



# THE EUROPEAN FILES

JUNE 2017 - n°47



## BLUE GROWTH STRATEGY

# BLUE GROWTH

71%  
of the Earth surface  
is **WATER**

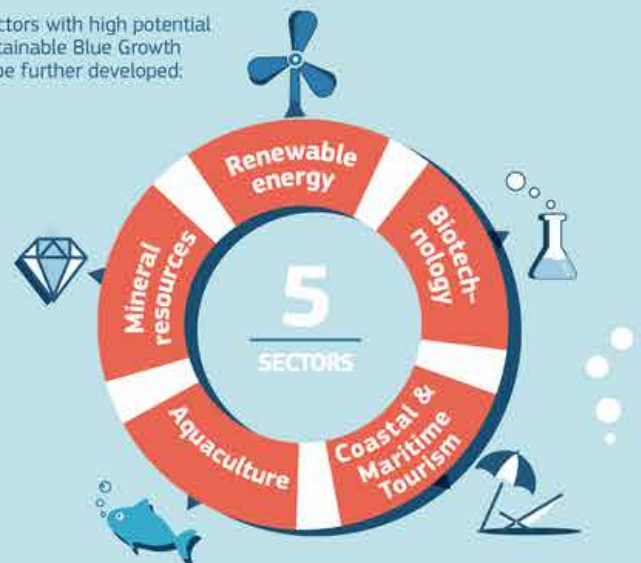
## Why?

Blue Growth is the European Commission's initiative to further harness the potential of Europe's oceans, seas and coasts for:



## Focus Area

Five sectors with high potential for sustainable Blue Growth are to be further developed:



other **sectors of the blue economy** crucial for value & jobs





## EDITORIAL

## BLUE GROWTH STRATEGY

As the strain on continental resources intensifies, the European Union (EU) is looking to the sea as a serious alternative to relieve and bolster its economy. In fact, the European Commission has already published a strategy to harness the potential of the oceans in its Blue Growth initiative. The pressures of a growing world population and the demand on natural resources that entails should be taken as an opportunity to build a more sustainable future. The further exploitation of the oceans is no light matter as it represents an immense boon to sectors across the entire economy, including key European areas such as health, security, and energy. It is therefore clear that the European institutions that are responsible for the health and security of the oceans must seriously consider the proper framework that allows industry to flourish while maintaining a high standard of sustainable development in line with the EU's vision for a carbon-free society. Furthermore, the legislation that supports fisheries, energy, and other extraction of natural resources must be pioneering and consistent. All of these considerations place the Blue Economy at the center of a sustainable future for the world.

Whether it's the OECD or the EU's very own reporting, the consensus is that the ocean represents an enormous opportunity for Europe's economy. This economy unites human activities such as shipping and transportation, fishing, and energy, in addition to a multitude of natural benefits like CO2 absorption. Within this is the realization of our dependence on a healthy ocean and its biodiversity to support further biotechnologies innovation in addition to the large carbon-friendly aquaculture. In short, as new technologies emerge, the exploitation of the oceans becomes easier and more important. This economic activity further depends on the knowledge capacity the EU is able to support. This manifests itself in a variety of ways including maritime spatial planning as

a way to ensure the efficient management of sea activities. This means reinforcing several satellite and spatial surveillance programs such as the EMSA. Whether it's monitoring human activity such as shipping channels or meteorological shifts, the efficacy of the Blue Economy will increase the demand on accurate information. The push for greater surveillance demands clear and effective legislation to ensure the appropriate sharing and usage of the information. In addition to this, the EU must consider the investment that such programs require and the options that are available to bolster their activities.

With all of the opportunity the ocean's present for Europe comes an even greater challenge as climate change and pollution change the physiognomy of the ecosystem. It is the EU's responsibility to provide a strict framework of sustainable legislation and investment. As public-private partnerships in funding are strengthened and strategic funds replenished, it's imperative that they be held at a high operational standard. Namely, any investment supported by the EU should work towards improving ocean conditions. There are aesthetic benefits that a clean ocean provides to tourism around the continent as well as long-term ecological benefits whose limits are yet to be fully outlined. Therefore, as acidification and littering continue to destroy natural fisheries, there must be a stronger consideration for alternative aquaculture in the EU's framework.

Building a sustainable approach to ocean exploitation is no easy task. The European Commission and its partners across the continent are responsible to ensure their citizens can benefit from this environmental treasure for generations to come. This issue of the European Files highlights and deepens the conversation that is driving the Blue Growth initiative.

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# The Maltese Presidency of the Council of the EU set the maritime sector as one of its priority areas



**Hon. EMMANUEL MALLIA**

*MP - Minister for Competitiveness and Digital, Maritime and Services Economy, Malta*

Approximately five years have passed since the European Commission presented its Blue Growth Communication, whereby a pan European Blue Growth strategy was established, which highlighting the potential of our oceans and seas and the need to establish sustainable policies to ensure healthy oceans. In its Communication, the Commission identified five key sectors having a high economic growth potential, namely aquaculture, coastal tourism, marine biotechnology, ocean energy and seabed mining; as well as other sector of the blue economy, which are crucial for jobs and growth, including maritime transport.

The Maltese Presidency of the Council of the EU set the maritime sector as one of its priority areas, addressing several maritime-related initiatives ranging from the hinterland to our oceans and seas. Among others, one of the key successes of the Presidency was related to initiatives and progress on Blue Growth. Malta is an ardent supporter of the Blue Growth Strategy and during the six-month mandate as Presidency successfully strived to maintain the momentum fostered over the years. Throughout the last months, the Maltese Presidency worked on taking stock of what has been achieved to-date under the Blue Growth Strategy and on identifying further actions required to address existing

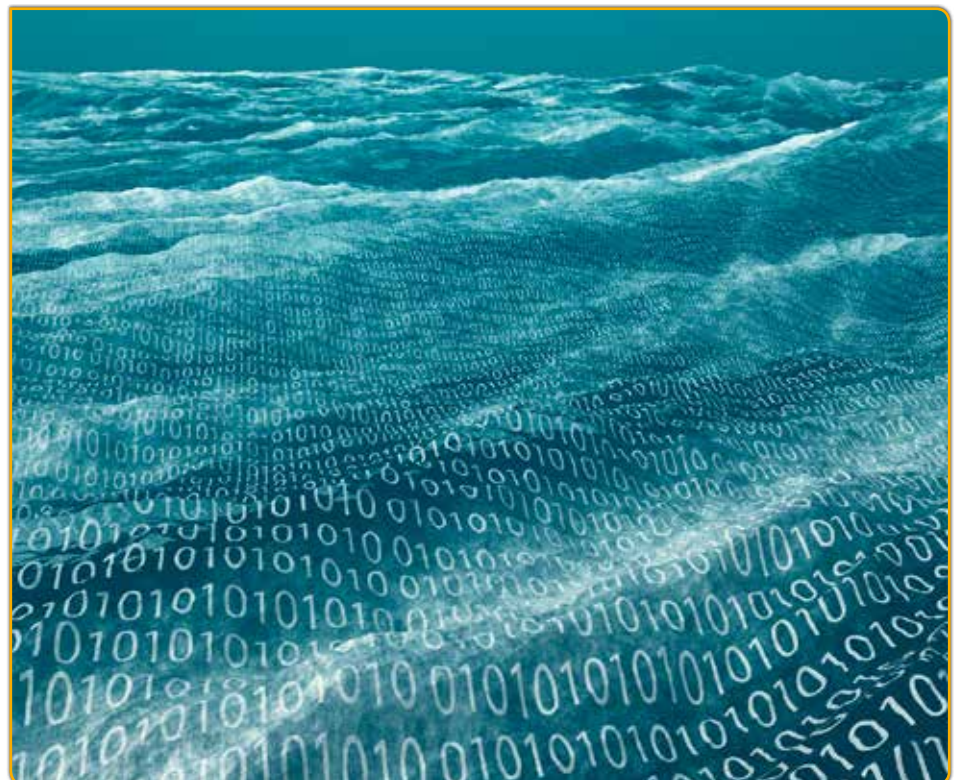
gaps and bottlenecks, to further encourage sustainable blue growth in the marine and maritime sector.

As part of its work programme on the Blue Growth, the Maltese Presidency placed the maritime transport sector high on its agenda. The transport sector is the cornerstone of the European economy and there is no doubt that transport plays an important role both with respect to the economy and society, which in turn has a large impact on growth and employment. The Presidency has acted proactively and in a forward-looking manner particularly since the EU transport policy is currently at cross roads in terms of its future outlook. The transport sector is faced with several opportunities and challenges; issues such as global competitiveness, modernization of the transport sector by embracing digitalization and de-carbonization are essential issues that need to be taken into consideration without delay. The 'Valletta Declaration' adopted in March is dedicated to the maritime transport sector and outlines priorities for the EU's maritime transport policy, focusing on

competitiveness, digitalisation and de-carbonisation. The declaration also recalls the need for advancing the digitalization of the sector and for boosting the sector's efficiency and competitiveness, while also generating new business opportunities and synergies.

The maritime transport sector is an integral part of the globalized economy and the EU shipping industry, it has always contributed to Europe's economy and has created quality jobs. During its mandate, the Presidency upheld the principle based on the fact that maritime transport is an international sector governed by the principle that global industries, such as the maritime transport industry, should be regulated at international level. Malta has continuously upheld the important role of the International Maritime Organisation and the relevant international conventions in order to ensure a level playing field. Only a competitive European maritime transport sectors regulated on an international level can secure growth and jobs.

As an island state Malta is sensitive to the specificities of insular and island regions, the





Presidency has attached great importance to connectivity and particularly the Motorways of the Sea project in order to further strengthen and work towards the completion of the Trans-European transport (TEN-T) network and thus ensure adequate intermodal maritime-based logistics chains and in turn sustainable growth opportunities.

With respect to establishing sustainable policies and to safeguard the competitiveness of the sector, the Presidency has also worked closely with Member States, the European Commission and the maritime industry to maintain the momentum to establish global action and the need to work towards the adoption, in 2018, of an ambitious initial IMO strategy on the reduction of GHG emissions from ships. In this vein, the Council Conclusions on International Ocean Governance adopted on 3 April 2017 under the Maltese Presidency acknowledged the importance of further strengthening efforts to decarbonise shipping in order to ensure that the sector remains sustainable, modern and acknowledges the threats of climate change. It is pertinent to point out that these Council Conclusions, Member States have made a number of commitments towards the sustainable use of our oceans and seas.

Another important element in safeguarding the protection of the marine environment is the further reduction of discharge of ship generated waste and cargo residue into the

sea. In this regard the Presidency has called upon the European Commission to accelerate the evaluation of the Port Reception Facilities Directive and adopt its proposal on the revision of the Directive in order to cater for recent technological updates to ensure legal certainty and address the needs of the industry.

The maritime transport sector has also embraced the importance of digitalisation from both the technical and operational aspects of the sector including, but not limited to, administrative simplification as well as energy efficiency. More effective and streamlined funding for the blue economy and its sectors is crucial in order to boost research and development in the maritime sector. Better use of existing funds, as well as improved combinations and synergies between the funding instruments available will allow for research and innovation and allow the maritime sector to fully embrace and exploit the potential of new available technologies. Improved marine and maritime research and innovation will also contribute to improving the sustainable development of this significant sector of the blue economy and achieve the objectives of the Blue Growth Strategy.

Throughout our Presidency mandate, we have acknowledged the importance of supporting jobs in this sector, to equip the blue economy workforce with the relevant

skills and qualifications and thus address the current skills gap, which will in turn boost the attractiveness of the sector and encourage future generations to consider a career in this sector.

A political debate was initiated under the Maltese Presidency to build further on the political direction that was established by the Limassol Declaration, adopted in 2012. Five years down the line, the intention of this political debate on Blue Growth is to provide a fresh political direction, and a new impetus to focus our collective efforts on existing gaps and challenges within the blue economy. This new political direction was clearly outlined through the a declaration of the European Ministers responsible for the integrated maritime policy on Blue Growth adopted in Malta together with Commissioner Karmenu Vella on 20 April 2017. The Declaration acknowledges the importance of all relevant sectors of the blue economy crucial for jobs and growth and addresses several issues such as the need to support an effective and efficient investment environment, quality of skills formation, the importance of embracing digitalisation, research and innovation, and business cooperation.



# The EU's Blue Growth Strategy

## Creating sustainable growth and employment in the marine and maritime economy



**Karmenu VELLA**

*European Commissioner for Environment, Maritime Affairs and Fisheries, European Commission*

**W**e may not often realise it, but the oceans play a vital role in the life of our planet. They produce oxygen and absorb carbon emissions, thus helping to regulate climate change. They provide us with rich and healthy food. They host an extraordinary biodiversity and a wealth of untapped resources.

Europe has a long maritime history which permeates our shared cultural heritage. And in the present day seas and oceans take centre stage again, presenting us with a number of choices and opportunities - from biotechnology and green energy to climate change and migration - that cannot be ignored. Over the next decade the blue economy is expected to become a key driver of our welfare and prosperity and, as European Commissioner for Maritime Affairs and Fisheries, it is a priority for me to make this happen.

Europe's maritime job market, for instance, has wide scope for growth. Take the boom in cruise tourism: port-of-call passenger visits rose by 22% between 2009 and 2014, generating new employment opportunities both at sea and on land. At the same time offshore wind energy, which already accounts for nearly 150,000 jobs, is calling for more human resources. These and other emerging industries, like ocean energy and marine biotechnology, are bound to require more and more specialised staff. That is why the Blue

Careers projects, funded by the European Maritime and Fisheries Fund, are helping to build the necessary skills and raise the attractiveness of the many possible "blue careers" that the ocean economy is opening up.

The European aquaculture industry also offers a great opportunity to provide a secure and sustainable supply of seafood while we leave wild fish stocks time to recover. But we have realized that a series of unnecessary rules and regulations still prevent the sector from really taking off. So the Commission is removing those barriers and has devoted one fifth of the Fund to sustainable aquaculture investments. Through consumer campaigns, we are also highlighting the high quality of products "Farmed in the EU", which meet the highest environmental, social and health and safety standards.

As oceans can be a source of innovation, we are making sure that our investment is far-sighted and that any new development stays firmly within the tracks of sustainability. Through its ambitious research programme Horizon 2020, the EU is supporting ground breaking marine research and helping to bring cutting-edge European products - from antibiotics to cosmetics - from the laboratory to the marketplace. Europe is also trailing the blaze in ocean energy as it currently hosts more the half the world's tidal stream and wave energy developers. We are making sure that we keep that competitive edge.

One way we do that is by seeking public engagement and cooperation, as we have done for example with private-public platforms like the Ocean Energy Forum and the Blue Economy Business and Science Forum. The involvement of all actors, including researchers, businesses, government authorities and civil society, is proving instrumental in identifying problems and finding viable solutions.

All the while we have set up region-specific initiatives that allow for cooperation between the countries sharing a sea basin - including when third countries are involved, as in the Baltic Sea or the Adriatic-Ionian. The BLUEMED Strategic Research and Innovation Agenda, for instance, has allowed Mediterranean countries to develop synergies and make good use of about 46 million euros of

Horizon 2020 funds for marine research (for the period 2016-2017).

In conclusion it would probably be too long for me to list here the many ramifications and initiatives of the Commission's Blue Growth strategy. Suffice it to say that many good results have been achieved in the five years since the Commission launched it in 2012. In Europe the strategy certainly sealed the mind set change that the integrated maritime policy had started ten years ago: EU governments now treat the ocean as a 'system' and agree on the importance of the blue economy. Internationally one of the merits of the Blue Growth ideas has been to move ocean issues up the international policy agenda. At the Rio+20 Summit, for the first time, the conservation and sustainable use of the oceans were put on a par with the world's other most pressing sustainability challenges. This resulted in Sustainable Development Goal 14.

I believe we may be at the dawn of a new era for sustainable ocean management, and I'm determined to ride the momentum. That is the spirit animating last year's Communication on International Ocean Governance and the conference on 'Our Ocean' that we are hosting in Malta on 5 and 6 October, where we will be seeking new alliances, this time with the corporate world.

It is undeniable that much potential remains to be harvested from the sea and we need to make sure that we do it in a sustainable manner: it is the right thing to do and frankly it is also good business. I believe it is my responsibility to take reflection forward with all the actors involved, so that, together, we can shape the next few years of blue growth.



# The future is bright blue



**Per SANDBERG**

*Norwegian Minister of Fisheries*

**P**roviding enough food for a growing population is one of the most challenging questions in our time. Blue growth is the key to a sustainable future.

The seafood industry is unique: It has a long past and an incredibly promising future. Historically speaking, fisheries have been one of Norway's most important industries. Fish became an important trading commodity in the 17<sup>th</sup> century. It has provided people with work, income and food for several hundred years.

Today Norway is ranked as the world's second largest exporting nation, supplying more than 140 countries worldwide with Norwegian seafood. The total value of our exports in 2016 amounted to 10.2 billion Euros.

As Norway's minister of fisheries, I am proud to represent an industry that produces commodities as vitally important as food. The world's population is growing, and by 2050 we expect to have nine billion individuals to inhabit the planet.

The increased world population, coupled with climate change and urbanization, makes it even more important to harvest from the sea. The Food and Agriculture Organization estimates that the world must increase food production by 70 percent by 2050 in order to meet the increase in demand.

The increase in food demand is a tremendous challenge that we must solve partly by producing seafood. The main growth in supplies of seafood will have to come from aquaculture production.

However, ocean farming needs to be developed in a sustainable way. The footprint on the environment must be at an acceptable level. As the world largest producer of farmed salmon Norway is committed to sustainable aquaculture.

Scientists believe that the potential for marine growth in Norway can be quadrupled over the next 30 years. To be able to reach this potential we need to expand our knowledge and technology. We must create new knowledge-based jobs and contribute to the necessary shift in the economy. This is a challenge, but also an opportunity.

For Norway's part, it means that we have to move from a petroleum-based economy to a knowledge-based economy. We have to use our experience in new ways. We have valuable knowledge from the oil industry that can contribute to new blue growth, one example is the development of off-shore sea-farms.

We are encouraging innovation and technological development. That is why the government recently announced special licenses for innovation projects. This is an incentive to develop and commercialize new, more environmentally sustainable technology paving the way for future growth.

The opportunities that lies in our oceans will not be realised by themselves. But we can seize the opportunities through cooperation and interaction between government, researchers, commercial actors and industry. Together we can create a bright blue future.



# How can the EU lead the way in “Blue” governance?



**Ana PAULA VITORINO**  
*Minister of the Sea, Portugal*

**B**lue Growth is a concept that is consensual and well understood by most people in Europe. We all feel we know what it means. However there is no universal definition of blue economy and sometimes we may be talking about different things, and the results of policies adopted at Member State or EU may not be directly comparable. Nevertheless, most decision makers in the EU agree that there is a great potential in terms of wealth and jobs, and a recent OECD study predicts that the output of the global ocean economy could more than double by 2030. Another important element of blue growth that became apparent in a study developed in Portugal is the resilience of these sectors of the economy. In the depths of the international financial crisis that hit Portugal, between 2010 and 2013, this study showed that in a crisis context the blue economy sectors perform much better than the Portuguese economy as a whole.

Europe should not miss this opportunity and therefore the Integrated Maritime Policy is a crucial instrument to promote integrated views and push efforts towards this objective. In 2012 the focus was in five promising sectors: Blue energy, aquaculture, coastal and maritime tourism, blue biotechnology and sea-bed mining. Along with these, we know innovation is a key element for all sectors, especially when we target overarching objectives like the reduction greenhouse gas emissions,

the increase of resource use efficiency and the reduction of our overall environmental footprint.

Ocean knowledge is also key in this equation and research and innovation are important drivers to achieve a smart blue economy. It is often said that we know more about the Moon, or Mars, than about the Ocean. Although this is difficult to quantify, it is unquestionable that we just recently have developed technology that allows us to reach greater depths. Also, only recently we started to better understand the strong links between the oceanic and the atmospheric systems. One thing is certain, we still have a lot to learn about both these dimensions, which are key to develop a truly sustainable blue economy.

Besides ensuring environmental sustainability, in the process of building a blue economy, the EU should ensure it is socially inclusive. Stakeholder's engagement in the cycle of public policy design, implementation and evaluation and multisectorial policy cooperation and coordination are key elements. In this sense the European Integrated Maritime Policy has a major role. Much has been done but there is still a long way to go.

There are two main challenges that I would like to point out. As the EU is now looking at the multiannual financial framework for the period beyond 2020, it is time to think about how to guarantee a robust level of investment in blue economy and governance. Should we have general programmes with few specific funds for ocean related issues, besides fisheries? Should we earmark projects in the context of maritime basins or not?

Secondly, another challenge to ensure the EU keeps a leading role in ocean governance matters is how to strongly engage the Agenda 2030 process in the United Nations, in particular the Goal 14 dedicated to the Ocean.

To address the blue economy we also need to guarantee a good status for the marine biodiversity and in more general terms for the marine environment. Portugal has been very involved in this process as co-facilitator of the “Call for Action” document, that was discussed in the UN Ocean Conference in June in New York.

We are planning a follow-up ministerial meeting in Lisbon on 7 and 8 September

(Oceans Meeting 2017), where high level representatives from governments across the world will discuss the state of the Ocean's health and its impacts on human health.

In terms of ocean governance and integrated policy making at national level, Portugal is also trying to set an example. We established a Ministry of the Sea dedicated to both the sectoral and crosscutting issues related with the Ocean and the blue economy.

Our National Ocean Strategy, which has been updated since its inception in 2006, is much in line with the European Integrated Maritime Policy and the European Maritime Strategy for the Atlantic Area, highlighting the areas where Portugal has competitive advantages and are of strategic interest to the EU. Renewable energies are an example of one of these areas, and we recently approved a national Roadmap for the Industrial Strategy of Oceanic Renewable Energies.

Both through national and international initiatives, Portugal is keen to spearhead the EU efforts to maintain its current leadership in the blue economy sectors, and its intellectual leadership in engaging the challenges of international ocean governance

# Developing Fair Access to International Fisheries



**Alain CADEC**

*MEP (EPP Group), Chair of the Committee on Fisheries*

**T**he European Union (EU) has established a Common Fishery Policy (CFP) in 1983. This policy has grown to become one of the most integrated policies of the Union. It has allowed growth and development for one of the most important sector of the European economy. More recently, the CFP has taken a strong turn towards Blue Growth and the sustainable management of fish stocks. The two recent reforms of the CFP, in 2002 and 2013, have significantly changed the approach of the EU regarding international fishery and its fair access.

International fisheries face important challenges and threats for European and local fishermen and the sustainable management of fish stocks worldwide. According to the European Commission, illegal, unreported and unregulated (IUU) fishing makes up for 19% of the total catches worldwide, which represents 10 billion euros every year. The IUU fishing, due to its lack of accountability, is a serious threat to the Union's efforts towards sustainable fishing and the preservation of marine ecosystems. It also affects social economic stability of coastal regions, particularly in developing countries, as it represents unfair competition for honest fishermen. The European Union is one of the main actor of the sector at the world level. It is our responsibility to fight against IUU fishing and ensure that every fisherman in the world follows common

sustainable rules, as European fleets have been doing for decades.

The reformed CFP allows for the Union to conclude different kinds of bilateral and multilateral fisheries agreements. Sustainable Fisheries Partnership Agreements (SFPAs) have been concluded between the UE and 12 third countries. They allow European fleets to fish surplus stocks in the Exclusive Economic Zone of third countries by offering financial compensation and technical help for strengthening sustainable fisheries management and control. The Northern Agreements, concluded with Norway, the Faeroe Islands and Iceland, insure joint management of shared stocks. Because IUU fishing is also largely reported in international waters, the EU cooperates with most of the Regional Fisheries Management Organizations (RFMOs). Those agencies regulates the fishing practices in large oceanic and sea areas by managing and controlling fish stocks and specific highly-migratory species like tuna. The RFMOs bring a crucial technical and regulatory help in the sustainable management of fish stock and a fair access to international fisheries.

When necessary, the EU is not afraid to use the power of its market to ensure the full compliance of third countries. The Union has adopted in 2010 a regulation creating a black list of countries that actively promote or do not combat IUU fishing practices. The list is an incredibly effective tool, as blacklisted countries lose access to the European fishing market, which is the biggest in the world. Today, only Cambodia is blacklisted and Belize, Guinea and Sri Lanka have been blacklisted and removed. But many more countries are pre-identified or identified by the European Commission, which provides guidelines for those countries to change their fishing policy. Ever since the creation of the list, most of identified third countries, like Korea, the Philippines or Ghana, have reformed their policy and engaged in tackling IUU.

The European Union is also involved in multilateral negotiations. The United Nations, with the strong support of the UE, has been a key player in combating destructive fishing practices, which notably damage seamounts or cold-water corals. In this regard, a UN conference will take place in June in New-York

on the Sustainable Development Goal n°14; the Union will need to be a key leader. Under the Food and Agriculture Organisation (FAO), the Union has also taken the leadership in conservation and sustainable fishing management through conventions and the Code of Conduct for Responsible Fisheries of 1995. Developing fair access to international fisheries also implies that the EU works with its trade partners to set up multilateral rules. At the World Trade Organization (WTO), especially after the Hong Kong Ministerial Conference of 2005, European negotiators have tried to improve the disciplines on fisheries subsidies. The unaccounted overuse of subsidies, specifically by far-eastern countries, creates unfair competition for local and European fishermen. It puts pressure on fish stocks and does not participate in a fair access to sustainable fish stocks. The incoming Buenos Aires Ministerial Conference, in December 2017 will be the right moment to find a consensus on the subject. The EU has successfully build momentum and leads the discussions. We need to continue to defend a regulated global fishery system.

Through very different tools, the European Union is working bilaterally, plurilaterally and multilaterally to promote worldwide its model of sustainable management of fish stocks. Fair access to international fisheries is a major challenge of the CFP. The European Union is committed to making sure its fleets can operate in international and third countries waters without damaging the environment or local communities. Through strict rules and effective control, EU vessels operate in full legality, transparency and responsibility. In order to tackle IUU fishing, the European Union must continue to promote its model around the world, in order to set up a truly fair and regulated international fishery system.



# The Maritime Sector and Blue Growth



**Miriam DALLI**

MEP (S&D Group) Member of the ENVI Committee

Our seas are an invaluable resource. Two thirds of our planet is covered by oceans and seas. If we manage them in a responsible manner, they can provide sources of food, medicine and energy while protecting ecosystems for generations yet to come. Given this scenario, the biggest question that Europe currently faces is - how do we manage such a potentially great and vast resource in a way that is sustainable, ecologically friendly and helps create growth and jobs? There are not silver bullets but a simple answer can help address this very pertinent question. I believe that if we had to properly tap into the Blue Economy then we can address this question in a sustainable manner.

In Europe, the blue economy represents roughly 5.4 million jobs and generates a gross added value of almost €500 billion a year. However, as former Commissioner Geoghegan-Quinn once said, we probably know more about the surface of the moon, and even Mars, than we do about the deep sea floor. In fact today, our seas are under pressure. For instance, if current trends continue, the seas and oceans that surround us will soon contain one ton of marine litter for every three tonnes of fish, and this is bound to happen in less than 10 years from now.

Marine litter is not the only global challenge that we are facing. Illegal fishing and over-fishing problems still persist in the maritime

area. More than 90% of the assessed Mediterranean fish stocks are heavily overfished; at times up to six times the mortality limit. This means one thing, more work needs to be done to prevent fish stocks from collapsing and to maximize sustainable yields in European waters.

At a time when our continent is facing economic uncertainty, I believe that we need to start actively considering our seas as an untapped potential, a resource for creating jobs.

There are 4 key issues which can ensure sustainable, long-term economic benefits and job creation within the maritime and blue economy sector. First, investment between the private and public sector which has the important role of identifying and articulating the actual market research needs and necessary projects. Investments and partnerships from non-EU countries will also reap benefits today and for generations to come through mutual goals and the protection of our seas.

Education on technology upkeep and creating a life-long learning process for the maritime work force will ensure that the skills gap in Europe are narrowed down. Research and especially collaborative research are also crucial in creating a truly innovation-friendly environment and promoting measures that can support SMEs. And lastly, EU actions should focus on strengthening the maritime economy, and generate growth in areas, which have great potential such as developing offshore renewable energy technologies or supporting research into the blue biotechnology sector.

Moreover, there are still legal gaps to fill in areas beyond national jurisdiction especially because 60 % of our oceans are beyond national jurisdictions, and therefore coordination between all Member states is needed to bridge the national-EU policies gap.

Early in 2015, the European Parliament's ITRE Committee issued a report on the need to un-tap the potential of research and innovation in the blue economy to create jobs and growth. The report included a number of proposals which provide further emphasis on the tourism sector of islands and coastal areas

in Europe, and it also gives due importance to the promotion of maritime heritage and sustainable maritime transport. All this whilst keeping in mind that the maritime economy should not grow at the detriment of our natural environment.

In this report, as a shadow rapporteur for the Socialists and Democrats I pushed for a number of issues, which were also accepted by the European Parliament. Amongst these, the idea of a maritime agency which co-ordinates maritime policies and which takes ownership of all aspects of our European seas, was taken on board. This agency should bring together all existing EU maritime and marine activities, authorities and would draw up a consistent EU action plan on the Blue Economy and induce Blue Growth.

We must also keep in mind that European waters are very diverse, ranging from the Mediterranean Sea to the Atlantic Ocean. This means that a one-size-fits all policy is not enough to tackle maritime problems and more tailor-made solutions are needed. We must ensure that European funds are not wasted or projects replicated, but on the contrary, these should help strengthen maritime regions and regional blue economy. Continued research is also essential in understanding maritime life and the effects of our actions on it.

To conclude, I believe that the blue economy and the maritime sector are two crucial parts of our economy. I sincerely hope that this sector will continue growing, further develop new technologies and new jobs, but above all safeguard our marine life in a sustainable way for future generations to enjoy.

# A single European maritime area for sustainable blue growth



**Isabelle THOMAS**

*MEP, Vice-president of the S&D Group, Vice-president of the Seas, coastal and insular areas intergroup, Member of the Committee on Fisheries*

**T**his is a unique chance for the 21st century: Blue economy is rising at the horizon of a new economic development model. With seaweed, micro-organisms or the strength of tides and waves, oceans and the seabed are starting to reveal their wealth. This wonderful treasure of biodiversity could allow us to better feed and heal ourselves, to produce organic alternatives to plastic, and to develop clean and renewable energy. The underlying potential for research is huge. And so is the perspective for job creation: in 2012 it was estimated that 1.6 million jobs could be created in Europe by 2020. This is a core asset in the current economic context.

Although these promises have been made, the sea is still not considered as it should, it should be a priority. In this perspective, a certain amount of conditions should be fulfilled.

First of all, the productivist mistakes which were made on land should not be reproduced at sea. Blue growth and ecology should be built on the foundations of sustainable use of marine wealth.

Second, a global, transversal, and truly integrated approach of the blue economy is

necessary. It must combine investments in research and innovation around bio resources, with training for maritime jobs, the support to renewable marine energy, the modernization of fishing vessels, the promotion of sustainable aquaculture, the development of port platforms, unleashing the potential of naval construction, and finally with the creation of a sector for deconstruction and depollution of vessels. This ambition must be local, national and European, with specific budgets, without which there would be no true political will.

In this adventure, Europe must play its role. It is a first role, that of a strategist and a facilitator. The importance of the single European energy and trade markets or of free movement is no more to be proven. However this is still not the case for our maritime area. Although our continent is a peninsula and our EEZ's are dependent from one-another, in European seas international and national law have to compose with one another. This unleashes fratricidal competition to the detriment of Europeans.

Today, more than 50% of maintenance operators on offshore platforms next to our coasts work under Asian contracts. It is the same for sailors aboard vessels which anchor in our harbours. Therefore, the blue economy might develop without Europeans if we don't act. We must begin by creating a European maritime legal area, a single maritime act.

The potential of job creation deriving from the Blue economy that is at stake must be well understood. There are not only job opportunities for sailors, but it is also an opportunity for the maritimisation of all traditional sectors: engineers, scientists and researchers, technicians, electricians, maintenance workers. Without a single maritime legal area, these jobs will not benefit European citizens and Blue growth will remain an unkept promise.

With a single maritime area at the scale of the Union, we would be able to adopt basic common rules. Beside a social pillar, these rules would also need to focus on the protection of the environment and marine biodiversity. The French Erika ruling would have to be transposed in European law, in order to recognize at EU level the notion of environmental damage and a chain of solidary responsibility,

permitting to incriminate freight forwarders in cases of environmental catastrophes. Our appreciation of the blue growth potential must be as wide as possible. It does not limit itself to the sustainable exploitation of marine wealth and energy. It also relies on innovation linked to better knowledge of the seas' biodiversity, of plankton, bacteria, sea-weed, corals and marine worms. Their safeguard is therefore essential, and implies that we swiftly build a maritime ecological area at EU level. This is not a pipe dream, we reached this objective with fisheries. This sector is today at the centre of a common policy and a single legal framework, especially for control. It has become a model of European integration. What are we waiting for to extend this example to all maritime sectors?

We are living a decisive moment. The EU was already shacking with the rise of nationalisms and is now threatening to disintegrate since Brexit. This is a serious warning that we mustn't ignore in order to avoid a European Trafalgar. Either we finally create a regulatory Europe which protects its citizens, its workers and its environment, but also is daring and offers the conditions for prosperity, or we will become the spectators of the sinking of the wonderful peace and prosperity project that we inherited from our ancestors. The recognition of a European maritime area is a necessary condition for our protection and for sustainable blue growth. Confronted with this great maritime ambition, we remained too often at port. Let's raise sails without waiting any longer.

# The potential of oceans and seas for new energies



**Dominique RISTORI**

*Director-General of DG Energy,  
European Commission*

Last November, the Commission adopted the Clean Energy for All Europeans package to keep the European Union competitive as the clean energy transition is changing global energy markets. It presents an opportunity to both achieve the clean energy transition and unlock the job and growth potential in Europe. It is about getting the energy system right for the next decade. This includes making the market ready for the integration of renewables and establishing a framework that supports the development of renewable energies.

This package will contribute to achieving the core objectives of the Energy Union of a secure, sustainable and competitive energy and will support the EU's global leadership role in renewables and clean technologies.

Over the last decade, the EU has been very successful in taking the first generation of renewable energy technologies, such as solar and onshore wind, to commercially competitive levels. However, the EU will have to further diversify its low-carbon technologies if it wants to meet the 2030 objectives of at least 27% renewable energies at EU-level and of reducing by 40% greenhouse gas emissions.

In this context, oceans and seas can play a key role as they are an abundant source of renewable energy which can reach significant scale of strong and continuous generation. Indeed, they have a potential of supplying at least 100GW by 2050 in Europe, which would

be enough to cover 10% of EU's electricity demand.

The implications of ocean and seas energy are far-reaching. First, by providing a reliable source of indigenous energy, they would reduce the EU's energy import dependency and will contribute to greater energy security.

Second, marine energy is also a growth sector that can spur investment in new technologies such as offshore wind, tidal streams, waves, algae and ocean thermal energy and thus provide EU companies with a competitive edge. For instance, over the recent past there has been an impressive cost reduction in offshore wind, with two successful bids last year of around 50€ per MWh both in the Netherlands and Denmark and with three recent tenders in Germany not requiring any subsidy but only relying on the wholesale price.

Great opportunities are also opening up for other technologies in the ocean and seas energy sector. In fact, the EU is already leading in the development of marine energies, hosting most of global developers (52% of tidal stream and 60% of wave energy developers). There is already great progress on the ground with projects like the La Rance tidal power station in France, which has a capacity of more than 200 MW, or the Mutriku wave power plant in Spain, which generates about 300 MWh annually. Progress is also being made in other areas: tidal stream devices are being deployed in pre-commercial farms and wave energy converters could move from a research demonstration phase to a pre-industrial phase by mid-2020s.

Similar to offshore wind, ocean and seas energy can build on the expertise that coastal shipbuilding regions have. Besides, the benefits of marine energy can have a wider geographical scope going beyond coastal areas. Indeed, the marine energy supply chain is truly pan-European, with both leading companies and supply chain SMEs spread across the EU's Member States, including landlocked countries like Austria, with long experience in hydro-equipment manufacturing. But perhaps most importantly, ocean and seas energy could provide up to 27.000 jobs by 2035.

However, despite the competitive edge and the abundance of resource, much progress remains to be done to fully exploit this potential. Until now, the EU has invested more in space than in our oceans and seas. It is time

to reverse this situation and support the development of marine energies.

To increase the efforts on this front, the Commission adopted already in 2014 a Communication on Blue Energy, which recognised the immense potential of harnessing the power of our seas and oceans. And building on that, the Commission set up the Ocean Energy Forum, a global network that gathers European industry, research communities, financiers and public authorities to explore ways to accelerate the development of this sector. Industrial initiatives have indeed a role to play in driving EU innovation and competitiveness. This led to the publication of the Ocean Energy Roadmap "Building Ocean Energy for Europe" in November 2016, which lays out a strategy and recommendations for maximising private and public investment in ocean and sea energy development in Europe. Finally, the Communication on ocean governance adopted also in November 2016 sets out actions that will help create a global level playing field for the European marine energy sector.

In addition, the Commission announced an initiative on islands as part of the enabling actions of the Clean Energy for All Europeans package which would promote the use of indigenous renewable energy, including marine energy. Indeed, EU islands are often well placed to support and test new innovative solutions and attract energy investments. And in this context, there is great opportunity for supporting the development of marine energy. This would help islands to become self-sufficient, reduce their energy generation or import costs and reduce high levels of pollution caused by the use of diesel generators. The political declaration on Clean Energy for EU Islands was signed by Member States at the occasion of the informal energy council in Malta on 18 May.

Ocean and seas energies are therefore the next generation of renewable energy which will be needed if the EU wants to meet the Energy Union's objectives of a secure, sustainable and competitive energy, in line with the 2030 energy and climate targets. The Commission is thus fully committed to accelerate the development of the marine energy sector so that it can move from a research and development stage and become a commercially viable and operational sector.



# Promote investment in the maritime sector and facilitate all types of offshore activities



**Gesine MEISSNER**

MEP (ALDE Group), President of the Intergroup Seas, Rivers, Islands and Coastal Areas Member of the TRAN Committee

1 50 years ago, Jules Verne wrote: *"The sea is everything. It covers seven tenths of the terrestrial globe. Its breath is pure and healthy. It is an immense desert, where man is never lonely, for he feels life stirring on all sides."*

Today, the ocean is far from being a desert but there is indeed life stirring on all sides. Shipping routes criss-cross our seas and oceans connecting the national and regional economies. The first transatlantic telegraph cable was replaced by more than 900.000 kilometres of fibre-optic cables spanning all over the ocean floor ensuring the instant exchange of communication and information all over the world. Globally, offshore energy will exceed 15 GW in 2017, most of it generated by European wind farms. Additionally, new technologies such as wave and tidal energy are about to make their breakthrough in the near future. Coastal and maritime tourism is among the fastest growing economic sectors in Europe, employing over 3.2 million people. Other fields like blue biotechnology are just about to establish itself as part of the blue economy. It is quite evident that the European maritime economy of the future will be driven by innovation and highly qualified professionals.

Therefore, the promotion of investment has to go hand in hand with an increase of programmes for ocean literacy and training. The maritime economy is too often associated with heavy industry, pollution or

overfishing instead of the modern character of a blue economy driven by high-tech and sustainability.

In order to unlock its full potential, there is a need for a European platform on maritime investments, facilitating innovation for maritime start-ups based on regional smart specialisation strategies. There are too few tools to facilitate the success of young entrepreneurs and maritime start-ups which are key for the competitiveness of the sector. Besides, available funding to enhance investments of maritime stakeholders is too difficult to access and spread among too many programmes from regional development, fisheries to transport. However, it is also necessary that the sector itself acts more united and coordinated as a blue economy to represent its interests.

Moreover, for the future of offshore activities maritime research is of crucial importance. Europe's research community is excellent and its scientists are among the best of the world. Still, there is a lot what needs to be done and discovered. Maritime research, however, is costly and in times of tight national budgets there have been many cuts in the last years. Therefore, we need a 'mission oceans' at European level to ensure the future of a strong maritime dimension of the new Horizon 2020 framework programme.

Furthermore, the cross-sectoral character of the blue economy is a challenge which requires an ambitious and coherent maritime governance approach, being established in 2007 with the integrated maritime policy (IMP). In the framework of a better cooperation and coordination, the EU directive on Maritime Spatial Planning was a milestone in maritime policy enhancing strategic and long-term planning within the Member State's EEZ. Developing plans and prioritising geographically one business opportunity over the other is a difficult decision but necessary to reduce conflicts in the long-term and to encourage investment in offshore activities. However, it is also crucial to look into possibilities to combine different activities such as wind farms and aquaculture or to allow, where possible, limited fishing or touristic activities in environmental sensitive areas. At the same time, in seas such as the North Sea, the dense utilisation of maritime space requires also the

close cooperation between countries. A blue growth of the maritime economy will only exploit its full potential when investments are made in a transnational logic and offshore activities are coordinated beyond national borders.

Finally, there is also a need for a European Ocean Literacy Centre, informing society about the potential but also about the environmental threats caused by climate change, marine litter or invasive species. The ocean's pure and healthy breath, which Jules Verne described 1870, has in some areas disappeared and the vast but also complex marine biodiversity is endangered. Therefore, it is necessary to work hard to achieve a good environmental status of our seas and oceans at the same time as maritime investment is promoted. This cannot be done without the support of society. Marine litter illustrates this very well. It will not be possible to tackle this issue sufficiently through directives, bans or initiatives to clean up the sea. They are useful and have to be part of the solution but consumer behaviour is even more important. Thus, initiatives on ocean literacy simply fill the gap between society, stakeholders, decision-makers and our oceans. For a great part of the society they seem to be far away, nevertheless more than forests it is our oceans regulating and affecting the climate.

Thus, promoting investments in the maritime sector and offshore activities has to be part of a broader approach of a comprehensive maritime policy. The cornerstone of this policy is a closer cooperation among all stakeholders from the industry and science to politics and the public. This cooperation is key for a strong and sustainable blue economy providing jobs, growth and health in Europe.

# Increasing investment for renewable marine energy



**Rémi GRUET**

CEO, Ocean Energy Europe

**W**hen discussing ocean energy the first question is often why we need it. We have wind, we have solar, we have biomass, why do we need more renewable energies? There are of course many answers: decarbonisation, environmental protection, energy security, grid stability... But the key one from the industry's perspective is the potential for investments, economic development both in the EU and on export markets.

## A new locally anchored primary industry for Europe

Ocean energy is a new primary industrial sector. Ocean energy devices, like other energy generating plants, are complex machines requiring a multitude of materials, components and expertise. This expertise is partly generated by device manufacturers themselves, but also largely created by existing suppliers.

The ocean energy industry will, therefore, carry the development of a supply chain covering a wide spectrum of specialisations in industry and services: from steelmaking to IT, from logistics to research.

This is a great opportunity for European businesses and jobs as Europe can capitalise on its first mover advantage in ocean energy and the fundamentally local dimension of ocean energy device assembly and deployment.

## €1bn invested in ocean energy in Europe

To date, companies have invested over €1bn in private capital to develop ocean energy devices in Europe. And the achievements are tangible: first generation full-scale ocean energy devices have been deployed in 10 European countries and the first tidal energy demonstration farms are feeding power to the grid.

Under the right conditions, almost 340 GW of ocean energy devices could be deployed around the world by 2050<sup>1</sup>. 100 GW of which in Europe alone; enough to meet 10% of the EU's power demand. Such a step up in deployment would generate over €650bn in investments globally with the annual market reaching up to €53bn<sup>2</sup>.

To unlock these investments, the ocean energy sector needs to be perceived as commercially ready and, therefore, offer a relatively good risk/reward for investments. Ocean energy devices need to demonstrate their long-term reliability through demonstration and pre-commercial ocean energy farms.

However, by their very nature, demonstration projects are difficult to finance: investors shy away from unfamiliar technologies. Those willing to take a dive require high rates of returns that drive up capital costs, sometimes by 200%.

High costs of finance have a direct impact on the cost of energy produced, making it harder to find investors, thereby completing the vicious circle.

## Achieving fit-for-purpose finance to unleash a new industry

To roll-out devices in high-CAPEX sectors, such as ocean energy, reaching financial close for early demonstration projects is the main stumbling block. An industry's capacity to attract enough investments to develop can be stalled for years if the economics of the first projects don't stack up.

The Ocean Energy Forum set up by the European Commission concentrated its efforts on just this. In October 2016, the Forum published its report and made two key recommendations to attract finance for

demonstration projects and pave the way for the development of a global industry made in EU.

## An Investment Platform for Ocean Energy

Different demonstration projects have different financing needs; one size will not fit all, neither will one financing scheme. The Ocean Energy Forum, therefore, proposes the creation of a fund where public money provides tailored investment support to bridge the gap between committed investments and total project costs.

Support could be in the form of equity, debt and/or grants. The latter could be repayable under certain conditions. Such a fund would be able to help numerous projects and spread its risks through a portfolio approach. It would also ensure the best possible use of public finance by avoiding pure grant funding where repayable instruments can be used.

The similarities between this recommendation and the concept of Investment Platforms under the European Fund for Strategic Investment (EFSI) are coincidental but striking. A vehicle for this ocean energy investment fund may, therefore, well have been identified.

The next steps will be to make it happen!

## Insuring project risks

Another idea rests on improving the risk/reward ratio for investors, by covering the risks associated with the technology and construction of the project. Risks such as under-performance, components failure or increased construction costs could be covered by a publicly-funded insurance scheme.

Similar schemes exist in commercial sectors, though not for an emerging sector like ocean energy. By covering project and technology risks, commercial financing would be easier to obtain and the cost of capital would be significantly reduced.

These are just some of the ideas identified by the ocean energy industry to use public money with maximum effect on reducing the cost of capital and leveraging private investment. As more ocean energy devices go in the water, more and more commercial investors will be attracted to the sector, giving European companies the opportunity to continue their lead towards a €650bn global industry.

<sup>1</sup> Source : IEA Ocean Energy System report 2016

<sup>2</sup> Source : Ernst & Young, Ocean Energy report 2015

# Green Policy for a Blue World



**Daniel CALLEJA ALLEJA CRESPO**

*Director-General of DG Environment,  
European Commission*

**W**e generally associate environmental sustainability with the colour green. Considering that 70 percent of the surface of our planet is made up of oceans, and given their vital role in many natural processes and the rich biodiversity they support, it could just as well be blue.

At the same time, the oceans hold great promise for future innovation, growth and jobs -- provided they stem from sustainable approaches. It has to be said that at present, the state of the marine environment in the EU is far from ideal. According to a 2015 report by the European Environment Agency on the State of Europe's seas<sup>1</sup>, while they may be considered productive, they cannot be considered healthy or clean. This is why the European Commission is working to ensure that protecting the environment and maintaining our competitiveness go hand-in-hand, for instance by developing the "green" aspects of Blue Growth and the "blue" aspects of Green Growth in parallel.

For example, the EU Marine Strategy Framework Directive<sup>2</sup> (MSFD) aims to achieve good environmental status of EU marine waters by 2020, as defined by a set of comprehensive descriptors covering all aspects of the marine environment. 'Blue' economic activity

needs to be seen in light of this environmental framework, where efforts to safeguard the marine environment provide benefits to the economic activity itself. An obvious example is the impact of marine litter on the tourism sector: who would want to swim in or look at a dirty coastline?

Under the MSFD, Member States identify the measures which need to be taken in order to achieve or maintain good environmental status in their marine waters, including the designation of marine protected areas, measures to prevent and combat invasive alien species, fisheries measures, etc. At the time of writing, 16 Member States have fully reported their measures to the Commission. Although the Programmes of Measures are still under assessment, the Commission has called for more ambitious and coherent marine strategies as a prerequisite to reaping the full economic benefits of a healthy sea.

Thankfully, this needed ambition is in sight, as the plight of our oceans is the subject of growing public attention. Two topics have in particular hit the headlines recently.

The first is marine litter. Every year, millions of tonnes of litter end up in the ocean worldwide, causing damage to the environment, the economy, and to human and animal health and wellbeing. Recognising this, the European Commission confirmed an aspirational target of 30% reduction of marine litter by 2020 as part of the EU Circular Economy Action Plan<sup>3</sup>. Combatting marine litter requires an integrated approach. That is why the Commission sees the reduction of marine litter and microplastics as a major challenge to be tackled in multiple, but connected work streams: as part of our work on Ocean Governance, through the upcoming strategy for plastics, in the rules on port reception facilities, and in the review of waste legislation under the Circular Economy action plan. We are currently assessing the measures reported by Member States aimed at tackling marine litter under the MSFD, and have stepped up work to define baselines for marine litter.

Another aspect of rising concern is the role of oceans in climate change, as raised at the informal joint Environment and Climate Council in Malta on 25-26 April. This concerns both the impact of acidification and warming water on marine ecosystems and the capacity of ocean ecosystems to store and sequester carbon. The Commissioners and ministers present recognised the importance of the issue and found that the ongoing acidification and warming militate even more strongly for a further reduction in all the other environmental pressures on the ocean.

Internationally, these issues will be addressed by two major ocean-related conferences this year. The first is The Ocean Conference in New York on 5-9 June, under UN auspices. It will address the implementation of Sustainable Development Goal 14 to conserve and sustainably use the oceans, seas and marine resources. The second will be the Our Ocean Conference, hosted by Commissioner Vella in Malta on 5-6 October. This is the fourth in a series of high-level conferences initially launched by then-U.S. Secretary of State John Kerry in 2014. In keeping with the earlier conferences, it will address four major themes: marine protected areas, sustainable fisheries, marine pollution, and climate-related impacts on the ocean. This year, for the first time it will also address the blue economy and maritime security angles of these themes, with a geographical focus on the countries around the Mediterranean, Atlantic and Indian Ocean.

These high-profile activities are welcome signs of a rising global awareness of the issues facing us in ensuring a healthy, clean and productive ocean. Together with economic actors, we need to continue working towards this goal which is in the shared interest of all.

1 EEA Report No 2/2015

2 Directive 2008/56/EC

3 COM/2015/0614



# Can Europe's seas be considered healthy, clean and undisturbed, and productive?



**Ronan UHEL**

*Head of Programme – Natural Systems and Sustainability  
European Environment Agency*

**T**he seas, Europe's seas in particular, have become busier places, driven by a combination of technological advances and an increase in our society's demand for food, energy, materials and other resources. Traditional maritime activities such as fishing have become more intensive and widespread, and the rise in global trade has driven an enormous growth in the shipping industry. Entirely new industries have also sprung up in the marine environment, including offshore wind-power and offshore production of oil and gas. On the other hand, 'seas' of marine litter, much harmful to the marine environment, become also an economic loss for coastal communities and the economic sectors dependent on the sea.

Coastlines have changed dramatically, as the growing population density and coastal economies have required a massive increase in the development of large infrastructure and housing on Europe's coastal areas. Old political barriers, for example in the Baltic Sea region, have been broken down providing new opportunities for communities to share Europe's seas; the Arctic is the most recent example. Today's huge super tankers, pipelines, and telecommunication lines across the seas bring the world ever closer. Factually, offshore activities continue to move ever farther away from the shore seeking new opportunities for exploitation of natural resources, whether it is for mining, energy, biotechnology, or

capturing fish, reaching out to commencing the exploitation of deep seas.

Combined, maritime activities have had a positive effect on Europe's economic growth and provided other social benefits. Further substantial investments are being made or planned, paving the way for the future expansion of the 'blue economy'. This 'Blue Growth', as it is called in the EU, will provide opportunities for economic revenue, trade and jobs. But how has such development affected the health of our seas and their ecosystems so far? Many of the signs we observe are worrisome, ranging from the degradation of marine ecological features, including the seafloor, to pollutions levels, invasions of non-native species and the effects of climate change by warming and acidifying Europe's marine waters. Another visible consequences of anthropogenic climate change are the shifts in marine species distribution towards more northerly (and thus colder) regions, namely of species with commercial value such as those targeted by fisheries thus affecting economic international relations.

Human activities are putting unprecedented pressure on our seas - induced and rapid changes to marine ecosystems are inexorably linked to the way we use the sea's natural capital. At times of mounting demands on the sea's natural capital, the resulting biodiversity loss and ecosystem degradation reduce ecosystem resilience. Undermining ecosystem resilience not only affects the health of our seas but also human well-being.

We must therefore act smarter with the knowledge of today to ensure resilient marine ecosystems and a sustainable blue economy in the long-term. The management of human activities in Europe's seas must follow a holistic approach, one that better protects, conserves and enhances marine ecosystem capital while meeting societal needs, and one that provides a coherent approach to maritime affairs and to increase coordination between marine-related policy areas. It focuses on issues that do not fall under a single sector and on issues that require coordination across sectors. Ecosystem-based management (EBM) offers such an approach and thus the opportunity to balance the future use of our seas with the boundaries of its bounty and intrinsic values.

These cross-sectoral issues include marine knowledge, 'Blue Growth', and maritime spatial planning. The Marine Strategy Framework Directive adopted in 2008, is the environmental component of the Integrated Maritime Policy. It is the policy tool used for setting the limits for sustainable use of marine ecosystems and resources. As such, the implementation of the Integrated Maritime Policy will encourage the ecosystem-based approach to management of our seas.

A major barrier to EBM implementation is the reconciliation of the often incompatible environmental, social and economic objectives of different actors and policies related to the use of marine ecosystems. Another key impediment to successful EBM is the complex European marine governance system currently in place. A plethora of governance forums, including those stemming from the Common Fishery Policy, the Marine Strategy Framework Directive and the recently adopted Maritime Spatial Planning Directive (part of the Integrated Maritime Policy), are discussing parts of the problem and parts of the solutions concerning the sustainable use and conservation of Europe's seas. Finally, EBM is a learning and adaptive process that can take time to deliver tangible effects in ecosystem health. A key measure for Europe's seas is the development of an adequate network of marine protected areas (MPAs). Implementing coherent and representative MPA networks is a no regret option for the safeguarding of the resilience of marine ecosystems and their ability to deliver services to people and their economies.

The success for developing an ecosystem-based management depends on the availability and quality of marine information. High quality information is critical for assessing the state and outlook of the marine environment, and the effectiveness of the policies aiming at its protection, conservation and enhancement. With unprecedented change occurring in Europe's seas, a coherent knowledge base might soon become our most valuable resource.

# A Blue Economy requires marine spatial planning – the case of Swedish municipalities



**Jessica HJERPE OLAUSSON**

Senior Maritime Expert, Region Västra Götaland, Sweden and Head of the Maritime Cluster West Sweden.

**W**hat connects regional growth with environmental legislation? A lot of grumpy faces. Too often we perceive this as a problem; on the one hand we want to have brave strategies and policies for development and growth, hoping to create more and new jobs for the future. On the other, we want to keep and manage our beautiful marine environment and make sure it doesn't deteriorate further. Sustainable growth is one of the easiest things to say and one of the most difficult things to achieve in practice.

The marine spatial planning process is one tool in the toolbox of solutions that can fill the gap between growth policies and environmental legislation and management. The MSP process has the ability to gather people around a table, mapping where different activities may take place or not and eventually agreeing (or agreeing to disagree) on a plan for future development. Mapping out where different sectors are allowed to develop may also create opportunities in how we manage different activities' effects on the environment. With a transparent physical mapping process, the impact from different activities will be made more visible. Putting a temporal scale on top of this may further help in making decisions on *where* and *when* different activities may or may not take place. In this context, the MSP process is a tool that will help look for

benefits from the overlap of different policies, strategies and legislation.

So, in a perfect world, the entrepreneur would get more long term assuredness of the preconditions for her or his business, the authorities would hopefully be forced to look into legislation needed, and public funding for research might be aimed at the areas of development that are agreed upon. Making the best prerequisites for innovation and blue growth -- right?

In Sweden, municipalities have a great responsibility when it comes to finding solutions to fill the gap between growth & development policies and environmental legislation & management. It is often at this governmental level that actual cases are tried that weighs environmental interests against the interests of development, however, in the case of *sustainable* development we want the two interests to pull in the same direction. How can we achieve this then?

The municipality is responsible for planning the municipal territory on land as well as up to 12 nautical miles into the sea from the so called baseline. This creates a physical zone where several different legislative frameworks overlap -- the Water Framework Directive, the Marine Strategy Framework Directive, the Marine Spatial Planning Directive as well as the Municipal Spatial Plan, to mention some. This makes municipalities pivotal in the marine and coastal spatial planning process. In this role, the MSP process may provide an important tool in making decisions on *where* and *when* different activities may or may not take place in regard to how they affect the environment.

Municipalities in Sweden are often small and led by part time politicians with a great number of issues on their table. They need compact and comprehensive information and they often need it fast. It then becomes important to have established means and channels for communication, ready to be summoned upon when needed. One way to make sure this knowledge and expertise is readily available is to create cooperation platforms. These types of platforms should operate with the triple helix perspective in center (and sometimes also the quadruple helix). Creating these types of platforms is a role that a regional development authority

may take, and potentially also be responsible for after its establishment. This is putting public resources to good use for both the region and its citizens and provides a space where stakeholders can come together to apply for EU-funding opportunities.

In the Region of Västra Götaland, we have spent the last decade building such a platform in the Maritime Cluster of West Sweden. A cluster in itself may also exchange ideas and knowledge with other clusters around Europe and the world, and thus may provide new knowledge, contacts and opportunities to the regional and local level.

But focusing on the *marine* coastal area is not enough. Land-sea interactions are absolutely critical when planning for development at sea. There are few, if any, maritime activities that will not need any infrastructure on land - be it roads, high voltage electricity cables, hotels, restaurants or quay space. What is being planned on land greatly effects what can be done at sea, making the case for focusing on municipalities for innovation and blue growth even stronger. There needs to be a holistic view in the marine spatial planning process if it is to guide us towards bridging the gap between growth policies and environmental management. Seeing the potential of using different policies and legislation together, and cooperating to make sure the right knowledge is provided to the right people at the right time is crucial for successful planning for blue growth and innovation in our European coastal zones.



# “Maritimization” of the world and sustainable development



**Francis VALLAT**

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*Honorary President of the “French Maritime Cluster” (founder) and the “Institut Français de la Mer”*

*President of “SOS Méditerranée”*

*President of “Expedition 7th continent”*

**T**he sea will obviously be one of the fundamental bases of the future economy, while being a powerful element of its competitiveness. This is both an extraordinary chance to face the challenge of our demography (until at least 2050 when we will be 9 to 10 billion inhabitants), and a big danger for the planet (which was the main anxiety of Captain Cousteau at the end of his life).

The current situation does illustrate this paradox. Given the current huge weight of the maritime economy first, but also given its incredibly powerful acceleration, which is due to the couple maritimization-globalization (infernal for some, prodigious for others) who is reshaping the world ....

Indeed the maritime sector is already the second activity in the world with € 1,500 billion turnover (2012 figures, which have increased since then!), but above all it is at least an increase of 1,000 bn that is expected by the early 20s (of which half coming from the new industries of the sea: Renewable Marine Energies, aquaculture, biotechnologies, desalination, deep-sea mining ...). This being confirmed by the total turnover OECD forecast of at least 3,000 billion total in 2030!

There are 50 000 ships sailing on the seas, but more important this figure has increased by more than 40% in the last 10 years,

representing more than 70% growth in cargo capacity (due to the increasing size of vessels). And the latest forecasts are still foreseeing a major medium-term growth trend.

The tonnage transported by sea was 2.6 billion tons in the 1970s, but more important it rose to 11 bn today and will reach 16 bn in the 1920s (which is not bad news since shipping is by far the least polluting transportation mode in the world per ton transported) and recalling that a container ship of 15,000 boxes (the biggest are over 20,000 nowadays) is representing a 150 kms queue of trucks on our roads!

On the fishery side, individual fish consumption has doubled, from 10 to 20 kg per person in 50 years according to the FAO. Added to the enormous population increase, this represents a 170 million tons consumption today, both from fisheries and aquaculture, whilst the latter is a majority since very recently and will continue to increase its share (which is not without raising different ecological problems, just as important, albeit different, as those raised by the situation of certain fish stocks).

There are also the cables ! More than one million have already been laid on the seabed, which carry 95% of the world's telecommunications, (ie thousands more communications than all satellites in space), but more important one is still awaiting a tremendous growth of course .

And of course we must mention the deep-sea mining, now stammering if one excludes the offshore oil tanker, but which should be strongly developing thanks to the concentrations of numerous minerals that can be found where tectonic plates meet each other in our different oceans

As far as the jobs are concerned, the maritime sector already represents 35 million direct employments but, more important, is expected to exceed 40 million in the years to come, according to the OECD.

Equally significant, if not more, is the fact that the sea is the future of the earth, tanks to the dynamically emerging maritime/ marine activities: cosmetology, pharmacy, food, research. Growing opportunities are all the more important since only only 5% of



*JulesVerne (Copyright CMA CGM)*



the underwater soil is known, and 10% of the fauna (one discovers 1600 species per year, and only 250 000 are known from an estimate of 2000,000). So far only 2 men went down into the deep seabed while 400 defeated Everest and 500 went into space!

This is of course a chance for humans, but only if the environment is respected and preserved in the long term, which is the reason why the good professionals have been fighting for the IPCC to make a complementary report on the role of Oceans in the climate machinery, and thereby for humanity.

This is all the more crucial as the sea is a fragile environment. For example, all the oceans of the world would fit in a cube of "only" 1100 kms of side! However, unacceptable quantities of waste are being dumped, mainly via the rivers, of which 35MT of plastic are a slow but sure cancer, for the fauna but also the phytoplankton ... Hence the famous gigantic continents of plastic (rather say of plastic soup) that accumulate in the 5 great gyres that are as many vortices in each of our oceans.

And then there are accidents! We know for example that the tsunami of Fukushima, beyond the nuclear disaster, spilled "at once" 5 million tons of waste of which 3 "only" sank (including Locomotives, oil tanks, etc.)

Finally, there are many other challenges and dangers for the sea: from the gigantism of the ships to the sometimes irresponsible ultra-liberalism, passing by the saturated great maritime straits etc ...

However, respect for the environment and respect for sustainable development are possible, as shown by the 20-fold division of pollution by oil tankers (despite the very large increase in flows carried over the same period), or by the disappearance of wild degassing / deballasting in European waters, and/or the creation and action of EMSA, and/or the Erika packages and/or many other measures of similar nature.. In fact, my absolute conviction is that complacency will lose, that the march towards quality is irreversible, that intellectual terrorism has changed sides and is now powerfully in favor of Sustainable Development. The time has therefore come to open our minds more positively and - obviously without lowering our guard - to fight against skepticism in order to increase the general mobilization. It is also our duty to demonstrate that this mobilization of human beings can be effective and highly efficient. Indeed, this is confirmed by the stability of greenhouse gas effect emissions after 150 years of continuous rise, and the corresponding filling of the hole in ozone (now expected by 2050 at the latest). This should be mentioned positively, emphasizing that these



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results are due to the efforts of men in recent decades, and therefore do not constitute a negation of climatic disruptions or associated evolutions.

Finally, and perhaps most importantly, we must focus on the irreversible and real change in depth of economic actors. Simply because more and more quality/clean operators are fed up with the unfair competition represented by the dirty operators. Therefore increasingly support the fight against the bad ones (greater severity, increased surveillance, heavy penalties...). Moreover, the new generations of economic leaders, and even a big part of older ones still in control, are sincerely and fully concerned with the sustainability of development.

It is so true that many of them, whether for positive reasons (preserve our planet) or negative (not destroy their reputation) would no longer take the risk of heavy investments without being sure that they will NOT significantly damage the environment. I can, for example, testify that the French and German industrialists concerned by the deep seabed, with whom I work in the frame of Maritime Clusters, will never start any real exploration or exploitation if they are not sure of the harmless impact of their activities. This is certainly not a reason to lose our vigilance, but it is certainly a reason sufficient to believe that the world is changing ... into the right direction

# No blue growth without clean oceans



**Thierry VANDEVELDE**

*Ph.D., Executive Director, Veolia Foundation*

Amongst many other actors, the Veolia Foundation has been supporting community-oriented, non-profit projects across the world since 2004. Its operating approach is grounded in high-quality partnerships and innovation, thereby encouraging the creation of high-impact and replicable models. Marine litter is one of our concerns and we welcome the fact that, by putting this topic high enough on the political agenda and developing regulatory tools, international and European institutions are paving the way toward a more comprehensive framework.

In the late 80s, the discovery of the “Great Pacific Garbage Patch” helped raise awareness on an issue that had been overlooked before: marine litter. Since then, public authorities and scientists have developed an impressive body of knowledge showing how marine pollution is closely tied to human activity, but also, in return, has an impact on human health and the economy. Indeed, it shed light on what had mostly been invisible before: not only is a vast amount of debris trapped in rotating ocean currents, known as gyres, but those materials are themselves broken down into tiny fragments which are then widely dispersed and ingested by marine life. This has potential consequences for wildlife and humans alike, as it can contaminate the whole food chain.

As is usually the case for global issues, figures and statistics can be quite contentious but they all point to big numbers: according to the European Commission, it is estimated that more than 150 million tonnes of plastics have accumulated in the world's oceans, while 4.6-12.7 million tonnes are added every year. In terms of origins, approximately 80% of marine litter is land-based and 20% sea-based, although local discrepancies shall be taken into account. Finally, we estimate that 70 to 90% of the waste found in this environment is plastic, which makes it necessary to address this particular stream as a matter of priority. While undeniable progress has been made in determining the amount and location of plastics, more details on how the debris is leaked are needed.

But what can other stakeholders such as citizens and organizations such as the Veolia Foundation do to make this operationally efficient and economically viable? As cleaning up the oceans is desirable but in practical terms challenging, tackling the problem at its very source should be given priority, by preventing debris from getting into oceans in the first place, while creating new, innovative partnerships involving all relevant stakeholders.

## 1 - Cleaning up the oceans is a necessity in the long run but will require investments and new technologies, so we should focus on smaller-scale projects as well

Today's large-scale schemes to clean up oceans are not yet practicable as most debris, especially microplastics, is distributed all around the globe. Vast sums of money and coordinated R&D will be required to develop innovative technologies in this field, but this has to be done in the long run, as debris found in oceans may contain toxic pollutants that can be widely dispersed, accumulated into biotopes, and finally passed on along the food chain.

In the meantime, inclusive smaller-scale projects can make a lot of sense to avoid future leakage and associated marine litter, but also to trigger remediation around coastal areas where water pollution has already caused damage. At the tip of Toulon Harbor, the Amphitria Water Treatment Plant (designed and built by Veolia) has been treating pollution and wastewater, leading to great improvements in water quality and helping to restore a healthy sand bed in the nearby sea. To attract back the flora and fauna that used to be so abundant, an innovative artificial



*REMORA Project: Consisting of light structures, the reef was designed to provide a habitat and protection to young aquatic life by boosting the fixation of microfauna, microflora and postlarvae, thus providing nutrients to both the fish and the seabed.*



reef was built in 2014 as an experiment called “REMORA” (sponsored by the Veolia Foundation and the Rhone-Mediterranean-Corsica Water Agency), conducted by a multidisciplinary group of partners. Three years after the launch of this program, surveys and studies made it clear that aquatic fauna and flora restoration was tangible in the harbor of Toulon. Small may not be always beautiful, but in these cases it is surely innovative, affordable and replicable!

## 2 - Tackling the problem at its source is a priority as the move toward the circular economy and resource efficiency can provide new tools

When fighting against pollution, the mantra could be: know what you are combating, then target the root cause.

As for knowledge, the European Union has dedicated substantial resources to better understanding marine litter through a set of robust studies. But all relevant stakeholders need to contribute to this daunting task. In this regard, the Veolia Foundation backed a number of expeditions called “TARA Oceans” to raise awareness of the many environmental challenges associated with the Mediterranean and to study the growing presence of micro-plastics in the sea and their probable incorporation in the food chain (previous studies targeted Climate Change and its impact on our biosphere). The results of this study, run by the University of Michigan (USA) and the CNRS Villefranche-sur-Mer Laboratory, will offer a basis for action to guide decision-makers in Mediterranean neighboring countries in dealing with this tissue. The program has also

received the backing of many multilateral institutions such as MedPAN, the Environmental Directorate of the European Commission, and the Intergovernmental Oceanographic Commission (UNESCO/IOC).

With regard to the source of marine litter, the usual suspects are poor waste and water management. Upstream measures (before a product has become waste) such as waste prevention, eco-design of products or substitution of pollutants are the cornerstones of a toxic-free environment. Nonetheless, downstream measures addressing and supporting proper waste and water treatment should not be overshadowed in the process, in line with the waste treatment hierarchy that gives priority to reuse, recycling and energy recovery (in that order). In this regard, the funding opportunities offered by the EU programme “Horizon 2020, Blue Green Innovation for Clean Coasts and Seas” represent an efficient tool to improve waste and water management in those areas.

Plastic is the poster child that epitomizes the many challenges, opportunities and pitfalls to be encountered on this road: it is as important to reduce the quantity and toxicity of it as to build required infrastructure to collect, sort, decontaminate and recycle the fraction that has become waste or to use it as fuel as a last-resort, yet valuable, option. Supporting ailing recycling markets when needed can also provide the incentive for companies to invest time, money and expertise in recycling and resource efficiency. As a company, Veolia is already taking action to address this issue by establishing a network of plastic recycling facilities, innovating to increase the recycling of plastics and collaborating in platforms such

as the New Plastics Economy with the Ellen MacArthur Foundation.

## 3 - Raising awareness and building capacity at local level go hand in hand with curbing illegal practices

The “BeMed” initiative, bringing together the Veolia and Prince Albert II Foundations, is a good example of how companies can help raise public awareness about environmental issues. Since 2006, the Prince Albert II of Monaco Foundation (FPA2) has supported initiatives in the fields of research and innovation. In March 2015, Veolia committed to undertaking concrete initiatives to reduce the impact of plastic waste in the Mediterranean. A call for micro-initiatives was made on 8 June 2016, World Oceans Day, to encourage behavioral changes in terms of plastic waste management through local capacity building and exchange of best practices. Another goal was to set up a Mediterranean network of local stakeholders actively involved in fighting against plastic pollution. This initiative is a positive story of how to share best practices and empower local communities, bearing in mind that punishing illegal practices and wrongdoings is also part of the equation.

### Conclusion:

There is a clear momentum for tackling marine littering and ocean pollution. Beyond ambitious targets and full implementation of the Marine Directive for litter, EU institutions and Member States should seize the opportunity offered by the ongoing work on the Circular Economy Package and the Strategy for Plastics to address this issue. This could be done in large part by incentivizing and investing in resource-efficient waste and wastewater management to reduce future leakage.

Involving all relevant stakeholders, such as competent authorities, companies and citizens, is key to transforming this momentum into long-lasting initiatives. While the Veolia Foundation, along with many other organizations and institutions, is working to help us gain a better understanding of the magnitude and impacts of marine litter, increasing awareness on a local scale is the ground on which replicable projects can be developed.

More information on Veolia's projects:

- REMORA:

<http://www.fondation.veolia.com/en/revitaliser-le-milieu-naturel>

- TARA Oceans:

<http://www.fondation.veolia.com/en/actions/projects/14EB1790%2Ctara-expeditions.htm>

- BeMed :

<http://www.fondation.veolia.com/en/promoting-initiatives-reduce-plastic-pollution-mediterranean>



“TARA Oceans” expedition



# How to keep Europe attractive for shipping activities?



**Karoliina RASI**

*Director Public Affairs and Communications,  
ECSA – European Community Shipowners'  
Associations*

From the different maritime sectors, the economic impact of the EU shipping industry has remained solid through the past years although many shipping companies still certainly operate in challenging market circumstances. The global recession resulting from the 2007 financial crisis caused a significant reduction in transport volume. It happened at a time when shipowners were building up their capacity in anticipation of an increase in transport demand.

There are over 50 000 merchant ships trading internationally, transporting every kind of cargo. Around 80% of world trade is carried by the international shipping industry. It brings benefits to people across the world and is the most efficient transport mode when large amounts of manufactured items or bulk transport of raw material need to be moved around, within Europe and between continents.

The world fleet is registered in over 150 nations, and manned by over a million seafarers. Out of the 516 000 seafarers employed in the EU shipping industry, 40% are EU/EEA nationals. European shipowners control 40% of the world's merchant fleet and operate shipping services all over the world. This includes trade between non EU countries such as trade between the Far East and Latin America. For many shipping companies the majority of their trade activity actually

happens outside of the EU. European shipowners thus play a key role in European and international trade and business. Moreover, in recent years specialized shipping activities have developed in connection to the offshore industry, representing an important new maritime activity.

Despite the long-lasting slow economic growth European shipowners play a key role in European trade and business. The industry continues to employ around 640 000 people, and with a high € 89 000 per worker productivity contributes an above-average amount to Europe's GDP for each worker employed. The EU shipping industry directly supported a €57 billion contribution to the GDP in 2015, which is more than sectors such as manufacturing and health care contribute. The shipping industry is an important contributor to, and facilitator of international trade in the European and global economy. Trade brings jobs, growth and improves the standard of living.

European shipping industry is clearly well positioned when we look at the sector from a global perspective. According to a recent Monitor Deloitte study on EU shipping competitiveness however, the European maritime industry is at the risk of losing ground to other globally leading shipping centres. The study compares the overall EU policy framework for shipping with policies of Singapore, Hong Kong, Dubai, Shanghai and Vancouver. The benchmark exercise is based on eight criteria: taxation and fiscal incentives, availability of professional services, regulatory, economic and political factors, skills, flag attractiveness, ease of doing business, legal framework for vessel exploitation and availability of finance.

The EU has an overall competitive regime in place for fiscal and social measures as well as quality ship registers and a strong skills base. This combination supports the current status of the EU as an attractive location for shipping activities. To develop further growth in European shipping however, the EU needs to adapt this framework into a comprehensive, globally oriented shipping policy that aims to improve the EU's competitiveness as a location for international shipping. The policy should be comprehensive by cutting across policy fields like transport, taxation and environment

and thereby cover the key competitiveness factors.

Successful shipping centres combine investment in an attractive business climate with investment in quality and skills. It is encouraging to see that the EU is in a good position and does not need a dramatic policy change. But global competition is fierce and we cannot take our position for granted. There are a number of policy gaps that should be addressed, firstly to maintain and then to enhance even further the competitive position of the EU. We have a unique momentum to do so now with the EU maritime year and plan the EU shipping strategy for the next decade.

The maritime state aid guidelines form an essential part of the EU policy framework. Legal certainty in the continuity of the guidelines is paramount. The guidelines are inherently flexible in nature and should therefore in their current format already allow for new growth opportunities of the maritime cluster and more competitiveness.

A globally-oriented EU shipping policy also involves the trade dimension. Global trade cannot exist successfully without an efficient shipping industry. Protectionism has been on the rise worldwide and there has been an increase of all types of anti-trade measures in recent years restricting access to markets and advocating unequal treatment. Europe should remain a champion of free trade. The EU plays a very positive role in supporting bilateral and multilateral free trade agreements as well as in promoting individual market access cases. EU shipowners need, maybe more than ever, continued and even increased support from the EU actors to maintain and boost the competitiveness of the EU shipping industry and to ensure EU shipping can continue to contribute to jobs and growth in the EU. The EU has a unique set of tools to secure and push a globalised, open trade agenda – to the benefit of EU shipping and beyond.

# Sustainable Blue Growth through Investment



**Bernhard FRIESS**

*Directorate A Maritime Policy and Blue Economy, European Commission*

## Double or nothing - Investing in the sea

Soon - give it a dozen years or so – we might be able to see several ocean-based technologies outperform terrestrial industries in terms of both value and employment. According to the OECD the output of the global blue economy, estimated at 1.3 trillion euro today, could more than double by 2030. Needless to say, for Europe the current 5.4 million jobs and nearly 500 billion euro per year of the maritime world would be a game changer if times two.

But this is not a game one can “play” lightly. Our continent does have the potential to increase its ocean economy, even significantly, but we must go about it with responsibility and judgement. Whatever we do in the oceans, we are doing it in a delicate environment that is as important for our welfare as economic development. We have had the far-sightedness to make preparations and take precautions quite a long time ago. Half a decade of efforts to boost marine research, equip people with the right skills and give certainty to business is now starting to bear fruit, as our most recent [report](#) show. And we have changed the way we go about maritime innovation. For the six years leading up to 2020 we have given all our funding instruments a maritime angle - mainstreaming blue growth into all.

A few examples. As the European Maritime and Fisheries Fund (€6.4 billion) helps

maritime regions to diversify their economies (for instance with the ‘Blue Careers’ action on vocational training or the ‘Blue Labs’ action in support of start-ups), Horizon 2020 spends over 260 million a year on maritime research. I will just mention here the PharmaSea project, whose discoveries might lead to new anti-Alzheimer’s drugs. Meanwhile the European Fund for Regional Development has 5.5 billion available for the blue economy - projects are ongoing to improve ports in outermost regions and minimize collisions and oil spills in the Baltic Sea. Another 2 billion come from the Cohesion Fund, which is behind the extension of the Cypriot port of Limassol. And while the Connecting Europe Facility secures year-round navigation in the northernmost regions, the EU programme for the competitiveness of small and medium sized enterprises injects over €600 000 into sustainable tourism.

Despite this all-round intervention, access to finance remains a challenge for many blue economy players. This is an area where new infrastructure is costly and paybacks are far from immediate. The European offshore wind energy industry alone needs to attract around 100 billion by 2020 to meet its deployment targets – an arduous task even for a tried and tested technology like wind power. But it is newer ideas that have the hardest time. Take other ocean renewables like tidal and wave energy: potentially huge but just at the dawn of their development cycle. Even though the EU has covered (quite well, one might add) the funding of research, investors are still needed to take those new technologies into the market. There lies the current rub.

We do have the European Fund for Strategic Investment (EFSI), which is precisely meant to fill that gap. Two years on, out of the 315 available about 3 billion are being used in favour of the blue economy: improving rail and road connections between land and ports in Spain, for example, or modernising the Balearia fleet with new dual-fuel vessels. Beyond these and a few other rather large projects, the Fund still needs to reach smaller, less established industries. Hopefully its uptake from the maritime sector will still increase in the next few months, and in the meantime the European Commission is not staying idle.

We have intensified work with the European Investment Bank and are exploring ways to pool projects around the same topic or region into packages that can be eligible for support and more attractive to investors. We are also looking at investment platforms that would combine capital from various sources and that would serve as “funds of funds”. The green shipping initiative signed last year by Société Générale is a good example of how this can work. The EU’s Connecting Europe Facility investment of €34 million is leveraged by an EIB loan of five times that amount and by private investment to make available a total of up to €500 million. This goes to support the cost of fitting or retrofitting vessels to emit less sulphur and carbon dioxide - a good way for the EU to help industry enter new markets and at the same time cushion investors against risk in new projects that support environmental policies and that would otherwise not get off the ground.

So much for the ‘preparation’. I have also mentioned ‘precautions’ and that is the other element that needs attention now. Because once we do secure the proper investments in the blue economy, we must still ensure that processes and outcomes are environmentally sustainable; that all ocean and coastal resources are managed responsibly; and that benefits are shared fairly and inclusively.

This is why at this very moment, in the run up to the UN Ocean conference in June and the ‘Our Ocean’ Conference in October (which the EU will host) we are striving to generate new commitments from both public and private actors on the conservation and sustainable use of ocean resources. We are seeking the active involvement of financial institutions and NGOs. And we are inviting business leaders to become ‘ambassadors’ for the oceans. Importantly, we are also initiating a global discussion on the *principles* that should guide any future investment in the blue economy. If the political world, the corporate world and the financial institutions agree on such sustainability principles, our October conference can culminate in a common Declaration – taking us a step closer to healthy oceans and to the economic miracle they are capable of.

# A new border for humanity



**Younous OMARJEE**

MEP (GUE/NGL), Vice-President of the Committee on Regional Development

A world is coming to an end. But who prepares the next one? We happen to be at the right time to entirely rethink the future. Solutions of the past work no longer. We must re-examine and reinvest new fields such as our oceans.

The sea is a fulcrum point which we have at our disposal to conceive this future. By adding up its maritime territories, the European Union is the world's leading maritime power. We have blue gold in our hands.

And yet, how much do we know about this vast space? 3%? 5%? In other words, close to nothing. We do not know its exact geography, its topography, its capacities or the species living there. What do we get from it? No more than what we know. The past and present role of the sea means that mapping, navigation and naval engineering are today among the most advanced sciences we have mastered. Alas, we know only the coastal bottoms and the surface of the seas. The remainder remains unknown. If today some people are pushing for exploration, it is often only in order to find fossil fuels, a concern far from the necessary energy transition.

The challenge of the 21st century is for the seas and oceans to enable the opening of a new page of human history. Geopolitics commands politics. The sea does not escape this rule. Yesterday for the control of the Suez Canal, tomorrow for access to the new maritime routes of the North, the passing of the maxi-cargos, the control of the fishing zones ... The

future of Europe cannot be thought outside this framework.

But the seas and oceans have also the capacity to serve a much larger ideal than the mere geopolitical goals inherited from past empires. The preservation of the biosphere, and therefore the survival of mankind, is intrinsically linked to the preservation of the oceans. There will not be a massive reduction of greenhouse gas emissions without the contribution of renewable marine energies. The 10 billion human beings living in 2050 will not be able to address their food needs without the resources of the sea. The same applies to access to drinking water or medical research among other.

Europe can drive this great change. From its metropolitan coast, of course, but above all by rediscovering its position and that of its islands, spread across the oceans; by becoming aware of the immensity conferred to it by overseas islands, and by replacing Europe, with the strength of its Overseas Territories and Outermost Regions, at the centre of a new revolution in human civilization. Making sustainable blue growth a reality is an opportunity to give Europe and its Member States a new direction. An opportunity to give our

youth a horizon of commitment and creative enthusiasm. It also provides us a means of weighing on the future of the planet.

While continental recipes no longer mobilize the imagination, everything that could be a possible engine of History and which is conducive in terms of sustainable development deserves our renewed attention. This is all the challenge of the recent study launched by the European Commission on the potential in terms of sustainable blue growth and the future European consortium for the mapping of the seabed in the European overseas. It is time, while opportunities for the future are losing momentum on the old continent, to redeploy them in island territories.

We can hardly imagine all that we are capable of doing and discovering in the sea. To cite but one example, it is now the "messengers of space", the neutrinos, with the Antares project that we are launching in open sea by 2400 meters of depth.

The world is an island. And the time of islands, coasts and the oceans has come. Let's arm ourselves with confidence. The taste of the future is blue like our oceans and green as our biodiversity.





# Sea and Space: an ever evolving partnership



**Leendert BAL**

Head of Department Operations  
European Maritime Safety Agency

People always have been intrigued by the *unknown* of the seas. However, these days *unknown* is less and less acceptable. For various reasons, governments want to understand what is happening in the seas surrounding Europe, but also beyond, particularly, when the interests of the European Union are at stake. The sheer size of seas and oceans are often underestimated and difficult to monitor. Therefore space systems can be of great help to cover and monitor these large areas. Quite often, space derived information is the only information available. That's why for maritime surveillance there is a logical and even necessary partnership between sea and space.

Over recent years, both domains (maritime and space) underwent a policy boost in the EU. Since the introduction of space in the Lisbon Treaty, the Commission has developed flagship programmes such as Galileo and Copernicus, making space data and services available to society at large. Within the maritime domain, initiatives like Blue Growth, the EU Integrated Maritime Policy and the EU Maritime Security Strategy have stimulated a debate on how to increase efforts in improving maritime surveillance.

Space derived data, along with terrestrial data, is collected, processed, correlated, and fused at the European Maritime Safety Agency (EMSA), and provided as a service to governmental authorities and to other EU bodies

to support maritime situational awareness (simply called the maritime picture). Through this service, operational users have the possibility to detect human activity at sea. Having access to a range of sensors is certainly beneficial however one is not necessarily better than the other - it is the combination of all that makes them powerful.

EMSA started to work in a bottom-up manner with space applications shortly after the Agency was established in 2002. In 2007 a full space-based oil spill detection and monitoring service, named CleanSeaNet, became operational and was offered to EU Member States, Norway and Iceland, to track illegal vessel discharges and to monitor accidental oil pollution. It is based on information from earth observation satellites. It became a unique service, appreciated by governments and known across the shipping industry. Since its introduction there has been a downward trend in illegal discharges in European waters, having a clear preventive effect, which is positive for the environment. Currently around 250 satellite images are delivered each month to coastal States within 30 minutes of satellite overpass, indicating whether possible pollutions were detected, to be further verified by national authorities. In some cases, the polluter can also be identified.

Ship reporting space systems are increasingly used as they are able to give global coverage. After the tragic 9/11 events in the United States, a new system was introduced via the International Maritime Organisation (IMO), called Long Range Identification and Tracking of ships (LRIT). This system, based on security concerns, can indicate at an early stage vessels heading towards a particular country (with a range of 1.000 nautical miles). Governments can exchange ship positions worldwide with a standard update of every six hours. In 2009, EMSA established, and since then has hosted, an LRIT data centre, collecting and distributing data of all merchant vessels of EU Member States falling under this reporting requirement. The system uses satellite based GPS and geo stationary communication satellites to relay the position reports.

An interesting development is the collection of AIS (Automatic Identification System) signals by satellite. A large number of vessels carry an AIS equipment, which is used

for safety of navigation for avoiding collisions between vessels and by vessel traffic services. These reports also contain other relevant information. Traditionally, the signals of vessels are picked up from vessels near shore by coastal stations. In 2010 EMSA started a successful initiative together with the European Space Agency (ESA) to explore the potential of this technology and to make space collected AIS messages available to EU Member States on a structural, global and continuous basis. Satellite-AIS information is now a highly valued data stream within the Integrated Maritime Services offered by EMSA, which was made possible by technical and financial support of ESA. The quality of data is improving, overcoming the technical challenge of the satellite capturing many AIS signals at the same time and making this data rapidly available as part of the maritime picture for Member States. Although this data has only been provided to users for a couple of years, it is already difficult to imagine the field of maritime surveillance without it.

A good example of sea and space coming together is the Copernicus earth observation programme. EMSA was appointed as Entrusted Entity of the Copernicus Maritime Surveillance Service in 2015. Responsible on behalf of the Commission, the Agency will develop and implement services until 2020. The service aims to provide timely, relevant, and targeted satellite-based information to Member States and EU bodies. Data from earth observation satellites is combined with a wide range of other data, both from EMSA systems as well as from external sources. This includes vessel identification and position information, behaviour patterns, and other intelligence from users. This programme helps to reach out to more users and to develop new and improved information services.

The space sector is dynamic and new possibilities are on the horizon. Innovation will lead to new opportunities in the short run for maritime information services, strengthening further the partnership between sea and space.

# EUMETSAT - Monitoring the global oceans from Space



**Paul COUNET**

*Head of Strategy, Communications and International Relations, EUMETSAT*

**M**ore than 70% of the Earth's surface is covered by oceans, which play a key part in shaping our weather and climate and are also a driver of the global economy.

Operational oceanography, like operational meteorology, is about delivering relevant and reliable information services to citizens and decision-makers, about the past, current and future state of the oceans. To do so, systematic and long-term observations of ocean and surface weather are needed, together with real-time processing and distribution of data products, their ingestion into ocean models – or other systems exploited by service providers – and, ultimately, the delivery of information services to users.

In many cases, end-users expect both – oceanographic and meteorological information. This calls for an integrated approach to observing systems and real-time data services.

- Satellites, like the Metop, Meteosat, Jason-2 and -3 and Copernicus Sentinel-3 spacecraft operated by EUMETSAT, Europe's Meteorological Satellite organisation, play a key role in delivering the input for such integrated data services.
- Satellites deliver continuous, long-term global observations of the physical and biological state of the ocean and of the

atmospheric parameters (wind, radiative fluxes, and precipitation) that drive its variability.

- Satellites are a unique source of highly accurate global measurements of sea state and ocean surface winds, sea level, Sea Surface Temperature, ocean colour and sea ice.

## EUMETSAT – committed to the development of operational oceanography

Operational oceanography has become a reality in Europe, thanks to the stimulus of the European Union Copernicus flagship Earth Observation programme, which has established the operational Copernicus marine Environment Monitoring Service (CMEMS).

EUMETSAT has been supporting this development for many years, through the delivery of a range of ocean products to users in the EU and EUMETSAT's Member States. This includes data and products from the Jason-2 and -3 satellites – jointly exploited with NOAA<sup>1</sup>, CNES<sup>2</sup> and NASA<sup>3</sup>, from EUMETSAT's own Metop and Meteosat satellite series, from missions of its international partners and, more recently, through the exploitation, in cooperation with ESA, of the in the Copernicus Sentinel-3 marine mission.

All marine products are extracted by EUMETSAT's central facilities in Darmstadt, Germany, its Satellite Application Facility on Ocean and Sea Ice SAF (OSI SAF) and CNES's AVISO system. They are delivered in real time via the EUMETCast satellite broadcast service and via the Copernicus Online Data Access Service CODA (<https://coda.eumetsat.int>).

EUMETSAT's role is expanding in the context of the EU Copernicus Programme and further cooperation with the United States. For example, EUMETSAT is developing the ground segment of the follow-up Sentinel-6/Jason-CS (Continuity of Service) mission implemented in partnership with ESA, NASA,

NOAA, CNES and the EU. Already, after the launches of the Jason-3 and Sentinel-3A satellites in early 2016, EUMETSAT is delivering a broad range of marine products. These data services will be enhanced in scope later in 2017 when the second Sentinel-3 is launched and further in 2021, with the improved capabilities to be provided by Sentinel-6/Jason-CS.

The ultimate aim of EUMETSAT is to combine EUMETSAT's and the Copernicus marine missions to support the development of operational oceanography in Europe, in a true, multi-decadal operational perspective, in full synergy with meteorology. The ultimate goal is to offer all service providers and users in the Member States of the EU and EUMETSAT equal access to a multi-mission marine data stream, through existing EUMETSAT dissemination channels, in order to create the broadest range of opportunities.

## A close view of ocean surfaces and cloud-free frequent observations – the contributions of current and future missions in geostationary and polar orbit

As part of the EUMETSAT Polar System, the **Metop** satellites provide global observations of sea surface wind, sea ice and sea surface temperature and collect *in situ* observations of the ocean through the ARGOS system. Global wind products, for example, provide most detailed information near the coasts, where winds are variable and high winds can generate large waves and storm surges. Ocean surface wind data are used directly or are assimilated by Numerical Weather Prediction models, which produce surface wind analyses and forecasts. These forecasts are in turn used to drive ocean models capable of forecasting sea state, storm surges, transport and dispersion of oil spills and wind-driven currents in the upper ocean. Forecasts of surface weather and ocean conditions are then used in combination to support navigation, offshore industries, fisheries, pollution control and coastal protection.

Through their frequent observations, every five to 15 minutes, EUMETSAT's geostationary **Meteosat** satellites contribute a unique potential to operational oceanography,

1 National Oceanic and Atmospheric Administration

2 Centre National d'Etudes Spatiales

3 National Aeronautics and Space Administration



particularly in the open ocean and coastal zones.

All ocean observation capabilities available on the current Metop and Meteosat satellites will be continued, enhanced and augmented with the EUMETSAT Polar System (EPS) Second Generation available in the 2020-2040 timeframe and Meteosat Third Generation (MTG), currently under development, with the first MTG-I imaging satellite expected to be operational in 2022 and the first MTG-S sounders following two years later.

### The benefits of international cooperation

The Committee on Earth Observation satellites has developed the concept of virtual constellations to coordinate missions that together meet a common set of requirements. To implement this concept, EUMETSAT has established cooperation with other operators of operational ocean satellites, in particular in China and India, to foster exchange of data and their use by the worldwide user communities. This enriches respective ocean portfolios and provides additional opportunities for the development of operational oceanography in Europe and worldwide.

For example, EUMETSAT disseminates meteorological products from Suomi-NPP to its Member States, and also provides sea surface temperature and ocean colour products from the satellite's Visible Infrared Imaging Radiometer Suite in response to Copernicus requirements.

Also, EUMETSAT users have access to ocean surface wind vector, sea state, precipitation and all weather sea surface temperature products from the HY-2 series of China's State Ocean Administration (SOA). Also, data relevant for weather forecasting, cyclone prediction, and tracking services are received via ISRO's Oceansat and Scatsat-1 mission.

### Jason-3 and Copernicus Sentinel-3 – Keeping an eye on the oceans

The **Jason satellites** are the continuation of the existing successful cooperation between

the USA and Europe, involving EUMETSAT, NOAA, CNES and NASA. High precision ocean altimeter missions deliver reference measurements of sea surface height, an essential input to the ocean forecasting models used in operational oceanography, and monitors mean sea level variations in our changing climate.

Ocean altimetry satellites deliver one of the essential inputs to operational oceanography, as they capture, on a global scale, the signature at the ocean surface of the three-dimensional structure underneath, which cannot be resolved otherwise, due to the sparse distribution of in situ observations. In fact, observations of ocean surface topography are as important as observations of surface pressure in meteorology, and are used in advanced ocean models to forecast the three dimensional ocean circulation, a major building block of any operational ocean information service. Estimates of mean sea level and its variations in space and time derived from measurements of sea surface height not only shed light on sea level rise – a major impact of climate change – but are also essential for adaptation policies in coastal areas threatened by rising sea levels.

Through their unprecedented accuracy, the Jason satellites also provide an indispensable reference for other altimeter missions such as SARAL, HY-2 - and Sentinel-3.

Jason-3 is the precursor to the Sentinel-6/Jason-CS (Continuity of Service) cooperative mission implemented by two successive Jason-CS satellites which will take over from Jason-3 after 2020.

EUMETSAT operates Copernicus **Sentinel-3**, with support from ESA, and delivers the marine mission. The ground segment implemented at EUMETSAT premises includes the Flight Operations Segment required to control and exploit the Sentinel-3 satellites, and one instance of the Data Processing Ground Segment for processing their ocean observations and EUMETSAT multi-mission ground segments.

The main objective of the Sentinel-3 marine mission is to monitor sea surface temperature, ocean colour, as well as ocean surface topography, in conjunction with the Jason-3 (and later Sentinel-6/Jason-CS) reference mission. The main products from the Sentinel-3 satellites are sea surface temperature, ocean topography, ocean colour, ocean-surface wave and sea ice products which will be ingested in a variety of models of the open ocean and coastal areas.

Applications include ocean and marine forecasting, management of marine resources and ecosystems, monitoring of water quality and pollution, sea ice charting service and ship routing.

### Jason-3/Sentinel-6 and Sentinel-3: An integrated Copernicus Ocean Altimetry Capability

Monitoring sea surface topography and mean sea level in support of operational oceanography and climate monitoring requires a virtual constellation of altimeter missions, including one reference mission. Considering the narrow, nadir viewing beam of altimeters, a constellation of at least three satellites, with different orbits and repeat cycles, is needed to provide global coverage and to sample ocean variability at scales ranging from eddies, to large gyre currents, tropical oscillations like El Niño and general circulation.

With the optimum combination of the Jason/Sentinel-6 reference altimeter missions and the altimeter mission of Sentinel-3, Europe, in cooperation with the United States, provides both the reference and the backbone of the virtual constellation expected to fulfil the requirements of operational oceanography and sea level monitoring in the next two decades.

### Data access

For the delivery of products from the Copernicus Jason-3, Sentinel-3 and -6 missions as well as from its own and relevant third party missions, EUMETSAT makes optimal use of its existing multi-mission infrastructure, accessible through its Earth Observation portal and Product Navigator, connected to the EU Copernicus portal.

To meet demanding requirements in terms of timeliness as well as to ensure data and products to a large and wide-spread group of users, EUMETSAT will rely primarily on its operational EUMETCast multicasting system. Sentinel-3 marine products will also be delivered online via the Sentinel-3 Online Data Access system accessible via the EUMETSAT Earth Observation Portal, while archived data will be accessible through EUMETSAT's data centre.

In the future, upon request of the EC, EUMETSAT will implement, together with MERCATOR Ocean and ECMWF, a Copernicus Data and Information Access System (DIAS), using innovative Big Data IT concepts – such as cloud computing, hosted processing, to facilitate further the access, among others, to Copernicus data and products.



# “From a few nascent ocean activities, new ocean-friendly industries will emerge”



**Pierre Bahurel**

CEO of Mercator Ocean

The ocean is full of surprises. It has been long known that the ocean covers 71% of the planet's surface. It has been more recently shown that the ocean plays an important role in climate regulation. And it is now becoming more and more obvious that the ocean will participate in the development of the next decade sustainable economy.

Until a few years ago, the oceans appeared to interest only a handful of specialists and small groups of experts dispersed around the world. Today, oceans are taking up an ever-increasing share of the public debate. The United Nations have organised the Ocean Conference in June 2017 with a relevant motto “Our Oceans, Our Future”, the European Union will host the fourth “Our Ocean” conference in Malta on 5 and 6 October 2017 aiming at commitments to actions for safe, secure, clean and sustainably managed oceans. After its fascinating and informative report entitled “The Ocean Economy in 2030”, the next OECD two-year project “The Ocean Economy and Innovation” will be undertaken through a series of expert workshops in October and November 2017.

Ocean now features on the agendas of major global forums, such as the COP21, COP22 climate change conferences and also G7's.

The European Union has actually the oceans on its policy agenda for a long time contributing to the increasingly vast scientific knowledge of our oceans, to marine

technology research and supporting decision-makers to take adequate actions. Copernicus is one of the two European Union flagship program. It is the European Union Earth Observation program, including the oceans within the so-called Copernicus Marine Service. The latter innovative service covers all the world's oceans and provides open and free oceanic valuable information for downstream applications. The Copernicus Marine service is a real asset for boosting the EU Blue Growth agenda towards Sustainable Oceans: offshore energy, ports, fishing, aquaculture, transport, insurance sectors now benefit from free ocean products and information ranging from meteo-ocean conditions (temperature, ocean currents, surface wind and waves) to sea water quality information (turbidity, concentration in nutrients).

The Copernicus Marine Service is designed to serve many public, for commercial and scientific purposes including major EU policies such as the Marine Strategy Framework Directive, combating pollution, protection of marine species and their protected areas, maritime safety and routing, sustainable exploitation of ocean resources, marine energy resources and climate monitoring. It serves the needs of all Member States committed to sustainable oceans. Many concrete examples of the use of the Copernicus Marine Service are already available and showcased on its web portal. To name a few, flooding prevention along the Portuguese Coast, monitoring oil spills in the North Sea, supporting aquaculture farms in the Mediterranean Sea, monitoring met-ocean conditions around wind mills farms or monitoring nearshore bathing water quality, are applications where the Copernicus

Marine Service already makes a difference. Moreover, as a real user-driven service, the Copernicus Marine Service portfolio is regularly enriched by products expected by the markets, such as wave data launched in April 2017. Tomorrow, Ocean Monitoring Indicators will contribute even better to offshore industrial development.

The EU Copernicus Marine Service is opening the way for the development of the next decade sustainable ocean economy. The private sector, counting for about 20% of the service uptake and a few Copernicus Marine Service “champion users” in each EU Member states, has already grabbed this opportunity and will more and more strengthen the blue growth in the coming years.

The EU Copernicus Marine Service supports the development of a blue market in the different Member States. Considering the relevance of marine and maritime activities in the Maltese arena, the Copernicus Marine Service is organising an event on the 27<sup>th</sup> of June to meet and inform Maltese experts, national and regional users, in the private, public and scientific sectors, about its capabilities and its innovative services.

For more information on the Copernicus Marine Environment Monitoring Service please visit <http://marine.copernicus.eu>.



# JPI Oceans: enabling blue growth through European cooperation



**Kathrine ANGELL-HANSEN**  
Director JPI Oceans secretariat

JPI Oceans brings together 21 European countries, with representatives from ministries and research funding agencies. Its vision is to enable Blue Growth and jobs whilst fostering the health and productivity of seas and oceans and addressing the pressures posed by climate change and human impacts.

In practice, JPI Oceans is providing a strategic policy platform for a long-term European approach to marine and maritime research and technology development. It adds to the value and impact of national research and innovation investments by implementing joint actions and aligning national priorities. These outcomes help develop effective policies for ocean governance with robust and independent scientific evidence to underpin the ocean-based economy.

JPI Oceans has launched a number of actions, above and beyond the traditional approach of joint calls, for testing new collaborative tools that are relevant and fit for purpose. The actions address a wide variety of topics, ranging from the ecological aspects of microplastics to deep-sea mining. Actions are lead or co-lead by a country responsible for driving the process in partnership with the other participating countries. This is showcased in the JPI Oceans actions presented below.

## I. Ecological Aspects of Deep-Sea Mining

The action on the “Ecological Aspects of Deep-Sea Mining” is testing new means to

provide integrated science evidence to policy makers to better assess impacts of deep sea mining activities elaborated in UNCLOS. Such baseline studies are required by European holders of exploration licenses from the UN - International Seabed Authority. To industry it is important that the global regulations provide a level playing field.

Core of the action is the research project ‘MiningImpact’ which resulted from the shared shiptime provided by German Federal Ministry of Education and Research (BMBF). The project is expected to improve our understanding of deep-sea ecosystems and the impact of mining thereon. The ongoing activities have not only attracted interest from the G7 Science Ministers in their Communiqué from October 2015, but the project is also delivering input into the development of the international Mining Code (set of regulations for the exploitation of polymetallic nodules in the deep seabed beyond the limits of national jurisdiction), which the International Seabed Authority is in the process of negotiating. At the 22nd Session of the Authority in July 2016, MiningImpact presented these results in order to ensure that the international deep sea mining regime is built on a solid scientific basis and the best available

knowledge. The project has been assessed and is ready to enter its second phase of implementation to secure relevant uptake and that the steps taken are fit for purpose.

## II. MarTERA ERA-NET Cofund on Marine and Maritime Technologies

JPI Oceans launched a new ERA-NET Cofund in Maritime and Maritime Technologies. The overall goal of the ERA-NET Cofund MarTERA is to strengthen the European Research Area (ERA) in maritime and marine technologies as well as Blue Growth. As a first activity, the MarTERA consortium, consisting of 16 collaborating countries, has organised and co-funded, together with the European Commission one joint call of 30 million Euro for transnational research projects. In doing so MarTERA is bringing industry and research actors together for crosscutting research and technology development. Through this transnational cooperation it is feasible to create critical mass and focus excellence on precompetitive breakthroughs, which can benefit marine and maritime industries in general and make them more competitive in the longer term.



JPI Oceans focuses on : the interactions between marine environment, climate change, and maritime economy and human activities and research in this area being enabled by ocean observation, data and infrastructure, cross cutting technologies and human capacities.

# Growing in the Blue – innovation as an asset of EU industry



**Christophe TYTGAT**  
Secretary General SEAEurope

For more than 20 years, the European shipbuilding and equipment manufacturing industry has pursued innovation as one of its main assets for competing in the global market. The sector's competitiveness and innovation are core elements of the LeaderSHIP Strategy, which maps the sector's challenges and provides a series of recommendations for the sector.

Since the mid-2000s, the European shipbuilding and equipment manufacturing industry has evolved from classical ship types to very sophisticated ships, such as cruise ships or offshore vessels (known as "high end ships") and to high-tech equipment and technologies, for commercial and defence purposes. The sector generates an annual turnover of € 91 billion, creates employment for more than 900,000 Europeans and is of strategic importance to Europe.

European shipyards and maritime equipment manufacturers contribute to the shipping industry's environmental agenda, e.g. by making the use of alternative fuels for shipping, such as Liquefied Natural Gas (LNG), a reality. Additional environmental contributions through innovative equipment and technologies are increased energy efficiency, or growing ships' safety. These innovations have been enabled thanks to strategic RDI agendas, shared with other maritime stakeholders and (financially) supported by the

European Commission. However, even more challenging tasks are ahead, at least for the next 20 years, such as the decarbonisation of shipping, digital-ready maritime logistics, Industry 4.0, the increasing need for mobility whilst ensuring a 50% CO2 reduction, or a sustainable exploitation and exploration of the seas and coastlines. This is the Blue Growth paradigm, which the sector endorses as a major EU wealth and job creation strategy.

To meet these challenges, current technologies will have to undergo major modifications and new innovative solutions will have to be established. Promising solutions including the use of fuel cells, other carbon free, non-fossil fuels, or the use of batteries for commercial ship applications (e.g. electric ships for small regional ferry routes or possibly also longer route).

The vehicles we are producing will have to adapt to a changing environment, characterised – already in 2030 – by smart cities, increased urbanisation, highly automated ports, and a truly digital market with interoperable IT systems.

These challenges will also need to be addressed in ever growing offshore activities. Specialised ships and high tech maritime equipment for sea-based industries, such as fishing, offshore and deep sea mining, will have to "plug and ply" within a growingly integrated and interconnected global environment. SEA Europe, as the voice of the European shipyards and maritime equipment industry, is working on these challenges and our sector's ability to be a front runner will the sector and Europe to remain innovative and thus competitive globally.

But to do so, more than ever before, a close cooperation between all players of the maritime industry will be essential. In addition, also common framework conditions with other sectors will have to be developed. For instance digitalisation and autonomous vehicles will require a stable and cheap "infrastructure", able to provide 24/7 broadband facilities – even in the middle of the oceans – where ships will operate along routes which may not even exist today.

Finally, to meet the industry's future challenges, Europe needs to make sure that it has the rightly educated and trained workforce, able to cope with digital systems, robotization or energy management and to quickly adapt to fast changing technologies and production and working environments.

None of the above-mentioned challenges can be achieved without the institutional support of the European Commission, Member States and the European Parliament – at all levels – ranging from adequate regulatory framework conditions to project financing.

A strong maritime sector, tapping into the potential of existing and new markets and activities, such as Blue Growth, able to meet future challenges and to adopt to ever changing circumstances with innovative solutions is a *conditio sine qua non* for the European Union to stay ahead in terms of innovation and global competition, to prosper and to create employment opportunities for the future.



# The fundamental role of fisheries in the blue economy



**Daniel VOCES DE ONAINDI**

*Acting Managing Director, Europêche*

**T**he world population grows by more than 70 million a year, steadily increasing the demand for food and jobs. Global actors seek to meet these global needs by unlocking the full potential of our oceans and seas. Indeed, 75% of our planet's surface is covered by plentiful oceans and seas which offer unique opportunities for sustainable growth and jobs. The EU fishing sector, as a key actor within the Blue Growth strategy, demonstrates how Europe's coasts, seas and oceans are not only a major source of food to secure the livelihoods of millions of European citizens but an engine for sustainable socio-economic growth.

The concept of a "blue economy" came out of the 2012 Rio+20 Conference<sup>1</sup> which emphasizes conservation and sustainable management, based on the premise that healthy ocean ecosystems are more productive and a must for sustainable ocean-based economies. Although fisheries was at the core of this international initiative, the European Union, in the Communication on Blue Growth<sup>2</sup>, did not include fisheries amongst the areas identified as priorities for investments at EU level (in view of their potential contribution to

the objectives of growth and creation of jobs within the blue economy).

Europêche believes, however, that fisheries make a significant contribution to the blue economy, since world fisheries support 170 million jobs and more than 1.5 billion people rely on marine resources for their protein intake. As regards employment, in some European coastal communities more than half of the local jobs are in the fishing sector. Regarding food security, on average, the EU fishing fleet catch almost 5 million tonnes of fish a year. That is the equivalent of 48 billion meals a year, enough to feed everyone in the European Union 96 times.

These numbers show how vital seafood is nutritionally, socially and economically, and how much we need our fishermen. They take their role as stewards of the sea seriously and there is no one more determined than the fishermen themselves to see healthy and sustainable stocks.

Now, since capture fishery production has been relatively static since the late 1980s, many believe that fish stocks are at their highest level of productivity with no room for improvement. However, the latest scientific studies<sup>3</sup> show that there is considerable room for increased profit in most of the fisheries from better management. Increased yield will come from rebuilding overexploited stocks, reducing fishing pressure on stocks that are still abundant but fished at high rates, and surprisingly from fishing some stocks harder. Particularly, there is potential to increase global fish yield by 14% with current fishing methods and to boost profit from fishing by 79%.

In order to achieve these objectives in the long-term, the fishing sector is fully committed to closely collaborate with scientists, governments and European Institutions. Particularly, with a focus to increase the number of fish stocks at sustainable levels, improve knowledge on data deficient stocks and operate within the limits set in the CFP.

Furthermore, compared to other animal protein such as beef, pork, poultry and farmed fish, wild-caught fish has a significantly lower carbon footprint. Nevertheless, the fishing industry is devoted to minimise any possible impact on the environment. For this purpose, the EU fishing sector is leading the way in innovative technology and gear development, and is taking part in a huge number of projects to improve catches, enhance monitoring and compliance and participates in voluntary ocean clean-up.

Moreover, fishermen play a fundamental role when it comes to increase the knowledge of our seas. Thanks to their partnership with scientists and governments, they facilitate growth in the blue economy, through both a better knowledge of the marine resources and a better understanding of how these can be used and marketed, in combination with respecting the highest environmental objectives and goals.

In conclusion, today's fishing sector greatly contributes to the objectives of growth and creation of jobs within the blue economy since it provides a vital source of food and nutrition, employment, trade, economic welfare and recreation. The proactive approach and commitment taking by the fishing community towards environmental, social and economic sustainability must filter down to the public and policymakers so they can see for themselves all the hard work and success the sector has achieved over the last few years.

<sup>1</sup> [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/66/288&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/66/288&Lang=E)

<sup>2</sup> (COM(2012)494 final)

<sup>3</sup> Hilborn, R., Marine Policy (2017), <http://dx.doi.org/10.1016/j.marpol.2017.02.003>

# Blue Growth and Sustainable Development



**Ricardo SERRÃO SANTOS**

*Mep (S&D Group), Member of the Committee on Fisheries*

Not many decades ago, science and politics were both claiming that the oceans were inexhaustible and untouchable or even immune to threats.

In fact, during the history of our planet there has been an amazing capacity of resilience, with the oceans playing a major role.

The problem is when a trigger, or a composite of triggers "... *changes everything*", to paraphrase the title of Naomi Klein's book on climate change. In the last 100 years mankind reached an overwhelming capacity of innovation and creativity leading to a "technological mastery of Nature". The result is population and economic growth in an unprecedented way. Since 1930 the world population increased from 2 billions to 7 billions people. A three+ fold increase. At the same time catches on fisheries increased 5 times, general consumption increased 150 times and energy/calories around 100 times.

The amount of waste is huge. The most impacting example is probably the case of plastics, which begin to be produced industrially in 1930. In 2000 we were producing globally around 250 million tons, 125 times more than in 1950. Now a days this is creating major environmental problems, including at sea and at the deep-sea. The case is so strenuous that in August 2016 at the World Geological Conference in Cape Town, South Africa, where the the International Commission Stratigraphy met to decide if the planet changed geological Era or Period. In this meeting it was agreed that planet Earth entered was not any more at the Holocene and had to entered the Anthropocene. One of the markers in discussion and vote to characterize this change are the micro-plastics in

the seabed of world oceans. A techno-fossil has been discussed and voted as one of the potential marker of change of geological Era or Period.

Global security of natural resources and the resilience of the planetary system are now in big jeopardy.

While we urgently need to invest in reliable systems of mitigation and reversion of change, we plan the so called Blue Growth, which is seen as an opportunity for Europe at a time when Europe is falling short of **economic** opportunities.

The difficulty, in fact, is to determine the scale and size of activities related with the blue economy. As it is difficult to determine with precision how large these sectors are. Current EU estimates have shown that there are around 4.5 million persons employed in marine activities in Europe. The EC believes that this number can increase by at least 1.5 million until 2020. Most important is, however, that 75% of Europe's external trade and 37% of trade within the EU is already seaborne.

These estimates demonstrate the actual significance of the blue economy, the significance of developing further the blue economy, but also the potential growth of environmental impacts.

If we measure the contribution of ocean-based sectors to economic production and employment, the global ocean economy is already very significant. Preliminary OECD calculations show that the contribution of the economy of the sea in 2010 was €1.3 trillion, or, in other words, approximately 2.5% of the global gross added value (GAV). Although offshore oil and gas accounts for one-third of the value of marine-based industries, the fact is that, still according with the same report, the largest employer is fisheries with more than a third of the total of 31 million jobs in the marine economy. In practice what does this mean? It means that the two most important economic activities in the economy of the sea, one in terms of global added value and the other in terms of employment, are two extractive industries, respectively fossil fuels and living resources.

The way that growth will be done and the jobs will be applied is fundamental. Without reliable, cooperative, scientifically informed and politically wise decisions it may lead to cumulative effects of unsustainable growth.

The Blue Strategy Communication of the EC is clearly inspired by green economy principles, as it is the recent resolution of the EP. Giving a prominent role to technology, efficiency and innovation is positive.

But what happen when urgency in growth rates outstrip efficiency gains? Efficiency and greener technologies are not always sufficient or able to break the link between environmental damage and economic growth.

As example I take the priority area of "blue renewable energies", where the only productive technology to date are the offshore wind farms. Misleading to classify them as "blue". They are just technologies developed in land and transferred to sea: moving pressure from land to sea where the energy is still from the atmosphere, but more efficient. True ocean energy like wave energy, tide energy or ocean thermal energy are still in their pre-history facing successive drawbacks and difficult challenges.

"Blue Growth" cannot encompass all ocean-related industries in a simplistic way. Blue Growth has to go hand-in-hand with sustainable development based on a **precautionary approach**, scientific knowledge and environmentally friendly innovation. While the last two appear in the original communication of the EC concerning Blue Growth, the precautionary concept is absent in explicit form.

Therefore, it is not possible simply to increase economic activity in the "blue growth", while not setting limits for certain indicators and targets of "Good Environmental Status". The Marine Strategy Framework Directive is thus the most important framework to measure when thresholds are reached, and activities have to be disciplined.

Blue Growth is not just investment or ocean-related industries. Blue Growth has to be a strong commitment to sustainability and ethics. If we are able to soundly bring together entrepreneurship and economic wisdom, fair social distribution of earnings and opportunities, such as employment, while respecting environmental barriers and even moral issues, then and only then, we may speak about Blue Growth. It is not just a question of geography or marketing. Blue growth is a matter of quality and future. We want to make sure that sustainable development is not just word added to every political speech. To do that, we also have to be creative, imaginative and daring.

# How innovative tools in Cohesion Policy boost blue growth



**Constanze KREHL**

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European seas and coasts are important drivers for the European economy, for the creation of jobs and growth. The European Structural and Investment Funds (ESIFs) provide a major contribution to the so-called “blue growth”.

The European Fund for Regional Development (ERDF) in particular supports innovation, businesses, the development of sustainable tourism, the protection of biodiversity and renewable energy. Over 5 billion euros from the ERDF budget goes into the blue economy in the current funding period (2014-2020). The European Social Fund (ESF) also offers important investments for the coastal regions. The ESF is a key driver for human capital development in the maritime sector. It invests in training, entrepreneurship and business creation specialising in maritime affairs. It also helps to achieve social inclusion in fisheries communities. The Structural Funds therefore represent key complementary measures to those implemented by the European Maritime and Fisheries Fund (EMFF).

The impact of these Funds can especially be enlarged when used in combination. After all, the possibilities for complementarities and synergies have been strengthened for this funding period, and the European Parliament has fought hard to have these principles

enriched in the legislation. Therefore, the possibilities for coordination between Funds and multi-funding should be exploited on the ground.

The 2014-2020 funding period broad also another important new element that can leverage the impact of ESI-Funds: the new territorial development tools. The so-called Integrated Territorial Investment (ITI) and the Community-Led Local Development (CLLD) can be used in all regions, including coastal ones. CLLD is based on the LEADER experience on community-led local development put in place from the early 90s. This tool has a strong bottom-up approach, which aims to strengthen synergies between local actors, while targeting the specific needs of a local area. ITI forms a key element when implementing integrated territorial strategies. It brings together funding from several priority axes of one or more operational Programmes. These tools were embedded into the regulation governing all funds, the so-called Common Provisions Regulation. The European Parliament affirmed these tools’ strong role in furthering territorial cohesion in a resolution last year. It thereby encouraged Members States to increase the use of CLLDs and ITIs as well as the European Commission to help provide additional guidance and disseminate best practices for the effective set-up of these innovative tools.<sup>1</sup>

Specifically CLLDs in the form of Fisheries Local Action Groups (FLAGs) have proven to be effective tools in addressing the challenges of fisheries areas. FLAGs are strong tools for local empowerment of fisheries communities. So far over 270 FLAGs were approved and more are planned. In Germany 6 Länder (Niedersachsen, Schleswig-Holstein, Sachsen, Bayern, Bremen and Mecklenburg-Western-Pomerania) have successfully set up all of their planned FLAGs (29 in total).

Much more however needs to be done to take better account of the different needs of fisheries areas and to further develop know-how within FLAGs. Therefore, increasing visibility, communication and the exchange of best practices is key - a concern in general for the ESI-Funds that can hopefully be remedied already for this funding period through the changes that are envisaged in the context of the Omnibus procedure. The Committee on Regional Development in the European Parliament has just voted on its opinion and is awaiting the start of the negotiations with the Council to make the changes for the positive happen to Cohesion Policy in this regard.<sup>2</sup> Looking ahead, a strong Cohesion Policy will be needed with an appropriate budget to tackle future challenges, including those affecting the maritime sector, and to achieve the Union’s goal of social, economic and territorial cohesion.

<sup>1</sup> European Parliament resolution of 10 May 2016 on new territorial development tools in cohesion policy 2014-2020: Integrated Territorial Investment (ITI) and Community-Led Local Development (CLLD).

<sup>2</sup> Opinion of 27.04.2017 on the proposal for a regulation of the European Parliament and of the Council on the financial rules applicable to the general budget of the Union and amending Regulation (EC) No 2012/2002, Regulations (EU) No 1296/2013, (EU) No 1301/2013, (EU) No 1303/2013, EU No 1304/2013, (EU) No 1305/2013, (EU) No 1306/2013, (EU) No 1307/2013, (EU) No 1308/2013, (EU) No 1309/2013, (EU) No 1316/2013, (EU) No 223/2014, (EU) No 283/2014, (EU) No 652/2014 of the European Parliament and of the Council and Decision No 541/2014/EU of the European Parliament and of the Council.



# Algopack the new plastic for clean oceans



**David COTI**

*CEO of Algopack*

Starting from a dramatic fact that 450 kg of plastic or nearly half of a ton finishes its life in the oceans every single second and certainly more than the double in nature as a whole, ALGOPACK has decided to act.

It is between 15 and 30 million tons per year or 5 to 10 % of the worldwide plastic production which contributes to form the Seventh continent and finally kill the ecosystem!

**ALGOPACK offers a solution for reducing pollution from fossil fuels plastics, on land and in the oceans.**

Since 2010, the French Brittany based start-up has one target: Replacing plastic from petroleum by a renewable and virtuous resource: Seaweed

The company has partly won its bet with the ALGOBLEND and fully thanks to the ALGOPACK ranges of granulate.

ALGOBLEND as its name indicates is a blend, a mix between a Polypropylene or Polyethylene matrix and a biobased seaweed part which reduces the percentage of petrol in the compound.

ALGOBLEND has the great advantage to be transformable with the tools of the traditional plastics industry for example Injection molding or extrusion molding. At a lower temperature less energy is needed for the same production productivity. We work on formulas to be able to be blown molded or

roto molded compatible for film production or yogurts pots to take concrete examples.

Algoblend is to be reusable and recyclable due to its petro sourced matrix which can also be an already recycled "PP" Polypropylene or "PE" Polyethylene.

According to the application we are able to reduce from 20 to nearly 50% of the old polluting plastic.

Each application has its own characteristics and specifications which means a unique ALGOBLEND formula. In deed you don't produce coffee cups with the same plastic granulate as a pair of sunglasses or cotton buds. This means huge R&D work to fit exactly the application demand in terms of strength, smoothness; transformation process and of course compatibility with food ingredients, kids use for toys application or cosmetics. ALGOBLEND can be tinted in the mass which allows a wide range of colors possibilities.

The target has been to reach a fully biodegradable and compostable Algoblend in a near future. It is not a dream anymore; it is coming true thanks to a PLA Matrix (Poly Lactic Acid). **Poly lactic acid (PLA)** is biodegradable and bioactive thermoplastic aliphatic polyester derived from renewable resources, such as corn starch, tapioca roots, chips or starch, or sugarcane. In 2010, PLA had the second highest consumption volume of any bioplastic of the world. Coupling PLA and Seaweed gives us hopes to get a granulate with

interesting properties at a fair market price of around 2 Euro/KG.

Our focus on seaweed led us understand that the sugars produced by seaweed when growing could be the third generation raw material to produce PLA at an even more competitive price than the blend.

ALGOPACK is a 100% vegetal biobased material. The target here is to get quick degradability as the main property. We can compare it to the beginning of century bakelite as it is opaque and inflexible. It offers a more limited range of application than ALGOBLEND but a very big evolution in the plastic consumption. ALGOPACK is a patented real revolution in the world of materials as it is a full cradle to cradle product. At the end of the life cycle, the material is fully compostable and becomes a natural fertilizer.

As to transform the ALGOPACK granulates we need to process through thermo forming with a well kept protocol; we produce directly the finished goods; for example flower pots, toys for porks, cartridges for explosives and fireworks and USB devices. Some other projects have been developed like funeral urns for regions and countries linked to sea (Brittany, islands...).

We will need to continue the wide investment program to be able to transform ALGOPACK through injection molding process to make it flexible and to give it transparency or as a first step translucent.



ALGOPACK's drive is: Thanks to seaweed it is less plastic!

For their growth, seaweeds need neither fertilizer nor pesticide and they don't need external amounts of water. They absorb and convert CO<sub>2</sub> into sugar for growth and release oxygen, thus promoting the development of plankton. To respect the biotope at its maximum we consider only the use of seaweeds coming from industrial wastes, invasive families for example sargassum and seaweed coming from culture. The biggest challenge in our seaweed sourcing is to find industrial amounts in Europe when 99% of the worldwide cultures and consumptions are in Asia. In Europe seaweed is still unknown even if applications in pharmacology, cosmetics, food, green fertilizers are growing fast.

Plastics are a major contributor of pollution, yet our society is dependent on plastics, in much the same way we are dependent on fossil fuels. Bio-plastics and Eco-plastics have been in development and are making progress, but petroleum based plastics are still the most widely used and easiest to mass produce. Plastics that degrade faster, and do so in a sustainable way, are what is needed in our society.

Although laws against pollution are becoming more standard, society should not rely on laws to dictate their behavior on this

matter. It should be conscious and willing decision to consume less, and to consume responsibly. Through awareness campaigns, volunteer cleanup efforts, and being aware that we, as consumers, are the driving force behind the corporations that produce the pollutants, the marine pollution problem can still be adverted.

As we feel a strong awareness from industries to use greener materials for products and packaging due to the rise of the demand from the customers we still face a major obstacle in the development of all biomaterials in the industrial production lines: the price!

98% of people are ready to consume greener and better for the environment but only at the same price. As soon as there is a mark-up to be paid the interest falls drastically due to the difficulties of purchasing power.

The ultimate and absolute target for ALGOPACK and all the actors of the biomaterial industry is to be able to offer a 100% biobased material with the same characteristics as a petro sourced plastic at the same price and of course at an industrial scale! This is where goes all our energy for our 5 years plan as we think that one of the solutions comes from the ocean thanks to marine seaweed.

[www.algopack.com](http://www.algopack.com)





# Integrated production models for aquaculture and blue growth



**Stella TSANI**

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**Phoebe KOUNDOURI**

Founder and Scientific Director of ICRE8<sup>1</sup> and Professor at the Athens University of Economics and Business

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It is often the case that aquaculture management aims for output maximization rather than profit maximization. This tactic can be economically inefficient but may also be associated with social and ecological risks. Aquaculture depends directly, but also impacts, on the availability and quality of the marine resources and on the environment. It also interacts with socio-economic parameters in a way that the costs and the benefits of aquaculture extend beyond monetary expenditures and revenues. In order to achieve the goals of efficient and sustainable aquaculture development and blue growth, both the ecological and socio-economic impacts of aquaculture should be identified and monetized, and explicitly incorporated in the aquaculture production and management decisions.

There is a general consensus among policy makers and resource managers that the sustainability of ecological and economic systems is tightly coupled. Nevertheless the interaction among the latter is complex and it makes informed resource decision-making extremely difficult, especially when considering the dynamic nature of ecosystems and the difference in the scale of analysis of ecological and economic systems. The research on the development and the integration of ecological and socio-economic models for aquaculture

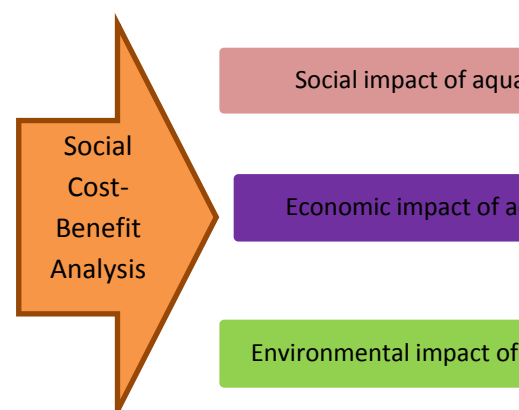
is under development. In these efforts several conflicts such as the scale of analysis, the communication between ecology and economics, and the implicit assumptions employed, have been identified in a way that explains their decoupling.

Recent work conducted by researchers at the International Centre for Research on the Environment and the Economy (ICRE8) and the BlueBRIDGE consortium have led to the development of aquaculture models that bring socio-economic and environmental aspects into consideration when analyzing aquaculture operation performance and production management. The modelling approach consists of three parts: i) Environmental part, where the modelled relationships aim at capturing the interactions of aquaculture and associated costs and benefits with regards to the environment (CO<sub>2</sub> emissions, water pollution, spatial considerations and consumer preferences), ii) Economic part that makes provision for the explicit incorporation of economic determinants (inflation, income/GDP, labour and production costs, and iii) Social part that introduces social costs and benefits (agents' and communities' livelihoods, wellbeing, consumer utility) in the aquaculture production and management decision process.

The work acts on identifying, conceptualizing and monetizing the social and environmental impact of aquaculture and combining this with the specific techno-economic and production models of Blue Economy, taking into account data and computational resources at reach. For this purpose researchers develop a Social Costs Benefit Analysis (SCBA) in which the total economic value of costs and benefits of aquaculture is identified, modelled, evaluated and monetized, aiming at the incorporation of the effects that extend beyond private costs and revenues and regard the broader impact which aquaculture has on the society. The costs and benefits associated to aquaculture are identified and quantified in a way compatible to the existing techno-economic and cost-driven production models.

To this end ICRE8 researchers develop a SCBA methodology that develops in stages, as illustrated in the figure below. In the first stage the costs and benefits associated to aquaculture are identified and quantified in a way compatible to the available techno-economic and cost-driven production models. The costs and benefits include among other investment costs, production costs and revenues, social interactions and environmental impacts translated into effects on ecosystem services and social effects evaluated over time and space.

## Methodology for integrated models of aquaculture production that consider socio-economic and environmental aspects







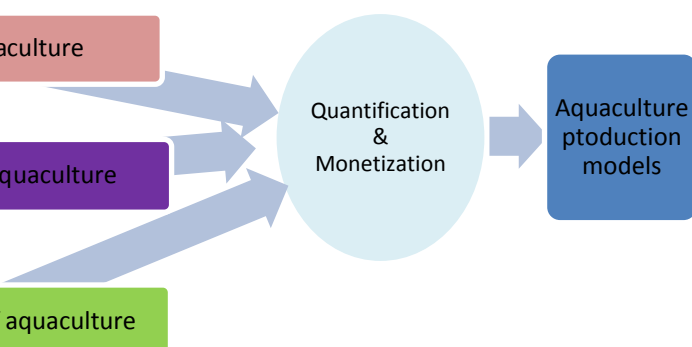
In the next stage the costs and benefits are valued and quantified. In contrast to the costs and benefits of goods and services that have a simple and transparent measure in a convenient unit, like market prices in monetary terms, social costs and benefits are not always captured by market prices, neither are limited to easily quantifiable changes in material goods. Thus, social costs and benefits are regarded and quantified in a wider sense, measuring changes in individual utility and total social welfare. In case of data limitations that do not allow for the direct valuation of the impact, Benefit Transfer methods are employed. In this way it is made use of experience and findings in other sites of similar context and useful quantified effects are inferred and made ready for use in the existing techno-economic and production models.

Appropriate relationships are formulated which quantify and introduce the

socio-economic and environmental costs and benefits of aquaculture into the decision support system of aquaculture management. In modelling aquaculture production, agents make decisions on the production and investments based on Net Present Value (NPV) estimations. In order to incorporate into the decision making system the socio-economic and environmental costs and benefits that extend beyond the financial flows that aquaculture producers are faced with, it is proposed the employment of an extended formulation of the NPV. Extended annual benefits and costs reflect the monetized value of socio-economic and environmental impacts. The criteria then to assess the aquaculture investment and production are as follows: In case  $NPV > 0$  the project is defined feasible in financial, economic, environmental and social terms while in case  $NPV < 0$  it is not financially, economically, environmentally and

socially feasible. In case  $NPV=0$  the investment and projected production are rendered as indifferent.

The resulting framework can support the integrated management of aquaculture production, allow for decisions that are consistent with the concepts of environmental sustainability, economic and social efficiency. In this way can be produced integrated models of aquaculture production that take into consideration both the private costs and benefits but also the social costs and benefits associated with externalities and effects not appropriately captured by market-driven functions and factors. Moreover can be provided quantified insights to the social costs and benefits that that producers internalize or can internalize, which can complement blue growth policies targeting aquaculture management and financing.



# “Access and Benefit Sharing on Marine Genetic Resources”



**Thomas DELILLE**

(PhD), associate in the Brussels office of Mayer Brown's International Trade and Government Relations & Public Law practices

“Blue economy” has become the catch-all term to describe a promised Eldorado for growth at a global level, based on the economy of the Sea. The EU is no exception, anticipating there a potential driver for Europe's welfare and prosperity<sup>1</sup> and

developing a strategy dedicated to that area<sup>2</sup>. The EC estimates the output of the global ocean economy at EUR 1.3 trillion today and foresees a doubling by 2030. Meanwhile, the Union wishes to link the Blue Economy to “sustainable growth”.

In that context, research and innovation (notably in the field of biotechnology) gets the full attention of authorities. Indeed, the variety of marine organisms offers significant promises for discoveries and raise an ever increasing interest for research activities, supported by various economic sectors, including the pharmaceuticals, the cosmetics or the food industry.

Understandably, this triggers many questions on the preservation of marine resources and the development of a normative framework to regulate the rights and obligations of all the involved actors: countries, economic actors and the civil society. The issue of the access to Marine Genetic Resources ('MGRs') and the sharing of benefits arising from their utilization thus becomes the focus of attention. A highly complex normative framework emerges.

'Genetic Resources' ('GRs') are defined in the Convention on Biodiversity (the 'CBD')<sup>3</sup> as any

material of plant, animal, microbial or other origin containing functional units of heredity, of actual or potential value. Whereas no legal definition of Marine Genetic Resources has been adopted to date, the CBD constitutes a useful basis to develop one: MGRs are Genetic Resources found in the marine environment.

Regulating access to and activities on MGRs is not without difficulties. Indeed, the Law of the Sea, which has evolved through centuries of customary law and is now organized by the United Convention on the Law of the Sea ('UNCLOS')<sup>4</sup> set boundaries between areas governed by states' jurisdictions and other one governed by international law (See Figure below).

The rules regulating the MGRs will depend on the exact area in which such resources are collected:

- States exercise sovereign rights on MGRs in the following areas: Territorial seas, the water column in Exclusive Economic Zones and the Continental Shelf. MGRs collected in those areas could be qualified as “States' governed MGRs”.
- In the High Seas as well as in the Area, MGRs are governed by international law.

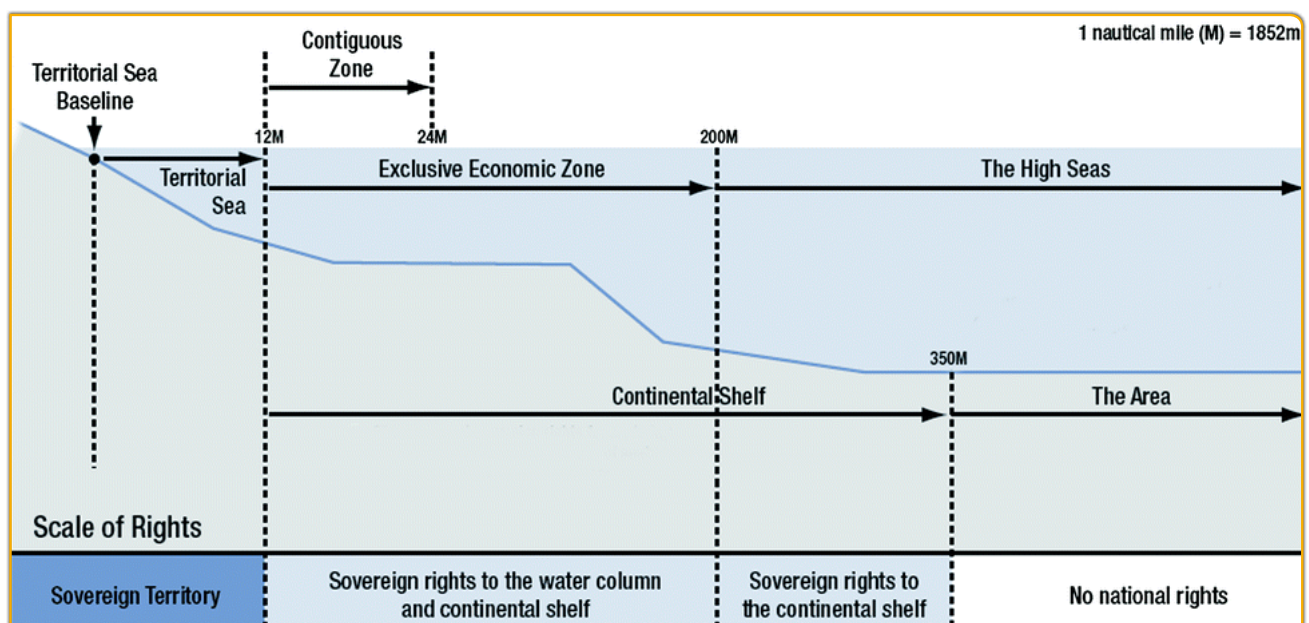
MGRs are therefore to be regulated by two distinct regimes.

1 European Commission, Report on the Blue Growth Strategy - Towards more sustainable growth and jobs in the blue economy.

2 Blue Growth – Opportunities for marine and maritime sustainable growth, COM(2012)494

3 United Nations Convention on Biodiversity, 1992

4 United Nations Convention on the Law of the Sea, 1994.

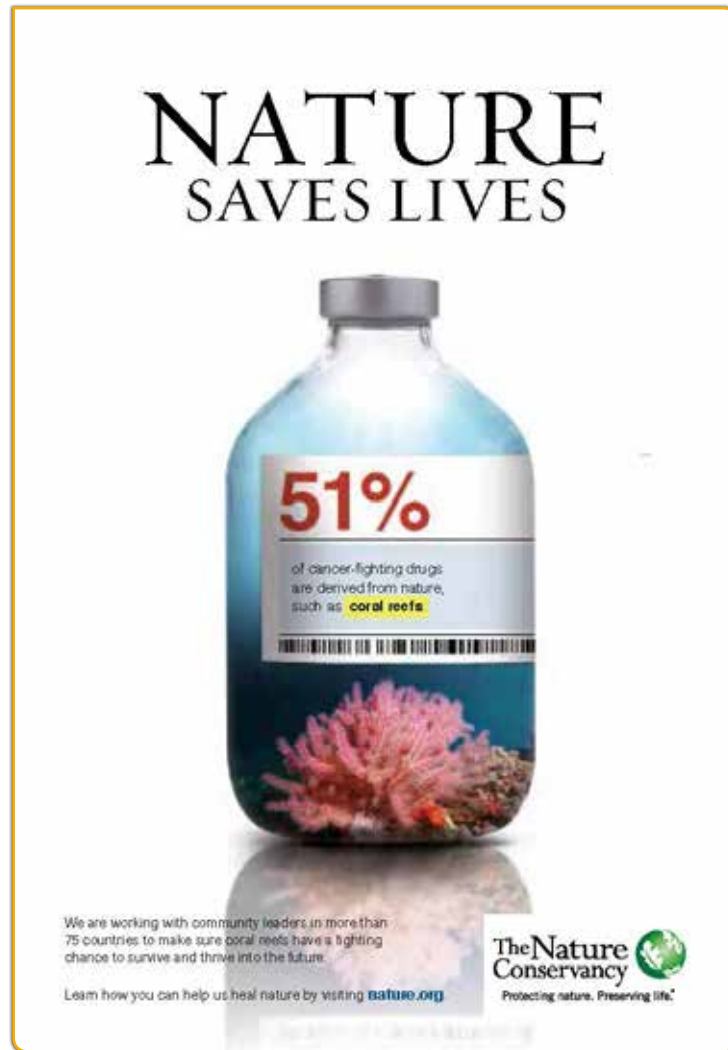




The first regime, applying to States' governed MGRs, has now reached an advanced realization within the framework of the Convention on Biodiversity and its Nagoya Protocol<sup>5</sup>, which entered into force in 2014. Parties to the Convention shall set up the appropriate national legislation to regulate access and benefit-sharing on their States' governed GRs. The Protocol provides for the principles, which organize the rules for access to GRs and the fair and equitable sharing of benefits arising from their utilization. Thus, access to those resources is conditioned by obtaining the "Prior Informed Consent" of the Country providing the resource. The sharing of benefits arising from activities conducted on those resources shall be upon "Mutually Agreed Terms". In the EU, it is for the Member States themselves to set up the legislation regulating the access to "their" GRs.

In addition to that, each Party shall set-up regulations ensuring that actors utilizing GRs obtained in another Party act in compliance with the Nagoya Protocol. It is the EU itself, as a Party to the Protocol, which has put in place a set of Regulations to ensure compliance of all Member States and EU economic operators<sup>6</sup>. Enforcement actions have started at Member States level and Access and Benefit Sharing obligations are today a reality for EU operators. Regrettably, so far they also have to deal with a lack of clarity on the exact scope of their obligations<sup>7</sup>.

This will be further complicated in the near future by the emergence of an international regime to regulate MGRs collected in geographical areas governed by international law. The UNCLOS<sup>8</sup> sets forth the rights and obligations of States, regarding the use of the oceans, their resources, and the protection of the marine and coastal environment. There



Source: <https://www.nature.org>

5 Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits arising from their Utilization to the Convention on Biological Diversity

6 Regulation (EU) No 511/2014 of the European Parliament and of the Council of 16 April 2014 on compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization in the Union (OJ L 150, 20.5.2014, p. 59) ; Commission Implementing Regulation (EU) 2015/1866 of 13 October 2015 laying down detailed rules for the implementation of Regulation (EU) No 511/2014 of the European Parliament and of the Council as regards the register of collections, monitoring user compliance and best practices (OJ L 275, 20.10.2015, p. 4).

7 See T. DELILLE, *Sharing Benefits within a Clear and Sound Legal Framework – Challenges to come for EU Companies impacted by the Nagoya Protocol and its EU Implementing Regulations*, Zeitschrift für Stoffrecht, 2016.

8 United Nations Convention of the Law of the Sea, 1994.

are to date no specific international rules on access and benefit sharing of MGRs in high seas. The United Nations General Assembly has however created an *ad-hoc* open-ended Informal Working Group to identify what could be achieved<sup>9</sup>. The development of this international regime is likely to face numerous challenges, *inter alia* to avoid any conflict in its geographical scope with the Nagoya Protocol. Moreover, the concept of MGR will likely be considered under the angle of a "common heritage of humanity" rather than as a resource on which to exercise sovereign rights and to collect benefits. This opens the

way for a very different regime of rules than the Nagoya Protocol.

Thus, while the MGRs represent great opportunities for a variety of actors, the regulation of activities conducted on them is accompanied by the emergence of a complex regulatory framework, which superposes multiple layers of rules, adopted at the national, European and international level. This complexity will undoubtedly represent an important challenge for economic actors in the Blue Economy, which they have to be prepared for.

9 See United Nations, open-ended Informal Working Group, Chair's non-paper on elements of a draft text of an international legally-binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.



# The Potential of a Blue Economy



**João FERREIRA**

MEP(GUE/NGL), Member of the ITRE Committee

The answers to many of the major societal challenges being posed to humankind could lie in **better marine knowledge** and a greater ability to use, manage, and conserve the resources of our seas, oceans, and coastal areas.

The sea has been known as a source of wealth at least since ancient Greek and Roman times. Ships were the main means of transporting passengers and goods over short, medium, and long distances until the end of the 19th century. Fishing has been, and remains, a major source of food for waterside populations. Added to these are the related (upstream and downstream) inland activities: shipbuilding and ship-repairing, port building and maintenance, the manufacture of fishing gear, insurance and banking, and many more besides.

During the last 50 years there have been significant changes in the nature of humankind's relationship to the sea, of which the following can serve as examples: the fact that fewer passengers are being carried by sea (and correspondingly more are being carried by air), the growing importance of leisure activities, the prospection for, and exploitation of, fossil energy resources (oil and natural gas, in increasingly deep waters) necessitated by the dearth of resources on land, seabed exploration (still in its infancy) and the prospects for deep-sea mining, the prospects for utilising the energy potential contained in waves, tides,

currents, and biomass (seaweed) to generate electricity, offshore wind farms and the development of marine-related biotechnologies.

The **concept of the blue economy** covers a wide range of economic sectors linked to the seas and oceans, spanning traditional and emerging sectors including fisheries, aquaculture, seagoing shipping and inland waterway transport, ports and logistics, tourism, pleasure sailing, and cruising, ship-building and ship-repairing, maritime works and protection of the coastline, prospecting for, and exploitation of, offshore mineral and energy resources, and biotechnology.

Notwithstanding the enormous potential of some emerging sectors, traditional sectors still have their place in several Member States and should not be overlooked. We must not think that innovation is exclusive to emerging sectors. It is also important, not to say essential, to approach it from the perspective of traditional sectors.

To give an example: faced with the serious difficulties that have beset the European shipbuilding industry in the last 30 years, some Member States have managed to overcome and reverse the general downturn by relying on a high degree of specialisation, which has led to visible increases in added value; having moved in this way into contexts less exposed to competition, they are in a position to rival the mighty shipbuilding industries of the Far East. As far as fisheries are concerned, the challenges are similarly huge: the sustainability of fishing, improving the selectivity of fishing gear, and combating illegal, unregulated, and unreported fishing are just some examples.

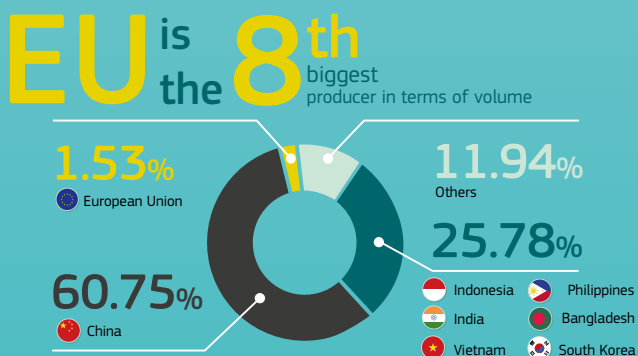
As regards emerging sectors, including prospecting for, and exploitation of, offshore mineral and energy resources, and biotechnology, for all their immense potential, it is necessary to bear in mind that, given the sensitivity of marine ecosystems and the environmental, ecological, and social functions of the seas and oceans, state authorities have to take the lead in managing resources in a sustainable way and protecting them so as to ensure that the general interest and the public good takes precedence over the particular interests of sectors or individuals.

Mistakes made on land must not be reproduced when it comes to seas and oceans, there must be no repetition of those models which quickly use up resources and rapidly become unsustainable (as well as serving to concentrate profits into the hands of a few). Transparency must be brought to sea- and ocean-based campaigns and research projects, especially when they are financed with public funds.

Education and training and research and development are central to the sustainable development of the blue economy. The yardstick for assessing the suitability of existing programmes and measures (including where financing is concerned) should be the development aims of the blue economy and the interactions linking the machinery and programmes in place, and the results achieved.

Seas and oceans are already under considerable anthropic pressure and are suffering the related consequences (pollution, environment and climate change, overexploitation of resources, overfishing, etc.), but that seas and oceans still retain important ecosystem reserves that are inaccessible and thus intact. Blue economy should therefore consider protecting, restoring and maintaining sea's and ocean's ecosystems, biodiversity, resilience and productivity, including the services associated with marine biodiversity and ecosystem functioning, thus the precautionary principle and the ecosystem approach should be at the core of the blue economy. The investment in the blue economy should focus, among others, on 'eco-innovation' which does not rely on finite resources, resource efficiency, the circular economy, nature conservation, marine and coastal protection, climate change mitigation and adaptation, and sustainable use of resources (ensuring that their rates of use do not, in the long term, exceed their natural regeneration rates). These principles must be incorporated into present and future support programmes.

## AQUACULTURE PRODUCTION



### Did you know?

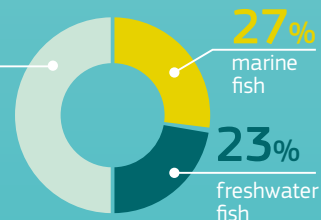
Aquaculture will soon surpass wild fisheries as the main source of seafood. This reflects the transition which happened on land in the past with the evolution from hunting to farming.

In AD 79, Pliny the Elder described fish and oyster farming techniques in his book *Natural History*

## AQUACULTURE IN THE EU

**1.25m tonnes** produced in the EU each year

50% molluscs & crustaceans



**5 main** aquaculture producers



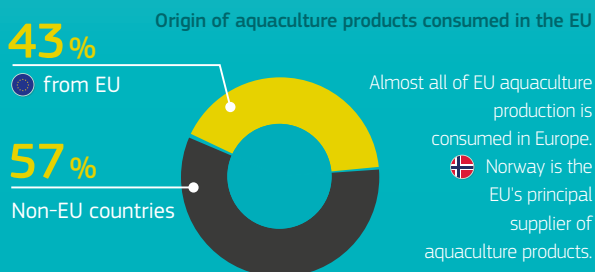
Top 7 aquaculture species produced in the EU

- 1 Mussel
- 2 Trout
- 3 Salmon
- 4 Oyster
- 5 Carp
- 6 Sea Bream
- 7 Sea Bass

EU aquaculture provides a fresh, local supply of healthy seafood and follows strict rules to protect the consumer, the fish and the environment.

# FARMED IN THE EU

## AQUACULTURE CONSUMPTION



**The 2 most consumed** aquaculture species in the EU are salmon and mussel



### Did you know?

Nine out of ten mussels eaten in the EU are actually farmed



## AQUACULTURE BENEFITS

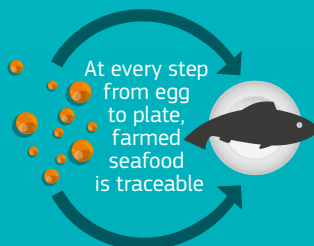
**85 000** directly employed in European aquaculture

**+14 000 LOCAL** enterprises in the EU  
90% of which are micro-enterprises (with under 10 employees)



Fish and shellfish provide oils, healthy proteins and minerals.

**omega 3**



Sustainable aquaculture is needed because fisheries alone will not meet the growing global demand for seafood. Aquaculture can also help reduce pressure on wild fish stocks.





# The Ocean Economy in 2030

