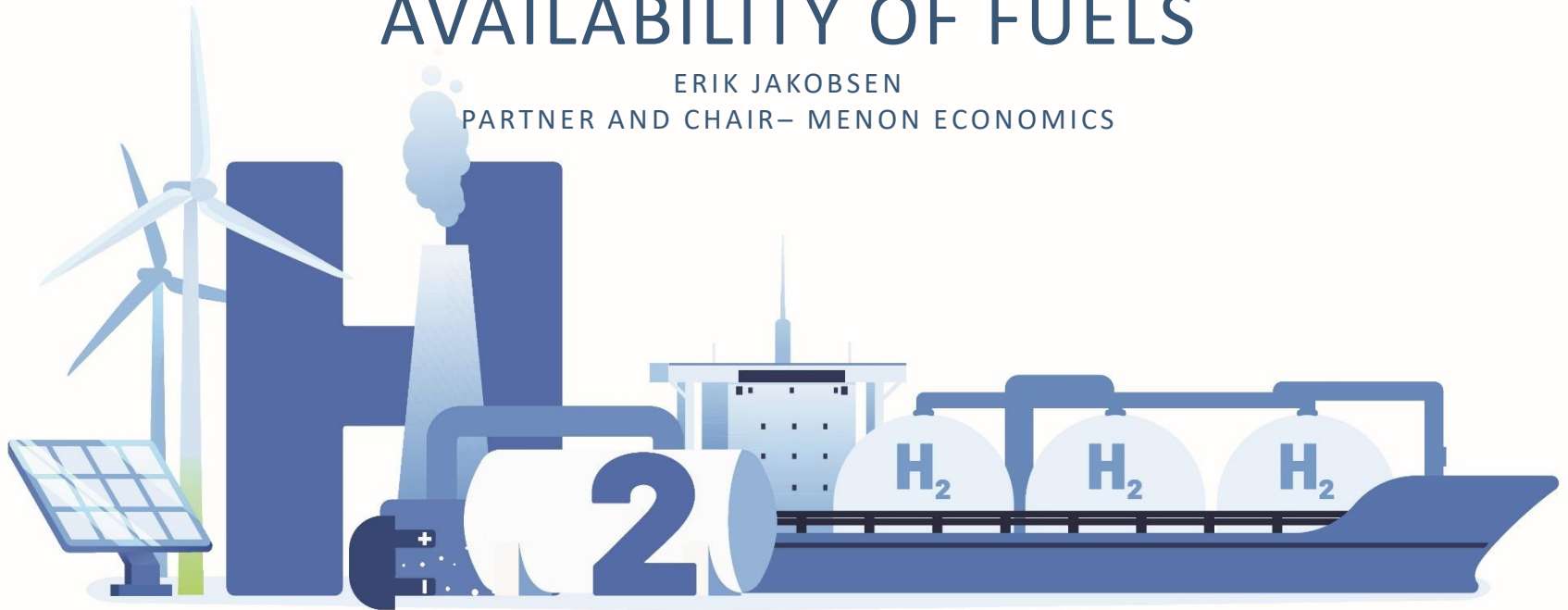




AVAILABILITY OF FUELS

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PARTNER AND CHAIR- MENON ECONOMICS



Need for significant upscaling of fuel production and bunkering supply

Ambition*:

- By 2030, zero or near-zero GHG emission technologies, fuels and/or energy sources should represent at least **10%** of the energy used by Nordic shipping
- By 2040, zero or near-zero GHG emission technologies, fuels and/or energy sources should represent at least **90%** of the energy used by Nordic shipping

* Source: *Fuel Transition Roadmap for Nordic Shipping, December 2024*)

The big puzzle: Matching supply and demand of fuels

Supply side:

What (choice of fuel)

Where (location)

How (energy source, price)

When (timing of investment and scaling)

Collaborative
solution:
**Green hubs and
corridors**

Demand side:

What (choice of fuel)

How (newbuild, retrofit)

When (timing of investment)

The shipowner's perspective: Barriers against scaling demand



Technological uncertainty

The shipowner's perspective: Barriers against scaling demand



Technological uncertainty



Capital Expenditures in newbuilding or conversions

The shipowner's perspective: Barriers against scaling demand



Technological uncertainty



Capital Expenditures in newbuilding or conversions



Availability of fuels – predictability is crucial

The shipowner's perspective: Barriers against scaling demand



Technological uncertainty



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Fuel price – predictability is important

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Availability of fuels – predictability is crucial



Fuel price – predictability is important



Regulations/safety issues

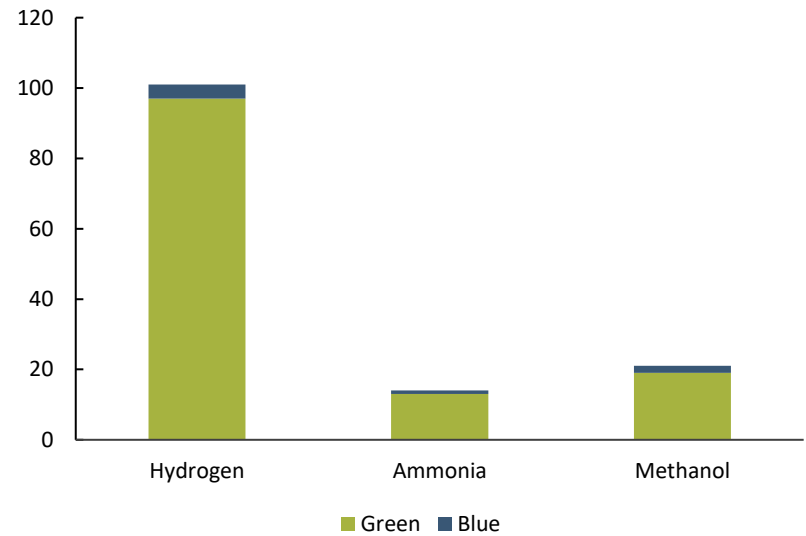
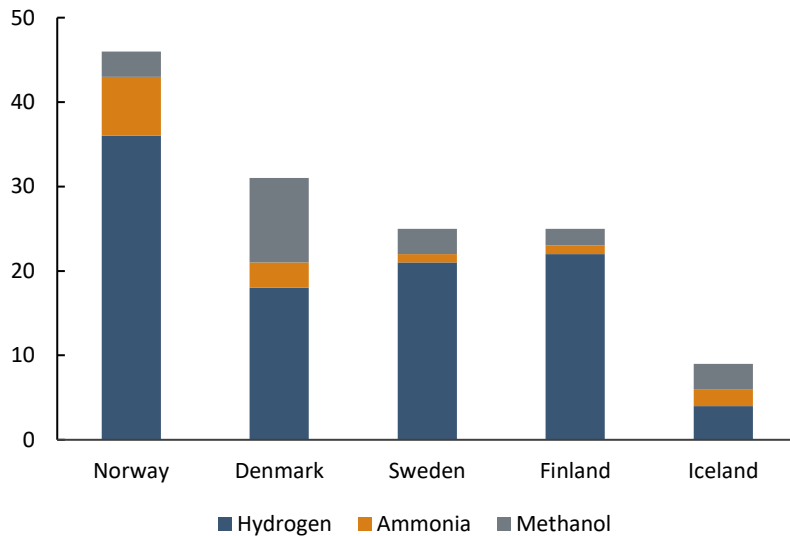
Planned production of hydrogen, ammonia and methanol in the Nordics

- For hydrogen, ammonia and methanol to be available for vessels in Nordic waters, a sufficient amount of the fuels must be produced
- Our mapping in 2022* revealed that:
 - **Potential demand for ammonia and methanol highly overshoots planned production of the fuels**
 - **Potential demand for hydrogen is much smaller than planned production of green hydrogen**

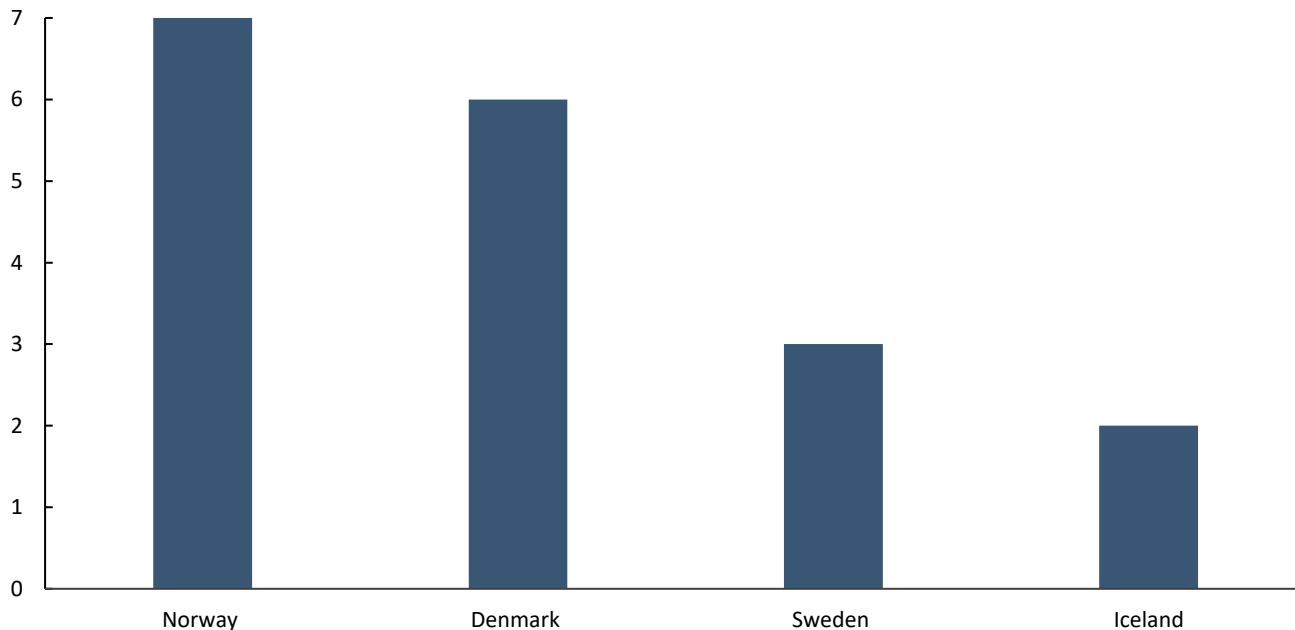
* Source: (*Menon (2023)*): Infrastructure and bunkering challenges for zero-carbon fuels. Nordic Roadmap Publication No. 2-B/1/2022

In total 140 projects identified related to the production of either hydrogen, ammonia or methanol

To the left: **Number of mapped projects** related to production of hydrogen, ammonia, and methanol in the Nordic countries . To the right: Number of mapped projects split between green and blue production method. Source: Menon Economics; Infrastructure and bunkering challenges for zero-carbon fuels. Nordic Roadmap Publication No. 2-B/1/2022



Mapping of 37 selected ports reveals that 18 ports plan to supply at least one of the three fuels in the Nordic countries

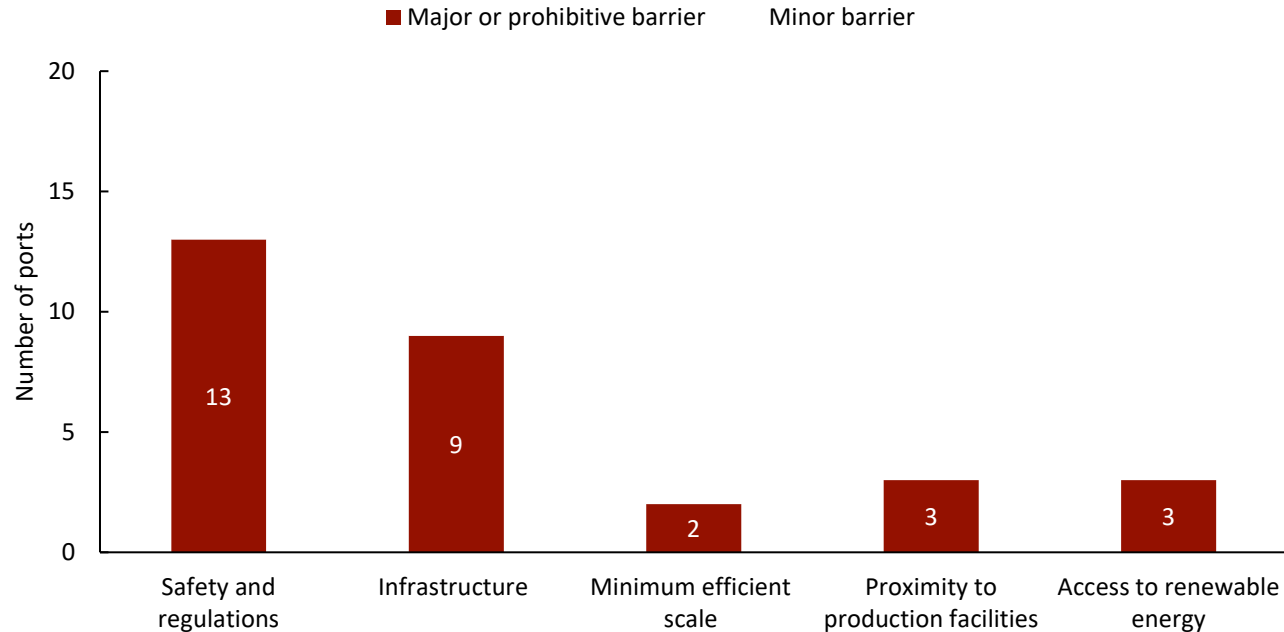


Number of ports that plan to supply at least one of the following three fuels; hydrogen, ammonia and/or methanol; split by country of location.

Data from interviews and or/questionnaire with the management of selected Nordic ports. N=27.

Source: Menon Economics; Infrastructure and bunkering challenges for zero-carbon fuels. Nordic Roadmap Publication No. 2-B/1/2022

Safety/regulations and infrastructure are perceived as the most important barriers for the ports to achieve their bunkering plans

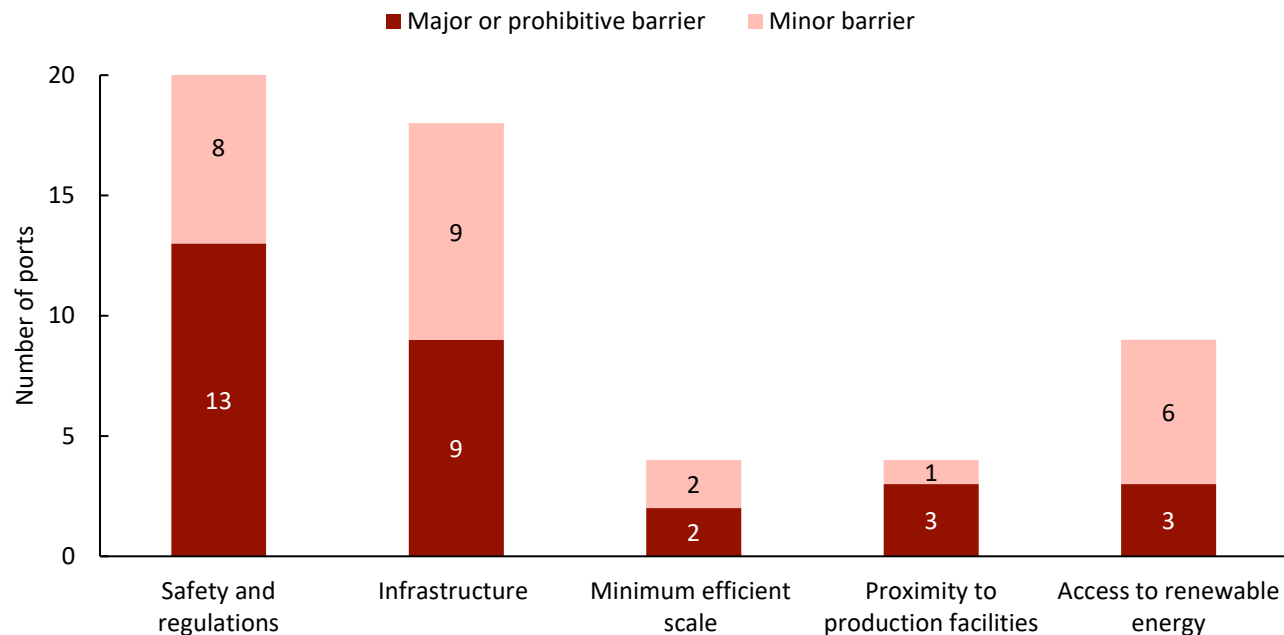


Assessment of different types of barriers against providing bunkering of hydrogen, ammonia and methanol in Nordic ports.

Data from interviews and or/questionnaire with the management of selected Nordic ports. N=27.

Source: Menon Economics; Infrastructure and bunkering challenges for zero-carbon fuels. Nordic Roadmap Publication No. 2-B/1/2022.

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THANK YOU FOR THE ATTENTION!

