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Reducing Fuel Emissions in Commercial Fisheries: Integrating Climate Mitigation and Justice

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The commercial fishing industry, vital for global food security and providing livelihoods, faces the urgent challenge of reducing its high dependence on fossil fuels which generates approximately 180 million tonnes of CO2 equivalent per year. Industrial fishing methods, such as bottom trawling, are responsible for a large portion of these emissions and are sustained by fuel subsidies. This policy brief proposes a pathway toward decarbonization that prioritizes social justice, preventing the costs from falling upon small-scale and vulnerable fishing communities.

EXECUTIVE SUMMARY

The commercial fishing industry is highly dependent on fossil fuels, making it a major contributor to greenhouse gas emissions (GHG) and a growing challenge for sustainable development. Emission intensity varies across fishing methods, with bottom trawling identified as one of the most carbon-intensive fishing practices. These challenges are driven by structural factors such as unequal subsidy distribution, market demand, and limited access to low-carbon technologies.

Currently, the majority of public subsidies benefit industrial fleets, exacerbating **existing social inequalities**. Therefore, a just decarbonization strategy based on three pillars is recommended:

1. **Reform commercial fishing fuel subsidies.**
2. **Implement Low-Carbon Corridors.**
3. **Incentivise new forms of market consumption.**

INTRODUCTION

Vessel fuel usage represents the main driver of energy consumption and GHG emissions from the commercial fishing industry, accounting for up to 90% of total emissions from catch up to the point of landing[1]. The global fishing fleet is estimated to use approximately 40 billion liters of fuel per year, and to emit around 180 tonnes of CO2-equivalent GHG into the atmosphere[2].

Within the seafood supply chain, fuel use varies significantly by fishery, gear type, vessel size, and target species, with studies showing that trawling can be more fuel-intensive than passive or alternative gears[3]. Bottom-trawling fishing has one of the highest rates of GHG emissions per kg of catch, while only providing a small fraction of the global fish landings[4]. In Europe, for instance, bottom-trawling is responsible for emitting 112 million metric tons of carbon dioxide annually and costs €16 billion per year to tax-payers.

However, it only contributes to less than 2% of the total animal protein consumed and generates employment for less than 20.000 people across the continent[5]. In many European countries, **the net value of bottom-trawling would be negative without the financial support of governments**, which sustain the industry with more than €1 billion per year on fuel subsidies.

Globally, fuel subsidies represent the largest type of financial support provided to the fishing industry, amounting to approximately $41 billion a year[6]. According to numerous studies, **artificially inflating fishery profits through subsidies provision can result in overcapacity and overfishing**[7,8].

Subsidies that enhance bottom-trawling capacity sustain **environmentally and financially unsustainable practices**, while supporting a sector that bears high societal costs and delivers limited economic and nutritional benefits. While reducing or eliminating fuel subsidies to the sector is necessary, the transition must be managed in a way that guarantees **food security, sustains livelihoods, and promotes social justice**.

ANALYSIS

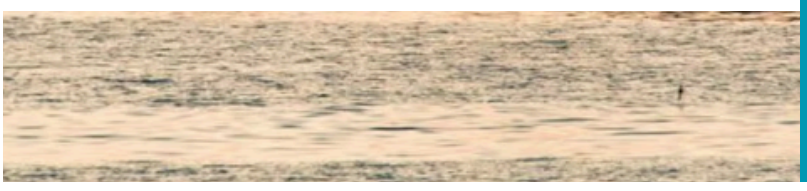
A combination of fossil fuel dependence, fuel-intensive fishing methods, public subsidies, market demand, and limited access to low-carbon alternatives drives fuel emissions in the commercial fishing industry[9]. As such, climate mitigation measures must avoid placing disproportionate burdens on fishers, especially smaller-scale operators with fewer resources to adapt. Subsidy distribution is already uneven: one global analysis found that only 19% of fisheries subsidies went to small-scale fisheries, while more than 80% went to large-scale industrial fisheries[10]. **A just transition requires redirecting public support away from high-emission practices and towards low-impact fisheries, cleaner technologies, fisher training, and livelihood diversification**. At the same time, mitigation measures should not rely only on vessel-level changes; it also requires spatial innovation, improved port infrastructure, gear sustainability, and stronger

consumer awareness of the fuel intensity of seafood products. Combining subsidy reform, low-carbon fishing corridors, and market-based incentives can reduce emissions while supporting biodiversity, food security, and fisher livelihoods.

Full decarbonisation offers the strongest mitigation outcome because it would eliminate GHG from fishing vessels. However, it is also the most difficult option to implement in the short term because the costs of replacing engines, vessels, port infrastructure, and fuel systems would likely fall heavily on the fishing industry[11]. **Without careful design, this could have a high social cost** by disadvantaged small-scale fishing communities, reducing profitability, or creating pressure to prioritise emissions reduction over other goals such as biodiversity protection, food security, and local livelihoods.

Energy-efficiency measures offer a more immediate pathway to large emission reductions, especially through improved vessel design and gear, fuel monitoring, and more efficient engines. However, these measures may benefit larger or better-capitalised fleets first, as they are more able to invest in new technology. **If incentives are not targeted, efficiency policies could unintentionally widen inequalities** within the sector and favour profitable fleet segments over small-scale or low-impact fisheries.

Economic policy instruments, such as fuel taxes, subsidy reforms, or the removal of fuel tax exemptions, can encourage lower fuel use and redirect public funds towards cleaner alternatives[12]. However, these instruments can create short- and medium-term costs for fishers, particularly those with limited access to capital or alternative livelihoods. They may also affect seafood prices and **raise equity concerns** if costs are passed on to consumers or if high-value species and industrial fleets are better able to absorb the transition than smaller operators.



CONCLUSION

Reducing carbon emissions in commercial fishing requires policies that **integrate cutting emission with addressing social justice**. While the long-term targets include the complete decarbonization of commercial fishing, short-term measures should prioritise subsidy reforms and market-driven incentives, and establish low-carbon fishing zones. It should be ensured that costs do not disproportionately fall on the small fishing communities that contributed least to emissions, yet remain the most vulnerable to the impacts of climate change and regulatory burdens.

A **just transition** thus requires redirecting public support to low-carbon fishing, cleaner technologies, and livelihood diversification to ensure that governments safeguard long-term food security and support resilient fishing communities while achieving climate targets.

POLICY RECOMMENDATIONS

- **Reform Subsidies:** Redirect public funding from high-emissions practices toward low-impact fisheries, clean technology, and fisher training to ensure a just transition.
- **Establish low-carbon corridors:** Create a pilot zone with efficient infrastructure and sustainable gear, prioritising equity to avoid benefiting only large-scale, well-capitalised fleets.
- **Utilise Market Incentives:** Couple fiscal measures with enhanced consumer education on energy consumption to safeguard small-scale operations from bearing inequitable transition costs (i.e. implementing a low-fuel consumption label for seafood).

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Picture of *A fishing trawler fleet off the coast of Myanmar, photographed during a Fauna & Flora marine ecosystem assessment*, by Michelangelo Pignani, 2026, Fauna and Flora (https://www.fauna-flora.org/explained/bottom-trawling-impact/). Copyright 2026 by Michelangelo Pignani.