European Commission

ENERGY TRANSITION PARTNERSHIP FOR EU FISHERIES & AQUACULTURE

WORKSHOP REPORT

Navigating the energy transition: strategic goals for a resilient and sustainable Distant Water Fleet

Organised by the Energy Transition Partnership, set under DG MARE (European Commission).

Background

In its latest round of consultations, the Energy Transition Partnership (ETP) has adopted a segmented approach to address the unique needs of various stakeholders with the goal of advancing the energy transition. The present report focuses on the workshop specifically dedicated to Distant Water Fleet (DWF), which aimed to:

1. **Identify challenges and needs**
2. **Identify concrete short-term, mid-term, and long-term actions for the energy transition of the EU fisheries and aquaculture sector**
3. **Showcase innovations and best practices**

Key outcomes

The Distant Water Fleet sector encounters significant challenges in meeting energy transition goals. These challenges include **limited digitalisation and AI adoption**, which impede energy efficiency optimisation, **high energy demand**, and skills shortages. The sector also faces fuel access problems due to reliance on third-country ports, especially in remote areas, compounded by economic competition from non-EU fleets that do not follow similar energy transition regulations. Additionally, the aging fleet complicates retrofitting efforts for alternative fuels, while inadequate port infrastructure restricts the use of multi-fuel engines and hydrogen technologies. Uncertainty regarding the availability of sustainable fuels, geopolitical instability affecting fuel supplies, and concerns about fish stock sustainability further complicate the DWF sector's path to a greener future.

To lay the groundwork for the energy transition, the sector should focus on **energy audits** across the fleet to establish baseline consumption and identify inefficiencies. Pilot projects will evaluate the feasibility of hybrid and LNG-compatible engines, with fuel access provisions potentially included in

Sustainable Fisheries Partnership Agreements (SFPAs) for reliable energy supplies. In the medium term, the sector plans to enhance retrofitting of multi-fuel engines and modular technologies, establish regional fuel hubs, and develop infrastructure for alternative fuels like LNG, hydrogen, and biofuels. The ultimate aim is to transition to zero-emission propulsion systems, supported by scalable hydrogen infrastructure and standardized global regulations.

Key actions identified can be summarised as follows:

1. **Immediate actions (by 2030):**

    - Conduct **energy audits** across the fleet to establish baseline energy consumption and identify inefficiencies.
    - Launch **pilot projects** for **hybrid and LNG-compatible engines** to evaluate feasibility and scalability.
    - Explore the inclusion of **fuel access provisions** into **Sustainable Fisheries Partnership Agreements (SFPAs)** to ensure reliable and affordable energy supplies.
    - Initiate **targeted training programmes** to **upskill skippers and crew members** in **energy-efficient practices** and the operation of emerging technologies.

2. **Medium-term objectives (by 2040):**

    - Scale **up efforts to retrofit vessels** for energy efficiency.
    - Focus on **multi-fuel engines** and **modular technologies** for long-term adaptability.
    - **Establish regional fuel hubs** in key locations to reduce dependency on third-country ports.
    - **Develop infrastructure** to support **alternative fuels** such as **LNG, hydrogen, and biofuels**.
    - **Automate onboard processes** to reduce energy consumption for auxiliary systems, including refrigeration.
    - **Expand training and upskilling programmes** to address **technological advancements** and workforce needs.

3. **Long-term objectives (by 2050):**

    - **Transition the entire fleet** to **zero-emission propulsion systems**, such as **hydrogen** and **advanced biofuels**.
    - **Establish scalable and reliable hydrogen infrastructure** in key ports to ensure long-term fuel availability.
    - **Standardise global regulations** for the DWF to harmonise energy transition efforts and align with international practices.
    - Continue **research and innovation** to address **technological and economic challenges** associated with energy transition.

The outputs of this workshop will be instrumental in shaping the Energy Transition Partnership's roadmap and ensuring that the DWF sector achieves its energy transition targets while maintaining economic resilience and competitiveness.

What did we discuss?

Participants were divided into different breakout rooms. Following the breakout sessions, all participants reconvened in the plenary workshop, where a rapporteur from each group presented the discussion outcomes.

Question 1: What challenges do the DWF sector foresee in meeting the energy transition objectives for 2030/2040/2050?

Challenges identified:

1. **Limited digitalisation and AI adoption:** Challenges in optimising **energy efficiency**.
2. **High energy demand:** **Vessels** consuming **~5,000 litres of fuel daily** due to propulsion, refrigeration, and onboard processing. Example of mitigation: Norwegian fisheries implemented solar-powered auxiliary systems, reducing energy use for refrigeration.
3. **Dependency on third-country ports:** **Fuel access challenges**, particularly in remote fishing areas.
4. **Economic competition:** Non-EU fleets **not adhering to similar energy transition regulations**.
5. **Retrofitting older vessels:** Challenges in supporting alternative fuels due to the **ageing fleet**.
6. **Lack of port infrastructure:** **Inadequate facilities** to accommodate multi-fuel engines and hydrogen technologies.
7. **Skills shortages:** **Lack of crew members skilled** in operating advanced energy systems.
8. **Achieving zero-emission targets:** **Technological and financial constraints** hindering progress.
9. **Uncertainty about sustainable fuels:** Challenges with the **availability and affordability of fuels** like hydrogen and biofuels.
10. **Geopolitical uncertainty:** Difficulty in **securing fuel supplies in third-country ports** amid changing political landscapes.
11. **Sustainability of fish stocks:** Concerns about **ensuring sustainable fish stocks**, impacting the profitability of the DWF sector.

Question 2: What are the conditions and solutions needed to meet the energy transition objectives for 2030/2040/2050?

Short-term goals (by 2030):

1. **Conducting energy audits:** **Identifying inefficiencies and establishing baselines** for optimisation. For example, energy audits in Spain's fleet transitioning to LNG demonstrated a 15% efficiency improvement.

2. **Implementing pilot projects:** **Testing** hybrid propulsion systems and LNG-compatible engines.
3. **Initiating targeted training programmes:** Ensuring skippers and crews are **familiar with energy-efficient operations**.

Medium-term goals (by 2040):

1. **Deploying scalable retrofitting technologies:** Supporting **modular fuel systems** through **adaptable solutions.**
2. **Establishing regional hubs for alternative fuels:** Creating **LNG**, **hydrogen**, and **biofuel hubs** in strategic ports like Las Palmas and Walvis Bay.
3. **Collaborating with research institutions:** Advancing **vessel designs** and **energy systems** through joint **research efforts**.

Long-term goals (by 2050):

1. **Transitioning the entire fleet:** Shifting to **zero-emission propulsion** systems like hydrogen and advanced biofuels.
2. **Scaling infrastructure:** Securing **renewable energy sources** in remote ports.

Additional Discussion Points:

Cross-sector partnerships: Collaborations with **cargo shipping** to adapt **scalable energy-efficient technologies**. Example: The North Sea Green Shipping Programme demonstrated successful cross-sector innovation.

Question 3: What is the sector ready to deliver by 2030/2040/2050 to achieve its energy transition?

Short-term solutions (2030):

1. **Leverage Sustainable Fisheries Partnership Agreements (SFPAs):** Include **provisions for alternative fuel access**.
2. **Introduce tax incentives and subsidies:** **Support first movers** adopting sustainable technologies. Example: Spain's transition to LNG achieved ROI within eight years due to reduced fuel costs, demonstrating the viability of tax-supported transitions.
3. **Advocate for EU regulatory revisions:** Allow **vessel retrofitting** without reducing quotas.

Medium-term solutions (2040):

1. **Automate onboard processes:** Reduce energy consumption for **auxiliary systems**.
2. **Expand funding mechanisms:** Support **large-scale retrofitting investments** beyond EMFAF.
3. **Develop port infrastructure:** Accommodate **multi-fuel engines and modular systems**.

Long-term solutions (2050):

1. **Standardise global regulations:** **Harmonise** energy transition **efforts** across regions.

2. **Develop scalable retrofitting technologies:** Bring lagging vessels up to **zero-emission standards**.
3. **Establish long-term storage solutions:** Ensure **supply stability** for renewable fuels.

Additional Discussion Points:

Knowledge Exchange: Establish an **online repository of best practices**, including case studies on energy-efficient retrofitting and hybrid propulsion systems. Example: Data from pilot projects in the Barents Sea informed designs for long-haul vessels, highlighting the value of shared knowledge.

Annex 1 – Points to be further developed in the working groups

Based on the key outcomes from the workshop, the following points could be further developed in the working groups:

I. **Foresight and ambition goals**
- Long-term vision: define clear, measurable long-term goals for the DWF to achieve zero-emission propulsion by 2050.
- Stakeholder engagement: discuss how to engage all stakeholders, including local communities, in setting ambitious yet achievable targets.

II. **Research and knowledge gaps**
- Technological innovations: identify specific areas where further research is needed.
- Best practices repository: develop a centralised platform for sharing research findings, case studies, and best practices in energy efficiency and alternative fuels.

III. **Skills and social aspects**
- Training programs: discuss the development of comprehensive training programs tailored to the needs of crew members in energy-efficient practices.
- Skills shortages: address the current skills gap in the workforce and strategies to attract and retain talent in the DWF sector.

IV. **Finance and business environment**
- Funding mechanisms: identify innovative funding solutions to support the transition, including public-private partnerships and EU funding opportunities.
- Market incentives: explore the role of tax incentives and subsidies in encouraging early adopters of sustainable technologies.

V. **Regulatory framework**
- Standardisation of regulations: discuss the need for harmonizing global regulations to facilitate the adoption of energy transition practices across regions.
- Policy support: identify specific policy measures that can support the DWF sector in achieving its energy transition goals.

VI. **Data and monitoring**
- Energy audits: discuss the importance of conducting regular energy audits to monitor progress and identify areas for improvement.

Annex 2 – Workshop execution

Part 1: Welcome and Introduction

Title	Name and affiliation of the speaker
Welcome and presentation of the ETP	**Sven Langedijk,** Head of Unit, DG MARE
DG MARE highlighted the sector's critical importance to the Energy Transition Partnership (ETP) and its mission to advance sustainable energy solutions. The presentation highlighted that the goal is to achieve climate neutrality by 2050. Although the DWF represents just 0.46% of the EU's active fishing fleet, it has an outsized impact, contributing 21.5% of gross tonnage and emitting 19% of the fleet's total CO2e emissions. It also plays a notable socio-economic role, employing over 6,400 fishers and accounting for 10% of the EU fishing fleet's full-time equivalent jobs. The roadmap for this transition aims to reduce the sector's carbon footprint and foster resilience through research, innovation, and sustainable practices. However, significant challenges exist, including the fleet's reliance on fossil fuels, regulatory complexities, technological uncertainties, and the long lifespan of vessels, which complicate the adoption of cleaner technologies. During the interactive Slido session, participants were asked to envision their initial steps towards energy transition in DWF. Their suggestions indicated that the first things to address are the identification of the technology options, improving the legislation considering the levelling playing field at international level and enhance the cooperation and agreements. Collaboration with the maritime industry it is considered crucial for DWF and the economic viability and environmental sustainability can increase the transition speed.	

Part 2: Setting the Scene

Title	Name and affiliation of the speaker
DWF sector general overview	**Susana Sainz-Trápaga**, Support Group Leader for DWF
Based on the updated statistics from the 2022 Annual Economic Report. The DWF fleet comprises 244 vessels, representing a mere 0.5% of the total EU fishing fleet. Despite its small size, it accounts for a substantial 20% of capacity and landings. This sector's significant contribution is further evident in its employment impact, supporting approximately 5.5% of jobs within the EU fishing industry. This fleet, whose vessels are over 24 m length and flies the flag of a EU MS, operates in fishing areas outside EU waters and in Areas Beyond National Jurisdiction (ABNJ) covered by Regional Fisheries Bodies, such as the Northwest Atlantic Fisheries Organisation (NAFO), the International Commission for the Conservation of Atlantic Tunas (ICCAT), and the Indian Ocean Tuna Commission (IOTC). These operations often occur in Exclusive Economic Zones (EEZs) through Sustainable Fisheries Partnership Agreements (SFPAs). Key species targeted include Greenland halibut, Atlantic redfish, skipjack tuna, and yellowfin tuna, highlighting the diversity of its operations. Challenges for the DWF fleet include its heavy reliance on fossil fuels, consuming nearly 5,000 litres per day at sea, and the difficulties associated with transitioning to alternative propulsion systems in distant and remote operational areas. Specific challenges outlined include the logistical and technical limitations of introducing hybrid or battery-powered systems, compounded by the necessity of ensuring fuel availability across multiple, often remote, regions. In recent workshops under the Energy Transition Partnership, key conclusions emphasised the need for tailored financial mechanisms to adapt port infrastructure, collaborative innovation with cargo shipping sectors, and dedicated workforce training to meet the unique energy demands of the DWF sector. Susana highlighted the importance of multi-fuel readiness at ports, as well as the integration of synthetic fuels and energy-efficient retrofitting solutions, which could pave	

the way for a more sustainable future. Key innovations discussed included tri-fuel engines, synthetic fuels compatible with existing systems, and collaborative research to leverage advancements in the cargo sector.

Title	Name and affiliation of the speaker
Presentation of the summary fiche for the DWF on Techno-economic analysis for the energy transition of the EU fisheries and aquaculture sector[1]	**Gema San Bruno**, CINEA
The results of a recent study funded by the Energy Transition Partnership and CINEA analysed 45 innovative solutions to enhance energy efficiency and reduce CO2 emissions in DWF. These innovations were assessed for their advantages, limitations, costs, and feasibility. Categories include alternative propulsion systems, fishing gear optimisation, and energy-efficient onboard technologies. Among the solutions, notable advancements include retrofitting propulsion systems to increase fuel efficiency, the integration of hybrid diesel-electric engines, and advanced hull designs to reduce drag and fuel consumption. These technological advancements are complemented by energy-efficient lighting and enhanced refrigeration systems, aiming to further optimise energy use onboard. Economic feasibility was a central theme, with the study providing a techno-economic analysis of capital expenditures (CAPEX), operational expenditures (OPEX), payback periods, and internal rates of return (IRR). For example, the adoption of diesel-electric hybrid systems was highlighted as a promising short-term solution due to its lower upfront costs and reasonable payback times, often under five years. Gema stressed the urgent need to bridge gaps between research outputs and practical applications for fishermen, with increased industry engagement and capacity-building initiatives as critical components. The study also underscored the importance of CO2 reduction potential across the solutions and recommended fostering stronger links between policy reforms, funding mechanisms, and industry adoption to drive systemic change.	

Part 3: Innovative solutions for energy transition in DWF

To complement the overview of the sector, the challenges, potential risks and their corresponding mitigations, examples of potential solutions have been explored.

Title	Name and affiliation of the speaker
Research for energy transition in Distance Water Fisheries	**Joseba Castresana**, AZTI
The discussion within the EU's ambitious climate targets includes the 2030 climate plan aimed at reducing emissions by 55% and the European Green Deal's goal of achieving climate neutrality by 2050. DWF vessels, characterised by high fuel consumption and extensive operational ranges, currently face exclusion from stringent decarbonisation mandates such as the FuelEU Maritime	

[1] Study on: Techno-economic analysis for the energy transition of the EU fisheries and aquaculture sector - European Commission

regulation, which predominantly applies to cargo vessels above 5,000 GT. This regulatory gap presents both challenges and opportunities for innovation.

Several case studies include the optimisation of semi-pelagic doors, which reduced fuel consumption by 7%, and route optimisation technologies that cut fuel use by up to 20%. Another noteworthy initiative, the System Tech Project, combined advanced Earth observation technologies with digital tools to enhance operational efficiency in tuna fisheries, achieving significant reductions in emissions and improving profitability. Joseba also addressed the spatial constraints of alternative fuels like LNG and methanol, which require up to 2.5 times more storage space than diesel, complicating their integration under current EU fleet capacity regulations. He stressed the importance of vessel-specific energy pattern analyses to identify and implement the most effective decarbonisation strategies.

Title	Name and affiliation of the speaker
Greening fishing boats in the Med - POWER4MED's proposal for DWF	**Giulia Antidormi**, Sustainable Development Goal for the Mediterranean

The POWER4MED initiative focuses on greening fishing vessels in the Mediterranean. The DWF fleet's role, while comprising just 0.6% of the EU fleet, accounts for 20% of catches and tonnage, underscoring its importance. Case studies show that LNG adoption resulted in energy savings of 26% and a return on investment of under five years. For instance, a pilot study on a medium-sized trawler operating in international waters demonstrated significant cost and fuel savings with LNG and controllable pitch propellers. However, LNG infrastructure remains sparse, with only 141 global ports currently equipped for refuelling, posing a logistical hurdle for widespread adoption.
POWER4MED's comprehensive approach includes retrofitting older vessels with modern engines, resulting in 10-15% energy savings, and integrating advanced propulsion technologies. The initiative also emphasises building local capacity through training and establishing a repository of best practices for Mediterranean countries. The establishment of refuelling infrastructure, alongside supportive policy frameworks and cross-border collaborations, is essential for scaling these solutions by 2035. Other medium-term strategies include adopting methanol and hydrogen-based systems as the refuelling network expands.

Title	Name and affiliation of the speaker
EU-Funded Projects as Case Studies for the Sector	**Gema San Bruno**, CINEA

EU-funded projects that provide replicable case studies for the DWF sector, primarily under Horizon Europe and the EMFF programme, illustrate the potential of hybrid and renewable energy solutions. For example, the 'C-Wind for Blue' project demonstrated the feasibility of wind-assisted propulsion, achieving fuel savings and operational efficiency in long-distance voyages, while the 'Nautilus' initiative focused on modular LNG integration for energy-efficient retrofitting. These examples underline the adaptability of renewable solutions to diverse fleet types.
Energy efficiency solutions such as the Gators project, which introduced a manoeuvre device to reduce fuel use and emissions, were also highlighted. This innovative device not only reduced CO2 emissions but also lessened noise pollution, aligning with broader environmental goals. Gema encouraged stakeholders to explore the CINEA database for inspiration, emphasising the importance of translating innovative research into tangible, market-ready solutions for decarbonising the DWF fleet. She also stressed that collaboration among regulatory bodies, fishermen, shipbuilders, and energy developers is crucial to overcoming infrastructure limitations and ensuring a stable regulatory environment to facilitate investment and adoption.

Annex 3 – Agenda

12 December 2024, 9:30-13:30 CET – workshop dedicated to DWF

Brussels and Online

Thon Hotel Bristol Stephanie - Brussels (interpretation in EN/FR/ES/IT available) or online (transcription in all EU languages available)

9:15 – 9:30	**Registration of the participants on site**
9:30 – 9:40	**Opening** Welcome and presentation of the ETP (**Sven Langedijk,** Head of Unit, DG MARE)
9:40 – 10:10	**Setting the scene** ETP-AM introduction and explanation of the aims of the workshop (**Mihaela Mirea**, ETP-AM Project Leader) DWF sector general overview (**Susana Sainz**, Fisheries Support Group Leader) Presentation of the summary fiche for the DWF (**Gema San Bruno**, CINEA)
10:10 – 11:00	**Innovative solutions for energy transition in DWF** Research for energy transition in Distance Water Fisheries – (**Joseba Castresana**, AZTI) Greening fishing boats in the Med - POWER4MED's proposal for DWF (**Giulia Antidormi**, Sustainable Development Goal for the Mediterranean) EU-Funded Projects as Case Studies for the Sector (**Gema San Bruno**, CINEA) Q&A through Slido
11:00 – 11:20	**Coffee break**
11:20 – 12:45	**Breakout sessions** *(there will be organised 2 on-site and 4 online)* Guiding questions: 1. **What challenges do the DWF sector foresee in meeting the energy transition objectives for 2030/2040/2050?** 2. **What are the conditions and solutions needed to meet the energy transition objectives for 2030/2040/2050?**

3. **What is the sector ready to deliver by 2030/2040/2050 to achieve its energy transition?**

SLIDO will be used to support gathering the feedback

12:45 – 13:15 **Summary of the outcomes**

Each group will have maximum 5 minutes to present the results.

13:15 – 13:30 **Closing**
(**DG MARE**, **Fisheries Support Group Leader)**