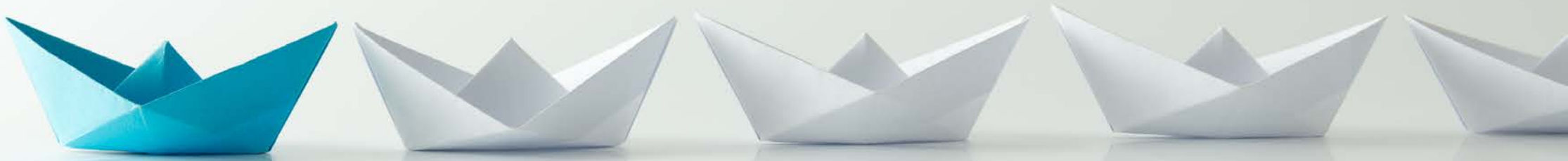
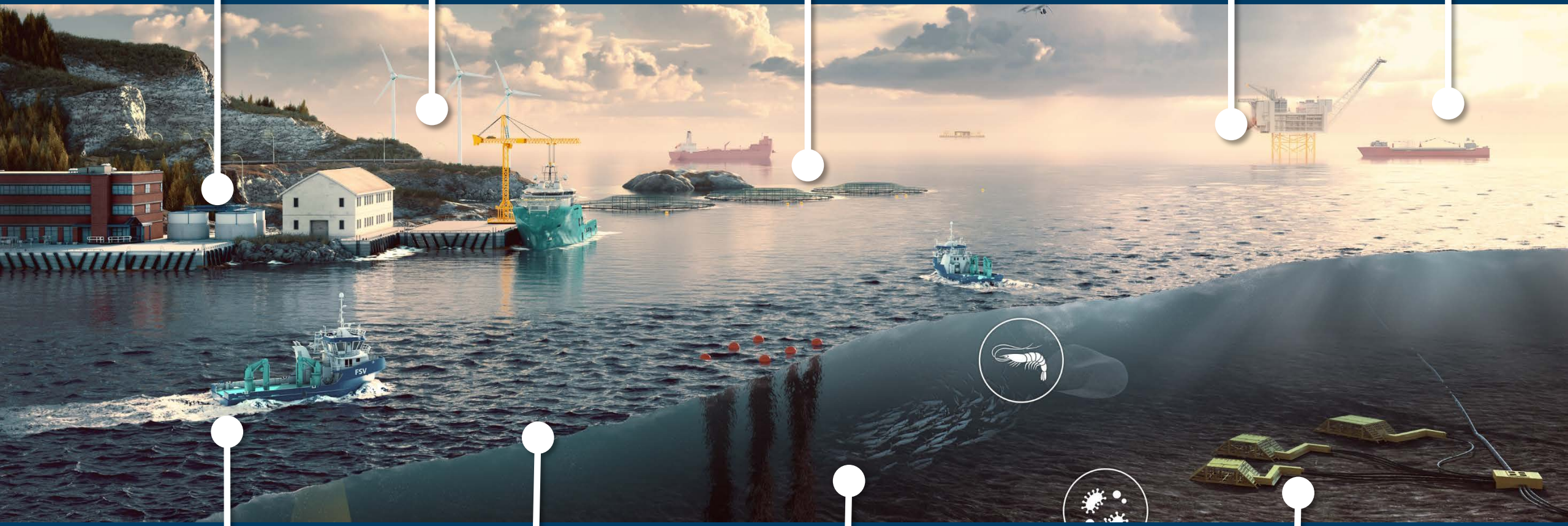
TEKNOLOGI FOR ØKT LØNNSOMHET OG REDUSERTE KLIMAAVTRYKK

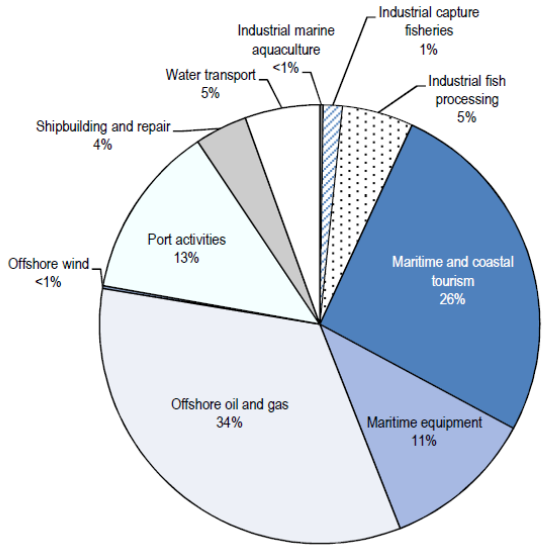
Vegar Johansen
Adm. dir. SINTEF Ocean AS
Klimamarin 2017




Prosessindustri
Vindkraft
Oppdrett
Olje og gass
Maritim
Fiskeri
Miljøteknologi
Nye marine ressurser
Subsea
SINTEF

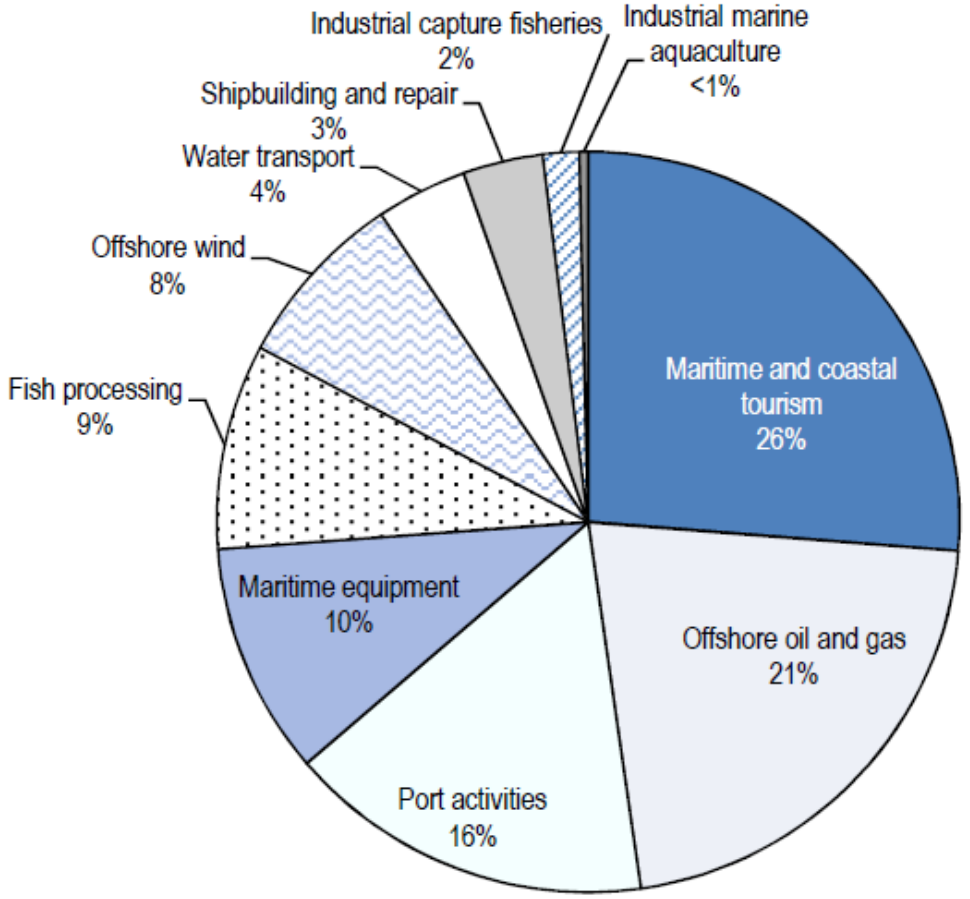
Global havøkonomi 2010-2030

2010



USD 1,5 Trillion (1,7 Oljefond)

x 2

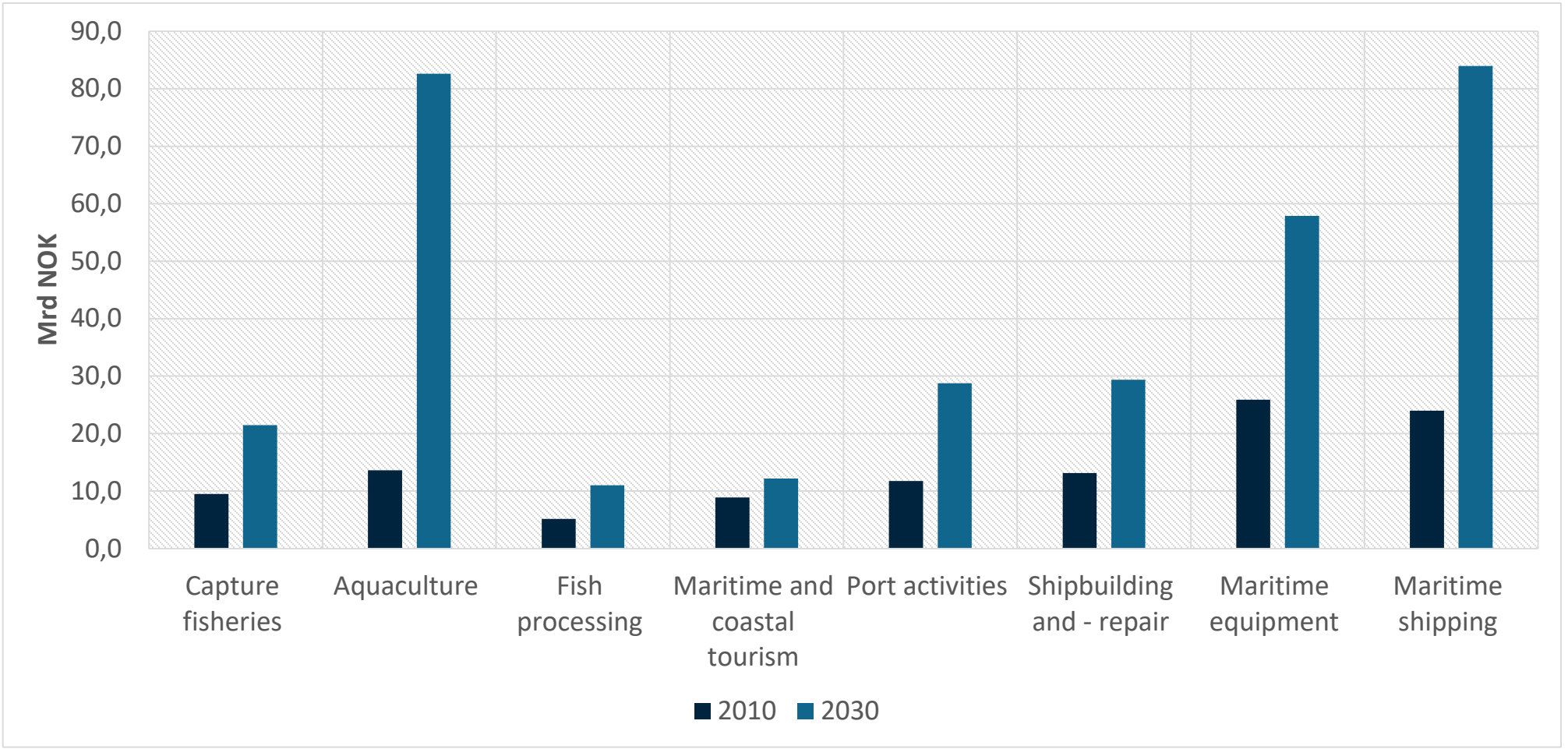


2030

USD 3 Trillion (3,4 oljefond)

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Norsk havøkonomi 2010-2030 uten olje/gass



SINTEF

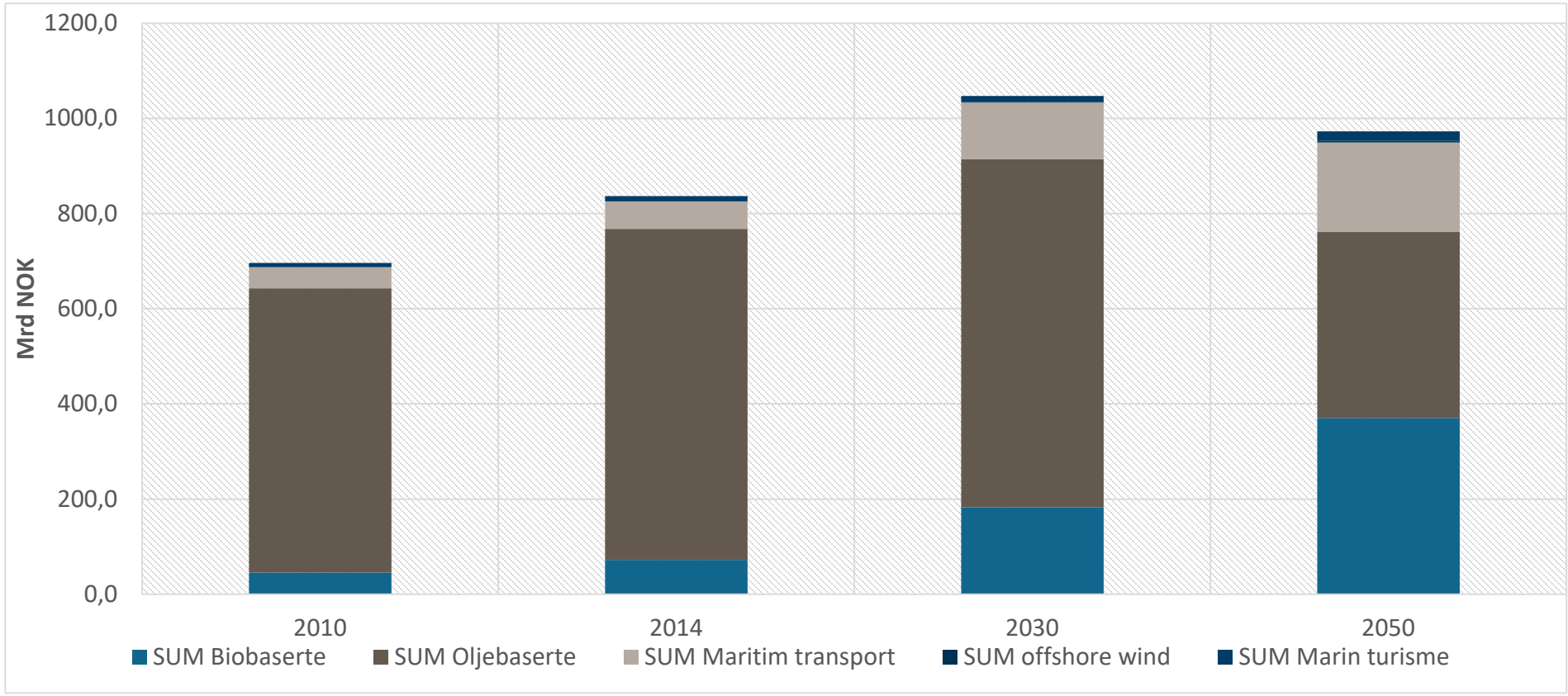
Et premiss for samfunnsutviklingen

- og en sterk strategisk impuls

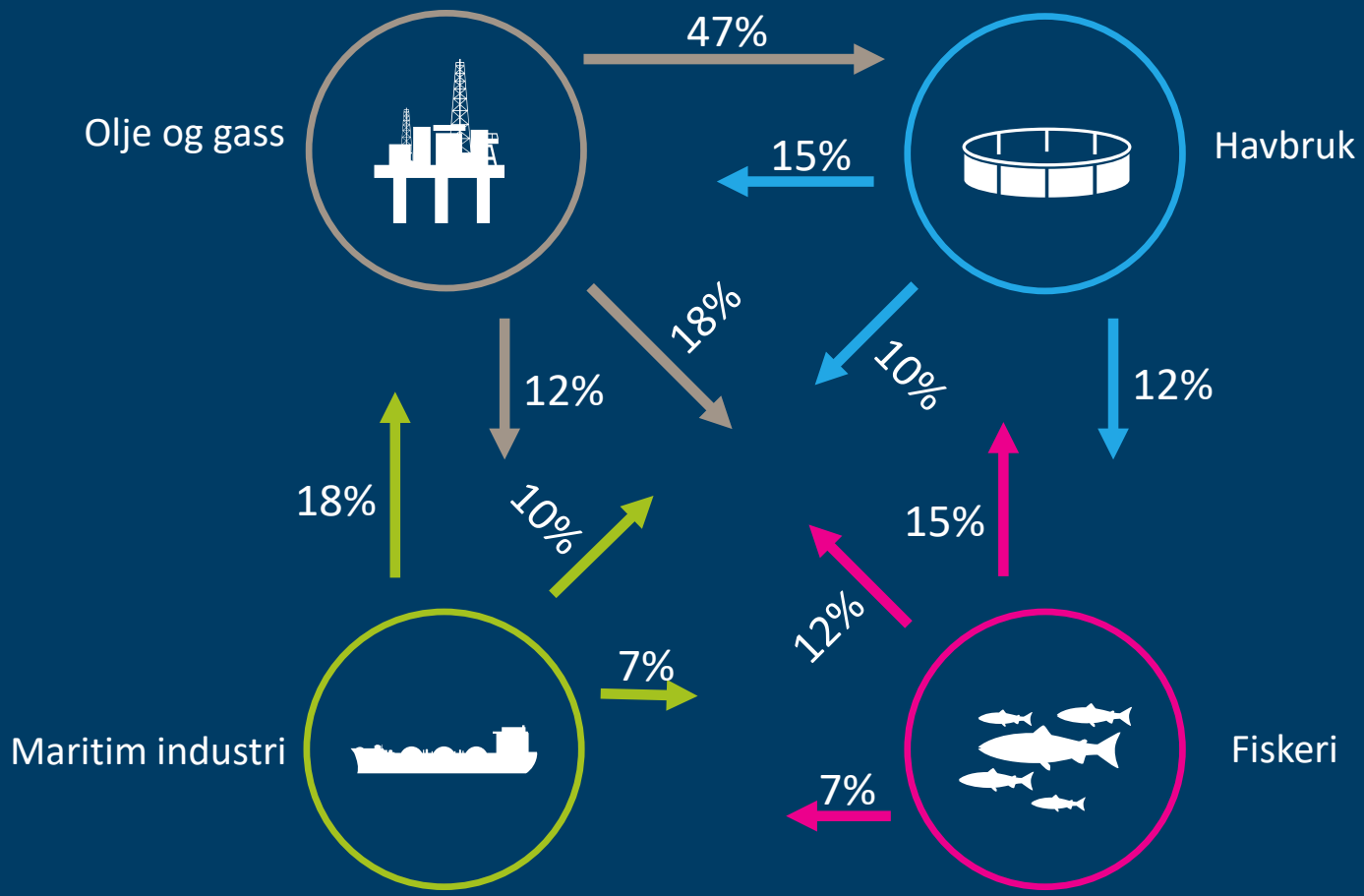


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Havbasert verdiskaping mot 2050

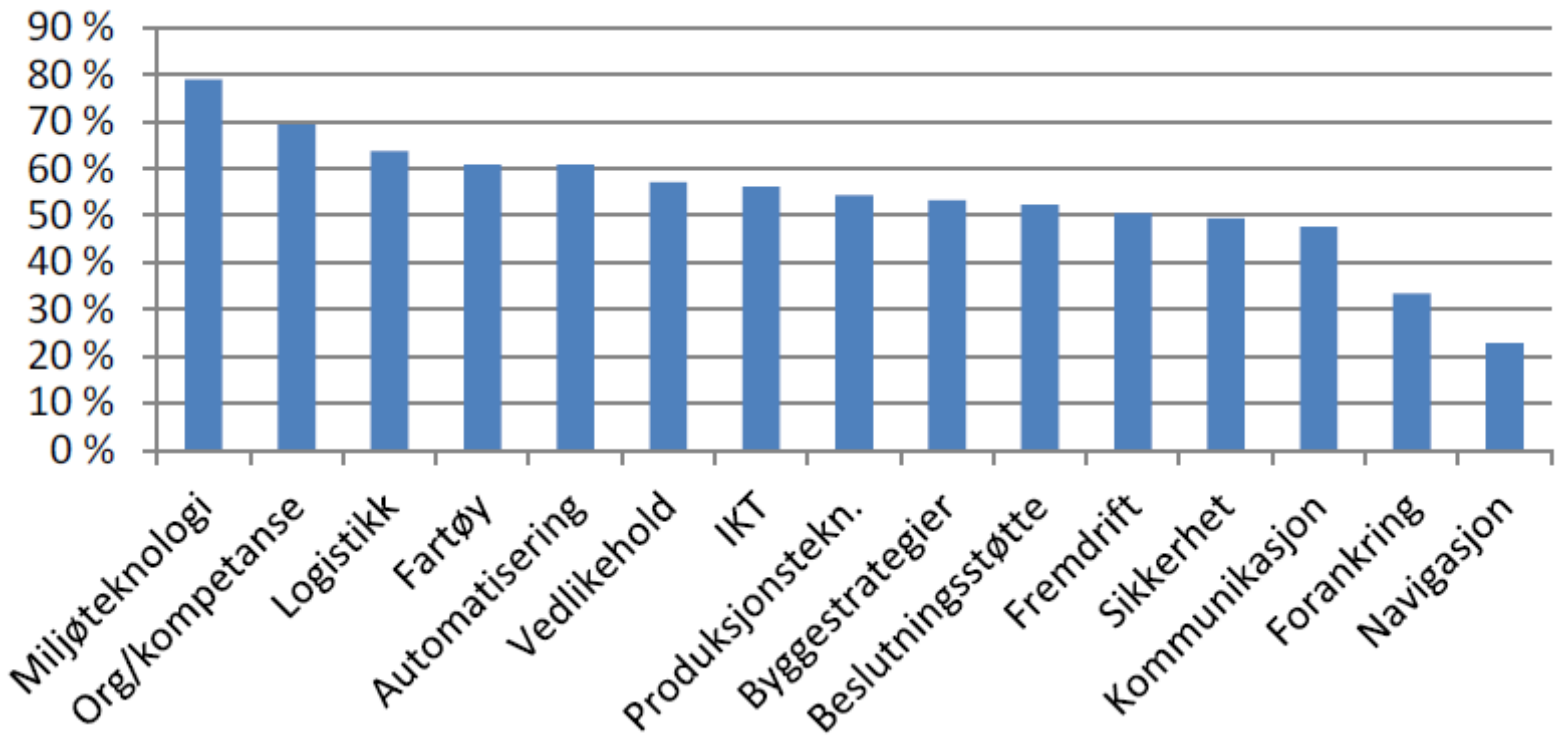


Mulige synergier i norske havindustrier



Kilde: Havteknologi. Holthe, Sønvisen, Holmen (2016)

Viktige framtidige utviklingsområder



Kilde: Havteknologi. Holthe, Sønvisen, Holmen (2016)

nature International weekly journal of science

NATURE | NEWS

One-third of our greenhouse gas emissions come from agriculture

Farmers advised to abandon vulnerable crops in face of climate change.

Natasha Gilbert

31 October 2012

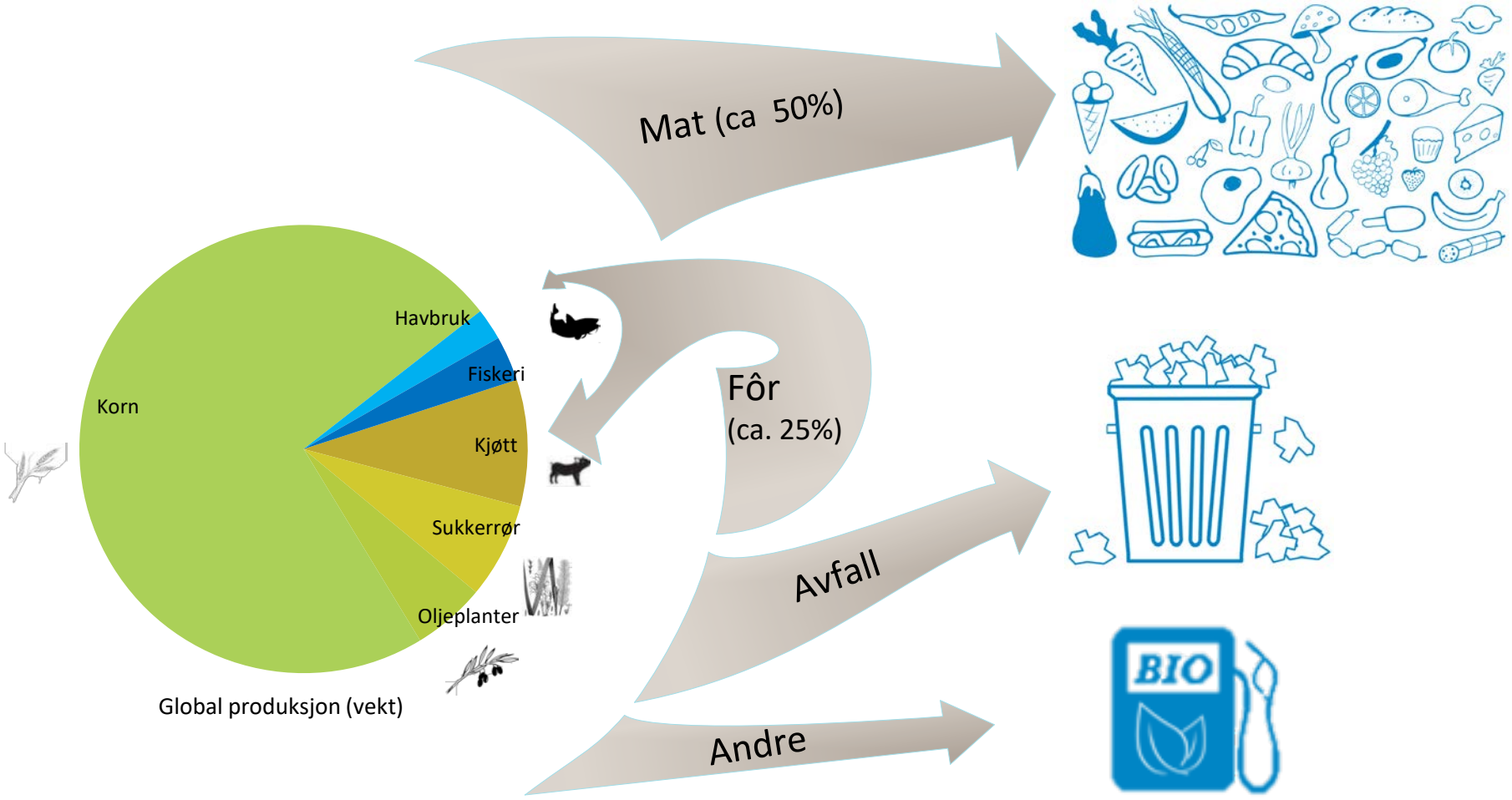
Rights & Permissions

The global food system, from fertilizer manufacture to food storage and packaging, is responsible for up to one-third of all human-caused greenhouse-gas emissions, according to the latest figures from the Consultative Group on International Agricultural Research (CGIAR), a partnership of 15 research centres around the world.



SINTEF

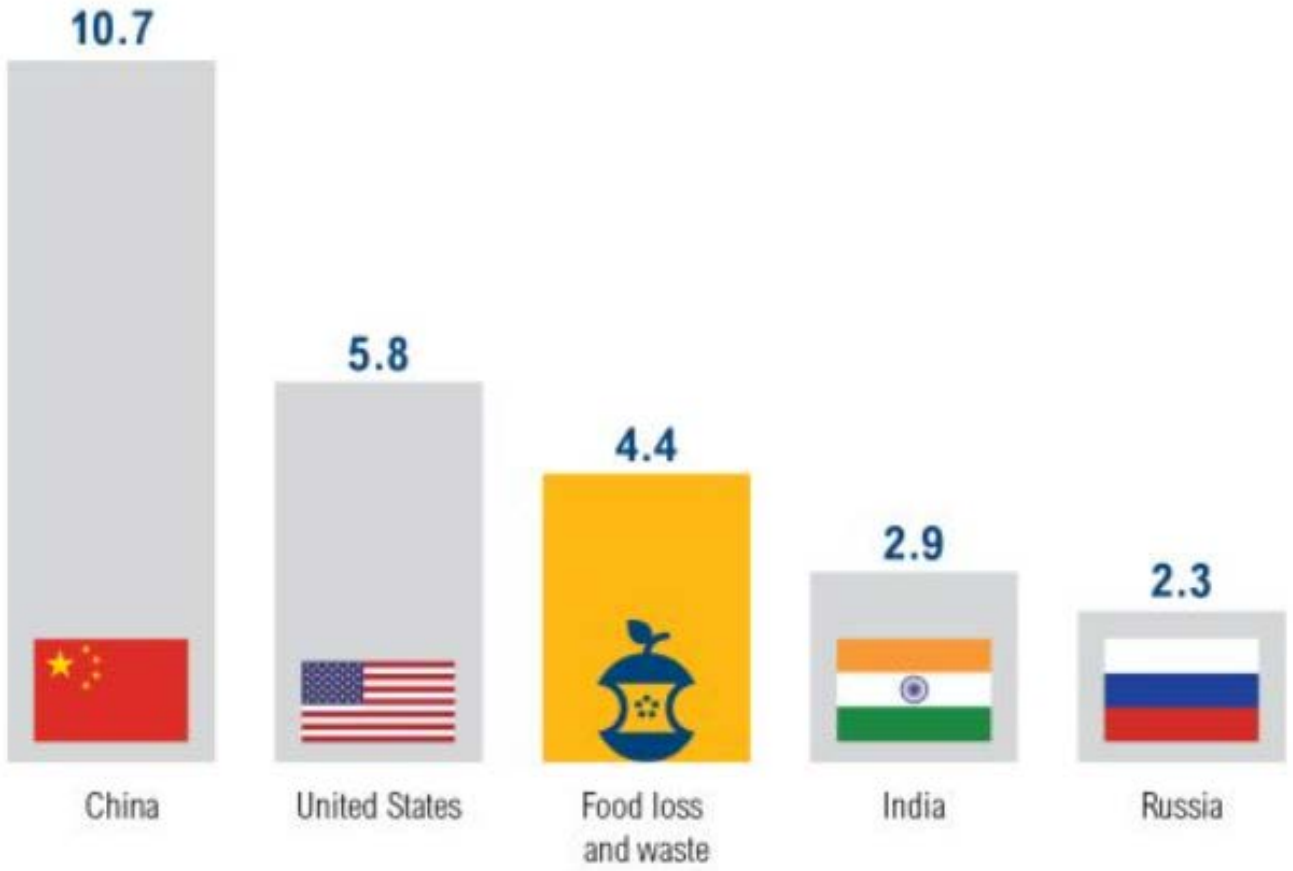
Global matproduksjon og anvendelser



Sources: Alexandratos, N. and J. Bruinsma (2012) “World agriculture towards 2030/2050: the 2012 revision”, FAOSTAT, FAO FishstatJ (2014) and World Resources Institute (2014) “Creating a Sustainable Food Future”

SINTEF

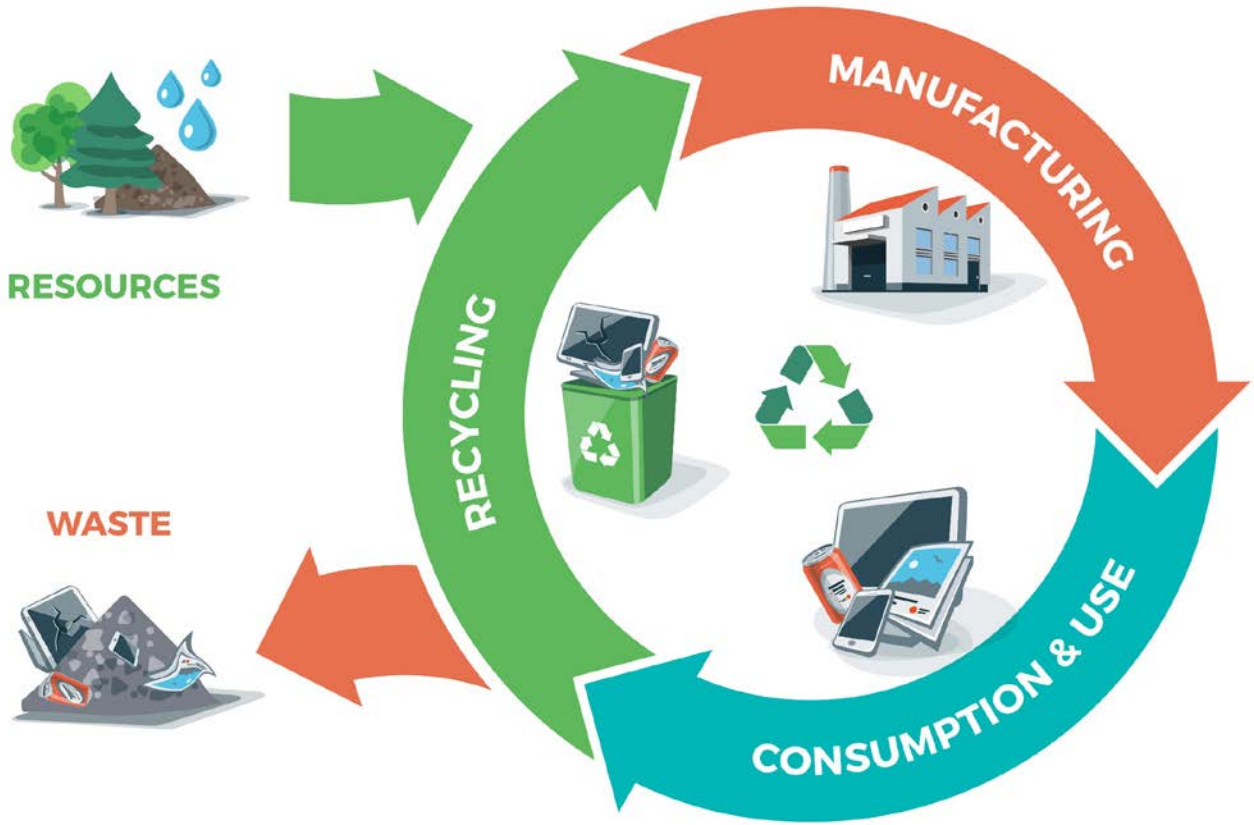
If Food Loss and Waste Were its own Country, it Would Be the Third-Largest Greenhouse Gas Emitter



* Figures reflect all six anthropogenic greenhouse gas emissions, including those from land use, land-use change, and forestry (LULUCF). Country data is for 2012 while the food loss and waste data is for 2011 (the most recent data available). To avoid double counting, the food loss and waste emissions figure should not be added to the country figures.

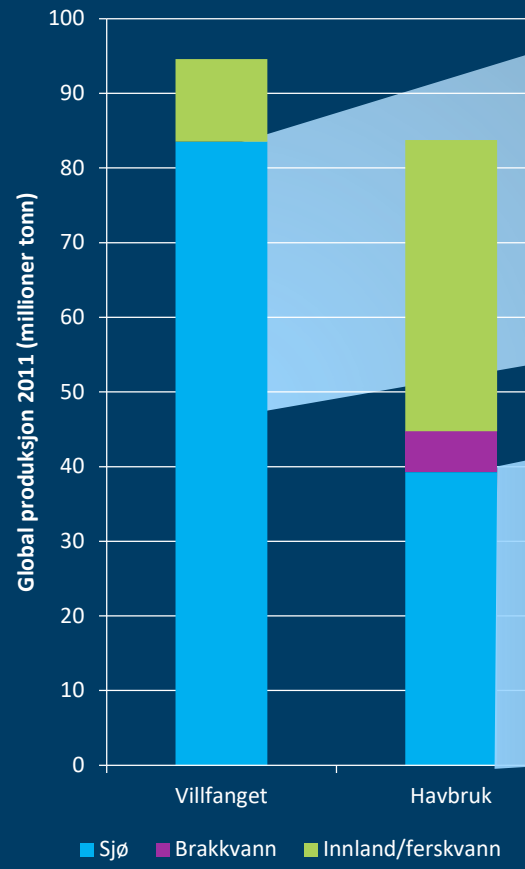
SINTEF

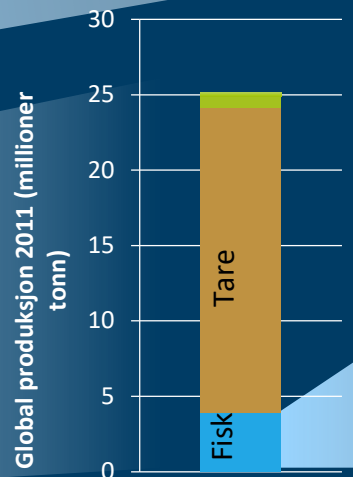
CIRCULAR ECONOMY

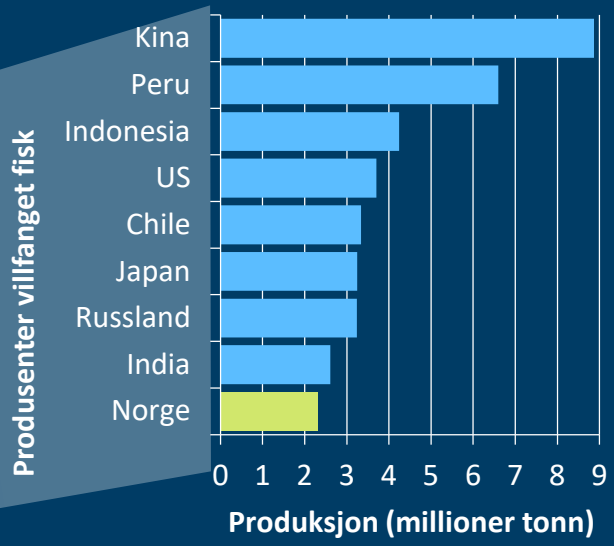


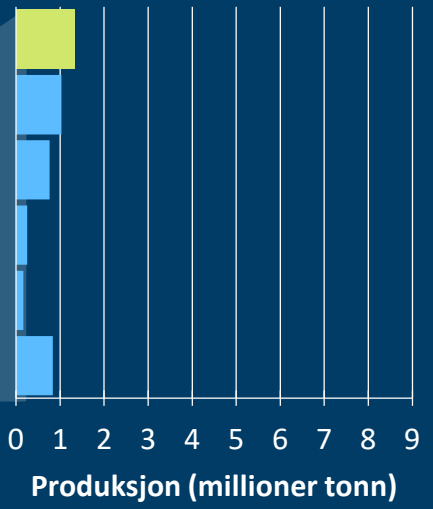
SINTEF

Global sjømatproduksjon





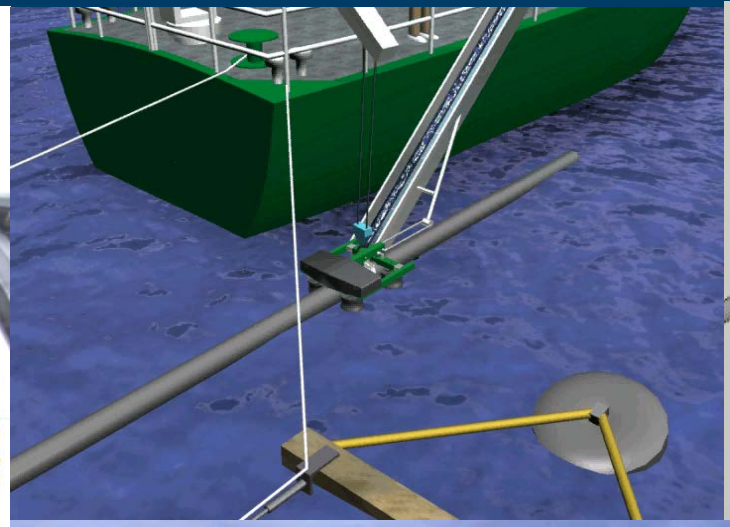


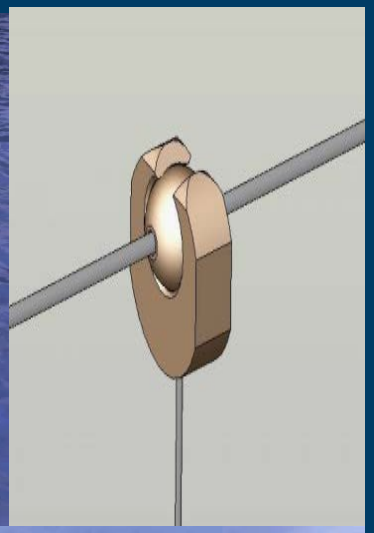


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Industrialisering og mekanisering av ikke fôret marine akvakultur









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Skjebnefellesskapet



Laks



Villfisk



Marine ingredienser



Leverandør-industri



Nye arter



Tang og tare



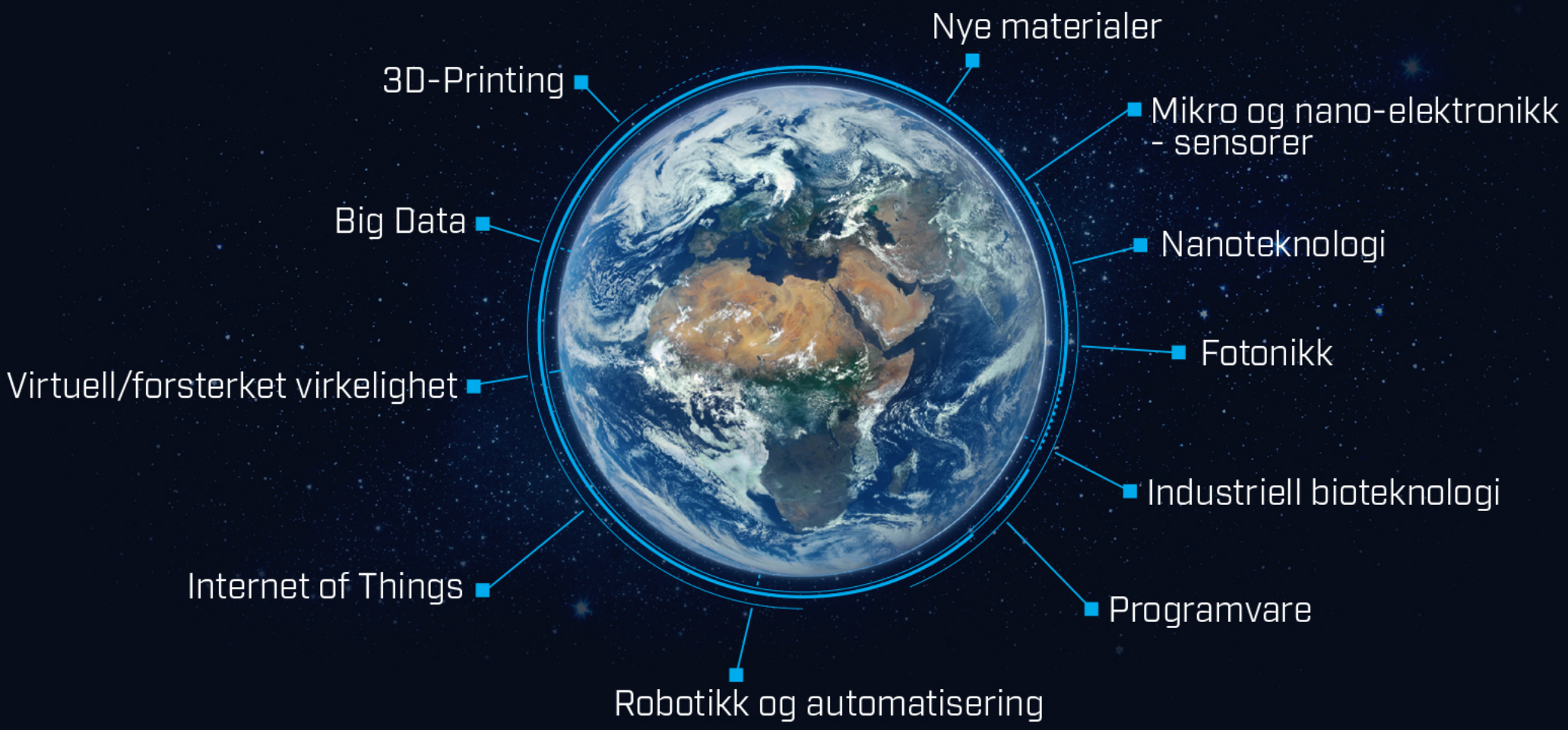
Marint fôr



Høyproduktive områder

SINTEF

Globale nøkkelteknologier og deres anvendelser



FRA RESTRÅSTOFF TIL PLUSSPRODUKT

Potensial i restråstoffet (tall fra 2014)



Restråstoff fra hvitfisk:
341 000 tonn



17 000 tonn lipider (oljer)

~ 27 mill. mennesker kunne fått sitt anbefalte daglige inntak (250 mg EPA + DHA) i ett år



48 600 tonn protein

~ 2.1 mill mennesker kunne fått sitt anbefalte daglige inntak i ett år

SINTEF

Innovativ bioraffinering



Ekstraksjon

Raffinering og prosessering

Modifisering

Stabilitet

Analyse

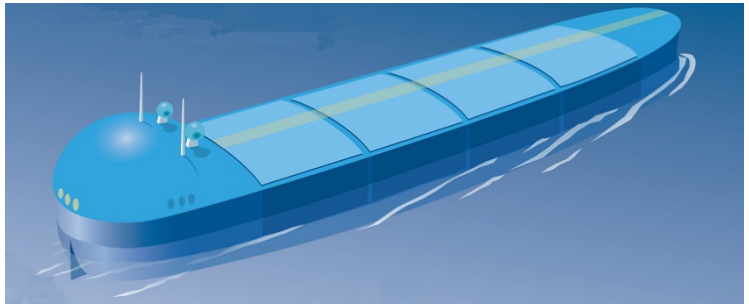


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LOGISTIKK-UTFORDRINGENE

Ubemannete fartøyer gir store gevinster

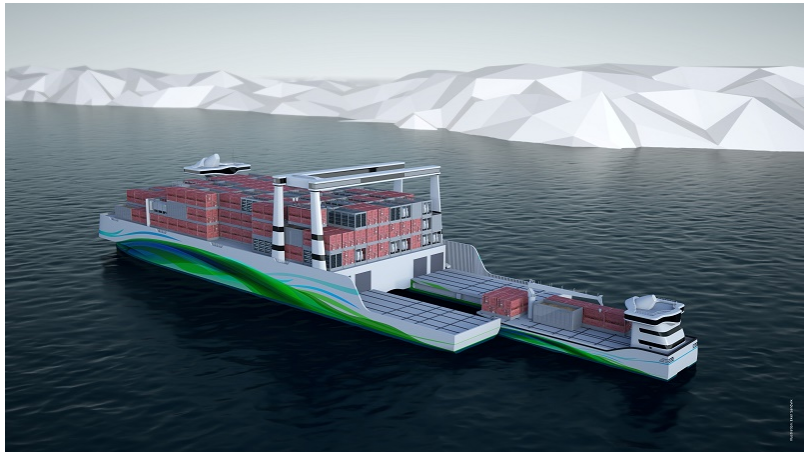


Ingen lugarer

Mindre maskineri

Mer last

Ingen mannskapskostnader

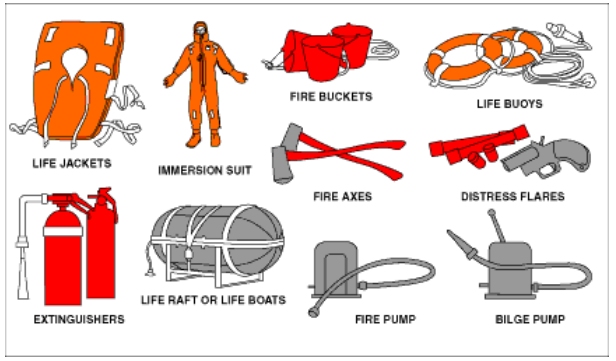


NCE Maritime Clean Tech & NCL

Muliggjør nye transportkonsepter

Ikke redningsutstyr

Nye konstruksjoner



Yara Birkeland – et nyrr transportsystem





- Helt elektrisk
- Erstatter 40 000 vogntogturer årlig

SINTEF

Noen aktuelle robotplatformer



Foto: Lerow

- Bemannete fartøy + ROV + kraner
- Ubemannete fartøy
- Permanente fartøy


Foto: Maritime Robotics


Foto: Kongsberg Maritime

Eelume – a snake robot











Testområde for autonome skip i Trondheimsfjorden



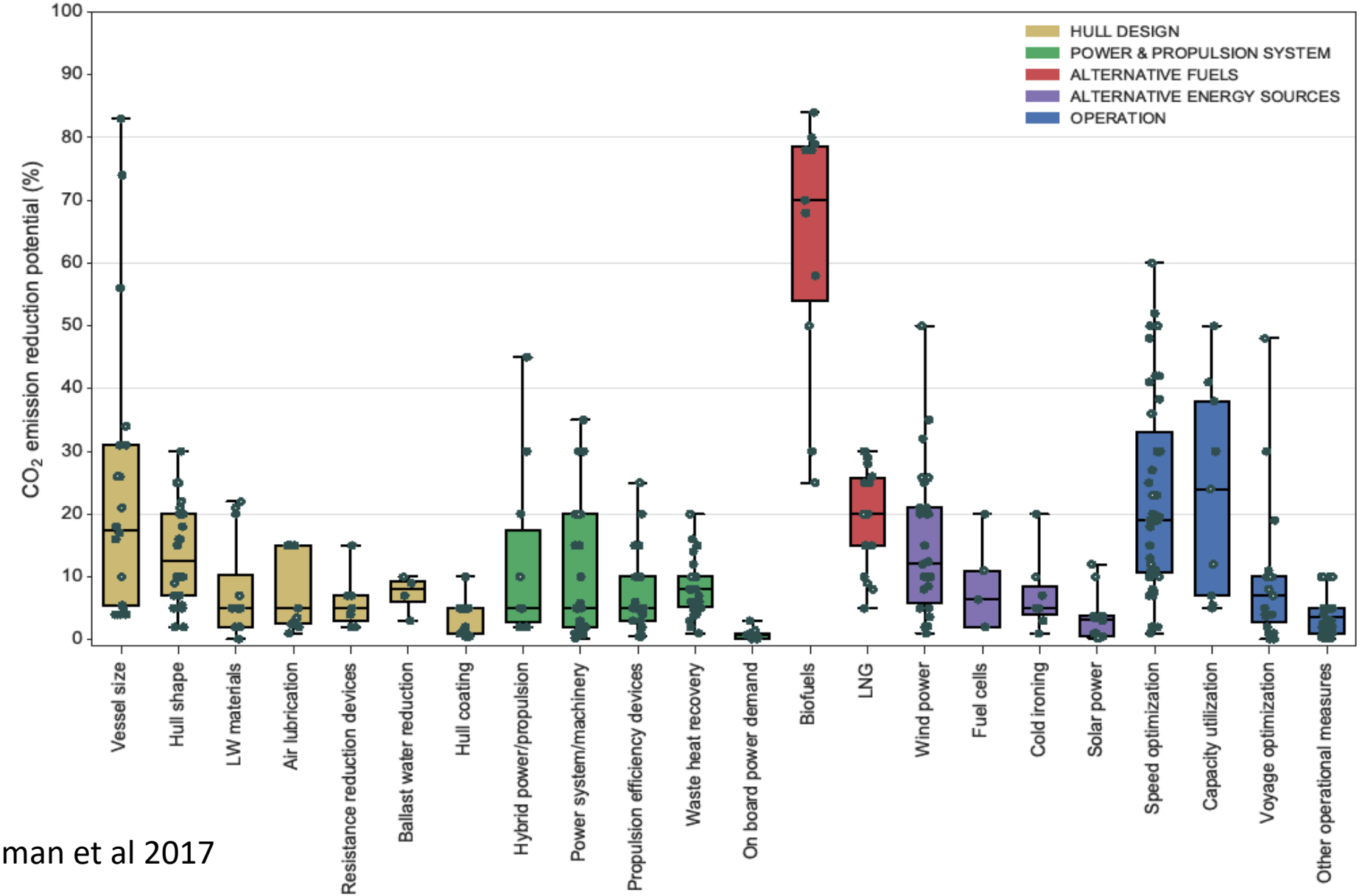
http://testsitetrd.no/

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MASKINERI OG ENERGISYSTEMER



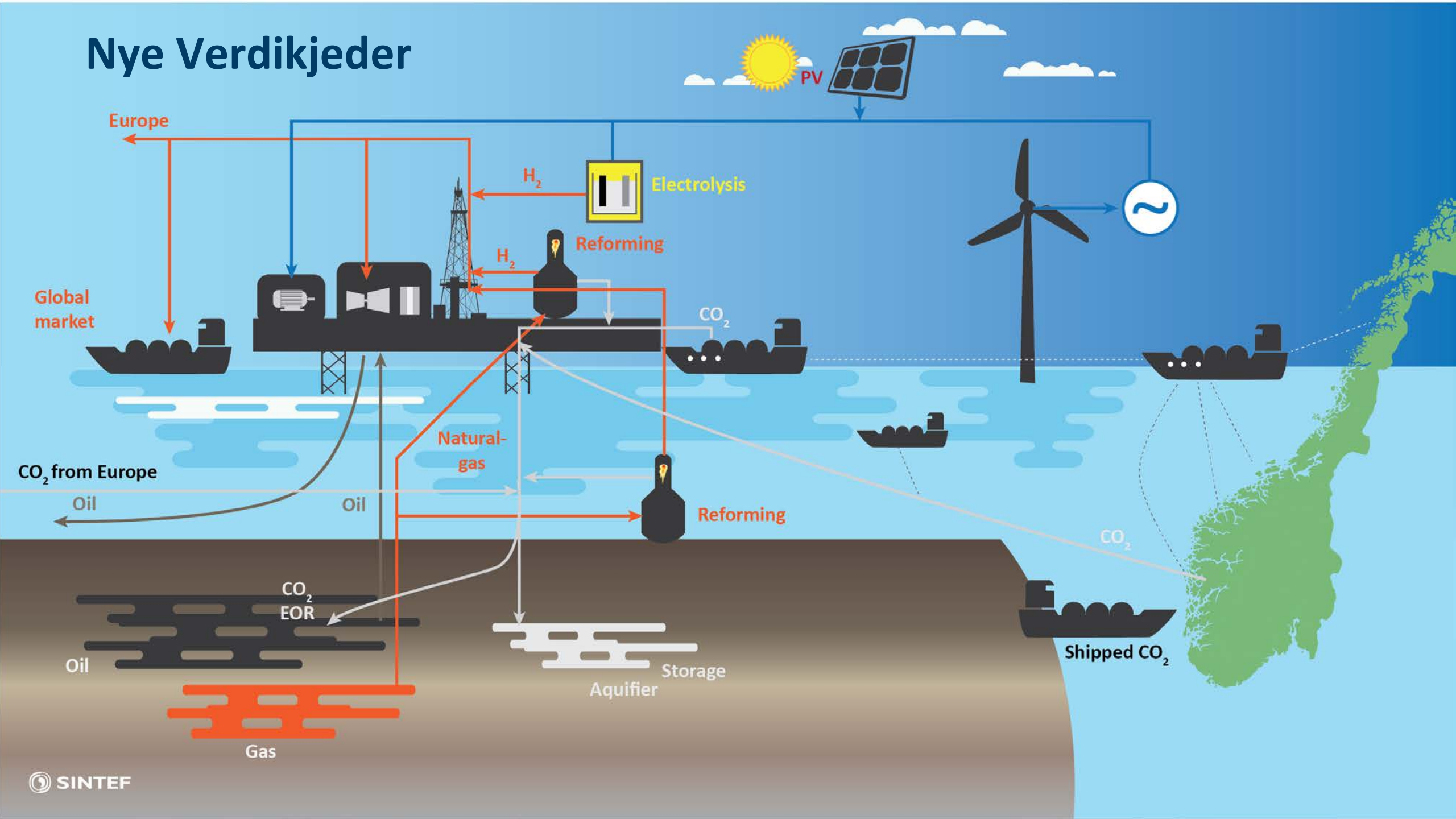
Reduksjonspotensial for CO_2-utslipp i sjøtransport: Bouman et al 2017



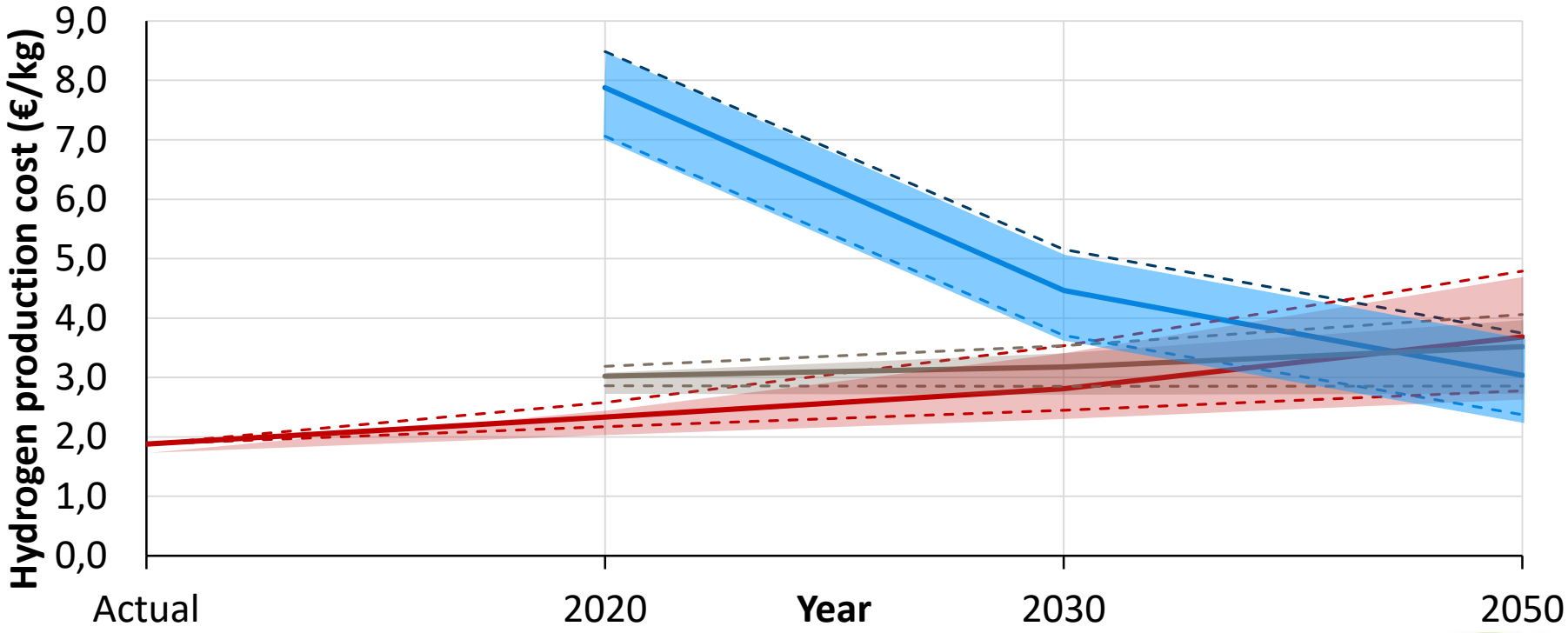
Kilde: Bouman et al 2017

SINTEF

Nye Verdikjeder



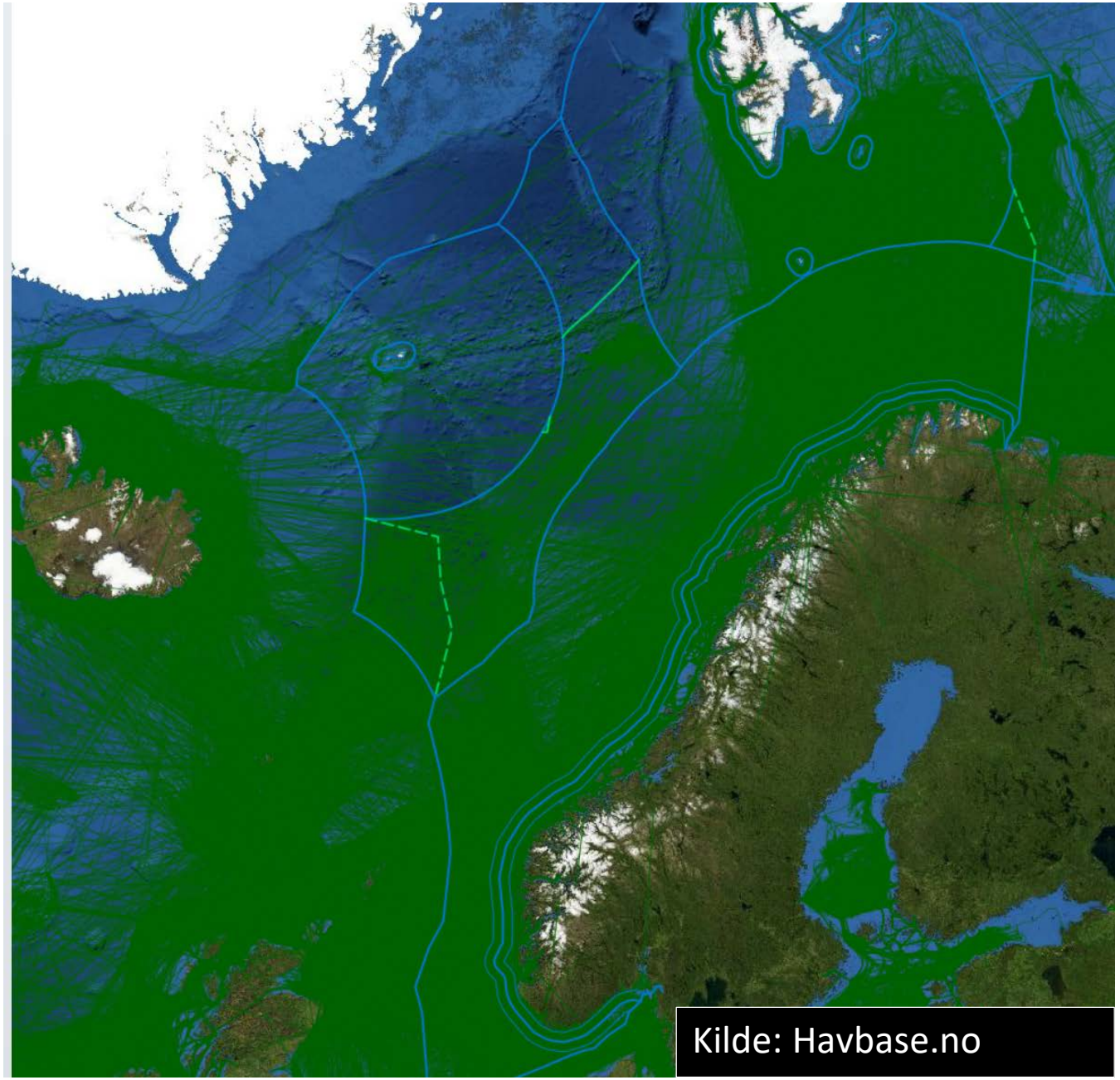
Hydrogenproduksjon kan endre alt



OPERASJONS-PLANLEGGING

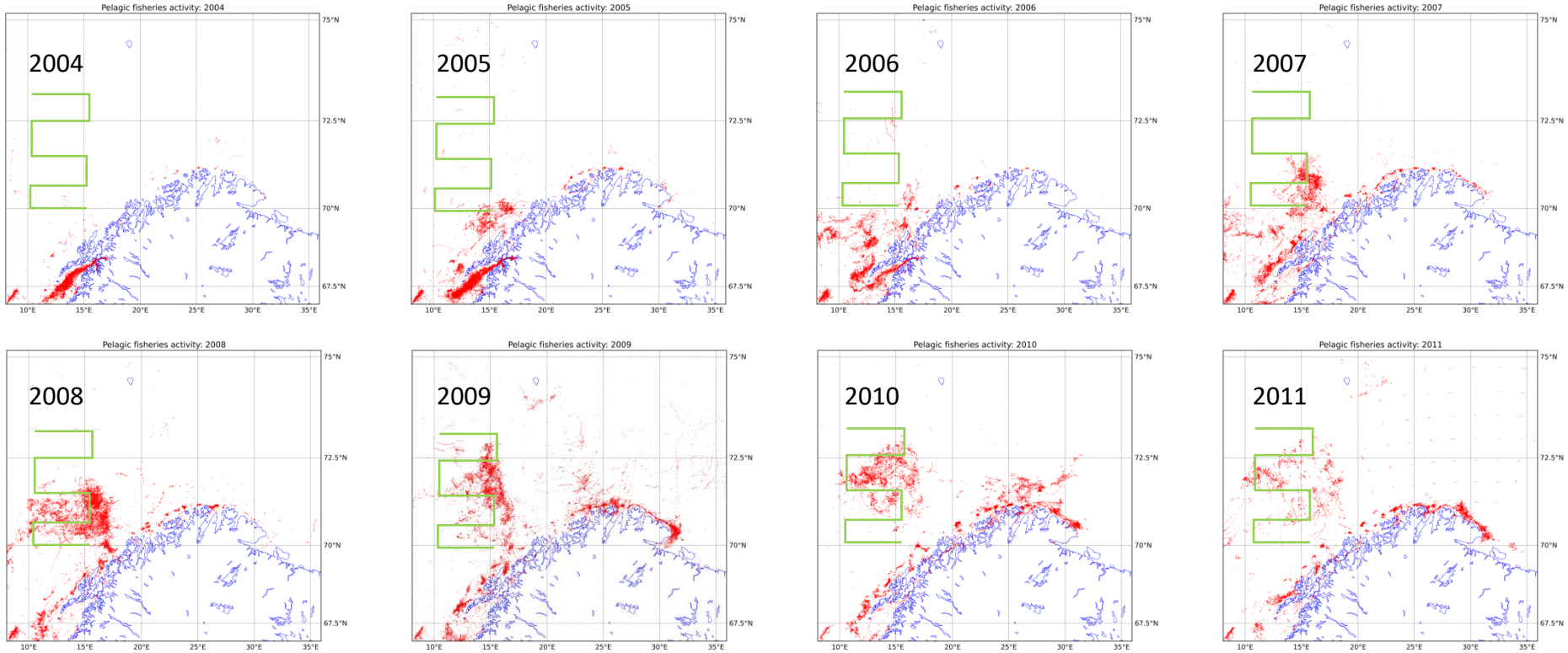


Illustrasjon: NTNU / AMOS



Kilde: Havbase.no

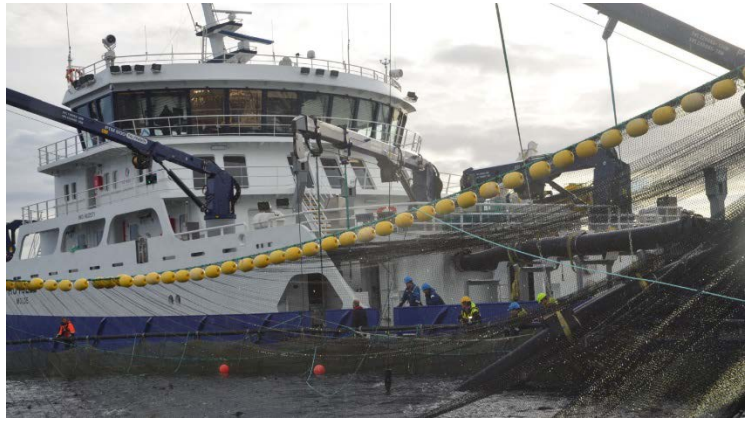
Havovervåking

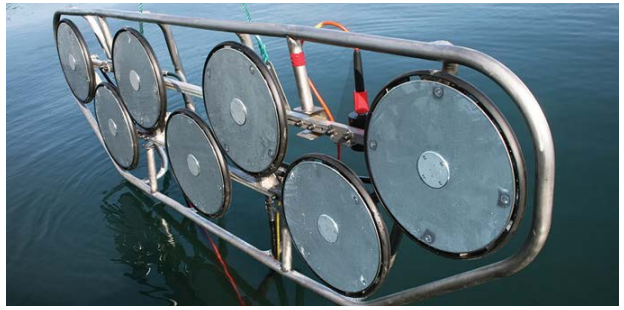


Operasjon og driftsteknologi i rask endring











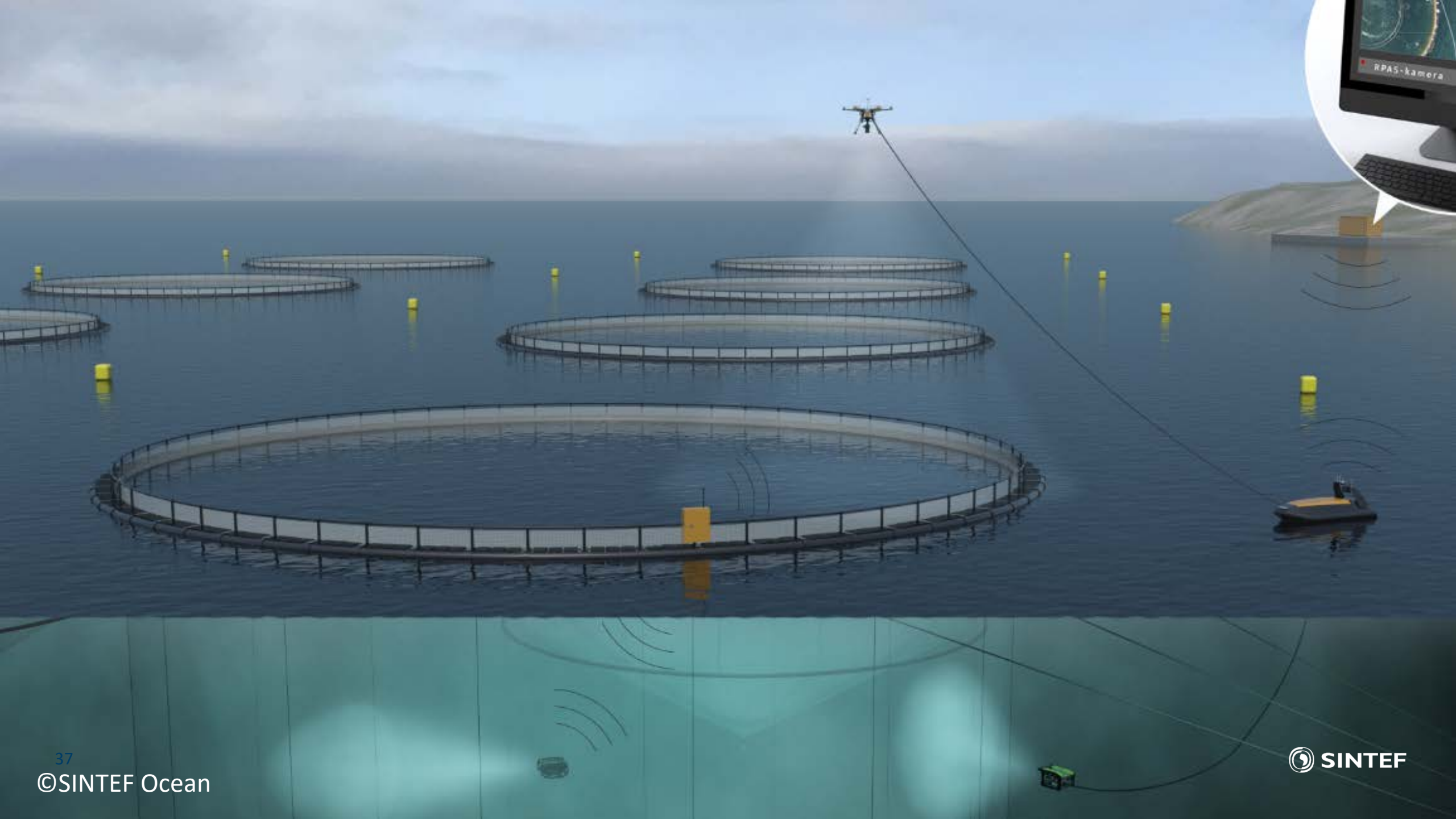




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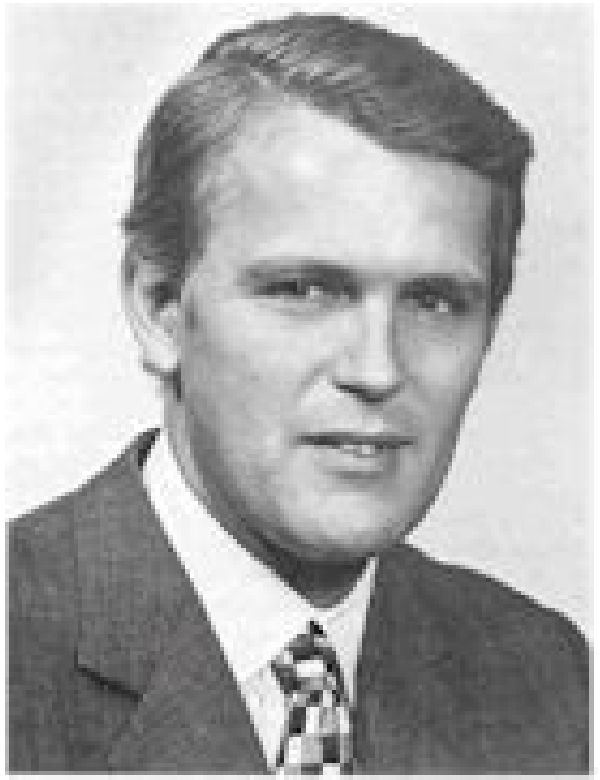
AUTOMATISERING

SINTEF

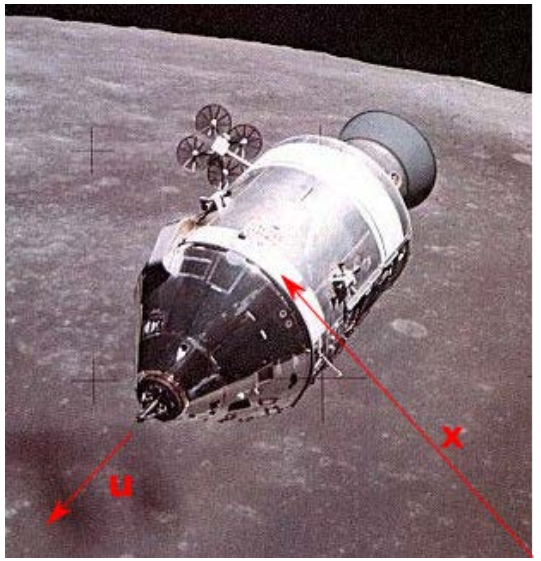


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Litt vitenskapshistorie: Rudolph Kalman og måleproblemene



- Vi måler det vi kan
- Vi lager en matematisk modell som justeres til målingene
- Det vi ikke kan måle hentes fra modellen



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Århundrets norske ingeniørbragder



		Andel av stemmene
1	Dynamisk posisjonering (DP)	23,6%
2	Missilene til Kongsberg Defence Systems	17,5%
3	Troll-plattformen	10,7%
4	Røntgenkontrastvæsken	10,1%
5	Verdens første lakkeringsrobot	4,8%
6	Utvikling av GSM-teknologien	4,1%
7	Ugelstad-kulene	3,6%
8	Simula	3,6%
9	X-Bow-designet til Ulstein	2,5%
10	Høyspent DC-sjøkraftkabel	2,3%
11	Umoes Skjold-klasse Corvette	2,0%
12	Åsgard gasskompresjon	1,5%
13	Aura-kraftverket	1,5%
14	Tokke kraftverk i Telemark	1,5%
15	Sonar/ekkolodd	1,2%
16	Halden-reaktoren	1,2%
17	Altinn	1,1%
18	Norsk LNG tank-teknologi	1,1%
19	Utslepet av Gullfaks-C	1,1%
20	Oppjekkingen av Ekofisk	1,1%
21	Elkems videreutvikling av Söderberg-metoden	0,9%
22	Verdens første subsea våtgasskompessor	0,8%
23	Nordisk mobiltelefonsystem	0,7%
24	Regnemaskinen Nusse	0,6%
25	Byggingen av helårsveien over Haukeli	0,5%
26	Statpipe	0,5%
27	Vaksine mot Hitra-syken	0,1%



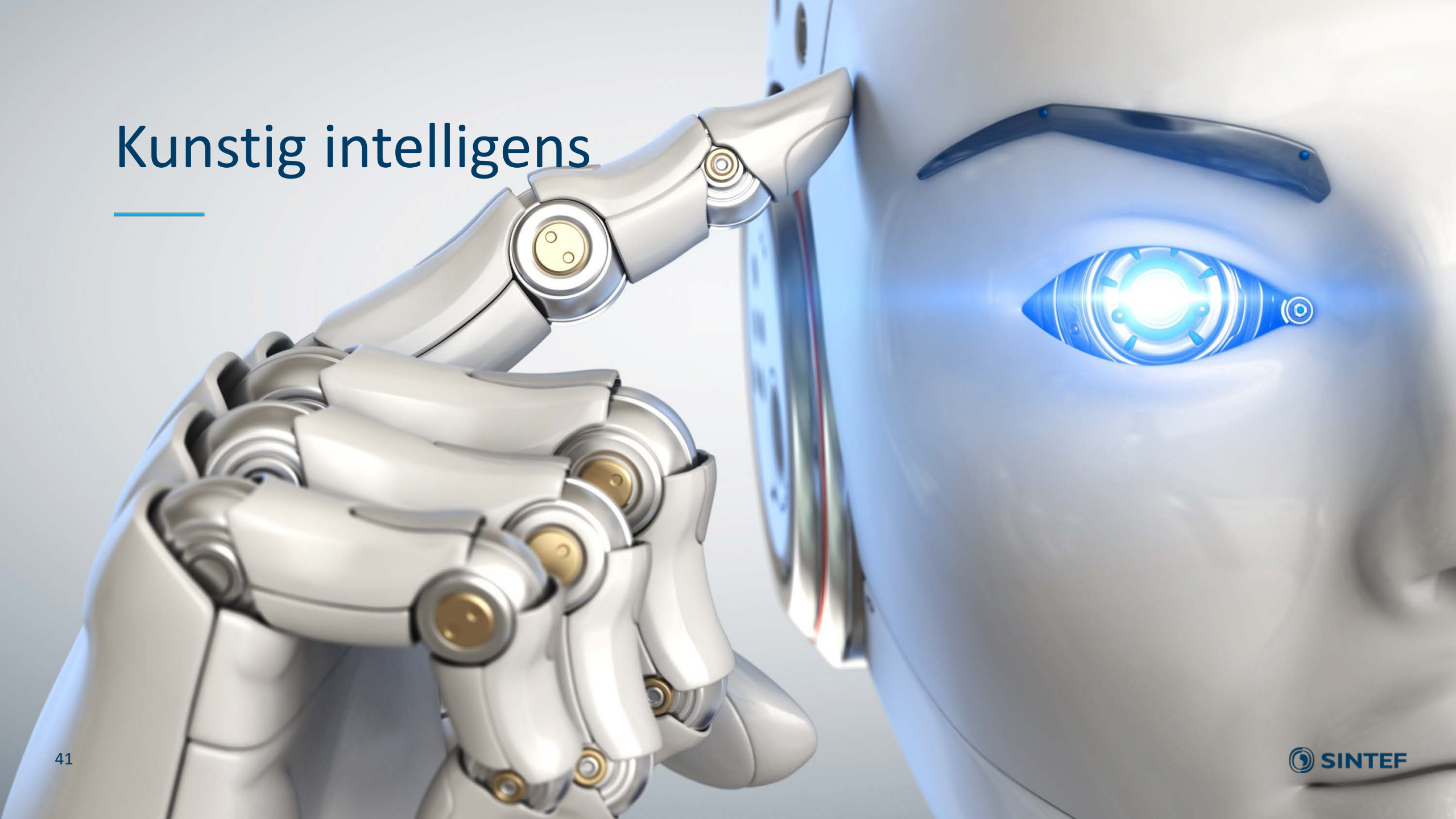
SINTEF

Kalman-inspirerte metoder er grunnmuren i værmeldingen



SINTEF

Kunstig intelligens



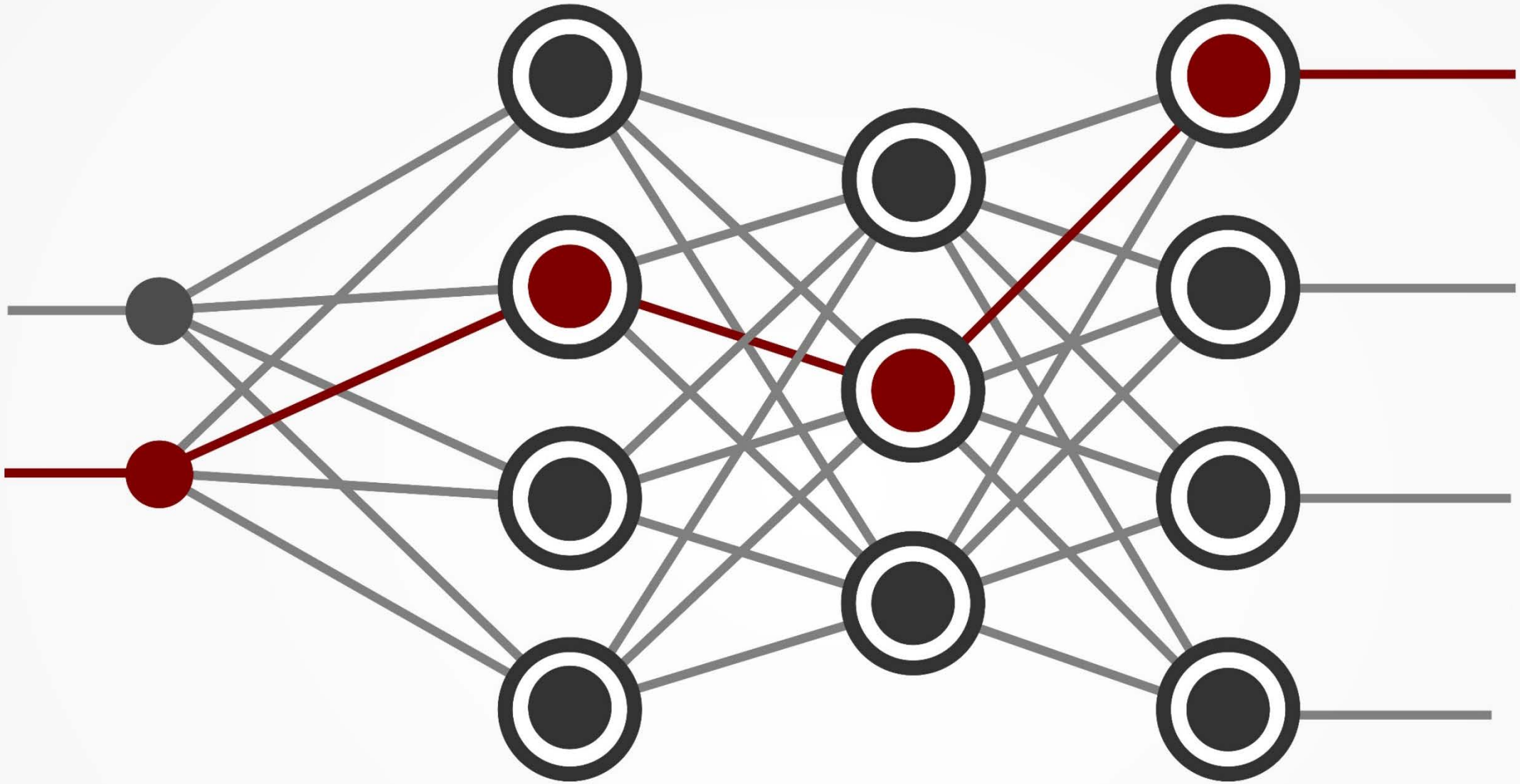
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Kunstig intelligens knuste verdens beste sjakkcomputer





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Teknologi for et bedre samfunn