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signed by Mr Jordi AYET PUIGARNAU, Director

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Blue Growth, opportunities for marine and maritime sustainable growth

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**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

Blue Growth

opportunities for marine and maritime sustainable growth

(Text with EEA relevance)

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1. INTRODUCTION

If we count all economic activities that depend on the sea, then the EU's blue economy¹ represents 5.4 million jobs and a gross added value of just under €500 billion per year². In all, 75% of Europe's external trade³ and 37% of trade within the EU⁴ is seaborne. Much of this activity is concentrated around Europe's coasts, but not all. Some landlocked countries host very successful manufacturers of marine equipment.

The sea and the coasts are drivers of the economy. Because of their outward-looking geography, ports and coastal communities have traditionally been centres for new ideas and innovation. In addition to this traditional propensity for innovation, three new factors have now come into play.

- First, there has been rapid technological progress in working offshore in ever-deeper waters. Robotics, video-surveillance and submersible technology are now routinely packaged into machinery for operations that were not feasible ten years ago.
- Second, we are increasingly aware that land and freshwater are finite resources. Further clearing of forests or draining of wetland will deprive future generations of the benefits they provide. We need to look how the 71% of the planet that is ocean can deliver human necessities such as food and energy in a way that is more sustainable. Meeting environmental targets can also be a source of innovation and growth.
- Third, the need to reduce greenhouse gas emissions has not only driven the deployment of offshore renewable energy installations, but has also provided a further impetus for energy saving and an additional reason to favour seaborne transport over land transport due to its lower emissions per tonne-kilometre. There is significant potential to reduce these emissions which account for about

¹ not including military activities.

² based on data from the Blue Growth Study 'Scenarios and drivers for sustainable growth from the oceans, seas and coasts', ECORYS, 2012. <https://webgate.ec.europa.eu/maritimeforum/content/2946>

³ by volume.

⁴ per tonne-kilometre.

3% of the total greenhouse gas emissions by further improving the energy efficiency of ships.

This has opened up an opportunity for blue growth – an initiative to harness the untapped potential of Europe's oceans, seas and coasts for jobs and growth. The potential is significant, provided the appropriate investments and research are made. Growth in the blue economy offers new and innovative ways to help steer the EU out of its current economic crisis. It represents the maritime dimension of the Europe 2020 strategy. It can contribute to the EU's international competitiveness, resource efficiency⁵, job creation and new sources of growth whilst safeguarding biodiversity and protecting the marine environment, thus preserving the services that healthy and resilient marine and coastal ecosystems provide.

This Communication drives forward the Commission's Integrated Maritime Policy and launches a process which will place the blue economy firmly on the agenda of Member States, regions, enterprise and civil society. It describes how Member States and EU policies are already supporting the blue economy. It then identifies specific areas where targeted action could provide an additional stimulus. A set of initiatives will subsequently be launched to explore and develop the growth potential in these areas.

2. WHAT IS THE BLUE ECONOMY?

The individual sectors of the blue economy are interdependent. They rely on common skills and shared infrastructure such as ports and electricity distribution networks. They depend on others using the sea sustainably.

⁵ See Roadmap to a Resource Efficient Europe COM(2011) 571.

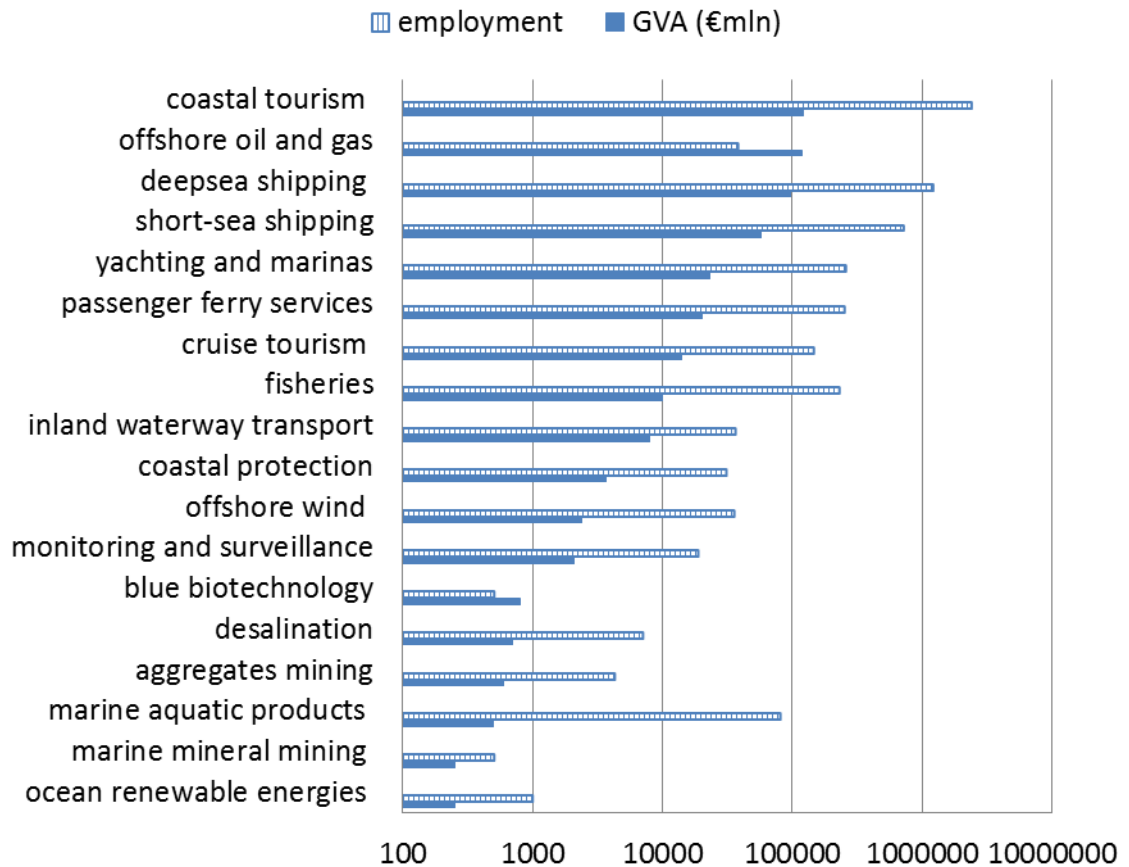


Figure 1 Employment and economic size of marine and maritime economic activities. Please note the logarithmic scale.

Figure 1 shows the blue economy's value chains in terms of gross value added and employment. This includes their upstream and downstream activities. For instance, the activity of the important shipbuilding and marine equipment sectors has been distributed among the relevant value chains.

The picture may look different by 2020. We need to prepare for technological progress, demographic shifts, increasing scarcity of natural resources and growth in hitherto underdeveloped economies, including our neighbouring countries. A number of traditional activities will remain significant employers, while emerging sectors will provide new jobs.

The blue economy needs to be sustainable and to respect potential environmental concerns given the fragile nature of the marine environment. Efforts are needed to reduce negative environmental impacts of maritime activities such as the emissions of pollutants and the discharge of noxious substances.

3. MEMBER STATE SUPPORT FOR THE BLUE ECONOMY

Member States are already making strategic investments to unlock the potential of the blue economy. These include Ireland's INFOMAR⁶ programme for mapping marine resources and the refurbishing of the Bremerhaven port to meet the needs of manufacturers and suppliers in the offshore wind industry. The €8 billion MOSE project currently under construction, is aimed at protecting the city of Venice from floods and morphological degradation.

Legislative measures that reassure investors that there will be no unforeseen delays in planning processes or infrastructure connections can give as much impetus to investment as financial support. A UK Department for Transport 'Harbour Empowerment Order' gave statutory powers to the London Gateway as a port and distribution centre. Not only will this £1.5 billion private investment reduce carbon emissions by bringing containers nearer to their final destination, it will also deliver about 12000 new jobs by the end of 2013.

Lack of access to finance and a shortage of suitably skilled workers have been identified as blocking growth in nearly all economic sectors. In the blue economy, Member States are tackling this by developing maritime clusters. These are groupings of larger industries, smaller suppliers and educational establishments that reinforce each other through their close proximity. The better communication brought about by geographical proximity mean that educational courses and research can meet the needs of local industry and suppliers can understand the market and predict future trends. Examples include the offshore energy industry in Scotland and the ship-repair business in Brest which plays host to France's largest maritime cluster, the 'Pôle de compétitivité mer'. Ostend has made land and quays available for renewable energy companies close to research institutes; and the Marine Institute in Galway is developing new ideas for marine observation and communication with large multinationals and small businesses in its SmartBay project.

In order to tackle the big research questions more efficiently through commonly agreed work programmes, Member States are collaborating on a Joint Programming Initiative on "Healthy and Productive Seas and Oceans".

4. ONGOING EU INITIATIVES

EU policies are designed to reinforce the efforts of Member States and regions and provide common building blocks for a successful blue economy. These include the following:

- (1) A Commission initiative on maritime spatial planning and integrated coastal zone management which should provide business with the legal certainty it needs to invest.
- (2) The "Marine Knowledge 2020" initiative⁷. This will provide an integrated knowledge infrastructure based on national data collection systems delivering

⁶ Integrated Mapping for the Sustainable Development of Ireland's Marine Resources.

⁷ COM(2012) 473 final.

data products at a European-level through the internet. This will include a flagship multi-resolution digital seabed map of European waters as well as up-to-date information on the water column by 2020. Benefits of at least €500 million a year⁸ through increased efficiency and innovation are expected.

- (3) A Common Information Sharing Environment (CISE)⁹ for the surveillance of the EU maritime domain. This will allow maritime authorities responsible for activities such as safe navigation or fisheries control to share information on risks and threats. This reduces their costs and the risk to businesses operating at sea.
- (4) The Marine Strategy Framework Directive¹⁰ which introduces an ecosystem-based approach, aiming to ensure that the collective pressure of human activities on the environment is kept within levels compatible with the achievement of good environmental status by 2020. The Rio+20 Summit commitments also address the sustainable use of a diverse marine ecosystem.
- (5) The European Maritime Transport Space without Barriers, which aims at simplifying administrative procedures for maritime transport¹¹ and which should be further developed into a 'Blue Belt' of free maritime movement in and around Europe.
- (6) An Action Plan to facilitate access to finance for Europe's 23 million SMEs, adopted by the Commission in December 2011¹² and a proposal for a new EU framework creating a genuine single market for venture capital funds.¹³
- (7) Actions in education and training financed by the forthcoming 'Erasmus for All Programme', such as Knowledge Alliances and Sector Skills Alliances; instruments for facilitating the mutual recognition of skills and qualifications such as European Qualifications Frameworks; and better anticipation of skills and labour market needs through European Sector Skills Councils and the EU Skills Panorama.
- (8) The EU's programmes for marine and maritime research and innovation¹⁴ funded through the framework programme. These include dedicated initiatives, such as the FP7 Ocean of Tomorrow calls, to further our understanding of the marine environment and its climatic and non-climatic stressors and to promote the sustainable use of marine resources. The future Horizon 2020 programme will target research and innovation on food security, clean energy, green transport, climate action and resource efficiency, as well as cross-thematic marine and maritime research.

⁸ European Marine Observation and Data Network Impact Assessment, 8.9.2010, SEC(2010) 998.

⁹ COM(2010) 584 final.

¹⁰ 2008/56/EC.

¹¹ COM(2009) 10.

¹² COM(2011) 870.

¹³ COM(2011) 860.

¹⁴ COM(2008) 534.

- (9) The LeaderSHIP 2015 initiative which is currently under review with the aim of adapting the strategy to better tackle the new challenges the EU shipbuilding sector is facing.¹⁵

EU funding under the 2014-2020 financial framework can reinforce these efforts. Member States and regions will be able to focus EU-funded investment on promising maritime economic activities and their supporting infrastructures.

Sea-basin strategies, such as those for the Baltic, the Atlantic and the Adriatic-Ionian, complement preparations for the new financial framework by identifying common issues, solutions and actions. They offer a platform for Member States to engage at an early stage in defining priorities. For instance, through the Commission's Atlantic strategy, national and regional authorities along the Atlantic seaboard are identifying which priority investments could be funded under the 2014-2020 structural budget envelope and which knowledge gaps could be filled by research within the Horizon 2020 initiative. Bringing in private sector funding, including through the European Investment Bank, will also help unlock the potential of the blue economy.

5. BLUE GROWTH FOCUS AREAS

An analysis of the job-creation potential¹⁶, as well as the potential for research and development to deliver technology improvements and innovation and the need for action at EU level, has suggested that the following five value chains could deliver sustainable growth and jobs in the blue economy. They could therefore benefit from clear-sighted policymaking, allowing the private sector to play a leading role in helping the blue economy reach its sustainable growth potential. This list should not be considered exhaustive. Ongoing EU initiatives are already encouraging innovation in sectors such as maritime transport. Other value chains may emerge over time as suitable areas for further policy focus.

5.1. Blue energy

Marine energies have the potential to enhance the efficiency of harvesting the European energy resource, minimize land-use requirements of the power sector and reduce the European greenhouse gas emissions (by about 65 Mt CO₂ in 2020). Thanks to the EU renewable energy targets and incentives for investments such as feed-in tariffs or green certificates, offshore wind power generation has started to expand rapidly in Europe. In 2011, offshore wind accounted for 10% of installed capacity, employed 35000 people directly and indirectly across Europe and represented €2.4bn in annual investments. By the end of 2011 the total capacity offshore was 3.8GW. On the basis of Member States' National Renewable Energy Action Plans, the electricity produced from wind power in 2020 will be 494.6 TWh and of that 133.3 TWh will be generated offshore. By 2030 the annual installation of offshore capacity could exceed that onshore. Offshore wind could meet 4% of the EU electricity demand by 2020 and 14% by 2030. This would mean 170000 jobs by 2020, increasing to 300000 by 2030. Continued efforts to reduce the cost of offshore

¹⁵ COM(2003) 717.

¹⁶ See Blue Growth Study, ECORYS, 2012.

wind technology will accelerate this growth. This is a prime objective of the Strategic Energy Technology Plan's (SET-Plan)¹⁷ European Industrial initiative on wind energy. Several Member States are active in this plan.

Other offshore renewable energy technologies are still at an early stage of development, with Member States planning to install only a moderate capacity of 2 to 4 GW by 2020. The challenge is to accelerate the commercialisation of ocean energy through reductions in technology costs as world-wide demand is expected to double annually in the near future. Different combinations of geographic and oceanographic conditions suit different technologies. These technologies offer a more predictable base-load supply of electricity that compensates the fluctuating supply from wind:

- Tidal barrage, a dam-like structure used to capture energy from masses of water moving in and out of a bay or estuary. The best example of this technology in Europe is the La Rance Power Station in France with capacity of 240MW, which is the second largest plant of its kind in the world.
- Wave power devices are currently being demonstrated and underwater turbines driven by currents (tidal or other) are close to commercialisation. In all, 22MW of wave and current devices were installed in 2012.
- Ocean thermal energy conversion, which uses the temperature difference between cooler deep ocean waters and warmer shallow or surface ocean waters to run a heat engine could be a feasible option for the EU's overseas territories in the Caribbean and Indian Ocean.

Commercial operation of blue energy technologies will need investments in grid connections and transmission capacity. Long-term support mechanisms, which have been successful in encouraging investment in other types of renewable energy, will also be needed for emerging wave and tidal current technologies.

As recently stressed in the Communication "Renewable Energy: a major player in the European energy market"¹⁸, further efforts to reinforce research and development in the field of ocean energy are needed. This will help to further reduce costs, lengthen the operating life of equipment and streamline logistics in technologies that will help to achieve the 2020 targets. Given the long lead time for EU research projects, increased effort should now be devoted to technologies such as wave and currents that will reach full maturity in the coming decades.

EU measures, including funding, can have a crucial role in providing a framework that gives investors the confidence to invest. The European Investment Bank lent €3.3 billion for offshore wind projects between 2005 and 2011. The sale of the first 200 million allowances for the NER300 funding

¹⁷ COM(2007) 723 and COM(2009) (519).

¹⁸ COM(2012) 271.

instrument¹⁹ will raise nearly €1.5 billion by October 2012. A proportion of this will support demonstration projects for offshore energy in Member States. These efforts in new technologies should be sustained and structural funds should be mobilised for demonstration projects. At the same time efforts must be deployed to reconcile tidal barrages with EU nature protection legislation, possibly in the framework of integrated coastal zone management or strategic planning.

EU industry is a world leader in blue energy and can contribute to reductions in carbon emissions outside Europe through exports. In addition, synergies can also be explored with the offshore conventional energy sector, for example by tackling safety and infrastructure challenges together. The Commission proposal for levelling up safety standards in the offshore oil and gas sector EU-wide²⁰ is a key initiative. Working together with the conventional energy sector will help secure affordable energy supplies in the EU.

5.2. Aquaculture

Fish accounts for about 15.7% of the animal protein consumed globally. The UN Food and Agriculture Organisation estimates²¹ that aquaculture provides half of this and that by 2030 it will reach 65%. It is currently 25% in the EU. Globally, it has a growth rate of 6.6% per annum, making it the fastest-growing animal-food-producing sector and faster than the 1.8% annual global population increase. It is thus contributing to an overall improvement in human diet. Growth in the aquaculture sector in Asia, which accounts for more than 89% of global production is more than 5% a year, while EU growth in the sector is stagnant.

More than 90% of aquaculture businesses in the EU are SMEs, providing around 80000 jobs²². Aquaculture has the potential to grow by providing more quality merchandise to consumers willing to choose fresh, trustworthy products, increasingly including those that are sustainably or organically produced. Moreover, it can help coastal communities diversify their activities while alleviating fishing pressure and thus helping to preserve fish stocks.

Lack of available maritime space for aquaculture activities, competition in the global market and administrative constraints in particular concerning licensing procedures are amongst the challenges to growth. Sustainable aquaculture must also consider potential impacts on wild fish stocks and water quality. Since the start of the present economic crisis, investment has been limited by the lack of capital.

As part of the Common Fisheries Policy²³ reform, the Commission proposes to promote aquaculture through an 'open method of coordination' based on non-binding strategic guidelines, multiannual national strategic plans and the

¹⁹ http://ec.europa.eu/clima/policies/lowcarbon/ner300/index_en.htm

²⁰ COM(2011) 688 final.

²¹ FAO State of World Fisheries and Aquaculture 2010.

²² 70258 reported under the EU's Data Collection Framework.

²³ COM(2011) 417 and COM(2011) 425.

exchange of best practice. There is a wide scope for improving administrative practices, especially in licensing. Member States need to be aware of ways of increasing production that are sustainable and that meet the concerns of other users of coastal or sea space – for example, by building cages along with offshore windfarms or by integrated multi-trophic aquaculture. Such measures will be supported financially by the proposed European Maritime and Fisheries Fund.²⁴ The future Horizon 2020 programme for research and innovation should also play an important role in unlocking the growth potential of European aquaculture for instance through the farming of new species or moving further offshore.

5.3. Maritime, coastal and cruise tourism

The extraordinary beauty and diversity of Europe's coasts, as well as the wide range of facilities and activities on offer, make them the preferred holiday destination of 63% of European tourists²⁵. The maritime and coastal tourism sub-sector has now become the largest single maritime economic activity, employing 2.35 million people, equivalent to 1.1% of total EU employment.²⁶ More than 90% of enterprises employ less than 10 people. In some areas, tourism is an additional source of income for coastal communities, but in others it can dominate the local economy.

While many of these tourists may not venture far from the shoreline, open-water activities are on the increase. Yachting is expected to grow by 2-3% a year. The cruise industry is also growing. Within Europe it employs nearly 150000 people and generates direct turnover of €14.5 billion²⁷. EU shipyards have been successful in serving this specialised market – both with large cruise ships and small leisure vessels.

A healthy environment is fundamental to any form of 'blue' tourism and favours the growth potential of new forms of tourism. High quality bathing waters and pristine coastal and marine habitats have a high recreation value. This increases the attractiveness of coastal areas which in turn increases the growth potential of activities such as nautical tourism and sports, and green tourism such as whale watching. The sheer variety of Europe's tourism means that most growth-generating initiatives will inevitably be on a local or regional scale. Each of Europe's sea-basins presents different challenges and opportunities, requiring tailor-made approaches. Public administrations will need to take a strategic approach to investments in enabling infrastructures such as berthing capacity, port facilities and transport. Higher education courses need to deliver a solid grounding in the specific skills needed to maintain and increase market share in a discerning and competitive global market. This needs to be accompanied by measures that help to improve the tourism offer for low-season tourism and reduce the high carbon footprint and environmental impact of coastal tourism.

²⁴ COM/2011/0804.

²⁵ 'Facts and figures on the Europeans on holiday 1997–98', Eurobarometer 48, Brussels, 1998.

²⁶ based on data from the Blue Growth Study.

²⁷ European Cruise Council (2011).

http://download.ecorys.com/fuu/downloads/Europe_cruise_industry_markets_2011_ecc_jun11.pdf

Given the sheer magnitude of the activity, the precariousness and low-skill level of much of its current workforce as well as tourism's dominant impact on many European coastal and marine environments, measures at a sea-basin or EU level could have a significant positive impact. Cross-border coordination as part of a sea-basin strategy can contribute to the development of high-value tourism areas. The Commission is already tackling issues such as the regulatory burden on small and medium enterprises. It will shortly begin an assessment of further specific measures to enhance the sector.

5.4. Marine mineral resources

Between 2000 and 2010 there has been an annual increase of about 15% in the price of many non-energy raw materials²⁸, mainly as a result of consumer demand in emerging economies. There is a risk of supply shortage for several of these, including those identified as critical to Europe's economy²⁹.

Advances in technology as well as concerns over security of supply have encouraged mining companies to consider what the sea can provide. The exploitation and mining of minerals, other than sand and gravel, from the sea have just started. Most current activity is in shallow water. By 2020, 5% of the world's minerals, including cobalt, copper and zinc could come from the ocean floors. This could rise to 10% by 2030. Global annual turnover of marine mineral mining can be expected to grow from virtually nothing to €5 billion in the next 10 years and up to €10 billion by 2030³⁰.

It may also become economically feasible to extract dissolved minerals, such as boron or lithium, from seawater. The most promising deposits are found in metallic sulphides which emerge from hydrothermal ore deposits (such as 'black smokers') in volcanically active zones. The temperatures and pressures in these regions are extreme and the impact of disturbance on these hot spots of marine biodiversity, which under the UN Convention on the Law of the Sea (UNCLOS) should be protected³¹, is largely unknown. Such operations are currently mostly located within areas under national jurisdiction (exclusive economic zones and continental shelf) where it is easier to transport ores to land. However there are opportunities outside jurisdictional marine areas. In these areas, the International Seabed Authority (ISA) is responsible for organising and controlling activities, including monitoring all mineral-related activities. This includes protecting the marine environment in line with the provisions of UNCLOS, to which the EU and all its Member States are contracting parties.

If this expansion in extracting minerals from the seafloor does take place, European companies, with their long experience in specialised ships and

²⁸ WTO (2010) 'Trade growth to ease in 2011 but despite 2010 record surge, crisis hangover persists', PRESS/628, 7 April 2011.

²⁹ London Metal Exchange (LME) indicates a price increase of about 256% for the period 2000 to 2010 for non-ferrous base metals. See also COM(2011) 25 final and its accompanying staff working document.

³⁰ based on estimates given by industrial stakeholders in the Blue Growth Study.

³¹ UN Convention on the Law of the Sea, Article 194 paragraph 5.

underwater handling, are currently well positioned to provide high-quality products and services. Their continued competitiveness depends on access to finance in an inherently risky market, targeted research and development in extraction techniques, the ability to obtain licences in international waters and robust measures to avoid harming unique ecosystems. The marine minerals sector will be able to benefit from the experiences of the offshore oil and gas sector here.

EU support could include measures to ensure that European companies are not squeezed out of the value chain for marine minerals by state-supported competitors. This might include a pilot action within the framework of the proposed European Innovation Partnership on Raw Materials³², supported by a structured EU research effort addressing main technology challenges. EU engagement would help to ensure that high environmental, legal and security standards are upheld.

5.5. Blue biotechnology

The unexplored and understudied nature of much of the underwater world means that the capacity of marine organisms other than fish and shellfish to provide inputs to the blue economy is only just beginning to be appreciated, partly through new gene sequencing technologies for living organisms. There have already been successes. The anti-viral drugs Zovirax and Acyclovir were obtained from nucleosides isolated from Caribbean sponges. Yondelis, developed from small soft-bodied marine animals was the first drug of marine origin to fight cancer. Exploration of the sea biodiversity is now helping us understand for example how organisms that can withstand extremes of temperature and pressure and grow without light could be used to develop new industrial enzymes or pharmaceuticals. At the same time, concerns about the land-use impact and the thirst for water of terrestrial crops grown for biofuel are driving efforts to explore the use of algae as a source of biofuels, along with high added-value chemicals and bioactive compounds.

While estimated current employment in the sector in Europe is still relatively low, and a gross value added of €0.8 billion, the growth of the sector will offer high-skilled employment, especially if ground-breaking drugs can be developed from marine organisms, and significant downstream opportunities. In the very short term, the sector is expected to emerge as a niche market focused on high-value products for the health, cosmetic and industrial bi-materials sectors. By 2020, it could grow as a medium-sized market, expanding towards the production of metabolites and primary compounds (lipids, sugars, polymers, proteins) as inputs for the food, feed and chemical industries. In a third stage, around 15 years from now and subject to technological breakthroughs, the blue biotechnology sector could become a provider of mass-market products, together with a range of high added value specialised products.

³² COM(2012) 82.

Accelerating this process will require a combination of basic research on ocean life and applied research on possible industrial applications with low probabilities but high rewards for success.

A strategic approach to research and innovation would provide the scientific and technological bases for substantiating the strategic decisions that emerging industrial sectors need. By reducing technical bottlenecks in this area, the whole sector would become more attractive to investors. It would also help EU industry to move from the developmental stage to the commercialisation of innovative products. A European approach would raise awareness among policy makers, the private sector and the general public of the potential of marine aquatic products.

6. CONCLUSION

This Communication has identified five areas where additional effort at EU level could stimulate long-term growth and jobs in the blue economy, in line with the objectives of the Europe 2020 strategy. With increasing awareness of the blue economy, and further analysis, other promising areas for EU policymaking may emerge.

For each of the five activities highlighted the Commission will analyse policy options and consider further initiatives. This will involve:

- Assessing the options for giving industry the confidence to invest in ocean renewable energy, taking into account the framework provided by the Strategic Energy Technology Plan, the aim being to address ocean renewable energy issues in a Communication in 2013.
- Working collaboratively with Member States to develop best practice and agree on Strategic Guidelines on Aquaculture in the EU to be adopted in early 2013.
- Assessing how maritime and coastal tourism can further contribute to economic growth and provide less precarious jobs whilst improving its environmental sustainability. An impact assessment will be followed by a Communication in 2013.
- Assessing how European industry can become competitive in extracting minerals from the seafloor and how best to ensure that this activity does not prevent future generations from benefiting from hitherto untouched ecosystems. An impact assessment followed by a Communication will be delivered in 2014.
- Assessing the options for blue biotechnology to harness the diversity of marine life. An impact assessment followed by a Communication will also be delivered in 2014.

In each of these areas the assessment of options will begin with consultations with Member States and industry and other relevant stakeholders in order to develop joint approaches that will provide the extra push that the blue economy needs in order to

provide a positive contribution to Europe's economic future, while safeguarding our unique marine environment for future generations.