

„THE BLUE ECONOMY” INVESTMENTS PROMOTION

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Abstract: *The idea of the „blue economy” is related to the promotion of economic growth, social inclusion, and living standards in line with ensuring environmental sustainability of the coastal areas at the seas, oceans and rivers. It refers to the decoupling of socioeconomic development through sea-related sectors and activities from environmental degradation. The blue economy has diverse components, including established traditional maritime industries such as fisheries, tourism, and maritime transport, but also new and emerging activities, such as offshore renewable energy, aquaculture, seabed extractive activities, and marine biotechnology and bioprospecting. A number of services provided by ocean ecosystems, and for which markets do not exist, also contribute significantly to economic and other human activity such as carbon sequestration, coastal protection, waste disposal and the existence of biodiversity.*

Key words: *blue economy, blue growth, investments promotion, sustainability, EU programmes*

Introduction

Promoting the blue economy requires access to affordable long-term financing at scale, but governments and coastal local authorities often have limited success in catalyzing public and private investments in the blue economy, particularly at a scale that would allow the transition of established sectors of the economy or that would open up new sectors. Sources of financing can include support for governance reform, ecosystem-based management of marine areas and resources, and other enabling conditions required for a blue economy. In parallel, correcting market and policy failures through the application of science based integrated maritime planning and barrier removal instruments can not only act catalytically to restore and protect coasts, it can also generate sizeable business activity and jobs when job creation activities. There are small but growing number of international public financing and other innovative instruments that are emerging to finance investments in existing, nascent, and new sectors. Examples include financing through marine conservation, such as visitor entry fees to marine protected areas, etc.

Characteristics of the blue economy and the areas to be promoted

In 2016 the MARIBE project (funded by HORIZON 2020) carried out a contextual study of blue growth sectors. Each sector was reviewed in terms of business life cycles as well as from a socioeconomic perspective. Taking into account a broad range of existing studies and research, nine sectors have been shown to be the most influential in the blue economy. These sector are:

- Mineral resources
- Marine food
- Marine biotechnology

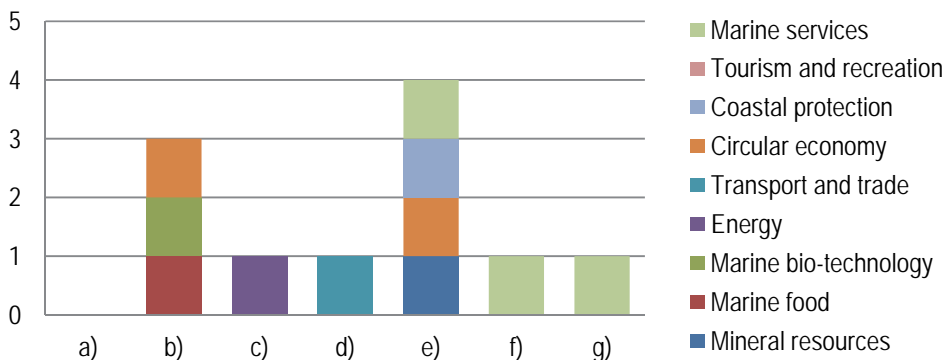
- Energy
- Transport and trade
- Circular economy
- Marine services
- Tourism and recreation
- Coastal protection

Many of the activities related to the blue economy take place upstream and downstream of one another, creating a value chain. It is important to consider these value chains in the context of SME involvement. Many SME-related activities take place not in the core of the sector, but upstream or downstream. In the maritime transport sector, shipping is the core activity. However, a great deal of value is added in seaports and associated services, as well as in shipyards and other supply activities that support shipping. Another example is fisheries, where opportunities exist to extend the value chain both upstream (e.g. vessel support services) and downstream (e.g. processing whole fish into higher-value products). The extent of the value chain will determine the total value that can be realised from a single maritime sector. Emerging technologies show that these value chains act as multipliers, triggering the introduction of new forms of production, technologies, logistics, labour processes, organisational relations and networks (Roberts and Ali, 2016).

The direct relation of the nine sectors to the following social goals focuses strongly on climate change and food security (Figure 1):

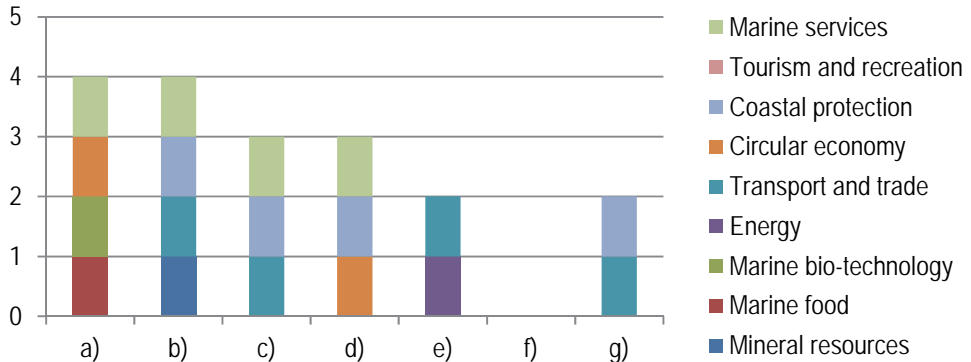
- health, demographic change and well-being;
- food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bioeconomy;
- secure, clean and efficient energy;
- smart, green and integrated transport;
- climate action, environment, resource efficiency and raw materials;
- Europe in a changing world – inclusive, innovative and reflective societies;
- secure societies – protecting freedom and security for Europe and its citizens.

Figure 1. Direct relation to social goals



Indirect relations address health and food security first, followed by clean energy and smart transport (Figure 2). The tourism sector does not really address any of the social goals, though this does depend on the type of tourism. Exceptions are small-scale, sustainable and local tourism activities that address food security, resource efficiency, and smart transport.

Figure 2. Indirect relation to social goals



At the meeting of the experts from the Black Sea coastal countries (the author was active part of it) including the Republic of Bulgaria, Georgia, Romania, the Russian Federation, the Republic of Turkey and Ukraine, as well as the Republic of Moldova, in cooperation with marine experts from leading European marine institutes and organisations, and with the support of the European Commission in May 2018 a decision on Burgas Vision Paper - A Blue Growth Initiative for Research and Innovation in the Black Sea was taken. According to it creating incentives for marine and maritime innovation in traditional and emerging blue economy sectors such as:

- Energy – establishing of renewable energy sectors such as offshore wind and waves;
- Aquatic living resources and food – developing sustainable fisheries, and high-tech and eco-friendly aquaculture, including multi-platform use;
- Biotechnology – deriving high-value novel products from organisms of the unique habitats of the Black Sea;
- Transport – developing sustainable safe shipping and a cleaner marine environment;
- Blue tourism.

Based on them the results of the MARIBE study and others could be concentrated on five of the sectors and further a focused view on the blue energy one will be described. Table 1 below gives an overview of the five sectors and their development status, as well as drivers for growth to trigger development.

Table 1. Five sectors overview

Sectors	Established industries	Emerging industries	Innovative trends	Drivers for future growth
Marine food	Fisheries	Sustainable fisheries	Food processing industry	Food security
	Traditional aquaculture	Freshwater aquaculture Mariculture	Coastal and near-shore farming of marine fish, Coastal and off the coast farming of molluscs, crustaceans Coastal and off the coast production of aquatic plants (macro and micro algae/seaweed) Coastal and off the coast Integrated Multi-Trophic Aquaculture systems Offshore mariculture	Demand for protein Rising fish consumption
Marine biotechnology		Bio-technology for cosmetics, aquaculture, food and nutrition, environmental protection and depollution	Functional food	R&D in healthcare and industry
Energy	Offshore wind energy	Tidal energy Wave energy	Ocean thermal energy conversion Salinity gradient	Demand for alternative energy sources
Transport and trade	Shipping			Growth in seaborne trade
	Port infrastructure and services	Electronic administrative procedures, E-logistics	Innovative freight handling systems	Changes in logistics requirements International regulations and regulatory changes
		Sustainable shipbuilding	Digitisation and automation Environmental technologies Safety technologies	

Sectors	Established industries	Emerging industries	Innovative trends	Drivers for future growth
Tourism and recreation	Tourism	Ecotourism		Growth of global tourism
	Coastal development			Coastal urbanisation
		Authentic experiences		Domestic regulations

Source: Economist 2017, Building Industries at Sea 2017, adapted by M&E Factory 2018

The challenges in the sector of the „blue energy“

By 2020, if technological and financial barriers are overcome, the pipeline of announced European projects could reach 600 MW of tidal stream and 65 MW of wave energy capacity. Taking into account only projects that have been awarded public funds, 71 MW of tidal stream and 37 MW of wave energy capacity could be operational within the EU in 2020.

Announced ocean energy projects that have obtained support through the different funding streams (e.g. H2020, NER 300 and Innovfin) and that are expected to be operational by 2020 account for 71 MW of tidal and 37 MW of wave energy capacity. Societal goals met directly are secure, clean and efficient energy. The societal goals met indirectly are the climate action, environment, resource efficiency and raw materials.

Speaking of the private investments there are generally three types of investments in off shore wind energy: Project acquisition and capital ventures, Company mergers and acquisitions, Technology funding. financial consultants play a key role in these three profiles. Merger and acquisition advisory services offered by consultants include project modelling, valuation, transaction services, due diligence and post-acquisition integration services. So far, over the past 10 years the ocean energy industry has invested an estimated €1 billion in capital to move concepts from the drawing board to deployment in EU waters.

There is a significant variability of CAPEX values for the first pilot projects (up to 1 MW) installed worldwide, ranging from €10–50 M/MW for wave energy, and a much lower €5–20 M/MW for tidal energy. The trends for both technologies were relatively similar as they progressed to commercial stage, converging to €3–6 M/MW for both wave and tidal energy. Investors see that most sites of high ocean renewable potential are very remote from population centres, with inadequate current plans for upgrading facilities to the scale of development planned. Investor confidence will be significantly boosted if it sees major government funding to upgrade infrastructures at this current time, providing the ingredients for a successful future technology development roll-out.

By 2016 about 70 different design concepts were under development (OES 2016), Unlike wind energy (or even tidal current), designs for wave energy devices have not converged around a standard technology solution (more likely that wave energy will converge on a number of standard technologies), and relatively few have made it to full scale prototype testing, and there are no current plans for commercial arrays.

Current estimates from 2014 for 2050 deployments, as quoted by SI Ocean (SI Ocean 2014), currently stand at 100 GW of combined wave and tidal capacity installed. Current capacity deployments to date (2016) of 16.7 MW will make it highly unlikely that the OEE target of 850 MW by 2020 will be reached (OEE 2015 (Ocean Energy Forum 2016)).

Financing and models on the blue energy

In 2007 EU approved of the Strategic Energy Technology Plan (SET-Plan) (European Commission 2015), with aims to develop technologies in areas including renewable energy, energy conservation, low-energy buildings, fourth generation nuclear reactor, coal pollution mitigation, and carbon capture and sequestration (CCS).

The following are the list of EU funded programs for ocean energy:

1. Within the EERA, a joint programme for investment in ocean energy has been set up. NER 300 is an example of one of the EERA initiatives. Three ocean energy projects were awarded around e60 million in total under the first round of the NER 300 programme, which will enable the demonstration of arrays from 2016 (European Commission 2014).

2. The development of ocean energy has been highlighted in the recent Commission Communication entitled „Action Plan for the Atlantic Ocean area” (Atlantic Action Plan 2013, European Commission 2013) which encouraged national and regional governments to consider how they could use EU structural and investment funds as well as research funds or European Investment Bank funding to support the development of the sector.

3. Research Framework Programmes (FP4,5,6,7) and the Intelligent Energy Europe Programme provided an amount of up to e90 million for ocean energy development since the 1980s (European Commission 2014). (Ocean Energy Europe5 reports e124 m to ocean energy projects between 2005 and 2014, almost e14 m per year).

4. Horizon 2020, the EU’s research and innovation programme, will aim to address important societal challenges including clean energy and marine research. As such, it is a powerful tool that can drive the ocean energy sector towards industrialisation, creating new jobs and economic growth. Between 2014–15, H2020 programme has funding over €60 million (Magagna, Monfardini et al. 2016) of R&D projects in wave and tidal energy. e30 M7 in demonstration funding was awarded (LCE3 and 12). For 2016–17, total of e22.6 M will be awarded for ocean energy specific calls, 9.8% of LCE budget. A further e35 M was allocated to Blue Growth and Co-Funded calls, which include ocean energy.

5. Other funding instruments available in Europe are Innovfin8 (a series of integrated and complementary financing tools and advisory services offered by the European Investment Bank Group together with the European Commission) and the European Regional Development Fund (ERDF). These funding mechanisms are supporting the deployment of demonstration projects. Collaboration initiatives at regional level are catalysing the formation of marine energy clusters to consolidate the European supply chain.

There are two types of support type mechanisms: push: grants and equity, and pull: tariff and other revenue mechanisms. Market pull mechanisms for wave and tidal sectors include financial supports mechanisms such as feed-in tariff and renewable obligations. Feed-in tariffs (fiT) are the most common support mechanisms, and are also currently the most popular and sought after mechanism by investors.

Post 2017 projects rely on Contract for Difference (CfD) for support in the UK market (Department of Energy and Climate Change 2014). CfD offers a fixed price above the market price for electricity, guaranteed for a period of time. Changing from the ROCs systems to the CfD is a major change for the UK renewable electricity sector. UK Government states that CfD will give Wave and Tidal much benefits and greater certainty¹¹. It is argued that CfD will lead to lower finance costs, which will reduce the overall project costs.

A potential wave or tidal development would need to bid into the new system and need win a successful bid to get access to the long term contracts. Once this is secured, CfD offers more revenue certainty, relative to the previous ROC regime. Wave and tidal developers will have access to a general pot of £260m which includes other renewable sectors such as advanced conversion, anaerobic digestion, dedicated biomass with CHP, geothermal. This does mean that wave and tidal will be competing with these other technologies to secure funding in a mechanism where the support will go to the cheapest technology. The highest strike price for both wave and tidal will be of 305 £/MWh, this is the Initial administrative (maximum) strike prices (£/MWh in 2012 prices). This change may have an initial settling period, where investors will be uncertain of the new market.

Technology push support mechanisms for wave and tidal include public grants and private equity. They tend to provide upfront capital for the deployment of pilot projects. Examples include €26 million in Ireland to more than about €285 million in the United Kingdom. There are potentially enormous exploitable energy resources available in the world's oceans. This would suggest significant potential markets for the sale of ocean energy as well as opportunities for supporting industries and services involved in the development, manufacturing, construction, installation and operation. However, uncertainty in future costs makes it difficult to estimate the scale of the opportunity and the size of the long term potential market.

The primary issue for the majority of investors is lack of confidence. Stated simply, there are no fully commercial arrays of wave or tidal devices in the water (Meygen may be considered a commercial array depending on definition), demonstrating that neither technology currently have the technical capacity to generate reliably. Wave energy development has been hampered by a lack of confidence in current existing technology concepts. The necessary infrastructures such as reinforcing electrical grid networks and deepening of ports required for the roll-out of large-scale ocean renewables are still many years from materialising. Wind energy is at a mature stage in the Atlantic and Baltic Sea. The Caribbean basin shows some potential considering complication due to hurricanes. However there is potential synergy with oil and gas supply gains. The Mediterranean sea does not show any promising market developments

Conclusion

The sustainable Blue Economy is expected to grow at pace over the next decade and offers significant opportunities for investment. Several studies have provided estimates of this growth potential. WWF has estimated that overall global ocean assets, including ecosystem services, are worth \$24 trillion and that a significant percentage of these assets will rely on healthy, productive, and resilient oceans to maintain their value. The Organisation for Economic Cooperation and Development (OECD) conservatively valued the Blue Economy's contribution to the global economy in 2010 alone at \$1.5 trillion in gross value added (GVA) terms. With an estimated three billion people relying directly on the sea for their livelihoods, and GVA set to reach \$3 trillion by 2030, the Blue Economy has the potential to outperform the global economy, in terms of both value added and employment, if managed in a sustainable manner.

However, the environmental risks or losses in natural capital resulting from unsustainable economic activity in the ocean are continuing to erode the resource base on which such growth depends. The stress and depletion of marine resources have been well-documented: acidification and warming seas are causing widespread damage; 85 per cent of fish stocks are either over-exploited or exploited to the limit; some estimate that the ocean

could contain one kilogram (kg) of plastic for every three kilograms of fish by 2025 should practices not change. Unlocking the full potential of a sustainable Blue Economy is good for the ocean and good for economies globally. Sustainable Blue Economy investment and development must be aimed, from the outset, at the transition to a net-zero emissions world, using circular economy models.

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