

STATE OF THE ART OF THE BLUE BIOTECHNOLOGIES IN SUD PACA AND OCCITANIE REGIONS

Pôle Mer Méditerranée

Maritime clusters in France

A national Cluster policy launched in 2005: Selection of two maritime clusters (one in Provence Alpes Côte d’Azur and Occitanie & one in Brittany)

Two clusters sharing:

- Brand
- Governance mechanisms
- Strategic Areas
- Expertise in innovative projects
- Members

Ambition: To contribute to the sustainable development of the maritime and coastal economy and create jobs.

The “Cluster Maritime Français” dedicated to Corporate communication, operational synergies and lobbying



Pole Mer Méditerranée Key figures



428

certified Projects

2 Regions

PACA & Occitanie

316

certified Projects granted

446

members

221

SMEs

65

Ecosystem

81

LEs

79

Research

M€ 771

funding obtained

M€ 1062

R&D investment

INTERNATIONAL

- Strategic Partnerships
- Collective missions with Business France (Australia, Asia, United Kingdom...)
- Shared stands at international trade fairs (Euronaval, Oceanology International ...)
- Organization of radiation events (e.g. FOWT)

SUPPORT SERVICE

- Post-project support (access to markets...)
- Strategic advice (fundraising, marketing, business development, industrial)
- BtoB meetings
- Enhancement through targeted events

INNOVATION

Over the entire life cycle of a project:

- Emergence support, partner search
- Technical and financial expertise, editorial support
- Referral to appropriate co-financing windows



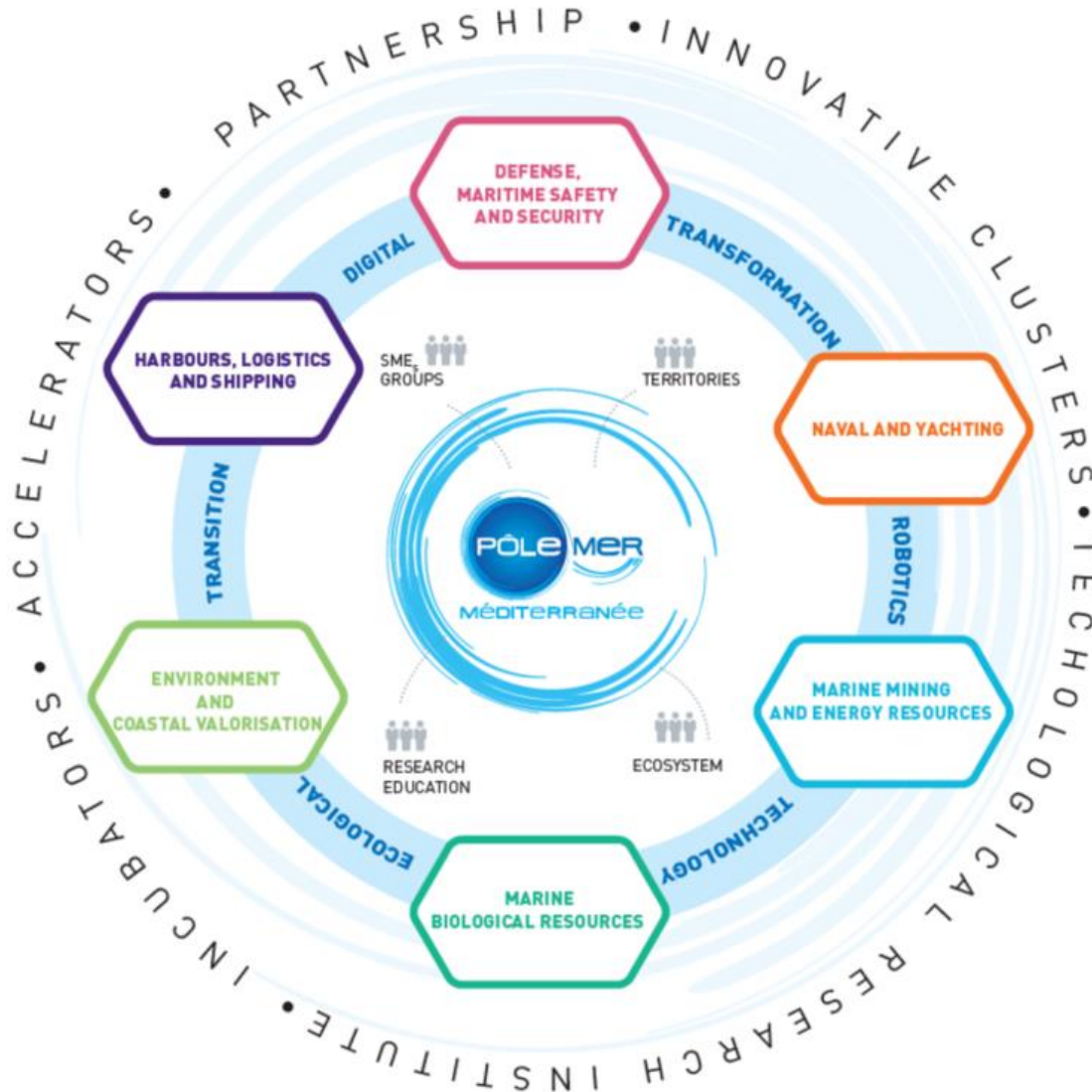
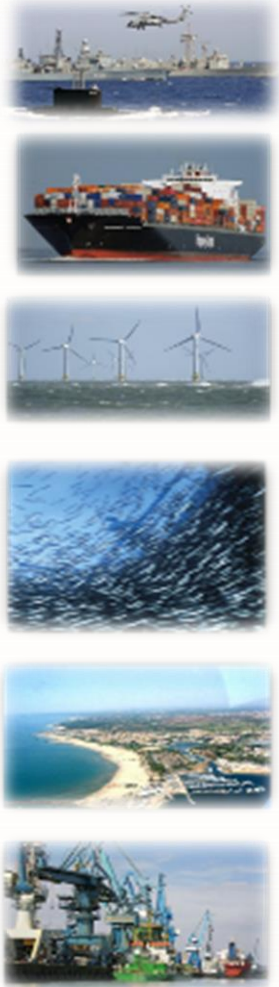
TRAINING PROGRAM

- Identification of voltage trades/skills on our channels
- Contribution to the emergence of new initial or vocational training courses
- With local authorities: by providing its expertise on strategic sectors and territorial training offers.

EUROPE

- Awareness meetings
- Monitoring of calls for projects
- Support in the search for funding
- Search for partners
- Advice and support in writing the file

6 Strategic Business Areas



MARKET AND TECHNOLOGY ROADMAP FOR ANIMATION OF OUR ECOSYSTEM

Focus on Blue Biotechnologies

Blue biotechnologies are identified as a **strategic priority** for SUD PACA and for Occitanie.

3 main value chains

the most developed sector in terms of socio-economic weight

Algae production for high-value compounds



Sustainable Integrated Multitrophic Aquaculture (IMTA)

Aquaculture/fisheries discard valorisation in added value sectors

Focus on Blue Biotechnologies

Marine Biological
Resources working group

7 large
entreprises

105
SMEs



29 research
laboratories

34
ecosystems



Example of actions

Structuration of the Blue Biotech sectors in our territory through **B-BLUE European Project** “BUILDING THE BLUE BIOTECHNOLOGY COMMUNITY IN THE MEDITERRANEAN”

Algae production for high-value compounds

Micro-algae are currently promoted as a new source of valuable nutrients for human and animal consumption.

Algae represent an emerging biological resource of great importance for its potential applications in different fields:

- **Healthcare and pharmaceutical applications:** new medicine for patients
- **Cosmetics**
- **Agriculture, veterinary products :** biotechnology can improve animal feed (food supplements to strengthen the immune systems of livestock and reduce the consumption of antibiotics)



R&D level is really strong on our territory

Example of collaborative projects supported

VASCO: Biological recycling of industrial CO2 thanks to the capture of fumes by microalgae

Leader : GPMM (Port of Marseille)

Research partners : IFREMER, CEA CADARACHE, CEA GRENOBLE

Industrial partners: KemOne, Arcelor Mittal , Solamat Merex, Lyondell Bassell , Coldep, Inovertis , Heliopur Technologies

- **Experimental phases** to demonstrate the feasibility of the capture of industrial gases with a high CO₂ content, resulting from the industrial activities of Fos-sur-Mer area, by cultivating microalgae in open spaces. The scientific feasibility study was carried out between 2011 and 2012 by a team from Ifremer Palavas, relying on an experimental demonstrator.
- **Development of industrial research:** To conduct these tests, cultivation tanks of 10 m² and 160 m² were installed on the Ifremer site in Palavas : The algae cultivation component, the cornerstone of the Vasco program, is a success : the consortium partners validated the transition to the industrial stage, This means that this unprecedented solution for treating industrial fumes without pre-treatment (the fumes are injected directly into the culture tanks) works. The results obtained during the last months of operation have made it possible to foresee very encouraging prospects for the production and storage of CO₂ in biomass for the emergence of a flue gas treatment solution.

Next step: implementation of an industrial-scale demonstrator, the last step in bringing about a solution to reduce atmospheric emissions of CO₂, NO_x and particles from the industrial-port zone of Fos



Pôle Mer Méditerranée actions

Research of funding
Project Management
Dissemination/ Valorisation

Example of collaborative projects supported

STUDIMA

2016



To produce and valorise microalgae for the production of new additives for the livestock nutrition/animal health market by targeting three species (pigs, poultry and dairy cows), providing "alicament" contributions to classic formulations.



SMILE (Slimming and Memory-Booster Microalgae Extract) On-going



To develop, produce and market natural active ingredients extracted from specific microalgae and contributing to weight loss and cognitive function maintenance.

Sustainable Integrated Multitrophic Aquaculture (IMTA)

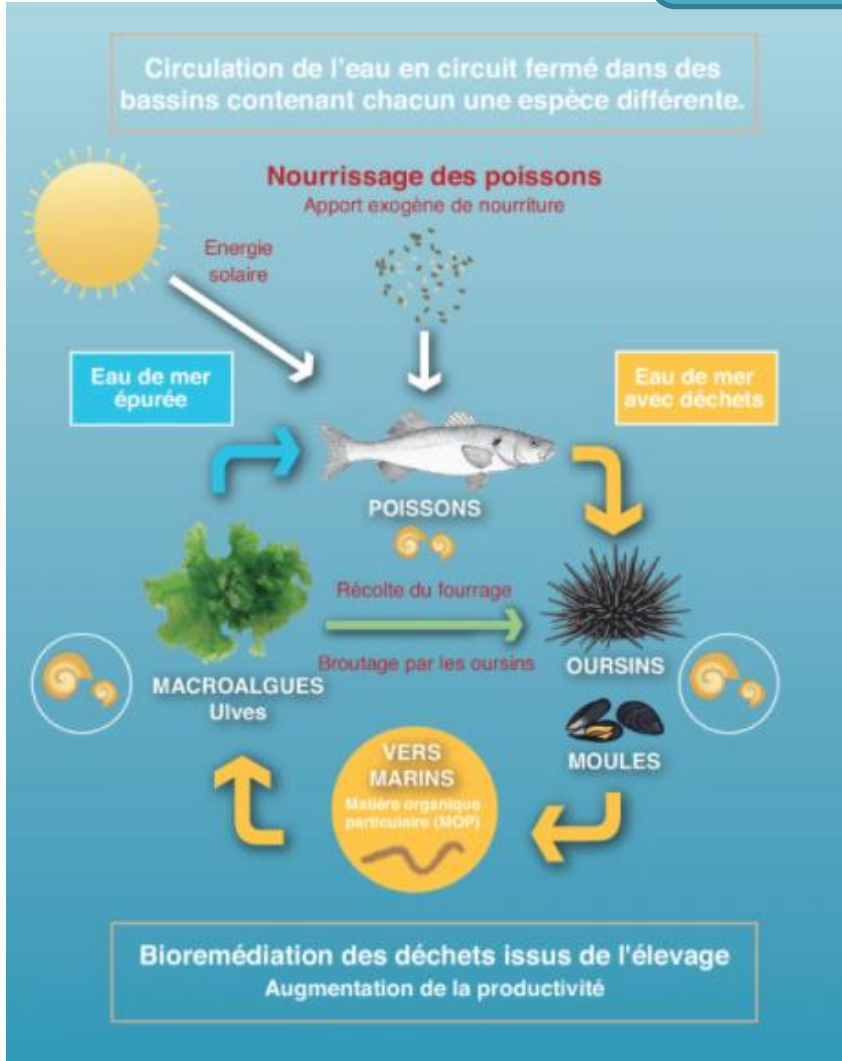
IMTA is considered as a highly promising solution for the sustainable development of aquaculture. Establishing integrated cultivation systems can increase productivity, profitability and sustainability.

The co-cultivation of fed species (such as finfish) together with extractive species, such as suspension feeding (e.g., mussels and oysters) and deposit feeding (e.g., sea-cucumbers and sea-urchins) invertebrates and macro algae that may feed on the organic and inorganic effluents generated by the fed species.

Species needing supplemental feed are therefore combined with extractive species in such a way that the by-products from one species become inputs for another species.



Example of a collaborative project



INSTITUT OcéANOGRAPHIQUE
PAUL RICARD

The researchers first selected compatible Mediterranean species capable of recreating a food chain.

They chose wolves, sea-urchins, ulvae (sort of algae), mussels, marine worms.

The ulvae and worms develop thanks to the fish waste, the sea urchins eat the ulvae, the mussels and gastropods filter and clean the environment.

Aquaculture/fisheries discard valorisation in added value sectors

Importance of aquaculture farms in Occitanie

Innovative processes for **valorising oyster shells**, which are considered as waste, for **cosmetic products**

- Oyster shells provide mineral salts and trace elements that promote micro-circulation and help to maintain optimal hydration



Ostrealia
by Tarbouriech
Parce que la vie vient de la mer





Key challenges



R&D	<ul style="list-style-type: none"> • Find new applications (pharma, food, industry, energy...) • R&D still need to be developed to know better the marine biodiversity and its potential applications and to reach the markets • Sector animation to boost innovation (networking, exchange about needs (industry) and possibilities (research)...))
Funding	<ul style="list-style-type: none"> • Funding exist but are not easy to get to support blue biotechnology development and commercialisation of products.
Cost-effectiveness	<ul style="list-style-type: none"> • Production can be expensive and the access to the market very long, especially for pharmaceutical products • Reduce production costs
Policies	<ul style="list-style-type: none"> • Policies are crucial for Blue Biotechnologies development. Biotechnologies potential are taken into account in policies and strategies (regional, national and EU) for R&D but policies needed to develop commercial applications.



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