



VISION ON MARINE BIOTECH R&I

Jacques Fuchs

*Marine resources Unit -
DG RTD/F4*



The Marine Resources Unit

Who are we ?

What is our mission?

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Who are we?



New Marine Unit was created 1 January 2014 in Directorate F 'Bioeconomy' to better coordinate Marine&Maritime Research within DG RTD and with other DGs '(MARE, ENV, ENTR, MOVE..)

HoU Sigi Gruber



What is our mission?



Long term objective (2020): Become a reference point and driver for increasing marine and maritime research and innovation, both within the EU, but also globally.

Short term milestones (2014-15)

- Consolidate the blue growth agenda by enhancing research and innovation potential in relevant EU Marine and Maritime policy and relevant EU policies
- Implement the different international commitments taken e.g. Trans-Atlantic Ocean Research Alliance in Galway and other international dialogues (aquaculture).

What is our mission?

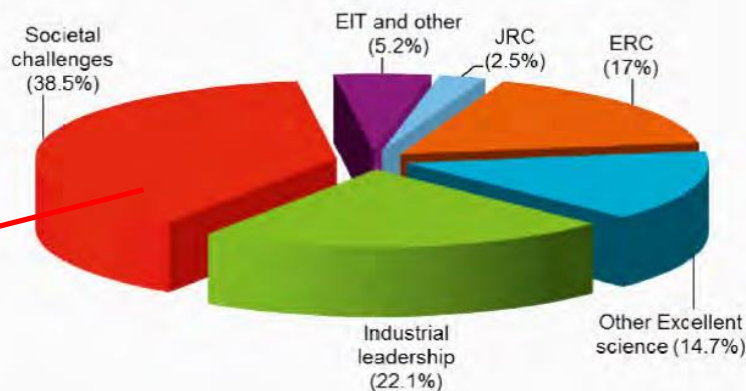


Medium term milestones (2016-17)

- Develop evidence on the potential of the economics of the Seas and Oceans and its impact on the blue economy
- Support and promote marine and maritime research and innovation activities for all EU Sea Basins and the Ocean, in close coordination with the Member States and relevant stakeholders
- Enhance Europe's competitiveness within the world's blue economy with a public private initiative for the Marine Economy

HORIZON 2020

H2020 budget > € 70 Billion



**Apprx. EUR 3,8 B for SC2
More than X2 compared
to FP7**

Biggest EU investment in Research and Innovation

Research and
Innovation

What is Horizon 2020

- **A core part of Europe 2020, Innovation Union & European Research Area:**
 - Responding to the economic crisis to invest in jobs and growth
 - Addressing people's concerns about their livelihoods, safety and environment
 - Strengthening the EU's global position in research, innovation and technology

What is new - Approach

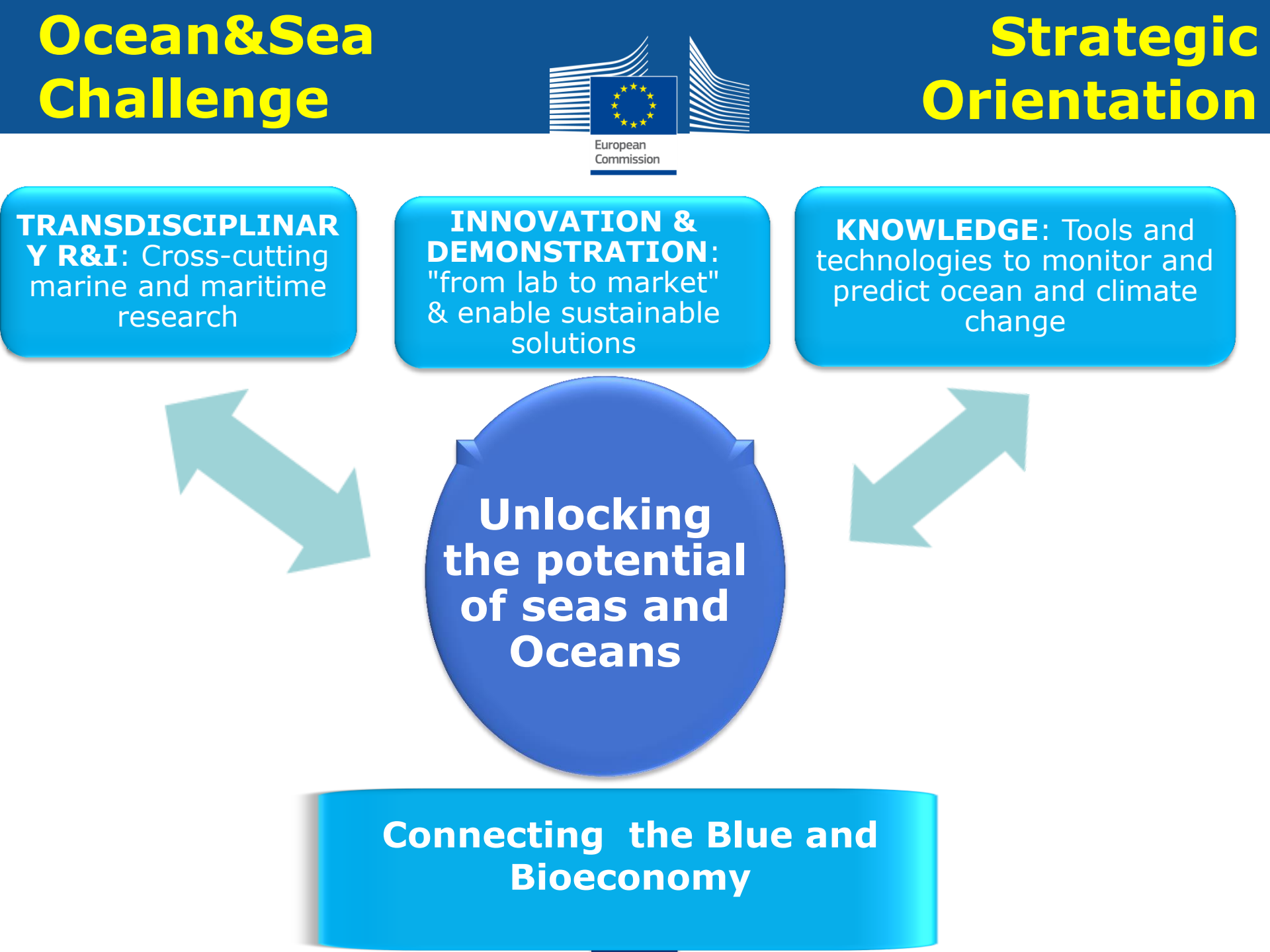
Coupling research to innovation

- Coupling Research to Innovation in order to bring research results to market.
- Support via
 - Demonstration activities
 - Testing
 - Prototyping
 - Proof of Concept
 - Pilot type activities etc.

TRANSDISCIPLINARY R&I: Cross-cutting marine and maritime research

INNOVATION & DEMONSTRATION: "from lab to market" & enable sustainable solutions

KNOWLEDGE: Tools and technologies to monitor and predict ocean and climate change



**Unlocking
the potential
of seas and
Oceans**

**Connecting the Blue and
Bioeconomy**



MARINE BIOTECH R&I in FP7 & HORIZON 2020

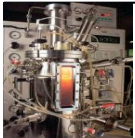
Activity 2.3 – Biotechnologies (2007-2013)



2.3.1. Novel sources of biomass and bioproducts



2.3.2. Marine and fresh-water biotechnology



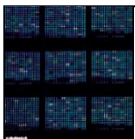
2.3.3. Industrial biotechnology



2.3.4. Biorefinery

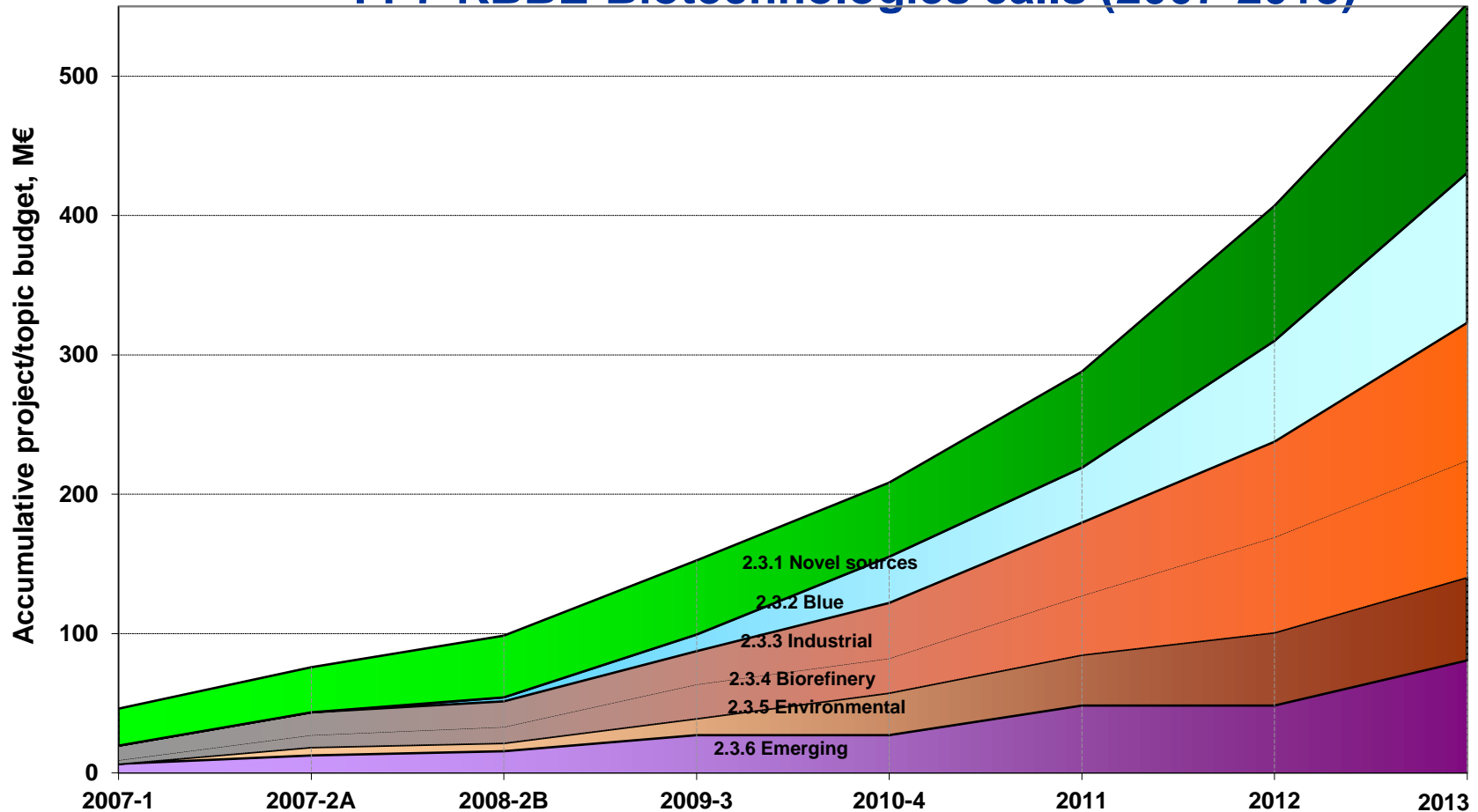


2.3.5. Environmental biotechnology



2.3.6. Emerging trends in biotechnology

Activity 2.3 BIOTECHNOLOGIES FP7-KBBE-Biotechnologies calls (2007-2013)



Blue biotech research in FP7

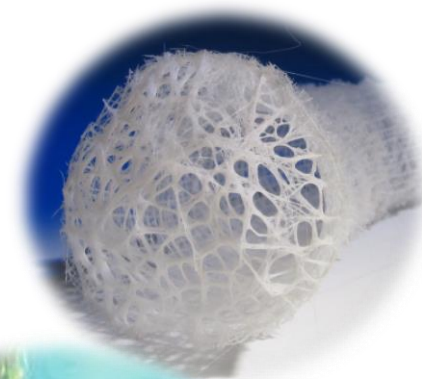
Key domains covered:

Bioactive compounds from marine and fresh water organisms

- Biodiscovery and bioprospecting
- Exploration of marine biochemical diversity
- Industrial exploitation of marine biodiversity
- Education/communication/outreach/coordination

Micro and macro-algae for bioproducts

Biosensors for remediation/monitoring





Marine Joint calls

«The Ocean of Tomorrow»

*Important tool for an improved **coordination** of marine and maritime research funded at EU level under FP7. Concerned Directorates: Environment, Transport, Energy, KBBE, NMP*

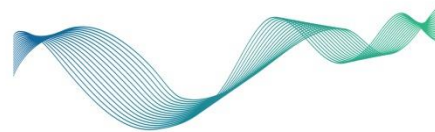
"Crosscutting and multi-disciplinarity as bases for innovation"

Biotechnology related topics: Microbial biodiversity, oil spill remediation, antifouling materials and biosensors

Coordination of national and regional managers of Marine Biotechnology programmes

- *KBBE-NET working group on Marine Biotechnology*
- *ERA NET preparatory action*

MarineBiotech



- *ERA NET "Stimulate a continued evolution of transeuropean community to develop marine biotechnology"*

Blue biotech research in FP7



MAMBA- *Marine Metagenomics for Biotechnological Applications*

MAREX -*Novel marine bioactive compounds*

SUNBIOPATH-*Better sunlight to biomass conversion efficiency in microalgae*

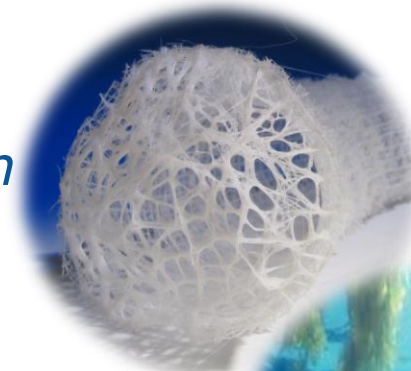
GIAVAP-*Genetic improvement of algae*

BAMMBO- *Biomolecules of marine origin*

Marine Fungi- *Natural products for treatment cancer*

SPECIAL- *Sponge enzymes and cells for innovative applications*

MG4U- *Marine genomics for users*



Blue biotech research in FP7

MICRO B3- Marine microbial biodiversity (OT)

MARINEBIOTECH ERANET

PHARMASEA – Marine Biodiscovery Pipeline

SEABIOTECH – Marine microbes for industrial biotech

BLUEGENICS – Marine genomics for biotech industry

KILLPILLI – Biotech solutions for marine oil spills (OT)

Algae Biorefineries - **MIRACLES, BISIGODOS, PUFACHAIN**

Biofouling – **ByeFouling** (OT)

FP7 EC CONTRIBUTION 130 Million €



** *Ulixes, MEM-S AquaTerrE; ColorSpore; PolyModE, Lypoyeast, Magicpah*

EU US TF: Marine Genomics Working Group

Goal: To address key coordination bottle-necks and new developments in the science, to foster the collaboration of research and training in the EU and the US in the field of marine genomics



Two flagship areas:

High throughput technologies: opportunities and challenges in marine (meta)genomics.

Next generation scientist training

Optimisation of data utilisation

Application of Marine Genomics to answer real world questions related to environment, ecology, conservation, human health



Transatlantic Ocean Research Alliance : Galway Statement (May 2013)

Marine microbial ecology working group.

1) *Early Warning Systems*

Pathogens and harmful algal blooms (e.g., *Ciguatera*)

2) *Biodiversity Exploration Using Marine Molecular Microbiology*

Ocean and River Sampling Day

Genomic Observatory Networks

EU FP7 MicroB3 and NOAA project





1. Health, demographic change and wellbeing

2. Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bioeconomy

3. Secure, clean and efficient energy

4. Smart, green and integrated transport

5. Climate action, resource efficiency and raw materials

6. Inclusive, innovative and reflective societies

7. Secure societies

Societal Challenge 2



Objective:

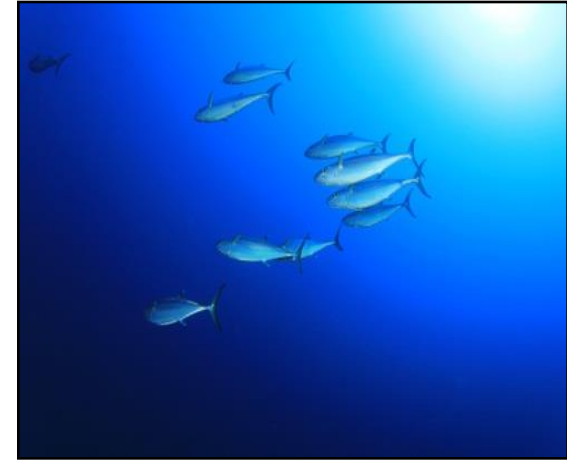
- Secure sufficient supplies of safe and high quality food and other bio-based products,
- alongside competitive and low carbon supply chains
- accelerate the transition to a sustainable European bioeconomy

Activities:

- (1) Sustainable agriculture and forestry
- (2) Sustainable and competitive agri-food sector for a safe and healthy diet
- (3) Unlocking the potential of aquatic living resources**
- (4) Sustainable and competitive bio-based industries and supporting the development of a European bioeconomy**
- (5) Cross-cutting marine and maritime research**

Activity 2.3. Unlocking the potential of aquatic living resources

- 2.3.1. Developing sustainable and environmentally-friendly **fisheries**
- 2.3.2. Developing competitive and environmentally-friendly **European aquaculture**
- 2.3.3. Boosting **marine and maritime innovation** through biotechnology



"Explore the large potential offered by marine biodiversity and aquatic biomass to bring new innovative processes, products and services to the markets (chemical, material industries, pharmaceutical etc)"

HORIZON 2020



Activity 2.3. Unlocking the potential of aquatic living resources

Main challenges/ Orientations

Sustainable and environmentally-friendly fisheries:

Competitive and environmentally-friendly aquaculture:

- Domestication of new species for aquaculture production; diversification; health and disease; nutrition; breeding; innovative production systems;
- Market and consumers; healthy, safe and competitive products.
- Environmental services (bioremediation ..); energy production.

Boosting marine & maritime innovation through biotechnology

- Explore & exploit marine biodiversity
- Aquatic biomass, new innovative and sustainable processes, products and services.
- Markets; applications chemical&material industries, pharmaceutical, fisheries&Aquaculture, energy supply, cosmetic.

Activity 2.5. Cross-cutting marine and maritime research

2.5.1. **Climate change impact** on marine ecosystems and maritime economy

2.5.2. Developing the potential of **marine resources** through an integrated approach

2.5.3. Cross-cutting concepts and technologies **enabling maritime growth**

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Activity 2.5. Cross-cutting marine and maritime research

Main challenges/ Orientations

Sustainably exploiting the diversity of marine life

- Atlantic marine ecosystems
- Effects of climate change on fisheries and aquaculture
- Marine biomolecules and marine derived enzymes

The new offshore challenge

- Innovative offshore economy
- Response capacities to oil spills and marine pollutions

Sea bed mining

- Sub-seabed technologies

Ocean observation technologies/system

- Atlantic Ocean observation
- Acoustic and imaging technologies

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Blue Growth Potential

Ocean energy

(Offshore wind, marine energies...)

Aquaculture

(biomass production)

Biotech

(high added value products from marine bioresources)

Deep sea resources

(minerals, methane hydrates, biodiversity)

Ocean observation technologies

Maritime technologies / offshore platforms / special vessels
Climate / Ocean interactions – Environment (MSFD / GES)

Three calls

Sustainable Food Security

- Sustainable food production systems
- Safe food and healthy diets and sustainable consumption
- Global drivers of food security

Blue Growth

- Sustainably exploiting the diversity of marine life
- New offshore challenges
- Ocean observation technologies/systems
- Socio-economic dimension - engagement with society

Innovative, Sustainable and Inclusive Bioeconomy

- Sustainable agriculture and forestry
- Sustainable and competitive bio-based industries
- Cross-cutting actions covering all the activities

BG 3 – 2014: Novel marine biomolecules and biomaterials

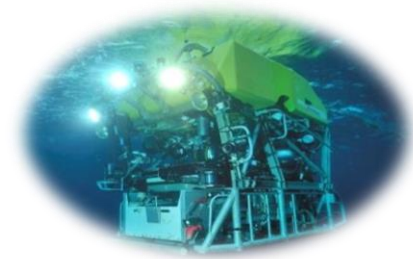
Scope:

- Technical bottlenecks : Biodiscovery pipelines
- Industry driven; innovation chain.
- Legal aspects linked to securing access to resources and related infrastructures as well as ABS.
- Environmental viability of the proposed concepts.

Expected Impact:

- Enhance competitiveness and sustainability of European Industry
- Social benefit, novel, improved, more economic, ecofriendly products
- Contribute to the implementation of the EU Blue Growth Strategy

Type of action: Research and innovation actions EUR million = 20
(indicative budget range: 6 to 10 M€/proposal)





BG 4–2014: Industrial exploitation potential of marine-derived enzymes



Scope:

- Develop and demonstrate innovative technologies for high throughput enzyme screening, and expression of marine enzymes and proteins, including purification systems and upscaling of marine enzymes.
- Screening - industrial technical specifications.
- Win-win academic and industry cooperation on issues related to IPR.

Expected Impact:

- Enhance competitiveness and sustainability of European industry using marine enzymes (pharmaceuticals, fine chemicals...).

Type of action: Innovation action EUR million = 6
(Indicative budget range = 6 M€/proposal)

**BG 7 – 2015 : Response capacities to oil spills and marine pollutions
(Research and Innovation action- 6M€)**

**BG12-2015: Supporting Smes for Blue Growth (Aquaculture, marine
biotechnology – 5 M€)**

**BG 16: 2015 : Support to the Joint Programming Initiative on
"Healthy and Productive Seas and Oceans" (Coordination and
Support Action-2M€)**



Strategic programming 2016-2017

Context



European
Co

FOOD SECURITY, SUSTAINABLE
AGRICULTURE AND FORESTRY,
MARINE, MARITIME AND INLAND
WATER RESEARCH, AND THE
BIOECONOMY

JUNKER'S POLITICAL GUIDELINES FOR THE
NEW COMMISSION

2.1

Sustainable agriculture and
forestry

1

A NEW BOOST FOR JOBS, GROWTH AND
INVESTMENT

2.2

Sustainable and competitive
agri-food sector for a safe
and healthy diet

3

A RESILIENT ENERGY UNION WITH A
FORWARD-LOOKING CLIMATE CHANGE
POLICY

2.3

Unlocking the potential of
aquatic living resources

4

A DEEPER AND FAIRER INTERNAL MARKET
WITH A STRENGTHENED INDUSTRIAL BASE

2.4

Sustainable and competitive
bio-based industries and
supporting the development of
a European bioeconomy

9

A STRONGER GLOBAL ACTOR

2.5

Cross-cutting marine and
maritime research

10

A UNION OF DEMOCRATIC CHANGE



• Stakeholders' Consultation

- **How?** Questionnaire (11 questions) + Workshop with EIP Agriculture
- **Who?** more than 100 targeted stakeholders :
 - EIPs
 - ERA-Nets / ERA-Net Plus
 - ETPs
 - Expert groups
 - International Organisations
 - JPIs, Art.185
 - Scientific and academic associations
 - Industry associations, land owners, NGOs etc.

• Advisory Group

- **How?** Questionnaire (11 questions)

• Horizon Group

- **How?** Questionnaire (11 + 6 questions), meeting and ongoing interactions

Context:

main goals, political framework, investments in WP 2014-2015



**Strategic
Orientation:**

Resource
efficiency as a
driver for
resilient primary
production and
related industries

**Strategic
Orientation:**

Smart and
inclusive
territories

**Strategic
Orientation:**

Unlocking the
potential of seas
and oceans

**Strategic
Orientation:**

Mobilising
stakeholders
engagement for
new bio-based
markets

Strategic Orientations



European
Commission

Unlocking the potential of seas and oceans

**TRANSDISCIPLINARY
R&I:** Cross-cutting marine
and maritime research

**INNOVATION &
DEMONSTRATION:**
Deployment of technologies
"from lab to market" &
enable sustainable solutions

KNOWLEDGE: Tools and
technologies to monitor and
predict ocean and climate
change

**Demonstrating
an Ocean
of Opportunities**

**Innovation in
emerging BG
activities**

**Healthy oceans
for healthy
people**

**European
ocean
observing,
surveying and
monitoring
capability**

Structure and Impact



Within H2020:

Cooperation with SC5, SC4 and potentially SC3 and SC6. Synergies with other parts of H2020: under discussion.

Regional and national level:

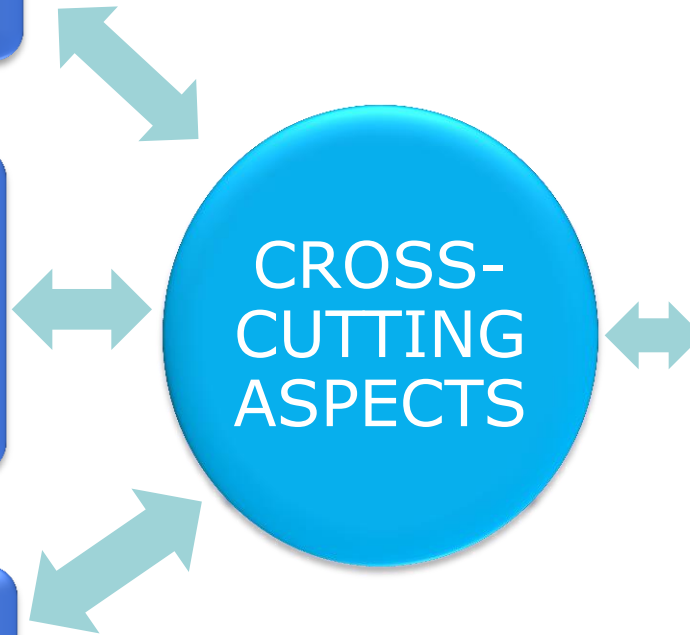
maximising synergies with regional initiatives (BONUS, Blue Med initiative), European Structural and Investment Funds and activities funded at national level (JPIs).

International Cooperation

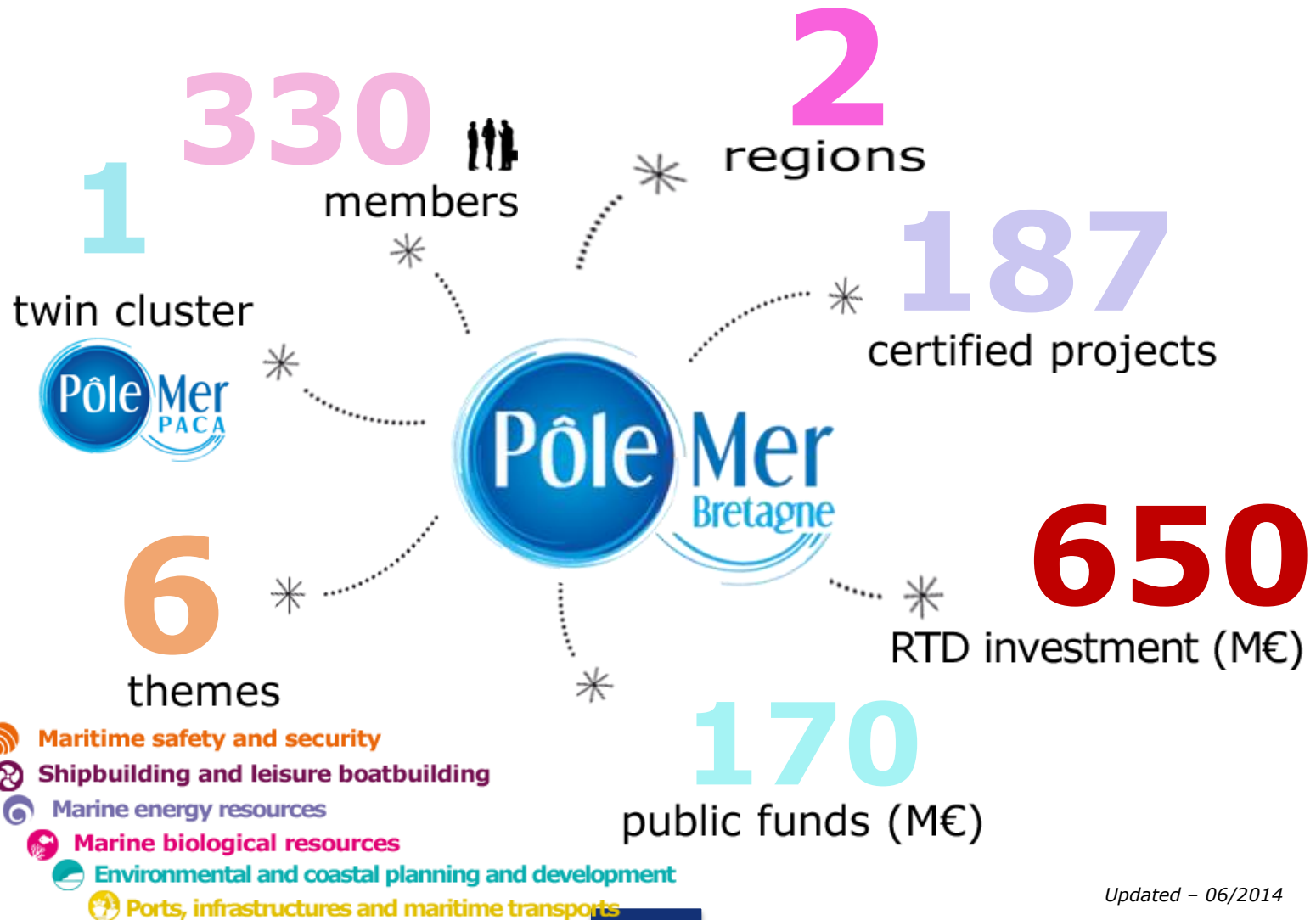
CROSS-CUTTING ASPECTS

Impacts on jobs & growth for the maritime economy

(>5,4M jobs)



Pole Mer's Figure





Thank you for your attention!

Find out more:

www.ec.europa.eu/research/horizon2020

Official documents:

[**http://ec.europa.eu/programmes/horizon2020/en/how-get-funding**](http://ec.europa.eu/programmes/horizon2020/en/how-get-funding)