

Decarbonisation of the fishing fleet in the Mediterranean and Black Sea



Orientation Meeting

*Framework Contract for the provision of
scientific advice for the Mediterranean
and the Black Sea*



Funded by
the European Union

Hybrid meeting
31/Jan - 2/Feb 2024



Project partners and subcontractors

| PARTNER OR SUBCONTRACTOR | INSTITUTE | COUNTRY | SCIENTIFIC RESPONSIBLE | SUBTASKS INVOLVEMENT |
|--------------------------|---|----------|---|---------------------------------|
| P1. CNR | Partner 1. National Research Council | ITALY | ANTONELLO SALA (PROJECT COORDINATOR) | 1A,B,C,D,E; 2C,F,G; 3A,B,C,D |
| P2. ABT | Partner 2. AquaBioTech Group | MALTA | ALFONSO SICILIANO | 1A, 3A,B |
| P3. CIBM | Partner 3. Consortium for the Inter-University Centre of Marine Biology and Applied Ecology | ITALY | MARIO SBRANA | 1A,B,C; 2B; 3A,B,C,D |
| P4. COISPA | Partner 4. COISPA Foundation | ITALY | ISABELLA BITETTO | 1A, 2D; 3A,B,C,D |
| P5. CONISMA | Partner 5. National Inter-University Consortium for Marine Sciences | ITALY | TOMMASO RUSSO | 1A,B,C |
| P6. FRI | Partner 6. Fisheries Research Institute | GREECE | EMMANOUIL KOUTRAKIS | 1A,B; 2H; 3A,B,C,D |
| P7. HCMR | Partner 7. Hellenic Centre for Marine Research | GREECE | ALEXIS CONIDES | 1A,B,C; 2H; 3A,B,C |
| P8. ICM-CSIC | Partner 8. Institute of Marine Science - Spanish National Research Council | SPAIN | MIQUEL ORTEGA CERDÀ | 3A,B,D |
| P9. IEO-CSIC | Partner 9. Institute of Oceanography - Spanish National Research Council | SPAIN | FRANCESC ORDINAS | 1A,B,C,D; 2A; 3A,B |
| P10. IO-BAS | Partner 10. Institute of Oceanology-Bulgarian Academy of Sciences | BULGARIA | VIOLIN RAYKOV | 1A, 2I,K; 3A,B |
| P11. IOF | Partner 11. Institute of Oceanography and Fisheries | CROATIA | NEDO VERGOC | 1A,B,C; 2E |
| P12. NIMRD | Partner 12. National Institute for Marine Research and Development | ROMANIA | DANILOV CRISTIAN SORIN | 1A, 2I,K; 3A,B |
| P13. NISEA | Partner 13. NISEA Società Cooperativa | ITALY | PAOLO ACCADIA | 3A,B,C,D |
| P14. SZN | Partner 14. Zoological Station of Naples | ITALY | CRISTINA MANGANO | 1A; 2B |
| P15. UTH | Partner 15. University of Thessaly | GREECE | CHRISTOS MARAVELLAS | 1A,D; 2E |
| P16. WWF | Partner 16. WWF Mediterranean | ITALY | MARCO COSTANTINI | 3A,B,C |
| S1. DIFFERENS | DIFFERENS DIGITAL, MARKETING, INNOVATION | ITALY | ANDREA ROSINI | ID |

Overview of the *DecarbonyT* project

Task 0. Project management and scientific coordination
(*Antonello Sala*)

Task 1. Review of the state of play
(*Tommaso Russo*)

Task 2. Pilot project for improved fishing gears development and testing at sea
(*Antonello Sala / Beatriz Guijarro*)

Task 3. Socio-economic analysis and conclusions from gear testing
(*Paolo Accadia*)

Task 4. Dissemination and stakeholder engagement
(*Marco Costantini / Alessandro Buzzi*)



Task 1. Review of the state of play

Subtask 1a. Existing research on gear modifications towards the decarbonisation of the Mediterranean and Black Sea trawling fleet

Emilio Notti (presenter Antonello Sala)

Energy audits will be implemented to establish baselines in the area/gear combinations

Pilot studies in the selected area (GSA) and fishing gear combinations

| Area | GFCM GSA | Fishing gear |
|-----------------------|----------|--------------------------|
| Western Mediterranean | GSA1-7 | OTB |
| Tyrrhenian | GSA9-10 | OTB |
| Central Mediterranean | GSA15-16 | OTB |
| Adriatic and Ionian | GSA17-19 | OTB, TBB, PTM |
| Eastern Mediterranean | GSA22-23 | OTB |
| Black Sea | GSA29 | OTB, TBB, OTM |

The energy audit surveys will be carried out on a sample of **ten fishing vessels in each area/gear combination** stratified by vessel length and engine power.

A **standard layout** for the information collection will be settled during the first coordination meeting (*Orientation meeting*)

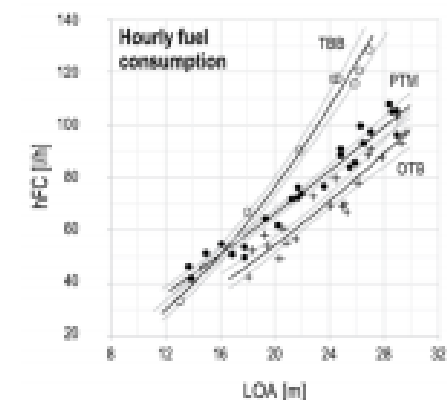
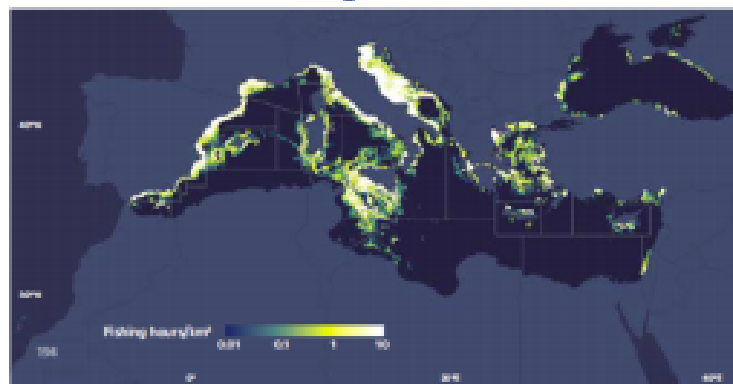
Task 1. Review of the state of play

Subtask 1b. Analysis of the fuel consumption and carbon emissions by fleet/gear and area

Tommaso Russo

Integrated analysis of Fisheries Dependent Information (FDI) data and Annual Economic Report (AER) on the EU Fishing Fleet

Carbon footprint of fishing vessels, according to their spatial behaviour and fishing strategies (using remote tracking device data) coupled with models developed in Sala *et al.* (2022)



Task 1. Review of the state of play

Subtask 1c. Identification of baselines of fuel consumption by gear/area

Anna Nora Tasseti / Carmen Ferrà

To identify new baselines of fuel consumption from vessels employing experimental gears.

Energy consumption data from individual vessels obtained in the pilot project for improved fishing gears development and testing at sea (Task 2) and energy audits implemented in Subtask 1a will be analysed to determine baselines of fuel consumption by gear/area combination (including steaming and fishing phases) to update where possible, the results described by Sala *et al.* (2022)

Task 1. Review of the state of play

Subtask 1d. Analyses of other relevant elements that could contribute to the decarbonization of the trawling fishing fleet

Andrea Rosini

An innovative blockchain-based system will be designed and developed to measure and track the degree of carbon footprint mitigation of innovative and improved gears and fishing practice solutions.

The mitigation of GHG emissions introduced by the innovations identified and tested in Task 2 can be compared with industry baselines (CO₂eq per catch tons) and recorded in form of Non-Fungible Token (NFT) on the blockchain, which is an inviolable and unalterable register to guarantee the integrity of all the data and information.

Managers may set incentives - including subsidies, tax breaks, or other forms of financial measures – to support proven sustainable low carbon footprint fisheries and promote fleet decarbonization.





Task 1. Review of the state of play

Subtask 1e. Analysis of the results of the ongoing EMFAF study on 'Technological-economic analysis for the energy transition of the fisheries and aquaculture sectors'

Maria Cristina Mangano

A comprehensive list of the existing projects/scientific evidence/recommendations and guidelines exploiting the energy transition in EU fisheries sectors will be created.

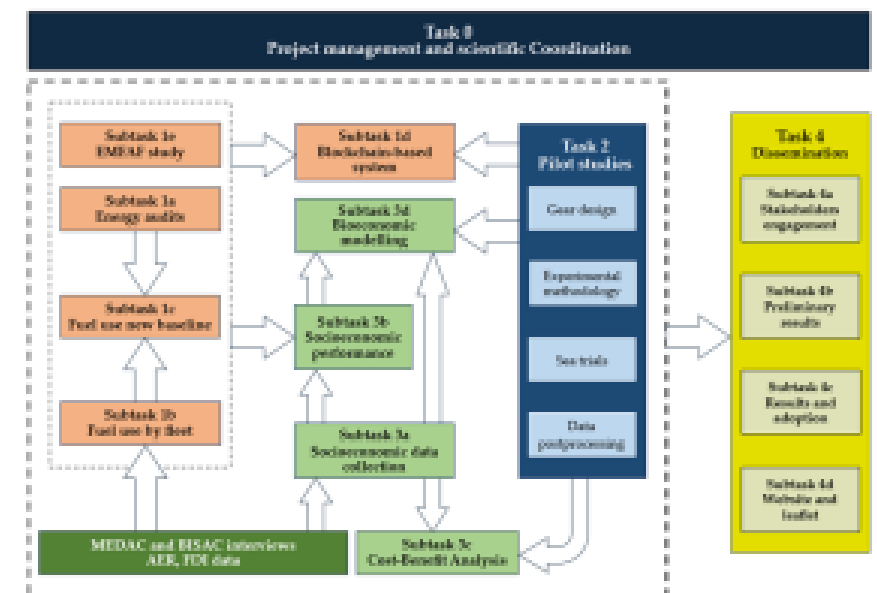
The outcome will allow to generate a map of the existing gaps (e.g., gaps in existing knowledge, low market-readiness for certain types of innovations, need for new skills, and sufficient and accessible financing opportunities) or rather, potential barriers to the further development and wide uptake of the necessary technologies.

Task 2. Pilot project for improved fishing gears development and testing at sea

Goals and outcomes

- Field work will be conducted to collect data on energy use during fishing operations
- To develop fuel-saving fishing gears in trawl fisheries
- To focus exclusively on parts of the fishing gears: warps, bridles, otterboards, sledges in case of beam trawls, net design, material, webbing and rigging
- To carry out sea trials in different GSAs in the Mediterranean and Black Sea

Experimental fishing gear systems that will ensure fuel consumption reduction between 20-40% or the maximum achievable fuel efficiency





Task 2. Pilot project for improved fishing gears development and testing at sea

Methodological approach

- Comparative trials of conventional vs the new gear (Sala *et al.* 2011; 2022)
- Catch profile: total catch, catch by species, and length distribution of the main commercial species
- Gear performance parameters:
 - ❖ door spread, horizontal and vertical net openings (gear monitoring system)
 - ❖ Warp loads (electronic load cells)
 - ❖ Door and net resistance (underwater load cells)
- Fuel consumption and emissions (fuel flowmeters)
- GPS to determine the position and speed of the vessel



Task 2. Pilot project for improved fishing gears development and testing at sea

| Pilot | Subtask / Area (GSA) / Gear | Subtask leader | Partner(s) Involved | Topic(s) |
|-------|---|----------------------|----------------------------|---|
| 1 | Subtask 2a. Western Mediterranean (GSA1-7), OTB | Francesc Ordines | IEO-CSIC | Midwater doors; fuel saving net design |
| 2 | Subtask 2b. Tyrrhenian (GSA9-10), OTB | Mario Sbrana | CIBM, SZN, CONISMA | Novel otterboards (flying doors) |
| 3 | Subtask 2c. Central Mediterranean (GSA15-16), OTB | Sergio Vitale | CNR, ABT | Novel trawl design with high strength material and large meshes in the forward nettings, replacement of groundgear with bobbins to reduce friction. Conventional (e.g., polyamide, polyethylene) vs new high-strength materials in the bridles and warps. |
| 4 | Subtask 2d. Adriatic and Ionian (GSA17-19), OTB | Pierluigi Carbonara | COISPA, CNR, CONISMA | Semi-pelagic otterboards; thinner twines, high-strength material (e.g., Dyneema®). Alternative groundrope constructions (e.g., sheering plates, drop chains) |
| 5 | Subtask 2e. Adriatic and Ionian (GSA17-19), OTB | Nedo Vrgoc | IOF, CNR | New net design, semi-pelagic otterboards, high strength material |
| 6 | Subtask 2f. Adriatic and Ionian (GSA17-19), TBB | Alessandro Lucchetti | CNR | New net design, reduction of the board inclination, the overall gear weight, and towing speed, replace the bottom-side chafer (EC Regulation 3440/1984) made of rubber with meshed netting |
| 7 | Subtask 2g. Eastern Mediterranean (GSA22-23), OTB | Alexis Conides | HCMR, FRI | Flying doors |
| 8 | Subtask 2h. Black Sea (GSA29), OTB | Violin Raykov | IO-BAS, NIMRD | Transfer of technology from advanced fisheries: more efficient otterboards and trawl design |
| 9 | Subtask 2i. Black Sea (GSA29), OTM | Cristian Danilov | IO-BAS, NIMRD | New net design and use of high strength material in the forward trawl nettings |
| 10 | Subtask 2j. Black Sea (GSA29), TBB | Violin Raykov | IO-BAS, NIMRD | The conventional 8 m beam trawl will be contrasted with the Turkish <i>Rapana</i> trawl-like and with a novel light beam (width of 4-5 m) |



Task 3. Socio-economic analysis and conclusions from gear testing

Subtask 3a. Data collection for socio-economic analysis

Paolo Accadia

Economic and social data will be collected for each of the fleet segments selected for pilot studies under Task 2 to be analysed under the Subtask 3b, CBA of Subtask 3c, BEMTOOL (GSA17-19) and ECOPATH (GSA6) of Subtask 3d.

A **specific data call** will be launched to Member States by DGMARE with the support of the Consortium to have the data in the appropriate level of detail (e.g., GSA).

Detailed data will be collected during the pilot studies for those fishing strategies and ports in which they will be carried out.

Task 3. Socio-economic analysis and conclusions from gear testing

Subtask 3b. Analysis of the impacts of recent variations in fuel price on fisheries economic performance

Angelos Lontakis

Time series data collected under Subtask 3a will be analysed with a focus on the socioeconomic impact of fuel price variations observed in recent years.

The analysis will not only focus on the profitability but will expand to cover various socioeconomic indicators such as the Gross Value Added and labour productivity which is a key measure of economic efficiency and a measure of fishers' prosperity.

The Subtask 3b will provide a description of the socioeconomic performance for each fleet segment included in the list of pilot studies defined under Task 2.

The outcomes of the subtask will be transferred to Subtask 3d for the bio-economic modelling.

Task 3. Socio-economic analysis and conclusions from gear testing

Subtask 3c. Cost-Benefit Analysis on the simulated technical innovations

Paolo Accadia

A short-term economic analysis on the cost of upgrading to less fuel intensive towed gear for each of the pilot studies defined under Task 2 will be carried out through a CBA.

This CBA is aimed to measure the economic impact realistically expected by a vessel owner, who wants voluntarily to implement one of the technical innovations defined under Task 2.

The CBA will cover a number of years sufficient to estimate the operational savings from the new gear and assess the time needed to absorb the initial economic investment.

The CBA will produce a set of profitability indicators for each pilot study, which will be presented and discussed with stakeholders.

Task 3. Socio-economic analysis and conclusions from gear testing

Subtask 3d. Evaluation of biological and economic impact of upgrading less fuel intensity towed gears in the short-medium-long term

Isabella Bitetto

This Subtask is aimed at investigating the consequences of the implementation of less fuel intensity fishing gears in the trawl fisheries, using biological, impact and economic indicators.

The approach will be based on simulations and scenarios' modelling to predict short-, medium- and long-term changes, using BEMTOOL bio-economic model in GSA17,18,19 and Ecopath, with Ecosym and Ecospace in GSA6.

Task 4. Dissemination and stakeholder engagement

Subtask 4a. Presenting the study and ensuring full engagement of stakeholders

Marco Costantini

Objective: full engagement of stakeholders from the Mediterranean and Black Sea

Presentation: aims and methodologies

Participatory workshop (M1): organized after the Inception Report

Participants: stakeholders from both the Mediterranean (MEDAC) and the Black Sea (BISAC)

| Timing and Work Breakdown Structure of the DecarbonyT Project | | 2023 | | | | | | | | | | | | 2024 | | | | | | | | | | | |
|---|--|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Task / Subtask | Task and Subtask Description / Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov |
| Task 4. Dissemination and stakeholder engagement | | | | | | | | | | | | | | | | | | | | | | | | | |
| M1 | Presenting the study and ensuring full engagement of stakeholders | | | | | | | | | | | | | | | | | | | | | | | | |
| M1 | Discussing preliminary results and collect qualitative assessment on the impact of tool and interest on the sector | | | | | | | | | | | | | | | | | | | | | | | | |
| M1 | Presenting results of the study and discussing the adoption of gear modifications | | | | | | | | | | | | | | | | | | | | | | | | |

Task 4. Dissemination and stakeholder engagement

Subtask 4b. Discussing preliminary results and collect qualitative information on the impact of fuel cost increase on the sector

Maria Cristina Mangano

Objective: presenting preliminary results to stakeholders from both the Mediterranean (MEDAC) and the Black Sea (BISAC)

Presentation: preliminary potential fuel efficiency gains, pros and cons of each innovation tested

Participatory workshop (M2): collecting information (questionnaires and interviews) on solutions adopted by the fishing sector

Timing and Work Breakdown Structure of the DecarbonyT Project

| Task / Subtask | Task and Subtask Descriptions / Months | 2023 | | | | | | | | | | | | 2024 | | | | | | | | | | | |
|--|--|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov |
| Task 4. Dissemination and stakeholder engagement | | | | | | | | | | | | | | | | | | | | | | | | | |
| a) | Presenting the study and ensuring full engagement of stakeholders | | | | | | M1 | | | | | | | | | | | | | | | | | | |
| b) | Discussing preliminary results and collect qualitative information on the impact of fuel cost increase on the sector | | | | | | | | | | | | M2 | | | | | | | | | | | | |
| c) | Presenting results of the study and discussing the adoption of green innovations | | | | | | | | | | | | | | | | | | M3 | | | | | M4 | |



Task 4. Dissemination and stakeholder engagement

Subtask 4c. Presenting results of the study and discussing the adoption of gear modifications

Marco Costantini

Objective: presenting results to MEDAC and BISAC stakeholders

Presentation: potential fuel efficiency gains, pros and cons of each innovation tested

Participatory workshop (M4): third final project workshop, with results presented also at the annual meeting of the GFCM WGFiT (M3)

Timing and Work Breakdown Structure of the DecarbonyT Project

| Task / Subtask | Task and Subtask Description / Months | 2023 | | | | | | | | | | | | 2024 | | | | | | | | | | | |
|--|---|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 2023 | | | | | | | | | | | | 2024 | | | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| | | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov |
| Task 4. Dissemination and stakeholder engagement | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4a | Presenting the study and ensuring full engagement of stakeholders | | | | | | M1 | | | | | | | | | | | | | | | | | | |
| 4b | Discussing preliminary results and collect qualitative information on the impact of fuel cost increases on the sector | | | | | | | | | | | | M2 | | | | | | | | | | | | |
| 4c | Presenting results of the study and discussing the adoption of gear modifications. | | | | | | | | | | | | | | | | | | | | | | M3 | | M4 |



Task 4. Dissemination and stakeholder engagement

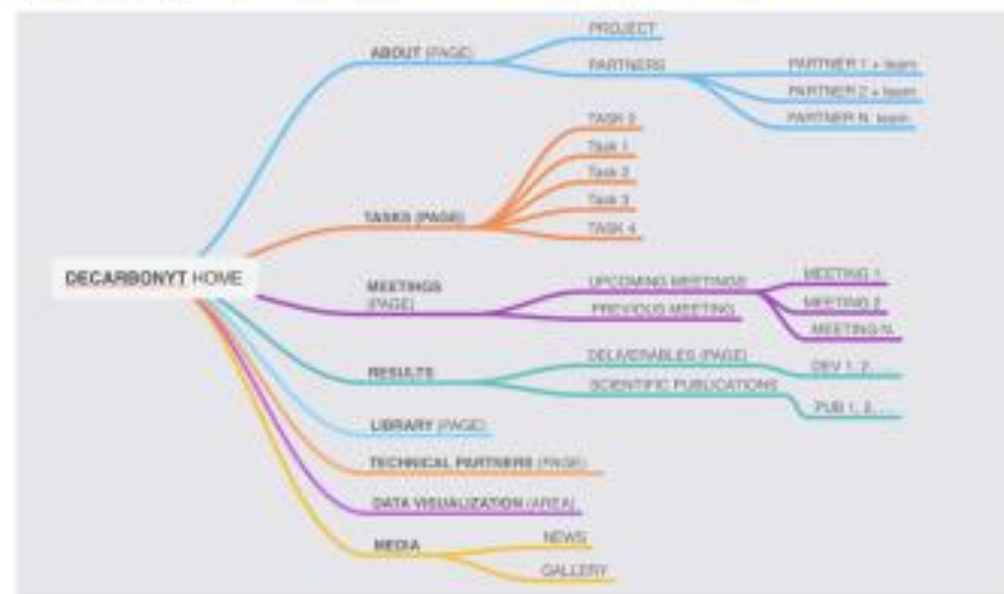
Subtask 4d. Create and maintain a project website and produce a Project Leaflet

Andrea Rosini

Logo



Website <https://www.decarbonyt.eu>





DecarbonyT

DECARBONISATION OF THE FISHING FLEET
IN THE MEDITERRANEAN AND BLACK SEA

Thank you for your attention

Antonello Sala

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Specific contract No. 7

Decarbonisation of the fishing fleet in the Mediterranean and Black Sea (*DecarbonyT*)



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