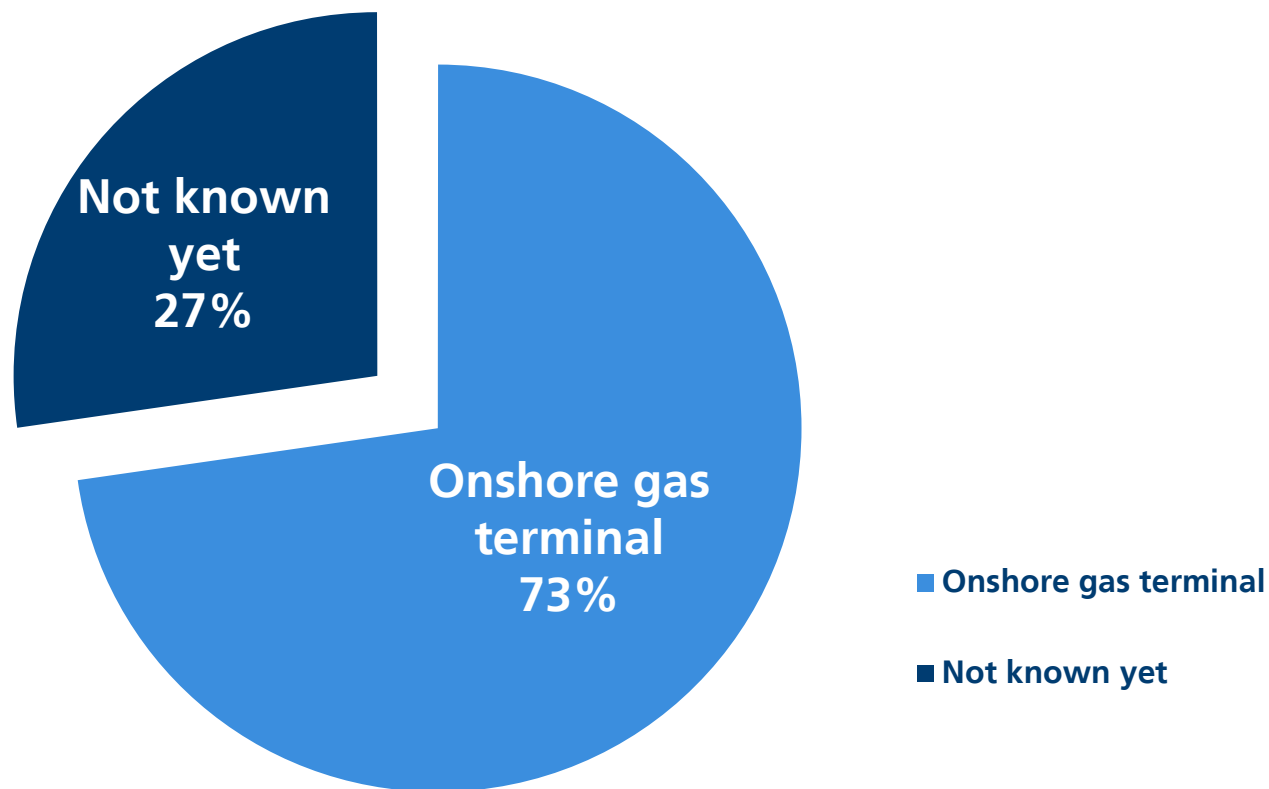
More Ports in Europe are ready for gas bunkering now

By 2020, Gas will be available for global deep sea routes



Q7. What is the expected timeframe for LNG bunkering operations to commence at your port?

Gas bunker will be supplied by existing onshore gas terminal

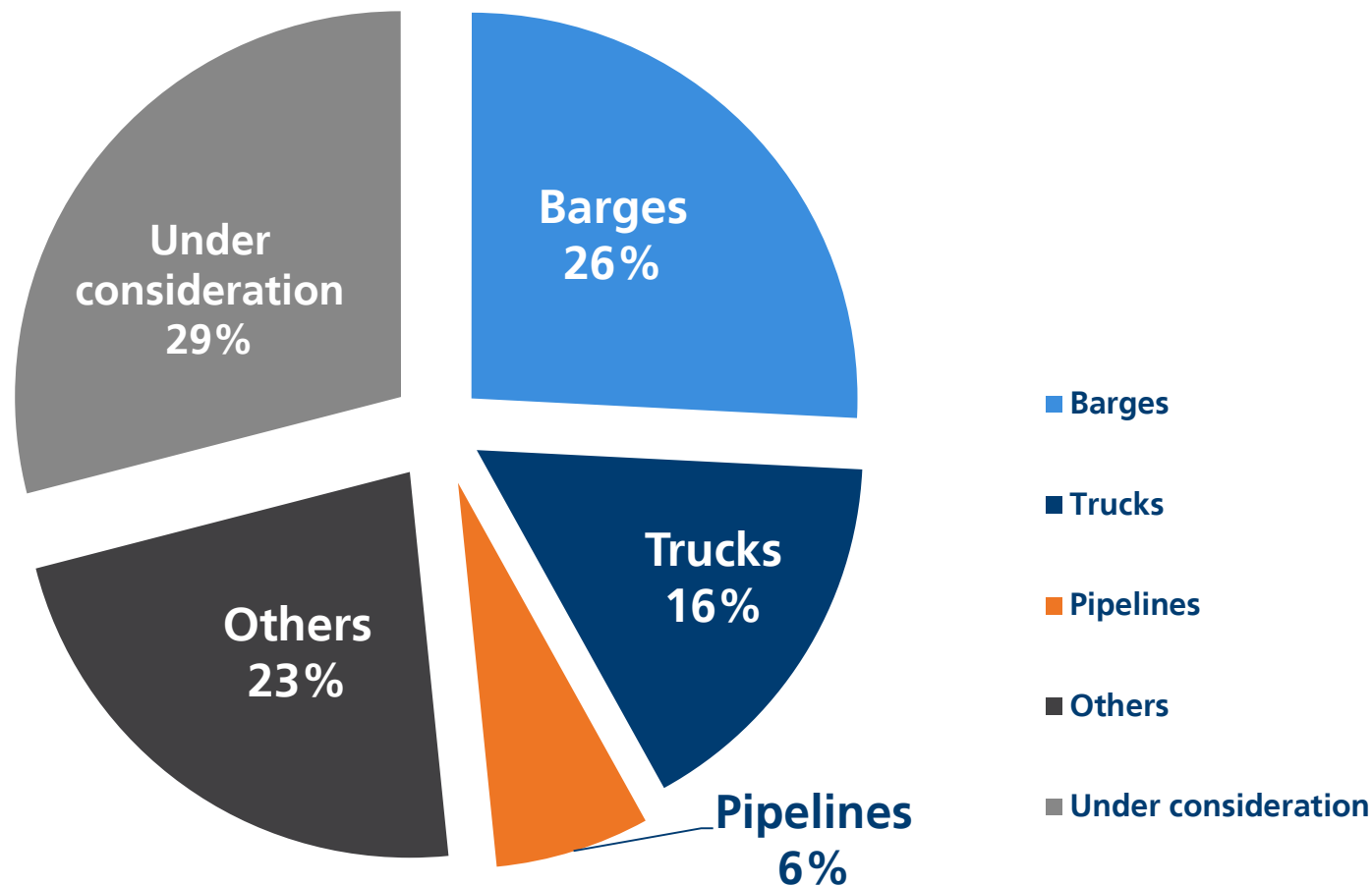


Q8: From where do you anticipate sourcing the LNG required for bunkering and in what volumes?

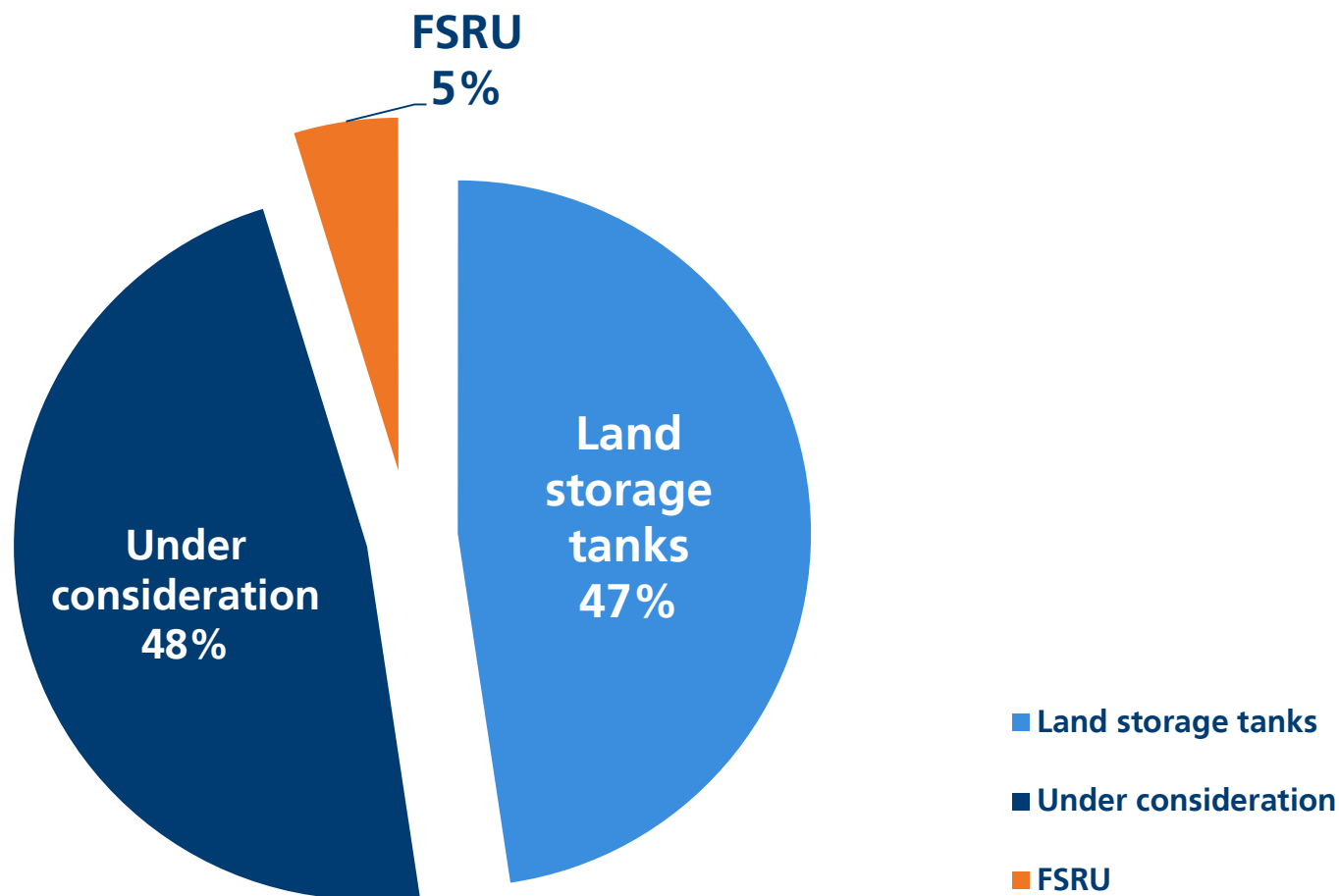
In short term, Ports will rely on 3rd party gas infrastructure as bunkering will be delivered afloat or by trucks

Q9. What kind of infrastructure are you planning to develop for LNG fuel supply to the port?

Purpose: Infrastructure required for receiving gas fuel from pipeline, LNG ships, LNG trucks, etc.



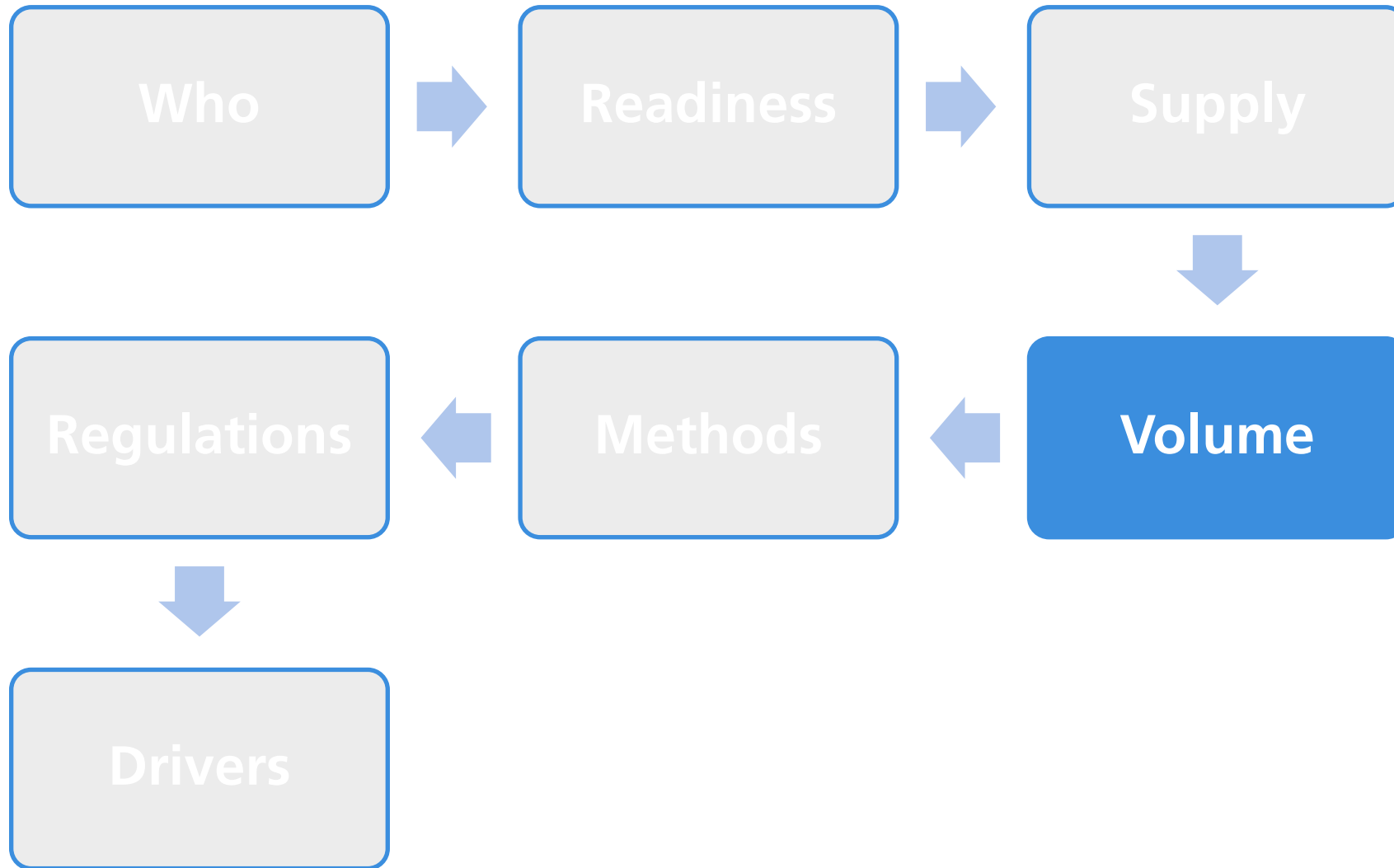
In longer term, Ports will have dedicated storage facilities for bunkering flexibility



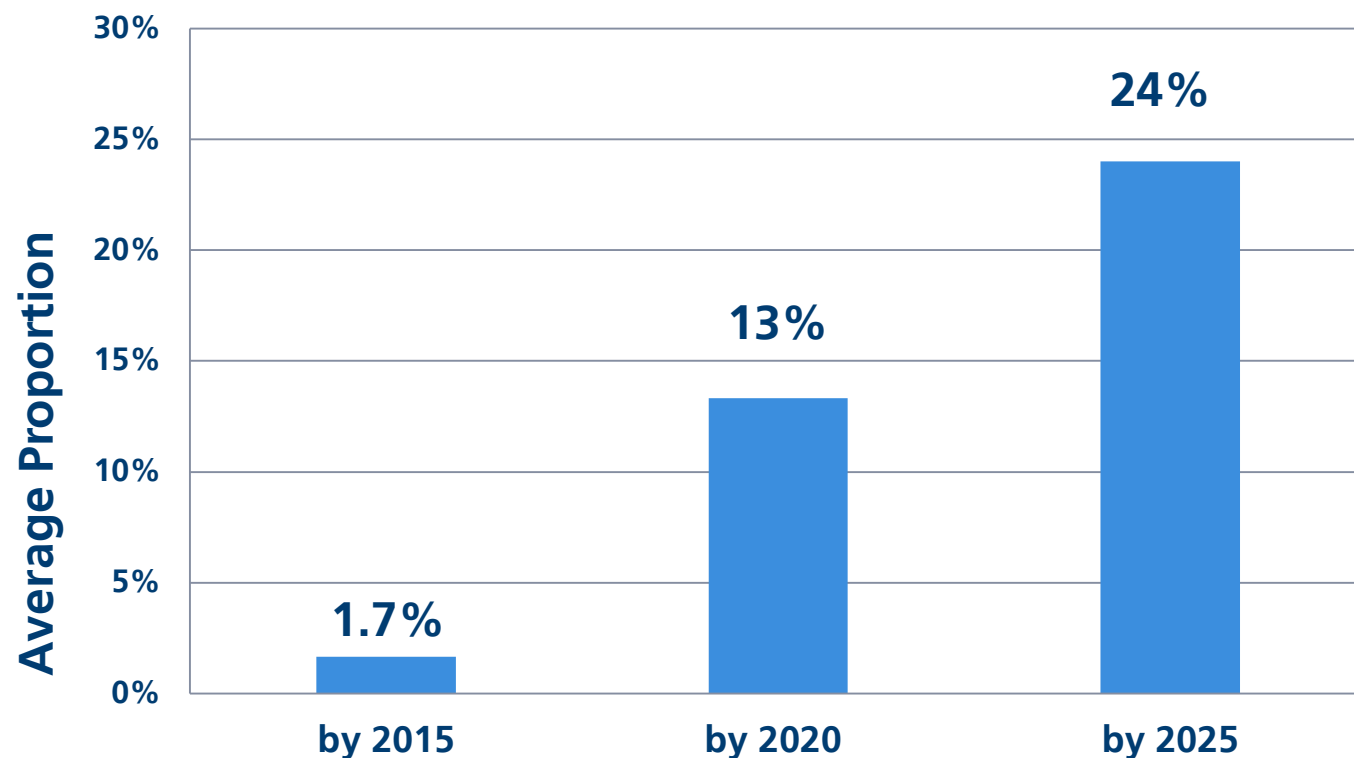
Q9. What kind of infrastructure are you planning to develop for LNG fuel supply to the port?

Purpose: Infrastructure required for storage of gas fuel, such as LNG storage tank on shore, FSRU, etc.

Flow



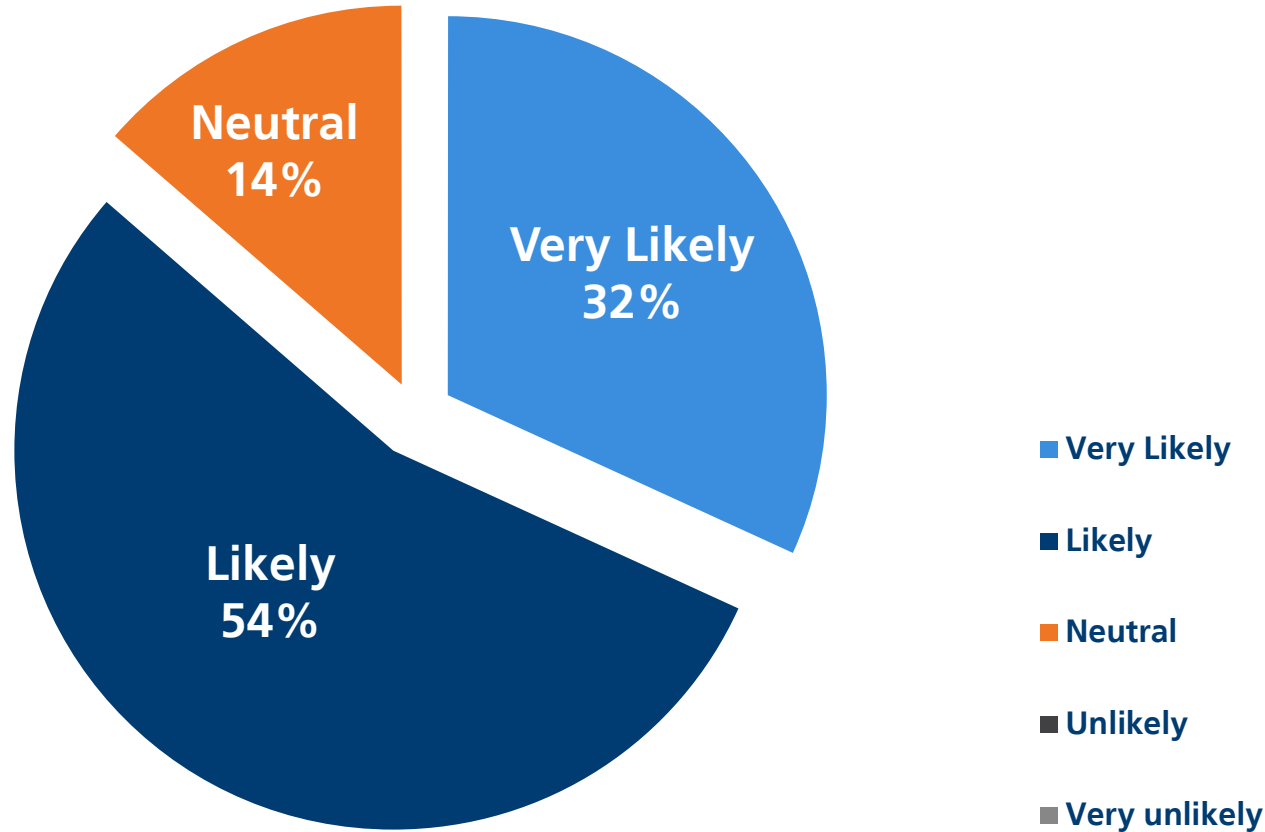
ECA Ports – availability of LNG for short sea seems secured



Q10. What proportion of the total bunkering volume at your port do you expect to be LNG within the following periods?



Ports show willingness to get ready for bunkering deep sea gas fuelled shipping

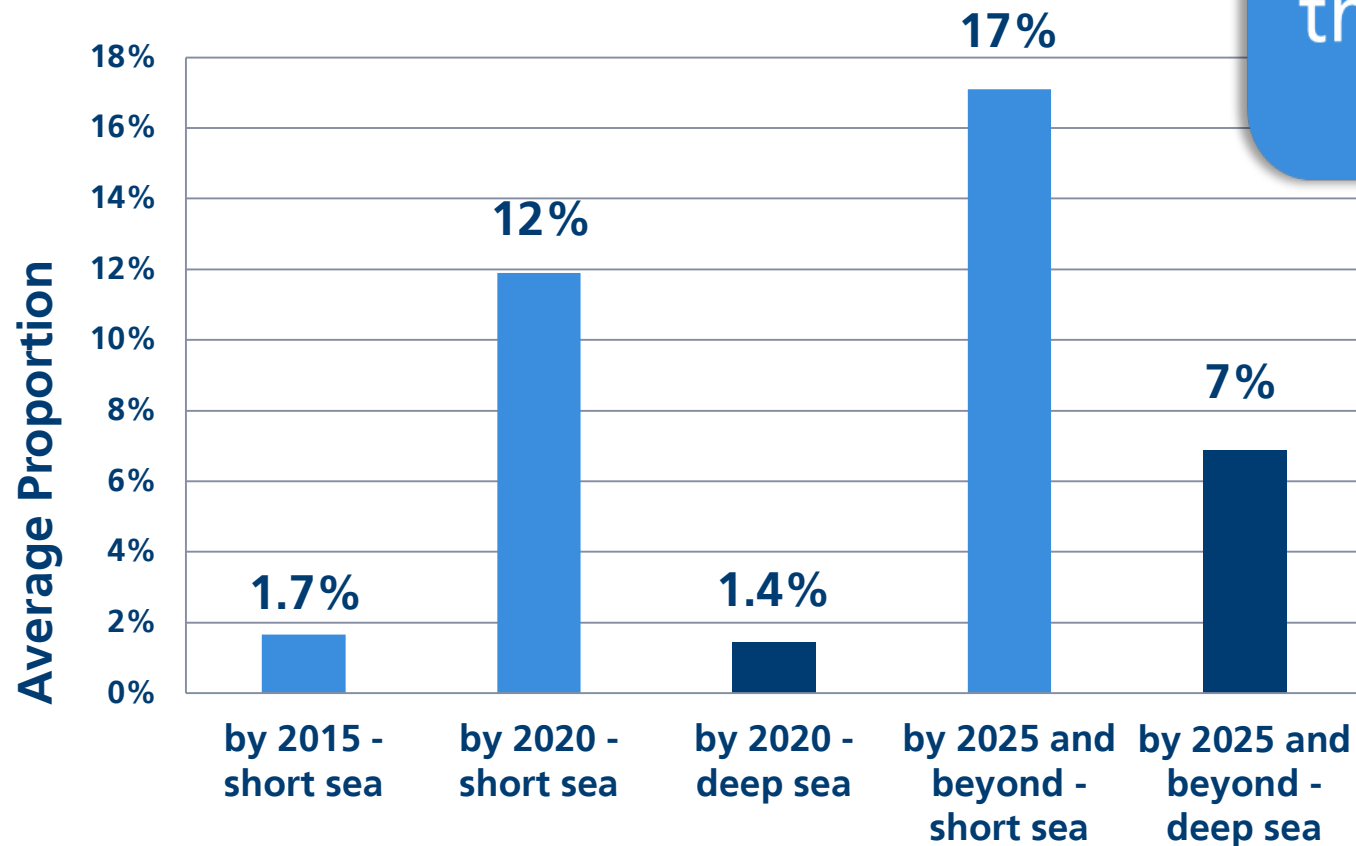


Q1: Generally do you consider LNG as a bunker fuel is viable for deep-sea shipping within the next 3 – 10 years?



Potential availability of LNG for deep sea shipping

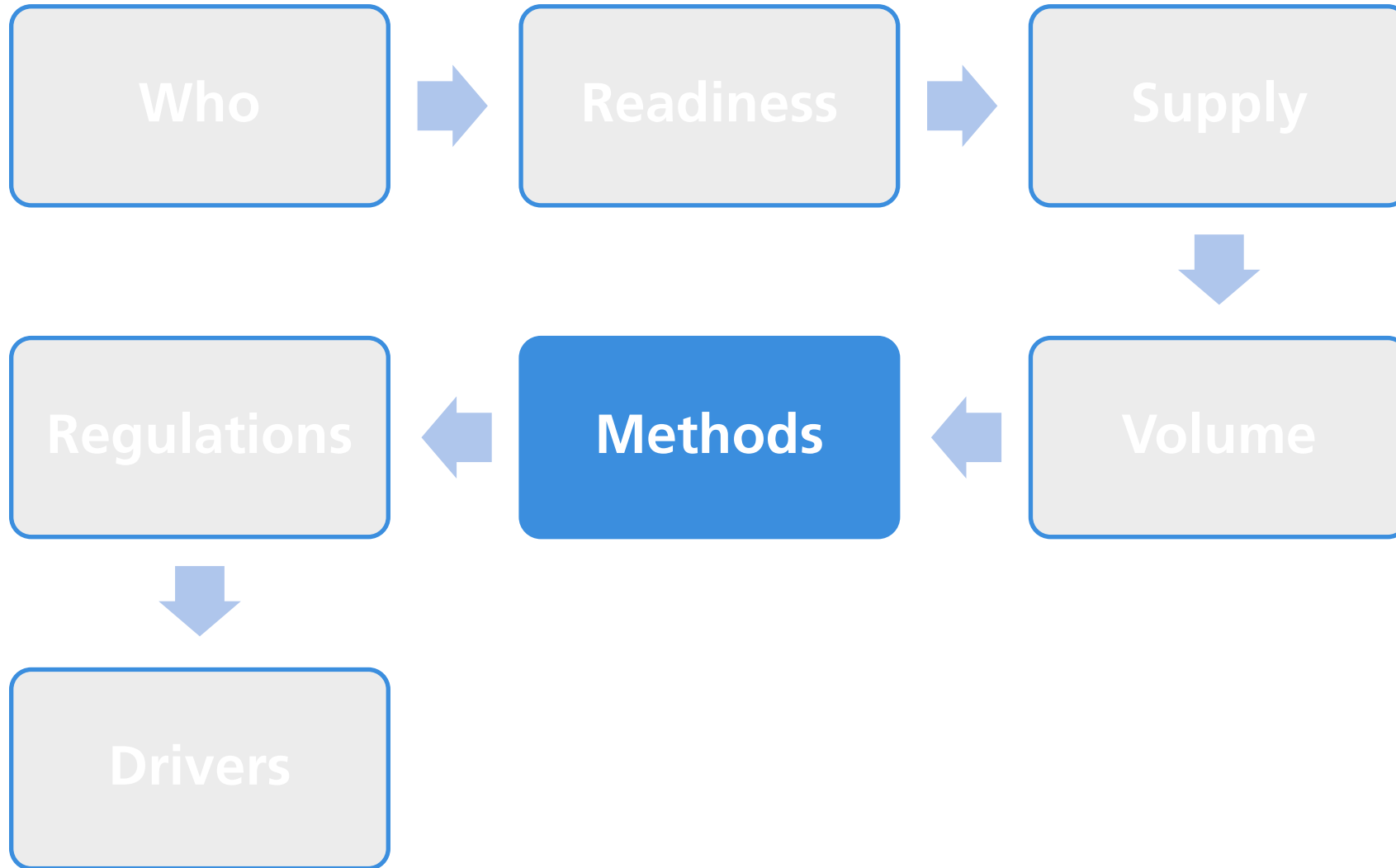
2014 Study - LNG will reach up to 11% of the Deep Sea fuel mix by 2030



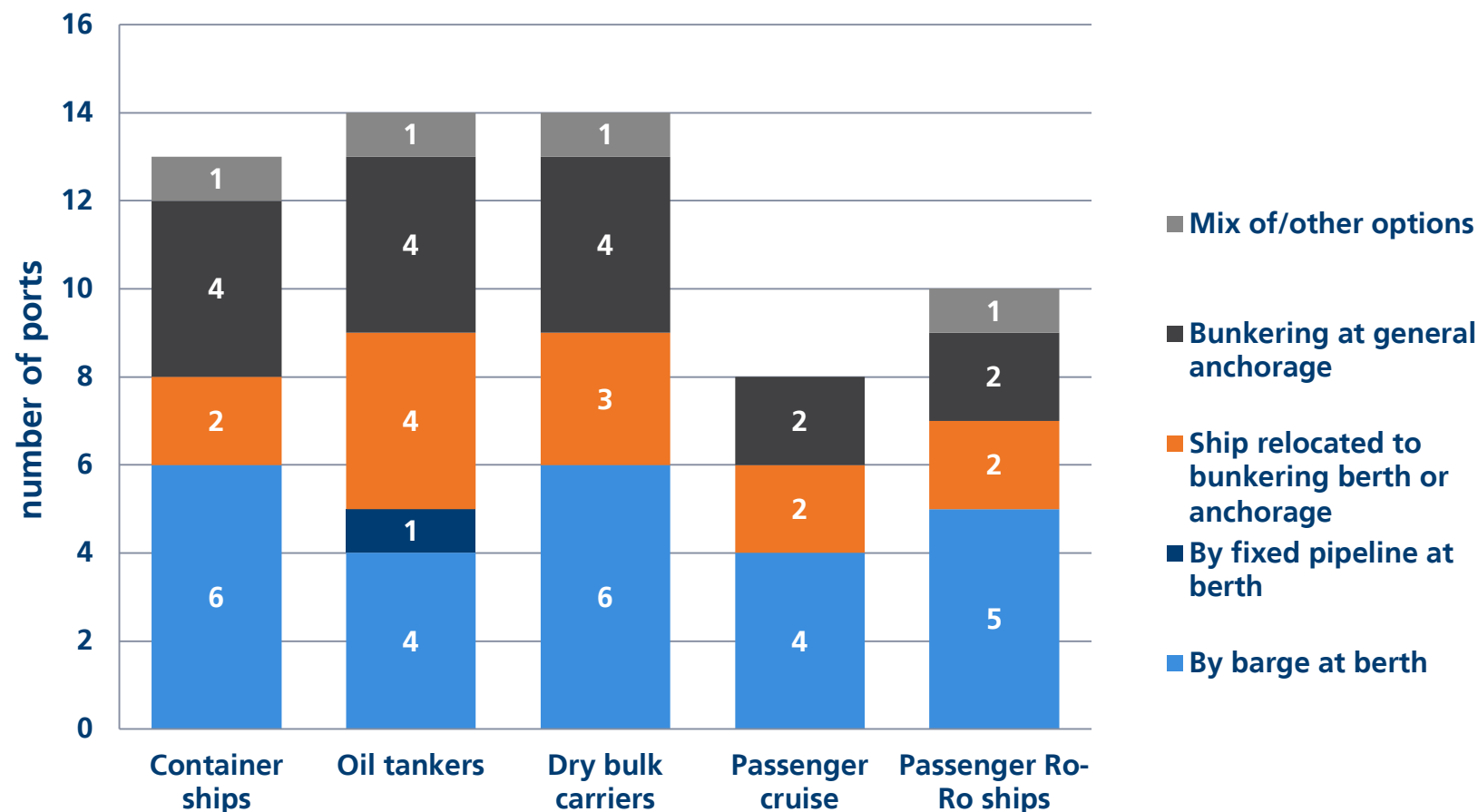
Global Marine Fuel Trends 2030



Flow



In 2011 ports contemplated a mix of LNG bunkering methods and locations



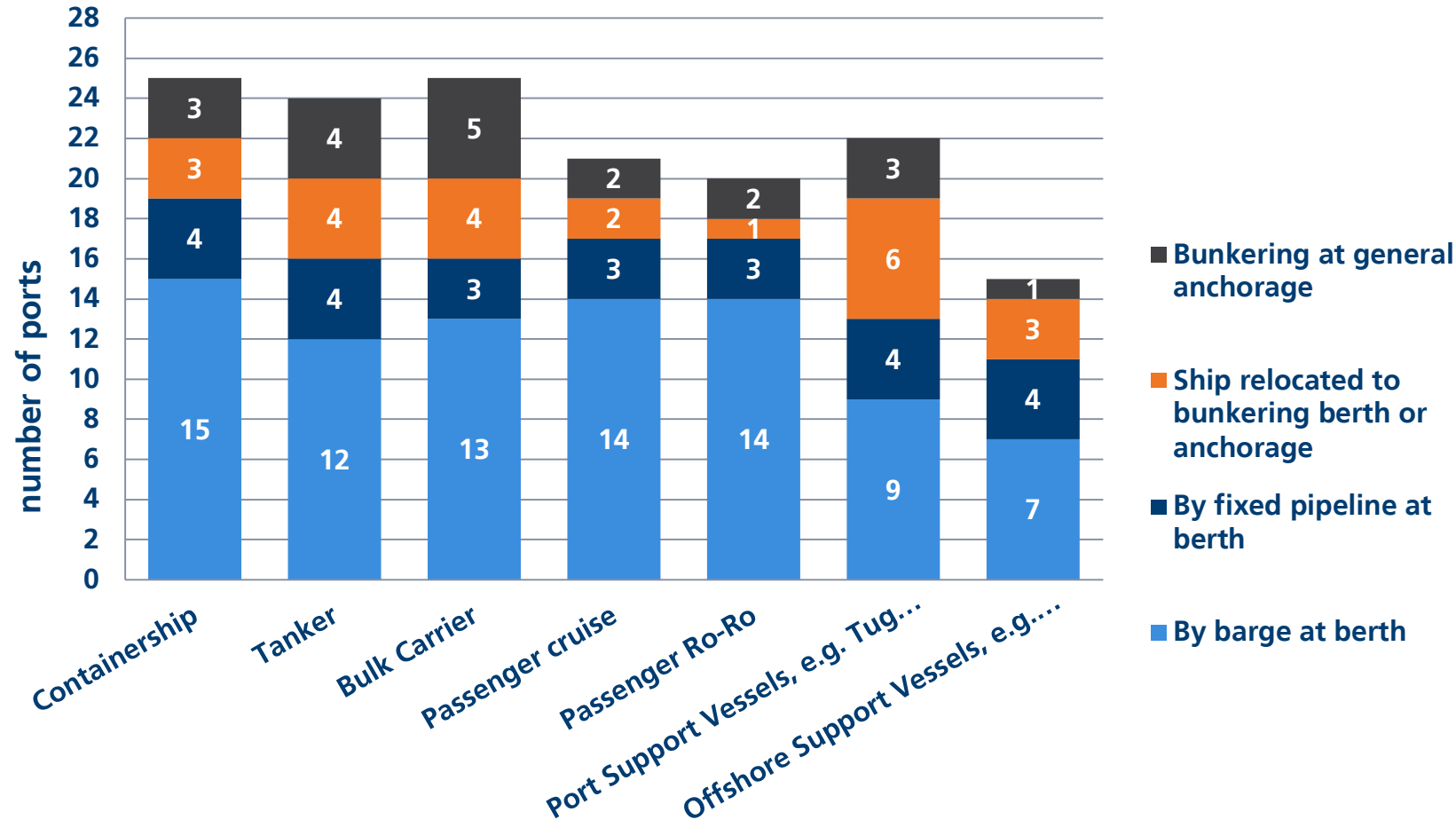
2011 survey: How is LNG bunkering operations **PLANNED** to be carried out for different ship types* at your port”?

* Containerships, Tankers and Bulk carriers are limited to sizes over 10,000DWT and passenger cruise and passenger Ro/Ro are limited to above 5,000GT



Barge is now the preferred method for LNG bunkering

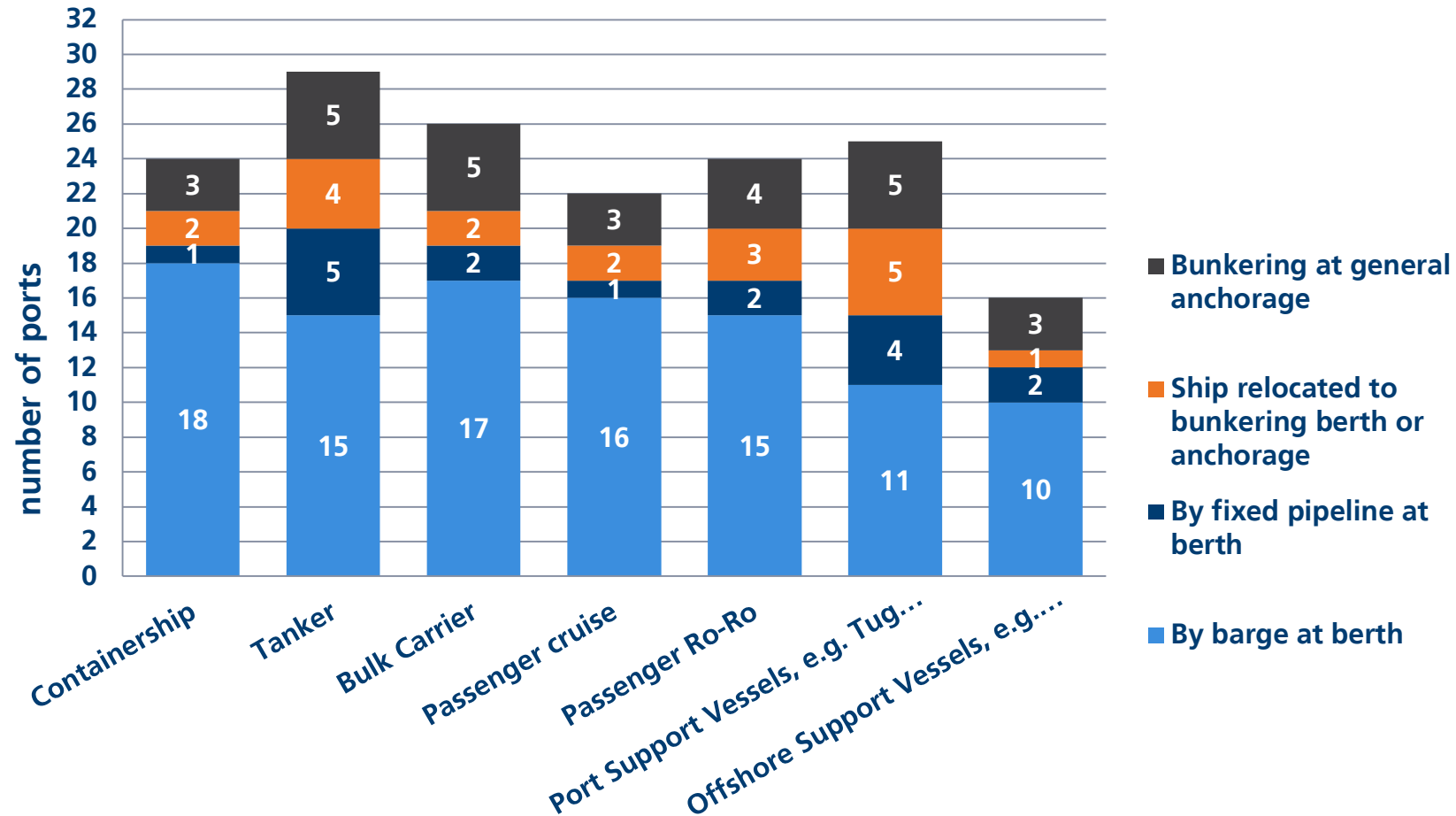
Q13. How is LNG bunkering operations **PLANNED** to be carried out for different ship types* at your port”?



* Containerships, Tankers and Bulk carriers are limited to sizes over 10,000DWT and passenger cruise and passenger Ro/Ro are limited to above 5,000GT



No significant change for bunkering methods between Oil and LNG



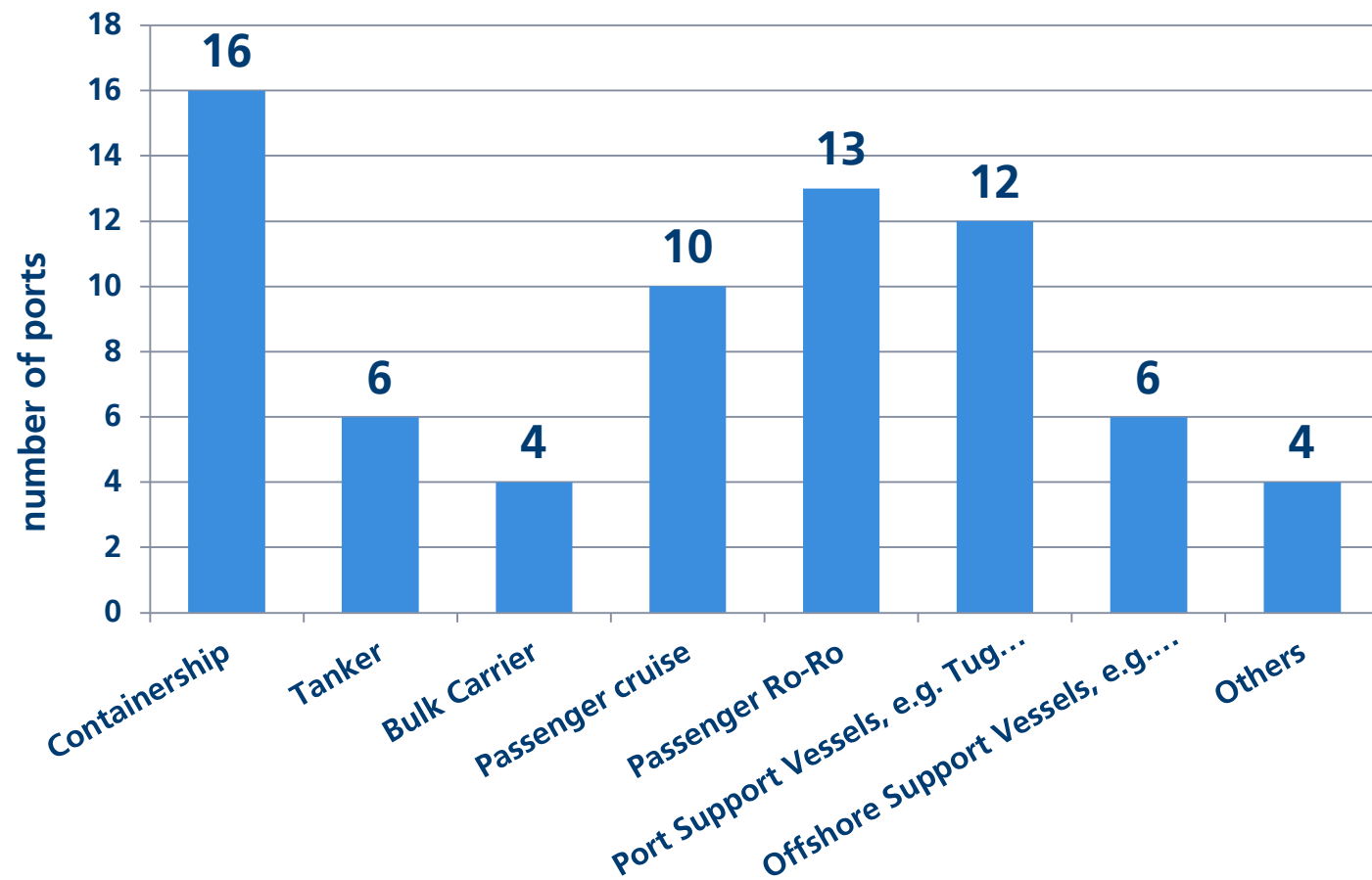
Q12. How is OIL bunkering operations CURRENTLY carried out for different ship types* at your port?

* Containerships, Tankers and Bulk carriers are limited to sizes over 10,000DWT and passenger cruise and passenger Ro/Ro are limited to above 5,000GT

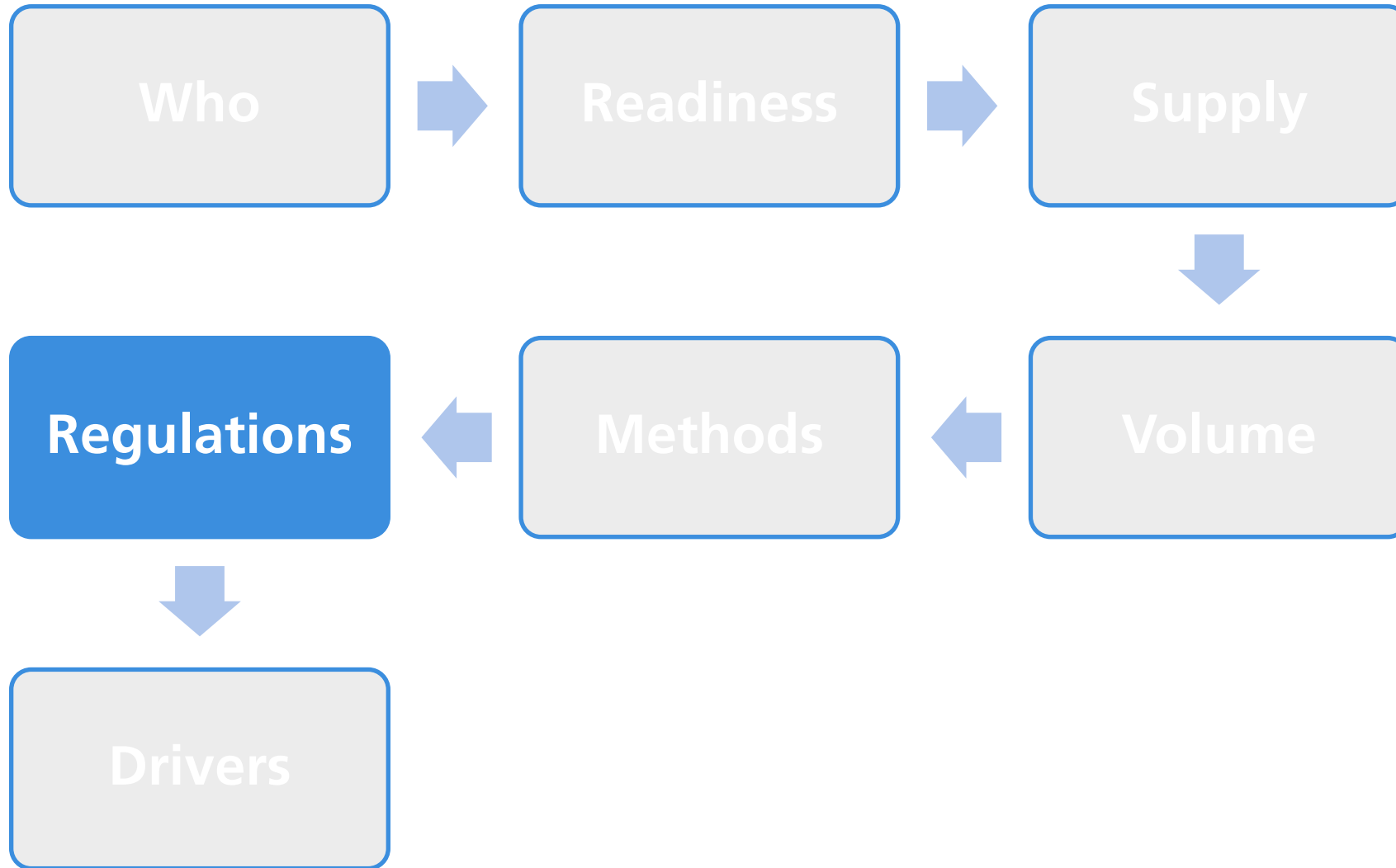


There will be gas bunkering solutions for all ships in need – no particular shiptype is “best suited” for gas

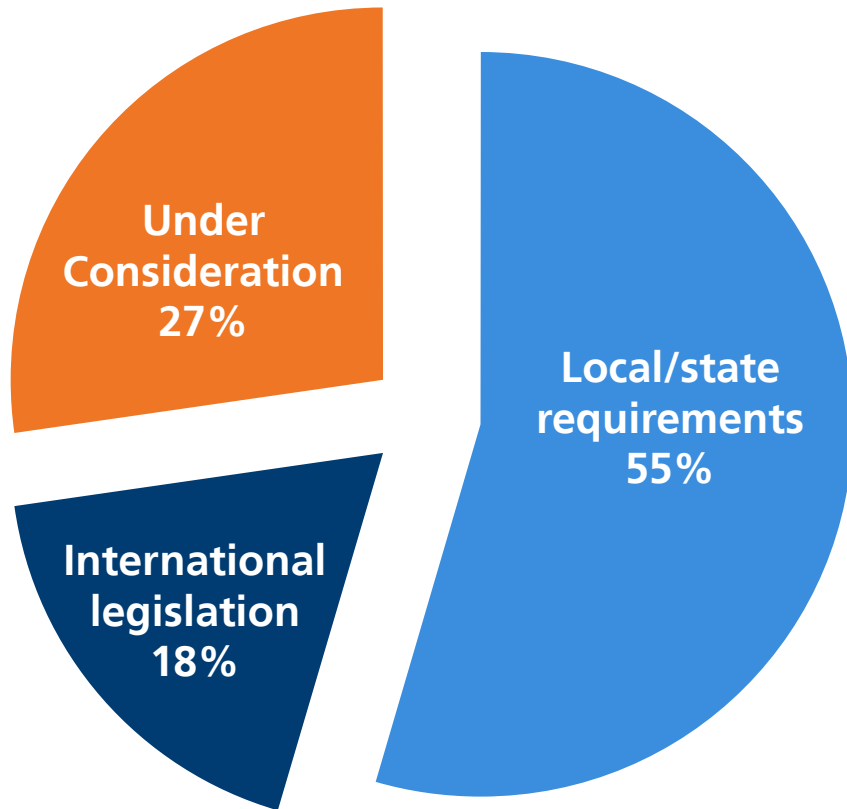
Q14. Which ship types do you consider best suited for LNG bunkering at your port and why?



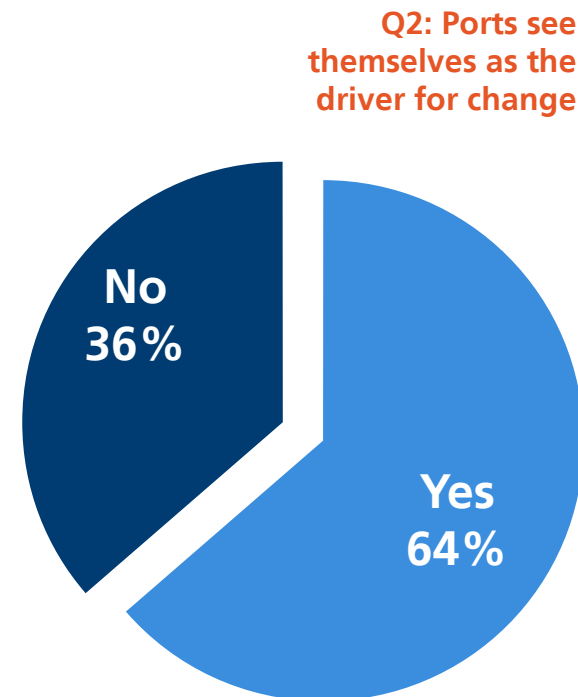
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Ports driving change are also making moves ahead of international regulations



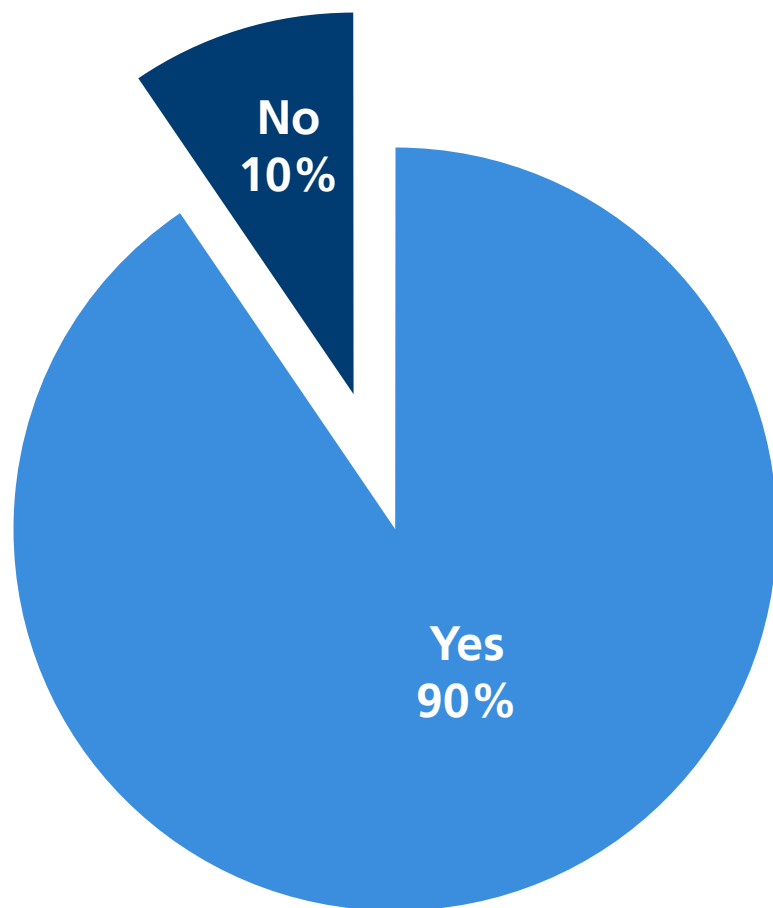
- Local/state requirements
- International legislation
- Under Consideration



Q15. What is your plan to regulate safety of gas bunkering operations at your port?



There is clear awareness that port and land safety requirements need to be harmonised

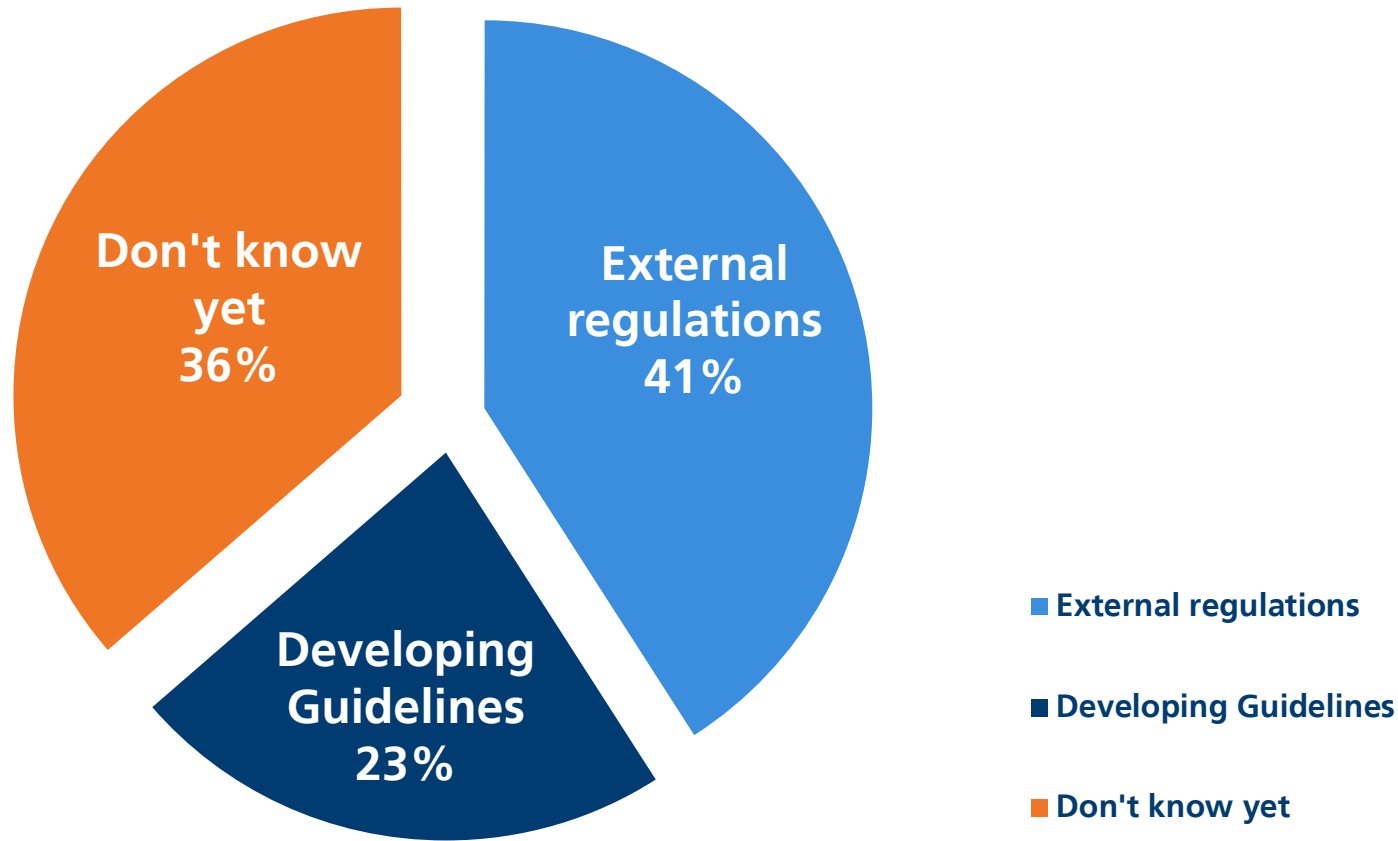


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Q16. When establishing your safety standards and operational procedures for gas bunkering at your port, do you envisage having to collaborate or harmonise standards with Land Authorities?

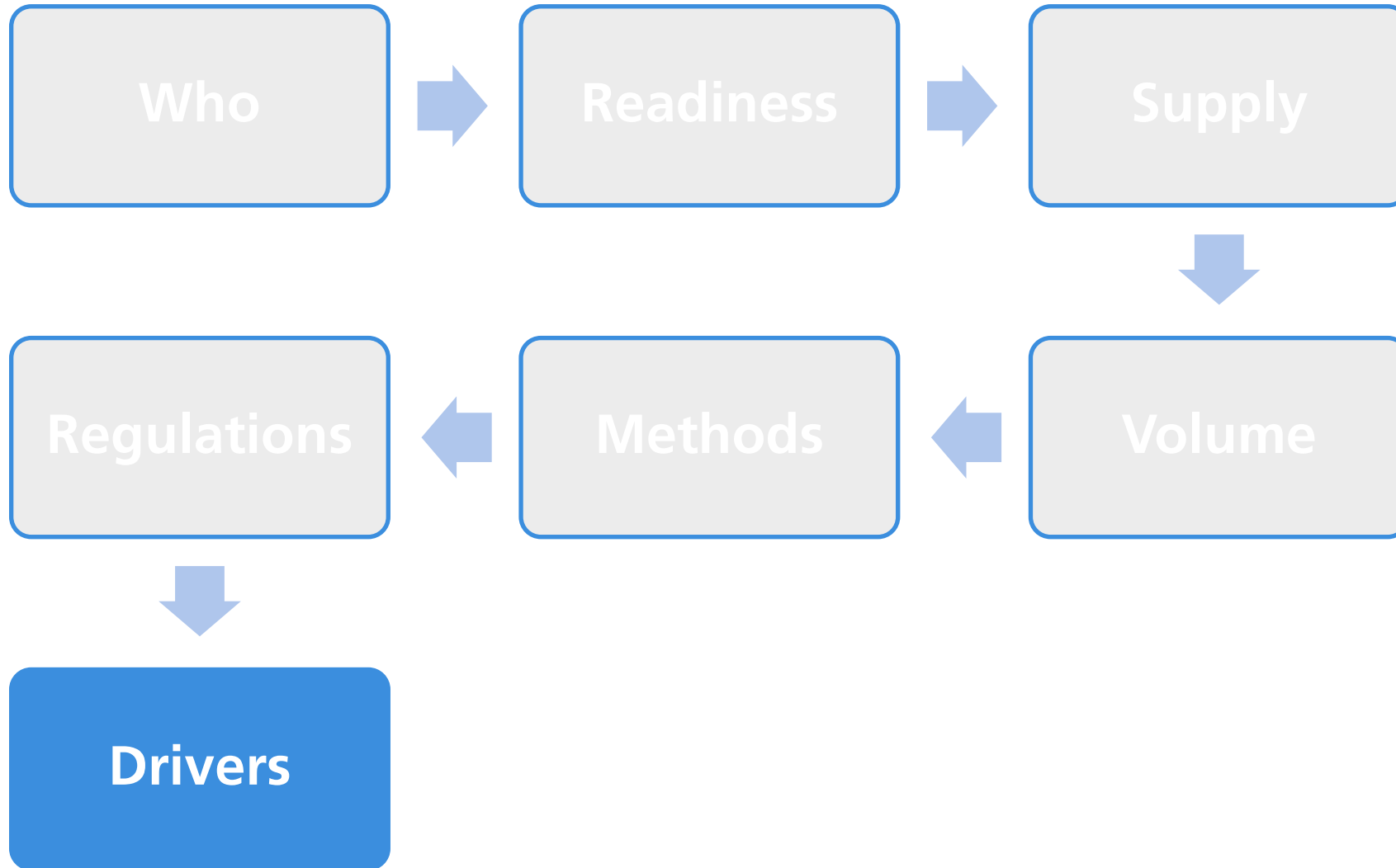


Split opinion on how to regulate 3rd party service providers



Q18. How would the port intend to regulate the gas bunkering companies? Which standard would the port adopt?

Flow



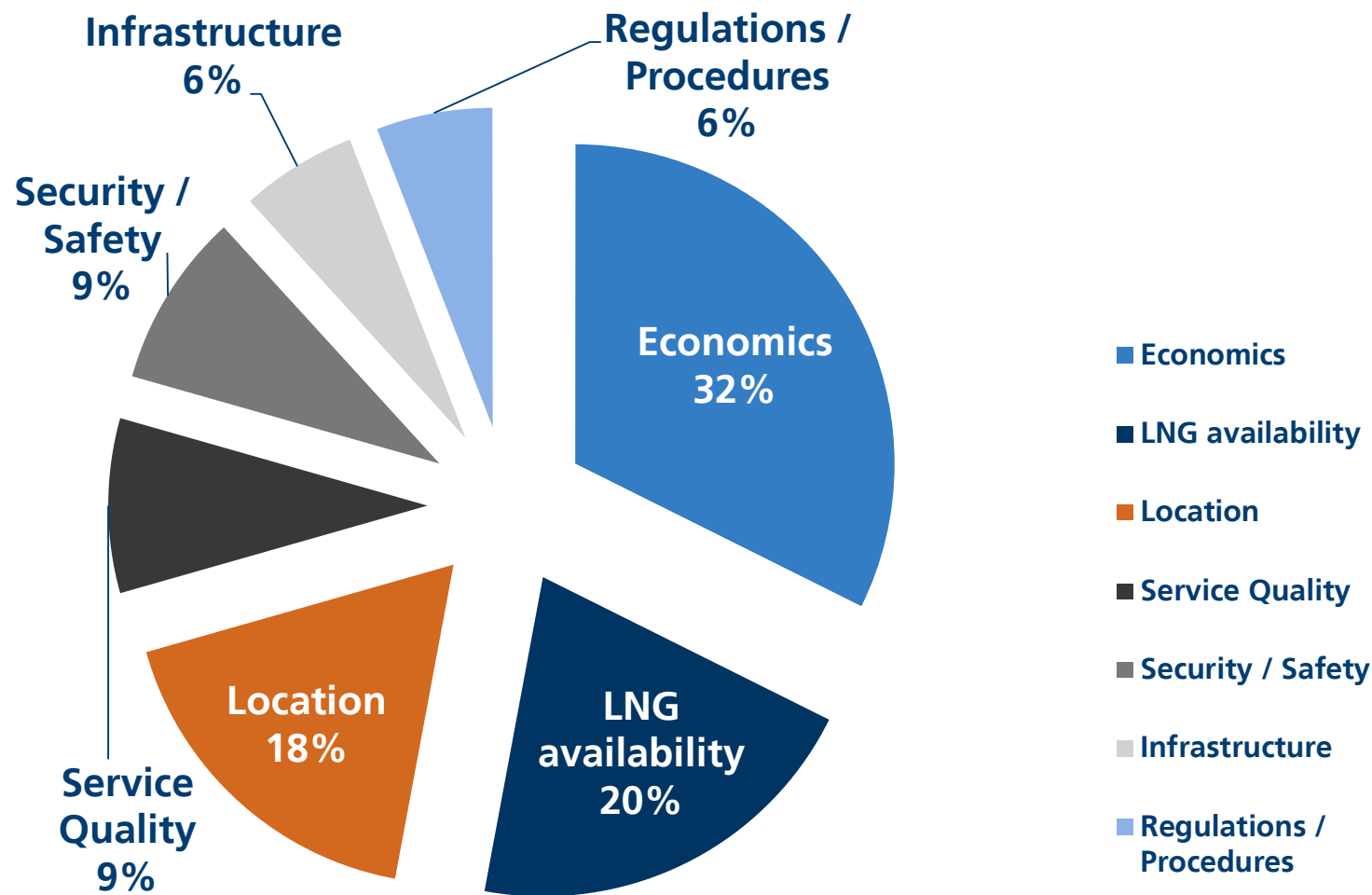
Drivers for supplying LNG at Ports

- **Competition** – Other competitive bunkering ports along the trade route
- **Pricing** – Pricing of LNG fuel comparable to alternative fuel options
- **Location** – Location of the port relative to an ECA
- **Traffic** – Number of ship calls at the port
- **Infrastructure** – Provision of infrastructure and facilities for LNG bunkering
- **LNG Demand** – Demand from ship owners or suppliers for LNG bunkering
- **Public opinion** – Retain / develop a positive public perception of the port
- **Port Significance** – Retain / attain the status of the port as a major bunker port

Q11. What are the most important drivers for your port to provide LNG bunkers in terms of the port's commercial position?



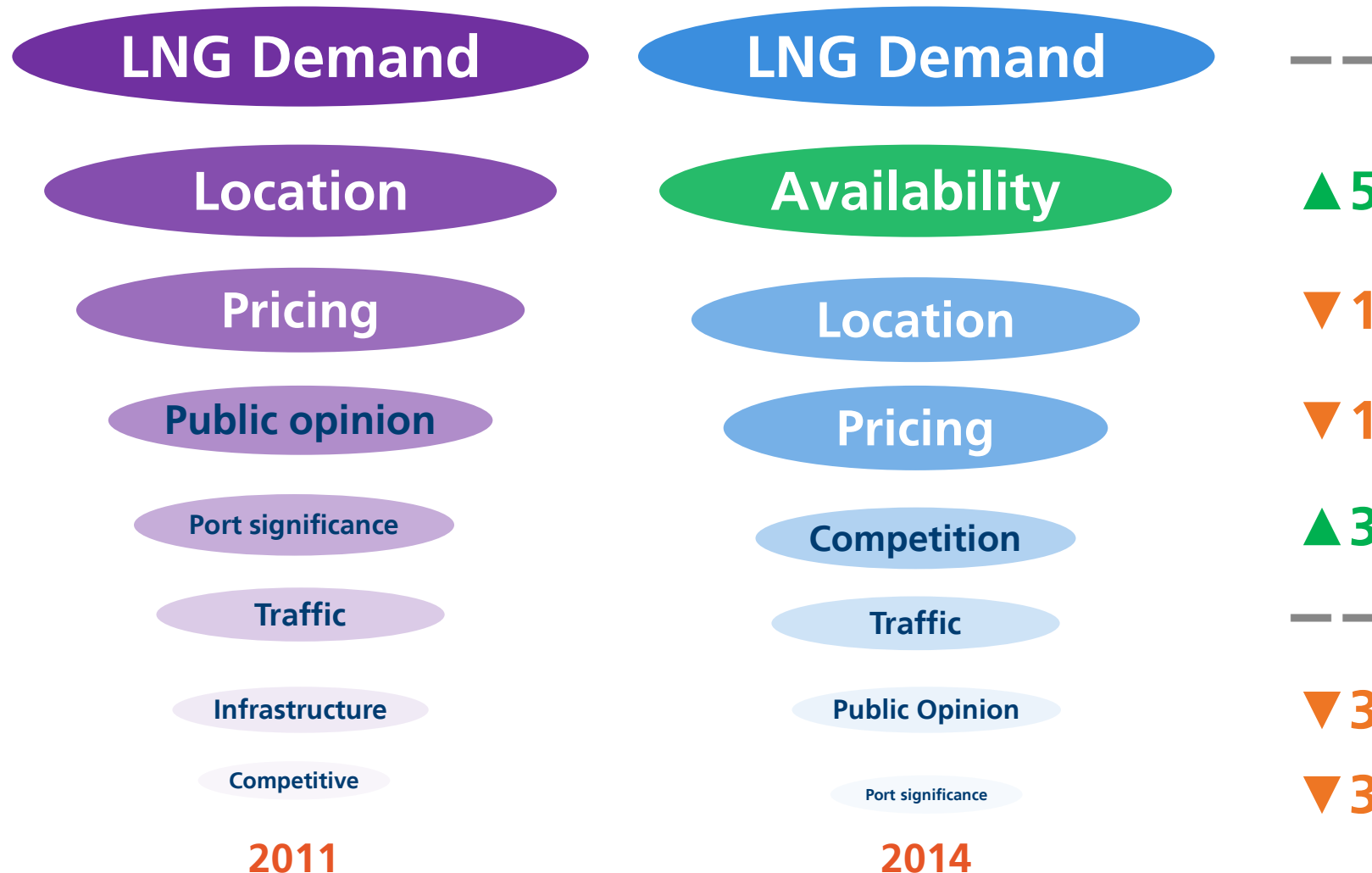
Economics (price differential / incentives) are the main factor to attract gas fuelled shipping to Ports



Q17. What are the main factors that will help to attract the gas fuelled target fleet into your port?



LNG “infrastructure” turns into “Availability” as the newly emerged key driver



Q11. What are the most important drivers for your port to provide LNG bunkers in terms of the port's commercial position?



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