



MARITIME

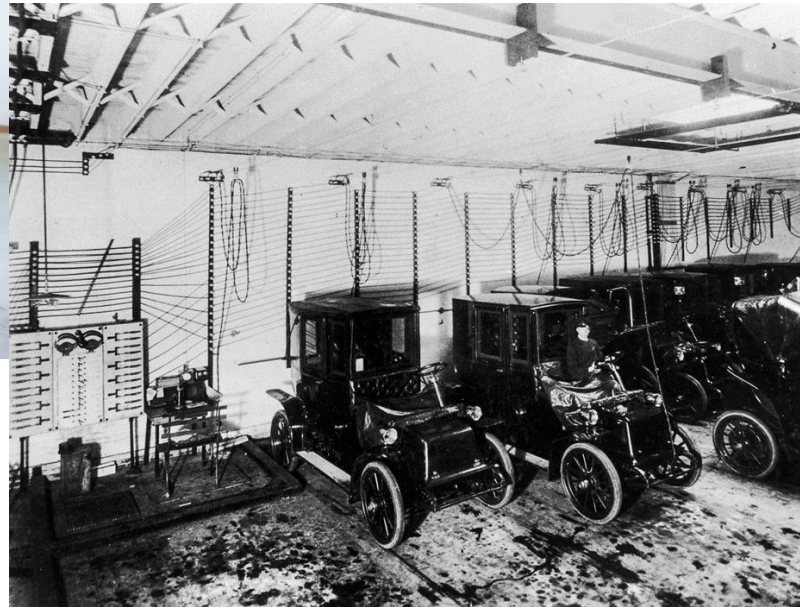
Status of ships with batteries

Why and Uptake? – DNV GL Battery Seminar, Houston

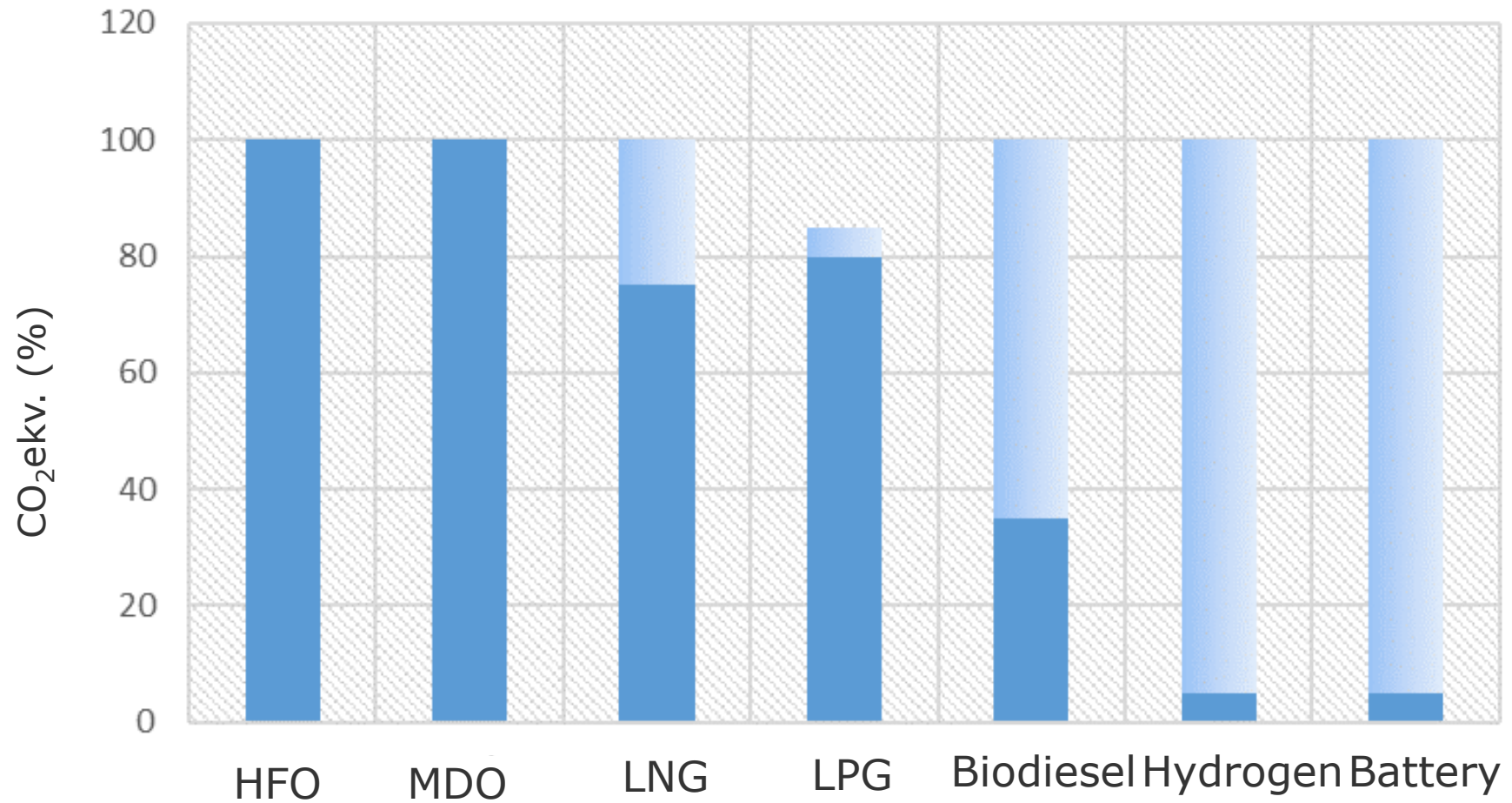
Sondre Henningsgård

26 March 2019

Batteries are a revolutionary new tech that has just been invented...?

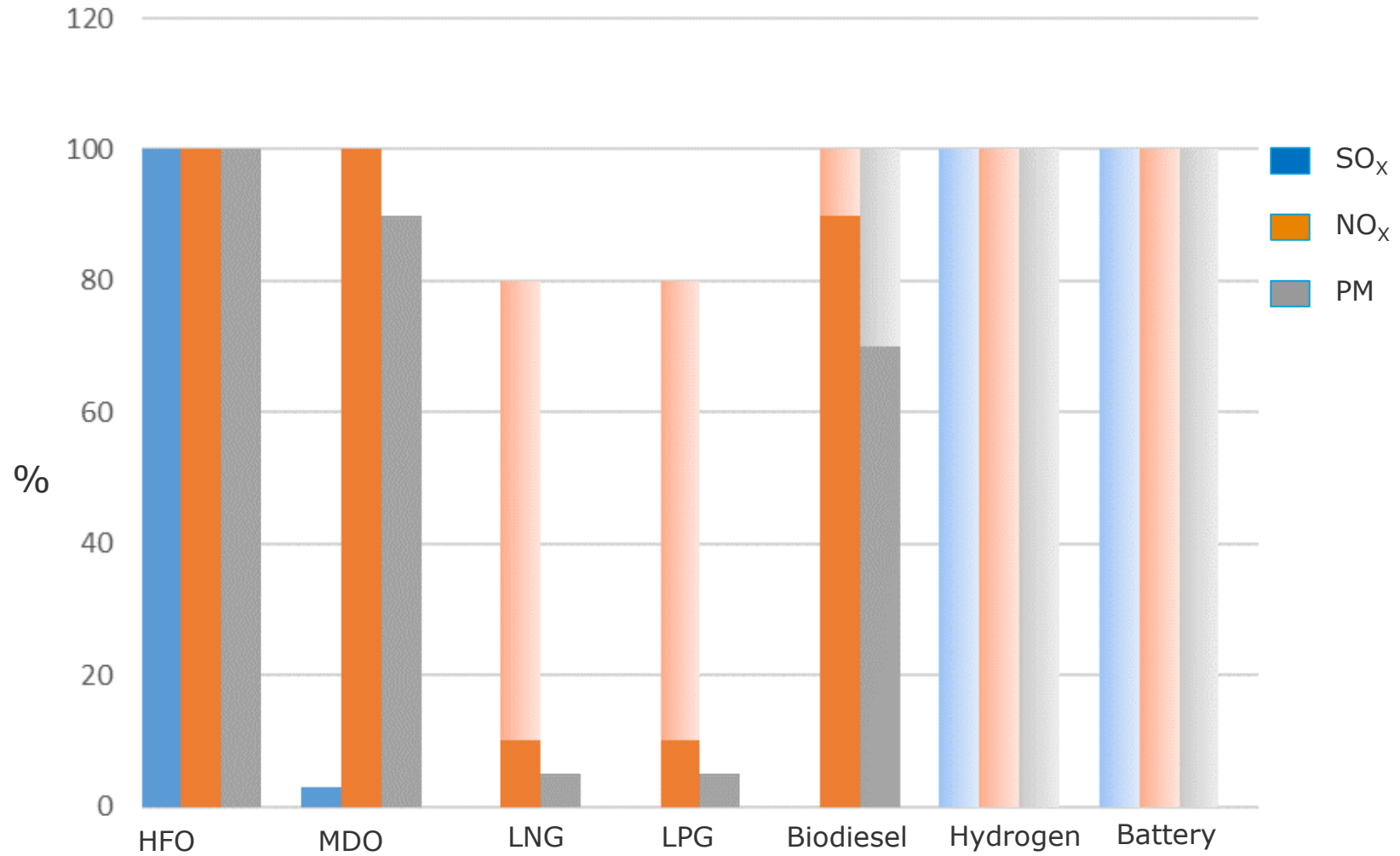


- Detroit Electric
 - Produced by Anderson Electric Car Company
 - Nickel-iron battery
 - Range advertised: 130 km
 - Record one charge: 340 km
 - (top speed abt 32 km/hr 😊)
 - Year: 1911 – 1916
 - Produced until 1939



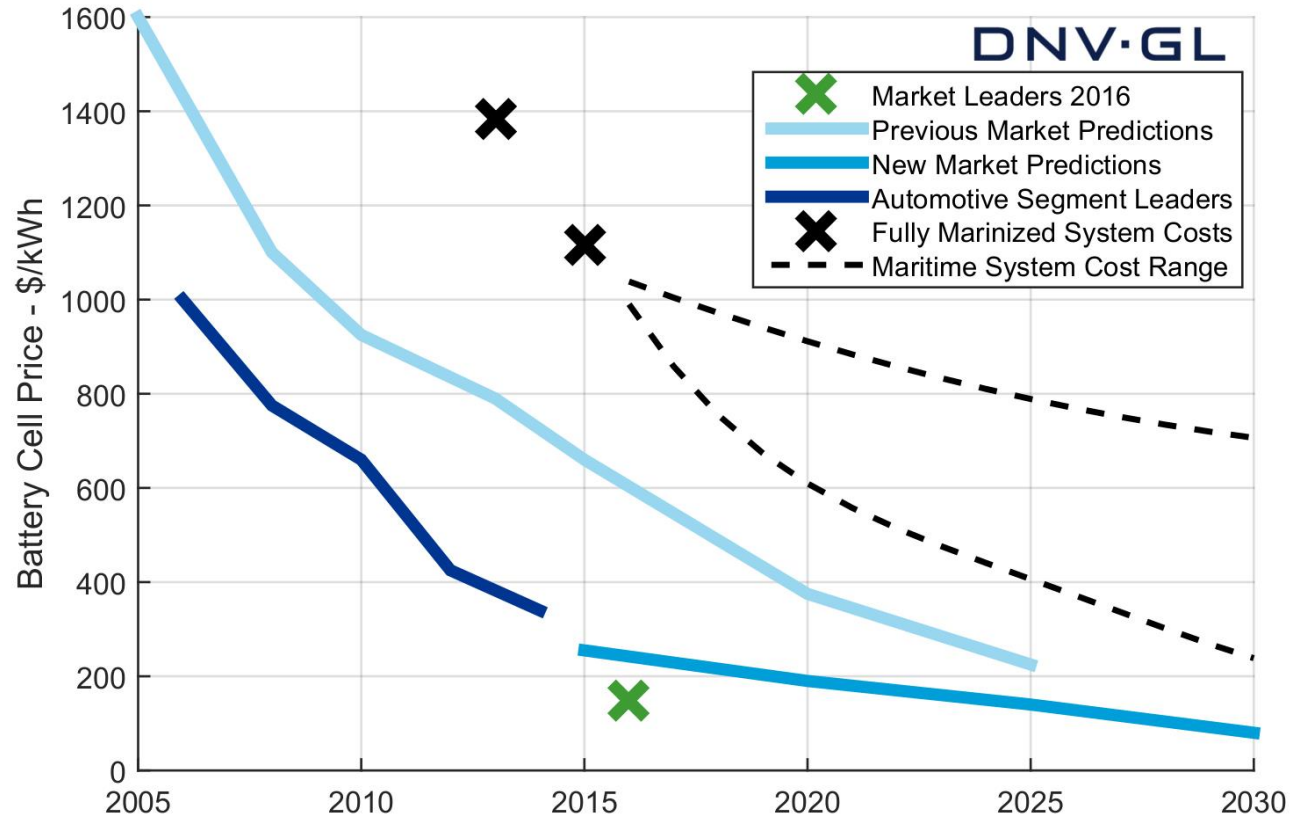
Source: DNV GL

Other

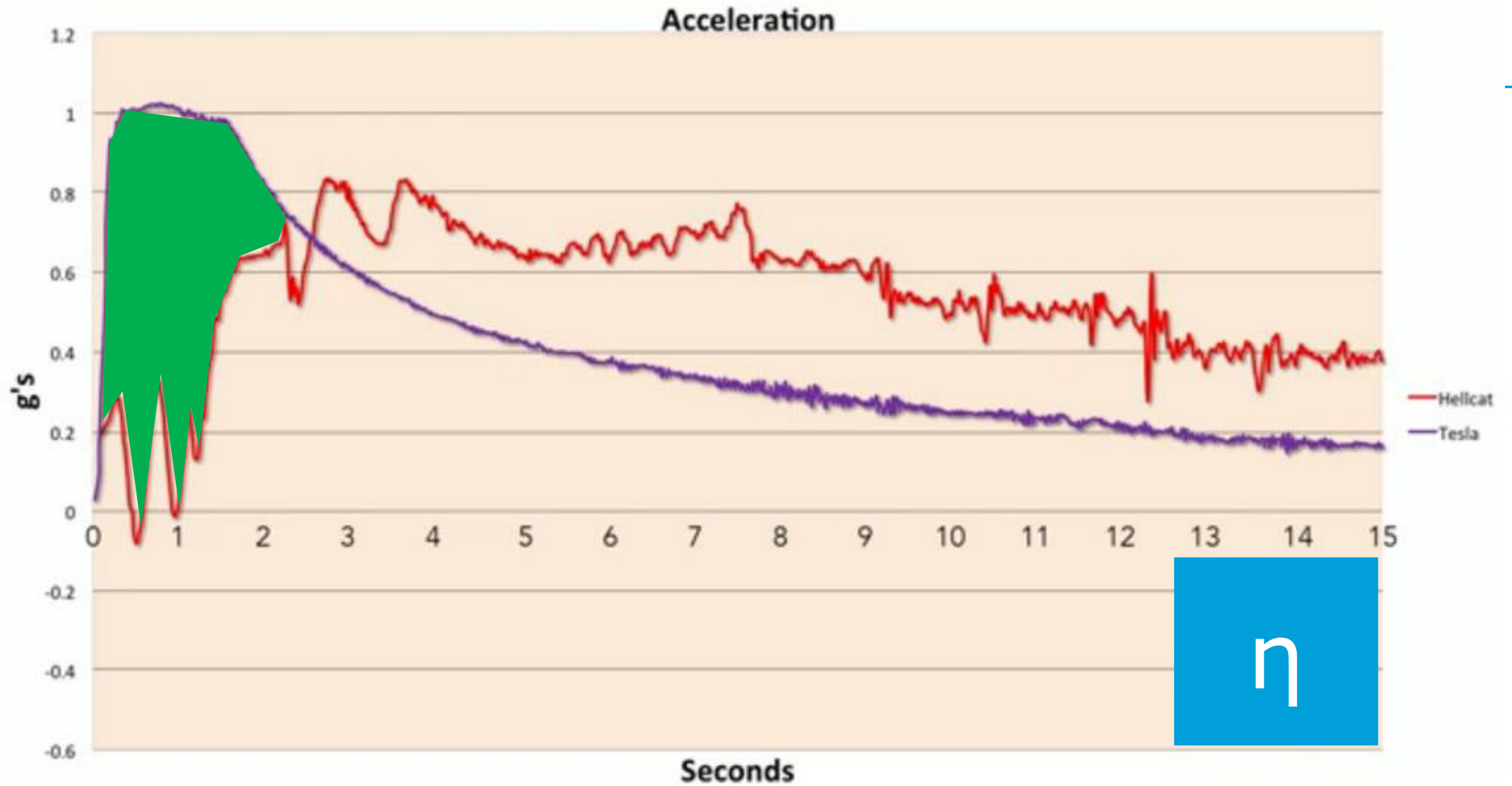


Source: DNV GL

Lithium ion battery price trends







NB: figure is unofficial, however, it illustrates the benefit of "instant Torque"

Batteries and hybrid systems represent a new way of providing power and propulsion – the trick is figuring out how to apply for your system



Spinning reserve

- Backup for running generators
- Fewer turbines needed online



Peak shaving

- Act as a buffer
- Level power seen by engines



Optimise load

- Optimise the operating point of the generators
- Reduce maintenance



Harvest energy

- Recover energy from cranes, drilling equipment, etc.
- Accommodate energy from renewables



Immediate power

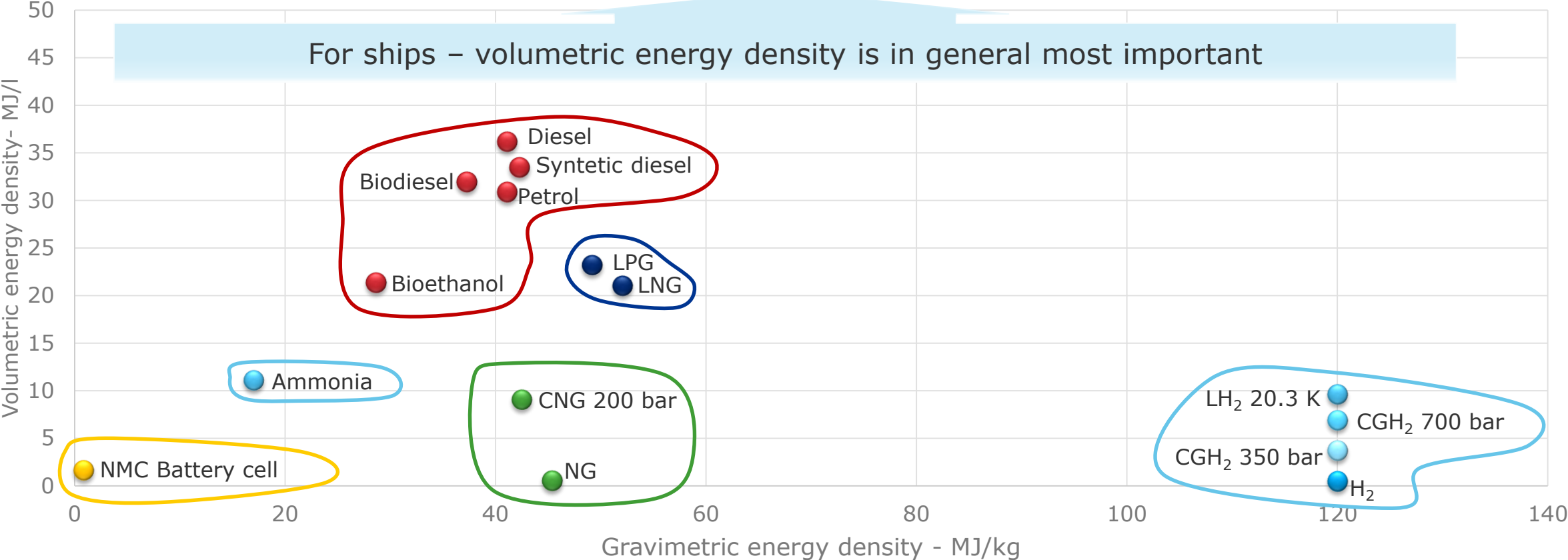
- Instant power in support of generators



Backup power

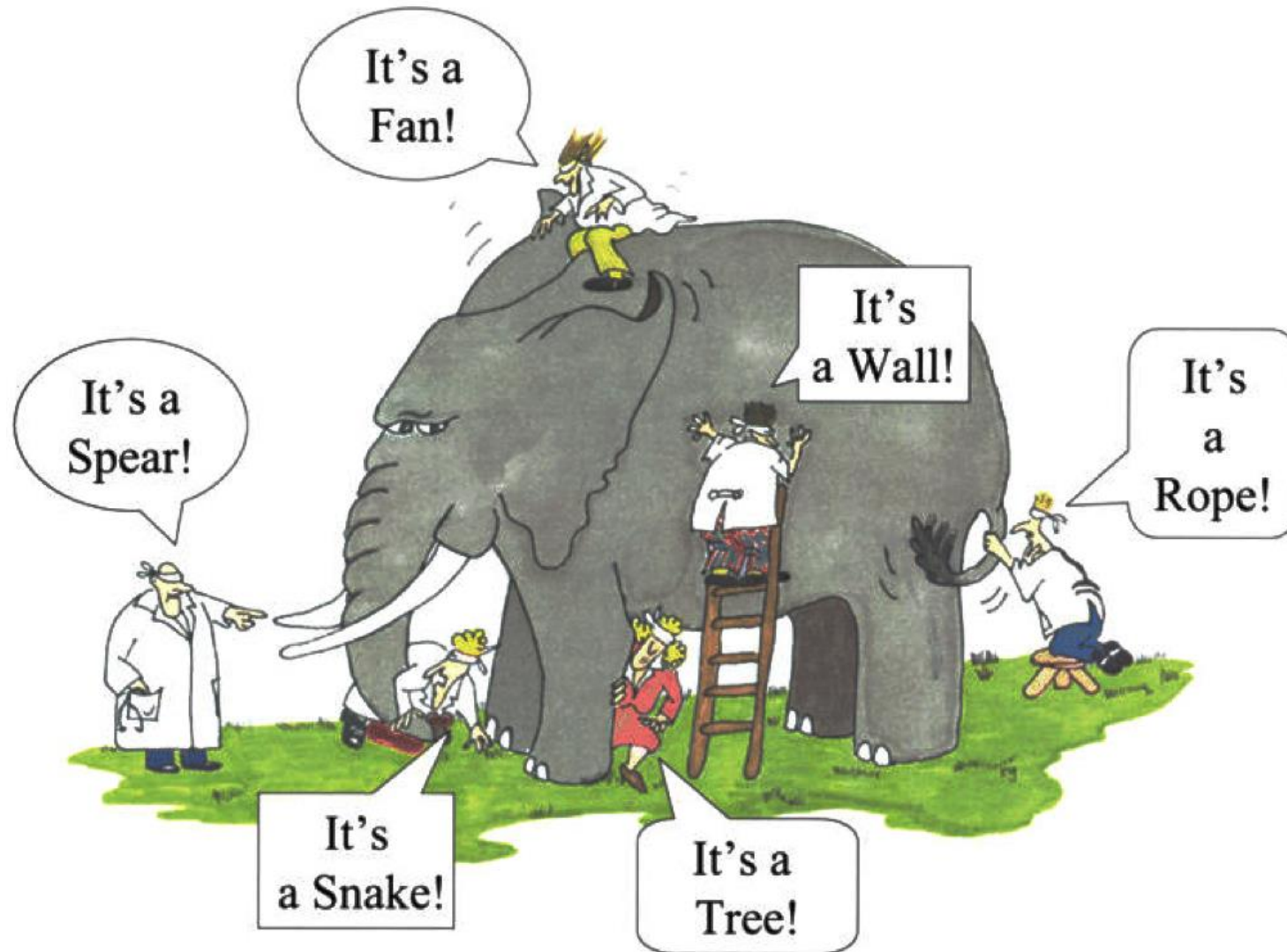
- Battery system provides backup power, UPS like functionality

Energy density of various fuels



https://en.wikipedia.org/wiki/Energy_density

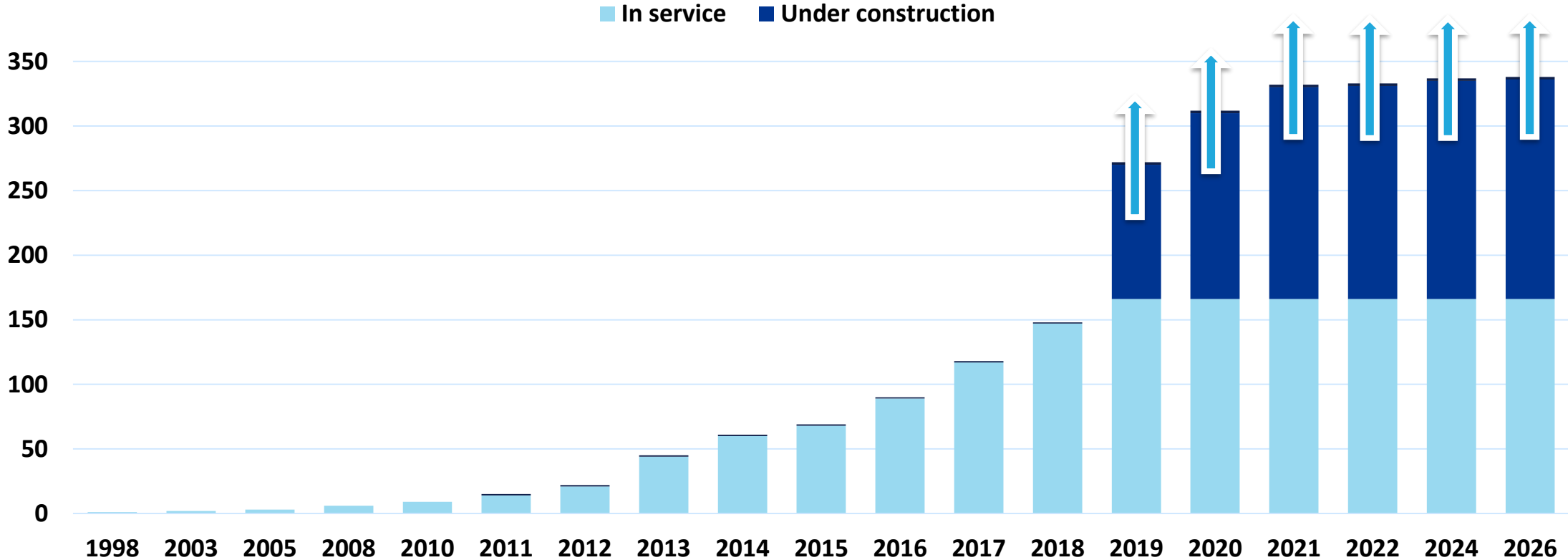
To make it simple – consider the system as a whole



Development in ships

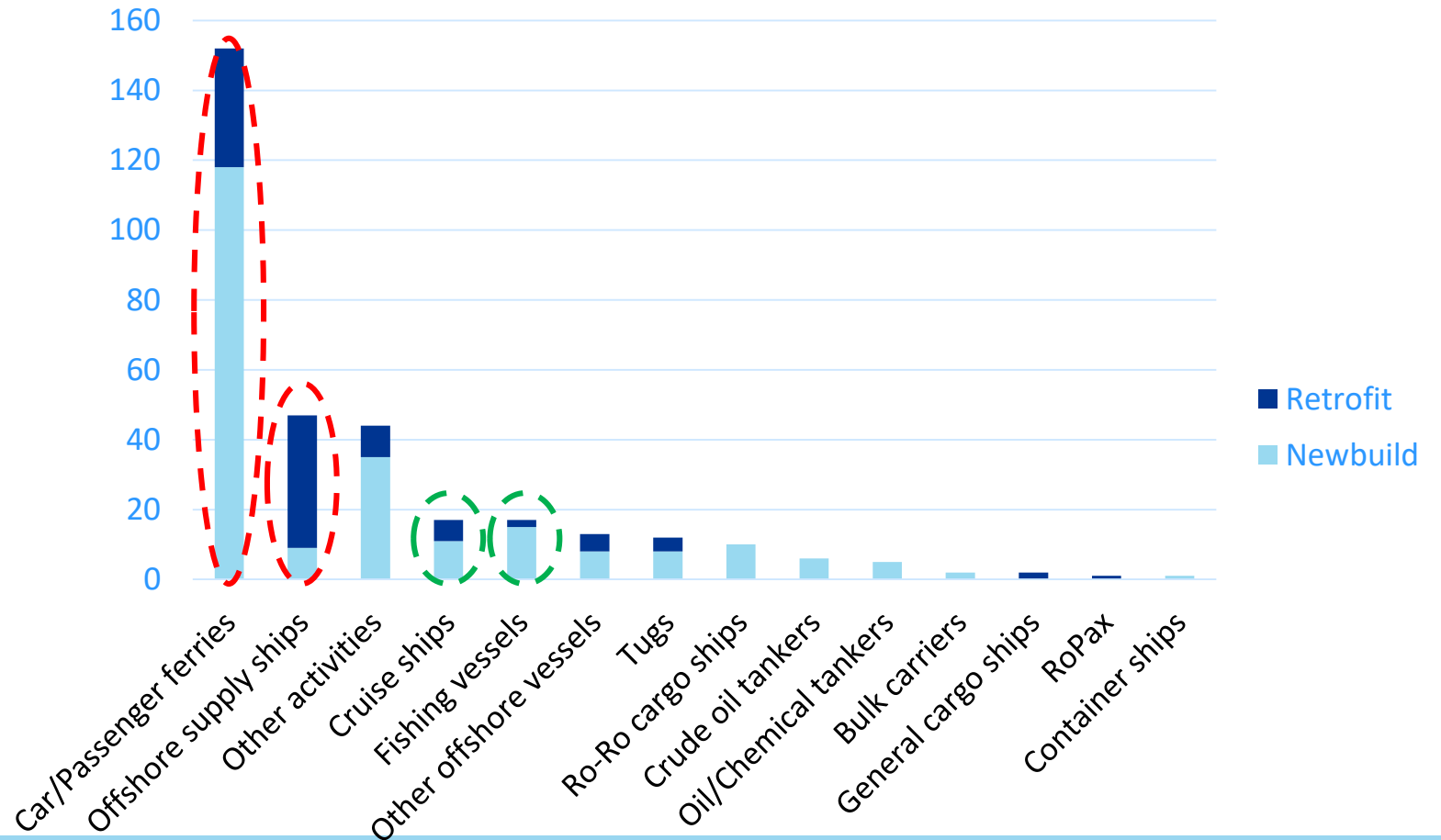
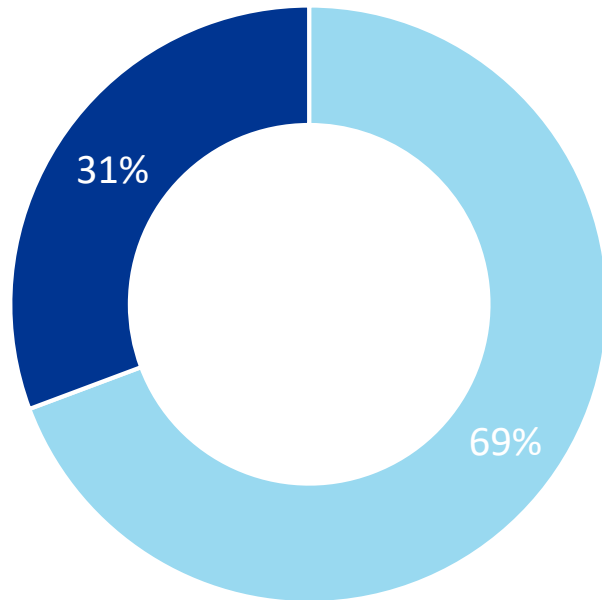
Based on year battery is installed

Number of ships with batteries installed or on order

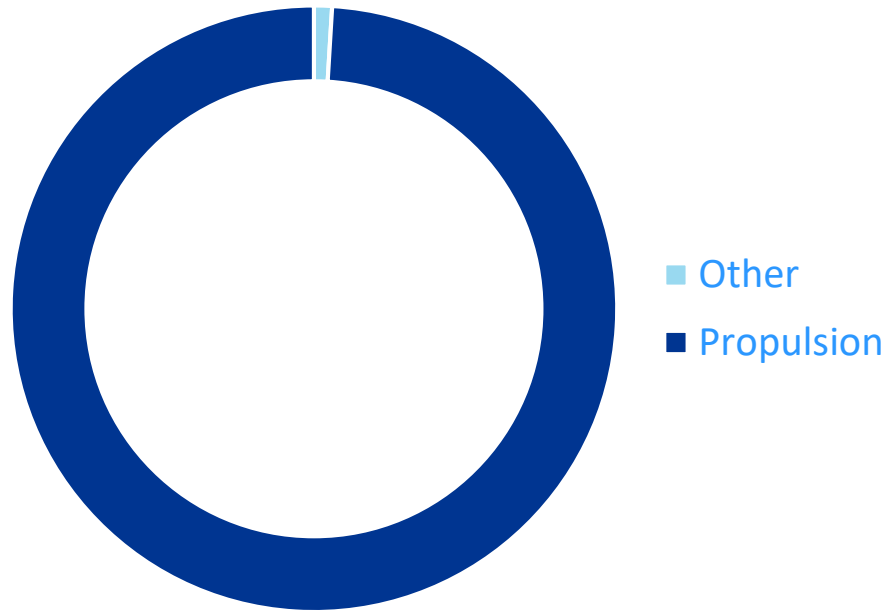


Newbuild or retrofit?

- Still mainly newbuilds. Share has been around 30/70 for a while now.

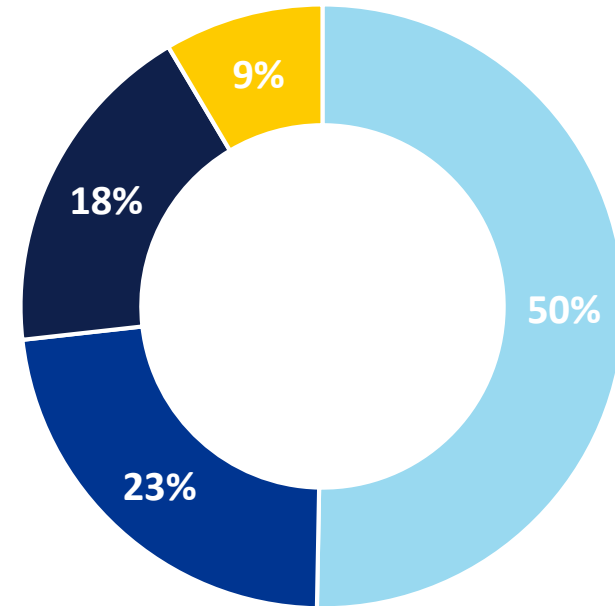


Technology



Battery application

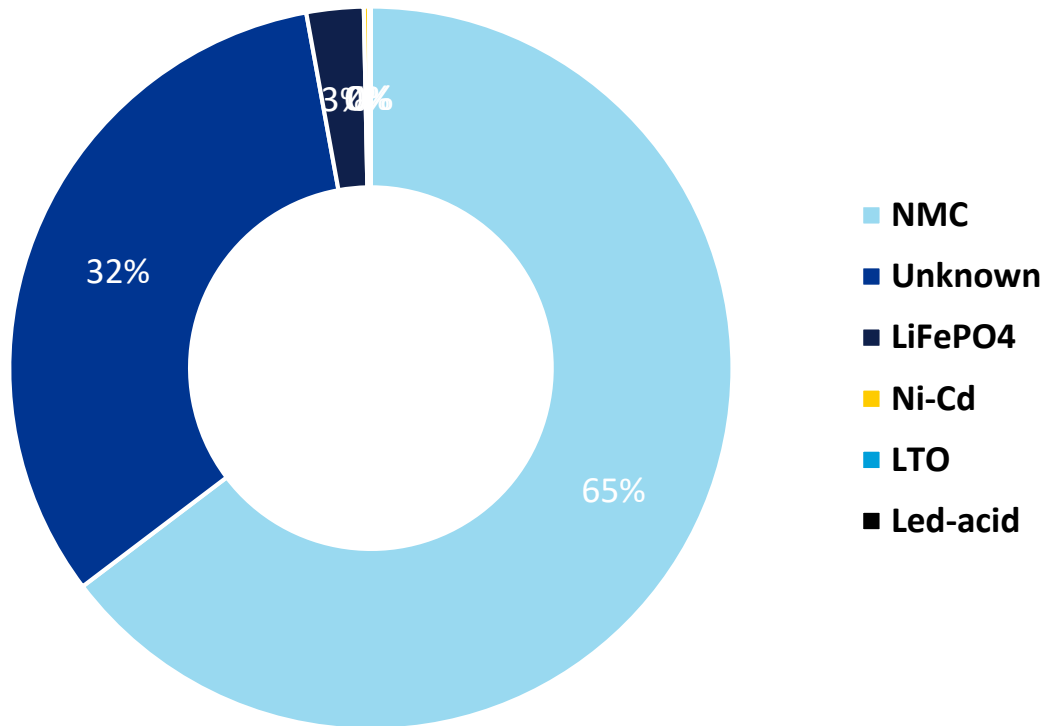
■ Hybrid ■ Plug-in hybrid ■ Pure electric ■ Unknown



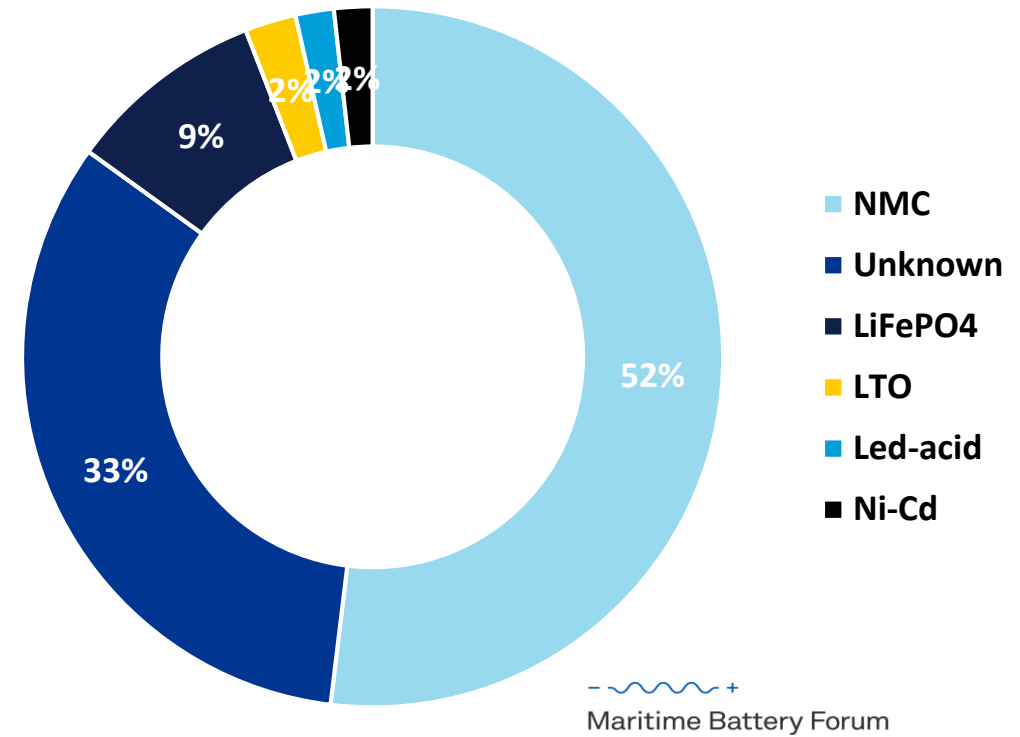
NB! Figure indicative as not all projects state if they are plug-in or not

Which batteries are being used?

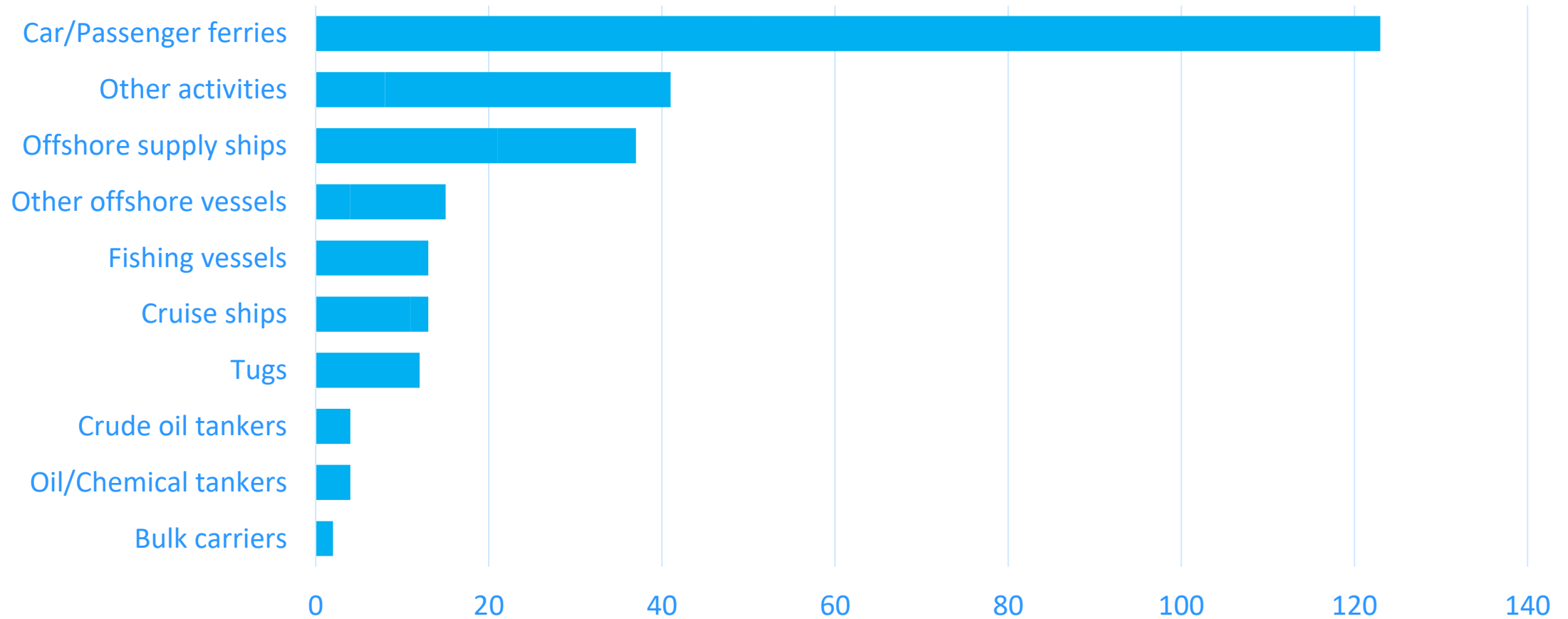
Cell Chemistry (by installed capacity)



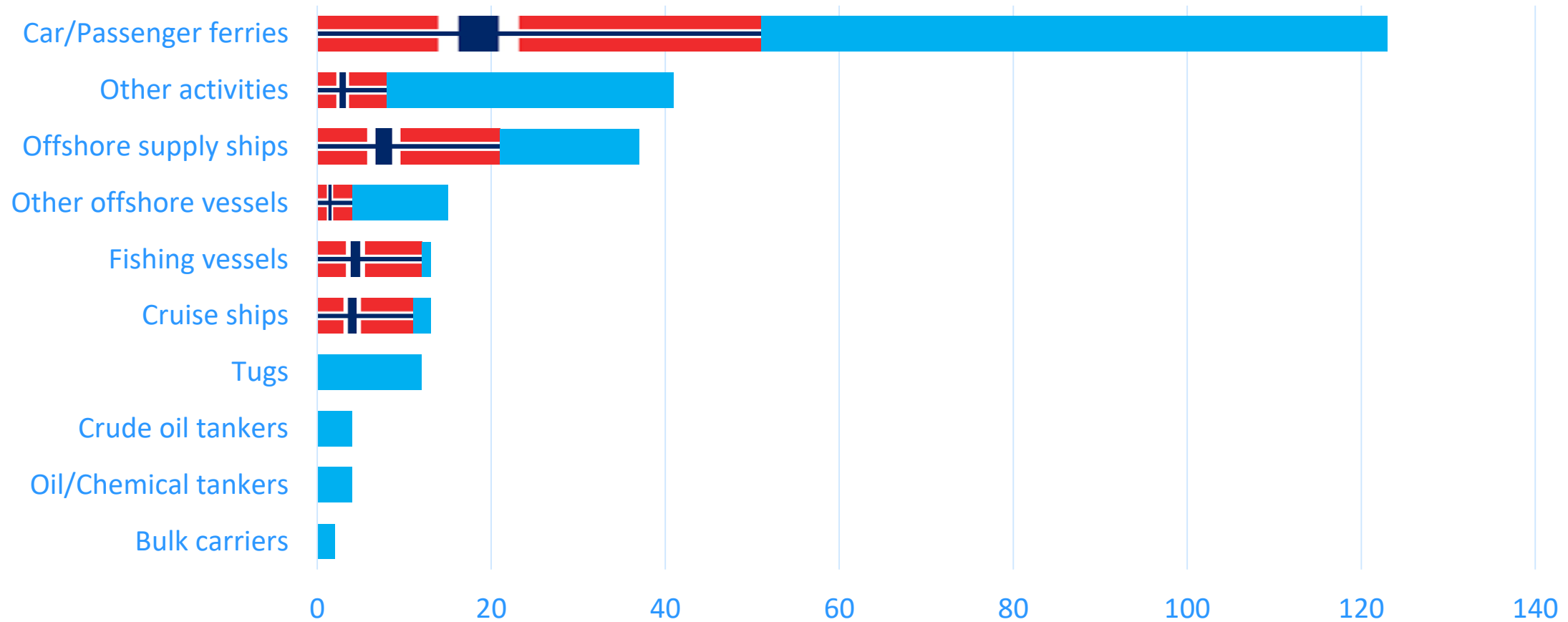
Cell Chemistry (by number of ships)



Segments (top 10)

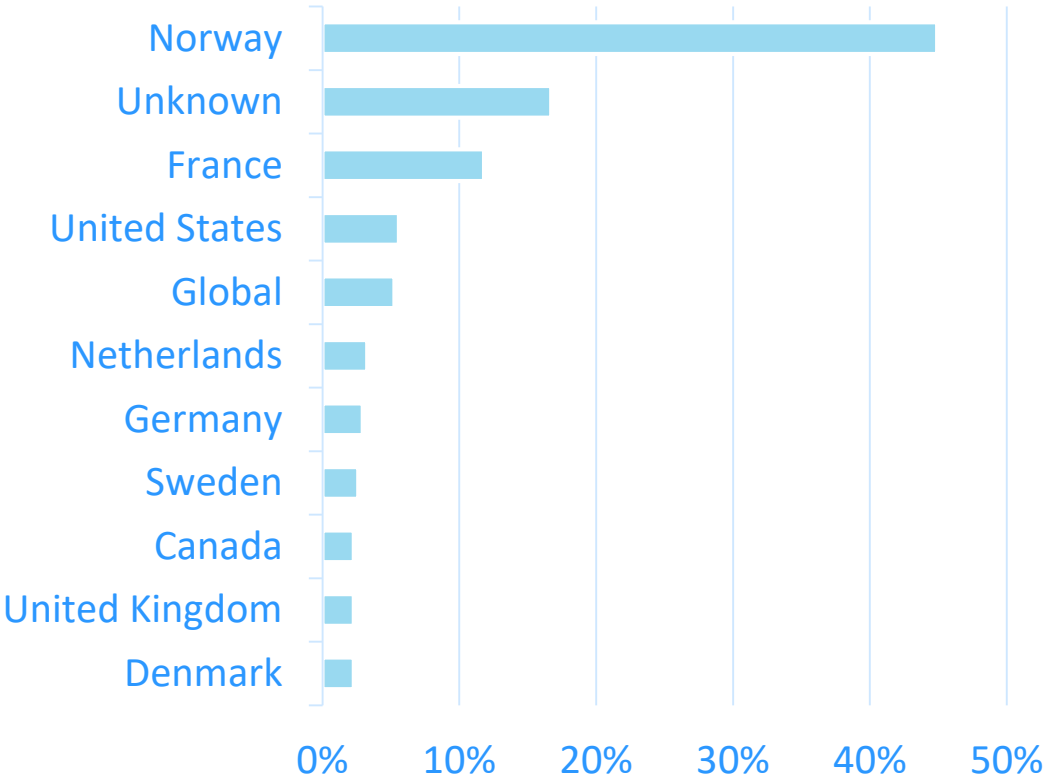


Segments (top 10)

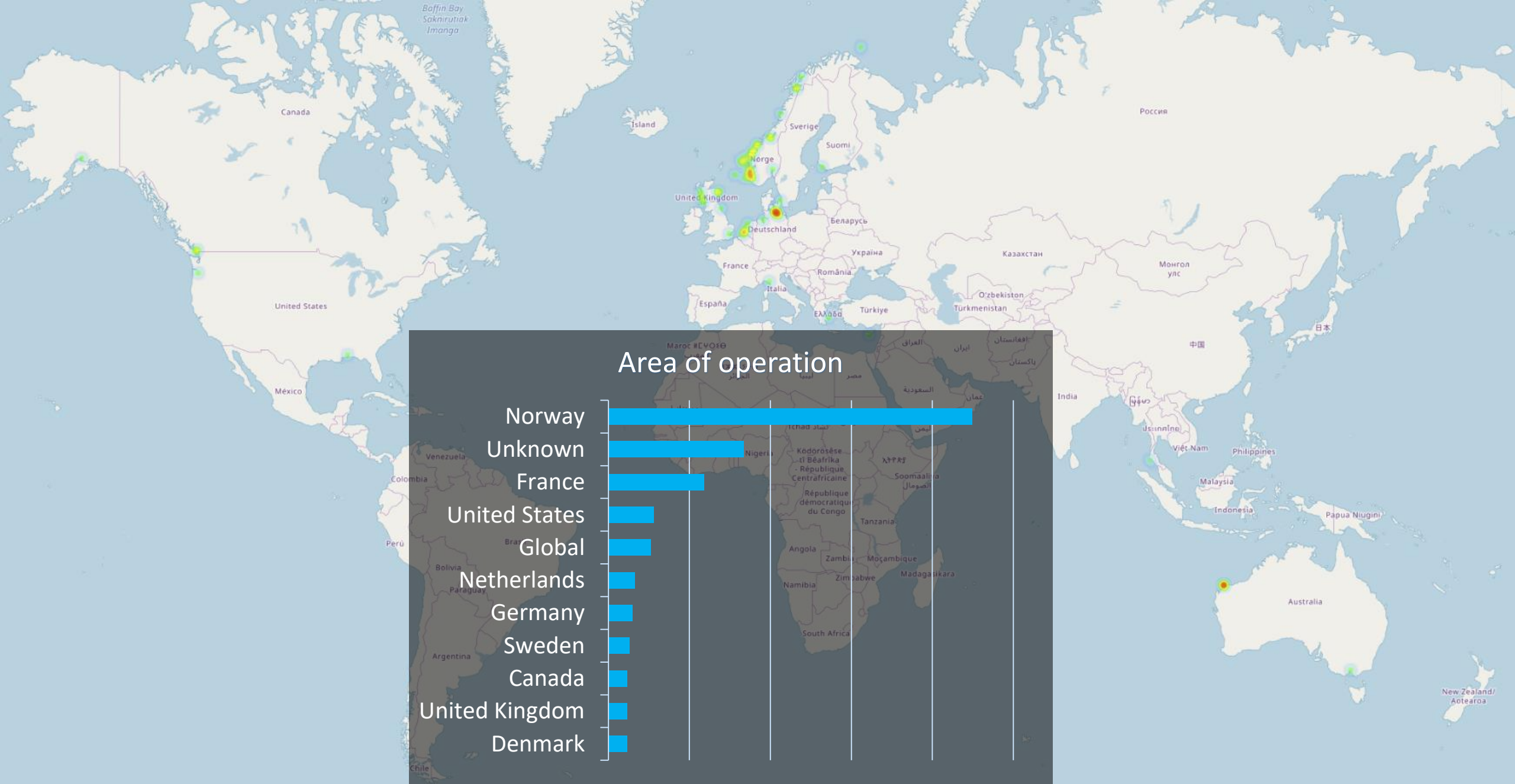


Country of operation

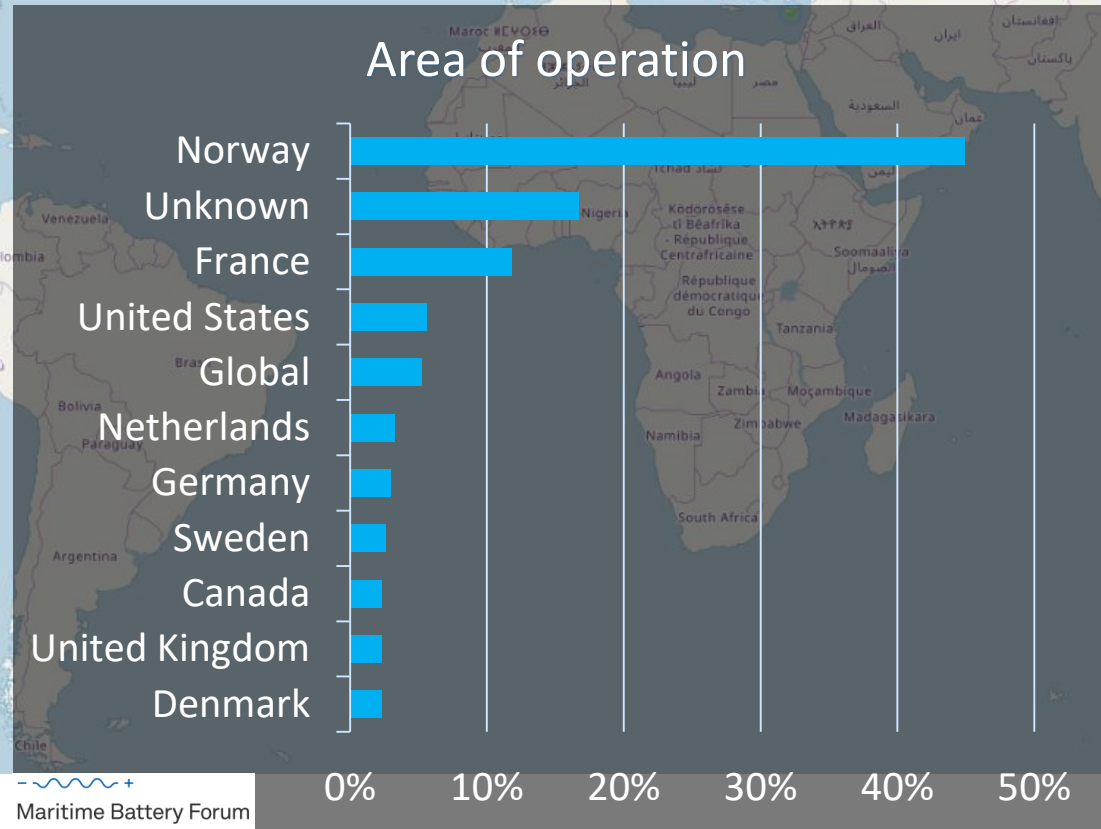
Area of operation



--~+
Maritime Battery Forum



Area of operation





How many PSVs should be hybridised?

Currently 47
are/will be
hybridised

1491 PSVs age
20 or younger*

1192 with DP2 or
higher – should
be candidates for
battery*

Average battery
size in fleet: 570
kWh

Potential for: 680
MWh of batteries
(if drawing a
straight line with
570)



*Data source: Clarkson Platou

MBF ship register – sign up!

The screenshot shows the homepage of the DNV GL Alternative Fuels Insight platform. At the top left is the DNV GL logo. At the top right, it says "Alternative Fuels Insight" with a location "Henningsgård, Søndre" and a dropdown arrow. Below this is a navigation menu with links: Home, Map, Statistics, Fuel Finder, Encyclopedia, Supporters, Contribute, Admin, and Contact us. The main banner features an aerial view of a port with three callout icons: a green leaf, a blue circle with "LNG", and a black lightning bolt. The text "Welcome to DNV GL's Alternative Fuels Insight platform" is overlaid on the banner. Below the banner are five content cards: 1. "Map" with a world map and text about exploring bunkering infrastructure, with a "SHOW MAP" button. 2. "Statistics" with a bar and pie chart, text about detailed insights and filtering, with a "SHOW STATISTICS" button. 3. "Supporters" with text about co-funding and industry pioneers, with a "SHOW SUPPORTERS" button. 4. "Fuel Finder" with a "New request" form and a map, text about connecting with suppliers, with a "SHOW FUEL FINDER" button. 5. "Encyclopedia" with an image of fuel dispensers and text about learning more about alternative fuels, with a "SHOW ENCYCLOPEDIA" button.

DNV·GL

Alternative Fuels Insight
Henningsgård, Søndre ▾

Home Map Statistics Fuel Finder Encyclopedia Supporters Contribute ▾ Admin ▾ Contact us

Welcome to DNV GL's Alternative Fuels Insight platform

Map

Explore the development of bunkering infrastructure for alternative fuels. You can also see where ships using alternative fuels and technologies are already operating.

[SHOW MAP ▶](#)

Statistics

Get detailed insights to the uptake of alternative fuels and technologies on ships. Filter on ship types, region, technology and more to create your own graphs.

[SHOW STATISTICS ▶](#)

Supporters

The AFI platform is made possible by co-funding from our supporters.

They include industry pioneers and market leaders who see the importance of alternative fuels in the maritime industry. Here you can learn more about them and get in touch with their experts.

[SHOW SUPPORTERS ▶](#)

Fuel Finder

Connect instantly with suppliers of alternative fuels by submitting your own bunker request.

[SHOW FUEL FINDER ▶](#)

Encyclopedia

Learn more about the properties of a wide range of alternative fuels and technologies.

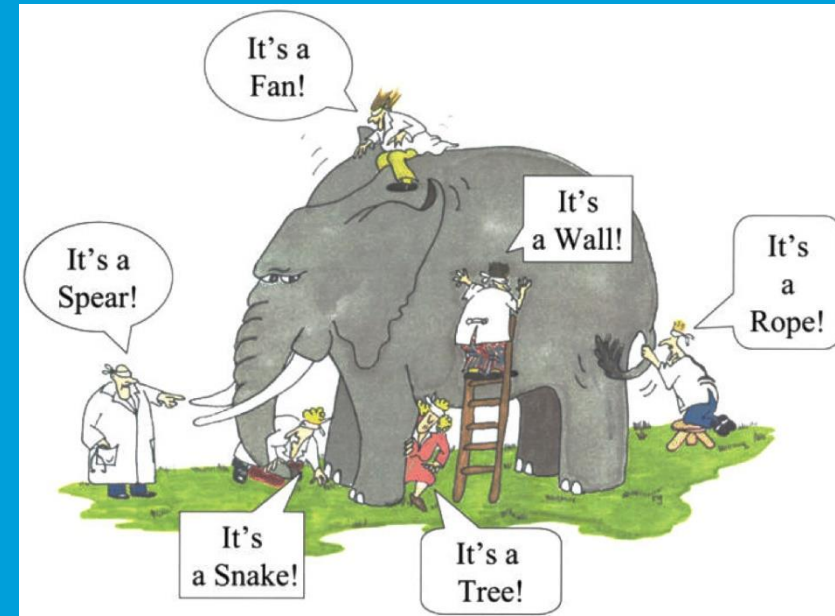
[SHOW ENCYCLOPEDIA ▶](#)

MBF members



Thank you for your attention!

(keep your eyes on the full picture)



Contact

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www.dnvgl.com

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