



UiT The Arctic University of Norway


Policy and incentives for change

Reykjavik 13. September 2023

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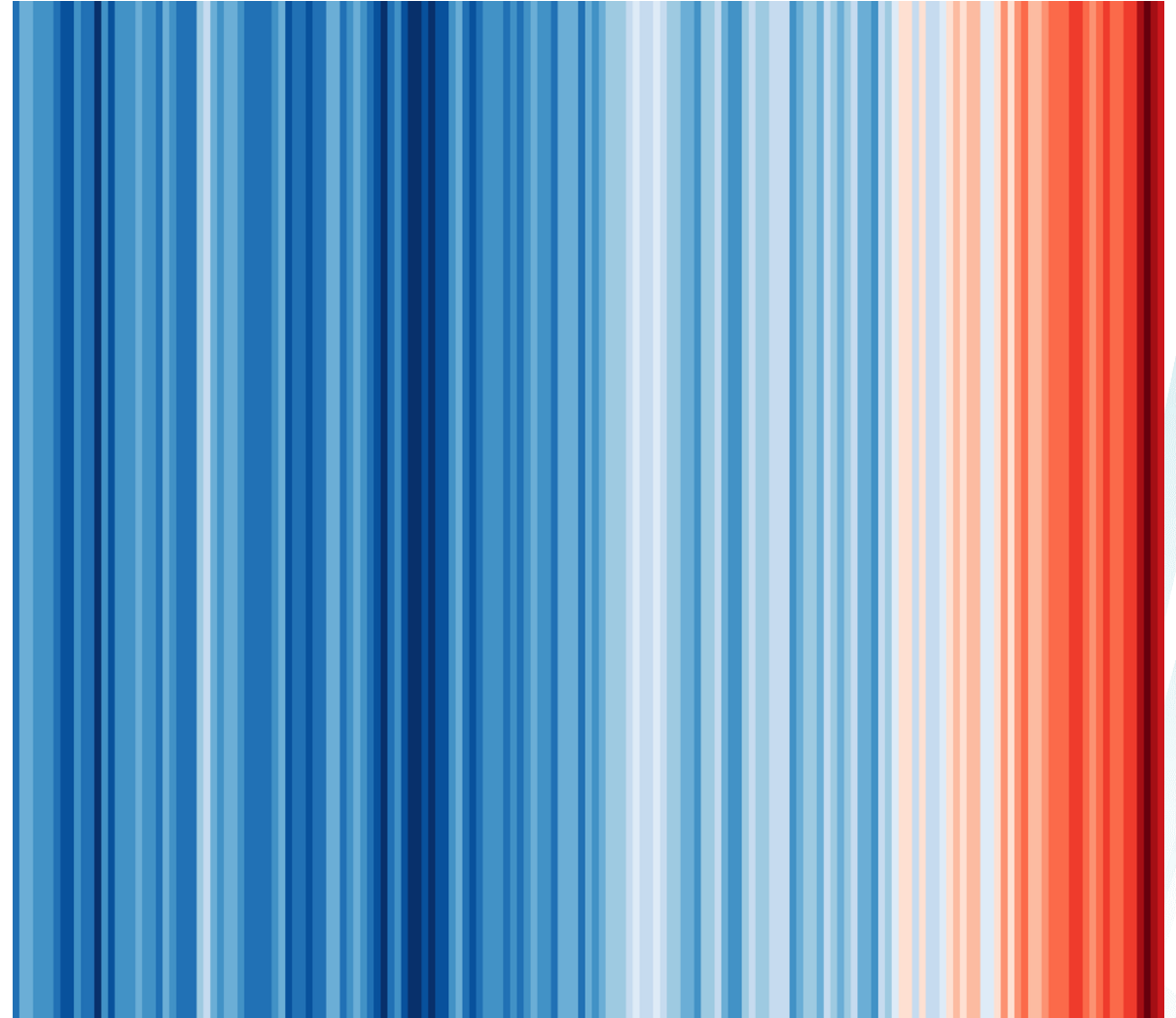
Associate professor UiT The Arctic University of Norway

Agenda

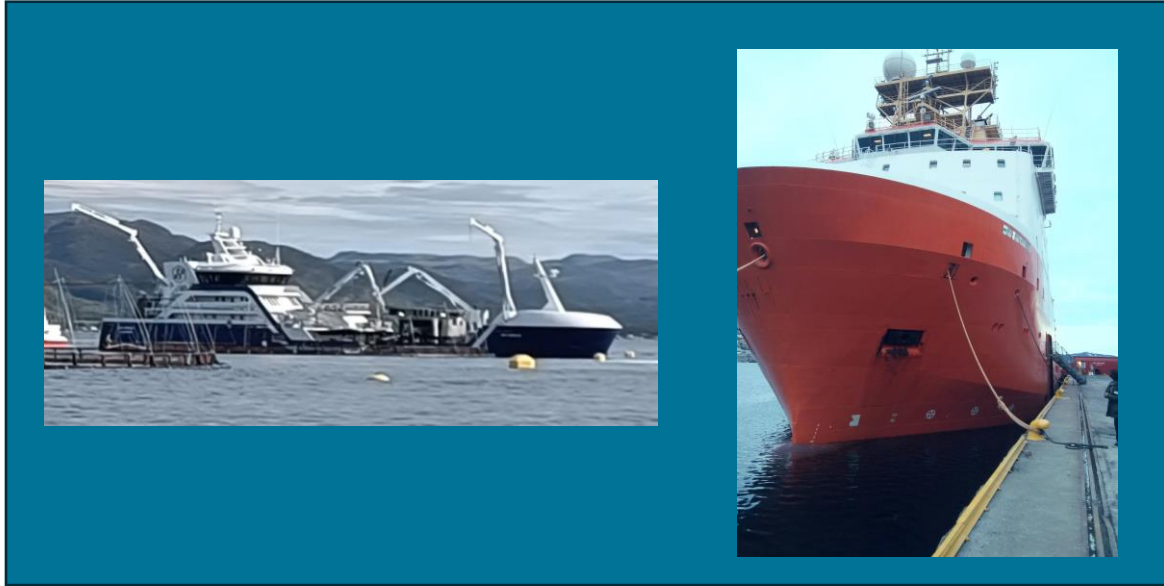
- Some background on emission reduction requirements
 - The Norwegian fisheries fleet
 - Current government support programs
 - Some unresolved questions
- 

Introduction

- The seafood sector requires a sustainable environment
- Norway has committed to the Paris agreement to limit global warming to 2C
- Through agreements with the EU Norway will reduce CO2 to 55% less than 1990 levels by 2030
- The seafood industry will have to adapt as well



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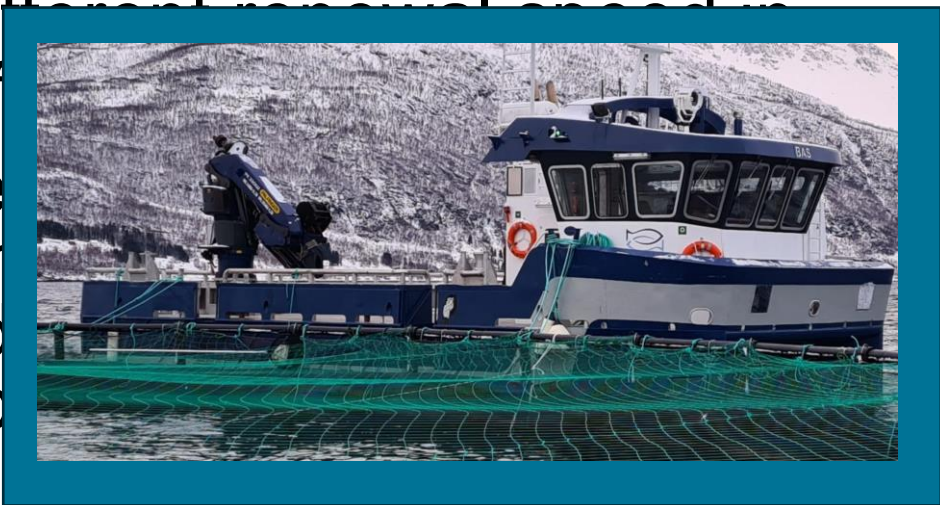
Cargo volume
 $500 \text{ m}^3 +$



- ~140 Ocean going vessels
- ~5000 registered vessels

• Different vessel lengths

- Different
- Terms
- similar
- accounts
- possible

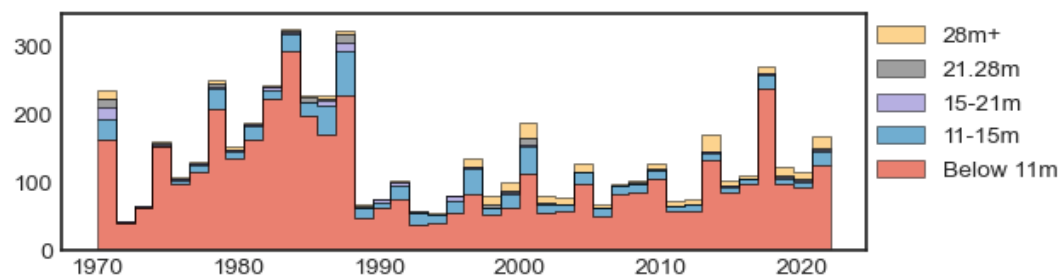


Length: $<11\text{m}$, 11.15m , $15\text{-}21\text{m}$, $<500\text{m}^3$ cargo volume

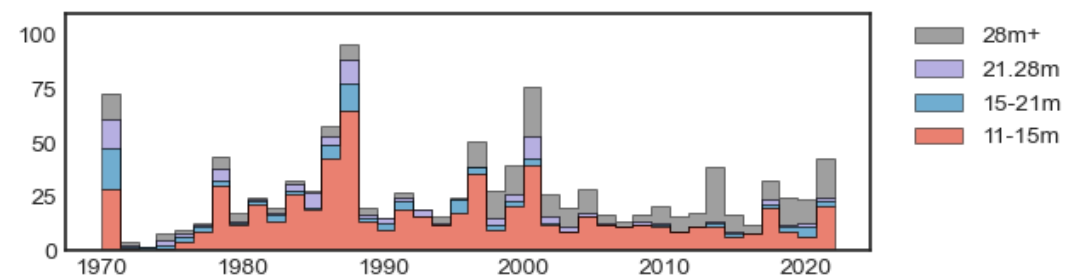


Fisheries fleet

All length classes



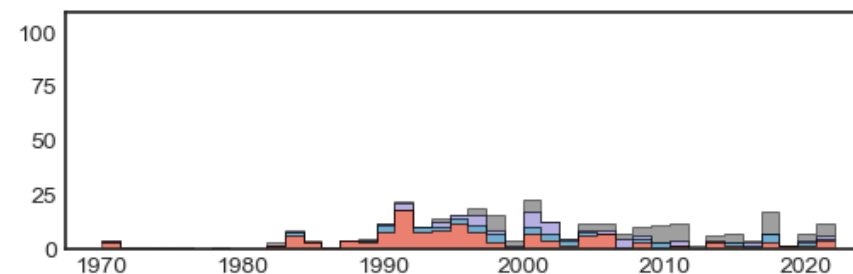
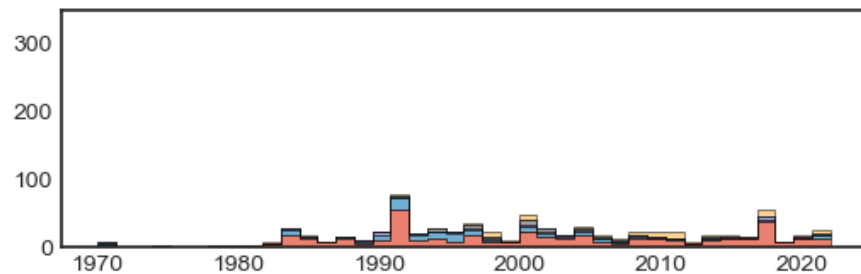
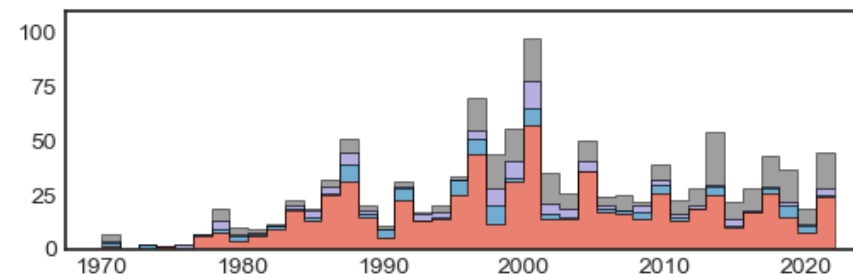
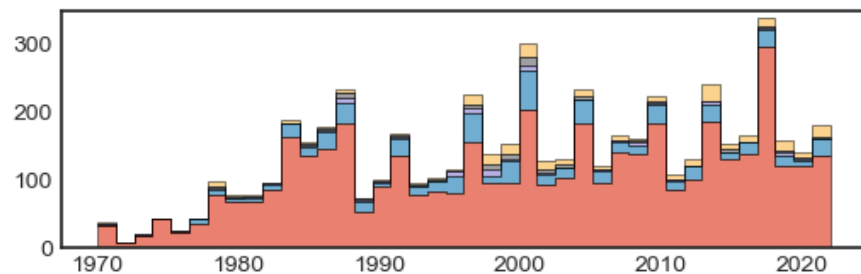
Excluding <11m



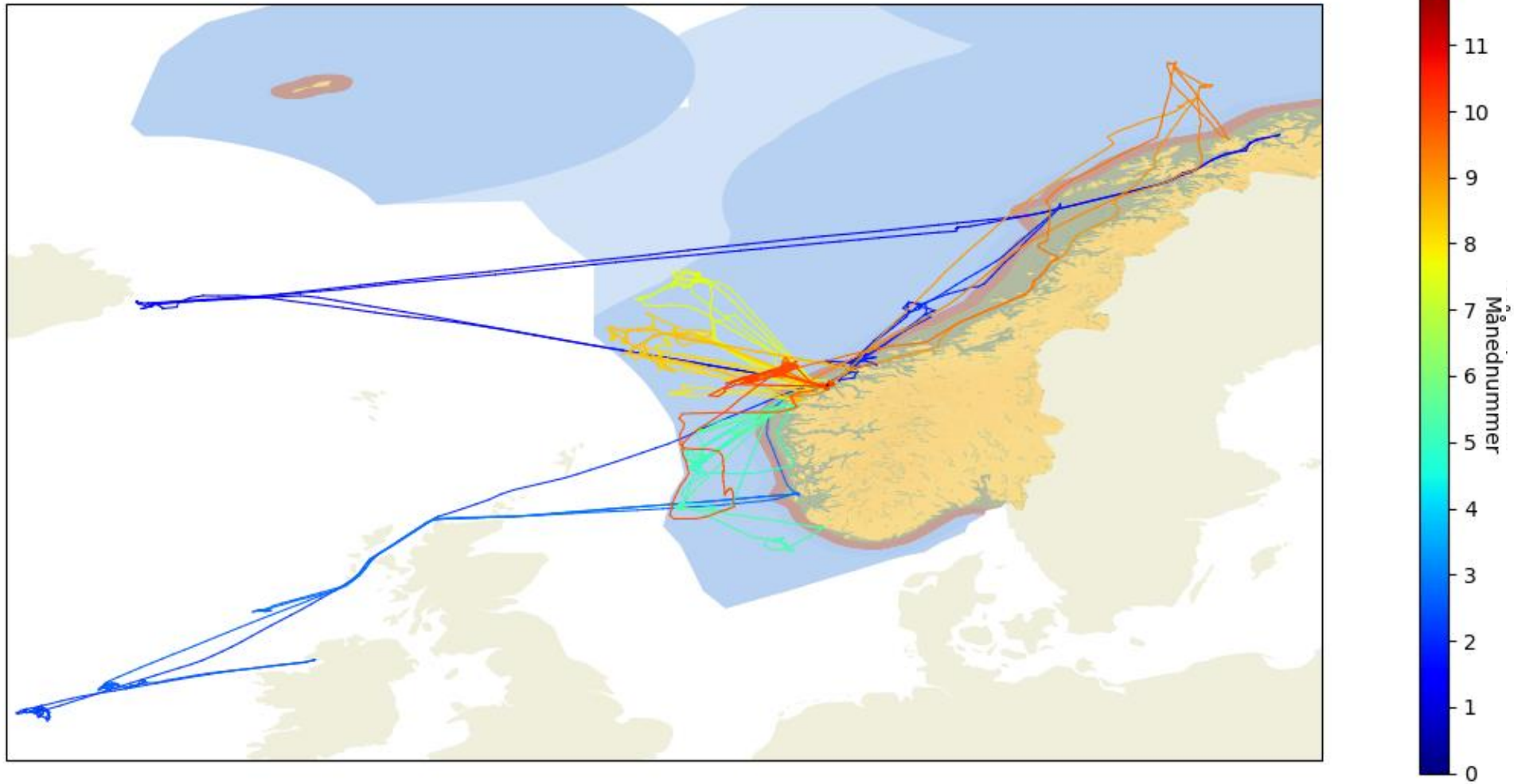
Vessel year

Engine year

Rebuild year



Fisheries fleet



Investment support programs



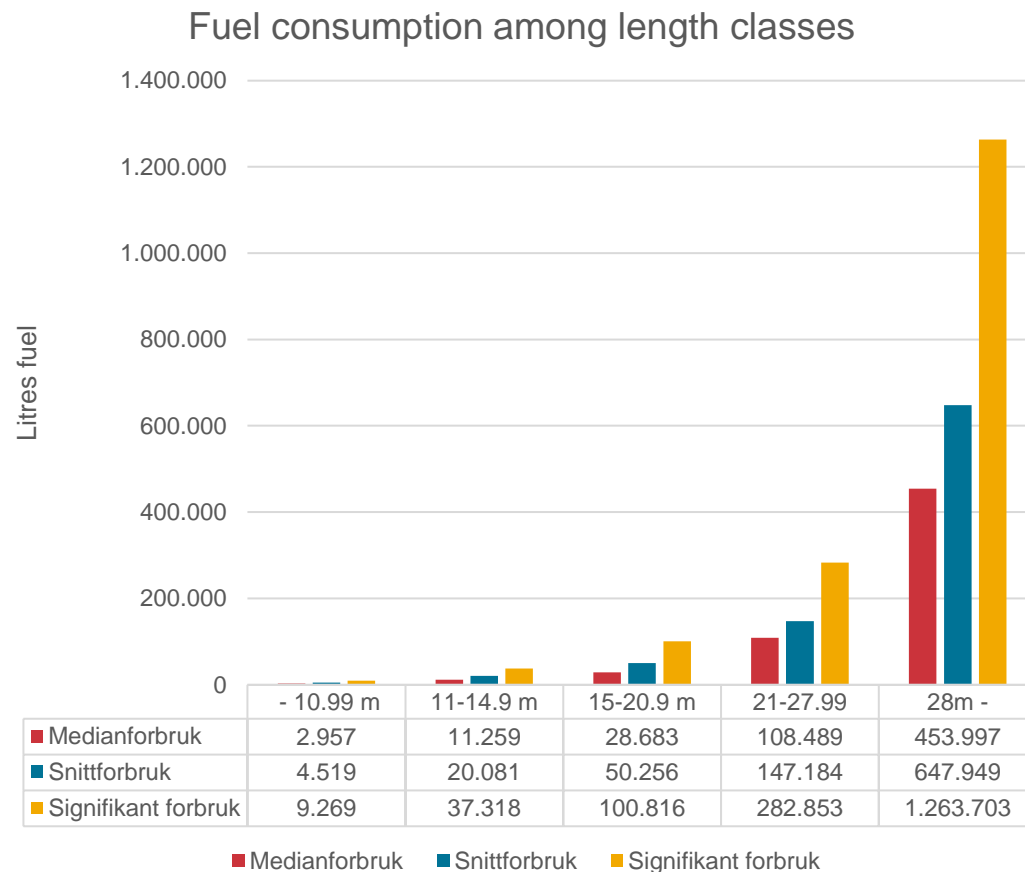
21m gillnet vessel with 270kWH battery capacity.
2X 850 KW generators and 2X 325KW electric
propulsion

- CO2 reimbursement program
 - Redistributing reimbursements to more energy efficient vessels
- «Enova» government agency
 - «Electrification of Sea Transport»
 - For elimination of 10 000L fuel
 - 30% - 50% of additional costs
 - «Batteries in Vessels»
 - Direct support for battery propulsion
 - 30% - 50% of additional costs
 - Discontinued, supported approximately 10 Offshore, 240 aquaculture and 40 fisheries vessels
- (NOX fund)

Investment support programs



Investment support programs

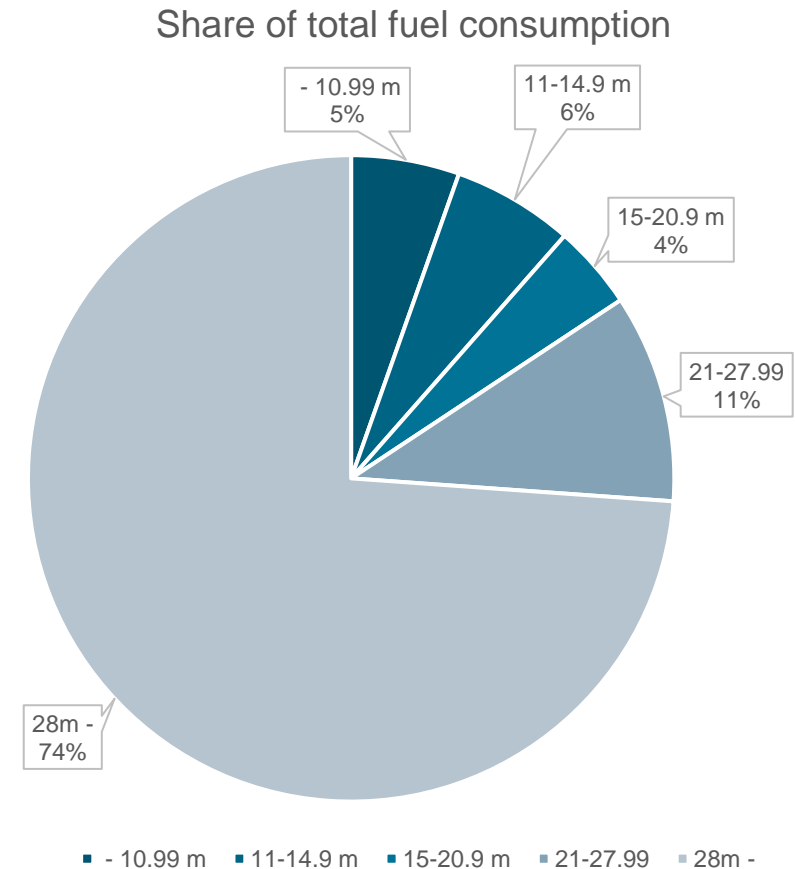


Source Adapted from [2] - SINTEF (2020)

- How much fuel can smaller vessel save?
- Support program is not designed for the smaller coastal fleet
- “Battery in vessels” was, but is discontinued as the technology was beginning to enter use in the coastal fleet

Investment support programs

- Batteries for “easy” electrification will result in 10%-15% reduction in CO2
- Not every vessel in the coastal fleet can be supported by batteries alone
- A solution for the ocean-going vessels is needed
 - Alternative fuels
 - Alternative power systems



Source Adapted from [2] - SINTEF (2020)

Alternative fuels

- LNG powered vessels proven through the NOX fund
- Ammonia, methanol and hydrogen are possible future fuels
- Less energy dense
 - More space requirement
 - New handling procedures
 - How does this
- Exchange/retrofit of existing ICE
 - Reuse existing vessel design
- Fuel cells produce electricity
 - Requires electric power distribution on vessels
- Reduced energy density should influence vessel design

Infrastructure

A scenic view of a coastal town with a harbor and a large mountain in the background. The town is built on a hillside overlooking the water, with several buildings and boats visible. The mountain in the background is covered in snow or light-colored vegetation. The overall scene is captured in a blue-tinted, slightly desaturated style.

- Infrastructure for diesel is established, and “easy”
- How will energy be delivered and stored for zero/low-emission technology
- Electric power
 - Peak demand can power be delivered?
 - Who will own charging infrastructure?
- How will alternative fuels be distributed
 - Will it demand more services and infrastructure from the ports?
 - Will safety requirements and handling procedures put pressure on scarce areas in the port
- Will this change the movement of vessels and catches?

Summary

- There is a need to cut emissions also in the fisheries fleet
- There are technologies available that are successful in other ocean industries
- Support programs must be adapted to the industry
- There are new technologies possible alternative fuels that can impact the structure of the fisheries fleet



Thank you for your attention

1. Stakeholder AS (2022) - Kartlegging av utslipp fra fiskeri og havbruk i Norge - <https://zerokyst.no/wp-content/uploads/2022/08/Rapport-endelig-ZeroKyst-juni-2022.pdf>
2. SINTEF (2020) - Hybrid fremdriftssystem for mindre fiskefartøyer