【欧州】【海事】

Maritime Issues - Renewable energy including offshore wind power: European Commission presents the EU Blue Economy Report 2020 of sectors related to oceans and coastal environment

Andrea Antolini Former Researcher JTTRI

【概要：Summary】

The European Commission's EU Blue Economy Report 2020 is the third edition of this type of report and includes an analysis of the development of all marine-based or marine-related economic activities. There are seven sectors that are defined as part of the EU's Blue Economy, including marine living resources, marine non-living resources, marine renewable energy, port activities, shipbuilding and repair, maritime transport and coastal tourism. The main sectors achieving gross value added results are coastal tourism, followed by maritime transport and port activities. However, while these sectors belong to the classic marine economy related sectors, it is in particular the marine renewable energy with offshore wind farms for power generation which are of increasing interest, since the EU intends to produce up to 35% of its electricity from offshore sources by 2050. Therefore, for the purpose of this article, the analysis concentrates on the results of coastal tourism, maritime transport and the offshore wind farms for power generation. These sectors have been chosen because of their overall importance based on their gross value added, as well as regarding the European Green Deal targets and as sectors strongly affected by the COVID-19 pandemic impacts.

It will be especially interesting to see how the COVID-19 pandemic has initially affected these sectors' development. According to preliminary assessment information, sectors like coastal tourism have suffered greater impacts as a result from the COVID-19 pandemic and have a slower recovery, while maritime transport and marine renewable energy are expected to have a quicker recovery after the COVID-19 pandemic crisis. The EU Blue Economy Report 2020 points out the latest development in the Marine Renewable Energy (MRE) sector, focusing on offshore wind power generation capacity of fixed and floating wind farms. The EU Blue Economy Report 2020 includes the power generation of offshore wind farms as an additional blue economy sector. It underlines the deployment possibilities of floating wind farms, allowing the wind power generation in deep-water areas.

【記事：Article】

1. The EU Blue Economy Report 2020

On 11 June 2020, the European Commission published "The EU Blue Economy Report 2020", prepared by the Directorate-General Maritime Affairs and Fisheries in cooperation with the EU's Joint Research Centre. The analysis of the EU Blue Economy sectors is based on the data collected by the European Commission through the EU Member States and the European Statistical System. This third edition of the EU Blue Economy Report 2020 provides an overview over

the development of oceans, coastal resources and the development and implementation of polices and initiatives line with the new approach for a sustainable Blue Economy. The Report is considered to support relevant initiatives and policies under the new European Green Deal and provides reliable data in order to make policy decisions.

The EU Blue Economy Report 2020 is the third of this kind of report and gives an overview of the development and the performance of the EU economic sectors related to maritime and coastal environment. The EU's Blue Economy includes all economic activities based on or related to the oceans, seas and coasts. The report defines seven sectors as part of the Blue Economy, including marine living resources, marine non-living resources, marine renewable energy, port activities, shipbuilding and repair, maritime transport and coastal tourism. However, the marine environment is not only associated with traditional activities such as fishing or maritime transport. It also includes emerging, innovative sectors like marine power generation based on wind energy. The offshore wind farms for power generation are of interest, since the EU aims at producing up to 35% of its electricity from offshore sources by 2050.

In 2018, the seven established sectors of the EU Blue Economy generated a gross value added (GVA) of €218.3 billion, which represents a 15% increase compared to 2009. 40% was generated by coastal tourism, 16% by maritime transport and 16% by port activities. While the coastal tourism in 2018, is the largest Blue Economy sector in the EU, the marine renewable energy production and transmission is currently in a strong expansion phase. The Marine Renewable energy (production and transmission) sector is growing exponentially, while still encountering challenges as wind energy production continues to be cheaper on land, which makes it difficult for offshore farms to compete. Furthermore, the lack of electrical connections of cables and grids is still a substantial barrier for offshore wind farms, which add to investment costs.

Regarding employment, in 2018, there were 5 million people working in the blue economy sector, representing a significant increase of 11.6% compared to 2017. This growth was mainly driven by the coastal tourism sector while jobs in the offshore wind energy sector have increased nine-fold in less than 10 years.

The EU supports the blue economy through various instruments. The European Fund for Strategic Investments has invested over €1.4 billion in offshore wind projects and offered also support to other parts of the blue economy. The BlueInvest Platform of the European Commission and the European Investment Fund has provided €22 million in grants in 2019 and €20 million in 2020, to innovative, starting blue economy entrepreneurs. In addition, a new BlueInvest Fund was created in 2020. Also the European Bank for Reconstruction and Development is financing blue economy projects.

2. The role of GHG emission mitigation and the European Green Deal for the blue economy

The EU Blue Economy Report 2020 also addresses the environmental dimension of the blue economy in detail. After the European Commission published the European Green Deal in December 2019, including the plan for an economy-wide transition to achieve climate neutrality by the year 2050, also maritime transport has to achieve GHG emission reduction, as part of the transport sector's efforts to achieve a 90% reduction of GHG emissions by the year 2050. Furthermore, based on the International Maritime Organisation (IMO)'s 2020 sulphur cap, maritime transport also needs to reduce its SOx emissions. In addition, a network of "green ports" is aiming at reducing the ecological footprint of these economically important hubs for maritime transport. While GHG emissions are the main contributor to global warming and climate change, the oceans play a major role in regulating the Earth's climate by redistributing and absorbing heat and by removing CO2 from the atmosphere. The oceans have absorbed the majority of the excess heat in the atmosphere

and have absorbed 20-30% of anthropogenic CO2 since the 1980s. However, this has also led to a doubling in the frequency of marine heat waves and increased acidity of the oceans.

Shipping currently represents 3-4% of global CO2 emissions and could reach 10% by 2050 if no action is taken. In order to ensure that the shipping industry will contribute its fair share to realising the temperature target of the Paris Agreement, the IMO's Marine Environment Protection Committee (MEPC) agreed in April 2018 to an initial strategy to reduce GHG emissions from international shipping. The GHG emissions should decrease as soon as possible, and reduce emissions by at least 50% by 2050 compared to 2008. The strategy represents an important first step but the EU advocated higher ambition levels. In December 2019, the European Council endorsed the objective of achieving a climate-neutral EU by 2050, and as part of the European Green Deal the Commission intends to propose an increase to the EU's 2030 GHG emission reduction target to at least -50% and towards -55% compared to 1990 levels.

However, currently, the CO2 emissions from EU related maritime transport activities remain substantial. The first data obtained from the EU monitoring, reporting and verification (MRV) system of CO2 emissions from ships over 5,000 gross tonnage showed that the 11,653 ships covered by the EU's MRV system emitted 138 million tonnes of CO2 emissions in 2018, representing about 3.7% of the EU's total CO2 emissions.

3. The COVID-19 pandemic's initial impact on blue economies

Besides the new challenges arising from the CO2 emission reduction targets, the COVID-19 pandemic has also had some impact on the blue economies. After the COVID-19 pandemic reached the EU in late February 2020 and led to lockdowns in almost all EU Member States, the subsequent economic crisis will have some heterogeneous impact across the Blue Economy sectors. The implementation of an economic policy response and measures in the EU and its Member States intend to mitigate the impacts of the COVID-19 crisis. The actions taken include the application of the general escape clause on EU fiscal rules so that national budgets can support the economy in response to the impact of the COVID-19 pandemic, among others.

Furthermore, as part of the EU budget from the ESIF (European Structural and Investment Funds) under the proposed Coronavirus Response Investment Initiative (CRII+), € 65 billion have become available, including unspent money available under the EMFF around € 2 billion. The EIB has been strengthened with a pan-European guarantee fund of €25 billion, which could support €200 billion of financing for companies with a focus on SMEs.

Moreover, on 21 July 2020, the EU Member States agreed to a historic coronavirus recovery deal to mitigate the pandemic's impacts.

Table 1: Preliminary assessment of the impact of the COVID-19 pandemic crisis on the Blue Economy

Sector	Size	Initial impact	Recovery path
Established sectors			
Marine living resources	Medium	Strong	Lagged
Marine non-living resources	Small	Medium	Prompt
Marine renewable energy	Nascent	Strong	Prompt
Port activities	Medium	Strong	Prompt
Shipbuilding and repair	Small	Medium	Lagged
Maritime transport	Medium	Strong	Prompt
Coastal tourism	Very large	Strong	Very lagged
Emerging sectors			
Blue bioeconomy	Small	Strong	Prompt
Ocean energy	Nascent	Small	Prompt
Desalination	Nascent	Small	Prompt
Maritime defence	Small	Small	Prompt
Cables	Nascent	Small	Prompt
Research and Education	Nascent	Small	Prompt
Marine observation	Nascent	Small	Prompt

Source: Commission Services.

https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/2020_06_blueeconomy-2020-ld_final.pdf

Although the maritime environment related sectors such as coastal and marine tourism and others are severely affected by the COVID-19 pandemic, the blue economy as a whole presents a huge potential in terms of its contribution to a green recovery. At the time of the EU Blue Economy Report's

publication, it was too soon to assess the full impact that the COVID-19 crisis had on the individual Blue Economy sectors. However, according to a preliminary assessment, the Blue Economy sectors expected to suffer greater impacts and having a slower recovery include coastal tourism, shipbuilding and repair among others. Sectors expected to suffer initial impacts but are expected to benefit from a rather fast recovery are maritime transport and marine renewable energy, among others.

4. Coastal tourism as a key blue economy sector

Tourism plays an important role in many EU Member State economies, with a wide-ranging impact on economic growth, employment and social development. In 2017, the EU welcomed 500 million international tourists (overnight visitors), accounting for 40% of the world's total. In 2018, just over half (51.7%) of the EU's tourist accommodation establishments were located in coastal areas for beach-related holidays. In 2018, coastal areas accounted for more than three quarters of the total nights spent in tourist accommodation across Malta, Cyprus, Greece, Croatia, Portugal and Spain. The three most popular tourist destinations in the EU, all located in coastal areas, were the Canary Islands and Catalonia in Spain and the Adriatic coastal region in Croatia. However, the increase in the number of tourists has led to concerns around the sustainable development of coastal areas.

For the purpose of the EU Blue Economy Report 2020, coastal tourism is broken down into three main expending categories: (1) Accommodation, (2) Transport and (3) Other expenditures. Overall, coastal tourism accounted for 62% of the jobs, 41% of the GVA and 34% of the profits in the EU Blue Economy in 2018. The EU coastal tourism sector in 2018 generated a GVA of about €88.6 billion, representing a 20% rise compared to 2009. Gross operating surplus was valued at €32.3 billion (+44 % compared to 2009). The sector was impacted by the global economic and financial crisis, which saw a gradual decrease in employment over the period 2009 to 2015.

However, the three years until 2018 showed a strong recovery. The EU's policy aims at maintaining Europe's position as a leading tourist destination while maximising the industry's contribution to growth and employment. As part of EU's Blue Growth strategy, the coastal and maritime tourism sector has been identified as an area with special potential to foster a smart, sustainable and inclusive Europe.

However, the recent COVID-19 pandemic has had a strong negative impact on tourism. Due to the travel restrictions, there are few new bookings for tourism services while at the same time, the industry is flooded with claims for refunds on cancellations and the non-performance of services. The European Commission and national governments are implementing measures in an attempt to mitigate the negative impact of the COVID-19 pandemic. Although the pandemic seems more under control lately, and national borders between EU Member States have been reopened for recreational travel, the true extent of the pandemic's economic impact on the coastal tourism sector remains to be seen.

5. Development in maritime transport

Currently, shipping is the most carbon-efficient form of commercial transport and plays a key role in the EU economy and trade. The main developments in maritime transport in recent years are related to the continuous increase in ship sizes for all segments (e.g. tankers and container carriers, but also cruises). This increase in the ship sizes, which aims to lower costs by reaping economies of scale, has been possible thanks to technological improvements. Moreover, more than 410 million passengers aboard cruises and ferries embarked and disembarked in EU ports in 2018, a rise of 5.6 % from 2017. While shipping is the most carbon-efficient mode of transportation, the size and global nature of maritime shipping makes it necessary for the

industry to reduce its environmental impact, in particular, in the context of the European Green Deal. The EU's maritime transport sector generated a GVA of €35.6 billion in 2018, representing an increase of 19% higher compared to 2009.

Although shipping is considered being by far the most carbon-efficient form of commercial transport, it also accounts for 2-3% of worldwide CO2 emissions and 15% of global NOx emissions as well as 13% of the world's SOx emissions. Maritime shipping, as an international transport sector, has a significant potential to support reaching climate neutrality as outlined by the European Green Deal, while the IMO is envisaging a cut of total GHG emissions from shipping by at least 50% by 2050 (compared to 2008). In order to reach this target, the sector has to considerably increase its R&D spending, and CO2 emission mitigating technologies need to be deployable by 2030. According to the Commission's Blue Economy Report 2020, the decarbonisation will require a combination of technological and operational innovations and the large-scale use of alternative fuels. Finding sustainable technological and viable solutions for reducing shipping's GHG emissions is a key challenge and no one-solution will fit all vessel types, trades and geographies. Deep-sea vessels have fewer options compared to short-sea segments and will likely rely on different solutions. Liquid Natural Gas (LNG) has been considered as a solution to complying with the 2020 global sulphur cap and as a potential transition fuel. However, according to the Blue Economy Report 2020, LNG's GHG abatement potential is rather limited. Therefore, it will need other solutions for maritime transport in order to significantly lower GHG emissions to help reaching the EU's target of carbon neutrality by 2050.

6. Marine renewable energy: The offshore wind market and floating offshore wind farms

The Marine Renewable Energy (MRE) sector includes all renewable energy sources generated at sea, including offshore wind energy and ocean energy, as well as floating solar PV. The MRE sector represents an important source of green energy, which could make a significant contribution to the EU's 2050 energy strategy. Moreover, the MRE sector could generate economic growth and jobs, while increasing the security of the EU's energy supply. According to the EU Blue Economy Report 2020, offshore wind energy is currently the only commercial deployment of a marine renewable energy with wide-scale adoption. The Blue Economy Report 2020 mentions the promising ocean technologies, which are still at the research and development stage and not yet commercially available, including wave energy, tidal energy, salinity gradient energy and ocean thermal energy conversion (OTEC). Wave and tidal energy are currently the more mature of these technologies.

In the EU, the utilisation of wind power is considered being one of the key elements to achieve the net zero carbon emission target of 2050. Regarding the offshore power generation by using wind in Europe, it started with the first offshore wind farm (Vindeby) in Denmark in 1991 and a small number of demonstration plants in the early 2000s. In 2018, the EU is the world leader in offshore wind energy, with a total of installed offshore wind power generation capacity of 22.1 GW from 5,047 grid-connected wind turbines across 12 countries. The European Commission's European Green Deal underlines that "… increasing offshore wind production will be essential, building on regional cooperation between Member States".

In 2019, 502 new offshore wind turbines were connected to the grid across 10 projects. This brought 3.6 GW of new (gross) additional capacity. In Europe, wind energy development is focused mainly on the North Sea, which has relatively shallow waters. The main EU producers of offshore wind energy are the UK, Germany, Denmark, the Netherlands and Belgium. Given the development in the construction of plants but also in being operational, the EU Blue Economy Report 2020

includes the production and transmission of electricity generated by offshore wind farms as an additional established sector.

For the purpose of this report, and due to data availability, the Marine renewable energy sector currently only comprises fixed offshore wind farms.

Regarding the size of the EU offshore wind energy (production and transmission) in 2018, the GVA generated by the production and transmission of offshore wind energy was almost €1.1 billion, a 1,276% increase compared to 2009 (€79 million).

Offshore wind turbines continue to get more powerful. On average, turbine capacity has increased by 16% every year since 2014. The sector directly employed 4,624 persons, up from 582 persons in 2009. The annual average wage, estimated at €51,570, increased compared to 2009 (€44,519).

The United Kingdom currently leads in offshore wind energy with 60% of the jobs and 48% of the GVA, closely followed by Denmark with 42% of the GVA, however, data for Germany, one of the leaders in EU offshore wind energy, were not available.

Over the past 10 years, the European Commission has invested over €300 million in ocean energy research, development and innovation (RD&I). EU research and innovation support is mainly directed at reducing the costs and increasing the performance and reliability of offshore wind. The EU is committed to further support the development of offshore wind power generation and to explore its potential.

In order to fully exploit the potential of offshore wind, the commercialisation of floating wind technology is expected to open up the market for offshore wind in the deep sea, allowing for the deployment of wind technology to take place in the Atlantic and Mediterranean Sea. By using the technology of floating offshore wind power generation platforms, more sites will become suitable for the installation of wind farms, also in deeper waters of more than 60 metres. The utilisation of floating offshore wind farms would allow an expansion of the utilisation of the up to 80% of offshore wind resources in deep water areas, which cannot be utilised by conventional bottom fixed structures.

For the regions with deeper water of 60 m depth and more, the Commission is supporting the development of floating substructures or integrated floating wind energy systems. The transition to floating offshore wind technology will not only open new markets for offshore wind energy, but also for the constructions of vessels to support its installation and operation. With a total installed capacity of 45 MW in 2019, Europe's floating wind fleet will open up the possibility to harvest the most resourceful wind energy sites in Europe.

A main distinction criterion is the floating substructure used, which provides the buoyancy and thus the stability to a floating offshore plant, such as spar-buoy, semi-submersible, tension-leg platform (TLP), Barge or multi-platforms substructures. So far, no concept prevailed over the others, however Equinor's spar-buoy concept has already been deployed in a commercial project (the 30 MW Hywind Scotland). Notably, through various instruments of EU-funding (e.g. the European Commission's FP7, H2020, NER300 programmes, the European Innovation Council's SME instrument or the co-financing of the EIB) several floating offshore wind technologies were brought from concept to a pre-commercial stage. The technology's capabilities in a deep water are again demonstrated in the case of a 2 MW floating prototype in France (Floatgen Project, generating 6 GWh in 2019) and the installation of the first of three wind turbines in December 2019 of a 25 MW floating wind farm in Portugal (WindFloat Atlantic (WFA)).

However, the main challenge for the uptake of floating offshore wind are the high investment costs, which so far can more easily be backed by major players. The next significant up-scaled project (88 MW Hywind Tampen) will be deployed by the energy company Equinor, close to the Norwegian Gullfaks and Snorre fields to meet approximately 35% of the annual power requirement of five oil and gas platforms. This would mean also an increase in

the design of the spar-buoy platforms (weight, draught and catenary length) as compared to the initial Hywind Scotland design as the project will be located 140km from shore at a water depth of about 260-300m. Quay-side assembly and maintenance in ports are only possible for floating technologies with shallow draft (e.g. barge, semi-submersible and TLP) whereas the large draft of the most developed spar-buoy systems limits these activities to deep-water ports. At a lower technology readiness level hybrid floating offshore platforms are announced (e.g. the wind-wave Katanes Floating Energy Park - Pilot) indicating the technology's capability for multiple use concepts or to other marine sectors. Further development of floating offshore wind technologies will lower costs in the sector and increase output, leading to a significant drop in the cost of energy for floating offshore wind projects. Currently, only 40 MW of floating wind capacity are operational, however, a further 300 MW are planned to be deployed between 2020 and 2022. The further increase in deployment possibilities of floating wind farms will improve the expansion of the wind energy into deep-water areas and it will also help increasing the European share of sustainable energy sources.

According to the European Commission's long-term Strategic Vision, offshore wind capacity can be expected to increase to 240-440 GW capacity by 2050.

References

European Commission: 2020 Blue Economy Report: Blue sectors contribute to the recovery and pave way for EU Green Deal. In: https://ec.europa.eu/commission/presscorner/detail/en/ip_20_986, retrieved 20 July 2020

European Commission: Blue Economy Report: Blue sectors contribute to the recovery and pave way for EU Green Deal. In: https://ec.europa.eu/jrc/en/news/2020-blue-economy-report-blue-sectors-contribute-recovery-and-pave-way-eu-green-deal, Jun 11 2020, retrieved 20 July 2020

European Commission (2020). The EU Blue Economy Report. 2020. Publications Office of the European Union. Luxembourg. In: https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/2020_06_blueeconomy-2020-ld_final.pdf, retrieved 20 July 2020

European Commission: The EU Blue Economy. In: https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/2020_06_blue_economy_infographics_hd.pdf, retrieved 20 July 2020