



MACROSEA - A KNOWLEDGE PLATFORM FOR INDUSTRIAL MACROALGAE CULTIVATION

Seaweed cultivation in Norway

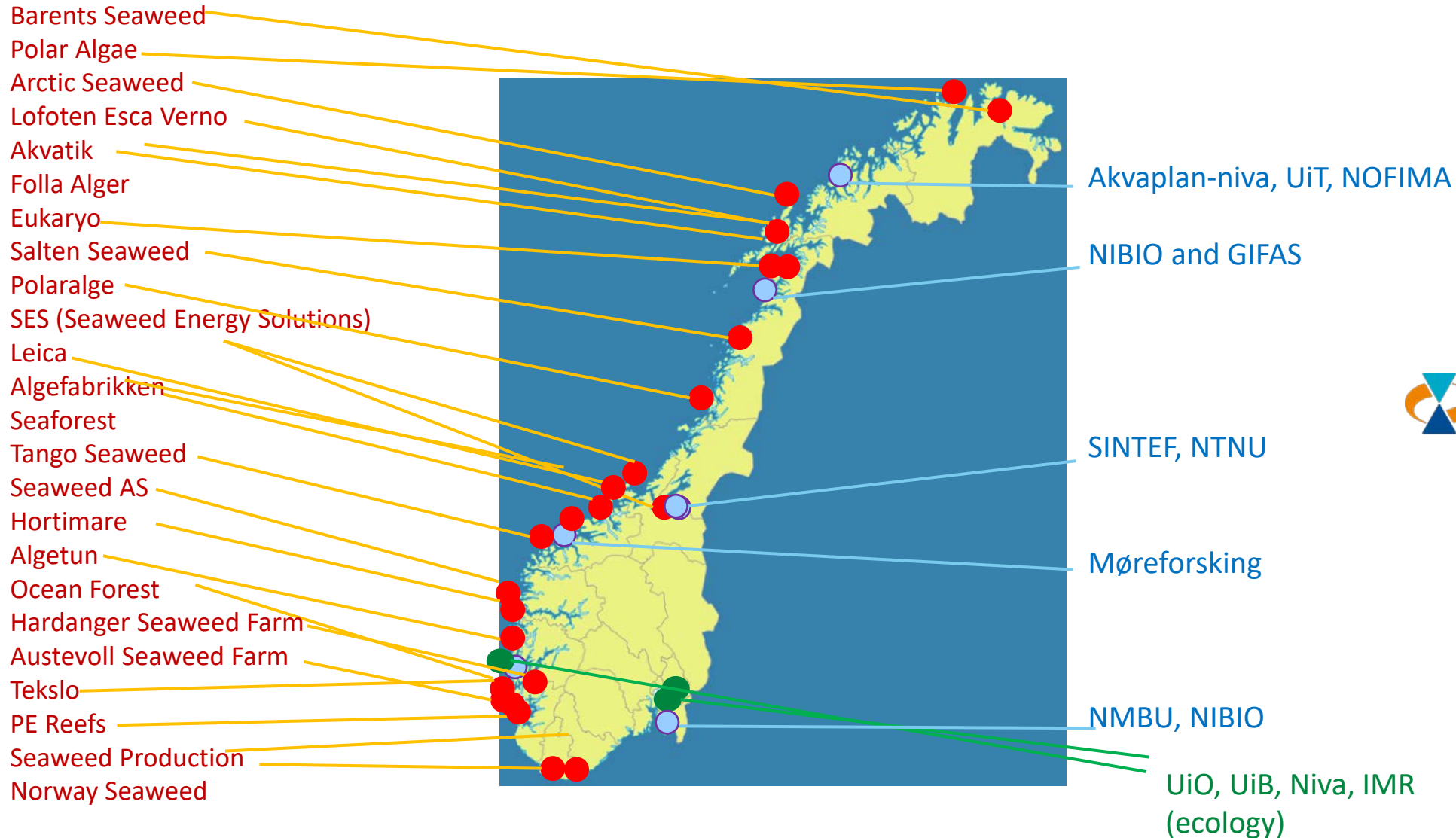
FOOD

FEED

MATERIALS

ENERGY

Seaweed industry and R&D in Norway



Ambitions



MACROSEA - A KNOWLEDGE PLATFORM FOR INDUSTRIAL MACROALGAE CULTIVATION

- Technological specifications
- Generic model and simulation tools
- Farm systems and biomass production

- Biological performance
- Environmental requirements
- Chemical composition and biomass

- Interdisciplinary knowledge
- Production biology and technology
- Climatic, ecological and physical conditions

Production Biology

WP1

Seedling
Biology

Jorunn Skjermo

WP2

Sea
Cultivation

Yngvar Olsen

WP3

Genetics
and
Disease

Kjersti Sjøtun

WP4

Marine
Modelling

Ole Jacob Broch



MACROSEA



Spores
Gametophytes

WP5

Seedling, Deployment
and Harvest
Technology

Torfinn Solvang

WP6

Sea
Farms

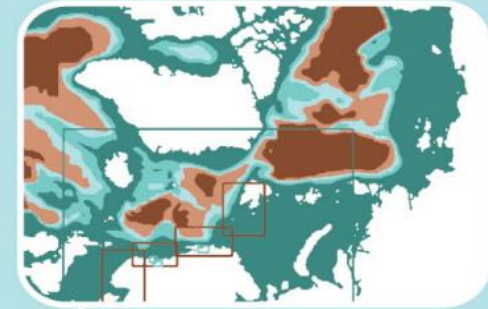
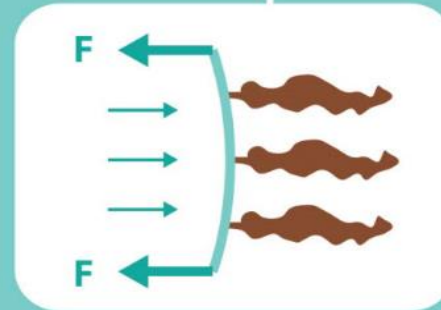
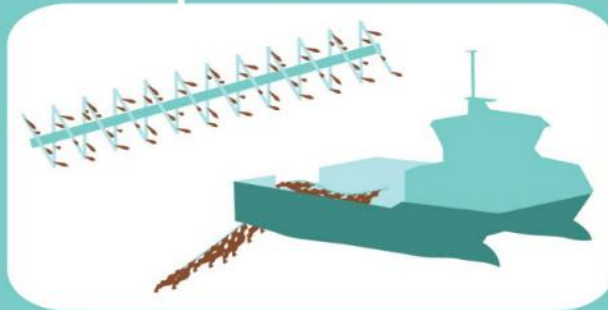
Per Christian Endresen

WP7

Management,
Coordination and
Dissemination

 **SINTEF**

Technology



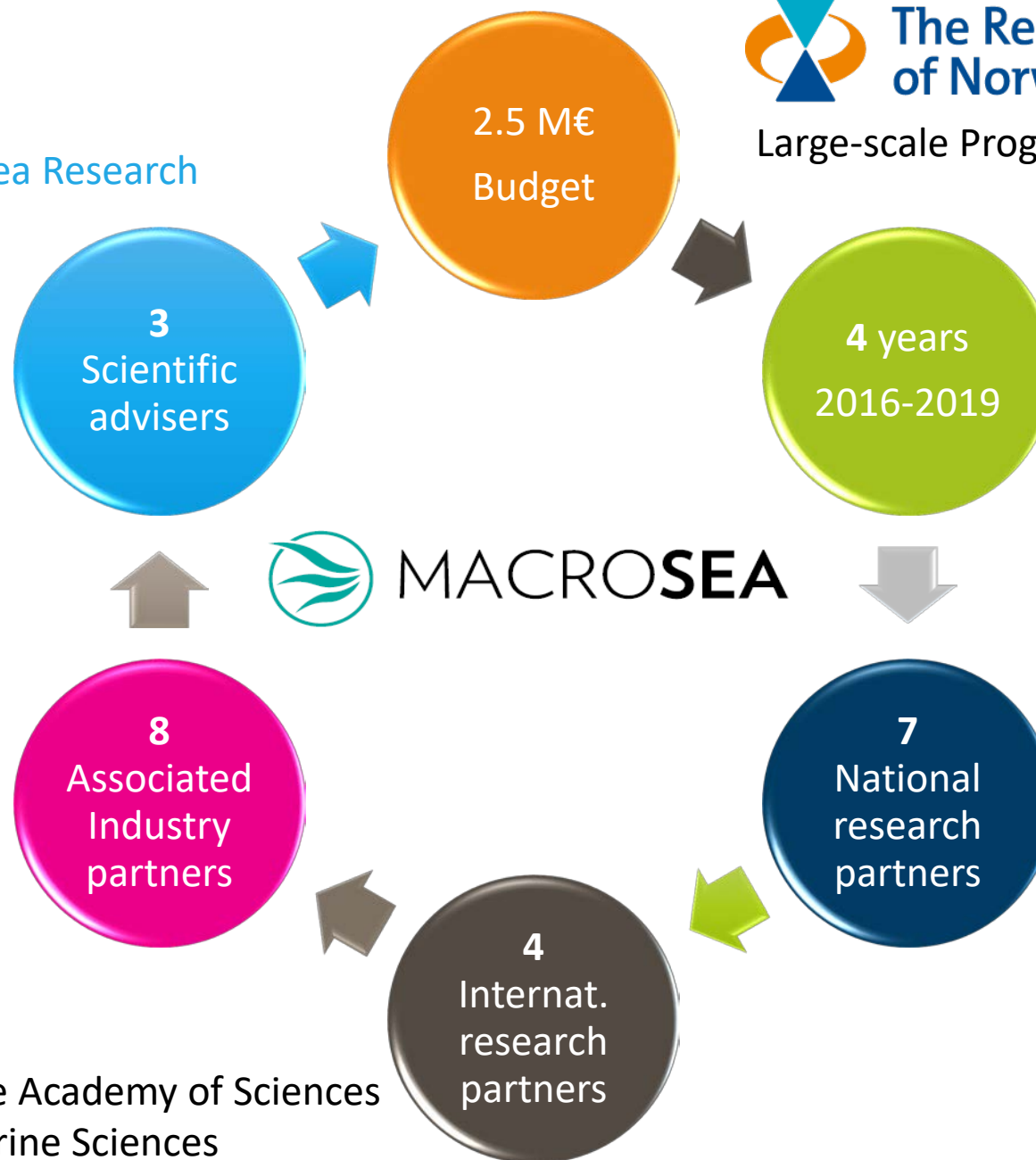
High quality
macroalgae

Key figures

Royal Netherlands Institute of Sea Research
Station Biology Roscoff
Technical University of Denmark

Austevoll Seaweed Farm
Biokraft
Folla Alger
Hortimare
Ocean Forest
PE Reefs
Seaweed
Seaweed Energy Solutions

Aarhus University, Denmark
Clarkson University, USA
Institute of Oceanology, Chinese Academy of Sciences
The Scottish Association for Marine Sciences



The Research Council
of Norway

Large-scale Programme on Aquaculture Research

SINTEF Ocean (Project leader)

Akvaplan Niva
NIVA
NTNU

The Arctic University of Norway
University of Oslo
University of Bergen

Key people



The MACROSEA PhD-stars



Silje
Forbord
NTNU



Sanna
Matsson
APN



Alexander
Thomson
SAMS



Saifullah
Saifullah
NTNU

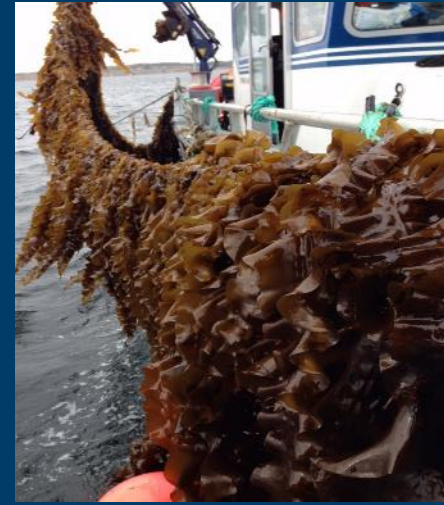


Siv Anina
Etter
NTNU/DTU



Peter
Schmedes
DTU/NTNU

Sugar kelp
Saccharina latissima



Winged kelp
Alaria esculenta



Dulse
Palmaria palmata



23.04.2018

29.05.2018

13.06.2018



Protocols for Macroalgae Research

Edited by **Bénédicte Charrier • Thomas Wichard • C R K Reddy**



MACROSEA

-A KNOWLEDGE PLATFORM FOR
INDUSTRIAL MACROALGAE CULTIVATION



13:00 Seaweed cultivation in Norway - ecology & strategy, Silje Forbord



13.20 How to enable red seaweed cultivation, Peter Schmedes



15:10 Automation of cultivation technology, Torfinn Solvang



16:45 Cultivation potentials for brown and red algae in Norway, Ole Jacob Broch



17:15 Biofouling of kelp – Local, latitudinal and time dependent variation, Sanna Matsson



09:30 Impact of genetics in cultivation of kelp, Alexander Thompson

Results



www.macrosea.no



RAPPORT

NYE MULIGHETER FOR VERDISKAPING I NORGE

Teknologi for et bedre samfunn



Høsting av havets planter – tang og tare

Dyrking av tang og tare representerer en stor verdiskapingsmulighet. Det kan brukes både til menneskelig konsum, bærekraftig proteinkilde for laks og andre produkter, og har stort potensial for å binde CO₂. For at tang og tare skal bli konkurransedyktige råstoff, må produksjonskostnaden ned og produktkvaliteten opp.



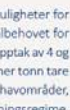
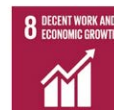
POTENSIAL OG MARKEDSMULIGHETER

Høsting og dyrking av tang og tare er del av bioøkonomien. Dyrking verdens største akvakulturstørrelse ca. 30 millioner tonn våttvekt i år menneskemat eller for. NTVA/Di 2050 kan omsettes produkter bas Norge for 40 milliarder kroner i år fra høykostprodukter.

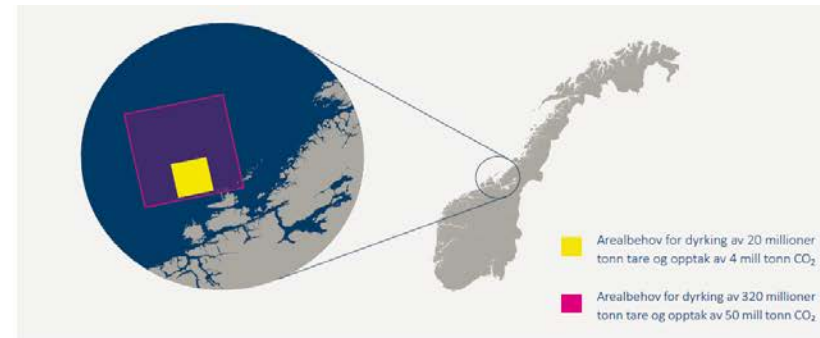
Seaweed Energy Solutions i Trond tareproduksjon i ti år, og er en av Selskapet har satset mye på FoU, i produksjonen fra 40 tonn pr. år til 32

Det eksisterer i dag 30-40 prosjekter langs norskekysten som dyrker og prosess basert på makroalger, og da særlig setningen fra dagens høsting er ca.

Vekst i lakseoppdrett krever nye løsninger. Laksen klarer ikke flytte laksen til et lavere tronsk nivå, så enten må genetikken endres eller det må finnes nye lipid- og



baserer seg på mye manuell arbeid, må Norge også utvikle standardiserte og automatiserte teknologier for dyrking.



KONTAKTINFORMASJON

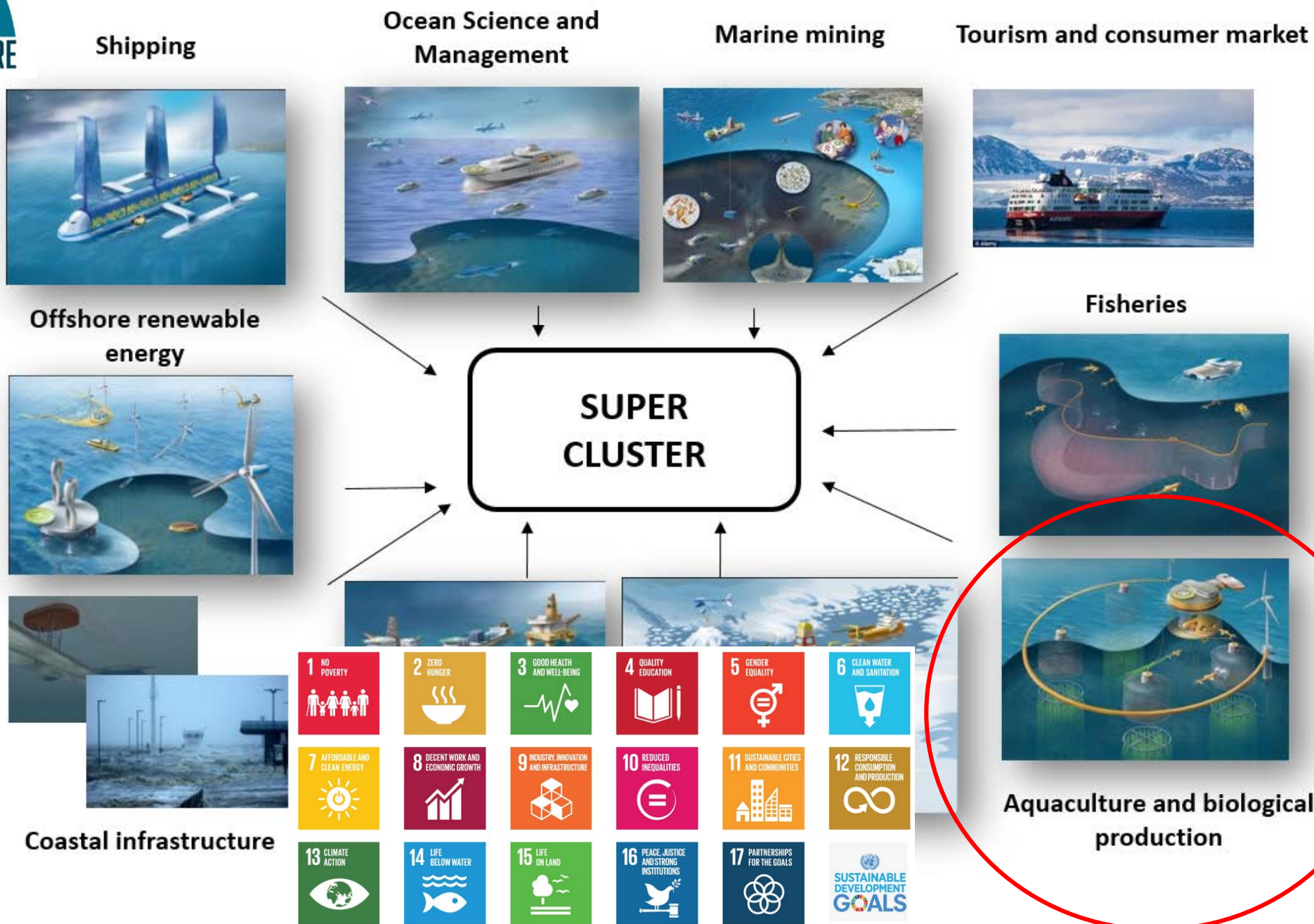
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Referanser og videre lesning

1. Olafsen, T., Winther, U., Olsen, Y., Skjermo, J., Verdiskaping basert på produktive hav i 2050. Det kongelige Norske Videnskapers Selskab (DNVNS) og Norges Tekniske Vitenskapsakademi (NTVA), 2012.

The Confederation of Norwegian Enterprise (NHO) is Norway's largest organization for employers and the leading business lobbyist.





SEAWEED INDUSTRY 2030

National Technology Action Platform for Automated Seaweed Production



Landfarms



Seafarms



Service vessels



Biorefinery

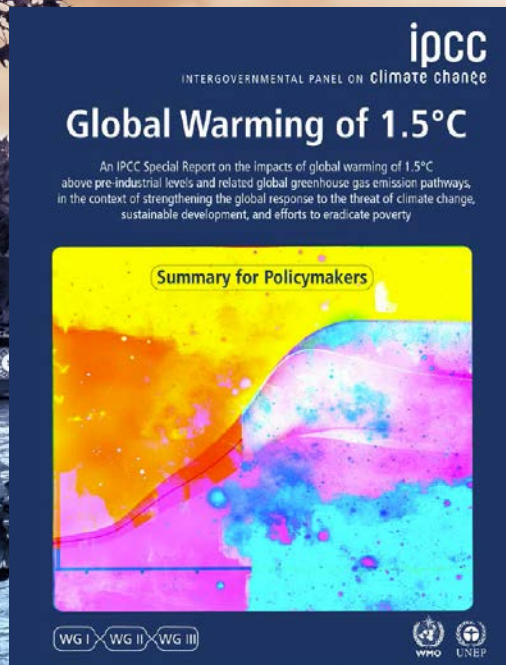
– A part of the solution for a new "low carbon" economy in Norway



The Norwegian Climate Law 1/1-2018

By **2030**, The emission of climate gasses shall be reduced by **40 %** compared with that in 1990.

By **2050**, Norway shall be a "low carbon" society, with **80-95 %** reduction in climate gas emmisions.



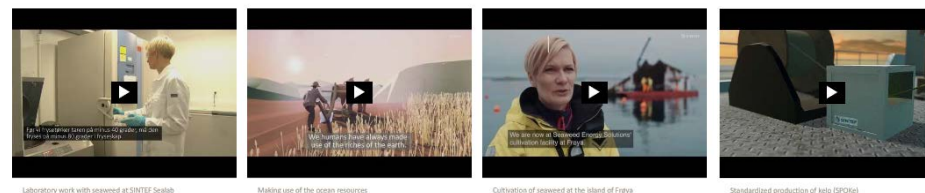
Ocean and Cryosphere in a Changing Climate

Summary for Policymakers



WG I WG II





See movies at www.macrosea.no