European Commission

ENERGY TRANSITION PARTNERSHIP FOR EU FISHERIES & AQUACULTURE

WORKSHOP REPORT

Navigating the energy transition: strategic goals for a resilient and sustainable Small-Scale Coastal Fisheries

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 small-scale coastal fisheries (SSCF), 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 SSCF sector is currently facing a range of significant challenges as it works towards energy transition goals for 2030, 2040, and 2050. Key issues include an **aging fleet, high fuel consumption, research gaps, and economic barriers** that hinder progress. To address these challenges, immediate action and collaboration among stakeholders are essential. There is a pressing need for better resource management, infrastructure development, community engagement, and supportive legal frameworks, along with targeted funding to facilitate the transition. Current efforts should focus on testing new technologies and building sustainable shore power infrastructure, while also encouraging innovation through research and collaboration.

To achieve the energy transition objectives, a critical initial step for the sector is to **adopt monitoring and auditing practices** to enhance energy efficiency. By better understanding energy needs and optimising usage, fisheries can identify solutions to significantly lower energy consumption, though many remain unaware of these options. In the medium term, the sector plans to **transition to electric vessels, implement smart technologies, and train fishers in energy-efficient practices**. By 2050, the

aim is to achieve **carbon-neutral fisheries**, **reduce fossil fuel dependence**, and integrate **offshore wind farms for at-sea recharging**. A comprehensive approach is essential for driving innovation and sustainable energy adoption, ensuring a resilient and sustainable future.

Key actions identified can be summarised as follows:

1. **Immediate actions (by 2030):**
    - Conduct **technology appraisal and testing**.
    - Develop **sustainable shore power infrastructure**.
    - Emphasise **innovative projects and extensive research and development**.
    - Secure **funding,** encourage **collaboration**, and improve **startup support**.
    - Monitor and audit
2. **Medium-term objectives (by 2040):**
    - Transition to **electrification of vessels**.
    - Implement **smart technologies** and **establish advisory points** for fishers.
    - Provide **training and education** on energy-efficient practices and renewable energy technologies.
    - Promote **policy changes and lobby for energy transition support**.
    - Strengthen **collaboration** between fishers, shipbuilders, and energy suppliers.
3. **Long-term objectives (by 2050):**
    - Achieve **carbon-neutral fisheries with at least 50% of the fleet renewed**.
    - Eliminate **dependency on fossil fuels and subsidies**.
    - Create **synergies with offshore wind farms and energy islands** for recharging at sea.
    - Promote **knowledge exchange, best practices**, and **innovative technologies**.
    - Ensure generational renewal based on **sustainable fisheries and energy transition**.
    - Achieve **financial solvency** for the sector, **reducing reliance on external funding**.

What did we discuss?

Participants were divided into breakout rooms to address one of three key questions. After the discussions, all reconvened in a plenary workshop where a rapporteur from each group presented their findings. This section summarizes the proposals generated during these discussions.

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

Challenges identified:

1. Demographic and social issues: **Aging workforce** and ensuring **survival of local fisheries**.
2. Economic barriers: **Financing** of the projects and **market development**.
3. Capacity ceilings: Existing limits on gross tonnage are hampering the transition to new types of propulsion systems. These **capacity ceilings** need to be addressed **to allow for innovation**.
4. Infrastructure availability: The **need for infrastructure** such as bunkering facilities for new fuels and plugging stations for electricity is critical. Without these, the transition will remain **theoretical**.
5. Cost and profitability: Bridging the **cost gap** between new propulsion systems and conventional fuels is necessary to ensure profitability.
6. Forward planning and strategic priorities: The market is **unbalanced**.

Solutions proposed:

1. Access to fish resources: Ensuring **long-term access to fish resources** is essential for the sustainability of fisheries. Without fish, there can be no fisheries or transition to new technologies.
2. Financial support: **Unlocking subsidies** for both existing and new fishing vessels is crucial due to market failures.
3. Shipbuilding capacity: Ensuring that **shipyards can meet the demand** for fleet renewal plans is important for the sector's transition.
4. Skills and training: **Upskilling fishers to use new technologies safely** is essential. This includes training on the safety aspects of new propulsion systems.
5. Collaboration: Collaboration among **all stakeholders**, ideally in a regional setup, is important to adapt to the specific needs of SSCF.

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

Solutions for short-term (by 2030):

1. Fish resource management: A better scientific approach to **managing fisheries** is needed to make fishing more **energy-efficient**. The current maximum sustainable yield set by the European Commission is too high.
2. Energy transition rationale: Energy transition is essential not only for environmental reasons but also to **break the dependency on volatile fossil fuel supply chains and prices**.
3. Community dynamics: Fishing communities are diverse, with leaders, innovators, and traditionalists. **Raising awareness** about energy transition and **involving innovators and leaders** is crucial.

4. **Implementing energy efficiency measures:** Innovation involving hydrogen, methanol, and similar measures is **not feasible** for small-scale vessels due to **space constraints and high costs**. The focus should be on **implementing energy efficiency measures**. Cost-effective solutions include: antifouling measures, optimising routes and organising work on board efficiently

Solutions for medium-term (2040):

1. **Technical solutions:** Existing technical solutions, such as electric engines, are viable for small-scale fishing. **Infrastructure**, like plugs in ports and on fishing beaches, **needs to be developed** by 2040.

Solutions for long-term (2050):

1. **Legal and financial certainty:** Laws providing **certainty** and making energy transition obligatory by 2050 are needed. However, this may lead to older vessels being phased out, necessitating **fleet renewal**.
2. **Funding and fleet renewal:** The current funding envelope (EMFAF) is insufficient for significant fleet renewal. A **special line of funding for SSCF is needed** for innovation by 2030-2040 and fleet renewal by 2050.

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

Short-term goals (by 2030):

1. **Technology appraisal and testing:** Conduct thorough **appraisals and tests** of new technologies to establish a baseline. **Encourage** and **facilitate participation** in **pilot projects** to advance the implementation of innovations. This includes testing and validating concepts, collaborating with manufacturers, and exploring financial models to support these initiatives.
2. **Sustainable shore power infrastructure:** Develop essential **port infrastructure** for sustainable shore power, including electricity and water in small ports and harbours
3. **Innovative projects and R&D:** Emphasise the need for **innovative projects** and extensive **research and development**. **Evaluation of existing studies** to find viable solutions and **address data gaps** in the SSCF sector.
4. **Funding and collaboration:** Secure **funding**, encourage **collaboration**, and improve **startup support**.

Medium-term goals (by 2040):

1. **Electrification:** Transition to **electrification of vessels**, despite concerns about fishers' resistance and fear of change.
2. **Smart technologies:** Implement **smart technologies** and establish **advisory points** for fishers.
3. **Training and education:** Train fishers on **energy-efficient practices** and **renewable energy technologies**, including wind propulsion.
4. **Policy changes and lobbying:** Promote **policy changes and lobby** for energy transition support.
5. **Collaboration:** Strengthen collaboration between **fishers, shipbuilders, and energy suppliers**.

Long-term goals (by 2050):

1. **Carbon neutral fisheries:** Achieve carbon-neutral fisheries with at least **50% of the fleet renewed**, focusing on hybrid and electric propulsion.
2. **Fossil fuel dependency:** **Eliminate dependency** on fossil fuels and subsidies, redirecting funds to new propulsion systems.
3. **Synergy with offshore wind farms:** **Create synergies** with **offshore wind farms** and **energy islands** for recharging at sea.
4. **Knowledge exchange:** Promote **knowledge exchange, best practices, and innovative technologies**.
5. **Generational renewal:** Ensure generational renewal based on **sustainable fisheries and energy transition**.
6. **Financial solvency:** Achieve financial solvency for the sector, **reducing reliance on external funding**.
7. **Additional discussion points:**
    - **Fishers** should have a **voice** in developing solutions, as they are often excluded due to **time constraints and marginal incomes**.
    - Commercial availability of solutions is limited; **manufacturers of engines and technology should be involved early**.
    - The EU has a role in mandating **more efficient engines**.
    - Lack of or inefficient incentives for fishermen need to be addressed through **pilot projects and funding frameworks**.

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: establish clear, ambitious vision for achieving carbon-neutral fisheries by 2050, including interim targets for 2030 and 2040.
- Scenario development: create multiple future scenarios to assess potential pathways for the SSCF sector's energy transition, considering technological advancements, market dynamics, and regulatory changes.

II. **Research and knowledge gaps**
- Technology assessment: conduct comprehensive assessments of existing and emerging technologies suitable for small-scale fishing, focusing on their feasibility and scalability.
- Infrastructure research: investigate the specific infrastructure needs for electrification and alternative fuels, including the development of charging stations.

III. **Skills and social aspects**
- Training and upskilling programs: develop targeted training programs for fishers on new technologies, energy-efficient practices and safety measures related to new propulsion systems.
- Community engagement initiatives: create initiatives to engage fishing communities in the transition process, ensuring their voices are heard and their needs are addressed.

IV. **Finance and business environment**
- Innovative funding mechanisms: explore innovative funding mechanisms, such as green bonds or dedicated funding lines for SSCF, to support the transition.
- Cost-benefit analysis: conduct detailed cost-benefit analyses of transitioning to new technologies and practices to demonstrate financial viability and attract investment.

V. **Regulatory framework**
- Policy alignment: ensure alignment of national and EU policies to create a supportive regulatory environment for the energy transition in the SSCF sector.
- Incentives for innovation: advocate for regulatory incentives that encourage innovation and the adoption of new technologies, including subsidies for fleet renewal.

VI. **Data and monitoring**
- Data collection framework: establish a robust data collection framework to monitor energy consumption, emissions, and the status of fish stocks, enabling informed decision-making.

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 key role in the ETP's efforts to promote sustainable energy solutions. The presentation underlined the long journey towards 2050 climate neutrality, stressing the complexity of the challenge and the necessity to look to the future with today's knowledge. The SSCF sector, comprising around 40,000 vessels and employing nearly 60,000 crew members, faces significant challenges, including an aging fleet and high fuel consumption per landed kilogram relative to the industrial fleet. The discussion aimed to launch reflection and analysis on opportunities and challenges, focusing on governance, innovation, skill development, and financing to increase resilience and reduce the carbon footprint. During an interactive Slido session, participants were invited to outline their initial steps for advancing energy transition in SSCF. Suggestions included fostering research and innovation, strengthening monitoring and auditing mechanisms, and collecting field data. These valuable insights shed light on the sector's challenges and will significantly inform the ETP's roadmap for energy transition.	

Part 2: Setting the scene

Title	Name and affiliation of the speaker
SSCF sector general overview	**Marta Cavallé**, Support Group Coordinator for SSCF, Executive Secretary of Low Impact Fisheries of Europe (LIFE)
The SSCF sector, defined by vessels under 12 meters using non-towed gear, is characterised by multi-gear, multi-species fleets that operate close to shore with short trips. These family-owned or single-person enterprises have strong social, cultural, and economic ties within their communities. However, the sector faces significant challenges. In 2022, profits dropped significantly, with 40% of SSCF fleets becoming unprofitable due to high energy prices. In terms of environmental and energy transition, the focus on carbon emission reduction is complemented by measures to enhance carbon sequestration and storage in the ocean, known as Blue Carbon. In this regard, key actions include reducing overfishing and rebuilding fish stocks, with a holistic view of the energy transition from sea to plate, prioritising fish for food consumption. SSCF are highlighted as sustainable, with minimal impact on overfishing and emissions, contributing significantly to local markets. Specific challenges for SSCF include the difficulty to envision future prospects due to fish scarcity and an aging sector. To address these, strong policies are needed to place SSCF at the center and reward their value. Motivations for improvement include generational renewal, better working conditions, and reduced fuel dependency. Limited access to infrastructure and after-sale services was also presented as a challenge. A differentiated approach with multiple strategies is necessary for a fair and adapted transition. Existing tools should be used while developing new technologies, focusing on efficiency, audits, reducing impact, enhancing selectivity, and energy transition. Funding is needed to co-develop and test prototypes, such as the SEAGLOW project funded with €4.5 million under the Horizon Europe Programme, along with developing monitoring schemes, baselines, and appropriate indicators. When it comes to finance and accessibility, the sector faces several challenges, including difficulty in accessing funding, limited budgets, and high upfront costs. To address these issues, solutions involve creating tailored funding mechanisms, simplifying application processes, and providing local administrative support. In the realm of innovation and technology, the sector struggles with limited resources, outdated fleets, and a reluctance to invest in unproven technologies. Solutions to these	

challenges include initiating small-scale pilot projects, establishing regional innovation hubs, and investing in port facilities for alternative fuels. Finally, workforce and training present their own set of challenges, such as an aging workforce, insufficient skills, and a lack of awareness about energy-efficient practices. To overcome these obstacles, solutions involve collaborating with producer organisations and local training institutions, offering hands-on training programmes, and utilising ports as training centers.

Title	Name and affiliation of the speaker
Presentation of the summary fiche for the SSCF 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 SSCF. These innovations were assessed for their advantages, limitations, costs, and feasibility. Categories included alternative propulsion systems, vessel operation, fishing gear, training initiatives and facilitating measures. The study highlighted that some innovations are highly developed, while others vary in CO2 reduction potential. Recommendations emphasised the need for policymaking and regulatory changes, funding and financing mechanisms, industry engagement and involvement, and skills development with capacity building. Six innovative low carbon solutions identified for the SSCF include small wind turbines, biodiesel, collaborative maintenance and training initiatives, energy audits and antifouling, battery-electric hybrid systems, and cold ironing. Short-term solutions (by 2030) include energy efficiency improvements, biodiesel trials, smart steaming and route optimisation tools, collaborative fuel procurement, and renewable energy investment. Long-term solutions (by 2050) involve hydrogen fuel cells and electric propulsion. Risks include limited financial resources, space constraints, technical complexity and lack of expertise, fleet adaptability and potential operational, downtime for retrofitting, and market volatility. Mitigation strategies include government grants, low-interest loans, practical training, infrastructure investment, fleet renewal incentives, and strategic retrofitting.	

Part 3: Innovative solutions for energy transition in SSCF

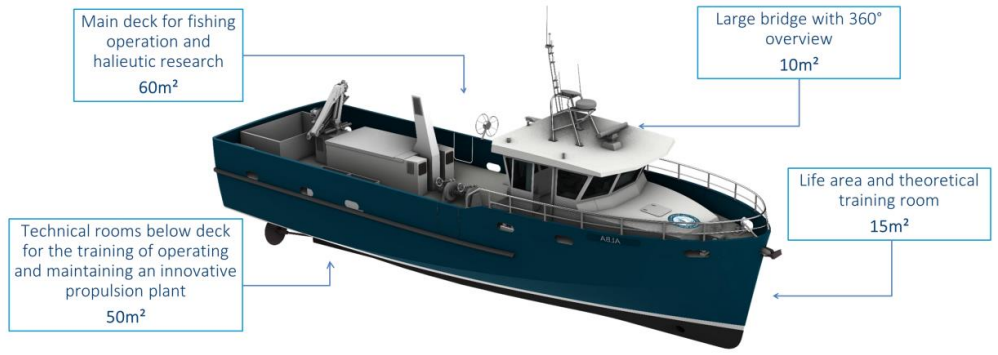
To complement the overview of the sector, the challenges, potential risks and their corresponding mitigations, examples of potential solutions have been explored.

Title	Name and affiliation of the speaker
ALBA: A Zero Emission Fishing Training Vessel	**Fabrice GHOZLAN,** MAURIC
MAURIC is a ship design company based in France and Belgium with expertise in designing professional vessels and providing services from concept to detailed engineering, including R&D and system integration. One of their key projects, "ALBA", is a zero-emission fishing training vessel developed for a maritime high school in Corsica with a €4 million budget under the France AgriMer 2021 call for projects. MAURIC led a consortium to deliver this innovative 20-meter GRP vessel equipped with hydrogen fuel cells. Despite facing certification and fuelling challenges, this industrial project was successfully completed, demonstrating the potential for zero-emission vessels.	

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

Although ALBA is not a commercial fishing vessel, it showcases the feasibility of hydrogen technology in maritime applications. MAURIC continues to explore other sustainable solutions like hybrid systems, wind assistance, and methanol to support the maritime industry's energy transition efforts.

Figure 1: ALBA – Zero-emission fishing training vessel



Source: MAURIC presentation

Title	Name and affiliation of the speaker
Fleet retrofits for low-cost emission reduction, REFEST project proposal	**Vasilij Djackov**, Klaipeda University

"REFEST" project aims to refit small fishing vessels to reduce greenhouse gas emissions and manage costs. With a €4 million budget (earmarked as part of the EU Horizon Europe Programme), the project started in May 2024 and is currently in the research phase.

Key goals include a 40% reduction in emissions and a six-year payback period. The project involves 14 partners from 10 countries and three demonstration vessels in Denmark, Lithuania, and Norway. Technologies being explored include hull optimisation, electric propulsion, air lubrication systems, solar panels, and battery packs.

The project's objectives are to integrate innovative solutions, ensure level safety, and demonstrate environmental and economic sustainability. Monitoring the impact on the marine environment and biodiversity is also a focus. The project includes work packages for technology development, integration and testing, and social, environmental, and economic regulatory studies.

Title	Name and affiliation of the speaker
Electric-engine refitting of SSC fishing vessels, 3EFISHING research	**Fausto Tinti**, University of Bologna

The project, part of the Italy-Croatia INTERREG programme and co-funded by the EU, aims to reduce greenhouse gas emissions and improve economic sustainability. Titled "3E-Innovation", the project focuses on the Adriatic Sea and started in March 2024. It targets SSCF vessels under 12 meters and involves academic institutions, territorial agencies, and the Croatian Ministry of Agriculture. The main goals are to develop and optimize E-engine technologies to refit two vessels used for fishing and farming, test retrofitted vessels, and create investment plans and financial guidelines for fishermen.

The project is organised into work packages focusing on technology development, testing, and financial planning. The current phase involves developing electric engine technologies, with future phases dedicated to testing and financial planning.

The representative from the University of Bologna highlighted the importance of collaboration among countries and stakeholders to address common challenges and promote technological innovation, supporting the blue transition in the Adriatic Sea.

Annex 3 – Agenda

11 December 2024, 9:30-13:30 CET – workshop dedicated to SSCF 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) SSCF sector general overview (**Marta Cavallé**, Support Group Coordinator for SSCF) Presentation of the summary fiche for the SSCF (**Gema San Bruno,** CINEA)
10:10 – 11:00	**Innovative solutions for energy transition in SSCF** ALBA: A Zero Emission Fishing Training Vessel (**Fabrice GHOZLAN,** MAURIC) Fleet retrofits for low-cost emission reduction, REFEST project proposal (**Vasilij Djackov**, Klaipeda University) Electric-engine refitting of SSC fishing vessels, 3EFISHING research (**Fausto Tinti**, University of Bologna) 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 SSCF 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**, **SSCF Support Group Coordinator)**
13:30 – 14:15	**Light lunch**