



HVORDAN KAN OFOTEN-REGIONEN BIDRA TIL VERDISKAPING FRA BIOMARINE NÆRINGER I NORGE ?

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Styreleder SINTEF Nord AS

Innhold

- Ocean Economy 2030 (OECD 2016)
- Norsk havøkonomi mot 2050 (SINTEF 2017)
- Norske biomarine næringer mot 2050 (NTVA/DKNVS 2012).
 - Fiskeri
 - Oppdrett
 - Leverandørindustri
 - Ingrediensindustri
 - Tang og tare
 - Lavtrofisk produksjon
- Avsluttende kommentarer

How big is the global ocean economy?

Ocean industries' net direct contribution to world economy in 2010 =
1.5 trillion USD (Gross Value Added)

2.5% of World GVA

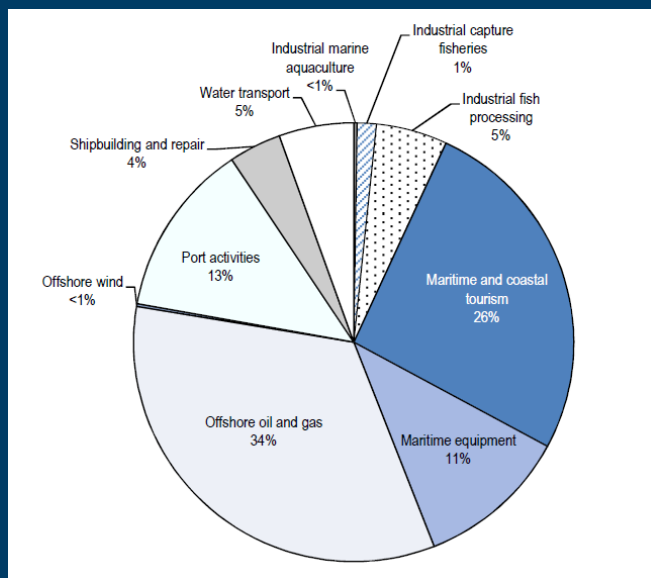


Norway (GVA):

0,3 % of the global economy, but
7 % of the ocean based economy

The global ocean economy 2010-2030 (OECD 2016)

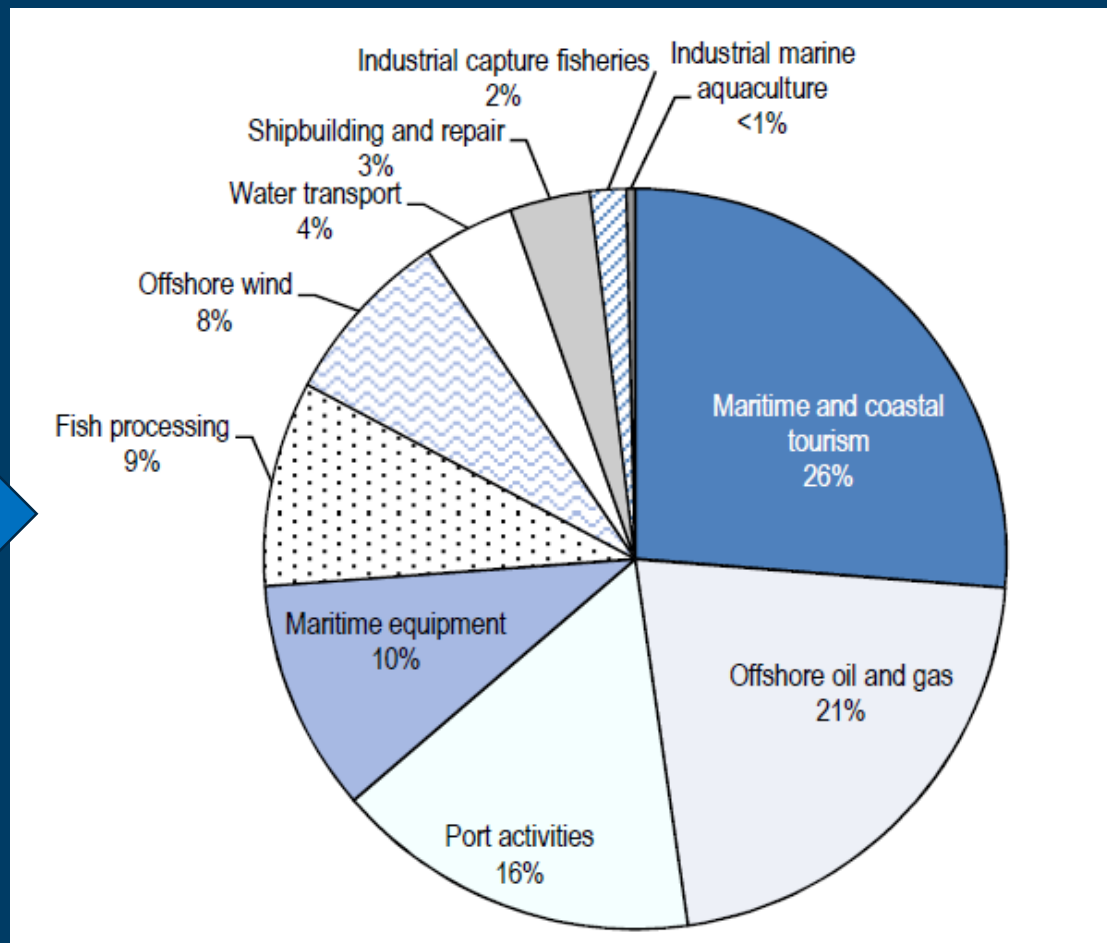
2010



USD 1,5 Trillion (1,5 Oljefond)

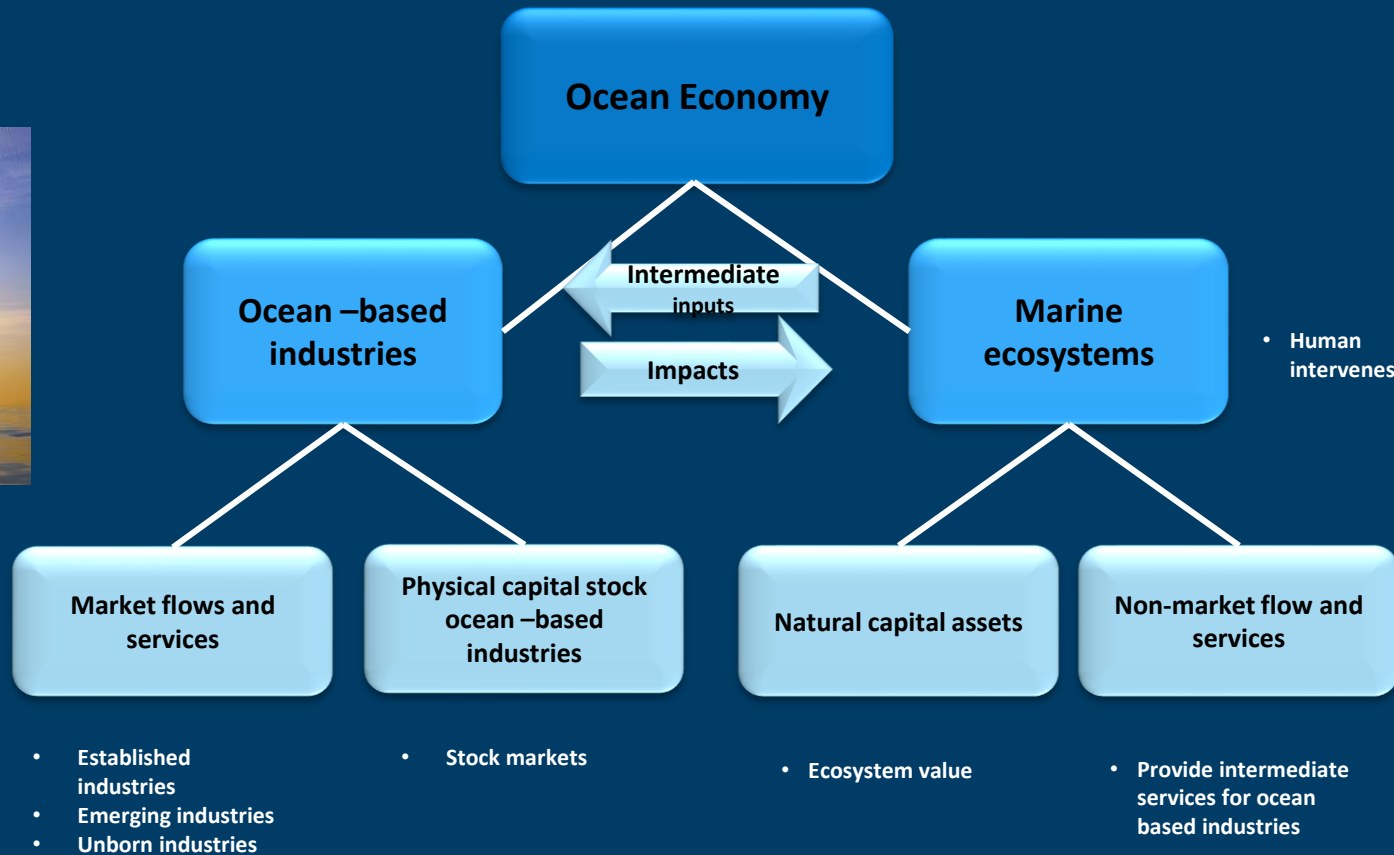
x 2

2030



USD 3 Trillion (3 oljefond)

Ocean Economy Model



Estimated growth rates

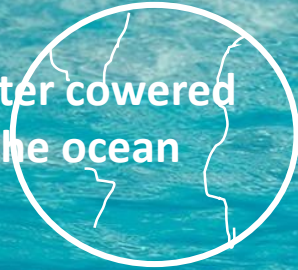
Industry	Compound annual growth rate for GVA between 2010 and 2030	Total change in GVA between 2010 and 2030	Total change in employment between 2010 and 2030
Industrial marine aquaculture	5.69%	303%	152%
Industrial capture fisheries	4.10%	223%	94%
Fish processing	6.26%	337%	206%
Maritime and coastal tourism	3.51%	199%	122%
Offshore oil and gas	1.17%	126%	126%
Offshore wind	24.52%	8 037%	1 257%
Port activities	4.58%	245%	245%
Shipbuilding and repair	2.93%	178%	124%
Maritime equipment	2.93%	178%	124%
Shipping	1.80%	143%	130%
Average of the total ocean-based industries	3.45%	197%	130%
Global economy between 2010 and 2030	3.64%	204%	120% ¹

1. Based on projections of the global workforce, extrapolated with the UN medium fertility rate.

Source: Authors' calculations based on OECD STAN, UNIDO INDSTAT, UNSD; Lloyd's Register (2014; 2013); World Bank (2013); IEA (2014); FAO (2015).

Ocean based activities are different from terrestrial

71 % of the surface is water covered
96% of all water is in the ocean



More fluid and interconnected



Lack of ownership less favorable for sustainable development

"More three dimensional"



Marine species can potentially travel much longer distances than terrestrial ones



Humans do not live in water



Pollutants (or nutrients) can be retained for several decades until they are released

Clusters of animals shift rapidly to another location



Water is less transparent than air



Ocean based value chains		
Marine Aquaculture	Maritime equipment	Offshore oil and gas
Capture Fisheries	Shipbuilding and repair	Offshore wind
Shipping	Port activities	Marine and coastal tourism



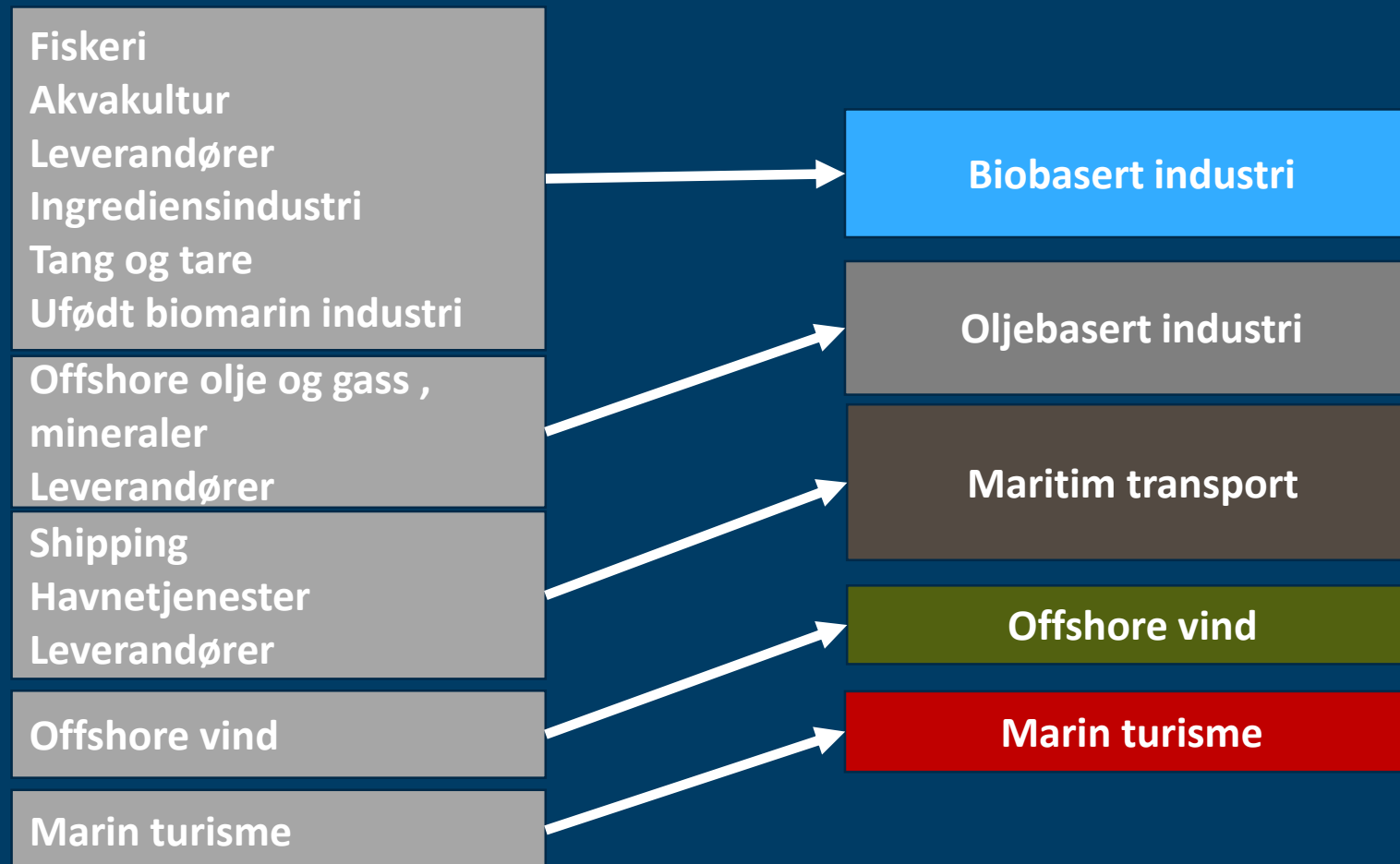
Enabling Technologies		
Advanced materials	Subsea technology	Big data analysis
Nanotechnology	Sensors and imaging	Autonomous systems
Biotechnology	Satellite technologies	Remote systems

**Land based
value chains**

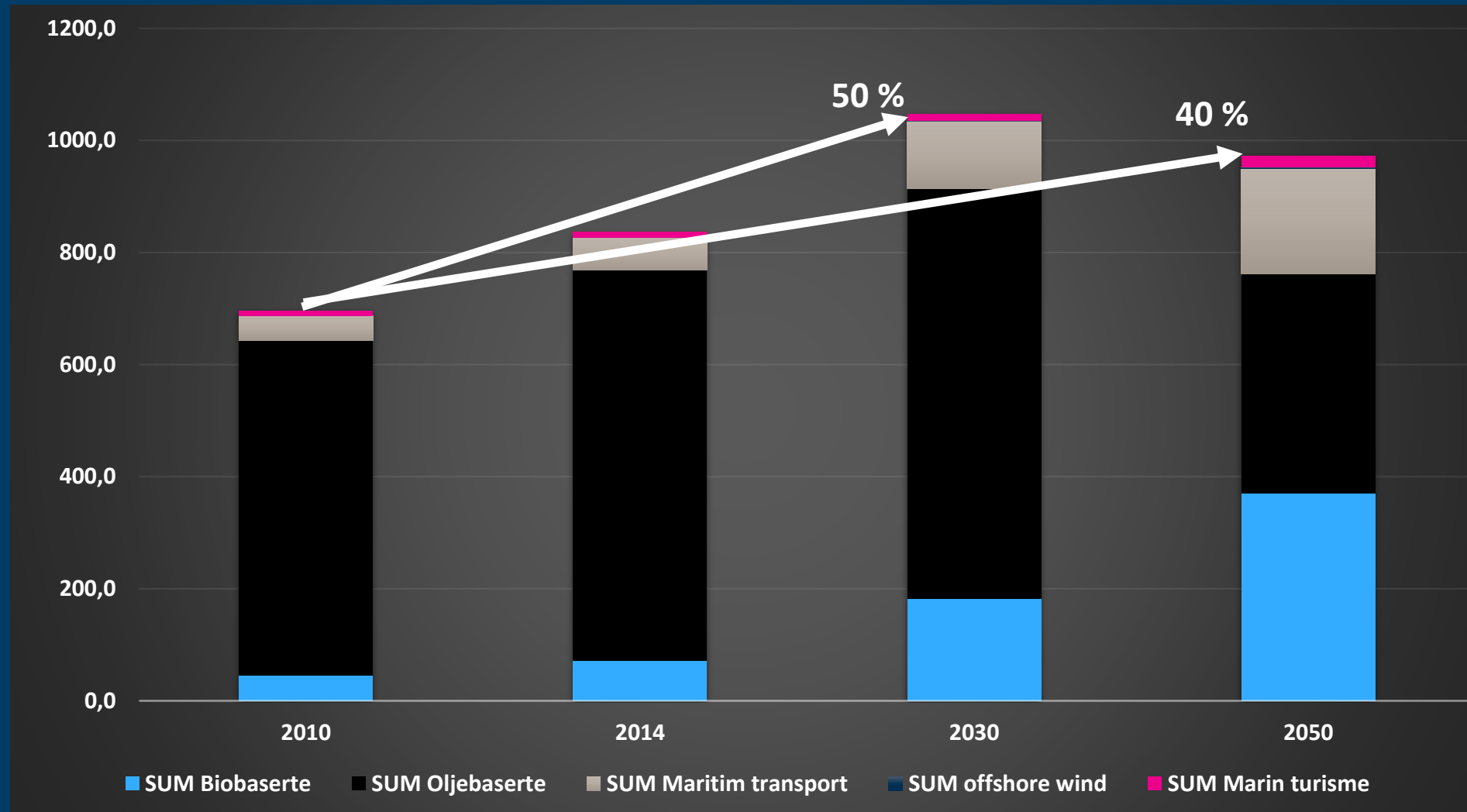
**Incremental
improvements
Disruptive changes**

Havbaserte næringsområder

(15 verdikjeder slås sammen til 5)



Havbasert verdiskaping mot 2050 (Mrd kroner)



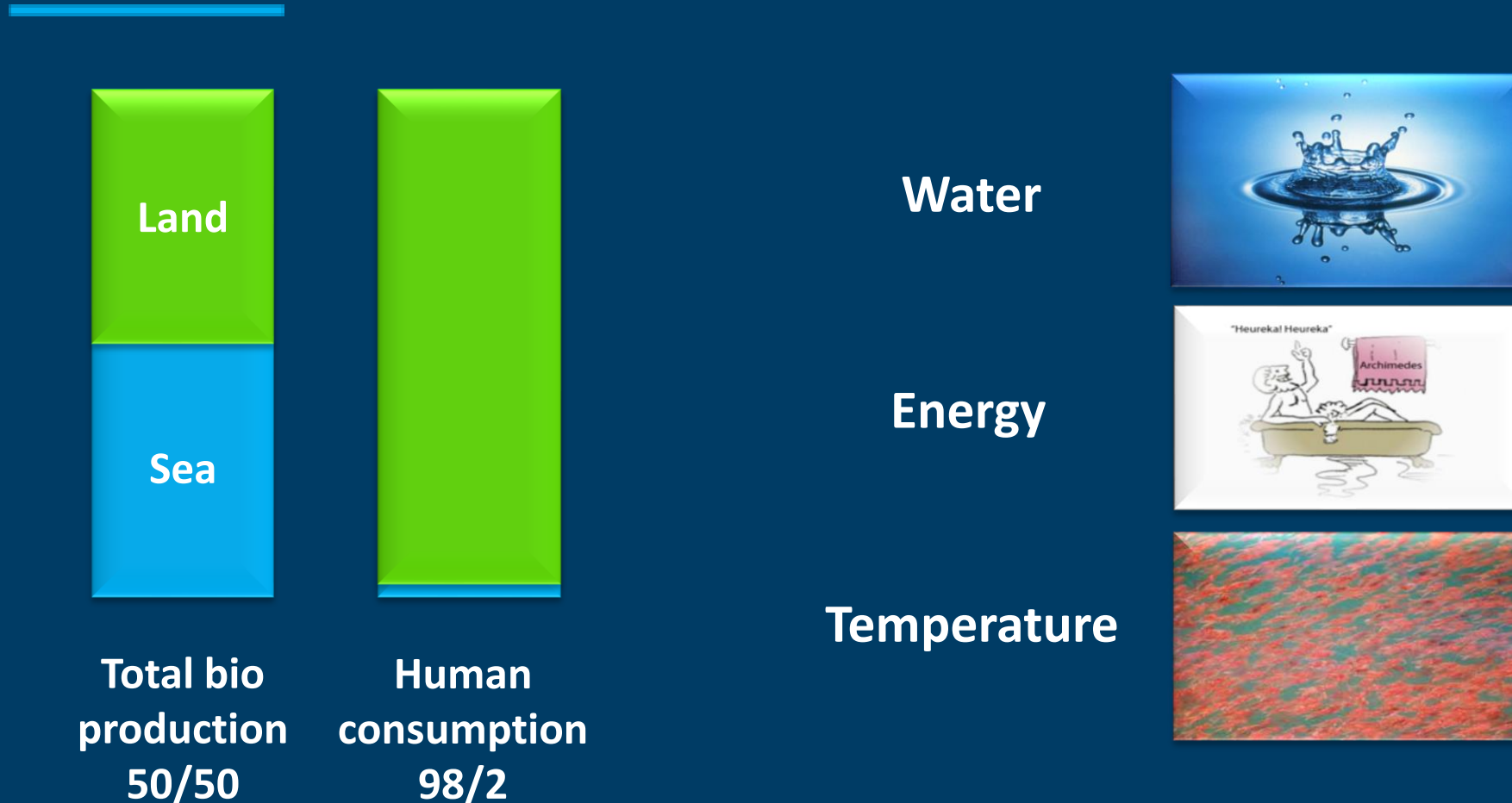
A question of balance

The oceans are already under stress:

- Pollution from human activity
- Growing coastline populations
- Over-exploitation of fish stocks
- Declining biodiversity
- Rising sea-levels
- Rising levels of acidity
-

- Challenge:
- How to develop ocean's potential without adding significantly to already existing pressures ?
- Rather, eliminating the existing pressures.

Why increase food production in the sea ?



Norsk biomarin industri



Fiskerinæringen



Havbruk



Leverandørindustrien



Ingrediensindustri



Tang og tare



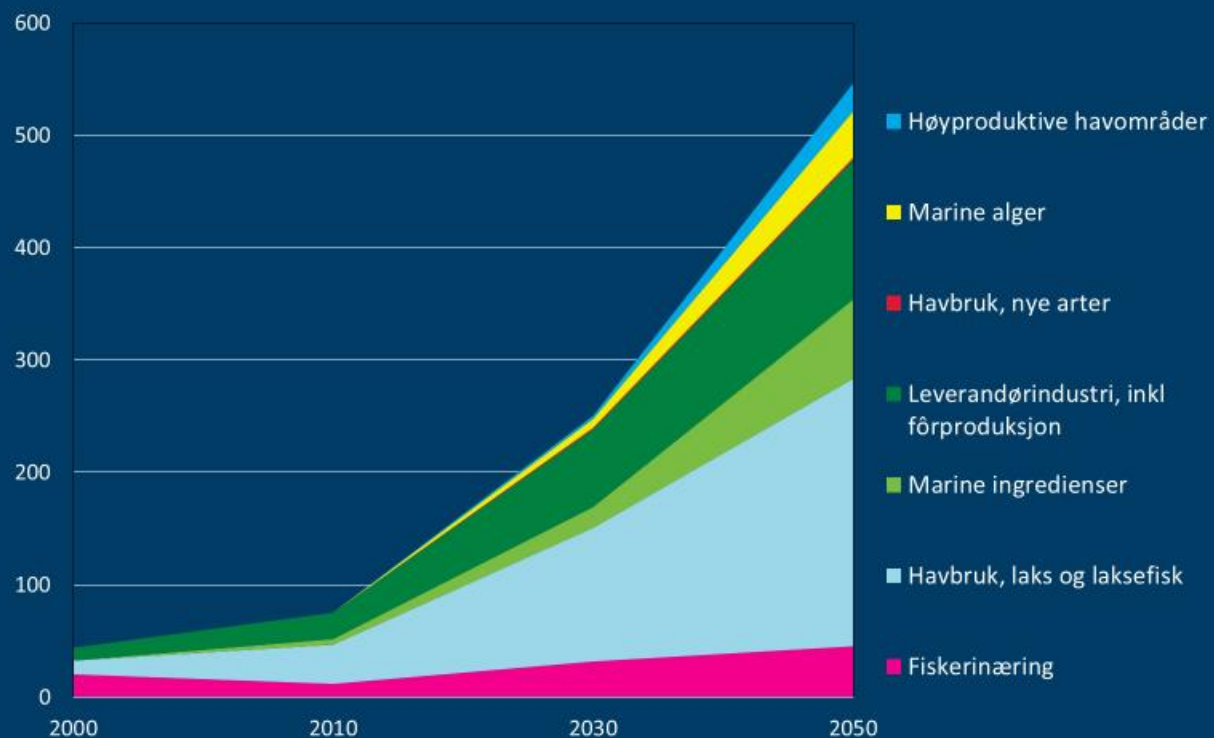
Lavtrofisk
produksjon



Foto: Aqualine AS

Scenario 2050: Potensial for verdiskaping

Tall i milliarder

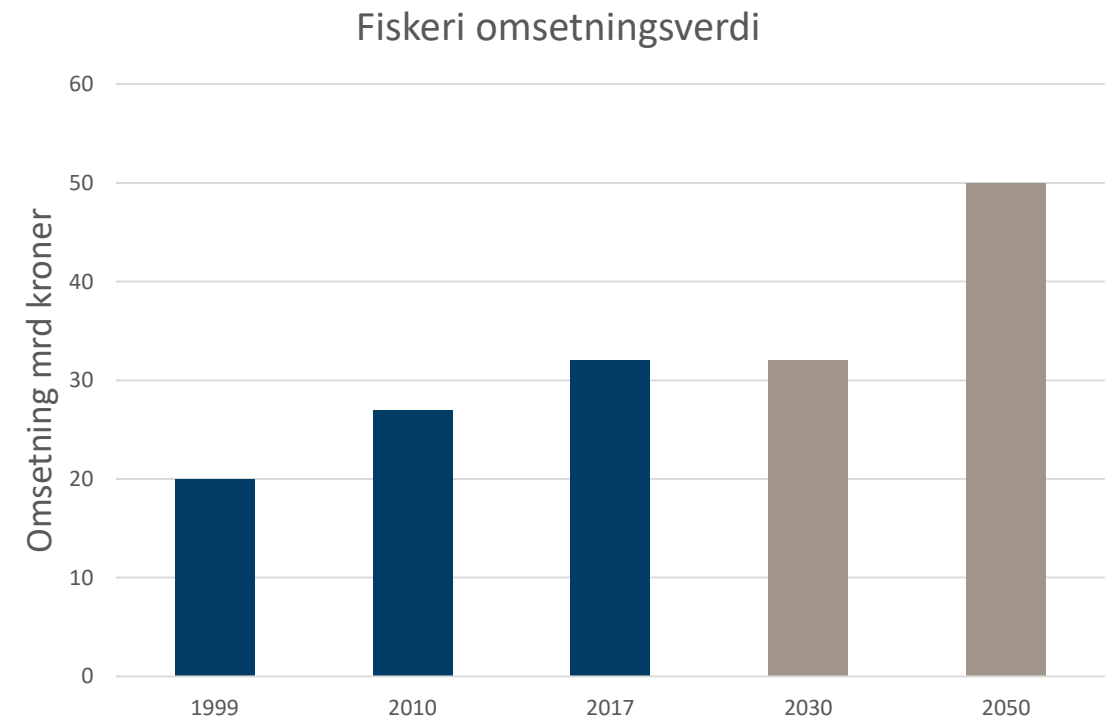
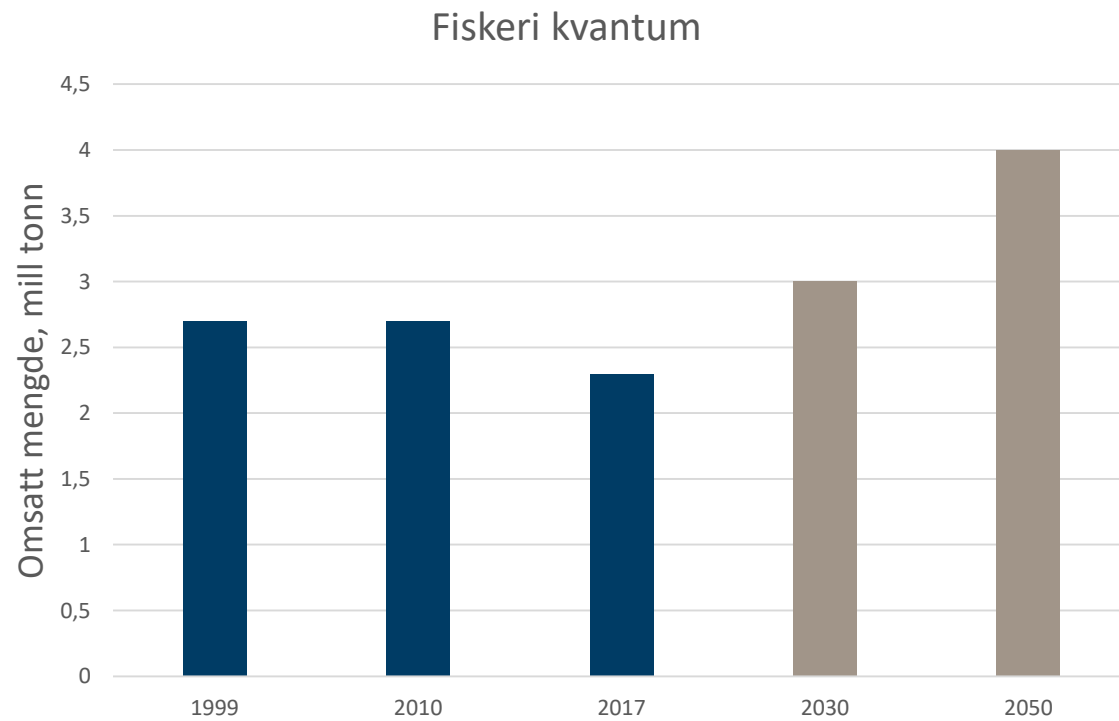


DKNVS, NTVA "Verdiskaping basert på produktive hav i 2050"



Fiskerinæringen

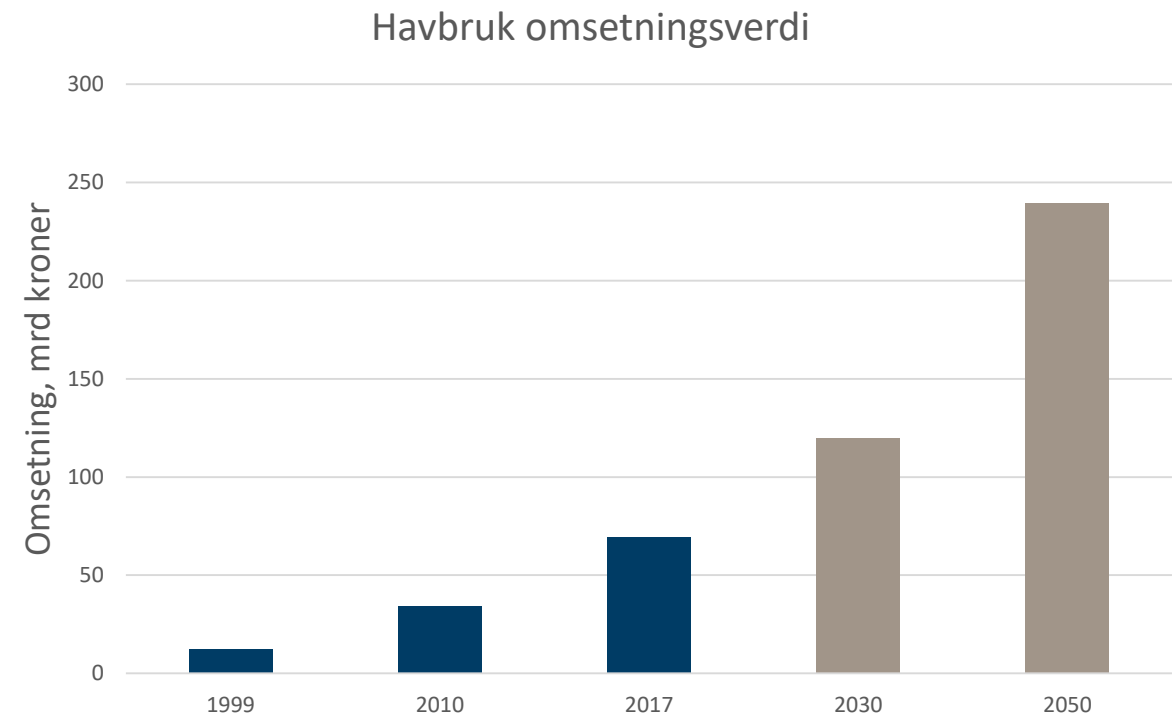
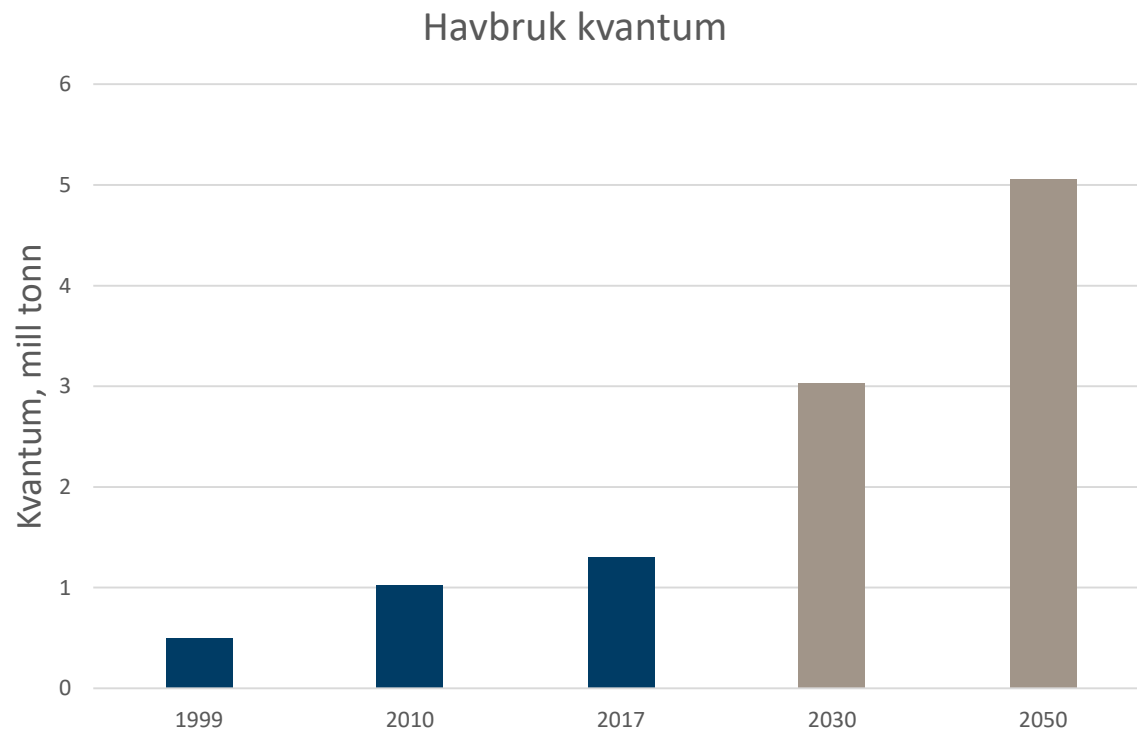
Fiskerinæringen



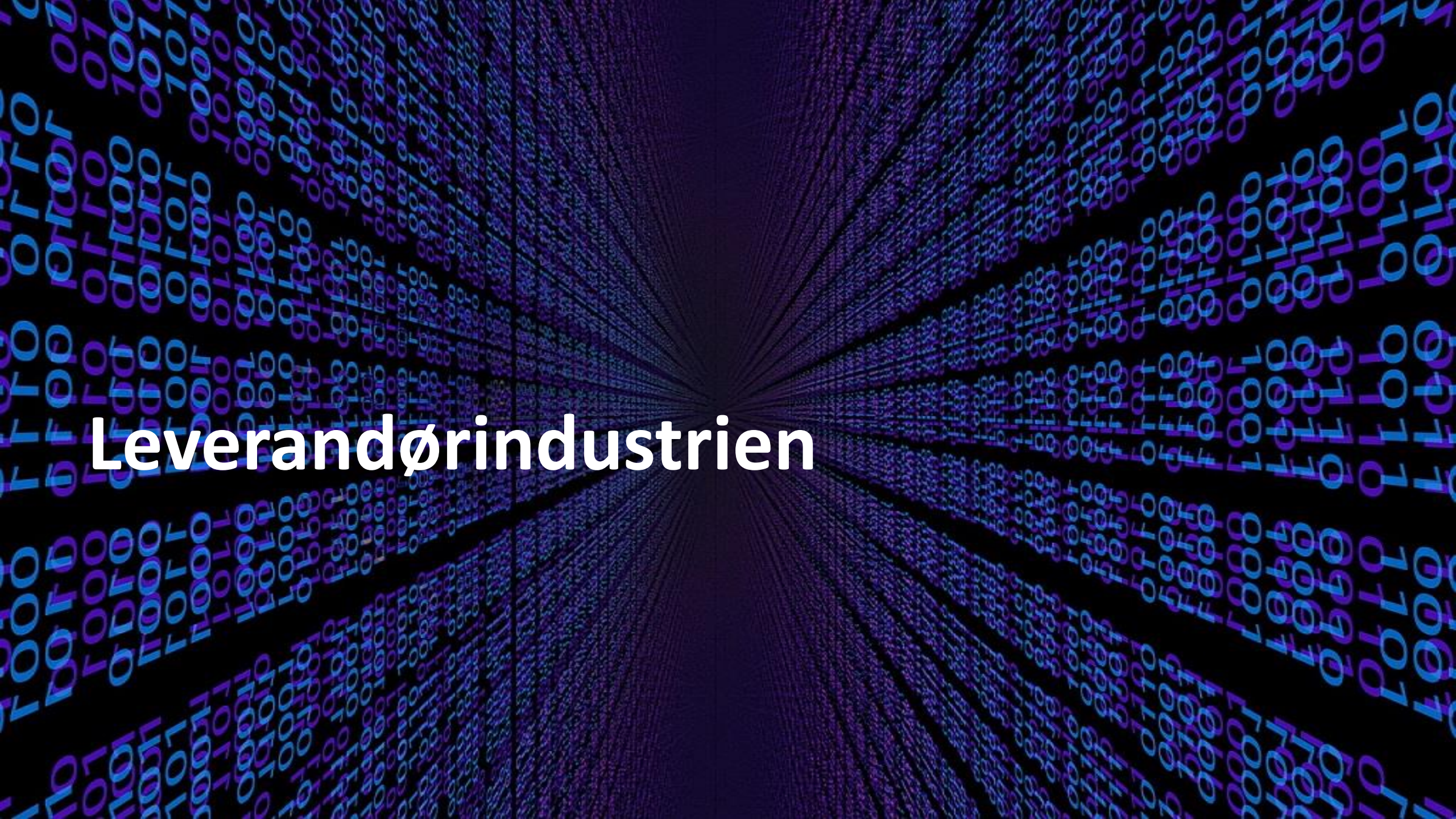
A large school of fish, likely salmon, swimming in clear blue water. The fish are silvery and elongated, moving in a coordinated pattern. The water is a deep blue, and the fish are densely packed in some areas, creating a sense of movement and activity. The lighting is bright, highlighting the scales of the fish and the clarity of the water.

Havbruk

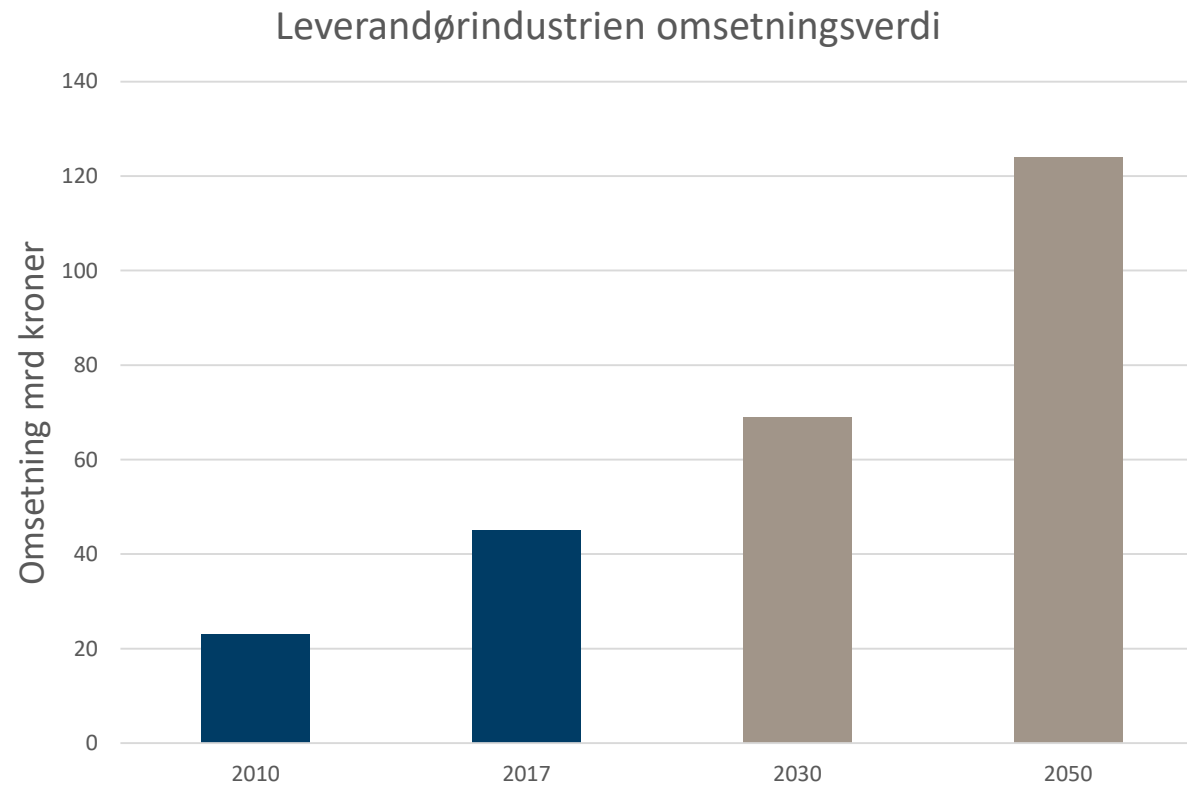
Havbruk - oppdrett av laks, ørret og andre fiskearter



Leverandørindustrien

The background is a dark blue to black gradient. It features a perspective effect with numerous lines radiating from a central point towards the edges, creating a tunnel-like appearance. Overlaid on this are streams of binary code (0s and 1s) in shades of light blue and purple, which appear to be flowing along the perspective lines.

Leverandørindustrien (omsetning mrd kr)



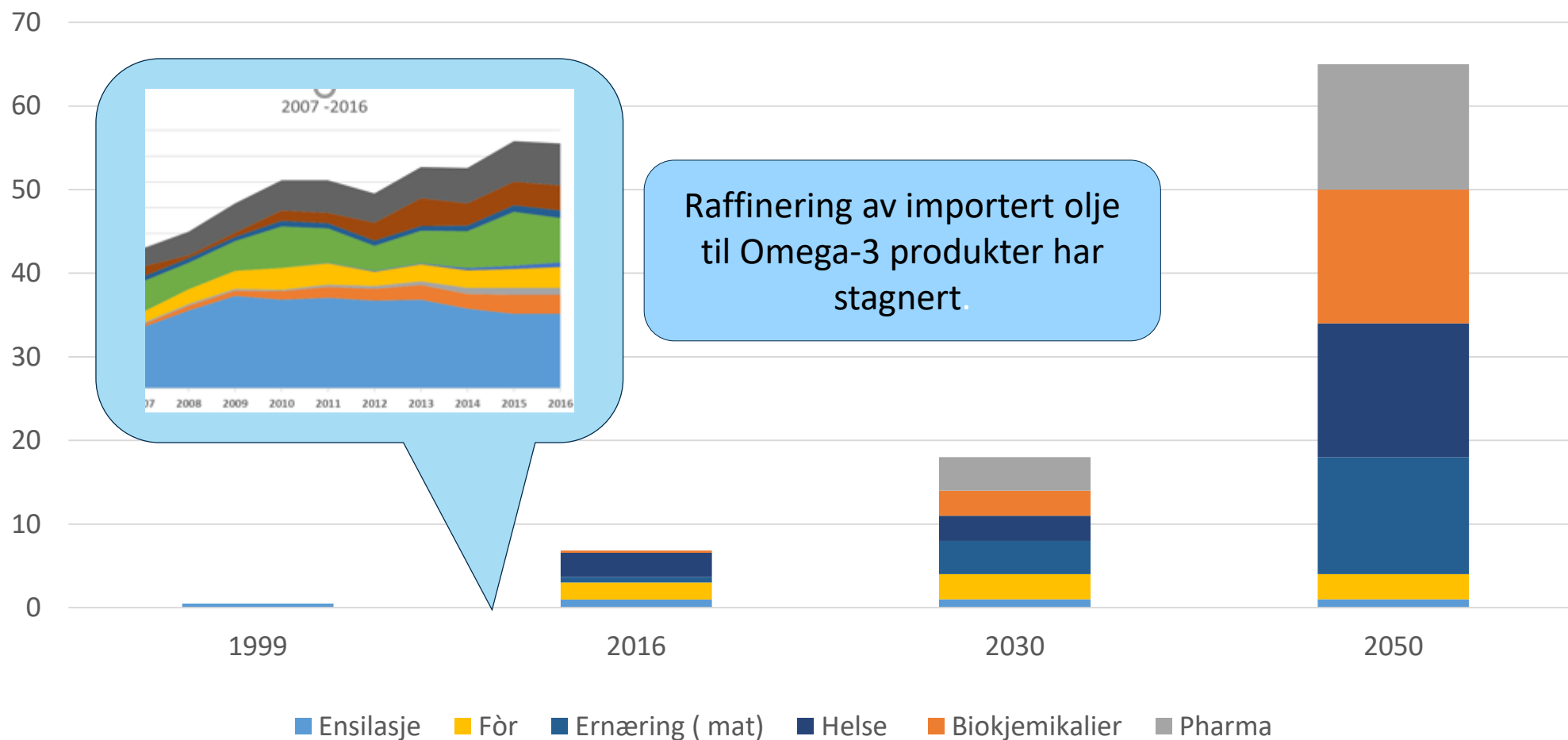
NCE Aquatech, 110 leverandørbedrifter.
Ønsker deltagere/medlemmer fra Narvik

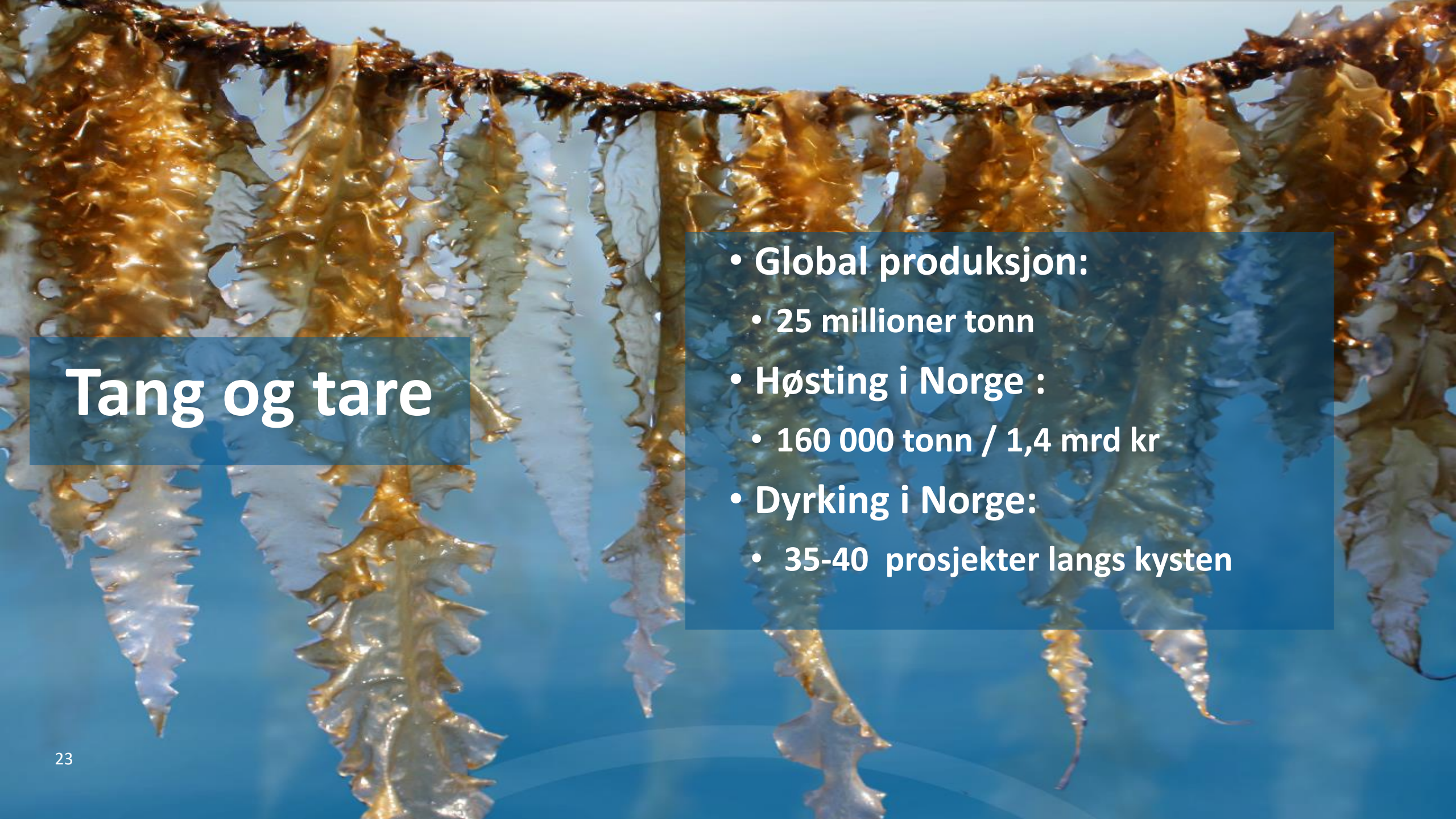
Ingrediensindustri

The background of the slide features a blue gradient with a soft light source in the top left corner. In the foreground, there are several pieces of laboratory glassware: a round-bottom flask on the left, a beaker with a test tube inside it in the center, and a larger Erlenmeyer flask on the right. All the glassware is filled with a clear liquid and is reflected on the surface it sits on.

- Omsetning i 2016:
 - 9,5 mrd kr
(ca. 100 bedrifter)
- Utnyttelse av restråstoff:
 - 40 % vekst over de siste 5 år

Marin ingrediensindustri (omsetning mrd kr)



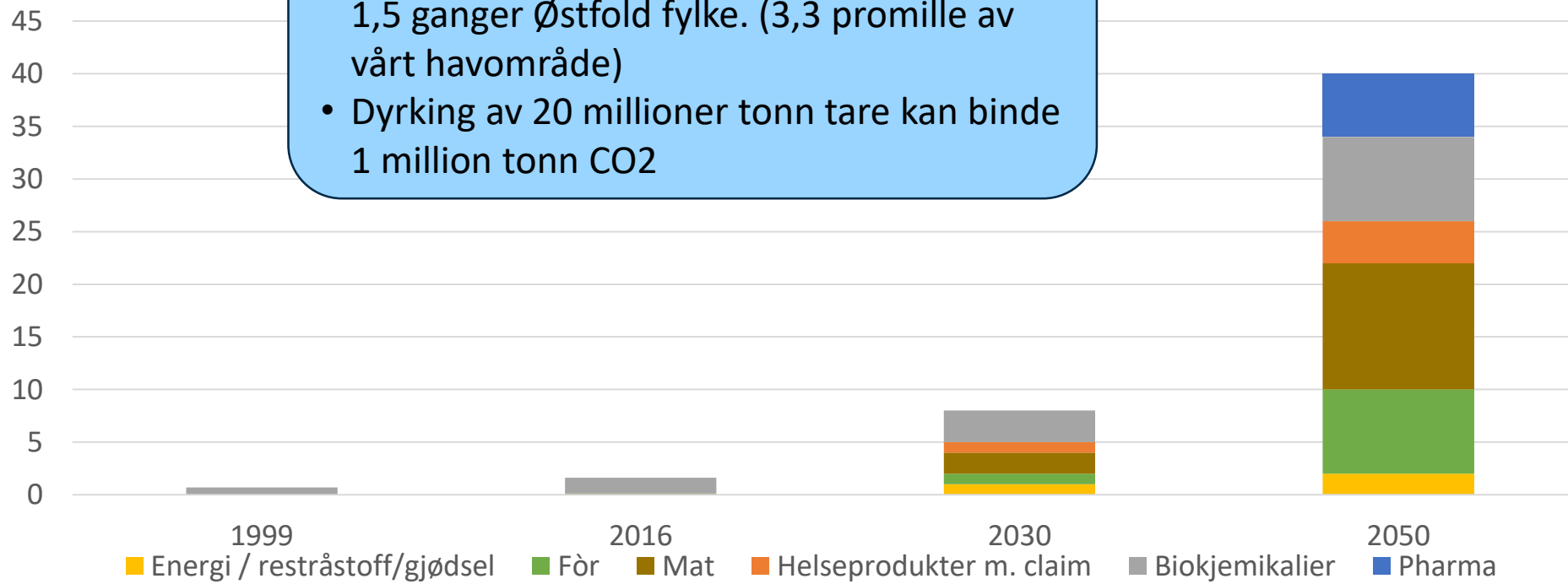


Tang og tare

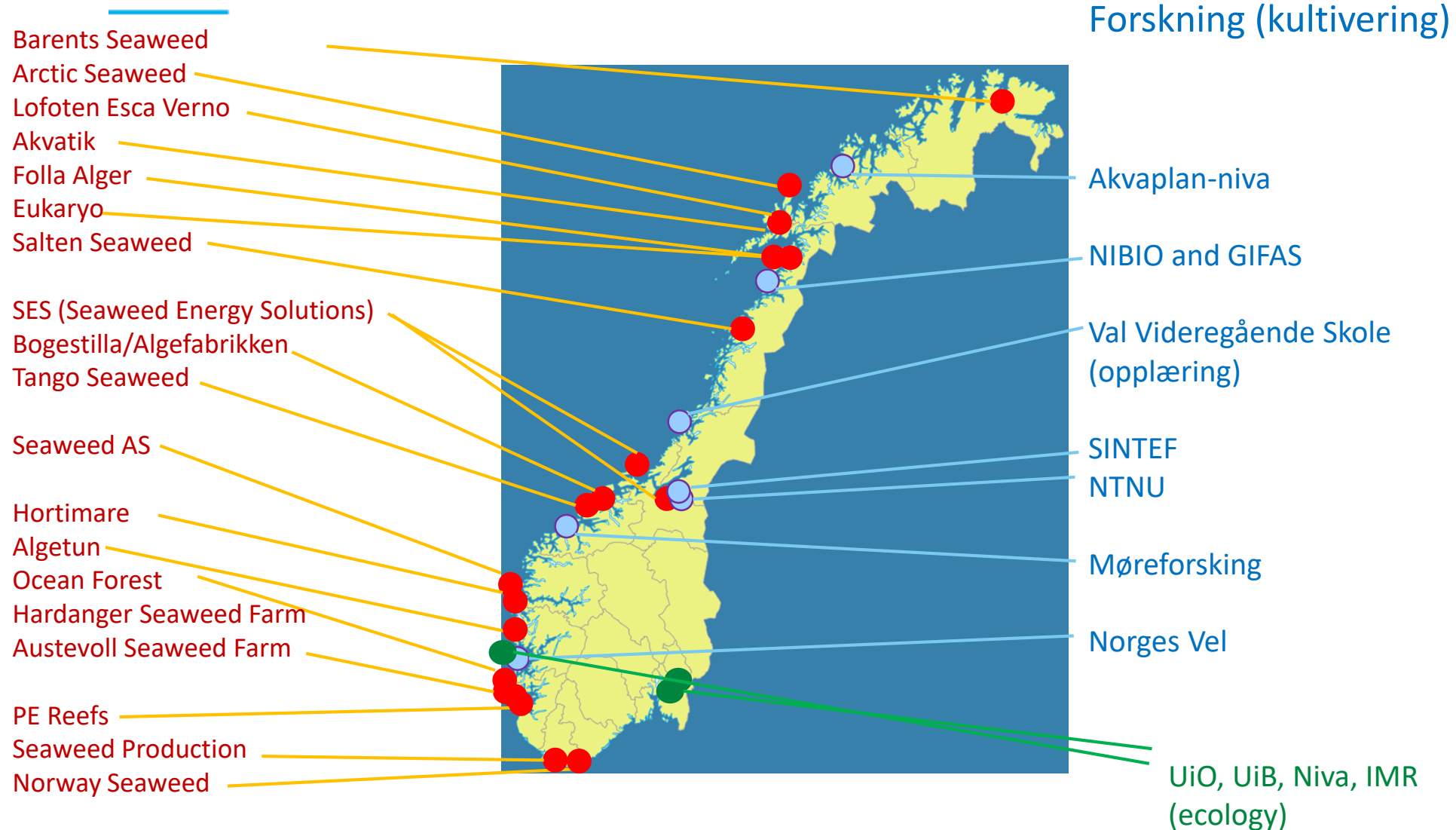
- Global produksjon:
 - 25 millioner tonn
- Høsting i Norge :
 - 160 000 tonn / 1,4 mrd kr
- Dyrking i Norge:
 - 35-40 prosjekter langs kysten

Tang- og tareproduksjon (omsetning mrd kr)

- Høsting: Tar bare ut 1,2 % av tillveksten
- Dyrking av 20 millioner tonn krever et areal 1,5 ganger Østfold fylke. (3,3 promille av vårt havområde)
- Dyrking av 20 millioner tonn tare kan binde 1 million tonn CO2

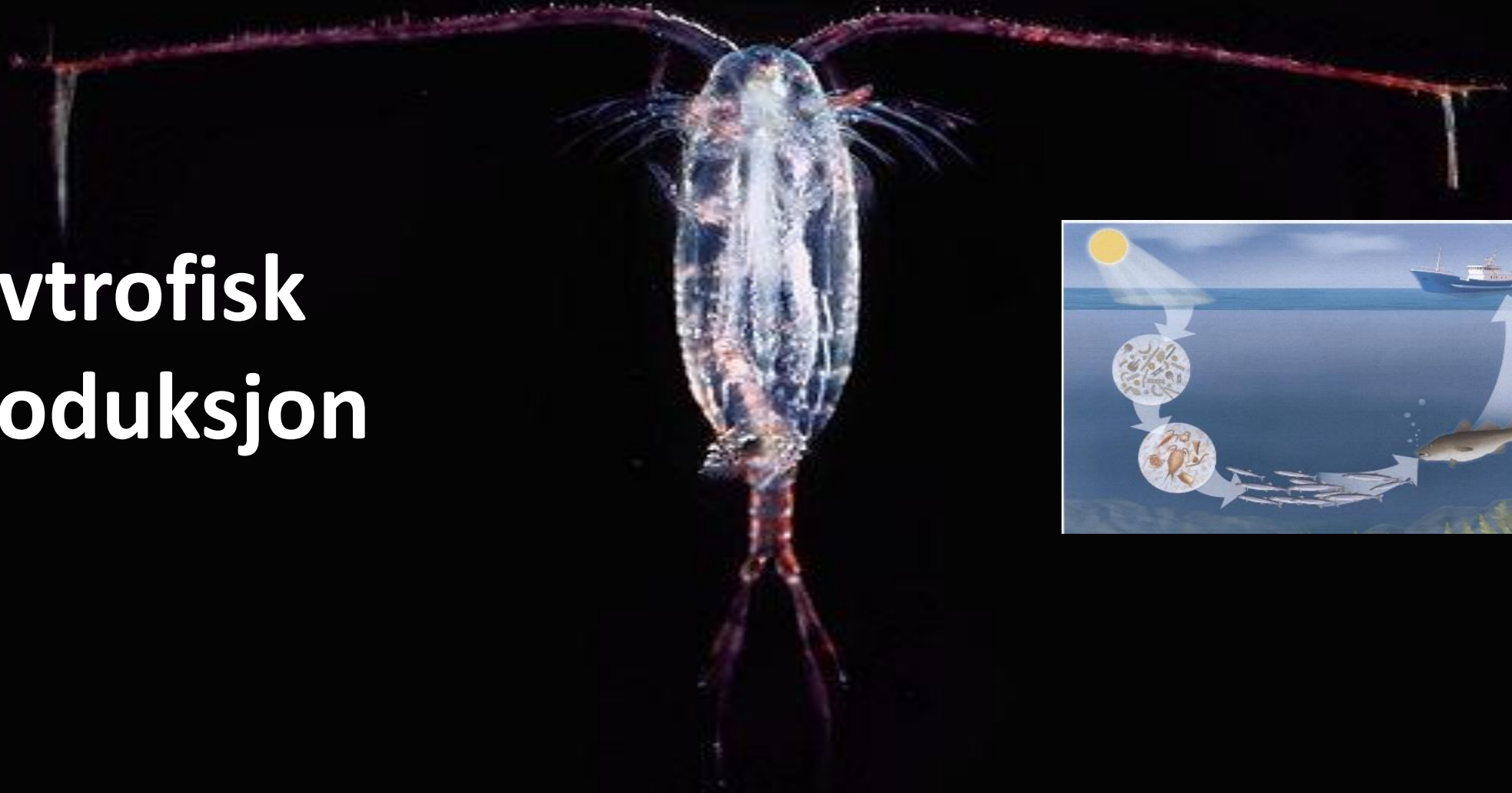


Makroalgedyrkere i Norge

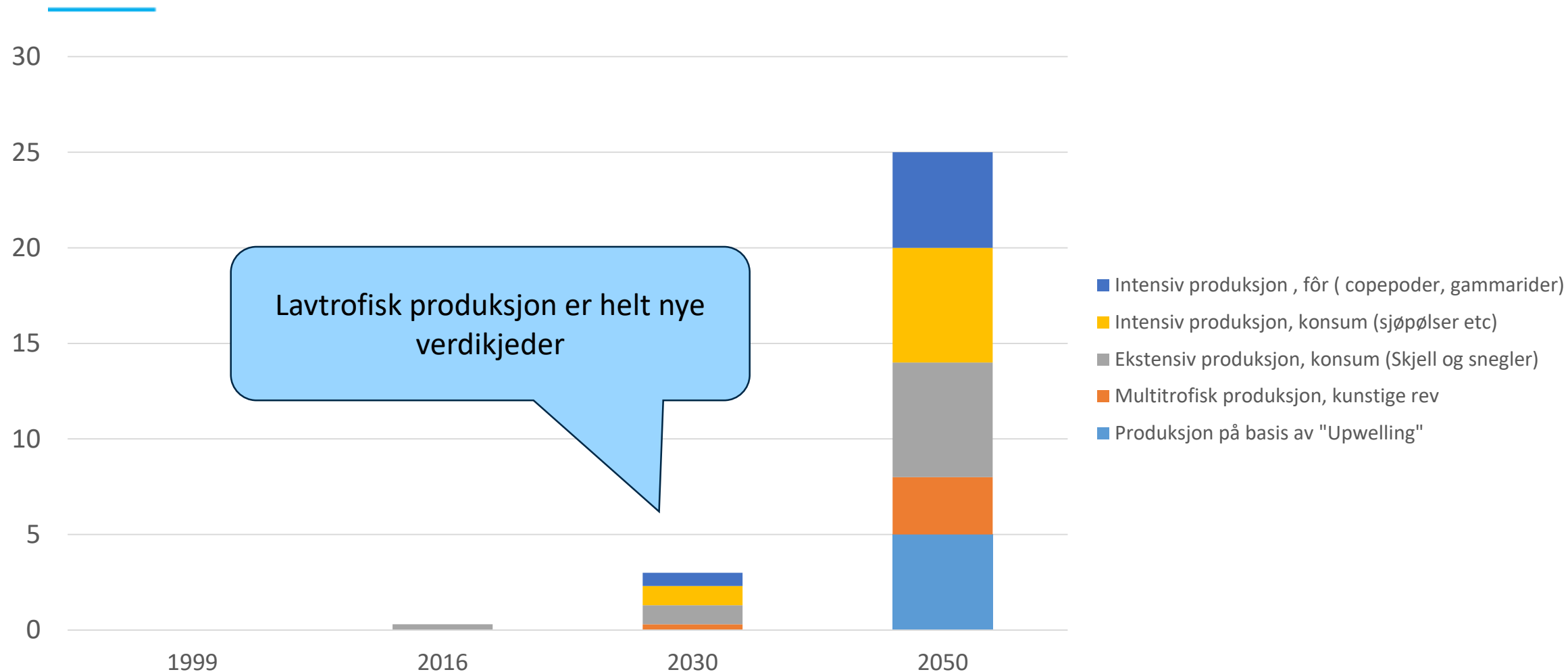


37 tillatelser (242 lokaliteter)

Lavtrofisk produksjon



Lavtrofisk produksjon (omsetning mrd kr)



Hvordan oppnå vekst i nye biomarine industrier?



- Lover og regler er ikke tilpasset utvikling av ny biomarin industri
 - Konsesjoner
 - Bruk av andre arter
 - Sirkulærøkonomi
- Tilgang på råstoff må sikres
 - Mesopelagisk fangst
 - Dyrking
- Teknologiutvikling
 - Oppskalering av prosesser
- Nye høykostmarkeder må utvikles
 - Biokjemikalier
 - Pharma

Avsluttende kommentarer

- Stor variasjon i hvordan vi ligger an i forhold til ambisjonene
- Klima- og miljøendringer vil legge viktige premisser for utviklingen
- Det samme vil de biomarine næringenes egen miljøpåvirkning
- Næringsaktørene må gjøre kloke valg for å få aksept for sin aktivitet
- Vi må produsere mer mat fra havet - må vi endre vår måte å tenke på bruken av havet på?
- Det kreves kapital – privat og offentlig – utfordringer må løses og ny teknologi må utvikles – det er et stort behov for kunnskap
- Kan vi utvikle et stort nok marked der ute?



Teknologi for et bedre samfunn