

## Decarbonising shipping

# Boats and ships must reduce emissions

Maritime shipping is one of the few industries Norway has a chance to influence internationally, in particular by identifying how to reduce greenhouse gas emissions from boats, ferries and ships.

”The solutions we can work towards in coastal shipping are different from those we can pursue in deep sea shipping,” according to Gunnar S. Eskeland, professor of environmental economics at the Norwegian School of Economics, NHH.

Near-coastal shipping accounts for some 8% of Norway’s total emissions, so technologies such as diesel-electric hybrid propulsion systems for ferries, platform supply vessels, and heavy duty fishing vessels offer potential.

“To date, we’ve targeted emission reductions by electrifying parts of the propulsion systems,” according to Øystein Ulleberg, principal scientist at the Renewable Energy Systems Department, Institute for Energy Technology, IFE.

“If you compare this to running a diesel bus in a city, the moment you hybridise it with battery electric, your emissions go down by about 30%. That was our initial approach in the maritime sector too.”

Zero emissions solutions are emerging, such as fully electric ferries that charge overnight and top up while unloading and loading cars and passengers.

In Norway, some 20 electric ferries are in



*Switching from diesel-powered to electric ferries helps deliver substantial emissions reductions.*

operation, under construction or have been ordered.

This has been stimulated by competitive bidding for ferry concessions that reward low carbon or emission free solutions.

Over time, operators have come to realise that battery-electric solutions are cost effective from an operational point of view, once the upfront investments in the vessels and the onshore infrastructure have been made.

“Operators of diesel-electric hybrid ferries have started to rely on the battery much more

than they did initially. In some cases we've seen emissions reductions of 85%," says Ulleberg.

"Associated operational cost reductions explain why many of them are eager to transition to zero emissions solutions."

An important motivation for Norway is that the benefits of pioneering new solutions can be shared internationally, according to Eskeland.

"Perhaps we can make business out of it, but if not then at least good solutions can spread, so we must show the world that it works and that we think it's worthwhile."

*"It's naive to think that we'll go quickly to zero emission solution in deep sea shipping."*  
~ Øystein Ulleberg, IFE.

### Deep sea shipping

Electrification of boats and ferries can work well in near coastal environments all over the world, but it is not a practical solution for longer distances.

"Deep sea shipping is different," says Professor Eskeland.

Global maritime shipping is already an efficient transport solution that handles some 95-98% of international cargo movements, yet emits just 3% of total global emissions of greenhouse gases.

"So there we have to go for more moderate solutions, but if you can have them on a large scale, the total emission reductions can be great, so we have to think in both these modes."

Ulleberg agrees: "It's naive to think that we'll go quickly to zero emission solutions in deep sea shipping. Instead, we'll see a gradual introduction of hulls with less resistance, more efficient engines, hybrid solutions with batteries, and alternative fuels."

### Policy instruments

International shipping will only cut emissions dramatically in response to tighter regulations around the world.

"We can't say, 'oh, the world is acting globally' by snapping our fingers," Eskeland says.

"But it is plainly wrong when some people think it's impossible to regulate international shipping, because somehow transnational movements are unreachable by governments."

The International Maritime Organization (IMO) has shifted its focus from basic vessel security and pollutant emissions, towards emissions of greenhouse gases such as carbon dioxide.

International shipping needs to operate in zones that are regulated for ecological reasons, and in this area IMO regulation is working fine.

The IMO's Energy Efficiency Design Index (EEDI) also marks a move in the right direction.

But imposing ambitious solutions that add to the burden of an industry facing tremendous cost pressures is not the solution, unless they are also economically viable.

High-cost solutions might inadvertently end up supporting operators of old vessels, they might run them faster and longer.

As a consequence, we are in danger of failing to discover and implement low cost, large emission reduction opportunities such as lower speeds or slender design solutions.

Instead, the most forward-looking action is likely to start at a local level.

International shipping needs to approach ports, which can make requirements and come up with local solutions that deliver significant emission reductions.

These range from electrification of cruise ships at port to autonomous renewable fuel vessels that shuttle cargo from larger ships.



“We are seeing many such concepts emerging,” says Ulleberg.

We are also seeing coastal emission control areas growing more powerful. These have evolved from local rules to prevent and limit the impact of tanker spills. Now they also address other pollutants such as sulfur.

Such initiatives have a habit of spreading, as other regions adopt similar rules, and as transnational operators opt for ships that meet regulations in ambitious jurisdictions such as California, New York, New England, North Western Europe, Japan, and increasingly China.

*In deep sea shipping we have to go for moderate solutions with great impact, according to Professor Eskeland.*

“What happens in ports is very important in international shipping,” says Eskeland.

“They serve you and you serve them”.

### **Our recommendations:**

- Encourage electrification in near coastal areas, along with local restrictions on visiting ships.
- Secure incremental efficiency improvements in deep sea shipping.
- Avoid burdensome regulation that delays a transition to environmentally friendly ships.
- Encourage those ambitious changes to start in certain regions, strengthening as they spread.

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