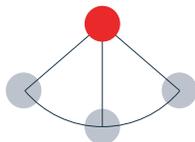




OPERATIONS REPORT ÅKP

*Innovative interplay
in practice*

2016



*More knowledge
about digitalization, virtual
prototyping and new business
models is the main focus
areas in 2017*

ÅKP

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GREEN COMPETITIVENESS, DIGITALISATION AND NEW BUSINESS MODELS

LEADING ARTICLE BY PER ERIK DALEN

Change, digitalisation and the ‘green shift’ are concepts currently circulating in the political arena and the media. On 28 October, the government’s expert committee on green competitiveness delivered its recommendations to the Prime Minister, Erna Solberg. The report’s starting point is that the oil nation Norway should cut its greenhouse gas emissions by up to 40 per cent by 2030, without compromising value creation, employment or the welfare system.

There is no doubt that the commitments under the Paris Agreement will have an impact on our industry. There is major potential here. Our businesses and engineers are at the forefront of environmental technology developments, maybe ahead of what the market has been willing to pay for. Perhaps part of the solution for commercialising the green shift will be to become as skilled at business model innovation as we are at product innovation. We are already seeing how major companies are increasingly beginning to deliver both products and services and thereby gaining control of a larger part of the value chain. This servitization represents a challenge for our Norwegian business structure where 99 per cent of companies are SMEs. Increasing knowledge of new business models will therefore be one of our three main focus areas for 2017.

A GREAT DIGITAL POWER AT SEA

Norway is one of the world’s biggest producers of maritime technology and equipment today. We are also at the forefront of research into autonomous and semi-autonomous solutions at sea. The technology makes it possible to automate and control off-shore operations remotely, i.e. on-shore, and thus reduce costs and help create safer and more environmentally friendly maritime operations. If the authorities and the industry manage to collaborate, Norway has the opportunity to take a leading role in this field. The industry itself is calling for an R&D boost in this area. But it needs to happen fast. The development of digital solutions for use at sea, and in the sea, is progressing more rapidly than we are used to in traditional maritime industry production and more in line with the pace of ICT developments in the last decade. Our input into the government’s new ocean space strategy, which will be launched in 2017, centres on an increased focus on maritime digitalisation as one of the most important ways of boosting Norway’s competitiveness in the international market.

THE VALUE-CREATING REGION

In the shadow of the new municipal reform, the regional division has been given little attention. In Møre and Romsdal, the County Council has decided that it wishes to continue being a separate region. This means that we will be one of Norway’s smallest regions in terms of inhabitants, yet also a region that contributes huge value-creation to

the country as a whole. The reason for this is that the region is home to strong, leading business clusters within the maritime, marine, furniture and tourism industries. Promoting and communicating these advantages to young talents, investors and decision-makers will be an important task. Today, the industry and the county administration works closely to strengthen our regional attractiveness, and it is important that this work is enhanced.

BLUE OCEAN INNOVATION ARENA

Two years ago, ÅKP began working to develop an innovation arena for the future. SIVA joined us, and together we established the company Blue Ocean Innovation Arena which will be ready to move into the new building on Campus Aalesund in autumn 2017. The company will serve as an arena for ideas, innovation and entrepreneurship for students, researchers, startups and businesses. We also decided to establish the next generation’s incubator in the arena. This incubator is based on enabling technologies within 3D visualisation and Virtual Reality (VR) for virtual prototyping and will be connected to the more than 40 simulators that already exist in the world-leading simulator environment on campus in order to be able to test and verify prototypes. Virtual Reality (VR) computer technology is increasingly enabling the system to respond to participant reactions in real-time. This means that we can develop and test complex products on customers far more quickly and cost effectively than is possible in traditional product development. In this way, we can help accelerate the pace of innovation and cut the time-to-market. Together with the large ocean space research laboratories that NTNU is establishing in the same building, this will create a powerful environment capable of strengthening the entire region. We will also create links with physical automated production environments connected to businesses, testing environments and research institutions.

We believe that ÅKP, as a regional innovation company, helps develop our already strong position as a value-creating region through this large-scale initiative. There is major potential here. We are an integral part of a strong university and we have leading companies with global business activities. At Campus Aalesund we will be doing our bit to ensure that we succeed.



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ÅKP

ACCELERATE INNOVATION

The core activity of the innovation company ÅKP is to stimulate the creation of future jobs and create an attractive region in which to live and work.

ÅKP is a regional centre for innovation and industrial development and facilitates, amongst other things, one of Norway's most complete incubator systems, the cluster programmes Blue Maritime Cluster – Global Centre of Expertise, Blue Legasea, Norwegian Rooms, and several other national and international projects. Today, the county of Møre and Romsdal is the host for world-class ocean-based industrial clusters. Many of ÅKP's activities are linked to these important industries, but ÅKP also works actively to transfer knowledge and experiences within innovation processes, organisations and cultures to other industrial environments and public activities. ÅKP assists with the creation of new growth businesses and the development of existing businesses through a fully integrated

and synchronised innovations system. In close collaboration with industry and R&D and funding agencies, ÅKP has established a model in which innovation activities and cluster programmes benefit from one another. Newly established businesses require networks, financial muscles, strong innovation environments and cluster programmes as support to be able to succeed. For their part, industrial clusters require new ideas, innovations and new businesses in order to grow and strengthen their competitiveness on the global market. This is a dynamic that ÅKP amplifies. Such network thinking and a seamless innovations model are unique in a Norwegian context. This is to stimulate and develop the basis for future value creation in the region.

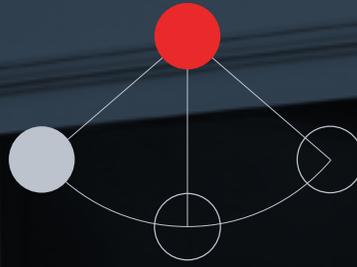
BUSINESS IDEA:

ÅKP is to be a innovation company with national importance that contributes to innovation, economic growth and regional development in a global context.

MAIN STRATEGY:

Innovative interplay in practice - Be a driving force for innovation connecting industry, academia and the public sector in processes that create sustainable value creation.

VALUES: VISIONARY FEARLESS COMPETENT GENEROUS RELIABLE



ÅKP FOCUS

INNOVATION

Innovation is the process of translating an idea or invention into a good or service that creates value or for which customers will pay

FIRST LINE SERVICES FOR ENTREPRENEURS

INCUBATOR

SEED FUNDING

BUSINESS DEVELOPMENT FUND



ÅKP INNOVATION – A SEAMLESS INNOVATIONS SYSTEM

ÅKP works actively to transfer knowledge and experiences within innovation processes, organisations and cultures to industrial environments and public activities. ÅKP Innovation operates the first-line service hoppid.no in seven municipalities and offers a range of different incubator services throughout Sunnmøre.

Every year we handle several hundred enquiries from idea owners, entrepreneurs and businesses. Some receive the help they need over the telephone, and others are closely monitored through workshops and through meetings with our consultants. Those who desire a long-term, binding collaboration with ÅKP can apply to be included in our incubator scheme. As of December 2016, 40 entrepreneurs and businesses have signed written precubator or incubator agreements with ÅKP.

INNOVATION DAYS

ÅKP's office in Ulsteinvik serves as the hoppid.no office for Hareid, Ulstein and Herøy. In partnership with the hoppid.no offices in Ørsta and Volda, two events were arranged in Southern Sunnmøre in 2016. The first event focused on local food and tourism, and was held in Ørsta in April. The second event was held in Ulsteinvik in October and focused on protecting ideas (IP) and the use of design in innovation processes. Both events were well supported and received a lot of attention from regional media.

In December, we organised Innovation Day Ålesund in partnership with Møre and Romsdal county, DNB, innovation Norway and Giske, Haram, Skodje, Sula, Ørskog and Ålesund municipalities. Here the focus was on the development of ideas and businesses.

"UNGT ENTREPRENØRSKAP" LOCATED AT ÅKP

Ungt Entreprenørskap (Young Entrepreneurship) is working to ensure that all pupils and students in the region receive good entrepreneurship training. Both UE and ÅKP are working to ensure increased entrepreneurship in our region and this local concentration strengthens the holistic and fully integrated innovation system at ÅKP.



MEET 3 ENTREPRENEURS

ÅKP INCUBATOR
SERVES 40
ENTREPRENEURS



LETSIP AS

*Ole Jakob Djupvik, Dag
Djupvik og Bjarte Høydal*

WHAT IS THE BUSINESS IDEA?

The idea is based on an oral motor training aid that can be used to exercise the muscles and functions that are in and around the mouth for persons with Downs Syndrom, CP, Parkinsons disease etc. Through exercising a person's lips, tongue and cheeks, you can reduce drooling and improve facial expressions and communication as well as the eating, drinking and swallowing functions.

WHY DID YOU START YOUR OWN BUSINESS?

We had product ideas that we could not let pass by. Our experience with oral motor skills and knowledge of materials provided us with a common platform from which to develop products that are to be used in the mouth. Our ability to be close to users for trials and testing, gave us the belief that we could succeed as entrepreneurs.

WHY ÅKP?

It would have been difficult to orientate ourselves without guidance and help from ÅKP. To be able to use the network that ÅKP has built up has been crucial to our success.



KA3LAB

Klaudia Król

WHAT IS THE BUSINESS IDEA?

To use 3D visualisation and virtual reality technology to prototype and visualise architectural solutions. With 3D tools, it is easier and you have more flexibility to choose the right materials at an early stage. The customer can verify ideas in a simple way and we can customise and tailor the building project in a cost effective manner.

WHY DID YOU START YOUR OWN BUSINESS?

I come from Szczecin in Poland, which is known for its distinctive architecture. I have worked as an architect for nearly 7 years, but have also experimented a lot with sculptures and 3D models. I now want to start my own business with the freedom to develop my own unconventional and distinctive style of architecture.

WHY ÅKP?

I am an artist and CG artist with little knowledge of starting a business. I contacted ÅKP and received lots of good advice. I have received support from hoppid.no and have signed a pre-incubator agreement with ÅKP. In November, I received a grant for creative businesses from Møre and Romsdal county.



SERVICE CULTURE AS

Arve Løset and Tommy Pettersen

WHAT IS THE BUSINESS IDEA?

Service management solutions for the digital age with features to handle Internet of Things (IoT) data in a scalable way. Most industries are in the process of developing technology to manage data from sensors in their products. Today's service management solutions are too costly to change in order to handle demand for scalability, Cloud, Big Data and analytics purposes. ServiceCulture have made a Service management solution that is very easy to configure to the client needs.

WHY DID YOU START YOUR OWN BUSINESS?

We have been running a IT consultancy company since 2010. When the downturn in the oil- and offshore industry came we became highly influenced and we needed to rethink our business strategy. We had seen the rapid development of Internet of things (IoT) and sensor technology and decided that we would try to use our competence to develop a new solution and a new company. We are persons who like the entrepreneurial way of thinking.

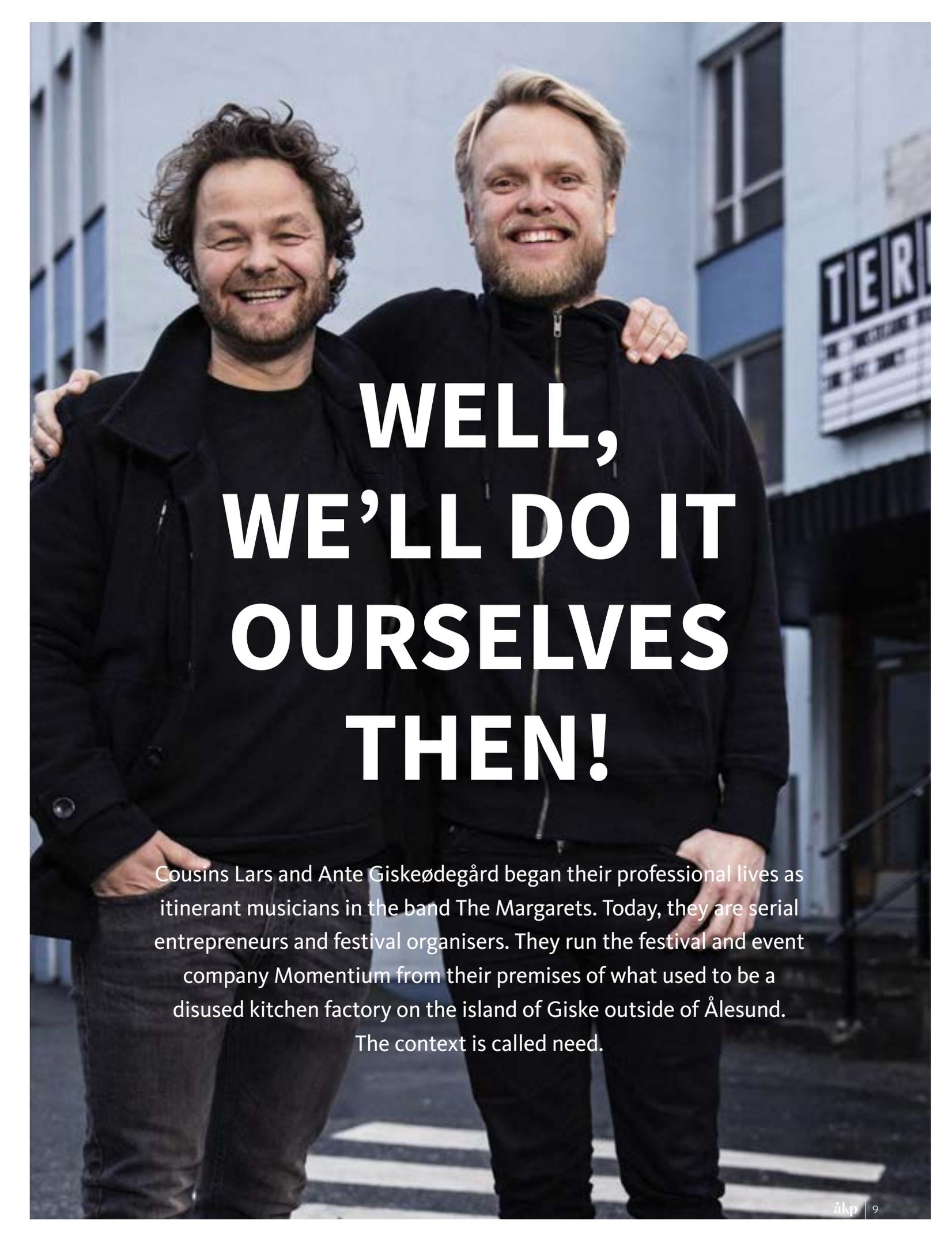
WHY ÅKP?

We decided to apply for admission as incubator company at ÅKP to access the network and resources that they have. We would also take Robert Voldnes as counselor to challenge us in ways we cannot ourselves when we work with business planning and development of the company.

OPERATES SEVEN
HOPPID.NO OFFICES

ÅKP operates hoppid.no offices in municipalities of Ålesund, Sula, Skodje, Sandøy, Hareid, Ulstein and Herøy. hoppid.no is a collaboration between the county of Møre and Romsdal, municipalities, Innovation Norway and the County Manager in Møre and Romsdal. ÅKP also manages business funds for the municipalities of Ålesund, Sula and Skodje. In this way, we can provide a full range of services to entrepreneurs and growth businesses throughout Sunnmøre.

hoppid.no®



WELL, WE'LL DO IT OURSELVES THEN!

Cousins Lars and Ante Giskeødegård began their professional lives as itinerant musicians in the band The Margarets. Today, they are serial entrepreneurs and festival organisers. They run the festival and event company Momentum from their premises of what used to be a disused kitchen factory on the island of Giske outside of Ålesund. The context is called need.



They have turned Ålesund into one of Norway's leading festival and concert cities, and have built a recording studio that draws musicians from far around. They run an IT company and sell ticketing and payment solutions. Of course they also have an events company and a company that runs «social marketing» ... to name but a few.

And there is more in the pipeline. So, what drives them? The joy of solving their own challenges in such an excellent way that they have been able to make a business out of it.

ITINERANT MUSICIANS HAVE ONLY THEMSELVES

«One thing you learn as a musician, is that you need to make the very most of yourself», says Lars. «Do you have a need? Meet it. Do you have a problem? Solve it. What you don't know, you teach yourself. People have no idea how hard aspiring musicians work. That time the band is standing on stage is peanuts compared with all the time we spend being able to stand there. There's always some part of the infrastructure missing.»

«THERE'S ALWAYS SOME PART OF THE INFRASTRUCTURE MISSING. That's often how it starts», says Ante. «When we played in The Margarets, we needed a studio. Lease or own? We settled on the latter, and built Ocean Sound Recordings. By so doing, we were able to meet our own needs, at the same time we hit upon a solution we could sell to others. Well, The Margarets disbanded before the studio was ready, so we never got to use it ourselves. However, many of those who have played at the festivals we've put on have recorded there.

The importance of good infrastructure became even clearer when we started up as festival organisers. Here's one of the many examples: The ticketing system we used broke down. That is a BIG issue just

before a concert, I can tell you. Yes, so we decided to write our own ticketing solution and established Kodebyraaet out here on Giske. The solution was awesome. We called it Tikkio, and established a company with the same name to sell the solution to other promoters.»

Tikkio is a app-based solution that allows the public to book tickets and buy goods at events via their mobile phones. The promoter receives his commission through Tikkio. Today, the company has 400 promoters amongst its clients and 90,000 users, and is experiencing excellent growth.»

Lars laughs: «It's not that hard to sell a solution to others, once you've run it on a grand scale in your own shop. They believe you when you can prove it works.

WE'VE TAKEN A BIG CHUNK OF THE VALUE CHAIN.»

In the beginning it was all about finding good, practical solutions. The truth was that with every new solution, they took an even greater proportion of the value chain at their own events.

Lars says that recognising this put things in a new perspective:

«When you grow and your economy expands, you also take on more responsibility. Employees, artists, suppliers and partners also have bills that need to be paid. Value chain thinking has become important for us when it comes to ensuring revenues and profits. We're fortunate to have had good financial advisers throughout.

EVERYTHING CAN BE SUMMED UP IN THE 'AUDIENCE EXPERIENCE'.

When you're growing rapidly and expanding at a great rate, it's important not to lose track of where you're heading. For the serial entrepreneurs on Giske the question is this simple: will this contribute to a better audience experience? If the answer is yes, we'll go ahead



"The two develop the idea and sell it in, but then they engage skilled people who can take the project forward."

with it. If no, we'll stop right here.»

«Arranging concerts and festivals is risky stuff», says Ante. «It's crucial that everything we call infrastructure also contributes positively to the audience experience. When we sell Tikkiö to a promoter, we're not selling something that just makes it easier for him. It's equally important that the public get tickets on their mobiles and can buy food and refreshments inside the area - no cards, cash or queues.»

AN ENTREPRENEUR NEEDS TO KNOW HIS LIMITATIONS

Entrepreneurs who do not let others in are a well known problem. In this respect, Lars and Ante are absolutely clear. The two develop the idea and sell it in, but then they engage skilled people who can take the project forward.

«We're not uninvolved», says Lars, «but talented people with ambition and fresh eyes add an enormous amount. By organising new businesses into separate limited companies, we're also demonstrating responsibility in a clear way.»

«Lars and I could never have got to operate as serial entrepreneurs if we hadn't done it this way», says Ante, and goes on:

«Here, incidentally, we've greatly benefited from the incubator service offered by ÅKP. A good entrepreneurial environment and skilled mentors with extensive experience is invaluable. I must say that we have an incredibly dynamic and innovative environment out here on Giske, where individuals and companies contribute to each other's futures. Notwithstanding, sometimes it happens really quickly, and when creativity has given birth to a new project, it's crucial to bring it home safely. Both Tikkiö and the social marketing company, All Hearts got off to a good start thanks to ÅKP.

WHOLLY-OWNED COMPANIES:

MOMENTIUM

Festivals and concerts

TERMINALEN BYSCENE

Concert in Ålesund

OCEAN SOUND RECORDINGS

One of the country's premier recording studios

ØYGARDHAMNA

Cultural industrial park on Giske with about 50 jobs

ALL OF US

Events and conferences

ALL HEARTS

Social marketing, physical and digital

COMPANIES WE ARE INVOLVED IN TOGETHER WITH OTHER OWNERS:

MOLO BREW

Microbrewery

KODEBYRAAET

Software company

TIKKIO

Ticketing company

FESTIVALS:

ÅLESUND LIVE

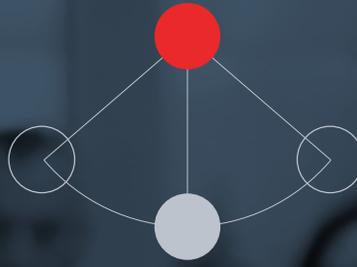
9-10 June 2017

SUMMERFEST ON GISKE

1 July 2017

JUGENDFEST

18-19 August 2017



ÅKP FOCUS

REGIONAL DEVELOPMENT

Møre og Romsdal is host to innovative and world-leading companies. Continued growth requires an attractive region for highly educated and skilled people. ÅKP is actively working to strengthen the attractiveness of the region

MIT REAP

REGION ÅLESUND

DEVELOPMENT PROJECT

NORWEGIAN ROOMS



OUR REGIONAL ENTREPRENEURSHIP ECOSYSTEM NEEDS A BOOST

The Møre region are participating in the MIT REAP programme with a goal to accelerating regional entrepreneurship. The project is co-funded by Sparebanken 1 SMN and GCE Blue Maritime Cluster.

Western Norway has a tradition of coping well with change. When the herring disappeared from Møre in the 1960s, many were forced to adapt. Today, we are losing thousands of skilled jobs in the off-shore industry, forcing us down a path of radical change once more.

«What is missing is not innovation policy measures. What we need is entrepreneurs who are willing to take risks and invest in new businesses.» Torger Reve, coordinator for MIT REAP Norway.

MIT REAP is a global programme that aims to accelerate regional entrepreneurship. It is being run by the world's top university in the field of innovation and entrepreneurship – Massachusetts Institute of Technology (MIT) in Boston.

Our region currently finds itself in a period of change and we need to learn how to help new start-ups to grow internationally. Over the course of the next two years, projects and measures will be implemented, the purpose of which will be to transform Western Norway from an oil-dependent region into a knowledge-based global region that aims to become the dominant force in the new ocean industries. It aims to achieve this by mobilising the innovative ecosystem, which consists of five stakeholder groups: the companies, the entrepreneurs, the investors, the universities and the policy implementation system.

STRENGTHS AND WEAKNESSES OF THE ENTREPRENEURSHIP ECOSYSTEM IN SUNNMØRE

In March, a survey was conducted which analysed the current quality of the region's ecosystem. The working groups were asked to come up with initiatives that could, potentially, help strengthen the ecosystem. The preliminary results of this work were:

Academia:

NTNU Aalesund has good resources and an expertise environment both in and for entrepreneurship activities, but these must be promoted and strengthened. Little start-up activity directly from NTNU. If Campus Aalesund is to become an innovation leader, entrepreneurship must be prioritised in education.

Investors:

There is a major lack of early-stage investors. Angel investors are needed. There is a lack of capital that could enable quick scaling. We need to coordinate risk capital and arenas where entrepreneurs come into contact with investors.

Government bodies:

Uncertainty relating to the distribution of roles and functions between the government, Møre and Romsdal county council and the municipalities. There must be better coordination in this area. Innovation Norway works well. It is difficult to navigate the jungle of measures and there is not enough focus on businesses with potential.

Entrepreneurs/start-ups:

Our entrepreneurial tradition has taken a hit and we are seeing risk aversion. Businesses are constantly changing, but there is no effective collaboration between established businesses and start-ups. The question is also raised whether there is enough variety in terms of ideas. We need to reinvigorate the entrepreneurship culture. We look at entrepreneurs as individuals, but we lack an effective, dynamic ecosystem.

Established businesses:

A large, but somewhat uniform, business community. Our established industries are changing. The businesses close their value chains and focus on becoming end-to-end suppliers, which makes it difficult to start niche businesses. It seems as though many established businesses are struggling to come up with new ideas.

The businesses are strong and globally competitive, but intrapreneurship needs to be strengthened. New models for collaboration between established businesses and start-ups must be created. Talented individuals need help to succeed. Create infrastructure for spin-offs?

CONCLUSION

There is a clear consensus that we are not good enough at innovation-based entrepreneurship today. This is critical for product innovation in particular. We are unable to make new businesses grow and there is a lack of global ambition. The teams are also aware of a lack of risk capital in the region.

The region has a tradition of innovation and entrepreneurship, but the long period of economic prosperity has weakened the natural drivers in this regard. The outlook seems bleak as far as ideas are concerned, but the current tough business climate will probably drive new developments.

New entrepreneurship models are needed, and an ecosystem where different forces collaborate and support each other.



Photo: Kjell-Erik Bigset and mayors

REGION ÅLESUND IS ON THE OFFENSIVE

Region Ålesund, ÅKP and Ålesund Port Authority cooperated during Nor-Fishing 2016. The fair stand proved highly popular, and thousands attended during the week.

The interaction between the public and private sectors is one of the strengths of our region. They depend very much on one another. ÅKP is engaged in the promotion and increased attractiveness of our region and, for this reason, we take part in a number of events that contribute to this. During the Nor-Fishing Fair in Trondheim, ÅKP took part with Region Ålesund and the port authorities around Ålesund, sharing a stand in the Møre and Romsdal County Council's shared pavilion. Region Ålesund is a collaborative effort by the municipalities of Haram, Skodje, Giske, Sula and Ålesund.

Region Ålesund's participation is an outcome of the project Urban Agglomeration, Ålesund which came into existence as part of the Ministry of Local Government and Modernisation's (KMD) national development programme for urban agglomerations – the Urban Agglomeration Project. The aim is to increase awareness of the interaction between urban areas and their surroundings and to strengthen regional growth. ÅKP was project leader for Phase 1 of this project during 2014 and 2015. The project is now in phase 2 and is being led by Ålesund municipality.

«This is all about networking, and about gaining knowledge about what is going on in the business world, so that we can be good facilitators», says Eva Vinje Aurdal, Mayor of Ålesund.»

MØRE OF ROMSDAL COUNTY – AN IMPORTANT PARTNER



The County Council's business department is an important co-financier of the cluster programs and incubator / first line services for entrepreneurs who ÅKP operates on behalf of the business community and municipalities in our region. In addition, the county is co-funding a number of innovative projects that contribute to strengthening the wealth creation in the region. The regional authorities' key role in strengthening host attractiveness requires that they have the necessary funding to implement measures.

CAMPUS WEEK – A BIG SUCCESS

The Campus week Ålesund could this year offer a varied program of both academic and social activities. ÅKP and GCE Blue Maritime Cluster has for several years worked actively to build campus Ålesund as a powerhouse for research, education and business. This year there was a two-day Cyber Security seminar, "Fagskolekonferansen", Quiz Night, Ocean Talent Camp Møre, Open University, GCE Blue Maritimes Annual Conference, Campus Lounge and a number of other events. Campus Week is a collaboration between NTNU in Ålesund, Technical College Ålesund, NMK, all the student associations and ÅKP.



RESTRUCTURING AND GROWTH

Development project for SMB businesses in Møre and Romsdal

Small and medium sized businesses hit by the decline in the oil-related sector attends in a restructuring project initiated by the GCE Blue Maritime Cluster. The project has received NOK 850,000 in funding from the Møre and Romsdal County Council, and 20 companies are now ready to commence work.

GCE Blue Maritime Cluster has engaged MRB to establish an innovation project with the objective of strengthening businesses in the face of market challenges within certain sectors of the maritime industry. It aims to strengthen the competence, competitiveness and profitability of businesses that are affected by the market downturn.

MOBILISATION FOR FURTHER DEVELOPMENT

In times of declining demand and increased competition, there is a corresponding need for new thinking and innovation. Many

businesses find it difficult entering into development projects at the same time as attending to daily operations.

The purpose is to promote the development of new business models and identify potential synergies and efficiency-promoting activities. The goal is to initiate development projects that ensure a retention of engagement in maritime activities and expertise in expectation of a change in the market.

NTNU FABLAB OPENED

FabLab originates from Massachusetts Institute of Technology, and is now a global network of over 100 laboratories. FabLabs make use of the same machines, software and projects, and users can share experiences with other FabLab users across the world. NTNU in Ålesund has now got its own FabLab, which was opened in mid-March. A FabLab makes it possible to quickly build physical models and prototypes by using 3D printing and other enabling technologies.





NORWEGIAN ROOMS

Behind the cluster initiative, Norwegian Rooms®, are several trend-setting Norwegian suppliers of finished goods from the furniture and interior design industries. The cluster administration is located at ÅKP.

A NATIONAL CLUSTER

The industry cluster is, by virtue of its members, already a cluster with a national foothold, and is now in its fourth year with arena status.

«This industry represents the only significant industry in Norway without nature-based, comparative advantages or support.»

The industry's geographical base is in Møre and Romsdal, and the region is, therefore, the natural hub for the cluster. The county municipality of Møre and Romsdal is, therefore, an active participant in the industry cluster's operation and development.

FUTURE GROWTH

The industry cluster, Norwegian Rooms®, represents Norwegian suppliers of finished goods with international status or potential. Further growth in the cluster will happen for businesses that aspire thereto. With this initiative, the businesses in the industry cluster have acquired a unique opportunity to develop their future competitiveness, and shared projects are being established that will make them stronger on the international stage.

The furniture and interior design industries are responsible for some of Norway's most best-known brands internationally. Stressless®, Håg®, Jøtul® and Stokke® are all brands that already enjoy considerable international recognition.

FOCUS ON SKILLS

Initially, the cluster was an important facilitator for the development of different skills programmes for the businesses' managers, middle managers and operational employees. The collaboration with different academic environments in colleges in Molde, Norwegian University of Science and Technology (NTNU) and the Norwegian School of Economics (NHH) has already contributed to several important skills programmes.

BRAND MANAGEMENT AND INTERNATIONALIZATION

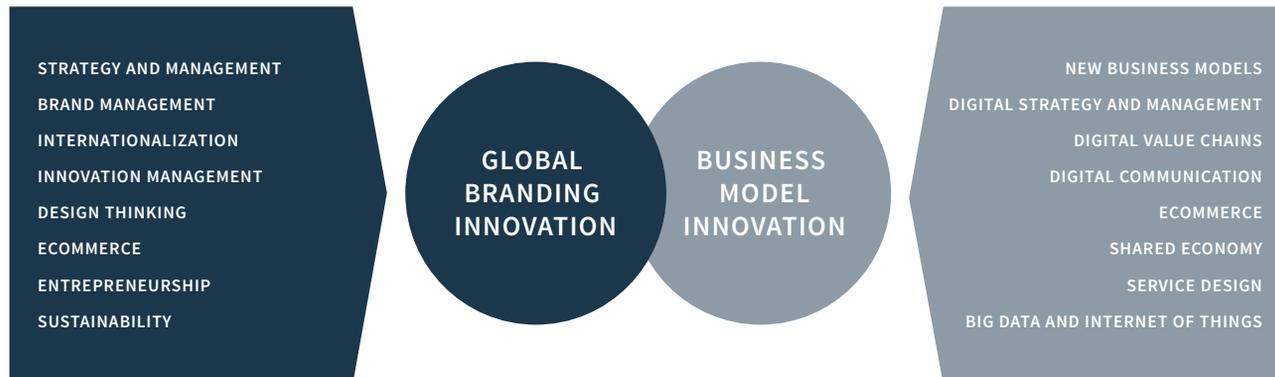
In autumn 2016 the cluster started a new skills program in Brand Management and Internationalization. The part-time masterclass was developed in collaboration with the NHH and is aimed at current and future leaders, marketing directors, marketing managers and business developers.

GLOBAL BRANDING AND BUSINESS MODEL INNOVATION

Norwegian Rooms® is about to establish a new competence project with both masterclasses as well as short-programs for executives as part-time studies. The different classes in brand management, internationalization and downstream innovation is being developed in cooperation with NHH and NTNU for both the maritime, the marine and the furniture cluster, and has been given financial support by Innovation Norway.

GLOBAL BRANDING AND BUSINESS MODEL INNOVATION

International growth through optimized and digital value chains



© Norwegian Rooms® Cluster 2016

The need for downstream innovation challenges companies in relation to developing new business models, which can provide new, strong international competitive advantage. Here experiencing even leading brands and industry environment a skills needs.

The project will help companies achieve increased international growth by developing new markets, new business models and optimized supply chains, through learning across various industries.

R&D COLLABORATION

Together with seven other industry partners, Molde University College, NTNU, Sintef, Møreforskning and iKuben, Norwegian Rooms® has been able to secure a 4-year skills project financed by the BIA programme. «Manufacturing Networks 4.0» is a strategically important project for the cluster, as it focuses on challenges and opportunities regarding Industri 4.0.

INTERNATIONAL COLLABORATION

The businesses behind Norwegian Rooms® all operate on the international stage to a greater or lesser degree. So it's natural that the cluster itself builds international networks and activities. There has already been contact between clusters in Scandinavia, and shared projects and knowledge sharing are under way.

THE CLUSTER'S KEY FIGURES

- Norwegian Rooms® was established by 10 companies in 2013.
- Core Companies today: 24
- Employees: 3729
- Turnover: 6.6 billion
- Export: 4.8 billion
- Export: 73% of total revenues
- Employees in Norwegian Rooms Cluster: 2

FUTURE TALKS WORKSHOP



Mega trends of globalization, urbanization and digitization will affect the entire finished product industry, nationally and internationally. The three leading megatrends will change both the market and society dramatically, and it is happening now – at a rapid pace!

The idea of Future Talks was to focus attention and focus on changes that will affect us in the future, and to come up with robust strategies that contribute to a provident Norway.

The knowledge base in Future Talks developed by 16 renowned speakers from academia and industry, have helped to describe and deepen trends in areas such as the future of lifestyle, future consumer, the future distribution and future value creation. In addition, 62 participants from cluster companies and partners helped to discuss trends in the workshops.

The idea behind the report Future Talks 2016, has been to describe the trends that we believe will be influencing furniture and interior industry for a 5-year perspective. These are trends which are important for the cluster to focus on the coming years. Not least, we must understand the youth, which will be an important power factor ahead.



A photograph of three women in a modern, dimly lit interior. The woman on the left is seated, wearing a dark grey sweater and glasses. The woman in the center is standing, wearing a grey button-down shirt and glasses, with her arm around the seated woman. The woman on the right is seated, wearing a dark blazer over a white shirt and glasses. They are all smiling. The background features a large green plant and blurred lights.

NOTHING VENTURED NOTHING GAINED



Furniture manufacturer Slettvoll established its first Slettvoll store in 1999. While the major chains were stronger and free-standing, furniture retailers were becoming fewer and fewer. Today we know that relying on your own abilities was a wise choice.

Fundamentally, it was about cultural differences. Bohus, who was Slettvoll's largest collaboration partner, was focusing on a broader platform, numerous suppliers and a fairly standard presentation.

This standardisation had become a problem for Slettvoll. The Stranda furniture factory was beginning to think conceptually. They hired their own «stylist» to safeguard Slettvoll's own «look and feel» in its stores. There was conflict in the air.

«And so it happened that we got to take over one of our independent retail partners», says CEO Kristine Landmark. «They were housed in a barn in Kolsås in Oslo. We were thoroughly prepared with invitations and all, but the tension was high. Will anyone show up?

Six hundred turned up all displaying enormous interest in furniture and interiors. The choice was made, in fact, there and then.» Five years later, Bohus and Slettvoll wish each other luck and went separate ways.

Today we have sixteen Slettvoll stores in Norway. In Sweden we have two and a third is underway.

THE SLETTVOLL BRAND HAS BECOME PART OF CULTURE

«With our own stores, we could expand the collection the way we wanted», says Brand Manager Liv Norun Moe. Today, we present our proprietary seating range, tables and storage units we have designed ourselves as well as a range of interior products, such as lamps, pillows and blankets. Strictly speaking, it is only the bathroom that we have not taken on.

When it comes to kitchenware, we do not supply wall furnishings and appliances. Our entry into kitchen supplies is the result of the kitchen and living room very often being two parts of the same room.»

You claim that everything fits together?

«Yes, that is a mainstay of our product line. You can choose a complete interior with us. Many do just that. With the range we



"The cluster's focus on production technology and the collegiate network was of great benefit in this restructuring."

have today, the variety of combinations is endless.»

Karoline Hole Fløtre is Quality and Customer Service Manager at Slettvoll. She says that the in-store service is something in itself: «Everyone working in our stores is actively focused on quality and excellent interiors. They have great knowledge and are truly happy to assist the customer. Without this passion out in the stores, we could never be able to offer two hundred different fabrics for our chairs and sofas.»

Moe sums it up as follows: «It's about having a proper collection, timeless design, quality products and unique service. Many of our customers choose Slettvoll for their home, the cottage or their house or flat abroad.»

«When you have such a good standing with your customers, you're very careful not to disappoint them», adds Hole Fløtre.

NORWEGIAN ROOMS IN ITS FURTHER DEVELOPMENT

Slettvoll is an active participant in the cluster collaboration, Norwegian Rooms. For Kristine Landmark, this is a matter of course:

«The objective is to consolidate Norwegian finished goods production, which after all we are a part of. When the cluster is also tailored for furniture and interior manufacturers, we are talking about a community of interest that we cannot afford to do without.»

She is also concerned about the breadth of the cluster's activities: «We've recently made significant changes in our production. The cluster's focus on production technology and the collegiate network was of great benefit in this restructuring.

The seminar, 'Future Talks' gave us an insight into and understanding of the megatrends that affect the development of society and therefore also us as producers. Since we're all industry people, it seems natural to make connections and continue working with the theme. It's good to be working on strategies in your own company.

I'd say that cluster cooperation makes possible a whole range of things that Slettvoll, with our size, could never have achieved on our own. Everything that happens in the cluster is needs oriented, and the path to practical application is short.»

BEING ENGAGED AT MULTIPLE LEVELS IN THE COMPANIES

Liv Norun Moe and Karoline Hole Fløtre have gone back to school. Norwegian Rooms, in collaboration with NHH, has set up a study in international branding. The pair of them has just returned from the first meeting in Bergen and are full of enthusiasm.

«It's highly effective», says Moe. «The lectures are largely industry-related. The other participants are colleagues from other companies and the case studies we are working with are directly linked to your own business.»

For Hole Fløtre, it is also important that the cluster engages both senior and middle management in areas such as administration, production and marketing. «It creates a common understanding of the challenges we face, and enables everyone to contribute constructively in solution and strategy work.»

THE WORLD IS A BIG PLACE

It is quite clear that the Norwegian manufacturing industry has a huge export potential. Exports are thus an area of focus in Norwegian Rooms.

Finally, it is not possible to say farewell to the girls at Slettvoll without taking a quick look at future expansion beyond Scandinavia.

«Well», they say, «we've probably reached the ceiling as far as stores in Norway is concerned. We see Sweden as much more exclusive, so it's quite possible that we ought to limit ourselves to Stockholm, Gothenburg and Malmö. But we've travelled a bit and seen so much, and this we know: there's room for Slettvoll in very many of the world's cities.» More coffee, anyone?



ÅKP FOCUS

BLUE OCEAN

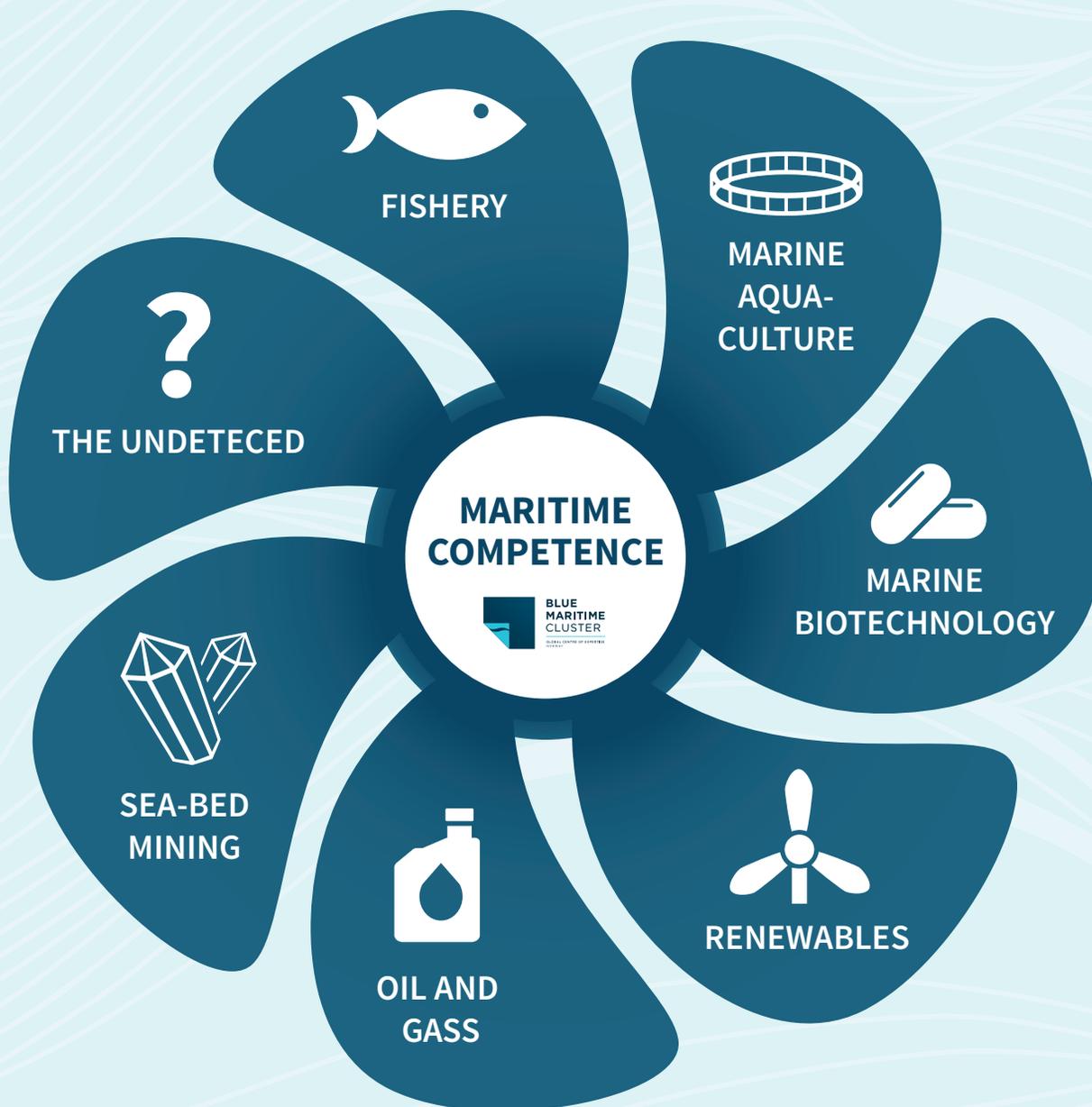
There is no doubt that ‘the blue’ is the future’s most important resource reservoir. We must therefore use all our maritime and marine skills built up over generations to uncover the secrets of the blue ocean.

BLUE MARITIME CLUSTER – GLOBAL CENTRE OF EXPERTISE

BLUE OCEAN INNOVATION ARENA

NORTH ATLANTIC OCEAN CLUSTER ALLIANCE

BLUE LEGASEA – NORWEGIAN BIOMARINE RESOURCES



THE FUTURE LIES IN THE BLUE OCEAN

For many generations, the Maritime Cluster in Møre has been a pioneer in technology development and operations at sea. It began with fishing and the development of a modern fishing fleet. Then came the activities connected to offshore oil and gas. As the cluster now ventures into the blue ocean arena, a new chapter is added to our story.

According to the OECD's forecasts, the world's population will increase from the current 7 billion to 9.5 billion by 2050. Meanwhile more and more people are being released from poverty. Consequently, the need for food, energy and minerals is growing rapidly. How the world will ensure sufficient access to these scarce resources in a sustainable way is the biggest challenge of our time. This challenge is not helped by climate changes making food production on land more demanding, and that the climatic challenges require purer forms of energy.

The ocean cluster in Møre is certain that many of the answers to these challenges lie out 'in the deep blue ocean'. Seventy per cent of the earth's surface is covered by sea, eighty percent of which is deeper than 3,000 metres and 90 per cent of the ocean remains unexplored. There is no doubt that 'the deep blue' is the future's most important resource reservoir. We must therefore use all our maritime and marine skills built up over generations to uncover the secrets of the ocean.

GREENER, SAFER AND HEALTHIER

The Blue Maritime Cluster's history of success has been based on rapidly responding to new market opportunities. Innovations have been developed in close dialogue between customers and suppliers. The willingness to take risks and to innovate using prototypes has been central to our success. Increasing globalisation and changing market conditions mean that our recipe for success must be developed further. The blue maritime cluster shall in future focus on developing knowledge bridges to national and international environments which, along with us, can be pioneers in transnational ocean operations. We shall create the best environments in the world and create new, smart and green solutions. Simulations and virtual prototyping

will be central platforms for increasing innovation speed. We shall digitalise the maritime industry and use the opportunities provided by big data and new technology. We shall collaborate with the largest companies within the health and nutrition sectors so that we can develop new, high-value products from fish and fish raw materials. We shall create new technology and new business models that use the resources in a sustainable and gentle manner. Our aims are to make the world greener, safer and healthier through developing the ocean-based industries. Our global attractiveness as a host will attract businesses, talent, expertise and capital that will help us achieve these aims.

MARITIME COMPETENCE IS THE FOCAL POINT

Norway has, for a long time, played a leading role in the fields of offshore energy, shipping and seafood. Maritime competence is the key to success in all these segments, and will be even more important when they merge in the future to become advanced offshore operations within new sectors. Knowledge of the sea, weather and wind, resource bases and sustainability will continue to play a key role and be crucial supporting elements when we develop new technology and new markets.

In this way, we will contribute knowledge and help commercially exploit the ocean in a safe and sustainable way, for the future growth business in Norway! This will create value and employment and will lay the foundations for future prosperity and welfare.

We are certain that our pioneering spirit, our unique experience-based skills and our culture for entrepreneurship make us well placed to create pure food, energy and minerals from 'the deep blue ocean'.

OPERATIONS REPORT 2016



**BLUE
MARITIME
CLUSTER**

GLOBAL CENTRE OF EXPERTISE
NORWAY

GREEN COMPETITIVENESS, DIGITALISATION AND NEW BUSINESS MODELS



PER ERIK DALEN

CEO,
GCE Blue Maritime Cluster

LEADING ARTICLE BY PER ERIK DALEN

Change, digitalisation and the ‘green shift’ are concepts currently circulating in the political arena and the media. On 28 October, the government’s expert committee on green competitiveness delivered its recommendations to the Prime Minister, Erna Solberg. The report’s starting point is that the oil nation Norway should cut its greenhouse gas emissions by up to 40 per cent by 2030, without compromising value creation, employment or the welfare system.

There is no doubt that the commitments under the Paris Agreement will have an impact on our industry. There is major potential here. Our businesses and engineers are at the forefront of environmental technology developments, and perhaps ahead of what the market has been willing to pay for. Perhaps part of the solution for commercialising the green shift will be to become as skilled at business model innovation as we are at product innovation. We are already seeing how major companies are increasingly beginning to deliver both products and services and thereby gaining control of a larger part of the value chain. This servitization represents a challenge for our Norwegian business structure where 99 per cent of companies are SMEs. Increasing knowledge of new business models will therefore be one of our three main focus areas for 2017.

A GREAT DIGITAL POWER AT SEA

Norway is one of the world’s biggest producers of maritime technology and equipment today. We are also at the forefront of research into autonomous and semi-autonomous solutions at sea. The technology makes it possible to automate and control off-shore operations remotely, i.e. on-shore, and thus reduce costs and help create safer and more environmentally friendly maritime operations. If the authorities and the industry manage to collaborate, Norway has the opportunity to take a leading role in this field. The industry itself is calling for an R&D boost in this area. But it needs to happen fast. The development of digital solutions for use at sea, and in the sea, is progressing more rapidly than we are used to in traditional maritime industry production and more in line with the pace of ICT developments in the last decade. Our input into the government’s new ocean space strategy, which will be launched in 2017, centres on an increased focus on maritime digitalisation as one of the most important ways of boosting Norway’s competitiveness in the international market.

THE VALUE-CREATING REGION

In the shadow of the new municipal reform, the regional division has been given little attention. In Møre and Romsdal, the County Council has decided that it wishes to continue being a separate region. This means that we will be one of Norway’s smallest regions in terms of inhabitants, yet also a region that contributes huge value-creation to

the country as a whole. The reason for this is that the region is home to strong, leading business clusters within the maritime, marine, furniture and tourism industries. Promoting and communicating these advantages to young people, investors and decision-makers will be an important task. At the same time, Norway must, as a small country, be able to collaborate across regions for the benefit of the nation as a whole.

BLUE OCEAN INNOVATION ARENA

Two years ago, ÅKP began working to develop an innovation arena for the future. SIVA joined us, and together we established the company Blue Ocean Innovation Arena which will be ready to move into the new building on Campus Aalesund in autumn 2017. The company will serve as an arena for ideas, innovation and entrepreneurship for students, researchers, entrepreneurs and businesses. We also decided to establish the next generation’s virtual ocean space incubator in the arena. This incubator is based on enabling technologies within 3D visualisation and Virtual Reality (VR) for virtual prototyping and will be connected to the more than 40 simulators that already exist in the world-leading simulator environment on campus in order to be able to test and verify prototypes. Virtual Reality (VR) computer technology is increasingly enabling the system to respond to participant reactions in real-time. This means that we can develop and test complex products on customers far more quickly and cost effectively than is possible in traditional product development. In this way, we can help accelerate the pace of innovation and cut the time-to-market. Together with the large ocean space research laboratories that NTNU is establishing in the same building, this will create a powerful environment capable of strengthening the entire region. We will also create links with physical automated production environments connected to businesses, testing environments and research institutions.

We believe that ÅKP, as a regional innovation company, helps develop our already strong position as a value-creating region through this large-scale initiative. There is major potential here. We are an integral part of a strong university and we have leading companies with global business activities. At Campus Aalesund we will be doing our bit to ensure that we succeed.

BLUE MARITIME CLUSTER

Global Centre of Expertise

«A cluster is a geographical proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and externalities».

(Porter 1998)

This maritime cluster at Møre is a world leader in design, construction, equipment and operation of specialized service vessels for the global ocean industry. Due to its unique global market position and its important contribution to Norwegian value creation, the cluster is granted the status of a Global Centre of Expertise.

Global Centres of Expertise are a new top level in the Norwegian cluster program and it has been referred to by Norway's Minister for Trade and Industry, Monica Mæland, as the industry's Champions League. Three business clusters in Norway currently carry this status: the Møre maritime cluster and the oil equipment/drilling cluster in Sørlandet and the oil and gas subsea cluster in Bergen. It is a national status awarded by the government to the most global business clusters in the country. It will assist in increased value creation and strengthened attractiveness and position within global value chains, through strategic collaborative projects between the cluster's partners and with external partners.

The status involves the financing of a cluster project. BLUE Maritime Clusters objective is to incite and strengthen team-based development activities in the maritime cluster at Møre with the aim of increasing the clusters' dynamism and attractiveness and individual companies' innovativeness and competitiveness. ÅKP is a facilitator for the cluster project

BLUE MARITIME STEERING COMMITTEE



- 01 **GUNNAR HAREIDE** Chairman of the Board, ÅKP AS
- 02 **KARL JOHAN BAKKEN** CEO, Farstad Shipping
- 03 **HELGE GJERDE** President, Rolls Royce Commercial Marine
- 04 **GUNVOR ULSTEIN** CEO, Ulstein Group
- 05 **ROY REITE** CEO, VARD
- 06 **STÅLE RASMUSSEN** CEO, Kleven
- 07 **KARL INGE REKDAL** CEO, Sykkylven Stål
- 08 **MARIANNE SYNNES** Rector, Høgskolen i Ålesund
- 09 **NJÅL SÆVIK** CEO, Havila
- 10 **ODD TORE FINNØY** CEO, Brunvoll
- 11 **STEIN BERG OSHAUG** CEO, Oshaug Metall

8 SMART GOALS

The cluster project Blue Maritime has 8 smart goals that we work by.

1 INCREASE THE SPEED IN PRODUCT INNOVATION

Further develop the cluster's innovation platform, and the culture for innovation in global value chains. Increase the rate of innovation through specific projects that lead to new ideas and knowledge.

2 INCREASE THE SPEED OF PROCESS AND ORGANIZATIONAL INNOVATIONS

Further develop the cluster's skills in effective production. Implement specific projects that introduce new production technology, knowledge and logistical solutions and LEAN.

3 STRENGTHEN GLOBAL KNOWLEDGE CONNECTIONS FOR WORLD-LEADING TECHNOLOGY AND KNOWLEDGE ENVIRONMENTS

Chart and connect with the right research environments, networks and clusters. Enter partnerships with relevant environments.

4 STRENGTHEN NATIONAL KNOWLEDGE CONNECTIONS WITH RESEARCH ENVIRONMENTS, CLUSTERS AND MARITIME COMPANIES

Further develop and strengthen existing cooperation agreements. Develop new, complementary networks and specific cooperation projects with other relevant Norwegian clusters and knowledge environments.

5 CREATE GLOBAL SMB WINNERS

Increase the knowledge level and create new business models for SMB companies.

6 CREATE NEW ENTREPRENEURS AND GROWTH COMPANIES

Further develop fully integrated innovation systems. Develop a global start-up programme.

7 INCREASE HOST ATTRACTIVENESS

Increase visibility and reputation building. Focus on regional development and recruitment. Increase dialogue with companies, knowledge institutions and authorities.

8 CROSSOVER-INNOVATIONS FROM THE MARITIME INDUSTRY TO NEW MARINE BUSINESSES

Increase knowledge and interaction between different marine businesses. Set up specific projects that lead to new knowledge.

GOLD LABEL APPROVAL FOR GCE BLUE MARITIME



Gold Label approval for GCE Blue Maritime
The European Cluster Excellence Initiative has awarded the cluster organisation GCE Blue Maritime Cluster with the quality label "Cluster Organisation Management Excellence Label GOLD".

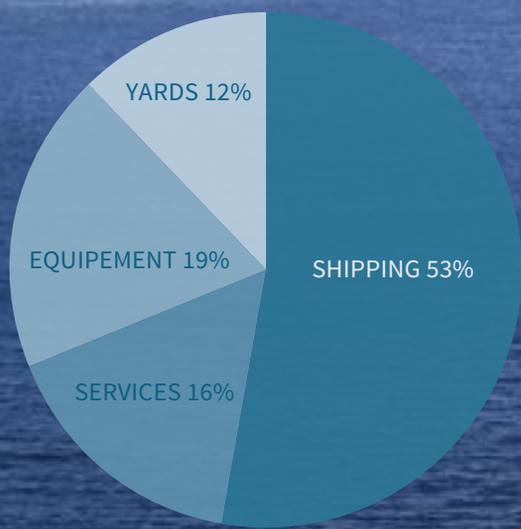
The "Cluster Management Excellence Label GOLD" acknowledges cluster organisations that demonstrate highly sophisticated cluster management and that are committed to further improve their organisational structures

and routines for the benefit of an even higher performance.

This is an important recognition and a seal of quality for the work we do. This certification will make it easier to partner up with the major industrial clusters in the EU, says Per Erik Dalen in GCE Blue Maritime Cluster.

The GCE Blue Maritime Cluster is one of only 80 clusters from 16 countries who have the status of "Gold Label".

CLUSTER VALUE ADDED 2015



GLOBAL ANALYSIS



TURNOVER
-12 %
Development
(2014/2015)

VALUE ADDED
-15 %
Development
(2014/2015)

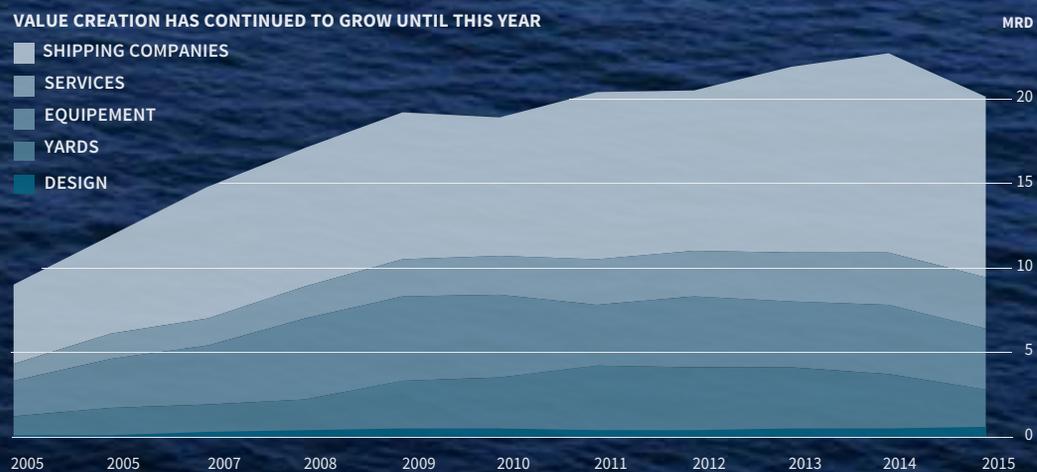
OPERATING MARGIN
-8 %
Development
(2014/2015)

EMPLOYMENT
-8 %
Development
(2014/2015)

BLUE MARITIME CLUSTER

GLOBAL PERFORMANCE BENCHMARK ANALYSIS

The last two years have been difficult for the Blue Maritime cluster in Møre. After 12 years of continuous growth, both value added, revenues and employment fell by respectively 15, 12 and 8 percent. For the companies that constitute the cluster, profitability from the business was wiped out. The cluster is now in a restructuring phase and the industry is looking for new sufficiently large and attractive markets opportunities to capitalize on the unique innovation capabilities.



HIGHLIGHTS

MENON BUSINESS ECONOMICS - SEPTEMBER 2016

Companies in the Blue Maritime Cluster demonstrated spectacular growth from 2004 to 2014 with the total value added increasing at, on average, 13 percent annually, reaching 23 billion NOK in 2014. Thus, more than 8000 new jobs were created in the cluster. That said, the growth, by all measures, already started to slow in the period from 2009-2014. This reduction in growth of revenue and value added coincided with stagnating productivity. Hence, it seems that the dramatic drop in revenues and profits cannot be entirely explained by market conditions.

Benchmarked against companies offering similar products and services in Norway, we see that the members of Blue Maritime have performed well, but there are signs that they have been falling behind their Norwegian counterparts recently. In the last four years, the national benchmark has seen significantly higher growth and better productivity development than the Møre cluster. While the national industry has increased its productivity since 2011, productivity growth in Møre has stagnated.

THE FALLING OIL PRICE IS A CATALYST FOR RESTRUCTURING THE CLUSTER

The falling oil price was the catalyst that uncovered the large oversupply that the market is currently facing. From levels of above USD 100 per barrel in 2010-2014, the oil price appears to have stabilized around USD 45-50 per barrel by the fall of 2016. As a result, 2016 may be the first year in a decade when no new offshore vessels will be ordered at Norwegian yards.

The whole cluster is struggling, but the focus in 2016 has been on the shipping companies. They are struggling with high debt and a critical need for financial restructuring. Rem Offshore was earlier this year acquired by Solstad and the Aker-group, while the situ-

ation for many other companies currently is uncertain. It will be a huge blow to the cluster if large parts of the shipping companies' activities are moved away from Møre.

Last year report highlighted that the market circumstances called for substantial revisions of the companies' strategies directed towards international expansion and, for some segments, diversification out of the offshore oil & gas industry, improved operational efficiency, flexible management of capacity, and increased focus on financial risk management. During 2015 and 2016 we have seen yards and ship designers targeting other vessel types with surprising success. The shipping companies' ability to adapt to new market conditions is of course more limited, since they are stuck with irreversible investments in offshore service vessels.

WILL THE CLUSTER RETAIN COMPETITIVENESS?

The cluster has historically demonstrated a remarkable capability for strategic transformation through both company and cluster-based innovation. The collective knowledge that innovation relies on – carried by firms and research institutions and spread among them through buyer-seller relations, cooperation, informal communication and mobility of people – is strong in the Møre region. In addition, the critical mass that the cluster has gained in the last decade has made it much more robust to adverse shocks than it was ever before.

Although the Møre cluster has achieved an impressive performance over the last ten years, three fundamental questions about future competitiveness can be raised:

1) PRODUCTIVITY

Since 2009, productivity in the cluster has stagnated, while the rest of the offshore oriented part of the maritime



ERIK W. JAKOBSEN
Menon Business Economics

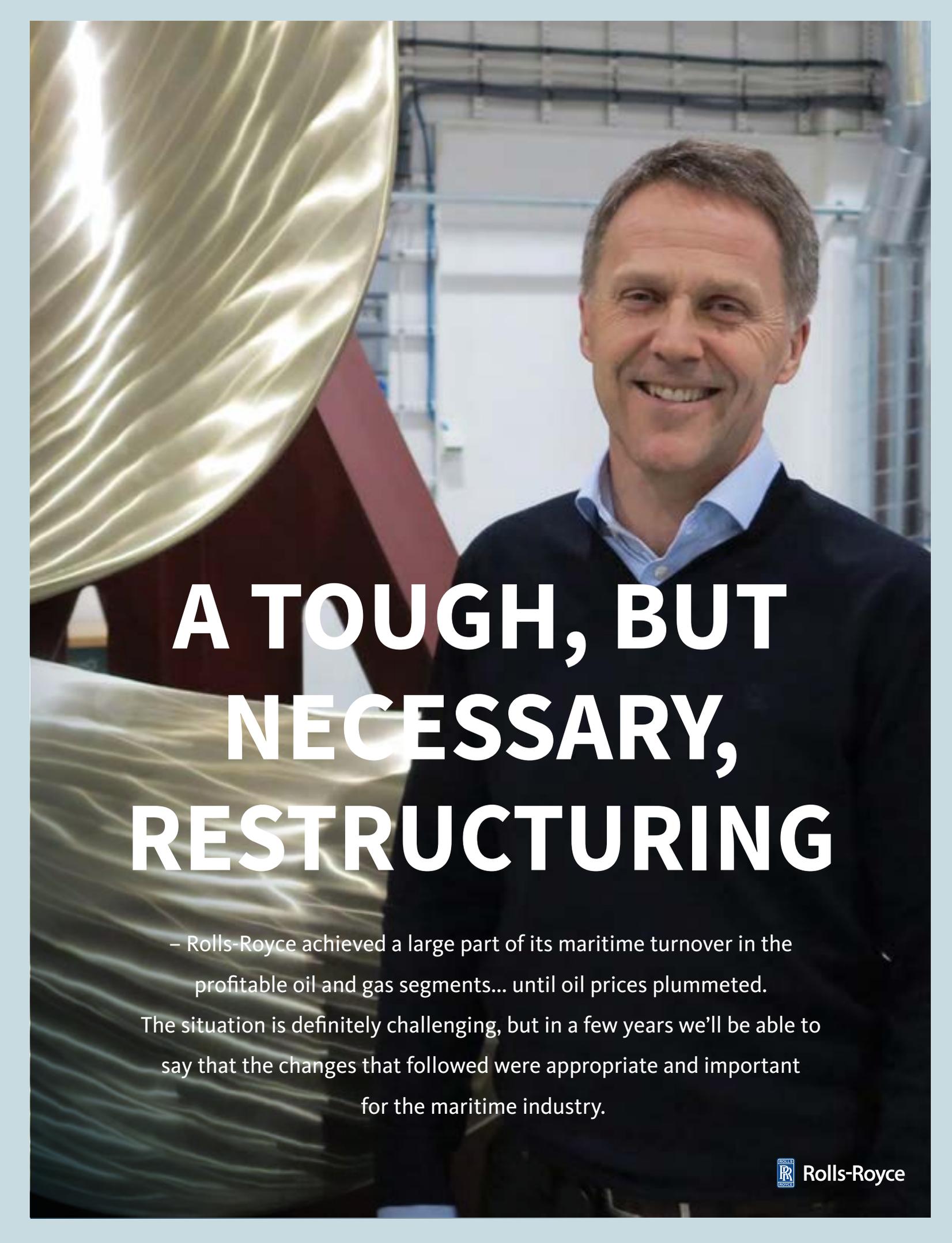
industry in Norway has improved productivity. *Why has productivity stagnated, and how will it impact competitiveness in offshore markets when global demand starts to increase?*

2) THE VALUE CHAIN

The most distinguishing feature of the Møre cluster has been the tight value chain structure, with internationally competitive companies within the local cluster in all steps in the value chain. This vertical structure is under pressure for two reasons: a) The offshore shipping companies will probably consolidate, and ownership and headquarters may be centralized outside Møre. b) The ship designers and yards in Møre show an impressive ability to adapt to market changes by switching to other types of vessels, for example ferries, cruise ships and well boats. *How will cooperation, knowledge flows and cluster-based innovation be affected when the buyer-seller linkages in the local value chain are broken?*

3) STANDARDIZATION AND COST-EFFICIENT MASS PRODUCTION

The Norwegian maritime industry, and the Møre cluster in particular, has been in the forefront of the technological breakthroughs and innovations of new ship types and equipment for many decades. However, yesterday's innovations are today's standards, because customers will require standardized solutions to reduce their own costs. This implies that the competitive conditions probably will be different when the offshore oil & gas market returns. Hence, there is need for innovative solutions within the offshore market, and for continuous search for new growth opportunities. *Can the Møre cluster find sufficiently large and attractive market opportunities to capitalize on innovation capabilities?*



A TOUGH, BUT NECESSARY, RESTRUCTURING

– Rolls-Royce achieved a large part of its maritime turnover in the profitable oil and gas segments... until oil prices plummeted. The situation is definitely challenging, but in a few years we'll be able to say that the changes that followed were appropriate and important for the maritime industry.



Rolls-Royce

"Norway is a leader in many areas of the maritime industry, and we need to maintain that position. Development is accelerating."



«The years between the millennium shift and 2014 was one big up-turn», says Helge Gjerde, President Offshore & Merchant Solutions at Rolls-Royce Marine AS. «When the financial crisis was at its worst, our industry's order books were full and we hardly noticed it. But we do now. Several of the traditional segments are now more or less in the dumps, and everyone's fighting it out in the segments where something is happening.» The competition is tough.

«When the oil companies downsized their exploration and cut investments, this left equipment suppliers, shipyards and shipowners with a significant overcapacity. For Rolls-Royce, it was particularly the demise of deliveries to major anchor handlers, drillships and floating rigs that hit us hard. We also noticed a downturn in the aftermarket. Laid-up vessels require little service and few spare parts», says Gjerde.

When the market changed, Rolls-Royce had already begun to look at its costs and organisational structure. The work continues, and Gjerde believes that the operators who succeed in their restructuring and with their investment in new technology will now survive. He is confident that oil and gas will pick up again, but also says that the world will not be like it was before.

«I think that we're now in a situation that is forcing the maritime industry to do some radical rethinking in many areas.

RESTRUCTURING IN THE SHORT AND MEDIUM TERM

The major megatrends in the industry affect the long-term commitment to Rolls-Royce. These are connected with automation and electrification, more intelligent technological solutions and systems in ships, increased automation in industrial production, increased standardisation and especially a focus on safety and the environment.

«But from a short and medium term perspective, it's as much about adapting to the opportunities we see now in neighbouring markets», says Gjerde.

He mentions the current opportunities in the marine environment related to energy and food production, wind power, fishing and breeding. In addition, there is plenty of building activity going on in terms of cruise and passenger ferries, advanced research vessels and coastguard vessels. «Decommissioning» is also a potential offshore application area, in other words, activities associated with the closure of fields and dismantling of installations.

«In the short term, it's about adapting and further developing what we have so as to be able to access new segments. In the medium term, there are also untapped opportunities in the marine environment, including new and more sustainable methods of harvesting.

Gjerde points out that the shipyards in North-western Norway have been good and visible examples of the positive things that are taking place in the maritime industry.

«They have seized on new opportunities and are making use of the expertise gained from the construction of advanced offshore vessels to build new types of vessels. It's demanding, but they're increasing their competitiveness and winning contracts in new segments. Of course, the currency situation has helped a lot, but much is also being done by the companies themselves by adapting their cost structures.»

WHAT'S TAKING PLACE WITHIN ROLLS-ROYCE?

«Pretty much the same thing. As you know, we're developing new cruise ships for the expedition market, such as the two new vessels for Hurtigruten. In this segment, we're making use of a lot of expertise gained from the design of offshore vessels for the polar regions. This includes two highly advanced research vessels currently under construction, the Kronprins Haakon and the Sir David Attenborough. Both of these research ships have been designed by Rolls-Royce here in Norway. Equally important are the equipment packages, which include energy-efficient propulsion systems.» Meanwhile, Gjerde is pleased about the repeat orders for advanced fishing boats.



«Norwegian and foreign fishing fleets are earning money and gladly investing in increased efficiency and more profitable operations. These are vessels we're good at, both in terms of design and equipment.

Now we're hoping to be able to compete for the supply of several new ferries for the Norwegian national road network. Orders for some of these have already placed by Norwegian yards. There are strict emission requirements for these. Here we have several well-proven, reliable solutions such as gas and hybrid operation.

It's an area that gets the entire cluster involved», says Gjerde.

WE CAN BECOME A DIGITAL POWER OFFSHORE

In the long term, much therefore depends on automation and more intelligent vessels. Rolls-Royce has been working on this for a long time, and has been working with the technology community in various places around the world, including Norway. Much of the technology is available today. With new solutions, this can also generate completely new needs.

HOW FAR INTO THE FUTURE IS THE REMOTE CONTROLLED SHIP?

«The speed with which this is happening is much faster than we thought just a few years ago. And so are the levels of autonomy and automation. Some ships would stand out as more suitable than others. When it comes to ocean crossings, that's a bit further off. One reason is that it requires extensive changes to regulations that many countries need to agree on. But ferries crossing Norwegian fjords might not be so far away. We're already developing systems for automation of fjord crossing and docking. Short distances and frequent departures in protected waters place Norway in a somewhat unique position when it comes to development and accumulation of experience. If the authorities, research institutes, clusters and individual companies are all playing in the same team, Norway could become a digital power offshore.

THIS HAS GREAT IMPORTANCE FOR THE LONG TERM

Norway is a leader in many areas of the maritime industry, and we need to maintain that position. Development is accelerating. Here are some of the issues, which in Helge Gjerde's opinion are of crucial importance.

- **WE MUST MAINTAIN AND STRENGTHEN THE NORWEGIAN MARITIME CLUSTER**

Many countries have maritime clusters, but none are as complete as the Norwegian one is. We need to look after it so that it remains a significant benefit.

- **CONTACT WITH OTHER INDUSTRIES**

The Norwegian maritime industry needs to be inspired by other types of industry. Many of the solutions we will be using in the future are under development in other industries.

- **WATCH OUT FOR GAME CHANGERS**

Great changes and ideas may arrive that do not originate in any of the environments we are familiar with today.

- **GOVERNMENT SUPPORT FOR RESEARCH AND DEVELOPMENT**

Support for the maritime industry in Norway is currently fragmented. We have now taken the initiative to change this. Digitisation of the shipping industry is a key area, and we believe it is important that the Norwegian authorities consider and adapt their contributions to the industry accordingly. We are global, but at the same time we want to further develop the solid expertise we have in this country.



Illustration: NTNU

INVESTING HEAVILY IN R&D

The Maritime Cluster in Møre has, for a long time, strongly focused on the interaction between research, training and industry. NTNU in Ålesund collaborates closely with GCE Blue Maritime Cluster and the businesses in the maritime cluster on the development of new and useful market-related concepts. This research is both necessary with respect to developing better training and as an engine for new innovations.

THE BUSINESSES RELY HEAVILY ON R&D

The cluster is characterised by its high innovation speed and entrepreneurship. Large parts of the R&D costs in new ship projects are not covered by public subsidies, and are therefore not recorded in official R&D statistics. For example, the Ulstein Group spent NOK 174 million on R&D in 2015. Of this amount, only NOK 4.3 million was received as a public subsidy (2.5%). Every year, Rolls-Royce Marine spends somewhere between NOK 200 and NOK 300 million in the cluster. If we look at the situation overall, it

is likely that the 220 businesses in the cluster spend well over NOK one billion on R&D each year.

TEAMING UP WITH THE PUBLIC

All the same, considerable resources are used up in publicly financed R&D. Figures from the SkatteFUNN scheme, which provides businesses with tax deductions for R&D expenses, show that the maritime cluster in Møre accepts around 25% of all applications on a national basis and this clearly places the region in the number one spot. The

Research Council of Norway, Midtnorsk forskingsfond and VRI have, over recent years, distributed several NOK hundred million in research funds to the maritime industry. Innovation Norway in Møre and Romsdal is clearly Norway's largest grant-providing body and is almost three times as large as the number two county (Nordland) and number three (Hordaland) on the list. In 2015, the total amount committed (in loans and grants) by the organisation was almost NOK 1 billion.

NTNU'S RESEARCH ARENA FOR OCEAN SPACE OPERATIONS (ROSO)

NTNU in Ålesund is planning to build a unique research lab for future ocean space operations. Simulation has been used for decades to test the physical aspects of maritime systems and operations. Simulators are used to train crew to perform

demanding maritime operations. Next generation technology has the potential to provide Virtual Prototyping to pre-test marine operations, including the human component.

This project proposes to move simulation technology from the surface to the ocean environment. By virtually merging offshore industry, fisheries and aquaculture, the largest Norwegian industries, we will be able to create ocean space simulator for future operations.

Innovation is the key to our research. In the future, we will be able to test new ship concepts, experiment with combinations of equipment and train crews in virtual

operations before they are carried out in real operations. Such a development will boost innovation and is at the core of our research. It is also an urgent need to do research of how to manage and perform operation remotely.

The centre will include a flexible set-up for a variety of workplaces on-board as well as remote-operations control centres.

The main display screen is a 10-13 m outdoor spherical dome, using a 360-720 degree projection display solution. Lab facilities such as we propose do not exist in Norway or anywhere else in the world.



AIMING TO INCREASE EXPERTISE IN SUSTAINABLE INNOVATION

SISVI (Sustainable Innovation and Shared Value Creation in Norwegian Industry) is a four-year long expertise project at the interface between industry and research. The overarching objective of the project is increased Norwegian industry competitiveness founded on shared value creation and sustainability where strategic, economic and societal needs are in confluence.

Specific company goals:

The integration of knowledge spanning traditional perceptions of internationalisation, innovation and value chain management and making this available through

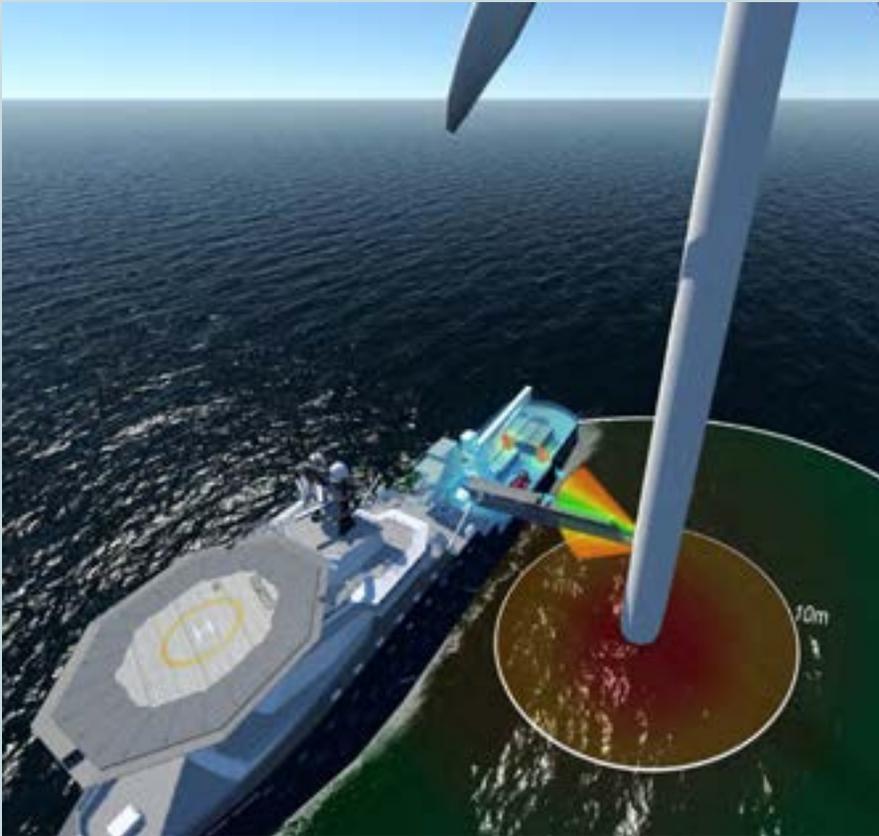
- Guidelines and decision support tools to help implement sustainability strategies in the companies
- Business models (Corporate governance models) focussing on sustainability, accountability and shared value / sustainability, accountability and shared value creation

GCE Blue Maritime is partner in the project

FROM OFFSHORE TO ONSHORE

The BIA X advanced building project aims to develop and implement a simulator platform that will serve as a process and planning tool during construction of complex buildings. The simulator will utilise LEAN construction methodologies and be developed in cooperation with NTNU. It

will be used for basic training and common understanding during building and construction operations, as well as LEAN constructions. GCE Blue Maritime is partner in the project.



SFI MOVE

NTNU in Ålesund is home to SFI Move (Centre for Research-based Innovation in Marine Operations). This is an eight-year research programme with a budget of NOK 200 million. The main objective is to establish a world leading research and innovation centre for demanding marine operations. GCE Blue Maritime is a partner in the project.

EXAMPLES OF ONGOING PROJECTS:

SAFE – ALL YEAR – COST EFFICIENT SUBSEA OPERATIONS

Subsea installation and services have operational limitations due to environmental conditions such as waves, wind, currents and water depth. As subsea field developments are getting more extensive and complex, there is an increasing need for low cost all-year marine operations.

Objectives to improve of the operational limitations are:

- Improve HSE by making the operations more robust vs. available weather window.
- Make operations safer and with required accuracy.
- Reduce total field development costs by more cost-efficient marine operations.
- Increase operational efficiency of subsea fields by all year vessel operation.

INNOVATIVE INSTALLATION OF OFFSHORE WIND POWER SYSTEMS

Wind energy is now a 72 billion Euro and 300.000 jobs industry in Europe and it is expected to serve 25 % of the EU's electricity needs in 2030. Offshore wind is expected to grow by 28 % yearly (WindEurope).

A year ago it was announced that Statoil is building the world's first floating wind farm off Scotland, at a total cost of around NOK two billion.

Today, wind turbines installed in shallow waters with jack-up ships and performed in 5 lifting operations after the foundation is set out. The maritime operations represent 30-45% of the cost of building out offshore wind. There is therefore a need for new technology to reduce costs.

In the long term, we believe that new wind farms will be located in areas with deeper water. SFI MOVE works with innovative solutions that allow to mount offshore wind turbines in one lift from floating vessels. This requires advanced robotic technology which compensates for heave and roll of the ship.

VIRTUAL PROTOTYPING OF MARINE OPERATIONS

The idea is to implement a simulation oriented design approach in the maritime industry, from design to execution of the operation to increase innovation speed and cut time to market.

The motivation for this framework is:

- Transform the industry to a performance oriented operation approach.
- Increase innovation by fast prototyping
- Reduce cost by reuse for models during the process from preliminary investigations to execution of operations

The project want to develop:

- Common standards and format for the maritime industry
- Generic models allowing suppliers in the maritime industry to customize behaviour and deliver models as a part of their delivery.
- Scalable systems, from integrated system to on-board systems
- Smooth transitions from heavy simulations to real-time systems





WANTS TO CRACK THE DIGITAL MARKETING CODE

A new innovation project intends to highlight recently acquired knowledge about international digital marketing for the maritime cluster. The Ålesund company Racer is managing the project along with the Ulstein Group, Metizoft, Uptime, GCE Blue Maritime and Innovation Norway.

Increasingly tough competition and a need for reorganisation in the maritime industry have led to a greater focus on cost/benefit analysis of the implemented marketing initiatives.

«When using digital platforms such as Google, Baidu and Facebook, we want to find the answers to how the maritime industry can most effectively promote itself on the international scene», says Racer's Olav Sindre Kriken.

«We want to measure the impact and costs of the targeted use of digital channels, both organically and via purchased placement, and this will give us a clear roadmap as to how the maritime cluster can most cost-effectively reach out internationally, and by so doing make optimum use of its investment in marketing. We're doing this by stocking up on Big Data from prospective sales leads from, for example, Asia and Europe, and analysing and visualising them», says Kriken.

Lene Trude Solheim from the Ulstein Group says that they are using a proportion of their

resources in digital marketing via digital channels. Meanwhile, she thinks there is massive potential for finding out more about how it really works.

«Briefly put, we're going to collect as much data as we can, to be able to digitally put out a relevant marketing message directed at a better segmented audience», she concludes.

Frank Støyva Emblem of the GCE Blue Maritime Cluster is in no doubt that this work will prove important for the industry.

«From our perspective, it's of ultimate importance that we acquire new knowledge about this area, because it's been taking quantum leaps in recent years. This is ground-breaking stuff, and it's where we have to be», he says.

FIELD DEVELOPMENT IN REMOTE AND HARSH ENVIRONMENTS



NTNU, the Memorial University of Newfoundland (MUN), Statoil and GCE Blue Maritime are developing leading environments within field development and operations in challenging and remote areas.

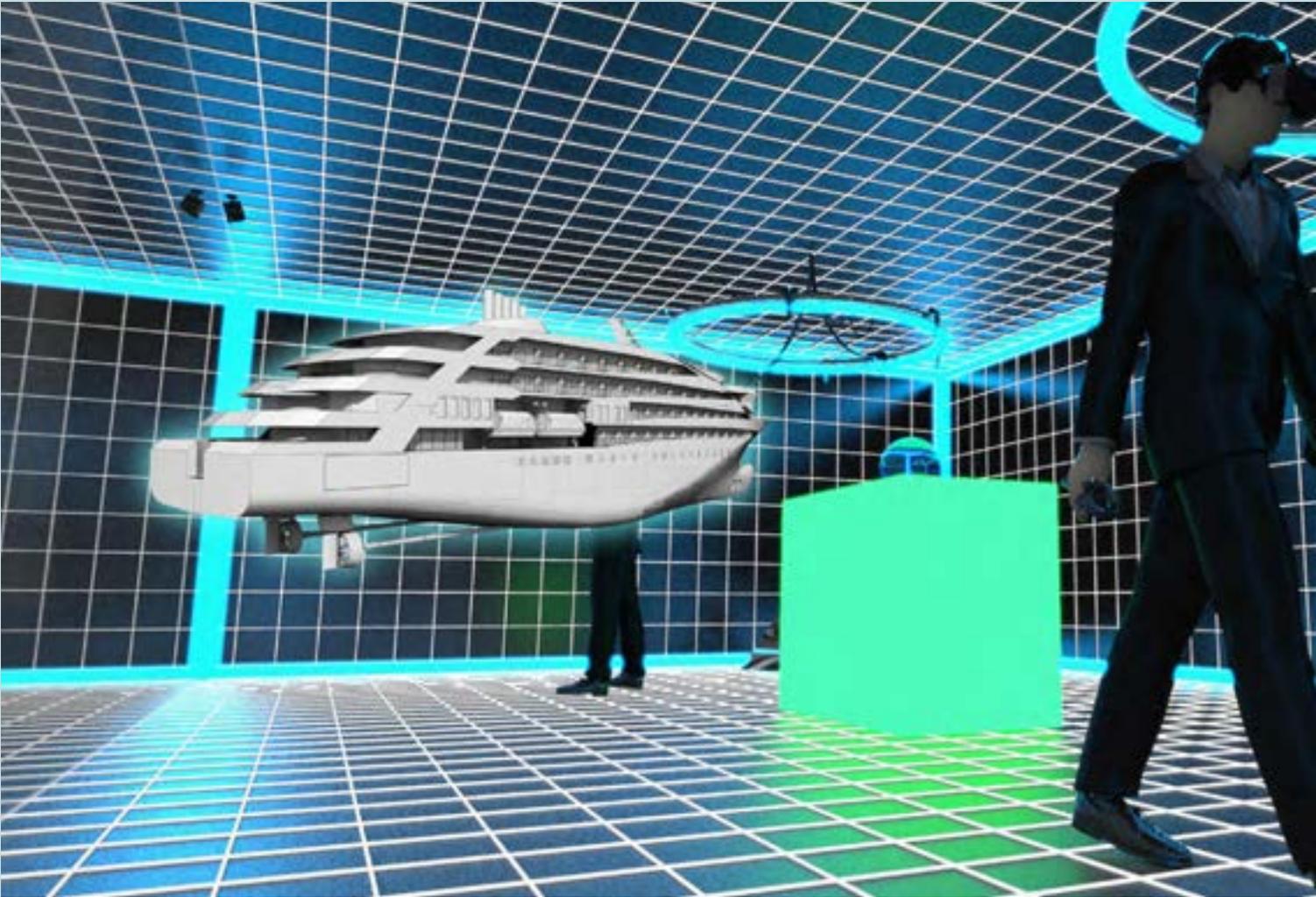
This is a 3-year project aimed at establishing an enhanced level of cooperation between the foregoing institutions. A successful workshop in Trondheim was held on 8/9 February around the topic of «Field development in remote and

harsh environments». 25 delegates took part and the issues discussed were marine operations, autonomous operations, integrated operations, logistics and contingency, drilling and improved recovery.

Norwegian and Canadian industry will contribute with relevant issues and challenges that a number of master's and doctoral students will be working with in the years ahead. The objective is to establish a world-leading academic and industrial environment within

field development and operations in challenging areas, and this should contribute to an increase in Norwegian and Canadian value creation.

One element of the project was the participation by students from NTNU and MUN in a six week summer school in St. John's in Newfoundland, Canada during 2016.



BLUE OCEAN INNOVATION ARENA

Accelerating innovation

The Blue Ocean Innovation Arena is on track. In October 2017, the plan is to open the doors to unveil the innovation platform of the future; a joint innovation infrastructure for companies and start-ups that want to speed up innovation in their effort in commercialising the oceans. Here, business and

research will work together to develop tomorrow's technical solutions and business models. The aim is to reinforce cross-over collaboration between the clusters in different sectors and technology areas to accelerate innovation, entrepreneurship, and scaling of companies.



Illustration: OSC / VARD



NEED FOR CHANGE

The maritime cluster in Møre is known for its global importance within the fields of design, production and operation of advanced offshore vessels. Since the 1970's, the technology has been developed in close collaboration with customers, becoming ever more advanced and complex. One of the enablers for this journey has been the ability to innovate fast, built on high level of experience-based skills and farsighted ship owners.

The slowdown in the oil and gas business is hitting the cluster hard. There is a need for reorientation into other market segments, including those who formed the hotbed for the industry. Fortunately, these segments have moved on with respect to complexity, e.g. introducing advanced low emission

propulsions system and on board fish treatment facilities, making Norwegian yards and suppliers competitive.

To stay ahead, building a winning strategy on innovation speed and cost reductions will be necessary. As the experienced based innovation platform was challenged by global value chains even before the slowdown, mastering the digital innovation and production platform becomes crucial.

Pioneering this transition and contributing to a revived innovation platform to face the new challenges is an important part of the GCE Blue Maritime task.

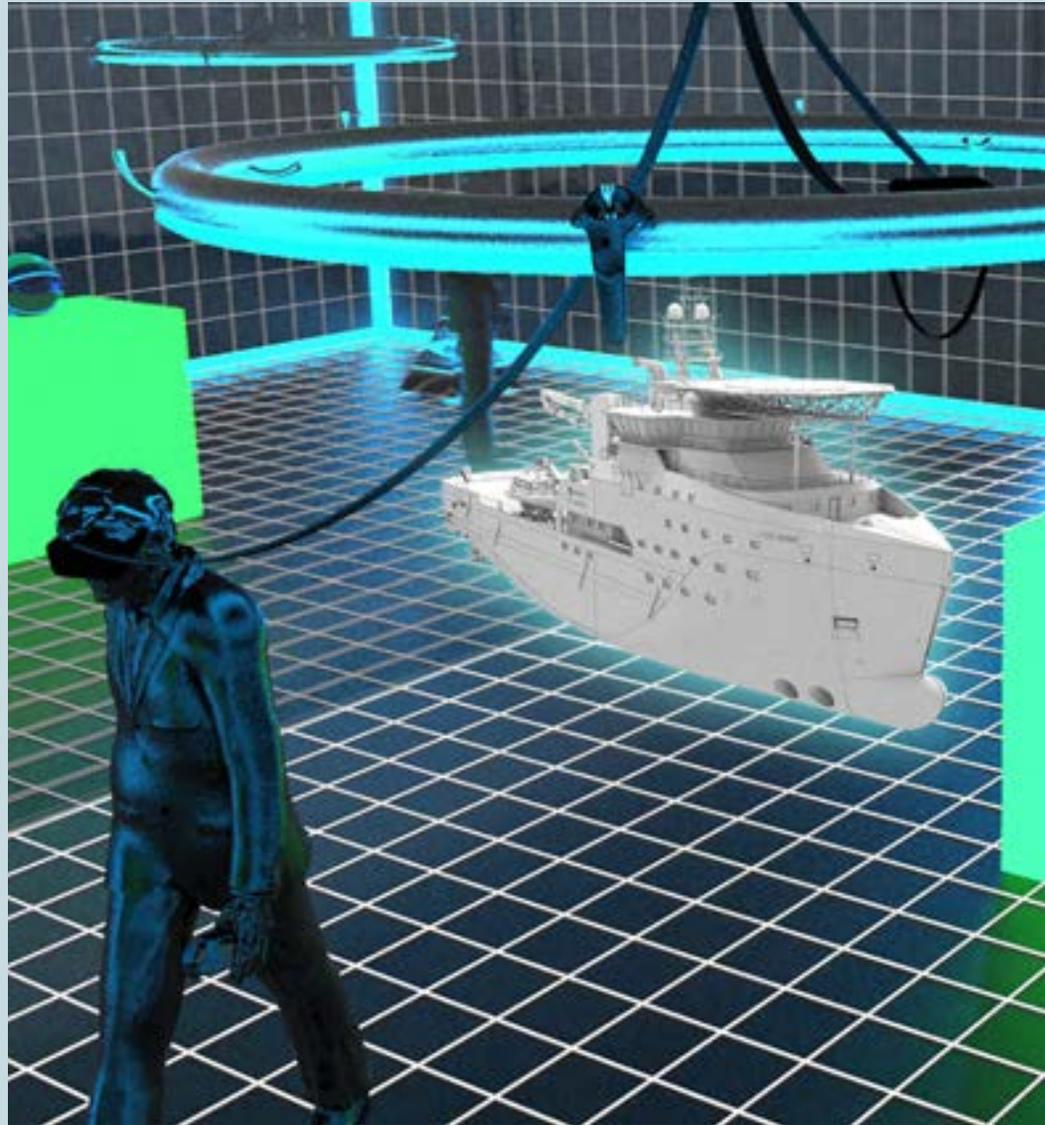
VISUALISATION THEATRES

The most important physical asset of the arena will be the three visualisation theatres:

- XPO, a 25 m2 high resolution display, with double visibility – from the foyer downstairs and inside the facility.
- 360°, a high resolution circular 3m x 28 m display, visible both from inside and outside the circle, surrounding a 60 m2 large meeting room.
- VRLAB, a 50 m2 large lab, providing the latest there is of head-mounted displays (AR and VR glasses) and high precision position systems.

The facility will be staffed by highly skilled people to ensure the expected user experience and result for the different user groups – students, start-ups and companies. The visualisation theatres are generic by nature, and designed for multi-use, including:

- Virtual prototyping, enabling companies



to test new concepts, engineering and production solutions by exploring the solutions virtually before they are built.

- Virtual trialling, making it possible to take a virtual tour of e.g. the vessel before constructed, either to convince the customer, test the performance or acquainting the crew before handing over the vessel.
- Virtual training, providing training of e.g. service personnel in disassembling and assembling equipment before doing this in the field.
- Big Data exploration, visualisation of big data sets to enable humans to extract the inherited, hidden information. From all information on board a vessel to the monitoring of different biological stocks and the environment.

START-UP ACCELERATION

The start-up lab will be an important integrated part of the facility. The lab will build on the principles and tools established and developed in the MIT REAP project – bringing together five major stakeholders; academia, entrepreneurs, risk capital, government and businesses. Early testing of hypothesis, both technical and business wise, is crucial and the arena will be used to visualise ideas and involving these stakeholders. Since speed is crucial for effective incubation, the arena can become a central tool for accelerating the process.

COMPETENCE BUILDING AND SHARING

Building knowledge is essential, both in the industry, amongst the start-ups, the students and the surroundings.

For NTNU and the students, the arena will provide facilities for training in 3D, virtual prototyping, visualisation and associated disciplines, including the facilitation of master students. It's a goal that blending companies, students and entrepreneurs shall trigger new business ideas not born otherwise.

The arena will also be the host for a lot of different kinds of events and seminars, ranging from market and technology development, to business models and trends driving the future. Some very targeting, other more generic or cross sectorial.



PILOT PROJECT IN THE BRAND NORWAY INITIATIVE

Brand Norway is one of Innovation Norway's strategic priorities for the next four years and aims to develop a strong common brand for Norway. GCE Blue Maritime and the other ocean clusters will be a pilot project in this national initiative.

The project will contribute to increased growth and value creation by strengthening Norwegian export and ensure access to capital, knowledge, talent and tourists. One wishes to unite business and government in a common and long-term commitment that will permit increased exports and economic growth across industries.

- This is not about creating a new logo for Norway, but a comprehensive strategy to strengthen our international competitiveness. The ocean industries are Norway's strongest card internationally and we believe it is important to be involved in developing a new national brand, says Per Erik Dalen, GCE Blue Maritime.

The project has defined five key focus areas:

- An aggressive export strategy for Norwegian goods and services
- A strategy to attract foreign investors, talents and tourists
- An adaptation of Innovation Norway tools
- Establish collaboration arenas
- Develop a Norwegian brand and communications platform

The first workshops in the project started up this autumn

GCE COLLABORATION ON INDUSTRIE 4.0 PROJECT

GCE Blue Maritime, GCE Subsea and GCE NODE have been awarded 2 million Norwegian kroner for a joint project.

The Norwegian government announced this year funding of 20 million Norwegian kroner to support restructuring of the supplier industry within the petroleum sector in Southern and Western Norway. The three GCE Clusters in Norway have initiated a collaborative project to take a leading position in the ongoing restructuring.

INCREASED COMPETITIVENESS

The main objective of the project is to contribute to increased competitiveness in the GCE's partner and member companies' main

markets nationally and internationally. This includes new business models and new technologies for lowering opex and capex.

The project will focus on four strategic areas, closely linked to industrie 4.0, all of which have the potential for significant cost reductions; framework conditions, innovations along the supply chain, new production technologies, and new maintenance and operating systems.

INDUSTRY INVOLVEMENT

The project had a kick-off medio November and will involve a series of industry focus group meetings and workshops.



Workshop in Design Thinking held by Ade Mabogunje from Stanford University

INTER CLUSTER COLLABORATION

GCE Blue Maritime Cluster enjoys broad and vigorous collaboration with a number of technology and industry environments, both nationally and internationally. The excellent collaboration with technology clusters in Norway continues. This is especially true when it comes to the oil technology environments of GCE Node and GCE Subsea. The excellent collaboration with NCE

System Engineering Kongsberg and the manufacturing environment surrounding NCE Raufoss is also on-going. The clusters have complementary technology skills and a range of common challenges.

INTERNATIONAL NETWORKS

During last year, GCE Blue Maritime has been working with selected technology and

knowledge environments, such as Silicon Valley and Boston, to set up new knowledge links. The work to establish the Blue Ocean Innovation Arena involved linking up with robust environments in VR technology in France and the UK.



TURKISH COASTER FLEET RENEWAL PROJECT

The GCE Blue Maritime Cluster and Innovation Norway's office in Istanbul has for many years worked to lay the groundwork to allow Norwegian designers and equipment suppliers to be able to collaborate with Turkish shipowners and shipyards in terms of short sea vessels. Per Erik Dalen, CEO of GCE Blue Maritime Cluster recently went to Istanbul for a project meeting in the «Turkish Coaster Fleet Renewal Project».

The host of the meeting was the Turkish Chamber of Shipping, with whom GCE Blue Maritime signed an MOU in 2014. The Norwegian participants were the Norwegian Ambassador to Turkey, Mr. Vegard Ellefsen and representatives from Innovation Norway. There is a growing market for Norwegian design and marine equipment in Turkey.

IN2 FRAM TURKEY

During the spring of 2016, GCE Blue Maritime and Innovation Norway ran a new international programme for maritime equipment and service providers in the SMB segment. The programme was aimed at smaller companies wanting to establish themselves or expand their businesses in Turkey. 8 companies from the cluster participated in this year's programme.

STUDY TOUR TO THE OFFSHORE WIND HUB IN ESBJERG

In May, GCE Blue Maritime organised a study to Esbjerg in Denmark to learn more about offshore wind and marine operations associated with this industry. The programme has been developed in collaboration with Offshore Energy DK which is one of GCE Blue Maritime's former partners in the EU project, ECOWindS.

The purpose of the trip was to learn more about the offshore wind industry in Esbjerg, to establish contacts and to explore the possibilities of cooperative efforts with Danish partners. The principal focus was on maritime logistics related to offshore wind operations. A number of key players from Esbjerg's robust offshore wind cluster, such as DONG Energy, Vestas

and World Marine Offshore, took part in the programme through lectures, discussions and networking events.



GET INSPIRED!

One of GCE Blue Maritime Cluster's most important tasks is to create meeting places for inspiration, skills development and networking. We are the main organiser and co-host of a number of conferences and seminars. Our events are free of charge and represent a central component of what we offer to all of the businesses in the cluster. They have become an important meeting point for the entire industry.



ÅKP Innovation

Courses and seminars for students, entrepreneurs, growth businesses and SMBs

GCE Blue Maritime Cluster's seminars:

- With Inside Information
- GCE Technofocus
- GCE Human Factor
- MarSem

Conferences:

- GCE Blue Maritime Cluster's annual conference - the cluster conference
- Fosnavåg conference
- Haram conference
- Mørebenk conference

COLLABORATION WITH OTHER ORGANISATIONS

The GCE Blue Maritime Cluster collaborates with a number of organisations in the industry and business world on specific projects and activities. In Møre, we work closely together with Mafoss, Maritimt Forum Nordvest, Ungt Entreprenørskap (UE) NHO and LO. This is primarily in joint recruitment projects and providing knowledge to young people. We are also collaborating with the organisations «Norges varemesse» and «Nor-Shipping» in relation to Ocean Industry Talents, in which GCE Blue Maritime is a member of the Board.

GCE Blue Maritime is a member of both INTSOK and Norwegian Maritime Exporters (NME) and works with these industry organisations. INTSOK's Arctic and cold climate solutions is a project in which GCE Blue Maritime is a partner. In 2016, GCE Blue Maritime joined the Norwegian Association for Autonomous Vessels (NFSA)

MARITIME CLUSTER COOPERATION NORWAY - SOUTH AFRICA

GCE Blue Maritime, together with GCE Node and GCE Subsea, have contributed to the development of a South African maritime cluster programme. The South African Maritime Safety Authority (SAMSA) would like to benefit from Norwegian experiences related to cluster thinking. The initiative is being run by the industry itself and GCE Blue Maritime sees this as an opportunity to establish contacts both within the industry and with the South African authorities. South Africa has a central position as the «gateway to Africa» and its economy is expected to grow rapidly in the coming years.



CROSSOVER BETWEEN CLUSTERS IN THE REGION

Møre and Romsdal has many robust industry environments and clusters. The biomarine cluster Blue Legasea, the furniture cluster Norwegian ROOMS and the industrial cluster iKuben are examples of these. In a region where these clusters are important additions to the strong maritime industry, we are now looking for synergies between the various industry clusters. The key words are skill division and collaboration. Work is ongoing with several crossover projects, both between businesses and clusters and also purely inter cluster work.



SIKT 2016 – YOU HAVE MOMENTUM

The innovation power in the strong marine and maritime clusters in Sunnmøre were illuminated when Crown Prince Haakon invited young talents to the annual SIKT Conference at Campus Ålesund in oktober.

The SIKT conference is a unique venue where around 200 young executives and talent aged 20-40 years come together to learn, think aloud, exchange ideas and inspire each other.

The Crown Prince met with representatives from the Maritime and Marine clusters in front of the conference. Shipowner Stig Remøy from Olympic told about his experience as an entrepreneur and how he mobilized his driving force.

– It is an interesting environment for innovation in the Ålesund region. Time after time this area has shown that it can find momentum to rebuild after adversity. We want to bring some of this energy into SIKT, said Crown Prince Haakon.





GCE BLUE MARITIME'S ANNUAL CONFERENCE

Challenging times

The challenging times for the maritime industry left their mark on this year's cluster conference. In a demanding market situation, there was great interest in the fresh market analyses and the cluster analysis. Throughout the year, the shipping companies of the cluster have experienced big challenges over the financing of their activities, and especially with bond issues; and the 250 conference participants were first given a thorough status report from the bond market. Lars Kirkeby from Nordea Markets opened with a discussion of the way forward for restructuring the offshore industry and said there would be more restructuring.

A weakened NOK has been a bright spot for the export sector in 2016. Gaute Langeland, Principal Analyst with Nordea, was able to say that the Norwegian economy has begun to regain its strength. Unem-

ployment nationwide is on the way back down again, but even the western counties continue to be affected by the decline in the oil industry. Interest rates have probably reached their lowest level and it is expected that NOK will slowly and gradually appreciate in the future.

Lars Lysdahl of Rystad Energy pointed out that the sharp decline of investments in oil worldwide would lead to a downturn in production. Demand for oil continues to increase and according to Rystad, the market will be in balance during 2017/2018. Oil prices are then expected to strengthen. The annual cluster analysis this year from Menon Business Economics was thought-provoking for the maritime cluster in Møre. The companies of the cluster are not doing quite as well as other national and international environments. Its productiv-

ity is generally lower than that of the competition. Since 2009, production growth has come to a halt and operating margins have fallen substantially.

Torger Reve presented an analysis this year of the situation in the offshore shipping companies. The shipping companies have traditionally been the drivers in the cluster. He believes there will be consolidations and that local solutions are the best for the cluster. The next best would be for new national owners with a clear understanding of cluster activities. Should the shipyards be bought up by financial funds that would divide them up, that could cause permanent damage to the cluster.

The conference ended with a presentation on Innovation's Ecosystem by Ade Mabogunje of Stanford University.



NETWORKING ARENA

It is important to establish arenas where new knowledge can be shared and new networks

created. All of our events are open and participation is available to all businesses in the cluster.

Conferences:

GCE Blue Maritime's annual conference, the Haram conference, Fosnavåg conference and Mørebenk conference

Seminars:

SMB forum, With Inside Information, Tech Focus, Human Factor, Marsem

Courses:

Big Data, 3D modelling, Systems Engineering, Management in Restructuring.

KNOWLEDGE ABOUT POLITICAL PROCESSES

One important task for the cluster organisation is to provide companies with more knowledge about social and political processes in Norway and internationally that may impact them. The maritime cluster contributes with many jobs, great value creation and has extensive international experience; and it is important that its companies contribute their expertise to such processes. The Government's white paper on industry, the new ocean strategy, Maritime 21, and the regionalisation process are examples of areas they are involved.

THE MØREBENK CONFERENCE

On 18 January, the Mørebenk Conference was organised by NHO, the Chamber of Commerce for the Ålesund region and ÅKP. This is an annual dialogue meeting between Government politicians from Møre and Romsdal County and industry representatives. The theme of the conference was Municipality reforms and regionalisation. Grete Ellingsen, Deputy Minister for Local Government and Regional Development made it clear that municipality mergers are profitable. The challenges to the offshore industry and new ocean business development were also on the agenda during the conference.

BLUE THINK TANK

The big challenge in the situation of the market for certain sectors of the maritime industry has created uncertainty regarding the way forward. An initiative was, therefore, implemented to start a think tank where companies from across the maritime supply chain could meet to discuss future-scenarios. Companies from other academic and industrial sectors were also brought in to give a fresh impetus. During the course of 2016, six think tank sessions were held.



ILLUSTRATION: DOXACOM

PROFESSOR
ALBERTO SOLS

STRENGTHENING OUR EXPERTISE IN KEY AREAS

With major changes in the maritime industry in our region, the need for strengthening and expanding internal expertise has been great. The most important and comprehensive needs expressed by many of the companies are related to broader and more future-oriented technical expertise, which we have tried to meet with measures financed through GCE Blue Maritime.

Following on from the companies in the cluster responding very well to skills measures undertaken in 2015, several new skills-related measures were established for 2016. In partnership with Mafoss and in dialogue with major players in the industry, needs were determined and prioritised. In cooperation with several of the larger educational centres in Norway, a number of technical courses as well as those dealing with change management were scheduled.

3D MODELLING/VIRTUAL PROTOTYPING:

Following on from a request by the GCE Blue Maritime Cluster, NTNU Ålesund implemented its own course in the field of 3D modelling and visualisation. The course content was aimed at technical personnel from design and development environments in the cluster, and the response was very good. Efforts to simplify modelling processes with extensive

use of virtual prototyping and 3-D modelling has become increasingly important and critical in maintaining control over costs in design and development work. Within this discipline, the skills of already well-trained technical personnel within organisations is increased to enhance their innovation and future-oriented project activities.

Cooperation with NTNU Ålesund has been excellent in this field and the cluster companies have already reported a need for additional courses.

SYSTEMS ENGINEERING

In cooperation with the University College of South-East Norway and Professor Alberto Sols, a basic course in Systems Engineering (SE) has been established. A very great need has been defined in some companies for training in SE, and we also perceive that

the need is increasing. The course covers the fundamentals of the development of systematic and technical leadership of major internal processes and development work. Course participants carried out assignments in the subject, and more support is arriving from the companies to go on to undertake graduate studies in this discipline. Due to this very good response, an evaluation will be made of the applicability of further training courses in the subject.

RESTRUCTURING COURSES FOR MANAGERS

In view of the demanding restructuring processes expected in their organisations, several member companies have reported a need for greater expertise in change management. In cooperation with Magnar Hjertenæs of the faculty of Humanities & Education at Volda University College, a course of 8 sessions was established with the theme of leadership in challenging times. The central focus of the course was on restructuring processes and vulnerabilities in organisations undergoing change. The participants included management at various levels from Scana Volda, Klevlen shipyard, Myklebust shipyard, Ulstein Power & Control and Ulstein shipyard. The response from participants as to the course concept and its relevance was excellent.



THE WORLD'S BEST SKILLED WORKER: – *An analysis of future skilled maritime workers*



**FREDRIK
LINGE KLOCK**

What skills and abilities should a skilled worker of the future have? And what does it need to take to get more young people to choose vocational courses? These are the main questions posed by Fredrik Linge Klock in his NTNU Master's thesis, which was commissioned by Mafoss with the support of GCE Blue Maritime. Klock is normally engaged in vocational training for the technical and construction sectors.

THE WORLD'S BEST SKILLED WORKER?

For the maritime industry in Søre Sunnmøre, and for industrial Norway in general, it is essential to ensure access to skilled labour at all levels to combat increasing competition from other countries. The costs involved in running the industrial sector in Norway are high, but the quality of work, delivery precision and development of equipment have led the world. For this to continue to be possible, there is one important prerequisite: that we ensure the

availability of skills at all levels. GCE Blue Maritime and Mafoss wanted to determine how to get good, young people to choose vocational courses and what competencies will be needed by the skilled worker of the future. Interviews were conducted in six different companies in the maritime cluster from April to June this year.

THE MAIN ISSUE IN THE STUDY HAS BEEN:

How can an individual company be certain to build up the necessary technical skills to ensure its competitive advantage by having «the world's best skilled worker»?

The survey was conducted as part of a Master's degree in International Business at NTNU in Ålesund.

The conclusions and recommendations are not yet fully complete, but there are a number of results that may well be worth mentioning:

- Most of those interviewed emphasised the importance of locally based workers
- In all the interviews, great importance was placed on the characteristics associated with positive attitudes, although this is not part of the concept of skills used by the Directorate of Education.
- At the various management levels in the companies, there were different understandings of, and opinions about, the expertise of a skilled worker. Organisational challenges were uncovered.
- The expertise of the skilled worker will have a direct impact on the individual company's competitiveness because expertise is one of the hardest things to duplicate.

A report will be prepared during 2017, which will be sent to the member companies of the maritime cluster.



GREAT ENERGY AT OCEAN TALENT CAMP

The region's largest recruitment event aimed at young people from secondary schools in Møre and Romsdal took place on 21 September at Campus Ålesund. 2,000 pupils and students met employees from all the maritime industry companies.

25 EXHIBITORS

At Ocean Talent Camp (OTC), students gain a good insight into training and career opportunities in the offshore industry. Around 25 businesses and organisations were exhibitors at this year's camp.

TEACHERS' LOUNGE

OTC Møre also arranged the Teachers' Lounge this year, where educators can take a breather, meet colleagues and receive information on the maritime industries. Two mini-seminars were held during the day, the topic of which was the market situation in the maritime industries.

COLLABORATION

10 secondary schools took part in this year's OTC Møre. The camp offers pupils an educational programme consisting of preparatory work, tasks during the visit and subsequent work that provides extra knowledge of working life and the society we live in. A talent test also helps you identify your own interests. The Ocean Talent Camp has gained a national reputation ever since this recruitment event was first held in Oslo in 2013. To date, 30,000 students across the country have attended the various camps.

The OTC Møre was arranged for the fourth time in 2016 and is a collaborative effort between Ålesund University College, Fagskolen i Ålesund, GCE Blue Maritime Cluster, Mafoss and Maritimt Forum Nordvest.

NRK-SERIES: MY PROFESSION

In cooperation with MAFOSS and three separate companies, GCE Blue Maritime has co-financed a short film in the series, «My Profession», which is a teaching series released by NRK (the Norwegian Broadcasting Corporation) for schoolchildren. In the film, shot in Sunnmøre, we meet engineers from Rolls-Royce, Kleven and the Ulstein Group who describe the paths they took to their professions. What these engineers have in common is that they have all taken General Technical Studies (TAF) in their Norwegian high schools, and doing this has been fundamental to their later career choices in the maritime industry. The film is actively used by MAFOSS and the member companies in the promotion of TAF as an important basis for further engineering training.



START FORUM 2016 – NTNU I ÅLESUND

150 delegates from all over Norway attended the spring gathering of the START FORUM in Ålesund. Start Norway is a Norwegian student

organisation founded in 2002 that works to promote innovation and entrepreneurship among students throughout Norway. In addition to NTNU in Ålesund, Start Norway is represented in all universities in the country, as well as in several colleges.

Members of Start are seen as being some of the most dedicated and innovative students in the country. Over three jam-packed days they got to experience our region and our business com-

munity. There were lectures, workshops and even a treasure hunt. All based on the theme of innovation.

START and other student organisations are important contributors to creating a vibrant and attractive student environment at Campus Ålesund. An attractive student environment is important for the maritime cluster in Møre and for this reason, GCE Blue Maritime Cluster made a strong contribution in organising the gathering.



«YOUR MARITIME FUTURE» – TECHNOLOGY AND ENGINEERING COURSE

GCE Blue Maritime Cluster and several leading companies in the cluster has for over 15 years organized a motivational course for the engineering profession. With the current downturn in the offshore industry it is more important than ever to show the young talent the rich possibilities in the maritime sector. In 2016, the course was held 8-12. February. The organizers were VARD, the

Ulstein Group, Kleven and Rolls Royce Marine, along with the organizations Mafoss and GCE Blue Maritime.

This year 13 top students from the secondary schools Fagerlia, Volda, Spjelkavik, Haram and Ulstein participated. The course provides a good introduction into the opportunities offered by the engineering profession in a world-leading maritime cluster. Using theory, visits to companies and social events, we hope to motivate young people to undertake advanced technical training and find a place as resource personnel in the maritime cluster at the end of their studies. Assessments of the course show that it is very well received by the students and that over 50 per cent of the participants go onto work as engineers.



A GOOD REPUTATION

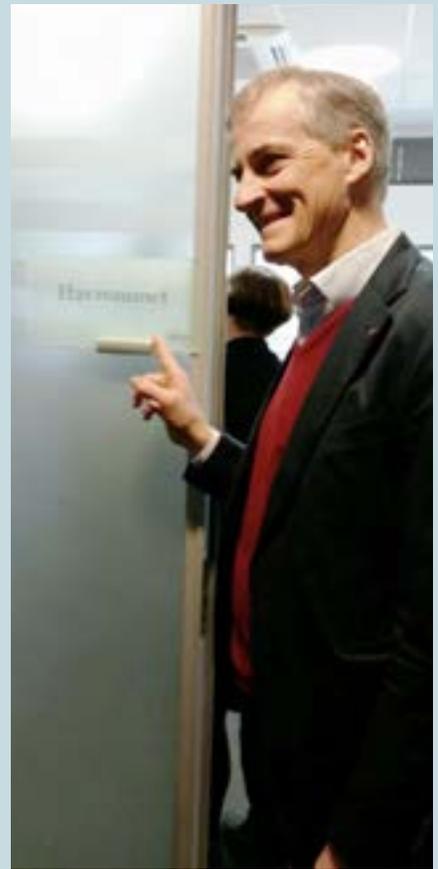
PRESS, HOSTING AND COMMUNICATIONS

Strategic positioning and branding are becoming increasingly more important to secure competitiveness for the future. Research shows that a good reputation increases corporate worth. A company's social responsibility, executive positioning and appropriate use of social media are perceived as important elements of a company's work.

In a global maritime industry characterised by fierce competition, a company's reputation can be critical to ensuring recruitment of talented and skilled workers, good market access and a good relationship with the press and interested organisations. The GCE Blue Maritime Cluster works actively to build a good reputation for its maritime cluster in Møre.

ACTIVITIES THAT STRENGTHEN OUR OVERALL REPUTATION:

- Contact with the press, and organised trips for the press
- Workshops in strategic positioning and branding
- Hosting delegations from home and abroad
- Marketing and communications activities
- Newsletters, websites and social media



BRAND NORWAY STRATEGY

Brand Norway is one of Innovation Norway's strategic priorities for the next four years and aims to develop a strong common brand for Norway. GCE Blue Maritime and the other ocean clusters will be a pilot project in this national initiative.

The project will contribute to increased growth and value creation by strengthening Norwegian export and ensure access to capital, knowledge, talent and tourists. One

wishes to unite business and government in a common and long-term commitment that will permit increased exports and economic growth across industries.

The project has defined five key focus areas:

- An aggressive export strategy for Norwegian goods and services
- A strategy to attract foreign investors, talents and tourists
- An adaptation of Innovation Norway tools
- Establish collaboration arenas
- Develop a Norwegian brand and communications platform

PRESS RELATIONS

A number of meetings are conducted annually with Norwegian and international press. This year's Blue C Press Tour was held in September. It gathered 12 international journalists from key maritime journals and from the news media. The maritime cluster in Møre is a very interesting place for journalists. The trip led to a number of articles and publicity from our companies.

DIGITAL MARKETING

Facebook, Twitter, LinkedIn and Google has for many years been used actively to build a good reputation for the maritime cluster in Møre. A new research and innovation project that looks at digital marketing in the marine industry has been implemented that aims to increase knowledge about new and important changes in this field. We will also offer workshops on digital marketing and targeted use of social media to the members of the cluster.

Find us at:

Twitter

Facebook

LinkedIn

www.bluemaritimecluster.no



THE MARITIME CLUSTER IN MØRE

7OCEAN AS | AAS MEK VERKSTED AS | ACEL AS | ADIMA AS | AHLSELL NORGE AS AVD ULSTEINVIK | ALFR. NESSET AS | ALUDESIGN AS | AMECO AS | ARILD MORK INSTRUMENTERING AS | ASK SAFETY AS | ASPER NORWAY AS | ASTERO AS | ATLANTCONSULT MARINE AS | AUKRA MARITIME AS | AXTECH AS | BANDAK ENGINEERING AS | BARO MEK. VERKSTED AS | BAS ENGINEERING AS | BJØRDAL INDUSTRIER AS | BJØRSHOL MEKANISKE AS | BOURBON OFFSHORE NORWAY AS | BRASTAD SKIPSSERVICE AS | BRATTVÅG ELEKTRO AS | BRATTVÅG MEK. VERKSTED AS | BREIVIK MEK. VERKSTED AS | BRUDE SAFETY AS | BRUDE SERVICE AS | BRUNVOLL AS | CARIBE AS | CEBRUM AS | CFLOW AS | FISH HANDLING AS | DET NORSKE VERITAS AS | DEVOLD AMT AS | DOXACOM | ELMARIN AS | ELMO TEKNIKK AS | EMIL LANGVA AS | ERLING MYKLEBUST MEK. VERKSTED AS | ET HYDRAULIKK AS | FAGSKOLEN I ÅLESUND | FARSTAD SHIPPING ASA | FILTRA AS | FINNØY GEAR & PROPELLER AS | FISKERSTRAND VERFT AS | FLORVAAG ELEKTRONIKK AS | FORA FORM AS | FOSNAVAAG WELLBOAT AS | FRIONORDICA AS | FRONT SAFETY AS | FUPE SYSTEMS AS | FURUNO NORGE AS | GE RØR OG STÅL AS | GLAMOX ASA | GOLDEN ENERGY OFFSHORE SERVICES NORWAY AS | GURSKØY AS | HANS-PETTER BRATHAUG AS | HAREID ELEKTRISKE TEKNIKK AS | HAREID SKIPSSERVICE AS | HAST AUTOMASJON AS | HASUND MEK. VERKSTED AS | HATLEHOL PRODUKTER AS | HAVILA SHIPPING ASA | HAVYARD GROUP | HAVYARD DESIGN & ENGINEERING AS | HEIMDAL PROPULSION NORWAY AS | HELLAND RØR AS | HELSETH AS | HELSETH RØR AS | HENRIKSEN MEKANISKE AS | HG MARINE ELECTRONICS AS | HUSE ENGINEERING AS | HYDRA PIPE AS | HØGSKOLEN I MOLDE | HØGSKULEN I VOLD | HØGSKOLEN I ÅLESUND | I.P. HUSE AS | ICD SOFTWARE AS | INDUSTRI OG SKIPSELEKTRO AS | INNOVASJON NORGE | INMARSAT SOLUTIONS AS | INPOWER AS | INVENTAS ÅLESUND AS | ISLAND OFFSHORE MANAGEMENT AS | ISOWEST AS | J. WEIBERG GULLIKSEN AS | JEMAR NORPOWER AS | JETS VACUUM AS | JOHN GJERDE AS | JOHNSON CONTROLS NORWAY AS REFRIGERATION ÅLESUND | KLEVEN | KONGSBERG DEVOTEK AS AVD ÅLESUND | KONGSBERG EVOTEC AS | KOPPERNÆSGRUPPEN | KRAEMER MARITIME AS AVD ÅLESUND | KRISTIANSUND ISOLERING AS | LANGSET TEKNIKK AS | LARSNES MEK VERKSTED AS | LIBRA-PLAST AS | LK VALVES AS | LUMINELL AS | MAFOSS | MARE SAFETY AS | MARIN TEKNIKK AS | MARINE RÅDGIVNINGSTJENESTER AS | MARINELEKTRONIKK AS | MARITECH SYSTEMS AS | MARITIM MOTOR AS | MARITIM MOTOR PRODUKTER AS | MARITIME AS | MARITIME MØBLER AS | MARITIME PARTNER AS | MARITIMT FORUM NORDVEST | MARITIMT MAGASIN | MAROFF CREWING AS | MASKINDYNAMIKK AS | MB HYDRAULIKK AS | MEDI 3 MARINE | MESTERPLAST AS | METIZOFT AS | MMC GREEN TECHNOLOGY AS | MOLDE JARNVAREFORRETNING AS | MOLTECH NORGE AS | MRF FJORD 1 AS | MYKLEBUST VERFT AS | MØRE MARITIME AS | MØRE OG ROMSDAL FYLKE | MØRE SVEISESENTER AS | MØRENOT AS | MØRE TRAFØ AS | NAVATEK AS | NEPTUNE OFFSHORE AS | NILS S. HANSEN AS | NOGVA MOTORFABRIKK AS | NORDEA | NORDVEST FORUM | NORDVEST MARIN AS | NORDVEST SVEIS AS | NORGES FORSKNINGSRÅD | NORWEST AAKRE AS | NYBORG AS | O. ØVERLAND AS | OFFSHORE & TRAWL SUPPLY AS | OFFSHORE SIMULATOR CENTRE AS | OLYMPIC SHIPPING AS | OPSTAD OFFSHORE AS | OSHAUG METALL AS | PARTNER PLAST AS | PLANY | PLATO AS | PLUGGFABRIKKEN TOR AS | PMC SERVI TECHNICS AS | POLYFORM AS | POWEX AS | PREPLAST INDUSTRIER AS | PROMARIN AS | R&M SHIP INTERIOR AS | RALF SKRAM AS | REGATTA | REKDAL INDUSTRIER AS | REM OFFSHORE ASA | REMØY MANAGEMENT AS | REMØY SHIPPING AS | ROLLS-ROYCE MARINE AS | ROSTEIN AS | RØRTEK AS | SALTHAMMER BÅTBYGGERI AS | SANCO SHIPPING AS | SANDBLOST AS | SCANA VOLD | SEAONICS AS | SEBASTIAN AS | SERVITEC GROUP NORWAY | SEVI AS | SHALK ENGINEERING AS | SHAPE AS | SHIPADMIN AS | SKAMEK AS | SKIPSTEKNISK AS | SKORGENES SERVICE AS | SLETTA VERFT AS | SOLSTRAND TRADING AS | SOLSTRAND VERFT AS | SEMCO MARITIME | SPAREBANKEN MØRE | SPERRE INDUSTRI AS | SPERRE SVEIS AS **STADT AS** | STADT TOWING TANK AS | STEEL TECH AS | STP AS | STRANDA VERKSTED AS | VARD ACCOMODATION | VARD | VARD DESIGN | VARD ELECTRO | VARD PIPING | SUNNMØRE LIVBELTEFABRIKK AS | SVEISEREPARATØREN AS | SYKKYLVEN MASKINERING AS | SYKKYLVEN STÅL AS | SØLVTRANS HOLDING AS | TESS MØRE AS | THEMIS CREATE AS | TOMRA ENGINEERING AS | TOMREFJORD RØR OG MONTERING AS | TOOLS NORD AS | TRIPLEX AS | TUSSA INSTALLASJON AS | UKSNØY & CO AS | ULMATEC COMPONENTS AS | ULMATEC PYRO AS | ULMATEC SKIPSSERVICE AS | ULMATEC STROMEK AS | ULSTEIN DESIGN & SOLUTIONS AS | ULSTEIN POWER & CONTROL AS | ULSTEIN GROUP | UNDERTUN INDUSTRI AS | UPTIME INTERNATIONAL AS | VAAGLAND BÅTBYGGERI AS | VARDE AS | VEGSUND SLIP AS | VELLO NORDIC | VENTIQ AS | VESTNES ELEKTRO AS | VESTSINK AS | VIGOR KRISTIANSUND AS | VIK ELEKTRO AS | VIKE AS | VOLSTAD MARITIME AS | VULKAN SKANDINAVIA AS | WEST MARITIME AS | WESTCOAT AS | WESTING AS | WEST OIL TOOLS AS | WILHELMSSEN SHIPS SERVICE AVD SIS CONSULT (ÅLESUND) | WISE CONSULTING AS | ZENITH ELEKTRO AS | ÅLESUND DATA AS

13 DESIGN COMPANIES **19** SHIPPING COMPANIES

14 SHIPYARDS **170** SHIP EQUIPMENT SUPPLIERS

16 000 SKILLED EMPLOYEES

61.5 BILLION NOK IN TURNOVER (2016)



**BLUE
MARITIME
CLUSTER**

GLOBAL CENTRE OF EXPERTISE
NORWAY

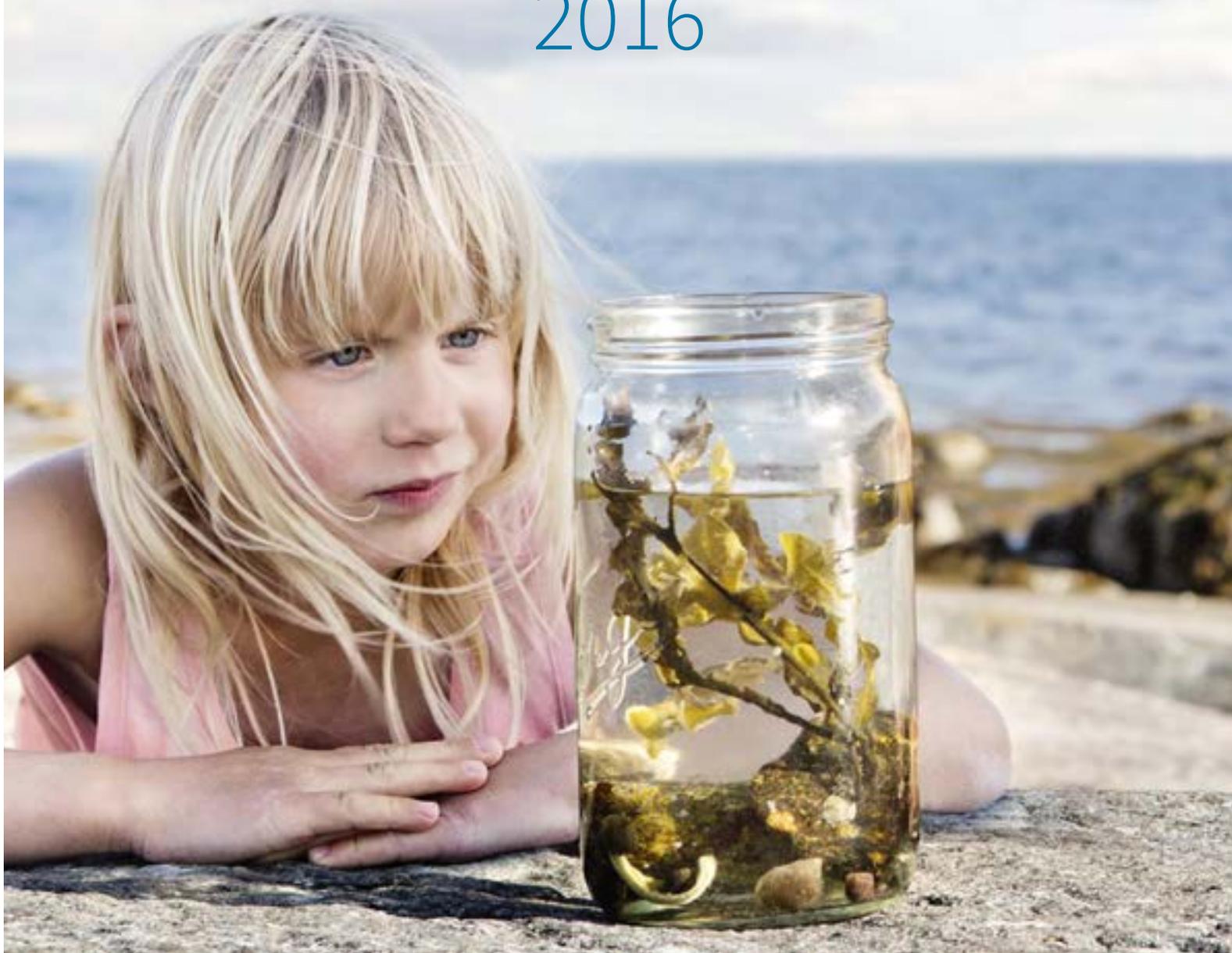


BLUE LEGASEA™

Norwegian Biomarine Resources

REVIEW

2016



A three kilo Barents Sea cod gives two kilos of headed / gutted fish and one kilo of trimmings providing half a desilitre of oil and 200 grams of protein, plus calcium. Three kilos of cod consists of five dinner servings of cod filets, three daily servings of high value protein, ten daily doses of oil and 13-14 daily doses of calcium. Today we throw away 150 million kilos of this raw material from norwegian fishing vessels. We can build a new industry in need of new vessels.

TORE ROALDSNES
Nordic Wildfish

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BUSINESSES:

Aker Biomarine, Arctic Nutrition, Berg Lipidtech, Brødrene Sperre, Calanus, FMC/Epax Norway, Eros/Ramoen, Eurofins, Firmenich Bjørge Biomarin, GC Rieber Oils, Havfisk, Innolipid, Marine Harvest, Marine Ingredients, Nordic Wildfish, Orkla Health div. Denomega, Pharma Marine, Rimfrost, Sparebanken Møre, Strand Sea Service, Vedde, Vital Seafood.

R&D AND SIMILAR:

GOED, Helse Møre og Romsdal, Norwegian University of Science and Technology (NTNU Ålesund), Møreforskning, Sintef Fiskeri og Havbruk, ÅKP.



Blue Legasea's aim is to become a global hub for the production of sustainable, healthy marine ingredients, based on the refining of trimmings from fish processing and biomass that is not destined to become food. Such use of residual raw materials will increase sustainability and value creation throughout the seafood industry.

Within a geographically very restricted area, the Møre region represents one of the world's most comprehensive marine clusters. The cluster covers all of the important functions in the value chain, from fish resource to customer, and a close collaboration has developed between the industry, suppliers, education and research institutions. In 2013, Blue Legasea acquired the status of «Norwegian Innovation Cluster» through the Arena programme. ÅKP is facilitating the project. Some results of the collaboration were achieved quicker than most of us expected.

Blue Legasea currently comprises 28 selected partners, of which 22 are businesses and 6 are R&D organisations. Over the last 2 years the businesses have seen 30 per cent growth in sales. Blue Legasea has now reached the point where it is natural to take the next step, and would like to acquire more members in 2016. Møre has around 500 businesses related to seafood, and they represent in total annual sales of at least NOK 36 billion.



BLUE LEGASEA™

Norwegian Biomarine Resources

BLUE LEGASEA INDUSTRY MEMBERS:

HC OMEGA 3

- Calanus
- GC Rieber Oils
- Pharma Marine
- Marine Ingredients
- Orkla Health/Denomega
- FMC/Epax
- Rimfrost
- Arctic Nutrition
- Aker Biomarine

FISH OIL /FISH MEAL:

- Vedde
- Strand Sea Service
- Eros/Ramoen
- Havfisk
- Vital Seafood
- Marine Harvest
- Nordic Wildfish
- Br. Sperre



**Norwegian
Biomarine
Resources**



HC PROTEIN INGREDIENTS:

- Firmenich Bjørge Biomarine
- Arctic Nutrition

MØRE – A GLOBAL MARINE SPEARHEAD

The region's most advantageous natural resource is a rich marine biomass. This is connected to the shape of the continental shelf and marine currents that ensure a high nutrient content in the ocean. These conditions are only present in a few other locations across the globe, for example off the coast of West Africa and in South America.

Furthermore, Norway and Møre enjoy certain structural advantages in well-developed and sustainable management systems and a world-leading maritime industry. These circumstances have made Møre a unique marine region on the global scale, as shown below:

- Norway is the world's second-largest seafood exporter (see top figure on the right). Norway is also renowned for its marine

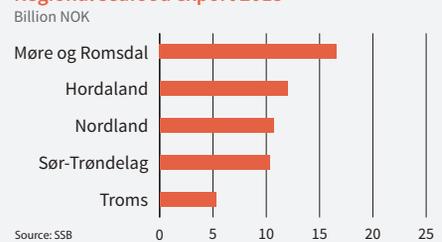
biomass management systems, which add credibility to the Norwegian reputation in documentable sustainability.

- Møre and Romsdal is the most important county in Norway when it comes to the export of seafood (see bottom figure on the right). It is also the region with the highest level of processing activity, and consequently the largest producer of trimmings. The expertise in this value chain is another important reason why this region is the centre of the country's marine ingredient industry (see map at the top).
- These facts also explain why large international corporations such as Firmenich, FMC and KD Pharma establish themselves in the region.

Global seafood export 2015



Regional seafood export 2015





LEFT: HRH Crown Prince Haakon and HRH Crown Princess Mette-Marit tasting marine peptides in juice, together with Director Gary Smith (left), Director André Pometta (partly hidden) both from Firmenich SA, and CEO Tormod Thomsen, Firmenich Bjørge Biomarín.
OVER: Vinita Bali, Chair of the Board of GAIN.

MARINE PROTEINS AND PEPTIDES IN FUNCTIONAL NUTRITION SYMPOSIUM

It is a basic principle of the Blue Legasea biomarine cluster that products are based on scientifically documented health benefits. The companies compete in a global market, and it is therefore essential to develop cutting edge expertise in the region. For this reason, we planned a conference, which would highlight the cluster and the region's position.

Following an initiative proposed by the international Firmenich organisation, the first Symposium was held on 20-21 April 2016, entitled: MARINE PROTEINS AND PEPTIDES IN FUNCTIONAL NUTRITION SYMPOSIUM.

The conference was officially opened by HRH Crown Prince Haakon, whose speech included the following statement:

"Our time is a time for change. Blue Legasea is a good example of innovative clusters that redefine global challenges into national opportunities. It also shows that close cooperation between the private sector and public institutions, such as hospitals and universities, can lead to important and rapid results."

The first conference included 14 profiled speakers from three different continents, thanks to the professional network of Firmenich. The CEO of Britannia Industries, Vinita Bali, gave a fantastic opening lecture on «The double burden of malnutrition», which really defined the perspective of the conference. Mrs. Bali is also Chair of the Board of Global Alliance for Improved Nutrition (GAIN).



THE IMPACT OF DOCUMENTED HEALTH EFFECTS

Norwegian health authorities would yearly save NOK 154 billion if public advises of diet were upheld.

NORWEGIAN INSTITUTE OF PUBLIC HEALTH

The world is faced with enormous challenges, two of the most significant being climate change and population growth. OECD states the world population will increase from the current 7 billion to 9.5 billion by 2050. Today 2-3 percent of the world's food comes from the sea. This figure must increase substantially, to meet demands of proteins and environmental measures.

From a global perspective, health problems caused by lifestyle are increasing dramatically. According to the World Health Organization 38 million people die of lifestyle diseases every year. Blue Legasea is certain that Norway can contribute to solving some of these global challenges by further developing our position as a superpower within seafood and marine nutraceuticals.

DOCUMENTED HEALTH BENEFITS

Health benefits from omega-3 are documented in more than 24,000 published articles. The fatty acids are e.g. important for the development of the brain and sight, and prevent cardiac and vascular diseases. Documentation for further health benefits is still presented.

With regards to marine proteins, research has shown that they will be highly significant for human health and the world's health budgets. Blue Legasea is currently cooperating with companies and trusts concerned with research and documentation to obtain public approved health claims.



“I am incredibly excited about this merger and the opportunities it allows the collective organization to bring to the market”

OSCAR GROET
KD PHARMA CEO



PHARMACEUTICAL

NUTRACEUTICAL

FUNCTIONAL FOOD

FOOD

FEED

RAW MATERIAL

OWNERSHIP, INNOVATIONS AND GLOBALISATION

Marine ingredients is a relatively young and rapidly growing industry. A natural development in a young industry is frequent changes of ownership. In growing industries, we often find that financial investors see opportunities for further developing young companies and then selling them for a profit. In our cluster we recently saw this when Epax was sold to FMC. After three years of ownership, Aker BioMarine was able to post a profit of NOK 250 million in 2013, according to the financial newspaper, Finansavisen.

Another aspect of the dynamic is that when companies reach a certain size, with sought-after products they attract the interest of globally positioned industrial companies, which, in this instance, was also the case.

At the end of 2014, BASF sold their omega-3 plant in Brattvåg to US-based Marine Ingredients. In October 2016, Marine Ingredients announced a merger with the German company KD Pharma, who by their own admission possess «one of the largest manufacturing capacities of concentrated omega-3 oils».

«Merging with KD-Pharma enables Marine Ingredients to enlarge our company's dedication to superior quality, operational excellence, and innovation, while also expanding our manufacturing technologies, which provides even greater benefits for our customers; the synergies allow both companies to extend competitive advantage to our customers. This is a win-win for the brands and customers we work with,» said Olav Sandnes, President of Marine Ingredients.

«I am incredibly excited about this merger and the opportunities it allows the collective organisation to bring to the market,» said KD CEO Oscar Groet. «Marine's products, customers and finished goods manufacturing capabilities combined with the technology and global presence of KD will allow us to serve a much broader segment of the market.»

The cluster Blue Legasea consists of an optimal mix of businesses with local ownership and placement, and large global players providing the cluster with market expertise and other qualities. Both Epax and KD Pharma now have FDA (US Food and Drug Administration) approval to produce APIs (active pharmaceutical ingredients). This opens up new possibilities in respect of pharmaceutical innovations.

BENEFITING FROM THE NORWEGIAN ADVANTAGES

The demand for omega-3 oils seems insatiable, but if you want to be in the premier league the quality requirements are extremely tough. This suits the CEO of GC Rieber Oils in Kristiansund very well. Their production facilities are located in Norway, which gives more advantages than disadvantages.

Jan Roger Bjerkestrand and GC Rieber Oils are optimistic about the future. The products are full of the essential fatty acids EPA and DHA, which have a positive effect on e.g. the heart and vascular systems, vision, the brain's development, and mental health. People are living longer and realize that they have an increasing responsibility for their own health. Today the Norwegian biomarine industry delivers primarily to the rapidly increasing middle class in the USA, Europe and Asia. Eastern Europe, South America and the Middle East are markets that are yet to be developed.

– But is there a connection between rising living standards and healthier diets? – There is a change in the direction towards a more Western diet, i.e. more meat. Furthermore, 50% of all fish consumed is farmed and raised on soy, and contains very limited omega-3. These two factors contribute to an increased need for supplements. The body needs omega-3 fatty acids, but they cannot be manufactured by the human body and must be added.

QUALITY, SUSTAINABILITY AND TRACEABILITY

Gone are the days when people indiscriminately stuffed themselves with whatever they were served. Today, they want to know the origin of the products, how they were harvested and how production was carried out. GC Rieber Oils supply their oils in bulk to large distributors who encapsulate or tap it into small bottles under their own brand. These businesses are aware of their responsibilities, and require documentation and tracking information back to the fishing boat, including regulatory systems.

«Here comes the first of the advantages being located in Norway», says Bjerkestrand. «The strict regulatory framework in Norway is well known abroad and gives us credibility. Although we buy much of our raw material today overseas, we can document sustainable fisheries and recognised certifications just as well as for Norwegian catches. We can also show that the raw material in its original form is not suitable for human consumption, and that nothing is wasted. Our by-products are used in animal feed, or as fertiliser or energy sources in our own factory.»

THE NORWEGIAN WORK CULTURE IS TOP LEVEL

The kind of production dealing with high-grade concentrates is advanced and automated. The two reasons includes high quality requirements and Norwegian cost levels. «Here we actually score an extra point», says Bjerkestrand. «A Norwegian operator who discovers a discrepancy doesn't allow a few thousand litres of expensive oil reach a too high temperature or go into the sewer while he or she waits for the boss. That operator assumes responsibility, takes action and reports afterwards. It's no wonder that the Norwegian level of competence and work

culture also has positive effect on quality. We want to raise the value of our products to a level that very few can match. We have operators who have delt with marine oils for decades. They're an invaluable resource.»

BRANDING TAKES ON A GREATER SIGNIFICANCE

The majority share of Norwegian biomarine oils and lipids is sold in bulk to big players who put their own brand name on the final products. GC Rieber Oils pay a lot of attention to build their own brand, which is important also in the B2B segment.

«We call our omega-3 products VivoMega™ and notice that some of our customers are starting to put this name on their packaging as a guarantee of quality and as a tracking reference. For us, this is important for two reasons. Other large customers want to copy this, which build a certain threshold to replace us as supplier. It is also significant that it makes it even easier for discerning consumers and consumer organisations to separate the wheat from the chaff. Internally, branding makes us even more conscious of the quality of everything we supply. This is especially important, simply because we have to deliver the very best at any given time.»

BLUE LEGASEA IS THE FACILITATOR

Currently, Blue Legasea has member companies representing the entire supply chain from harvesting to processed products. What is the impact?

«Firstly, I'd say that this is another of our Norwegian advantages. We're close to one another and see the whole value chain as a shared good. Here is one telling example: Norwegian whitefish are harvested on sustainable resources and maintain a very high quality standard. The problem is that people only eat the pure white meat. What about the trimmings? We, the ingredients industry, will gladly apply this biomass as raw material, and the fishermen will gladly sell them. So we get together to work out how a trawler should be built and equipped to manufacture raw oil and fish meal so that we are able to create high-quality health products.» Don't these new value chains take a long time to build? «The first such trawlers have already been built.»

A LONG WAY FROM MAJOR MARKETS

The disadvantages Bjerkestrand points at by manufacturing in Norway are the distances.

«We're a long way from the major markets, and for those companies who obtain their raw materials from South America and North Africa, this also brings challenges. But the benefits of staying in Norway far outweigh the disadvantages. If we are successful in obtaining a greater proportion of the raw materials from Norwegian whitefish, we will become even stronger.»



BLUE LEGASEA CONNECT

In connection with the extension of Blue Legasea's Arena status in the autumn of 2016, it was decided to initiate a project focussing on affiliation and stronger formation of clusters. One of the reasons behind the project was to further anchor Blue Legasea in the industry prior to renewing its NCE status in 2018.

NCE cluster status has been decided as the correct direction to take and is considered an essential tool for elevating the biomarine industry with its natural centre of gravity in Møre and the entire associated value chain to the position which the industry ought to have nationally and internationally.

As a member-driven industrial cluster, it is important for those of us working in the programme to know what is going on amongst the members of the cluster, to get a grasp on the projects in progress and to contribute to the smooth running of collaborative efforts between the companies and other players in the cluster project. We also need to be aware of which players who potentially could be recruited as members of Blue Legasea.

Blue Legasea Connect is a two-stage project. We have conducted interviews with each of the cluster's members with the primary goal of embedding and clarifying expectations. This will be followed by a recruitment process to increase the number of members in the cluster.



BRONZE LABEL APPROVAL FOR BLUE LEGASEA

As part of the EU efforts to create more world-class clusters across the EU by strengthening cluster excellence, the Commission launched the European Cluster Excellence Initiative in 2009.

The European Cluster Excellence Initiative developed methodologies and tools to support cluster organizations to improve their capacities and capabilities in the management of clusters and networks.

Results are presented by an individual report to the cluster management and include also recommendations for further improvement in line with the requirements of the cluster quality label.

The European Cluster Excellence Initiative has awarded the cluster organisation Blue Legasea with the quality label "Cluster Organisation Management Excellence Label Bronze".

We have been very well received during the visits and have experienced great involvement associated with profiling relevant issues and topics such as:

What is the most important motive for member companies in cluster collaboration projects? And what will it take for companies to become involved and to ensure that collaborative efforts become a component of competitiveness?

How can Blue Legasea perform our best for the members? How can we together increase the cluster's visibility and enhance its reputation? How do we achieve the position the industry deserves, nationally and internationally?



R&D AND CLUSTER COOPERATION

A major goal for industrial clusters is to create added value and sustainable innovation. In order to succeed, cooperation at several R&D levels is needed. In recent years companies connected to Blue Legasea have been increasingly engaged in research, and a number of R&D projects, both large and small have been accomplished. An overview by Møreforsking Ålesund revealed a large number of projects related to raw materials, new omega-3 sources, fishing methods, catch issues, on-board processing and the sensory and health effects of marine ingredients. It is estimated that the total value of the projects exceed NOK 150 million, with significant contributions being made by the participating companies themselves. External funding sources are many: including Research Council of Norway, FHF - The Norwegian Fishery and Aquaculture Industry Research Fund, VRI (instruments for regional R&D and innova-

tion), the Directorate of Fisheries, and private sources.

The need for further research and documentation is huge in the marine industry and not least the ingredient industry. Raw material quality and efficient production throughout the supply chain is essential when supplying nutritional products, and a prerequisite for achieving good food safety and healthful products.

The companies are facing an increasing number of regulatory requirements, nationally and internationally. In order to succeed, it is important to be active and at the forefront of development. The ingredients industry, in both the lipids and proteins sectors, needs documentation pertaining to product efficacy. The commitment of Blue Legasea members shows that the industry takes this seriously and wants

to help strengthen its own position and that of Norway in this respect.

R&D projects dealing with issues throughout the marine supply chain are expected to yield exciting results in the coming years. We believe that the results and the advances being made in marine research and R&D projects will definitely help to create added value for the companies, as well as new jobs; and that they will strengthen corporate competitiveness and release the huge potential that marine resources and raw materials will have in the future.

This will assist us in attaining our goal of becoming the world's leading seafood nation. Blue Legasea will thus be an important player in putting the Norwegian marine industry on the map, both at home and abroad.

SIZE MATTERS

When herring disappeared in the 1960s, Vedde AS had been producing fish meal and fish oil for 40 years. Ever since then, the company's owner, Koppernæs AS in Ålesund, has been concerned about three things: proximity to raw materials, production of a wide range of fish species, and the importance of being a major player.

VEDDE AS

Produces 110,000 tons of raw material from blue whiting, sand eel, herring, capelin, sprat and trimmings from other fishing industries.

LOTA PROTEIN SA

Produces 70,000 tons of raw material from anchovies, sardines, squid and horse mackerel

TRIPLE NINE FISH PROTEIN AS

Produces 440,000 tons of raw material from sand eel, sprat, Norway pout, blue whiting and trimmings from the fishing industries.



To solve the «lack of herring» problem, half the factory was dismantled and re-assembled in Peru, with access to its huge resources of anchovy. Ten years later, this industry was nationalised by the Peruvian authorities, and Koppernæs was left with the factory in Langevåg only. The raw material was now the Norwegian industry fish – except herring.

«It's important that our production includes a wide range of fish», says Koppernæs AS' CEO, Kenneth Lande Klokk. «Quotas and catches can have big fluctuations, but it never happens that all the species are 'down' at the same time. If production is on-going in several countries and on several continents, you're far less vulnerable with regard to stocks, quotas and catches.»

Why is this so important?

For two reasons. The first is that we are working in a global industrial market. Our customers are mainly manufacturers of animal feed for land-based use and fish feed for the aquaculture industry. We are talking about large companies in Europe, USA and Asia. They need to have a regular supply of meal and oil for their own production. If we are unable to deliver, they go elsewhere.

The second reason is that this is a process industry. The systems have required huge investments, and they cannot be turned off and on. They have to go on, around the clock for long periods of time.

PRODUCTION IN THREE COUNTRIES SO FAR

After many years of production in Norway alone, in 2000 Koppernæs was back in South America.

«We'd never given up thoughts of South America», says Klokk. «We knew the area and the resource situation well. In 2000 we bought a Chilean plant, Lota Protein, which we upgraded to become a state-of-the-art facility.

Later, we entered into a partnership with a major Danish manufacturer, Triple Nine, and formed the Triple Nine Group,

of which now, in 2016, we have become the majority owner. Together, we now produce 620,000 tons of raw material. Nonetheless, we have a growth strategy. So, we're not likely to stop here.»

THE STRUGGLE FOR RAW MATERIAL

«The world's demand for marine meal and oil for fish and animal feed is large and increasing. The competition for raw materials is fierce.

A lot is bought at auction, but more and more raw material is locked in by large corporate structures that control the entire value chain», Klokk says. «For us, it means that, for example, we have to get involved in the financing of boats and land-based fillet production facilities with delivery obligations for the catch and the processed product. On top of this, in Chile, in addition to running our own fleet, we've also entered into financing agreements with a number of local boat owners.

IN IT FOR THE LONG RUN

Lande Klokk pauses, before going on to establish that this industry is not something you enter to make a quick return.

«Major investments in processing plants, and natural fluctuations in production and raw material prices means that it's a roller-coaster we're on. The only thing we never know is when it will go up or down. You have to be in it for the long term, and that in turn requires that you're stable.

This also explains why this industry is a strong supporter of resource management and regulation. Regulated fishing of sustainable resources is essential to ensure the stability we need in both the short and long term.

The Triple Nine Group wants to be ahead of its customers, and invests significant resources in R&D aimed at ingredients and human consumption. This is long-term work with future profits that requires size and a solid balance sheet.»



From problem
to resource thanks to
new technology

MARINE INGREDIENTS «MADE IN NORWAY»

– FROM PROBLEM TO RESOURCE THANKS TO NEW TECHNOLOGY

Residual raw material from white fish trawlers with onboard production remains a problem for most countries. In Norway, some 250 thousand tonnes are still being discharged back to the sea. In 2013 and 2014 the shipping companies Havfisk and Strand acquired new trawlers capable of capturing and storing the residual raw material.

In 2016, the Møre trawler fleet received two new additions equipped with state-of-the-art technology that, each in its own way, pave the way for increased sustainability with regard to finances, the environment and reputation.

M/TR MOLNES – 1/3 REST RAW MATERIAL

The Nordic Wildfish shipping company invested approximately NOK 100 million in the Molnes trawler. This is the first trawler capable of hydrolysing the trimmings. In

practice, this means that the proteins can be treated at low temperatures and used in illness-preventing products for human consumption. The fat is transformed into crude oil which is refined further by the ingredients industry on-shore to produce valuable Omega-3 supplements. Molnes produces white fish that has been gutted and the heads removed, meaning that a third of the biomass caught is rest raw material.

M/TR RAMOEN – 2/3 REST RAW MATERIAL

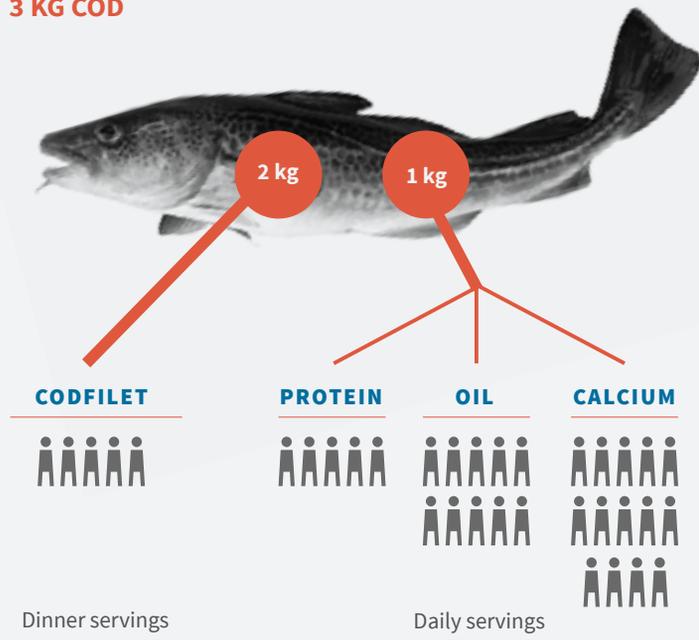
The trawler Ramoen, costing about NOK 340 million, was delivered to the shipping company Eros in October 2016. Ramoen is a factory trawler that produces skin and boneless fillets of the highest quality. It is also the world's first vessel to remove bones from the fillets using water jets. The result of this production is that approximately two thirds of the biomass caught is rest raw material. The protein is turned into fish meal for high-quality feed while the crude oil and

fat is further refined for the Omega-3 industry on-shore in the same way as on board Molnes.

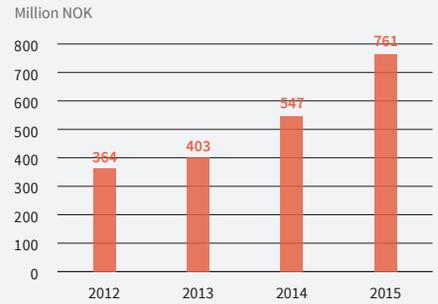
NEW AND TRACEABLE NORWEGIAN VALUE CHAINS

The result of this collaboration between sea and land is the creation of value chains based on sustainable fish stocks that are traceable, entirely Norwegian and capable of documenting a small carbon footprint. These three factors all contribute to competitive advantages on a global scale. The Omega-3 oil could replace imported products from South America and proteins derived from hydrolysis open up for new products with high value-creation potential. The new value chains are created by visionary leaders in a thriving industry and create huge opportunities for the region and for Norway as a whole, with Blue Legasea as a platform for the collaboration.

3 KG COD



Profit before tax



Source: SSB

Turnover



VALUE CREATION AND GROWTH

Since export accounts for 40 per cent of GDP, export activity is crucial to Norwegian prosperity. In order to succeed in export markets, companies must be leaders within their fields, not just nationally but internationally. International competition is tough, meaning that organisations need to be highly productive in order to survive. Value creation per employee in export companies is 80 per cent higher than in other Norwegian business sectors. (Source: Menon-Publikasjon 9/2015).

The Menon report defines an export company as a company where exports account for 25 per cent of turnover or more. For most members in Blue Legasea, export accounts for more than 90 per cent of their business.

TURNOVER

The term value creation has various meanings. In the SINTEF report from 2012 titled 'Value created from productive oceans in 2050' (Verdiskaping basert på produktive hav 2050), the term is used synonymously

with turnover. The report estimates a turnover value for the Norwegian marine ingredients industry of NOK 70 billion in 2050, corresponding to an annual increase of 7 per cent per year (= red line in the bottom figure on the right).

The 13 ingredients companies and 6 suppliers of rest raw material that have been members of Blue Legasea since the start in 2013 have seen an average turnover increase of more than 11 per cent (= red bars in the bottom figure on the right). Even though many factors impact turnover and profits, such as currency fluctuations, raw material prices, etc., these even out over the years. The figures seem to support the 2012 SINTEF report and indicate that the marine ingredients industry may, by 2050, match total seafood exports in 2015.

PROFITABLE AND SUSTAINABLE

Some have been sceptical of the ingredients industry's profitability. The figure on

the right shows that the aforementioned 19 companies have experienced highly positive development in the last three years, with an average annual growth of almost 30 per cent. Between the 2014 and the 2015 accounting years, the growth was nearly 40 per cent.

In addition to creating much needed value and jobs in these changing times, there are many other important aspects to the marine ingredients industry.

For example, by utilising rest raw material from the white fish trawler fleet instead of discharging it back to the sea, a reputation problem is turned into a practice that is sustainable from an environmental, financial and social point of view. Creating high-value products from seafood industry residual increases profitability across the entire marine value chain. Another unique characteristic of this industry is that it employs a large number of women with higher education.



VITAFOODS GENEVA 2016



GOED and Blue Legasea membership exchange

Vitafoods in Geneva is referred to as the global nutraceutical event and brings together almost 20,000 visitors annually from around the world. Representatives of the entire value chain in the ingredients industry are present – including ingredient manufacturers and suppliers of finished products to the health and nutrition market. A number of Blue Legasea members participate in the exhibition; with their own stands, as visitors or as delegates at conferences and seminars.

One of Blue Legasea’s major initiatives in 2016 was to set up a stand at the Geneva fair. This gave our members the opportunity to exhibit for the first time as a unique Norwegian biomarine cluster. Joint effort will help to strengthen the Norwegian biomarine industry’s position nationally and internationally and raise the profile of innovative Norwegian companies in a global and highly competitive market.

A lot of effort and resources created an appealing pavilion for the Norwegian organisations, and three of Blue Legasea’s members chose to participate with an integrated profile. In addition, some of the other members who did not exhibit at the stand made use of common areas and meeting rooms. We invited our members to an informal kick-off on the first day to strengthen relationships with one another and external invitees.

One highlight of the trade show was the exchange of membership between Blue Legasea and GOED (Global Organization for EPA and DHA Omega-3*). GOED defines themselves as «a proactive and accountable association of the finest manufacturers, marketers, and supporters of EPA and DHA omega-3 fatty acids, working to educate consumers and work with government groups, the healthcare community and the industry, while setting high ethical and quality

standards for our business sector.» GOED is already well-acquainted with several of Blue Legasea’s member companies, and we look forward to our continued cooperation in working for the common good.

Feedback has been good, and we received many suggestions and new ideas from our first major international initiative. The value of showcasing our unique biomarine industry nationally and internationally is important – as there are many players challenging the Norwegian position.

* EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) are essential fatty acids. The human body is unable to produce EPA or DHA, and the only source is through diet.



LEFT: Marine ingredients course – Spring 2016, NTNU Ålesund
Group picture of participants

BELOW: Lecturer Oddrun Gudbrandsen and Øyvind Sætre and Kim Thorup from Marine Harvest



COMPETENCE BUILDING

An important prerequisite for success in value creation through cluster cooperation is the development of relevant competencies and training opportunities. Cooperation between businesses, educational institutions and research environments in Blue Legasea provides a unique backdrop for assessing needs and creating appropriate and timely training opportunities.

During 2014 Blue Legasea was awarded a NOK 2,5 million funding from Innovation Norway to work systematically on competence building within the field of marine ingredients, together with Sintef and NTNU. Norwegian University of Science and Technology (NTNU Ålesund) now offers a Bachelor programme in biomarine innovation that qualifies for a Master at NTNU in Trondheim. Post graduate courses on raw materials, process technology, analysis and

methodology, marine ingredients and international markets are also on offer, and there are now several commercial Ph.Ds involved with member companies of the cluster.

Strong involvement and commitment have been provided by cluster companies during the process of identifying needs and knowledge areas. This will be of great benefit to the industry in both short and long term. Blue Legasea is also a participant in the Norwegian Rooms development project, «Global Branding and business model innovation», which in 2016 was awarded a NOK 2.8 million funding over a two year period by the Norwegian Ministry of Local Government and Modernisation. Herein, we expect more exciting competence building with cross-cluster relevance for the development of international competitive advantage, branding and new business models.

"The course has been very useful and definitely fulfilled my expectations of learning more about marine ingredients. In addition to enlightening more of the market opportunities, this factor along with great relationship-building with new business contacts has opened up exciting possibilities."

KATRINE FLORVAAG
Sales Manager, RAMOEN AS



BLUE LEGASEA PRESS TOUR

In May 2016, Blue Legasea and Blue-C arranged a press tour for the first time, visiting member companies together with domestic and international journalists. Press tours have been successfully undertaken in the maritime cluster for several years – and the response from member companies was good, also in the biomarine industry.

Three days of company visits throughout the county resulted in several articles in national and international magazines, and on several websites. The Blue Legasea member companies were presented both individually and as part of a strong cluster with huge international potential.

The well-established collaboration between business players and academia – and focus on sustainable management, harvesting and processing within the cluster created great interest among journalists. Optimising usage of traditional marine resources and residual raw materials from the whitefish industry caused media representatives to listen very intently.

Blue Legasea members in Møre and Romsdal may be holding the key to solving some of the world's major health challenges with high quality Norwegian marine ingredients. This made a substantial impact on many of

Pure, sustainable,
premium-quality omega-3
products from the
west coast of Norway
Pharma Marine

the journalists who gained new insight and understanding of the potential.

Increased international awareness of innovations and value-creating projects are important to the Norwegian biomarine industry in general and to Blue Legasea members in particular.

The contact that was established between the companies and the participating journalists will be able to bear fruit in many contexts in the future, and we encourage all our members to nurture these contacts by sharing industry news on a regular basis.



“By most accounts, Norway leads the world in marine industry sustainability. In the process they are demonstrating that management of a limited resource does not mean shrinking the supply to the point where it can't meet demand. Sustainability, true to its name, can indeed mean continuous supply.”

BILL GIEBLER
Newhope.com

“The Ramoen will also have a fish meal factory that can take out fish oil for heads, tails, and trimmings. In recent years, the group has upped fishmeal sales to Norway and China, and is also looking at the ingredients sector, revealed Eggesbø”

ROSS DAVIES
Undercurrent News

“CodMarine in many ways reflects a grandmothers love and care. Our love for wild nature and care for people and resources are important aspects of our company's philosophy of sustainable production. Like a grandmother, we take pride in utilizing 100 % of the fish, so that none of these important resources go to waste. Leif Kjetil Gjendemsjø, Pharma Marine.”

MARTIN UHLENFELDT
Fiskerforum

“They didn't know why, but our grandparents were in no doubt that a daily spoonful of cod liver oil was good for us.”

QUENTIN BATES
Fishing News International

“Norwegian producer Rimfrost has launched new krill oil products onto the European market, giving the European supplement market access to opportunities to develop krill oil products with authorized health claims.”

MARTIN UHLENFELDT
Fiskerforum

“Taking omega-3 a step further.”

MARTIN UHLENFELDT
Fiskerforum

“En Norvege, la navire usine du future transforme 100 % des captures en mer pour la consommation humaine: decoupes surgelees, farines et huiles, concentres de proteines.”

BRUNO VAUDOUR
Produits de la Mer

FOCUS AREAS:

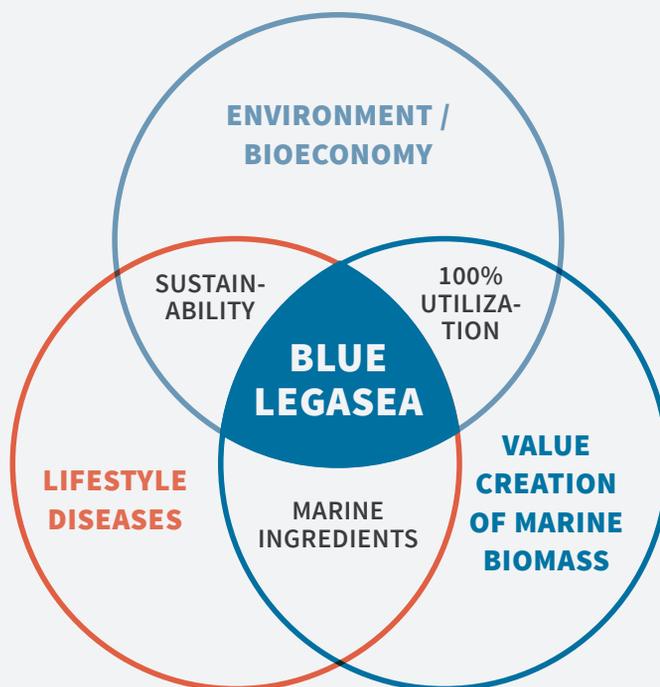
1 DEVELOP COMPLETE, COMPLEMENTARY AND MARKET DRIVEN VALUE CHAINS

- MARINE LIPIDS
- MARINE PROTEINS AND PEPTIDES

2 COLLABORATION WITH LEADING ACTORS IN THE MARKET

3 STRENGTHENING THE CLUSTER MECHANISMS

4 TO BECOME KNOWN AS A LEADING MARINE INGREDIENTS CLUSTER



SUMMARY:

- From oil economy to bio economy
- Sustainable production of Norwegian marine ingredients
- 100 % utilization – high value products
- Knowledge based industry
- Basic needs globally: Nutrition & Health

GLOBAL CHALLENGES, NATIONAL POSSIBILITIES

DID YOU KNOW...

- Møre and Romsdal county is the most important export region in Norway, representing some 23 % of the national export value.
- More than 500 seafood companies are active in the Møre region.
- More than one million tons of seafood were transported from Alesund harbour in 2015.
- One million tons of fish represent some 3 billion fish fillets dinners.
- The ocean cover 70% of the earth surface. Equal primary biological production ocean/land, but food consumption from the ocean is only 2 %.
- Protein products from Firmenich Bjørge Biomarin made of trimmings are included in more than one billion servings.
- SINTEF expects some 4 million tons of trimmings from the seafood production in Norway in 2050

ÅKP

THE REGIONAL
INNOVATION COMPANY



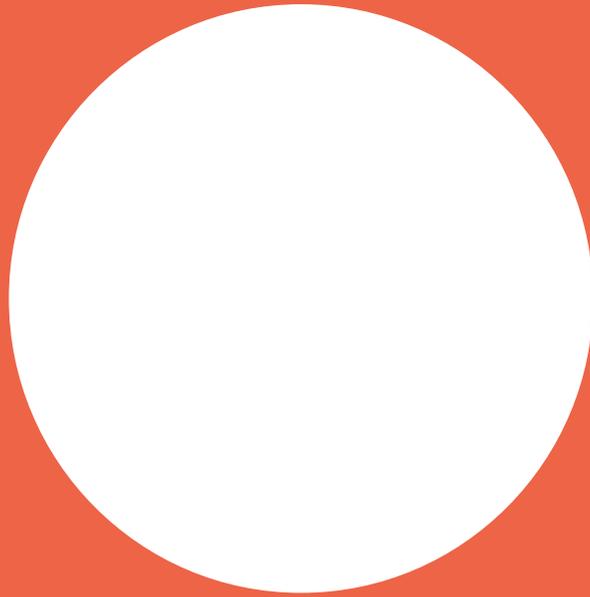
BUSINESS IDEA:

ÅKP is to be a regional center with national importance that contributes to innovation, economic growth and regional development in global competition.

MAIN STRATEGY:

Innovative interplay in practice - Be a driving force for innovation connecting industry, academia and the public sector in processes that create sustainable value creation.

VALUES: VISIONARY FEARLESS COMPETENT GENEROUS RELIABLE



-Creates Opportunities

PHOTO/ILLUSTRATION: GCE BLUE MARITIME CLUSTER, NTNU ÅLESUND, KRISTIN STØYLEN, TONY HALL, SINTEF, LEGASEA, STOCK PHOTO, VARD, ROLLS-ROYCE, SUNNMØRSPOSTEN, DESIGN: HAVNEVIK

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Blue Legasea is a complete business cluster project within marine ingredients. Blue Legasea started out with 23 members in 2013, to sort out the strategic important elements to establish new value chains. The cluster has now reached a point where it is natural to move to the next level. In Møre there are around 500 companies associated with marine biomass, representing a turnover of some 38 billion NOK. Blue Legasea is part of the governmental program «Norwegian Innovation Clusters», financed by Innovation Norway, The Research Council of Norway and SIVA. The project is facilitated by ÅKP (AAKP). Møre and Romsdal County is another important partner, including partial financing.



