

Multi-use of the Seas Asks for Integral Innovation

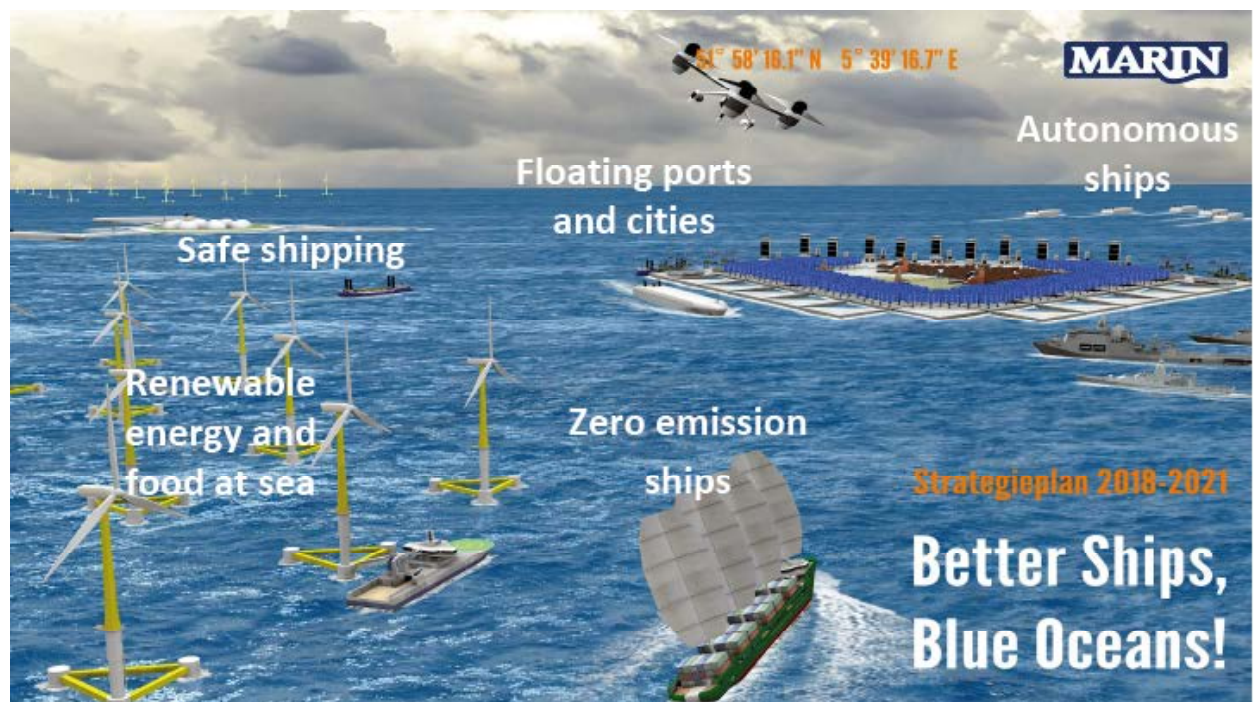
Blue Week 2018: The Energy Transition at Sea

The upcoming energy transition is challenging us to find not only new technological solutions, but also ways to combine these solutions in a harmonious ecosystem at sea. How are we going to achieve this?

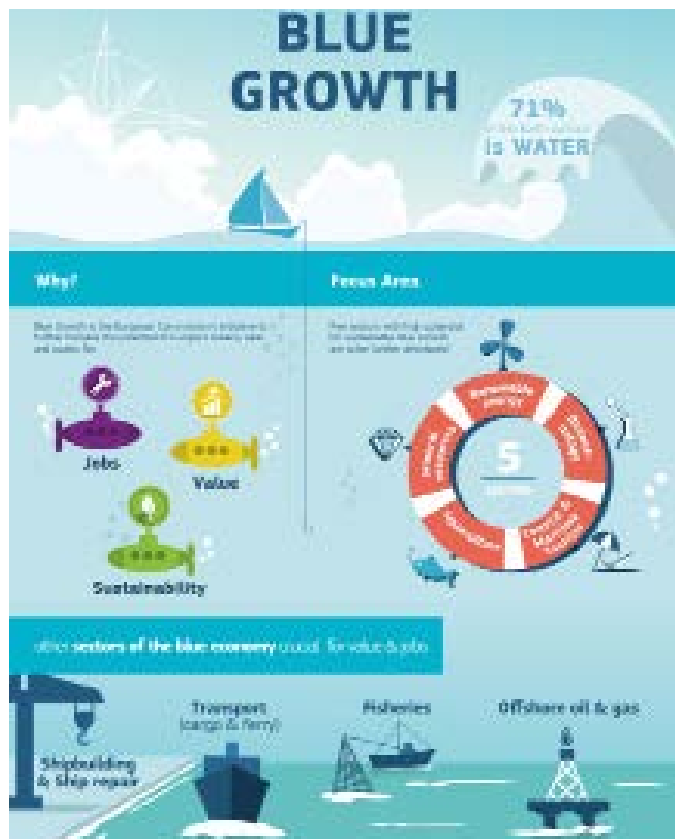
To make room for new solutions of harvesting energy, more space is needed, for example for installing wind farms. Space on land is getting scarce in the Netherlands, so we have been looking at options to use the space at sea. However, the oceans provide more than just energy. Next to catching fish from the natural population, production of food by fish and seaweed farms can provide us with valuable nutrients. Furthermore, let us not forget shipping in general. There will be so many users of the space at sea that we might need two North Seas to make it all happen. Therefore, it is important that all these initiatives are integrated and work together.

Urgency

The oceans have a lot to offer, such as value and sustainability, see the “Blue Growth” infographic. If we do not take part in these developments, others will and we might miss out on the returns of “our” North Sea. Neither can we do it alone; if everybody is developing their own plans at sea individually, there is not enough space and competition will kill sustainability. The only way is to find partners and generate shared success. To use the oceans sustainably, we have to make room for each other, not try to keep ahead of each other. We have been very good at cost reduction and optimisation in



Challenging and urgent ambitions ask for integration and cooperation (by Marin).



The EU Blue Growth infographic gives five areas to focus on, see the full infographic on our website, www.swzonline.nl/news/9233/eu-publishes-infographic-blue-growth.

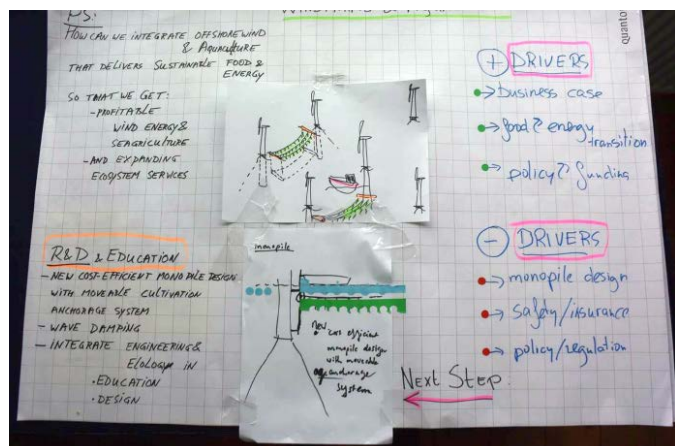
the past, but now we have to take the step to integration and creation of ecological value.

BlueWeek Seminars

From 28-30 May, the BlueWeek was held in the "Lloyd-room" at the Lloydsstraat Rotterdam, with a view of the Port of Rotterdam. Marin has powered the BlueWeek and chaired the BlueForum since 2012. This year, the STC group and the city of Rotterdam co-organised the



The four themes shown here are the pillars of the BlueForum, which meets twice a year during the BlueWeek. The next port of call of the BlueWeek will be Shanghai in October.



Result of the challenge "Integration of offshore wind and aquaculture" in Workshop I.

event. Next to a lot of inspirational presentations on Monday concerning sustainable ocean energy and use of space at sea for sustainable activities, there were two workshops on Tuesday. In workshop I, titled "Glimpse on the Sustainable Future of Shipping & Ocean Energy", participants worked together on challenges in sustainable energy production, storage and distribution, operations and maintenance, multi-use of sustainable offshore assets and zero emission shipping. The focus was on finding solutions for these challenges and despite that time was limited, some were indeed found. Workshop II was about how we can continue to cooperate in facing these challenges and bring parties and people together. A lot of forces are involved in this type of cooperation; how will we manage this? So many subjects were presented and discussed at this seminar that it is hard to describe them all. In this article we focus on how we are going to manage the integration of the different uses of the oceans and the cooperation of the different parties involved. It was nice to see that half of the participants in this workshop were women. Apart from making the transition sustainable, stimulating cooperation and integration also interests women to participate in the maritime industry.

The Wednesday was all about inspiring each other by presenting solutions and ideas about natural propulsion and natural solutions various parties are already working on. Topics included the new STX France cruise ship with modern sails for propulsion assistance, which was in fact the first presentation on this ship to date, and the integration of hydrogen in a co-combustion engine thereby drastically reducing emissions as already applied by an innovative ship owner from Belgium.

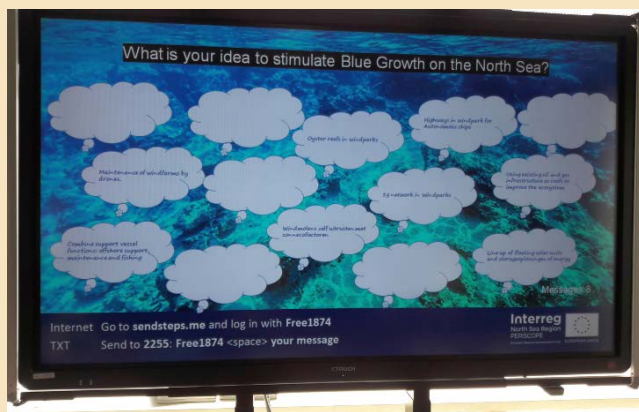
Pioneering Activities

In recent years, the North Sea has been a breeding ground (or water) for several new initiatives. Wind farms have been installed and tests with aquaculture solutions are being held. The experiences from these pioneering activities tell us what we have to take into account when considering the future use of the oceans. They also raise new questions to which we have to find an answer. How can we find the right location for wind farms in the middle of the North Sea? How are we going to transport or store the generated electricity? What is the safest solution for wind farm maintenance? Visual inspection of wind turbine blades, for instance, can be done by drones, but other tasks still require people to undertake dangerous moves hanging from ropes to reach the wind turbine blades. Perhaps dismounting the blades is a better solution here? This means new ship designs have to be developed, such as a

“motion compensated wind turbine blade maintenance vessel”. Then there is the next question: how to blend in these solutions in such a way that ocean life can still flourish? With some adjustments, such as placing concrete domes and using the right material for scour and cable protections, a good environment can be created for fish and shellfish. Why not kill two birds with one stone by using the space between the wind generators for aquaculture? A next step may be making living at sea possible, giving maintenance personnel and fish farmers a better environment to live and work in. This may even lead to complete villages at sea. Another big question is how to make these pioneering initiatives cost efficient. Investments have to be made in new solutions and how are we going to finance them? The answer may be in standardisation, like the use of containers has made shipping more efficient.

Periscope Idea Jam

New cross-border and cross-sectorial challenges in the North Sea region ask for transnational and intersectorial solutions supported by incentives to break out of existing silos. Periscope aims to support sustainable development of the North Sea by strengthening cross-sector Blue Growth innovation capacity and bringing together the players (businesses, entrepreneurs, clusters/networks, researchers, universities, incubators, investors and funds, customers/users, regional and local authorities and development/business support agencies) for knowledge sharing, and acceleration and launch of new innovation-projects. The BlueWeek was an excellent opportunity for Periscope to get stakeholders to think together about innovative Blue Growth ideas. To foster this discovery process, the organisation has given the attendees of the BlueWeek the opportunity to participate in an interactive ranking of business opportunities and to come up with new innovative ideas. Periscope will foster the development of promising ideas and will help idea-owners with matchmaking and in the search for financial support. For more information, see the website: northsearegion.eu/periscope/



Periscope joined BlueWeek for inspiration and innovative ideas.

An example is using different modules so that ships can be used for different functions. For instance, by applying different modules on board an offshore support vessel, it may be made suitable for fishing. In particular, it is the combination of functions that makes the use of the seas more efficient and eco-friendly. This asks for new ways of thinking. One example is that rules and regulations for offshore constructions have to be developed that take into account a fish friendly design.

These are only examples of the many challenges and “what-ifs” we have to deal with following these new developments, but we have to start somewhere and a beginning has been made.

Finding a Balance in Interests and Ambitions

An efficient use of the oceans is all about balance:

- balancing the three Es: Energy, Ecology and Protein (*Eiwitten* in Dutch);
- balancing economic and ecological benefits; and
- balancing supply and demand.

Forces like ownership, urgency, risks, culture, conflict and dependency can affect these balances, while multiple value creation is what we are trying to achieve. Competition is not always a bad thing, it shows there is a demand and it gives a shared focus. The trick is to find a balance in interests and ambitions. When this balance is right, people are willing to accept some disadvantages, such as some cargo owners at the seminar who are willing to transport their goods with the least environmental impact, even if this results in an increased shipping price.

More and more integrated solutions are being developed. Wind generator cables prevent fishermen to fish in wind farms, while placing the cables deeper in the seabed gives room for both. Ecologists and engineers are working together to combine wind farms with fish and oyster cultivation. Offshore platforms that are on the list to be decommissioned can stay in place and get a new life as a breeding ground for several species. In this way, the owner of the platform will leave the sea in a better state than he/she found it in and it might be an ecological success on top of a financial success. In addition, it is a lot cheaper to use existing structures for stimulation of the ecosystem, than placing new ones. The urgency of decommissioning serves as an accelerator in these developments. We could also make the connection with functions that are now placed on land and require lots of electricity and cooling, for example, by realising offshore data centres. These examples of win-win situations are what we are looking for, but they ask for a different perspective on the different systems and how they are connected.

Goals, Space and Budget

More and more, the North Sea is becoming a playing field for field tests, yet even more integrated pilots have to get started if we want to meet the goals we have set. Maybe we should scale up and aim higher, like the way the monitoring of the Oosterschelde has been set up. The first step is to find each other and be open to participation. Sometimes ideas are in such an early stage that the initiators

do not want to involve more people to prevent things from getting too complicated. On the other hand, this can lead to unfit solutions or unforeseen problems and repairs at a later stage. Clear goals, space and budget are needed to make integrated pilots sustainable. At the seminar, a map was presented with projects and ideas to use the space at the North Sea, to make people aware of what is already going on and where they can make a connection. Space can be found by making use of existing facilities, for instance, at existing test locations. If there are clear and sustainable goals, the government can contribute in the budget. This is a win-win situation, because from these tests, the government can learn where regulations do not fit.

Accelerate Innovation through Learning

Learning is the main tool and is our day-to-day job in innovation. We learn from model tests and tests at sea. We learn from observations of ships at sea and of the weather, from which we can make calculations and predictions of the movements of these ships.

A new development is machine learning, where computers are trained with big data from measurements. The predictions they make of waves and weather are sometimes even more accurate, than predictions based on calculations.

Serious gaming is another effective way to learn and predict behaviour and improve efficiency.

We can also learn a lot from each other. Not only by absorbing

knowledge from others, but especially by building on the knowledge that grows in the cooperation, where new knowledge is created. Talking about an applied subject like a specific platform, helps to get parties involved, while there also is a clear subject to build knowledge on. The North Sea Energy Lab is an example of knowledge creation in a "social lab". To provide a relatively safe environment, an agreement was made that information created in the lab can be shared outside the lab, as long as it is not linked to a person. By managing these forms of learning, innovation can accelerate.

Shared Work Ahead

The BlueWeek seminars were a great step in bringing people together, matching supply and demand and setting up formations for new initiatives. To continue to make this transition a success, we need to keep bringing people together and form the right conditions for innovation. What is missing now and what can be the next step, is a large scale community where experiences gained from practice can be shared and exchanged. To link initiatives in a certain area, an area manager can act as an accelerant. A task for the government is making clear regulations that support sustainability. Participation can be part of the concessions when developing new initiatives on the North Sea. Additionally, integration should be an important subject at universities, since there is a gap between fundamental research and applied projects. All in all, we have a lot of shared work ahead of us to make the energy transition work.

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