The Seafood Innovation Cluster

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Growth and innovation through collaboration

Norwegian Innovation Clusters

Norwegian Innovation Clusters is a government supported cluster program.

The program aims to trigger and enhance collaborative development activities in clusters.

The goal is to increase the cluster dynamics and attractiveness, the individual company's innovativeness and competitiveness.

The program is organized by Innovation Norway, and supported by Siva (The Industrial Development Corporation of Norway) and the Norwegian Research Council.

Innovasjon Norge

siva

The Research Council of Norway

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

NCE Seafood Innovation Cluster community

Founders:

Industry Partners:

R & D Partners:

Members:

Collaborators:

Financial Partners:

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Board of Directors

Alf-Helge Aarskog

CEO, Marine Harvest Group ASA

Henning Beltestad

CEO, Lerøy Seafood Group ASA

Andreas Kvame

CEO, Grieg Seafood ASA

Anne Øen

Director, Salmon Group

Torger Reve

Professor, Norwegian Business School, BI

Jarl Giske

Marine Dean, University of Bergen

Øystein Thøgersenl

Rector, Norwegian School of Economics

Sissel Rogne

Director, Institute of Marine Research

Øyvind Fylling-Jensen

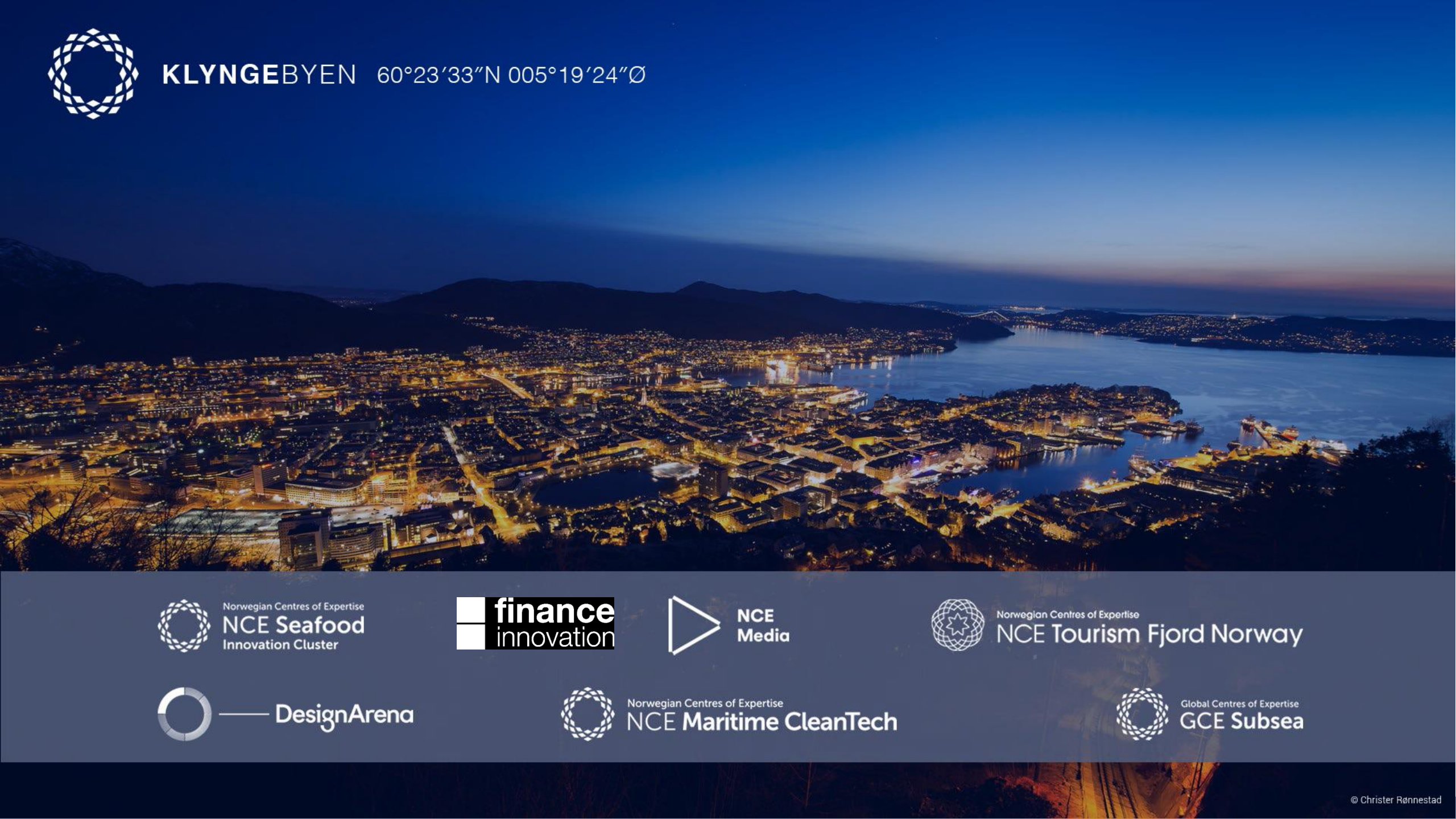
Director, NOFIMA

Einar Wathne

Chair of Board
President Cargill Aqua Nutrition

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

marine holmen
Sars International Centre for Marine Molecular Biology
bioCEED
HORDAFOR
Alltech
CRISP
sfi Centre for Research-based Innovation
IRIS
MSD Animal Health
Sea Lice Research Centre
NCE Media
NCE Norwegian Centres of Expertise
uniResearch
HOMMESSEN
UNIVERSITAS BERGENSIS
PHARMAQ Analytiq
Veterinærinstituttet Norwegian Veterinary Institute
SINTEF
DNB
PATOGEN
NIVA
vaxxinova veterinary prevention strategies
VILVITE
BTO
DesignArena
Mattilsynet
EWOS Cargill
LERØY
Norwegian Centres of Expertise NCE Maritime CleanTech
nyskapingsparken INKUBATOR
DNV·GL
NERSC
NORSK HAVLABORATORIUM
Global Centres of Expertise GCE Subsea
OIA Ocean Industries Accelerator
Salmon Group
Norwegian Centres of Expertise NCE Seafood Innovation Cluster
CORNERTEATERET
ACCEL
Hatch
BI HANDELSHØYSKOLEN
Aquabyte


KLYNGEBYEN 60°23′33″N 005°19′24″Ø
Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster
finance
innovation
NCE
Media
Norwegian Centres of Expertise
NCE Tourism Fjord Norway
DesignArena
Norwegian Centres of Expertise
NCE Maritime CleanTech
Global Centres of Expertise
GCE Subsea
© Christer Rønnestad

70%
water

2%
food

SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY

2 ZERO HUNGER

13 CLIMATE ACTION

14 LIFE BELOW WATER

Norwegian Seafood

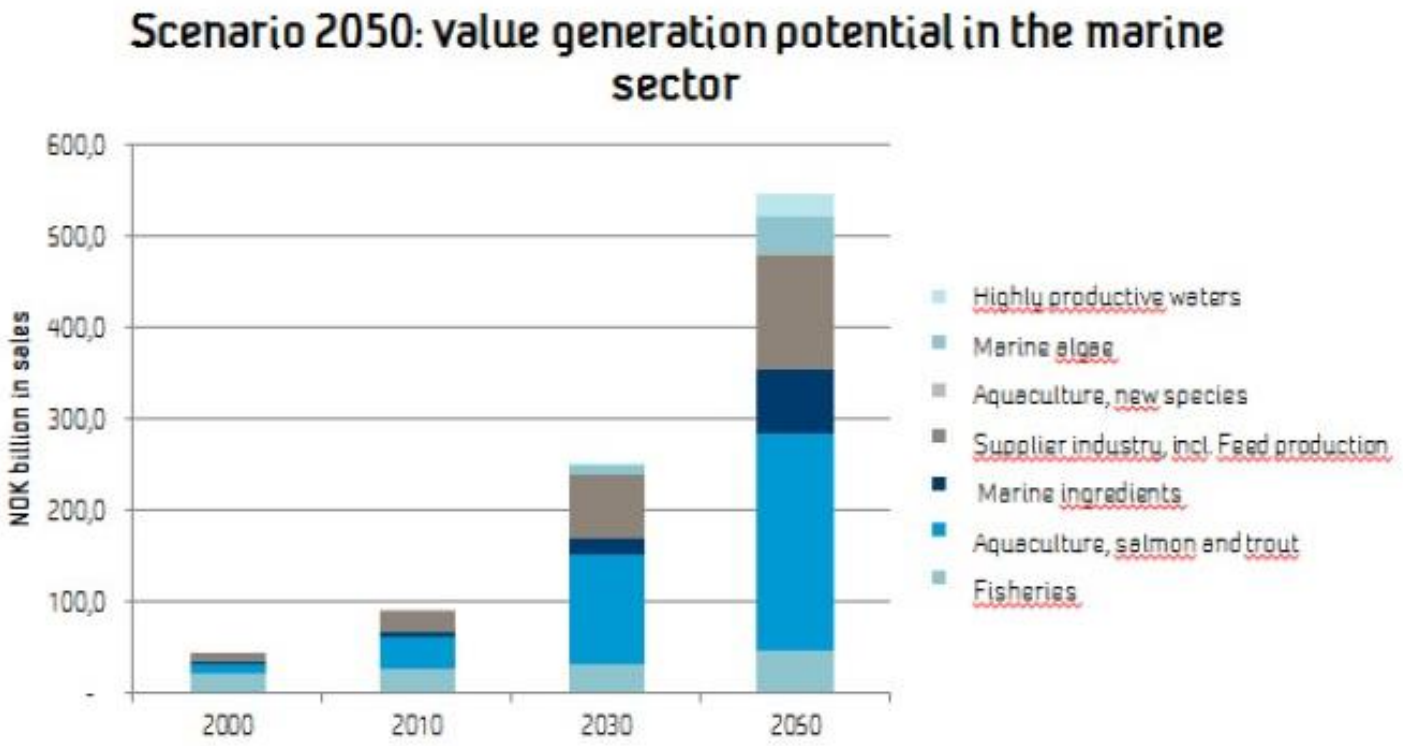


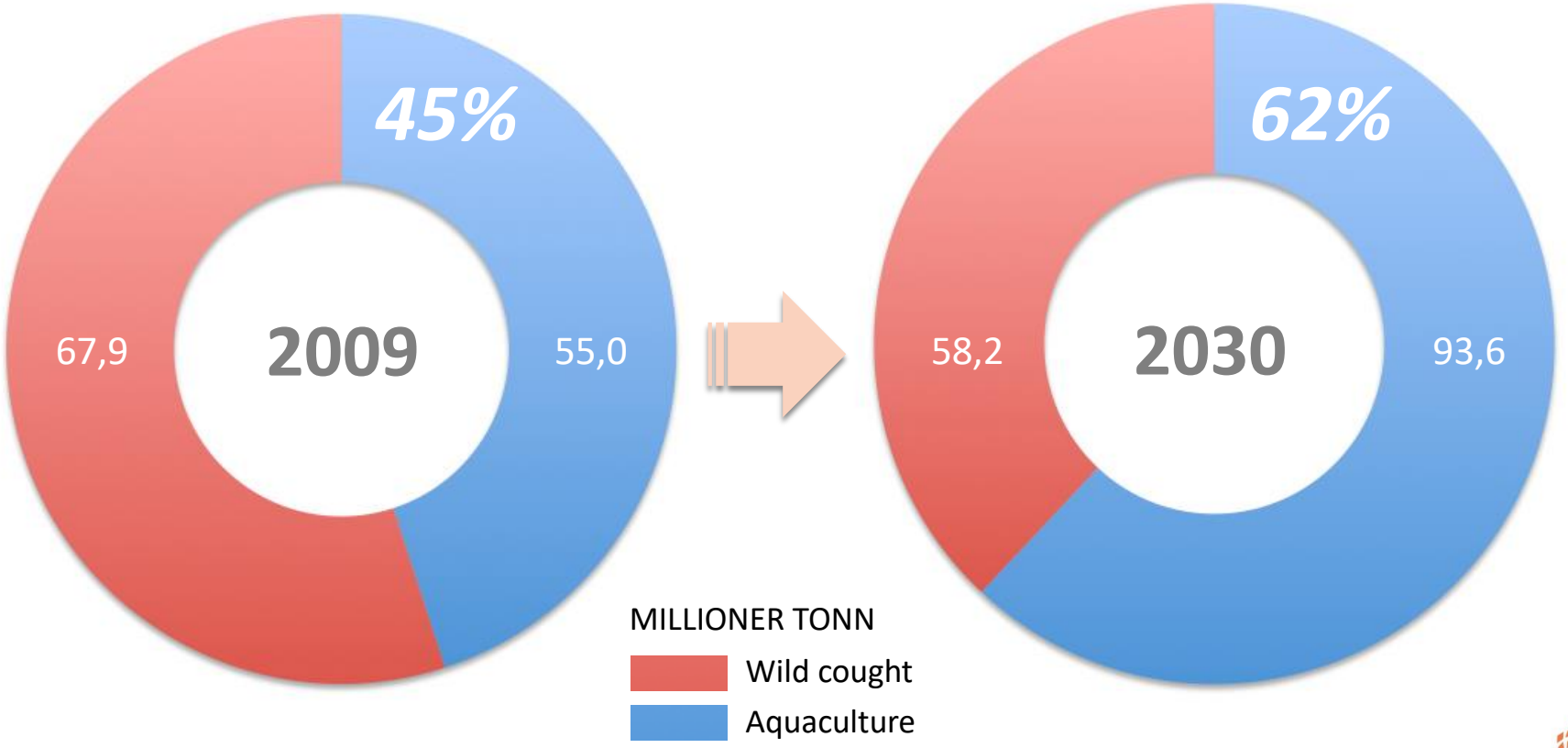
Figure 1-3 Value generation potential in the marine sector

Source: Value created from productive oceans in 2050
A report prepared by a working group appointed by the Royal Norwegian Society of Sciences and Letters (DKNVS) and the Norwegian Academy of Technological Sciences (NTVA)

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

More Seafood must come from Aquaculture

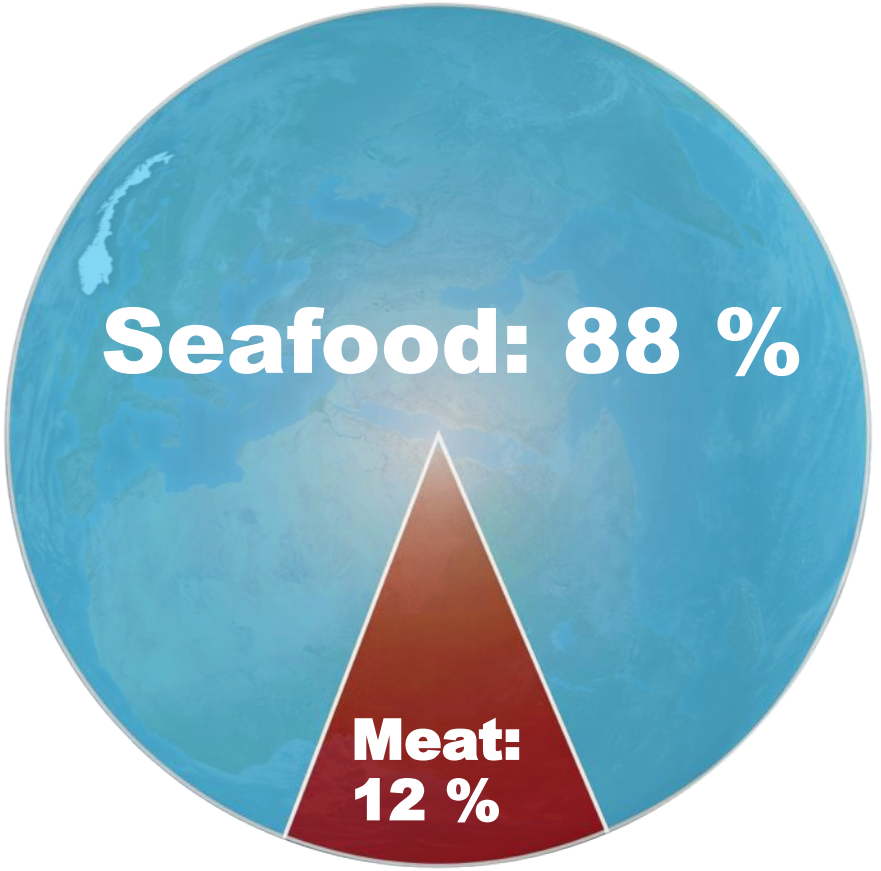
Expected seafood consumption in 2030



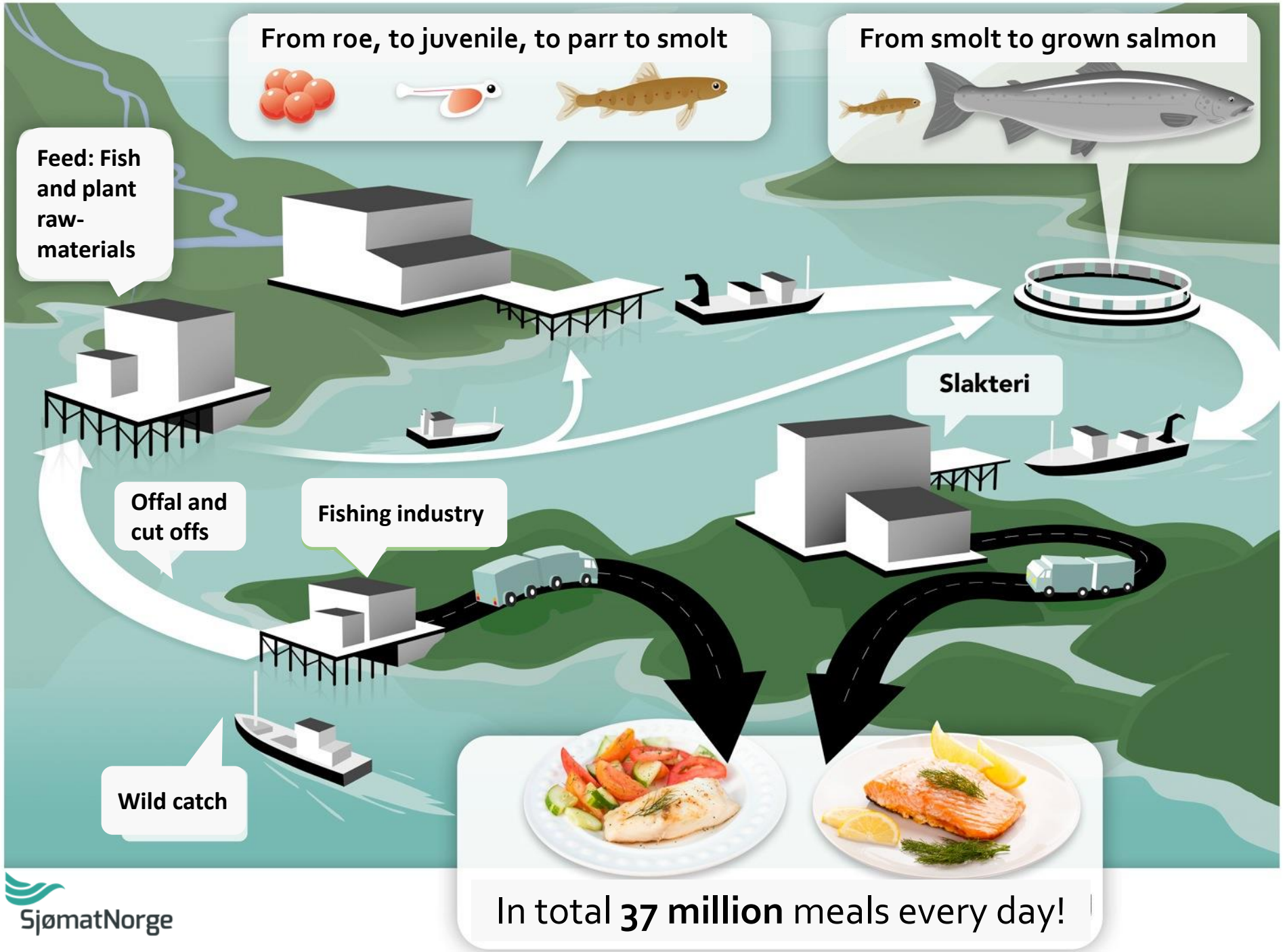
Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

FAOSTAT (2014) / FISH TO 2030 (Verdensbanken 2013)

Food production in Norway



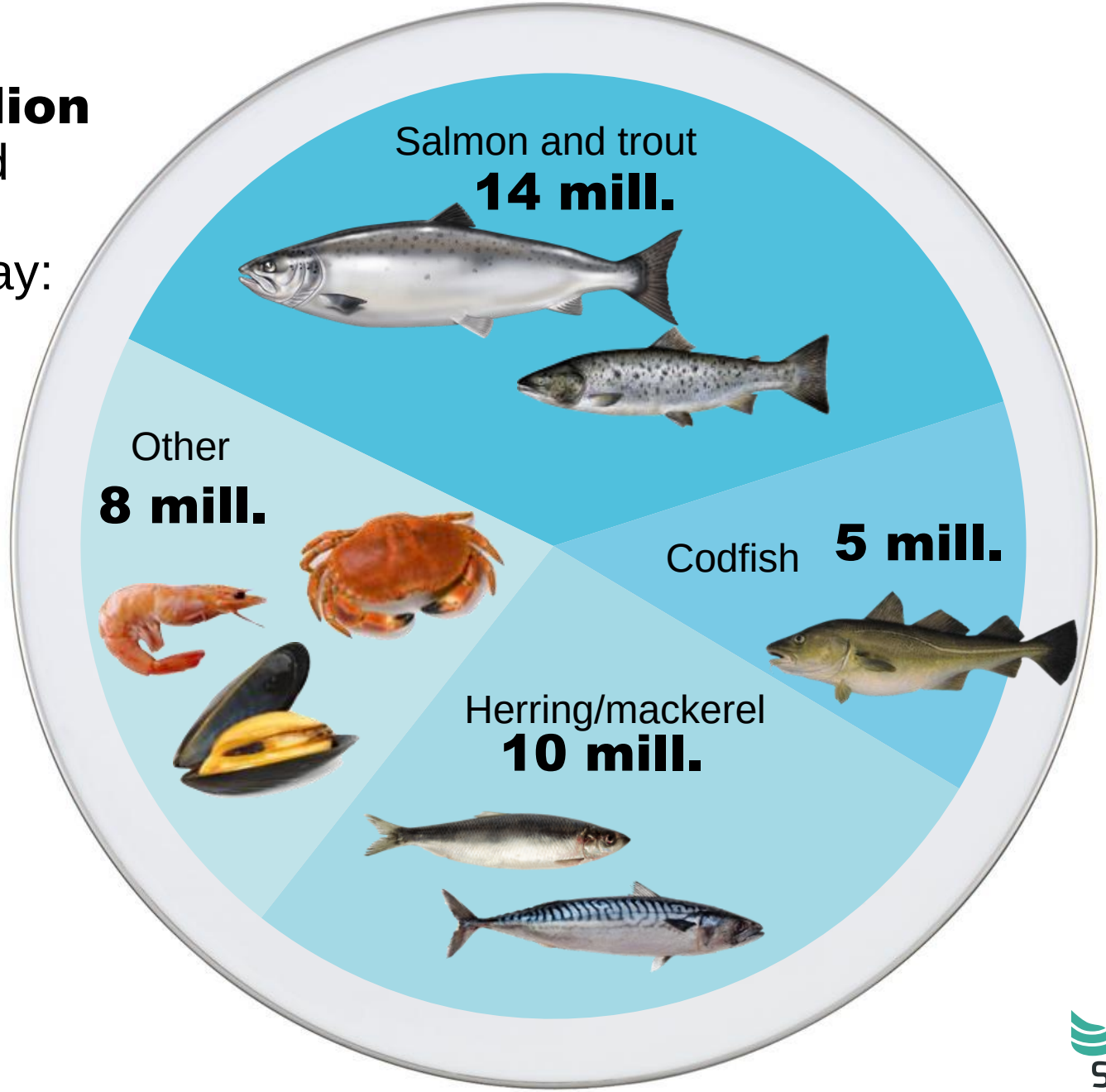
Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster



SjømatNorge

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

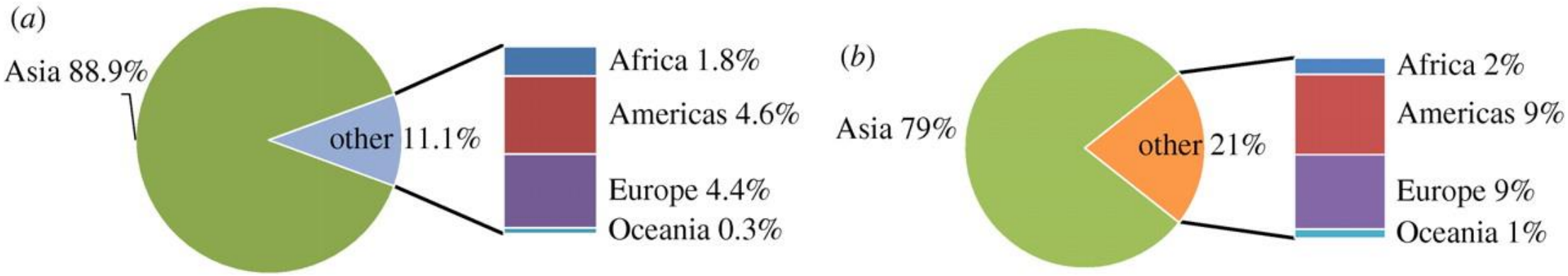
37 million
Seafood
meals
every day:



SjømatNorge

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Salmon – A part of an International Industry

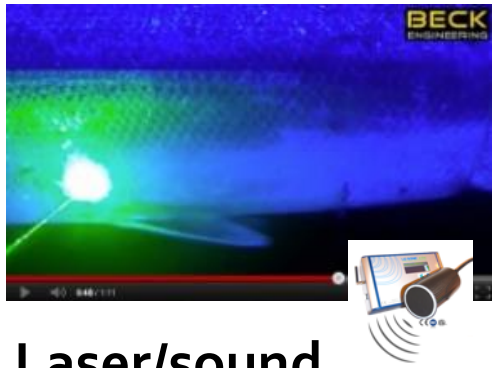


John Bostock et al. Phil. Trans. R. Soc. B 2010;365:2897-2912

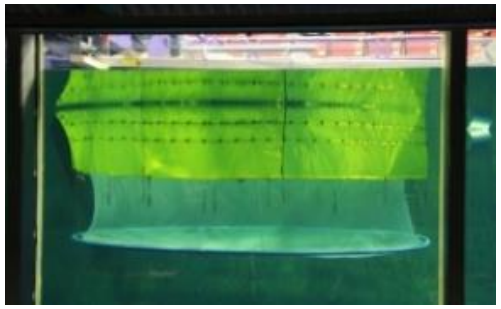
© 2010 The Royal Society

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

An industry driven by challenges



Laser/sound



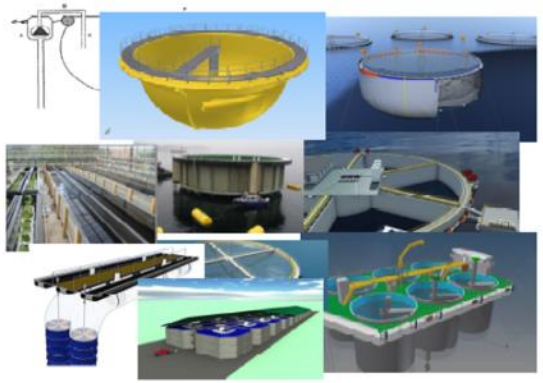
Shielding

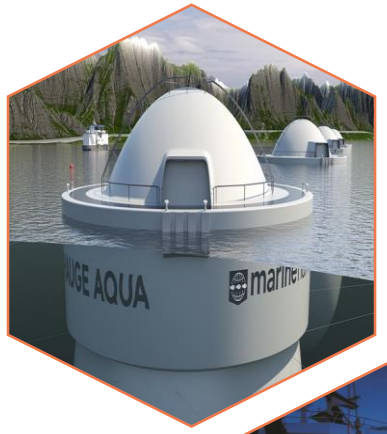
Offshore

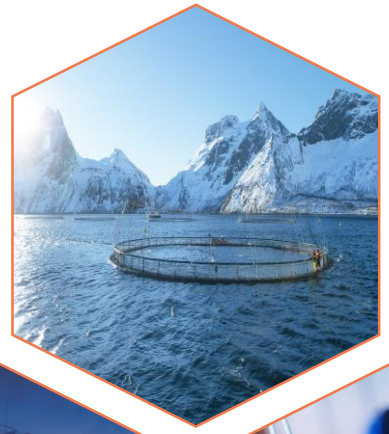
Freshwater

Cleanerfish

"Closed"







Akvakultur

Fiskeri

Finkjemikalier

CLUSTER FACTS

70 partners representing **146** enterprises

57 BNOK
Revenue of the Cluster's core industry partners (2015)

15.000 Employees

60% of Norway`s total R & D capacity

400 mill.
R & D Budget

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

For a Sustainable Seafood Business

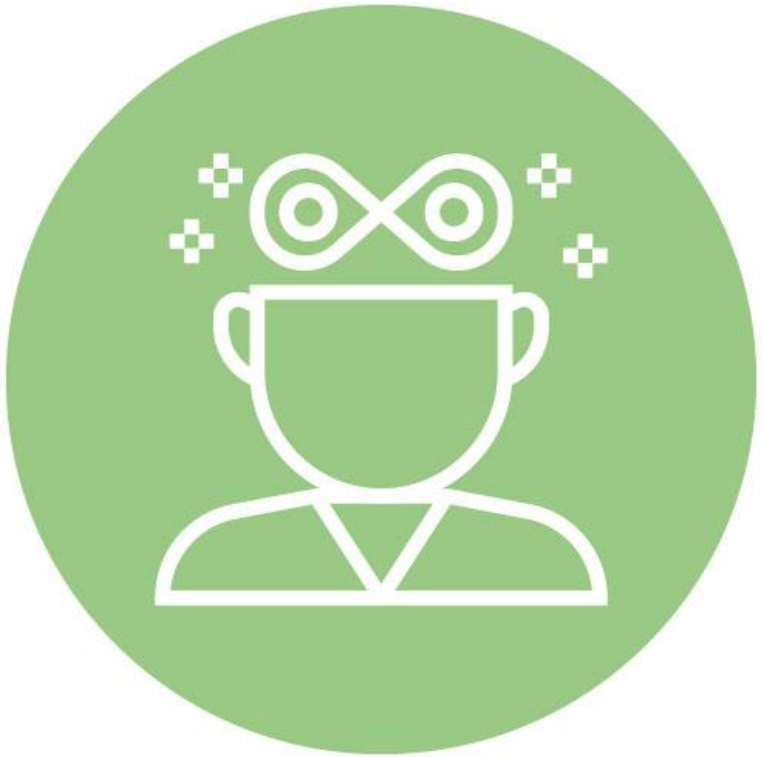
1 Knowledge

2 Innovation

3 Entrepreneurship

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

1. Knowledge



The Cluster focus on securing access to key competence to our partners and increase talent attractiveness.

Cluster's Key Services:

- Talent development programs
- Leadership development programs
- Education and training programs
- Initiate R&D projects in companies
- Seminars and workshops
- Competence projects

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Seafood Trainee

Knowledge

The first Norwegian Seafood Trainee Program for recent graduates.

The first group started September 2016, and the second group started in September 2017.

54 seafood trainees from Lerøy, Marine Harvest, Grieg Seafood, Cargill, DNB, MSD, Thommessen and Norges Sjømatråd has attended the program.

The program gives participants a practical experience throughout the value chain from production, technology, marketing and innovation, all put into a sustainable context.

The trainees meet four times during the trainee program, in Bergen, Trondheim, Brussel/Paris and Tromsø.

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Executive MBA – Sustainable Innovation in Global Seafood

Knowledge

24 participants from Norway, Sweden, Denmark, Great Britain, Canada, France, Portugal and Australia is attending the first Executive MBA, Sustainable Innovation in Global Seafood.

The cluster's goal is to enable sustainable growth of Norwegian seafood internationally. Sustainable innovation is increasingly important to succes in a highly competitive and international environment and and the candidates are provided with in-depth knowlegde and expertise within sustainable seafood.

NHH's international ranking has increased due to Executive MBA, Sustainable Innovation in Global Seafood

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

CO2Food (CO2Bio) - Microalgae for sustainable salmon farming

Knowledge

The Cluster, together with the CO2Bio AS and the new Algae pilot facility from the University of Bergen, has set an ambition to build a solid innovation platform on local production methods of micro algae. Our ambition is to develop and apply knowledge that can boost innovation of new functional, cost-effective and sustainable raw materials in salmon feed.

In early 2017, the last technical adaptations were made to the National microAlgae pilot Mongstad (NAM). The reactors have run since the beginning of May, with some exceptions due to technical failure.CO2FOOD has selected 7 strains as possible interesting candidates for aquafeed, following the industrial requirements on nutritional profile.

The biomass produced under the standard operating conditions at NAM gives us benchmark productivity value (biomass, EPA and DHA). Moreover, the biomass has been used to optimize the harvesting process with the new Evodos separator at NAM, and in September this biomass has been used for the first trials on development and optimization of the bead milling process.

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Industry Professor

Knowledge

The Board has awarded an Industry Professor to support UiB's expertise and resource needs in the new Siv Ing study.

The position will contribute to research within RAS and for farming in closed/semi-closed plants (S-CCS) for salmon farming, with direct relevance to industry's applications for research and development concessions.

In addition to supporting teaching, the position aims to support research into the new RAS pilot facility at Marineholmen, and to generate R&D projects in cooperation with industry.

The position will support the establishment of continuing education (EVU) for industrial actors in areas such as RAS and S-CCS, areas where there is a significant need for building new skills and transfer to industry.

The investment in the Industry Professor has triggered two new applications to support the same research topic; 1) NFR application “Kapasitetsløft”, 2) SIVA, RAS Pilot Facility (Infrastructure).

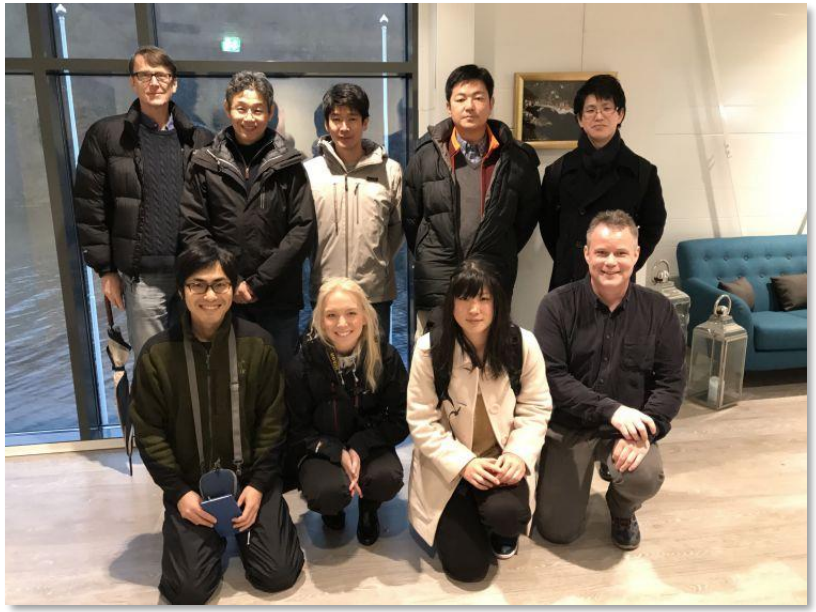
Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

R & D Partnerships

Knowledge

International Partnerships for Excellent Education, Research and Innovation:

- Excel Aqua, Sustainable Aquaculture: Partnership between Norway and Japan
- Cross Atlantic Sea Lice: Partnership between Norway and Canada
- Aquaculture Biology: Partnership between Norway and North America
- Entrepreneurship/Kogod School of Business: Partnership between Norway and Washington



Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Young people, a valuable resource

Knowledge

The Cluster is dedicated to support young talented people. This year, the Cluster has hosted 6 young talented interns to assist our partners.

"Vi var begge var sultne på relevant erfaring som vi kan ta med oss videre i arbeidslivet. Sjømat og havbruksnæringen er en bransje i enorm vekst, og dermed ble Sjømatklyngen et naturlig valg for oss. Kombinasjonen av internship og vår interesse for denne næringen, gjør oss svært ettertraktet på jobbmarkedet. Vi har fått utdelt en rekke svært relevante oppgaver innenfor markedsføring og kommunikasjon, spesielt knyttet opp til bærekrafts konferansen – Sustainable Growth Summit 2017. Internshipet har vært svært lærerikt og vi setter begge utrolig pris på den muligheten vi har fått fra klyngen.»

Cassandra Ulleberg, Maria Wathne, Tora Sandven, interns Høst 2017

2. Innovation

Our focus is to ensure better coordination and dissemination of R & D initiatives and to strengthen collaboration within the cluster and between cluster actors and external partners.

Cluster's Key services:

- Establish collaboration projects between companies and R&D
- Initiate common innovation projects
- Establish common R&D infrastructure
- Common promotion
- Assistance and funding pre-projects
- Legally assistance for start-ups
- Seminars and workshops
- Expand international partnerships network

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

How we work

Innovation

Our innovation strategy is anchored in «Innovation Strategy & Activity Plan 2017-2018»

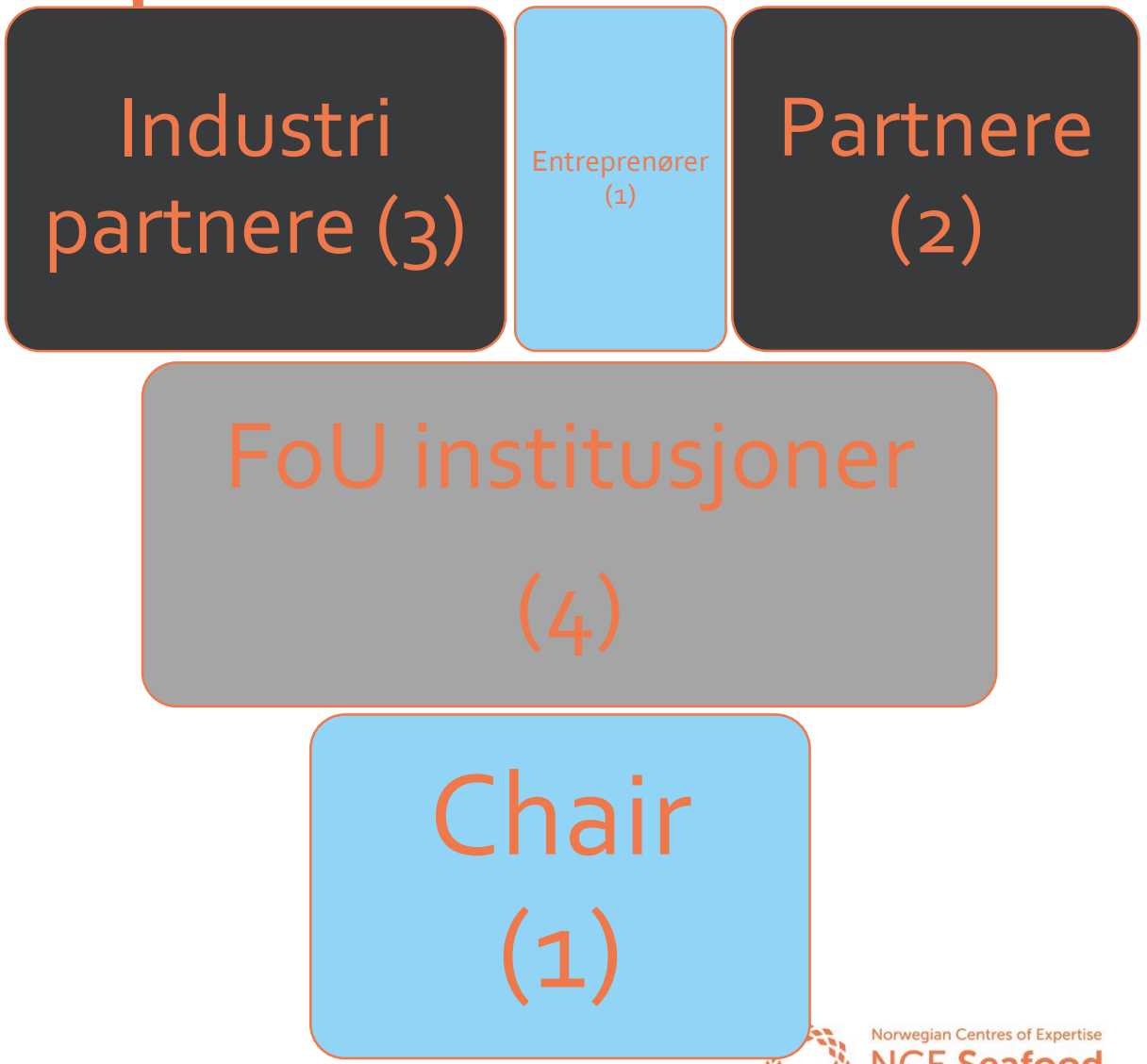
The strategy is executed through:

- Dedicated Staff
  - Innovation Manager coordinating the work supported by the Resource group-Innovation
  - EU-specialist working closely with cluster companies
- Company outreach
- Close cooperation with R&D companies that can deliver on a specific need
  - UiB, NORCE (ex Uni Research+CMR+IRIS+Agder Forskning+Teknova), IMR, Vetrinary Institute and others
- Cooperating with other clusters, Norwegian or foreign
- Close cooperation with cluster partners involving or catering to their specific needs.
- Workshops, meetings and other activities fronting calls, establishing consortia
- Participating in tradeshows, conferences etc to network and aid companies in sharing knowledge (or move to Norway – Hatch Blue and AquaByte)

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Innovation Resource group

- Innovasjonsleder – Chair
- Partners (board members) 2 seats (1 dept)
  - Lerøy Seafood
  - Grieg Seafood
  - (Bremnes Seashore)
- Industrypartners 3 seats (2 dept)
  - Pharmaq
  - MSD
  - SalmoBreed
  - (Patogen)
- R&D partners 4 seats (2 dept)
  - IMR
  - UIB
  - Western University of Applied Sciences
  - Veterinary Institute
  - (NORCE)
- Startups 1 seats (1 dept)
  - Optimeering Aqua
  - (Hauge Aqua)
- Cluster members not represented on the group will be forwarded the right to observe without voting



Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Innovation Scheme (Innovasjonsrammen)

Innovation

In June, Innovation Norway granted the Seafood innovation Cluster 1 million NOK to support early-phase innovation projects.

5 projects have been initiated:

- Using underwater drone for environmental monitoring (IoT/AquaCloud) (AquaSmart, Antea, Bremnes Seashore
- Using Data to develop Decision Support to address biological risks (OptimeeringAqua/Pathogen
- Pre - project – «New» bacteria causing gill damage (Pharmaq Analyze)
- Pre - Project – Tissue loss – effect of exposure to warm water (Pharmaq Analytic/Steinsvik)
- Use of hydrophones to map salmon behavior (Aarhus innovation/Lerøy)

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Innovation funding EU, new EU Advisor

Innovation

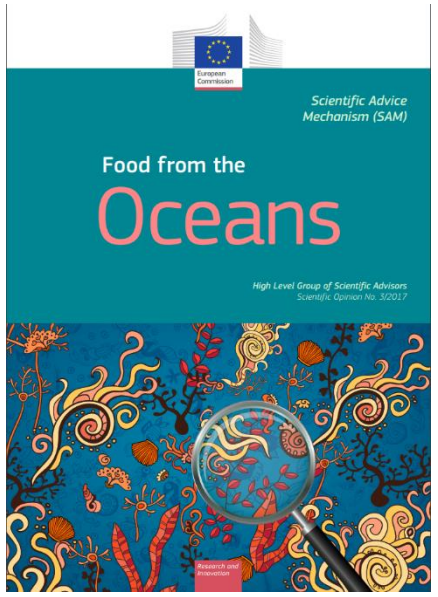
Innovation Norway has granted NCE Seafood Innovation Cluster and GCE Subsea partial funding of a new EU advisor position to strengthen EU funding Capacity. The new EU Advisor, Poppy Kalesi, is a joint resource of GCE Subsea and NCE Seafood Innovation Cluster and started on January 1st 2017 and will work within the following areas:

Strategic positioning:

- The Cluster is now invited by the European Commission to lead the EU's innovation agenda on Blue Growth and Food from the Oceans
- Strategic positioning based on partners' priorities and active participation overtime translates into market power.

Mapping of partners project activities:

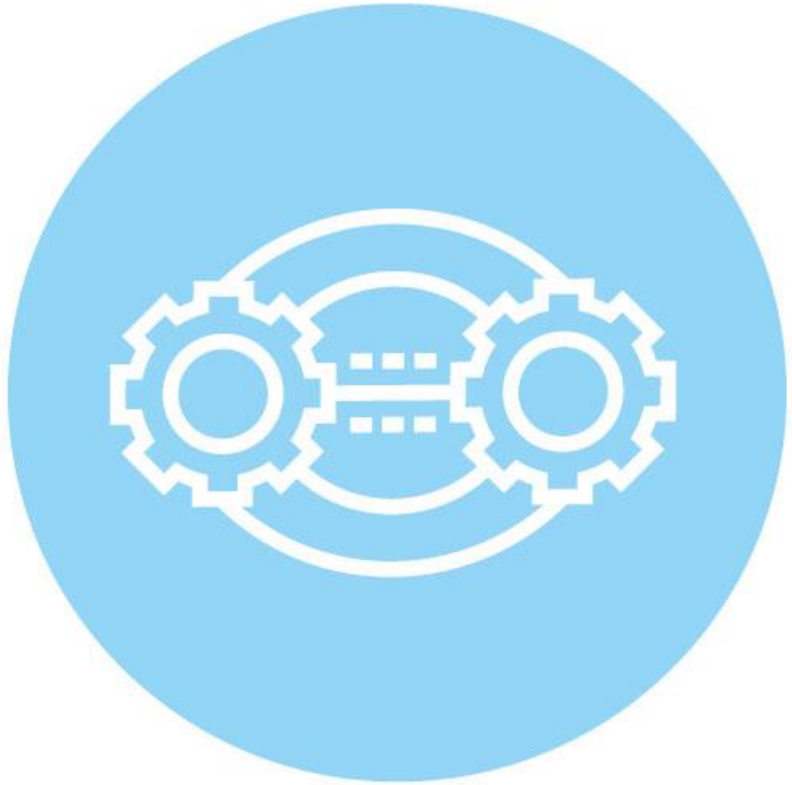
- How can we sustainably source new raw materials for feed?
- New species – how can we process and integrate into our value chain?
- Genetics – how can the fish grow faster, safely? How can we deliver better roe?
- How can we increase efficiency and performance of feed and production technology?



European Aquaculture
Technology and Innovation Platform

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

3. Entrepreneurship



Our goal is to be an important driving force by attracting and supporting new suppliers to increase innovation capabilities in the Cluster.

Cluster's Key services:

- Business development programs
- Incubator for start-ups
- Connect SMEs with major customers
- Collaboration technological challenges
- Partnerships international markets
- Attract/assist international delegations
- Seminars, workshops and courses on internationalization

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Accel – Entrepreneurship program

Entrepreneurship

Accel

ACCEL is a 10 week intensive innovation program that provides highly qualified assistance to students, entrepreneurial companies and established businesses working with innovative solutions. ACCEL helps the participants to structure and establish their business plan, networking and to use the most efficient methods to reach their goals.

Through guidance from mentors and practical training in innovative methods, ACCEL gives you the tools you need to build strong and viable business ideas. During Demo Day the developed business ideas are also presented to potential investors and customers. The programme is therefore a great way to expand your network within your field and shorter time to marked.

Accel Seafood

The first Accel Seafood program ended January 2017, and the nine participating companies are now members of the cluster.

ACCEL Seafood 2016 : TIALTA, Anteo AS, Normong, Ecomerden, SeaSmart AS, MT-AQUA AS, FishGLOBE AS, Scantrol Deep Vision and Optimeering Aqua AS.

ACCEL Seafood 2017: Invertapro AS, Sailing Sea Farm, Fjord Maritime AS, wi innovate as, Bulandet Miljøfisk AS, AquaPro AS, Ecotone SpectraLice, Mithal as, AquaByte. Cargill is the main sponsor of the program

Accel Crossover

Introducing the Subsea industry to the aquaculture industry creating an exciting forum for mixing of ideas and creative outlet.

8 companies from the Oil & Gas sector participated

Accel Crossover, a cooperative effort between The Seafood Innovation Cluster, GCE Subsea and Deloitte has been a great success.

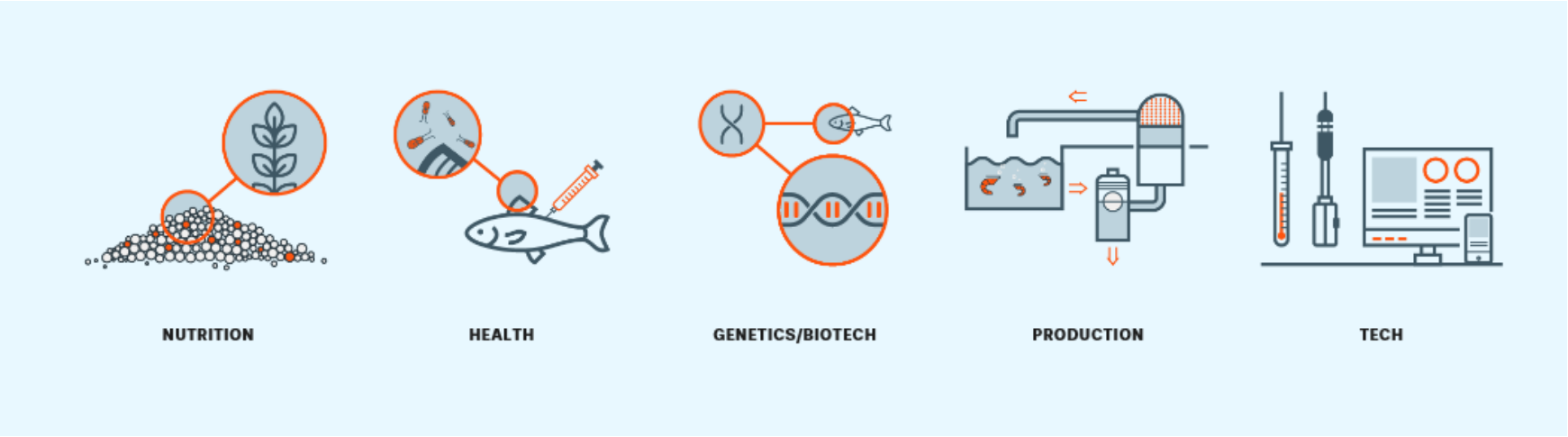
Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Global Accelerator program

Hatch

HATCH is the world's first accelerator program focused on the aquaculture industry seeking to find, develop and scale talented and disruptive aquaculture startups.

We look for teams with innovative and scalable solutions, that solve significant problems in the aquaculture industry in order to enable its long-term sustainability.



Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Hatch start-ups 2018

Hatch

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Oil & Gas meets Aquaculture - New technology suppliers

Entrepreneurship

The cluster-to-cluster project Subsea meets Aquaculture between GCE Subsea and NCE Seafood innovation is facilitated by Deloitte and sponsored by Hordaland County.

Areas for crossover that has been identified; control and instrumentation systems, remote control, sensor technology, advanced image recognition, data acquisition and analysis, tracking systems, environmental survey, piping and valves, surface protection and anti-corrosion, marine operations, diving and ROV support, anchoring, materials and more.

Possible solutions will be vetted and prioritized for further development into new cross-over R&D projects.

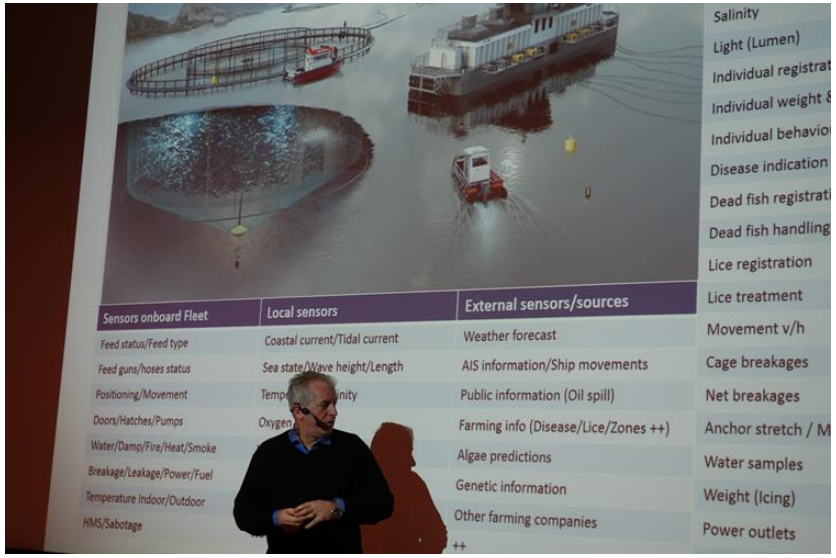


Photo: Grieg

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Ocean Industries Accelerator (OIA)

Entrepreneurship

Together with Bergen Teknologioverføring AS (BTO), the technology transfer office and GC Rieber, Ocean Industries Accelerator (OIA) has been established in Marineholmen Sciencepark.

The OIA is a symposium of internationally-minded entrepreneurs in an exclusive co-working space, where good ideas flow and open people create value together. Our goal is to foster innovation in an excellent working environment, connect entrepreneurs and business with the right people and grow business and international business.

Photo: Opening of Ocean Industries Accelerator

Global Centres of Expertise GCE Subsea

Norwegian Centres of Expertise NCE Seafood Innovation Cluster

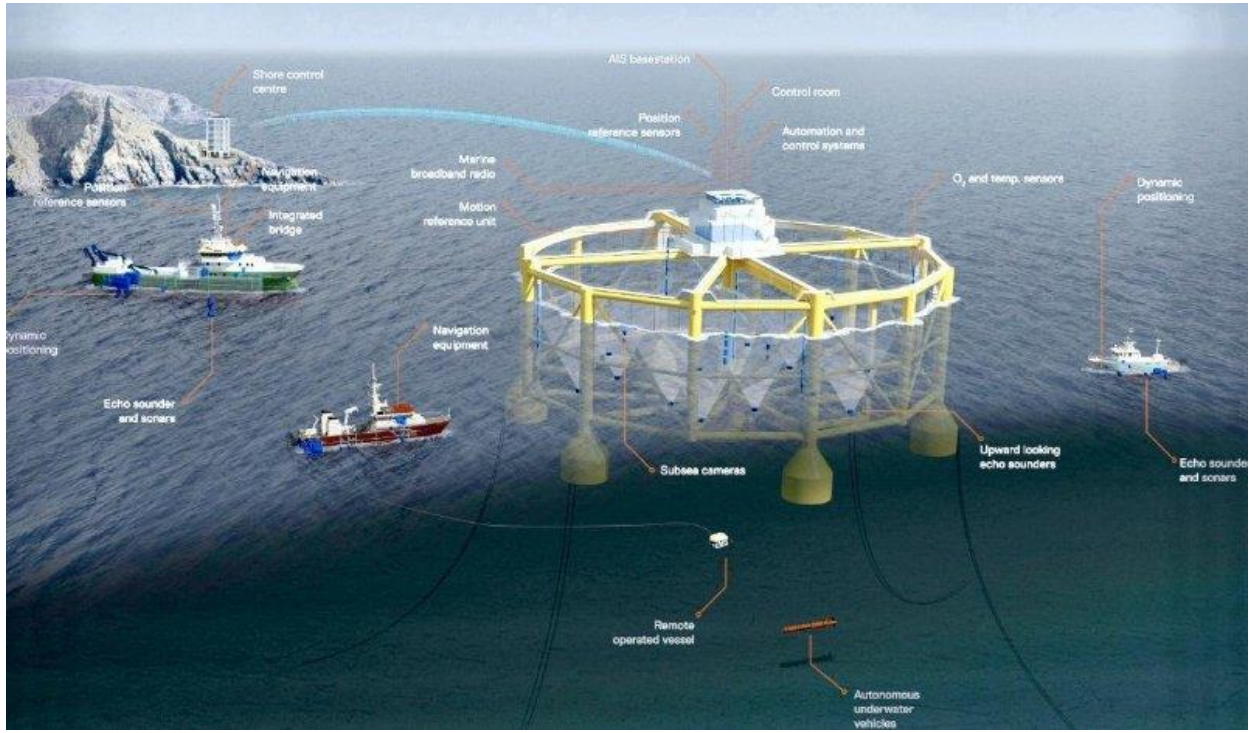
Norwegian Centres of Expertise NCE Maritime CleanTech

Norwegian Centres of Expertise NCE Seafood Innovation Cluster

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster
AquaCloud

AquaCloud – Making innovation possible

- High salmon price
- Low oil price
- Increased digitalization



Bilde: Kongsberg Maritime

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

Norwegian Centres of Expertise
NCE Seafood
Innovation Cluster

- High salmon price
- Low oil price
- Increased digitalization