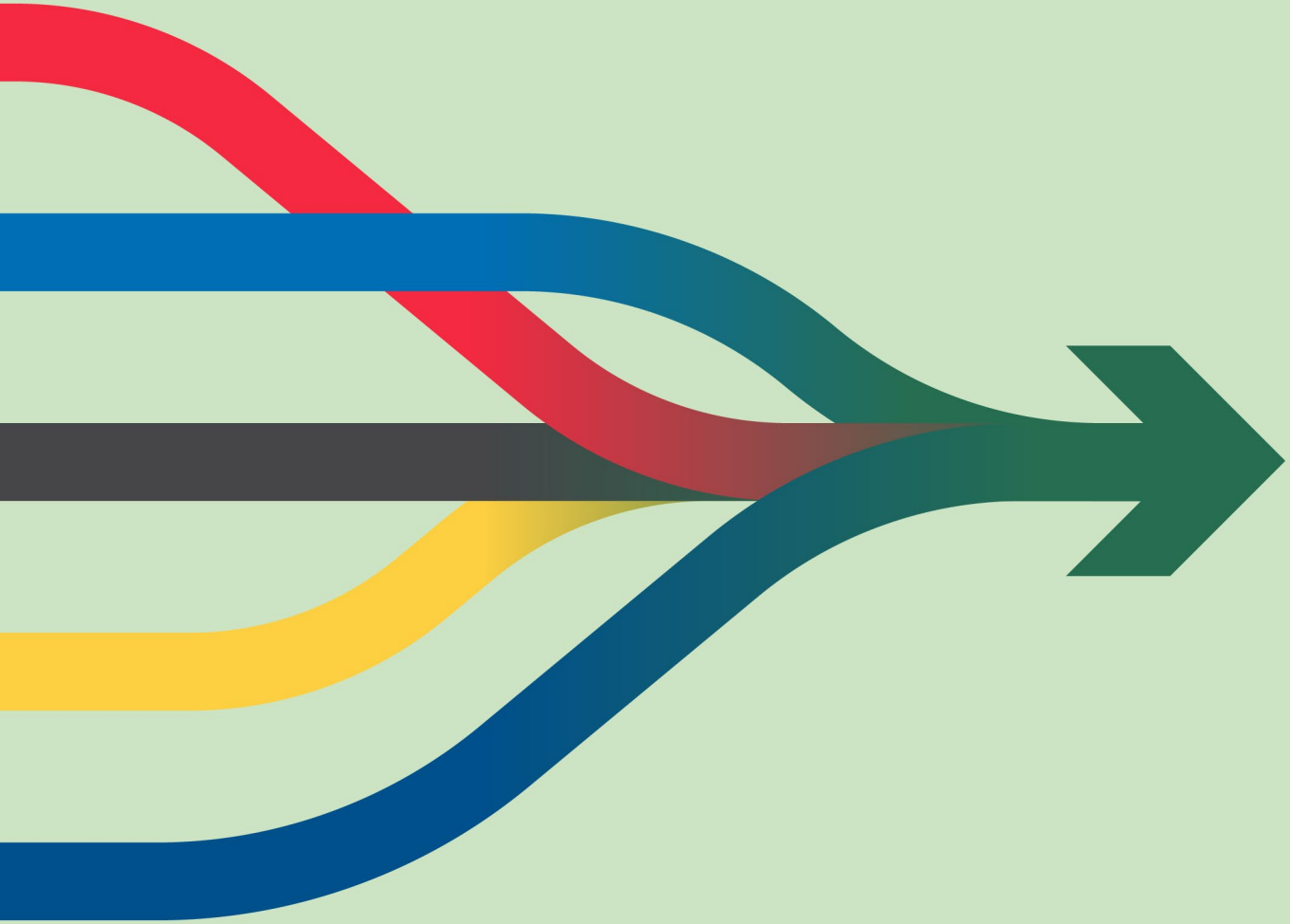


# Maritime Energy Transition in the Nordics

**Andreas Bach**, PhD

Director

Maritime Systems Innovation @RISE

Nordic Energy Research

# Agenda

- About MAREN
- Maritime industry – setting the scene
- The Nordic Case
- Strongholds and challenges for the Nordics
- Policy recommendations
- The question to be answered

# About project MAREN

- A Nordic maritime energy program with the purpose of fostering and spreading knowledge on new insights and innovations in the field of sustainable maritime energy
- A Nordic strategy on maritime energy transition together with leading Stakeholders
- A Nordic digital platform for cross-industrial open innovation and collaboration

Five clusters & two major Research Institutes in five Nordic countries

Renewable energy meets maritime in new value chains

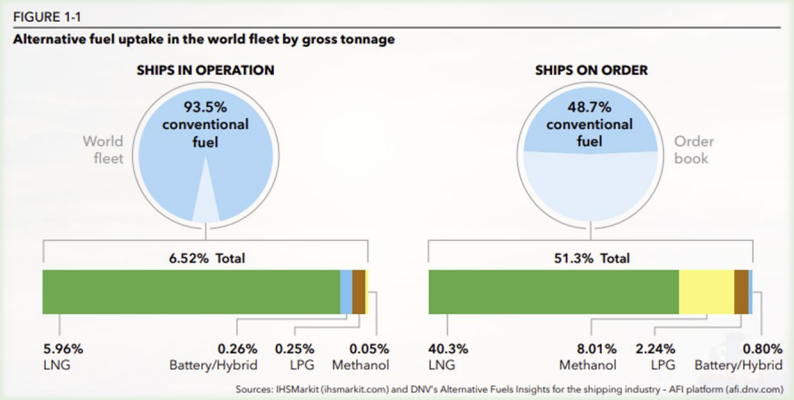

Nordic Innovation

Nordic Green Transport Forum

Nordic Energy Research

# Maritime industry - setting the scene

- Shipping is international
- Increased demand for transports at sea
- Huge energy demand
- Ships has long lifespan and are built in small series
- Lack of space (energy efficiency)




Nordic Green Transport Forum

# The Nordic Case

- Strong maritime technology industry Responsible shipowners and energy companies
- Good potential to increase intra-nordic Green Corridors
- Some difference, inviting to collaboration
- Strong supporting networks / clusters

Ships with alternative fuel in order worldwide

3 Norway
12 Denmark
13 Sweden

(Swedish Transport agency 2022)

Nordic
Green Transport
Forum

# Strongholds and challenges for the Nordics

- Assessed using Sectorial Innovations Systems Perspective
- Nordic Maritime Innovations system is Strong

| Function | Assessment |
|---|---|
| Entrepreneurial experimentation<br>Testing new solutions | Strong |
| Knowledge development and diffusion<br>Knowledge base, relevant technologies | Moderate<br>Overall positive, some gaps |
| Direction of search<br>Incentives/pressure, regulations | Moderate<br>Long term vs short term |
| Legitimation<br>Compliance with regulations and standards, social acceptance | Moderate<br>A lot of uncertainty, security, costs, HSE regulations |
| Resource mobilisation<br>Human and financial capital complementary assets | Weak<br>Large investments needed all over the value chain |
| Market formation<br>Development and upscale of tech | Weak<br>Slow development |

# Policy recommendations to overcome the challenges

## Strengthen market formation

Taxation GHG emissions
Public procurement policy instruments

## Bolster public sector capacity

Lack of regulations and standarder

## Value chain approach

Significant chicken and egg problems
Holistic planning including upstream energy production

## Mobilize resources

Strengthen ports role as green energy hubs
Increase R&D funding


MAREN

Policy brief

Maritime Energy Transition in the Nordics

Background

Globally, shipping contributes significantly to greenhouse gas (GHG) emissions, a trend expected to worsen with economic growth and trade expansion. The Nordic countries, with large maritime sectors, are also affected. Both technical (e.g., battery-electric systems, onboard carbon capture) and operational (e.g., reduced speed, optimized freight capacity) measures are necessary to cut emissions. However, the primary strategy lies in fuel switching, transitioning from fossil fuels to alternatives like biofuels, hydrogen, and electrification. While technically feasible, challenges persist, including resource scarcity, infrastructure limitations, competition for low-carbon fuels, and the need for new energy supply chains.

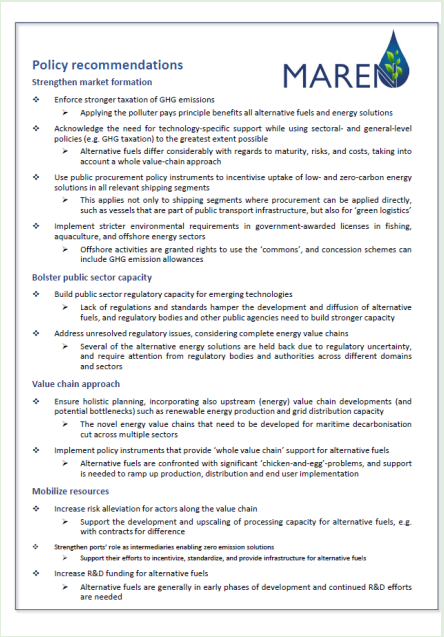
Status

The Nordic countries have ambitious GHG emission reduction targets for 2050, with strong attention to electrification, biofuels, ammonia, and e-fuels. Feasibility varies based on factors like operational regularity and customer demand for green logistics. Maritime decarbonization relies on innovative solutions, with strong experimentation in the Nordic maritime innovation system. Yet, there are knowledge gaps in alternative fuel use, production, distribution, and bunkering, posing resource mobilization challenges. Legitimacy for alternative fuels may be fragile due to electricity and energy feedstock reliance. Market formation and resource mobilization for alternative fuels are currently weak, reflecting an early phase of maritime energy transition. Given that the emissions need to be urgently reduced, its imperative that policy makers address current bottlenecks.

Project partners

RENERGY RI.SE VASEK NYORKA Danish Maritime Svenskt Marinteknisk Forum SINTEF

Nordic Innovation


Policy recommendations

MAREN

Strengthen market formation

- Enforce stronger taxation of GHG emissions
  - Applying the polluter pays principle benefits all alternative fuels and energy solutions
- Acknowledge the need for technology-specific support while using sectoral- and general-level policies (e.g. GHG taxation) to the greatest extent possible
  - Alternative fuels differ considerably with regards to maturity, risks, and costs, taking into account a whole value-chain approach
- Use public procurement policy instruments to incentivise uptake of low- and zero-carbon energy solutions in all relevant shipping segments
  - This applies not only to shipping segments where procurement can be applied directly, such as vessels that are part of public transport infrastructure, but also for 'green logistics'
- Implement stricter environmental requirements in government-awarded licenses in fishing, aquaculture, and offshore energy sectors
  - Offshore activities are granted rights to use the 'commons', and concession schemes can include GHG emission allowances

Bolster public sector capacity

- Build public sector regulatory capacity for emerging technologies
  - Lack of regulations and standards hamper the development and diffusion of alternative fuels, and regulatory bodies and other public agencies need to build stronger capacity
- Address unresolved regulatory issues, considering complete energy value chains
  - Several of the alternative energy solutions are held back due to regulatory uncertainty, and require attention from regulatory bodies and authorities across different domains and sectors

Value chain approach

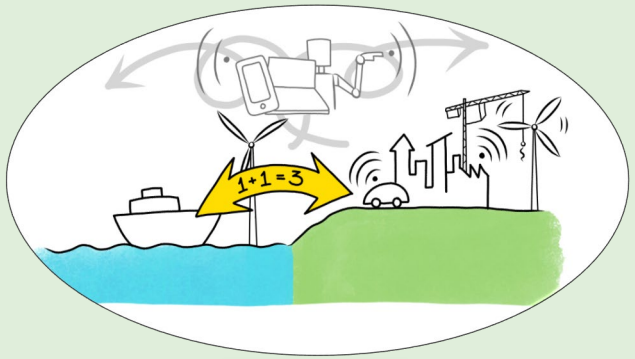
- Ensure holistic planning, incorporating also upstream (energy) value chain developments (and potential bottlenecks) such as renewable energy production and grid distribution capacity
  - The novel energy value chains that need to be developed for maritime decarbonisation cut across multiple sectors
- Implement policy instruments that provide 'whole value chain' support for alternative fuels
  - Alternative fuels are confronted with significant 'chicken-and-egg'-problems, and support is needed to ramp up production, distribution and end user implementation

Mobilize resources

- Increase risk alleviation for actors along the value chain
  - Support the development and upscaling of processing capacity for alternative fuels, e.g. with contracts for difference
- Strengthen ports' role as intermediaries enabling zero emission solutions
  - Support their efforts to incentivize, standardize, and provide infrastructure for alternative fuels
- Increase R&D funding for alternative fuels
  - Alternative fuels are generally in early phases of development and continued R&D efforts are needed

## “What would you recommend other Nordic actors to cooperate on to contribute to the green transition of the transport sector, based on your presentation?”

- Not co-operate but collaborate
- Policy Lab / Innovation
- Boost Green Corridors in the Nordics
- Nordic R&D funds
- Collaborate with cargo owners




Nordic Green Transport Forum

# Thank you for the attention!

MAREN
Project Partners:


The MAREN project is co-funded by
Nordic Innovation