Decarbonisation of the EU Fishing fleet – summary of workshop

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"Decarbonizing the EU fishing industry workshop"

- Arranged by Client Earth, Our Fish

- Speakers
  - SINTEF (Cecilia): Research projects/approach – ex. from Norway
  - Wärtsilä, Finland: Carbon neutral/zero carbon fuel
  - CMB.TECH, Belgium: Hydrogen (and ammonia)
  - Bound4blue, Spain: wind propulsion

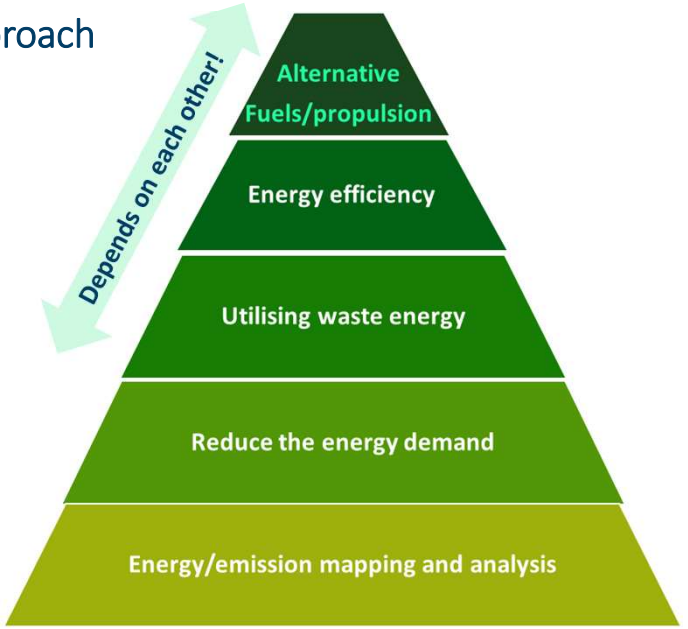
Our Fish ClientEarth

Examples of projects

Approach - Operational data and system thinking is crucial!

- The choice of propulsion and fuel must be made with an integrated system approach
- Various solutions offers various opportunities for waste energy recovery
  - LNG/LBG and LH2 enables cold recovery
  - Combustion engines and HT fuel cells enables heat recovery
  - LT Fuel cells and batteries has limited heat recovery options
  - Hybrid propulsions system – intermittent availability of waste heat

- Energy mapping and analysis - Challenge: lack of operational data
  - today based on annual fuel consumption, or even installed engine power
  - need for continuous onboard measurement on various energy consumers

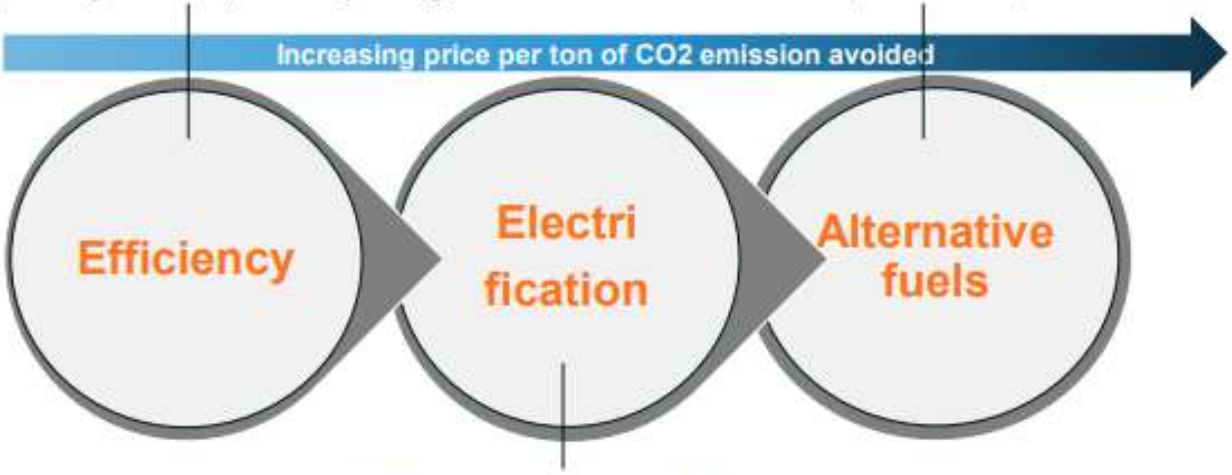


Presentation from Wärtsilä

key elements of GHG reduction in fishing
A combination of efforts

Most efficient engines / energy production, Optimized propulsion systems, propulsion energy saving devices, multi speed gear

Bio fuels or Green E-Fuels with low or Zero Carbon. Methanol, Ammonia, H2



Shaft generator, Hybrid battery systems, shore power connection

- Full electrification of vessels where possible small local fishing or fish farming (long haul applications, physics preclude the use of full electric ships)
- Lowest possible speeds and optimum routing (fish finding)

TRANSITION TO GREEN FUELS WILL FOLLOW THE PACE OF THE ENERGY TRANSITION, CUSTOMERS NEED TO INVEST IN FUEL FLEXIBILITY TO AVOID RISK OF STRANDED ASSETS

WÄRTSILÄ

Fishing segment will follow the available fuel infrastructure

Key take-aways from Wärtsilä

- Focus on carbon neutral and zero carbon fuels – but continued use of carbon fuels for many years, still
- Next steps in abatement technologies (e.g. carbon capture)

- Increased use of battery systems, hybrids, and energy saving devices
- Focus on fuel efficiency, flexibility and use of **data**
- Space is limited
- More complex ship technology – **integration** is of key importance

- Clear and harmonised regulations for Norway, UK, EU countries – to avoid unfair competition

Presentation from CMB.TECH

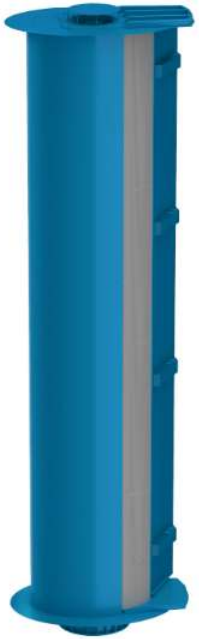
Our Pathway Towards Zero Emission Shipping

CMB .TECH

SINTEF

Presentation from bound4blue

WINGSAIL



eSAIL

bound4blue installs its eSAIL® system on the "Balueiro Segundo", the first fishing vessel in the world to sail with wind-assisted propulsion technology.

Publications from Our Fish, ClientEarth

Situation today

- IMO: targets on GHG emission and carbon intensity for international shipping

- EU Green Deal: 90% reduction in GHG emissions from transport

- BUT, the global fishing fleet lacks any agreed decarbonisation objectives, exists no decarbonisation strategy/roadmap for the fishing sector

- AND, EU fishing sector today relies on fossil fuel subsidies to operate (fuel-tax exemption)

Recommendations

- Regulatory framework:
  - Revision of Energy Taxation Directive - introduce fossil fuel taxation for fishing - revenue to be reinvested in decarbonisation
  - Establish a Port policy - recharge of batteries, bunkering of alternative fuels, …
  - EU Common Fisheries Policy – redefine capacity ceilings - decarbonisation leads to less space available for fish / fishing gears
  - Develop a decarbonisation transition plan

- Funding:
  - EU Maritime Fisheries and Aquaculture Fund (2021)
    - lacks the vision to decarbonising the fishing sector
    - limits new-build (to avoid overfishing) while conversion to hybrid solution is supported

- Research & Innovations
  - Ability of use alternative energy for fishing activities, also covering safety onboard, and environmental toxicity
  - Flexibility - diverse industry – no "one size fits all" solution

Alternative propulsion systems/fuels

- Batteries: better for short distances
- Hybrid systems: easy to implement in the short term

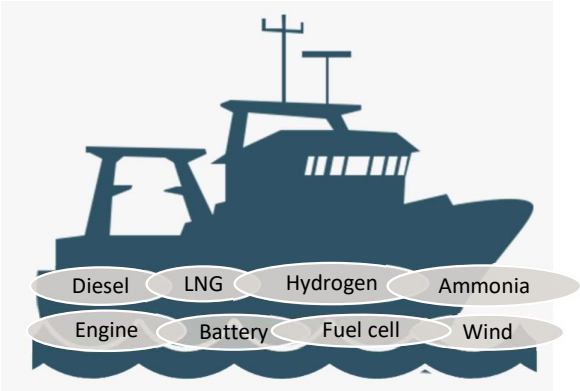
- Hydrogen: offers the best energy-to-weight storage ratio, but concerns on scalability, expense, security and storage
- Ammonia: easier to store, "but is so dangerous for environment and human health that it is not a viable alternative"...

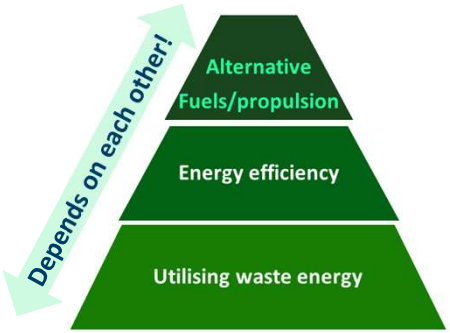
- Biofuels: great potential, but their efficiency needs to be proven, both in terms of production and energy generated
- Biogas: interesting both for large and small fishing vessels, but large-scale use in the maritime sector is needed

- Wind-assisted technology: looks promising as short-term solution, but must be combined with a non-fossil fuel

SINTEF

Thank you!





TEMP. [°C]	HEAT/COLD SOURCES			USERS	TECHNOLOGIES: Heat-to-cold	Heat upgrade	Heat-to-power		TES
>500		HT FC (SOFC, MCFC)							
200-300	Exhaust gases								
200		MT Fuel Cells							
190									
180									
170									
160									
150									
140				Steam users (galley, laundry, HVAC, FWG etc)					
130									
120									
110									
100	Steam dump				Absorption cooling			ORC	
95			HT cooling water						
90									
85									
80						Heat Pump			
75		LT Fuel Cells (PEM)							
70				Hot water users (PTW, AC preheat, space heating, etc)					
65									
60									
55									
50									
45									
40		Battery cooling	LT cooling						
35									
30									
25	Sea water								
20									
15				AC					
10									
5				Cooling					
0									
-5		LNG							
-10									
-15				Freezing					
-20									
-25									

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