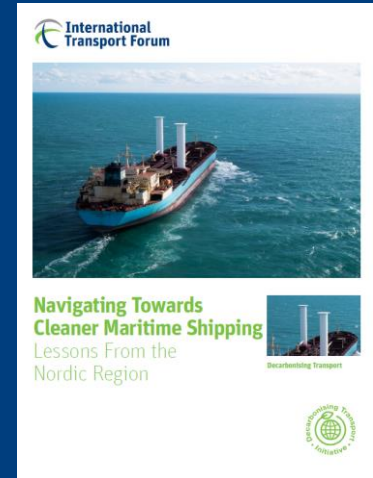


Navigating Towards Cleaner Maritime Shipping

Lessons from the Nordic region

Presentation of ITF report

November 2020

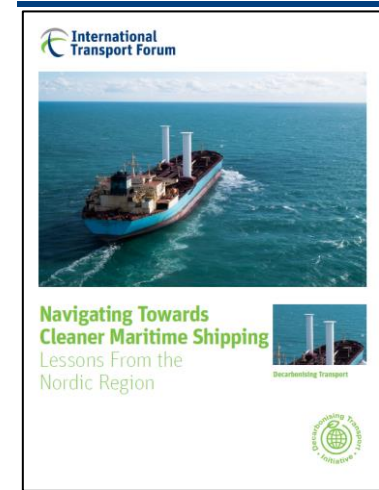


Report purpose

- Review of technologies and policies that can foster energy efficiency, energy diversification and the reduction of emissions
- The pioneering policy and technology developments in Nordic countries mean findings are likely to have global relevance

Background

- Maritime transport identified as a “hard to decarbonise”
- The IMO defined ambitious decarbonisation targets in its initial strategy on the reduction of GHG emissions from ships and is discussing follow up actions
- Governments and private sector stakeholders in the Nordic region show strong leadership in environmental developments and have a strong presence in the maritime sector (e.g. as owner/operators, ship designers/builders, engine manufacturers...)



Project characteristics and timeline

- **Cooperative effort**

ITF - Decarbonising Transport Initiative

Nordic Energy Research, platform for cooperative energy research and policy development under the Nordic Council of Ministers



- **Kick-off Workshop at World Maritime University**

26-27 February 2020



**Prospects for Energy and Maritime
Transport in the Nordic Region – Expert
Workshop**

26 - 27 February 2020, Malmö, Sweden, International Transport
Forum / World Maritime University (WMU) / Nordic Energy Research

- **Call for funding on low-carbon maritime transport
by Nordic Energy Research**

26 August 2020



Funds available for low-carbon maritime transport

Nordic Energy Research is announcing a call within the
Nordic Maritime Transport and Energy Research
Programme (NMTEP). Transport - and especially
maritime transport - is considered one of the hardest...

- **Publication of the report**

16 November 2020 (IMO MEPC week)



Today's webinar

Report overview (ITF)

- Findings
 - Technologies to decarbonise maritime transport
 - What could be the best fuels to decarbonise shipping?
 - Nordic policies for the decarbonisation of the maritime sector
- Recommendations
 - Moving towards zero-carbon shipping

Comments from Nordic Energy Research

Q&A session



Technology options: energy efficiency

- Efficiency improvements on new and existing ships are essential – but not sufficient – to meet international climate commitments
- Efficiency improvements are also crucial and to limit energy cost increases that may come from low-carbon fuels
- Promising efficiency improvements include wind assistance technologies and skin friction improvements via reduced hull fouling and hull air lubrication
- Other energy efficiency savings can continue to come from increases in ship capacity and slow steaming



Technology options: low carbon fuels



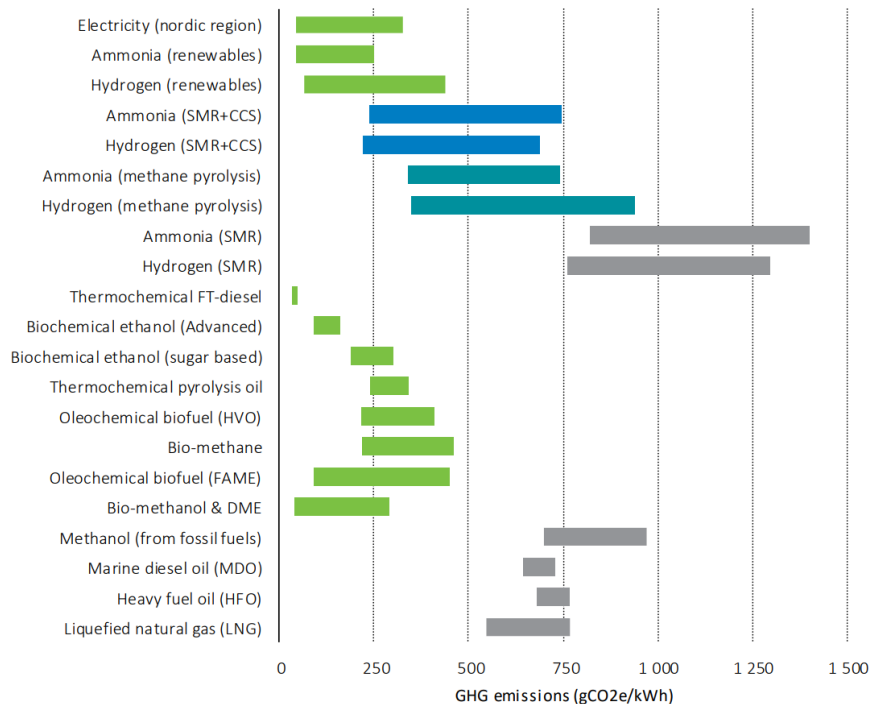
- While the case for improved efficiency is clear, choosing between the range of possible low carbon fuels and energy vectors is a challenge
- Four broad factors can help narrow down the choice to the most promising solutions
 - the energy density of fuels (the first requirement for long distance transportation)
 - their GHG emissions intensity (essential to meet climate goals)
 - the potential to scale up the production (indispensable to replace large volumes of oil-based fuels)
 - cost prospects (a crucial requirement for any economical assessment)



Technology options: low-carbon fuels



Well-to-wake greenhouse gas emissions of different fuel options per kWh of shaft work



- Due to methane emissions in natural gas production and methane slip, LNG or methanol (when produced using fossil fuels) do not deliver, in current conditions, lower GHG emissions than conventional marine fuels
- Biofuels, electricity, hydrogen and ammonia are promising options, if produced with low-carbon energy and (where relevant) renewable carbon, when comparing energy options based on well-to-wake and lifecycle assessments





GHG reduction targets in the Nordics

| Country | GHG reduction targets (overall) | | | | GHG reduction targets (transport) | | |
|---------|------------------------------------|--------------------|-----------------------------------|----------------------|-----------------------------------|--------------------|------------------------|
| | 2030 | 2040 | 2045 | 2050 | 2030 | 2045 | 2050 |
| Denmark | 70% (1990) | - | - | Low-emission society | - | - | - |
| Finland | 40% (1990) | Carbon neutrality* | - | 80% (1990) | 50% (2005) | - | - |
| Iceland | 40% (1990) | Carbon neutrality | - | - | - | - | Phase out fossil fuels |
| Norway | 40% (2030) | - | - | 80-95% (1990) | 50% [Shipping] | - | - |
| Sweden | 63-75% (1990) [Sector-specific] | - | 85% (1990); Zero net emissions | - | 70% (2010) | Climate neutrality | - |

Note: The year in brackets is the reference year, or level compared to which emissions must be reduced.

*By 2035

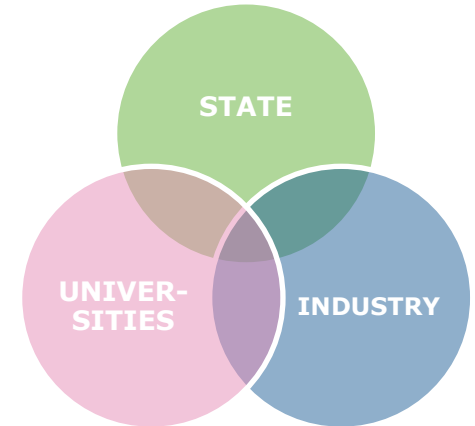
Source: ITF based on: Danish Energy Agency (2020), Finnish Ministry of the Environment (2020b), Government of Iceland (2020a), Government of Norway (2018), Swedish Environmental Protection Agency (2019).



Research and innovation policies address environmental concerns and employment



- **Proactive government approach** that minimises risks for companies willing to adopt zero-emission technology, and that bridges research with real-life application
- **Participation across the entire value chain.** Triple-helix collaboration between government, industry and academia, links research with opportunities to apply low-emission solutions
- **Maritime cluster support** and innovation partnerships initiated by Nordic governments and private stakeholders (interactive and often gvt. supported)
- **Global marketing support, support for internationalisation of SMEs** and **export finance** paves the way for future scale-up of low-emission technology and aims to create local jobs




Pricing and incentives for shipping decarbonisation

- **Shipping emissions not priced sufficiently**

- Nordic countries have carbon taxes in place since the 90s, but only Norway applies it to domestic shipping
- Norway's NO_x Fund uses revenues for innovative technologies and infrastructure
- EU Parliament voted for the inclusion of shipping emissions in the Emissions Trading System (ETS) using revenues similarly to NO_x Fund

- **Subsidies and tax exemptions not aligned**

- Support and tax deductions for R&D business expenses
 - Aid for investments in env. performance of ships & electrification infrastructure
 - Ecobonus schemes for modal shift
 - Electricity tax exemptions electric charging of ships
 - Environmentally differentiated port & fairway dues
 - Green procurement
- 
- **Energy/carbon tax exemptions** for the shipping sector result in indirect fossil fuel subsidies of around EUR 174 million per year
 - **Tonnage tax** not conditional on environmental performance, except Norway. However, vessels in oil & gas sector are still eligible for tonnage tax.



NO_x-fondet



Source: Port of Gothenburg



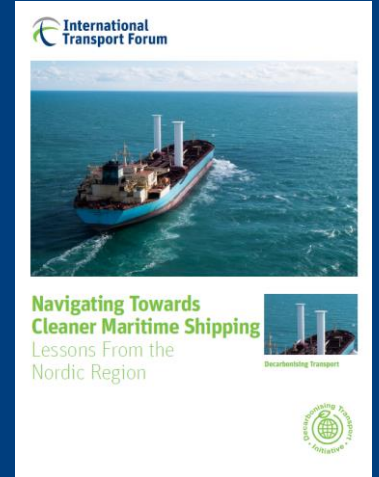
Recommendations



- Increase the energy efficiency of new and existing ships
- Leverage public sector procurement to stimulate the electrification of short-distance shipping
- Introduce regulations on lifecycle emissions of maritime fuels
- Put in place carbon pricing for shipping and policies that can reduce carbon content of ship fuels
- Advance the discussion on market-based mechanisms at the International Maritime Organisation
- Launch pilot projects to gain experience with new fuels and accelerate the adoption of safety guidelines



Thank you!





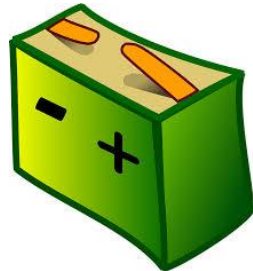
Nordic Maritime Transport and Energy Research Programme

Svend Søyland, Senior Adviser, NER



Why NMTEP ?

- Nordics – a progressive maritime region!
- Nordic added value and co-funding
- Deep industry involvement and co-funding
- High TRL > Maturing zero-emission fuels
- 3 projects (30 mNOK / 2021-23)



Nordic Energy
Research

Scope

Alternative fuels and propulsion systems with low-carbon impact

- Concepts utilizing Hydrogen, ammonia or other fuels based on green or blue hydrogen



NMTEP: Hydrogen and Ammonia

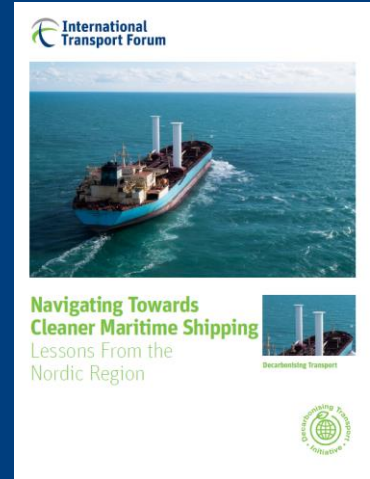
- “**The CAHEMA project** - marine engines using ammonia and hydrogen as fuels, based on new engine concepts.
- **The REDESIGNA project** - ammonia as an energy hydrogen carrier utilize it for a PEM fuel cell-system on-board a ship”.
- “**The AEGIR project** - unique fuel cell and membrane-based system for efficient conversion of ammonia into electric energy.”
- “**The HOPE project** - RORO/ROPAX-vessel with hydrogen as fuel and fuel cells for energy conversion”.



Navigating Towards Cleaner Maritime Shipping

Lessons from the Nordic region

Do you have questions?





The ITF

- **Intergovernmental organisation**
 - OECD framework, but 60 member countries
- Only global body covering **all transport modes**
- **Think tank** for transport policy
 - **Data and statistics**
 - **Analysis, identification of best practices**
 - **Knowledge sharing**
- Organising global dialogue for better transport
 - **Annual Summit**, largest gathering of transport ministers
 - **Corporate Partnership Board**
 - “Platform for **discussion and pre-negotiation**”
- Current **focal areas**
 - Digitalisation, connectivity, safety & security, universal access, **decarbonisation**





Decarbonising transport initiative

- Launched in 2016, right after the signature of the Paris Agreement
- Aims to support governments in the definition of policies that help meeting its ambition
- Key enablers

ITF Modeling Framework

- Projects transport activity and related CO₂ (up to 2050)
- In continuous development
- Models cover different transport sectors (non-urban freight, non-urban passenger, urban passenger, urban freight TBD)
- Backbone to biennial ITF Transport Outlook

Partners

- More than 70 partners, including corporations, governments, NGOs, intergovernmental organisations, multilateral development banks, professional and sectoral associations, cities and regional networks, research institutions, and foundations
- Provide feedback, data, methodologies, inputs to workshops etc.

Funders

- ITF's Corporate Partnership Board (30+ organisations)
- France, Germany (IKI), Korea, Ireland, The Netherlands
- World Bank, European Commission
- The Climate Works Foundation
- FIA + FIA Foundation
- International Road Transport Union (IRU)
- Swedish Shipowners' Association
- Nordic Energy Research

Decarbonising transport initiative

Key activities



Progress tracking

- Evaluate how current mitigation measures contribute to reducing transport CO₂
→ **NDC analysis**

In-depth sectoral reports

- Identify effective policies for decarbonising transport sub-sectors
→ **urban passenger, road freight, maritime transport, aviation...**

Focus studies

- **Analyse specific decarbonisation issues**
→ e.g. Impact of decarbonising road transport on tax revenues, Vehicle technology choice in the case of France, Regulations & standards for clean trucks and buses

National pathways

- **Help countries define pathways to meet their transport CO₂ reduction ambitions**

Policy dialogue

- Organise global dialogue on transport and climate change → **ITF Summit**, roundtables, briefings, workshops
- Act as a conduit for transport sector input to climate change negotiations → **Involvement in UNFCCC & COP**
- **Transport Climate Action Directory**