

Resources from the Sea

Promoting the Competitiveness of Europe's
RTD-based Maritime Economy through the EIT



Proposal

Resources from the Sea

as a potential KIC topic in the
EIT Strategic Innovation Agenda

Supporting Partners:



Cooperating Partners:



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The increasing demand for resources

The environmentally-sensitive development of living and non-living marine resources is one of humankind's grand challenges. The world's fast growing population is demanding food, material resources and energy at an ever-increasing rate. In the wake of this demand, increasing attention is turning to exploiting both living and non-living resources from the sea.

Resources from the Sea

The focus is on energy, biological, and mineral resources in particular. In search of energy security, countries around the world are investing heavily in research and technology development to exploit gas hydrates and to develop renewable energy sources. Marine ecosystems hold a huge biodiversity and unique habitats, providing enormous good and services. For instance, compounds produced by marine organisms and used by pharmaceutical, nutraceutical, and cosmetic industries are also increasingly in demand, while fisheries and aquaculture are a key source of food. Similarly, metals, minerals, sand and gravel can be extracted from the oceans. Already, the latter is extensively and profitably mined. Future extraction of metals and other minerals, and energy resources – especially in the deep sea and Arctic region - will take ocean exploitation to a whole new dimension in terms of economic and environmental impacts.

Resource Security for Europe

One of the major motivating factors in driving interest in maritime resources is the lack of direct access to natural resources in Europe. This resource scarcity affects industrial production (e.g., IT and high-tech industries), energy security, seafood consumption and many other areas of maritime relevance. In parallel, the EU has passed extensive marine environmental protection legislation, with the clear political goal that standards need to be established for the environmentally-sustainable production or extraction, transport and use of resources taken from the oceans and seas.

The need for specialized technologies and expertise

For industry, this means that marine technologies will have to be developed further to ensure that they can fulfill the required tasks effectively and that are both economically and environmentally sustainable. This includes ship assembly, offshore monitoring and communication systems, marine equipment technology integration, underwater and diving technologies, platform and facility construction, special floating equipment, and production, transport and pipe-laying ships along with next generation decision support tools to maximize cost effective deployments. It also implies the development of new techniques, concepts and designs for the sustainable development of fisheries, aquaculture and marine biotechnologies. The big opportunity for the future for Europe is in the development of integrated innovative technologies that could compete with conventional technologies in the global market based around new "blue" industries.

Implementing Europe's marine policy

For policymakers in Europe, energy security, access to key natural resources for industry and markets, the competitiveness of maritime centres, marine environmental protection, and mitigating the effects of climate change in coastal

regions are all major concerns. To balance these concerns with the interests of industry, it is in Europe's interest to promote the development of refined and innovative methods of marine resource (new "blue" technologies and innovations) for use both in Europe and around the world. This will ensure fair environmental assessment of risks and opportunities that are associated with resource recovery from the oceans takes place, thus balancing the economic use of the oceans and the protection of marine ecosystems. Under all circumstances, the risks of resource recovery should be minimized to avoid mistakes made on land being repeated in the oceans. Enhanced exploitation of the world's oceans will undoubtedly occur – the question is who will innovate new technologies and thinking first to undertake such activity that is both economically and environmentally sustainable.

The economic benefits

Studies of the 5 million maritime jobs in Europe suggest that about 100,000 of these are related to the "new" maritime industries (blue technologies, renewable energies, etc). The total of the global market for marine RTD, biotechnology, minerals and aggregates, renewable energies as well as education and training between 2005-2009 was estimated as being as high as 100 billion€. Europe's private enterprises and marine RTD institutions account for between 20% and 95% of the each of the aforementioned markets. While the global market in other sectors (such as oil and gas, fisheries, aquaculture and marine equipment) was worth 1218 billion€¹ As the demand for living and non-living resources grows, the potential and demand for a knowledge-driven and innovative maritime economy (the "blue" economy) will expand dramatically.

Proposal for a MarineKIC

For the above reasons, we propose that the European Institute of Innovation and Technology (EIT) should add the following to the list of topics for the next call for Knowledge and Innovation Communities (KICs):

The sustainable development of living and non-living marine resources (Resources from the Sea)

The key goal

The "*MarineKIC*" will provide a framework for making European economic and RTD activities in the oceans the most economically competitive, technologically advanced, and environmentally sustainable in the world.

The breadth of activity

Behind this short proposal exists a broad field of endeavor covering a wide spectrum of scientific (social, economic, natural and engineering), technological, industrial and educational (both higher and skilled) activities benefiting coastal regions across Europe. Numerous globally competitive research and educational institutions, as well as private companies across Europe, focus on marine resources. Given the fundamental dependence of the marine resources economy on marine RTD and skilled expertise, a KIC would offer an ideal flagship initiative to making investments in marine RTD and education more efficient from an industry perspective.

Concrete Services

There are a variety of concrete services and activities that a *MarineKIC* might usefully deliver, including:

- **Short-term commercial services** derived from integrated management and

¹ See Irish Marine Institute, Marine Industries Global Market Analysis, 2005. A study sponsored by the European Commission to be published in 2012 will deliver more up-to-date and precise data.

visualization of marine data and knowledge, e.g., as part of permanent, operational ocean observing stations or marine seabed mapping and/or environmental monitoring programmes.

- **Medium-term technological capacity-building** ranging from the development of next generation observing and monitoring tools, specialized platforms for deep-sea interventions to support structures for permanent installations. By raising the complexity of the underwater operations the reliability of the individual systems has to grow correspondingly. For this task, a strong interaction between European companies involved in offshore activities and marine equipment technology manufacturing as well as research institutions needs to be established. This could involve the creation of project-specific, for example European Consortia for Deep-Sea Mining Technologies with the aim of developing specific technologies. Technological capacity building will be also developed in the sectors related with the sustainable exploitation of biological resources, also including the development of new technological applications derived from marine products and biomaterials.
- **Long-term capacity-building in education and training**, e.g., as part of industry co-financed university programmes. Various models for co-operative (industry/academia) programmes exist in Europe, Canada and the US, which can be explored.
- **Long-term analytic – “think-tank” – capacities and services** to assess issues of interest to industry and society. This may include engaging in discussions about standard-setting or intellectual property rights with industry or identifying environmental best-practices for deep-sea economic activities. It could also involve an annual fact report on marine innovation. In Europe there exists a serious lack of analysis of trends, developments and possible future directions of marine and maritime RTD as well as related social, economic and political aspects, impacts and outcomes.

Taking an integrated and systematic approach

A central feature of the *MarineKIC* will be that it takes an integrated and systematic approach to delivering the above services. Specifically, with reference to mineral resources, this could include the preparation for the medium-term development of offshore resource-extraction projects by organizing the development and industrial management of mining processes on the basis of improvements in the knowledge of the ocean depths. This action, which will take into account the environmental impact of this type of exploitation, will depend on pooling the skills and expertise within the framework of a European consortium. A multiple partnership would be preferable, to encourage project transparency and the implementation of a pilot system in parallel to the development of projects and experiments. Methods and criteria for assessing the impact of the experiments on deep sea sites must be drawn up by competent and expert partners, including NGOs. Similarly, integrated approaches could also be implemented in the other fields of activity such as exploitation of marine biological resources, oil-gas prospecting, renewable energy, etc.

The benefits to industry, research and policy communities

The strength of the *MarineKIC* will be that it is a practical enterprise that has specific goals and does not simply involve “networking”. It will offer:

- To the **industrial community** a focused, hands-on mechanism to promote marine equipment technology development, innovation and an opportunity to

be a partner in training and education.

- To the **scientific community** an opportunity to illustrate the value-added of marine scientific research, without seeking to restructure core research funding activities.
- And to the **policy community** a flagship initiative, which will help position the European activities in the deep sea on a global level.

**Cooperation and
Coordination**

The **EU Committee of Regions** has expressed its support for this initiative in Opinion NAT-V-007 of 27 January 2011, which states:

suggests that the maritime community should encourage the European Institute of Innovation and Technology to set up a Knowledge and Innovation Community (KIC) in the near future on protection and sustainable use of marine resources. Such a KIC could cover a broad spectrum of scientific, technological, economic and educational activities in the spheres of biological and mineral resources, as well as energy, while taking account of environmental protection issues.

This initiative is being pursued in cooperation EU Member States, Associated States, Regions and the European Institutions including with the:

- **Conference of Peripheral Maritime Regions (CPMR),**
- **Joint Programming Initiative *Healthy Oceans and Seas*** and the
- **Marine Knowledge 2020 Initiative**, including the **European Marine Observation and Data Network (EMODNET).**
- **Marine Board** of the European Science Foundation
- **Waterborne Technology Platform**

This initiative also takes account of other relevant ongoing initiatives, including, but not limited to: The EU Raw Materials Initiative and related European Innovation Partnerships as well as the implementation processes of relevant EU policy and legislation, including the European Integrated Maritime Policy, the Marine Strategy Framework Directive and the Carbon Capture and Storage Directive.

THE PARTNERS

The following institutions and enterprises have agreed to list their details as a sign of support for this proposal.

The Supporting Partners

Industry & Technology Assoc.

 	Aker Wirth	www.wirth-europe.com
	Community of European Shipyards' Associations	www.cesa-shipbuilding.org
	European Marine Equipment Council	www.emec.eu
	German Association for Marine Technology	www.maritime-technik.de
	IBM	www.ibm.com/ie/en
	IHC Merwede	www.ihcmerwede.com
	Arbeitsgemeinschaft Norddeutscher Industrie- und Handelskammern	www.ihk-nord.de
	Intel	Intel Ireland: www.intel.ie Intel Labs Europe : www.intel.com/en_XE/intel/technology/labs/index.htm
	Pharmamar	www.pharmamar.com
	Statoil	www.statoil.com
	Technip	www.technip.com

Research & University

	Universitetet i Bergen	www.uib.no/en
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	Universitatea din București – Facultatea de Geologie si Geofizică	www.unibuc.ro/ro/fac_fgg_ro
	Centro Interdisciplinar de Investigação Marinha e Ambiental	www.ciimar.up.pt
	Centre for Sensor Web Technologies	www.clarity-centre.org
	Instituto Español de Oceanografía	www.ieo.es
	Institut français de recherche pour l'exploitation de la mer	www.ifremer.fr
	Instituto de Hidráulica Ambiental, Universidad de Cantabria	www.ihcantabria.com
	Konsortium Deutsche Meeresforschung	www.deutsche-meeresforschung.de
	Marine Institute / Foras na Mara	www.marine.ie www.marinetech.ie
	Marine & Environmental Sensing Technology Hub	www.dcu.ie/ncsr/Beaufort/index_home.html
	National Oceanography Centre	www.noc.ac.uk
	The Royal Netherlands Institute for Sea Research	www.nioz.nl
	The Ryan Institute for Environmental, Marine & Energy Research, National Univ. of Ireland	www.ryaninstitute.ie/
	Plymouth Marine Laboratory	www.pml.ac.uk/
	SINTEF Group	www.sintef.no
	The Strategic Research Cluster in Advanced Geotechnologies	www.stratag.ie/
	Stazione Zoologica Anton Dohrn Napoli	www.szn.it



Vlaams Instituut voor de Zee

www.vliz.be

Public Sector & Regional Clusters



British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

British Geological Survey

www.bgs.ac.uk



BGR Bundesanstalt für Geowissenschaften und Rohstoffe

Bundesanstalt für Geowissenschaften und Rohstoffe

www.bgr.bund.de



National Institute of Marine Geology and Geo-ecology of Romania

www.geoecomar.ro



Maritime & Energy Research Campus and Commercial Cluster

www.merc3.ie/



National Research Council of Italy

Consiglio Nazionale delle Ricerche – Dipartimento Terra e Ambiente

www.dta.cnr.it



Sea Innovation & Business Cluster

Pôle Mer - Pôle de compétitivité à vocation mondiale

www.pole-mer-bretagne.com/
www.polemerpaca.com/

The Cooperating Partners



Conference of Peripheral and Maritime Regions

www.crpm.org



Marine Knowledge 2020 – European Marine Observation and Data Network (EMODNET)

ec.europa.eu/maritimeaffairs/modnet_en.html



Joint Programme Initiative “Healthy Oceans and Seas”

www.jpi-oceans.eu



Marine Board

www.esf.org/research-areas/marine-sciences



Waterborne Technology Platform

www.waterborne-tp.org

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