



Norwegian Centres of Expertise
NCE Blue Legasea

Innovative technology unleashing fish waste value potential

Wenche Uksnøy, Cluster Director



A driving force for interaction and circularity throughout the value chain



Technology development and relevant competence in fishery and processing

Commercialisation of products of higher value



<p>Vessel owners</p>	
<p>Utilization onshore</p>	
<p>Equipment Competence</p>	
<p>Marine algae New species</p>	
<p>Universities, R&D, Health</p>	
<p>Governmental Funding Sponsors</p>	

**We must use as
much as possible**

Once the fish is taken out of the oceans

A large, circular porthole with a dark, weathered metal frame is the central focus. The porthole's view is a teal-colored scene filled with a collage of US dollar bills, including \$100 and \$50 bills, and a silhouette of a bird in flight. A large white dollar sign (\$) is also visible. At the bottom of the porthole, a pile of cash is spilling out onto a dark surface.

**Stop
throwing
money**

Mapping since 2013

Mapping of Marine Rest raw materials
in the Norwegian Seafood industry

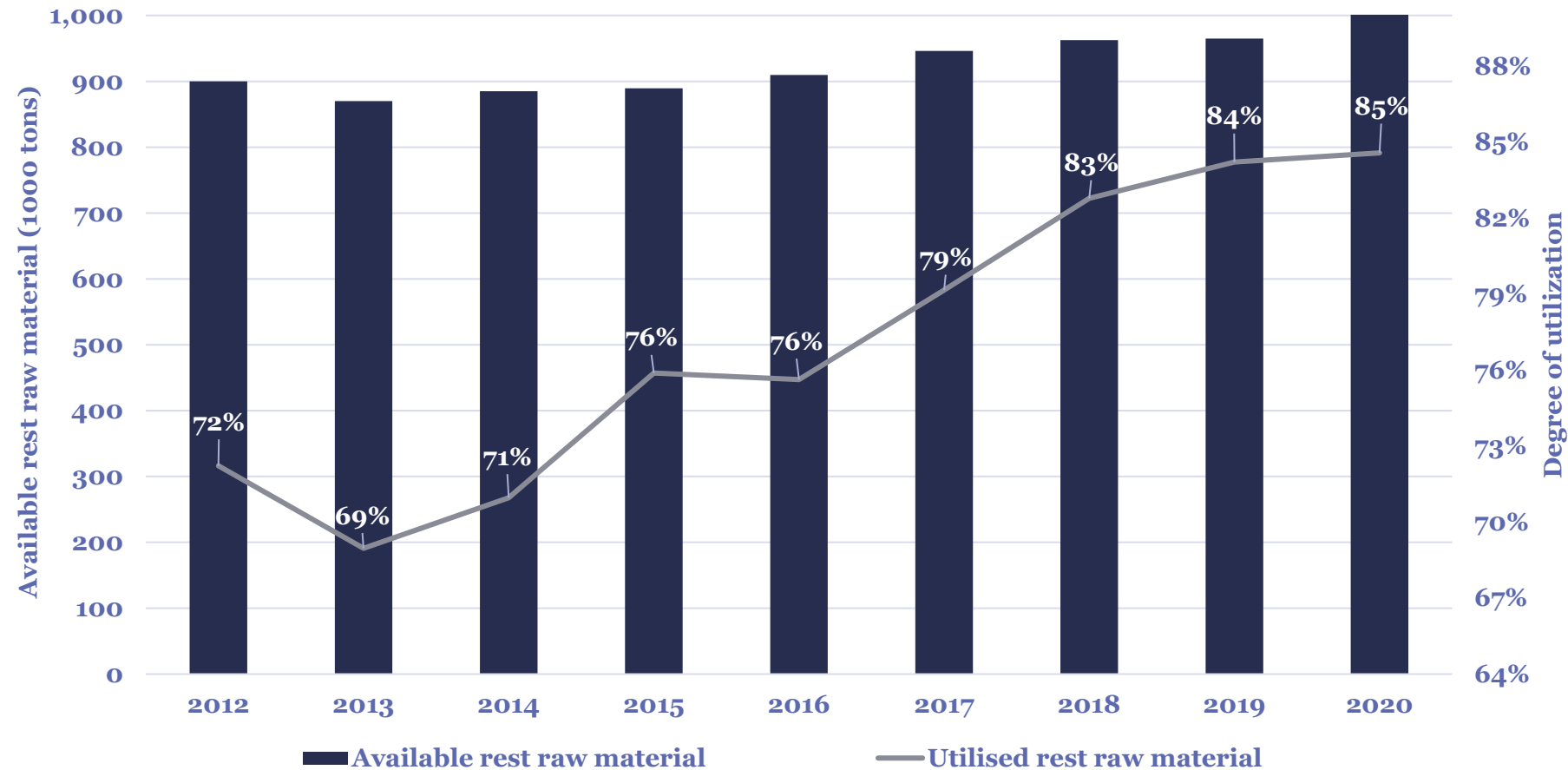
Goals:

- Availability
- Degree of utilization
- Application

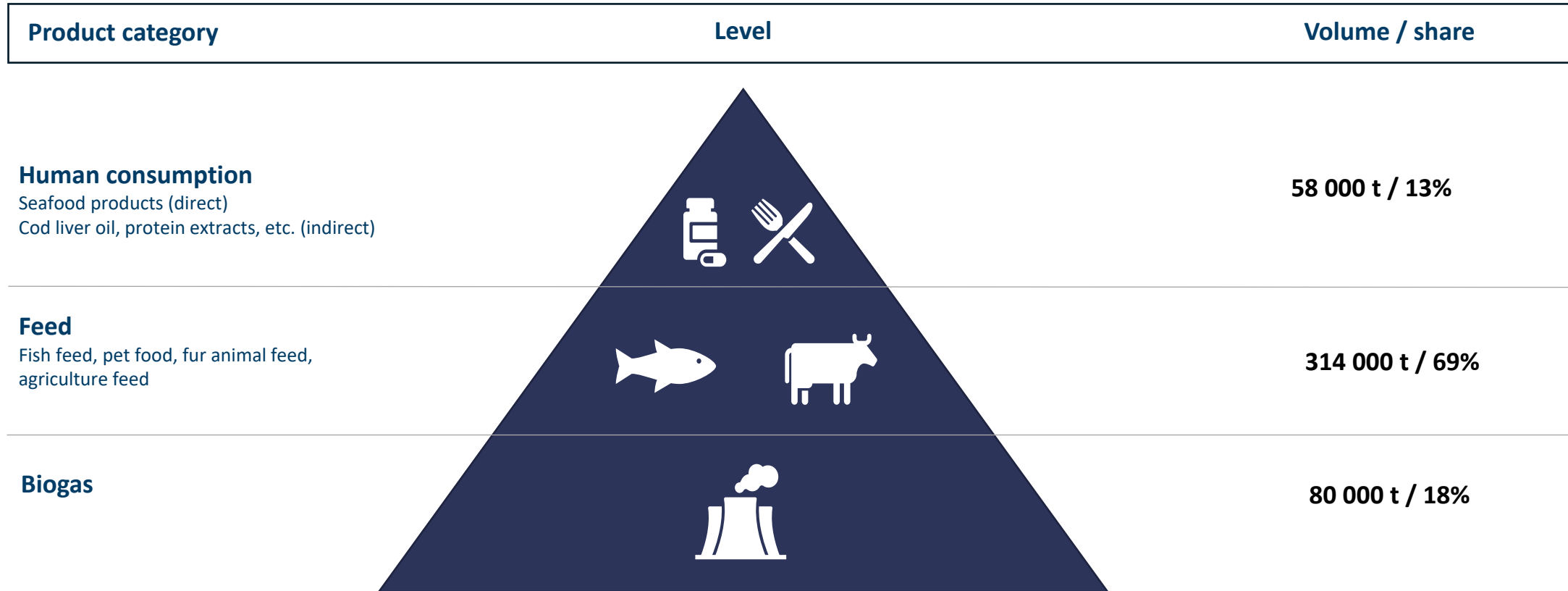


Findings

Development for overall degree of utilization



Product categories based on marine rest raw materials





**Supreme seafood
from sustainable
sources**

A photograph of a red shopping bag with a red ribbon handle. The bag has a green "C" logo and the text "C FOOD NORWAY" and "挪威" (Norway) printed on it. A package of fish maw (鱼肚) is visible inside the bag. The package has a blue and white design with the Chinese characters "大西洋鳔鱼胶" (Atlantic Fish Maw) and a picture of the product. The background is dark grey.

**From bulk
to consumer
products**

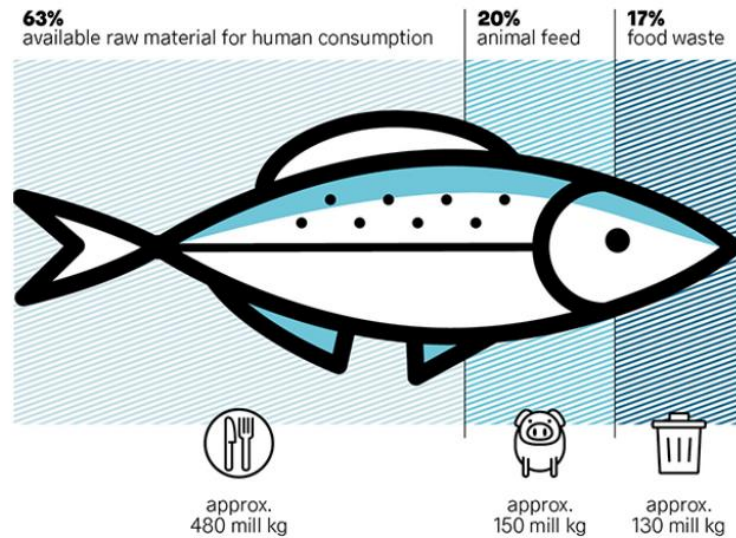
Change the food future

We want to change the food future and the way blue food is consumed by utilizing 100% of the catch

The challenge

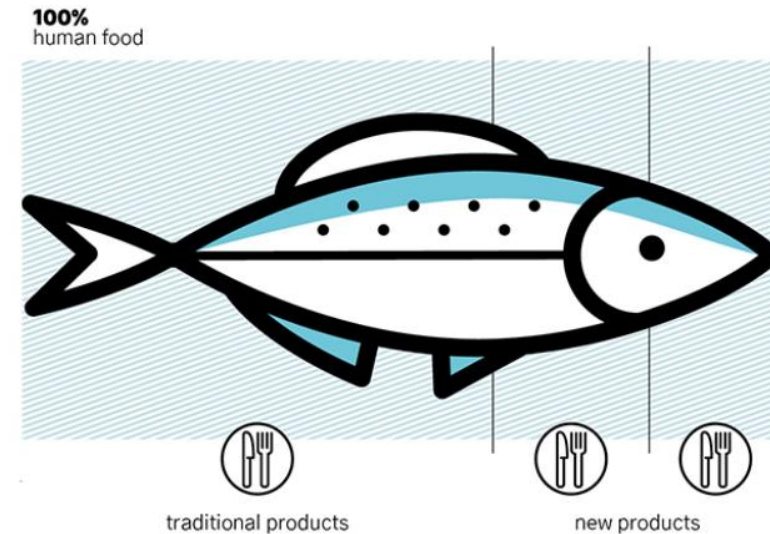
Global protein demand increases

Limited growth potential in fisheries



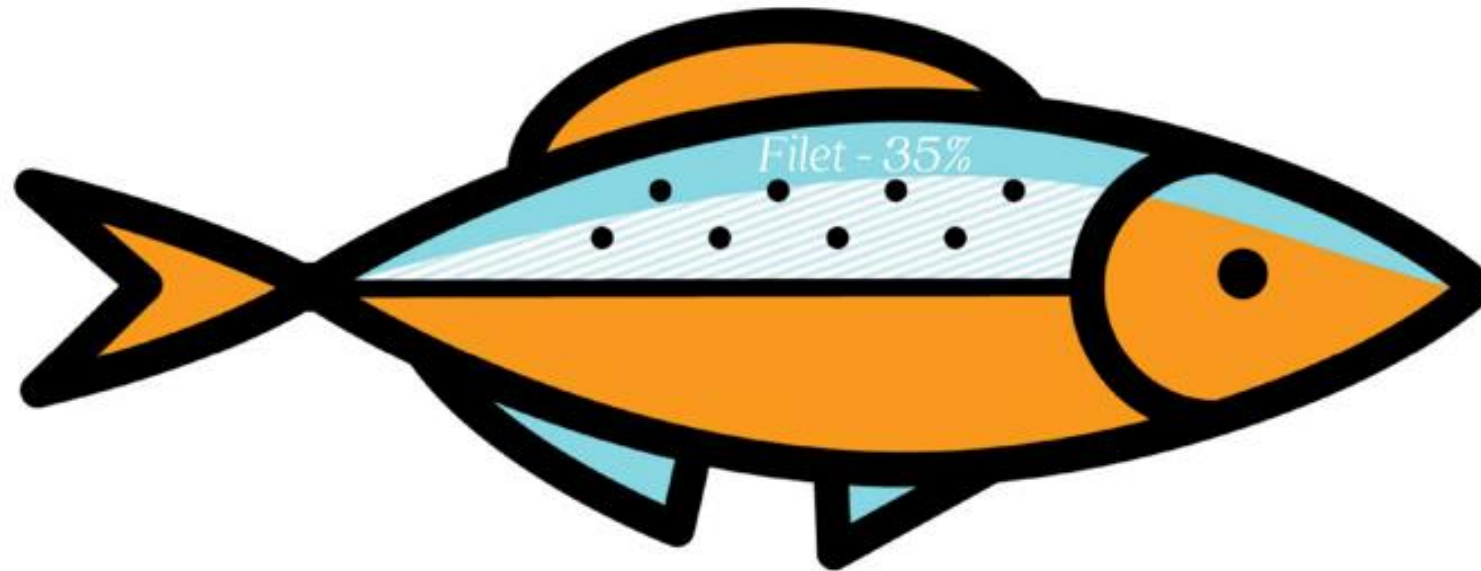
The solution

From food waste to human food

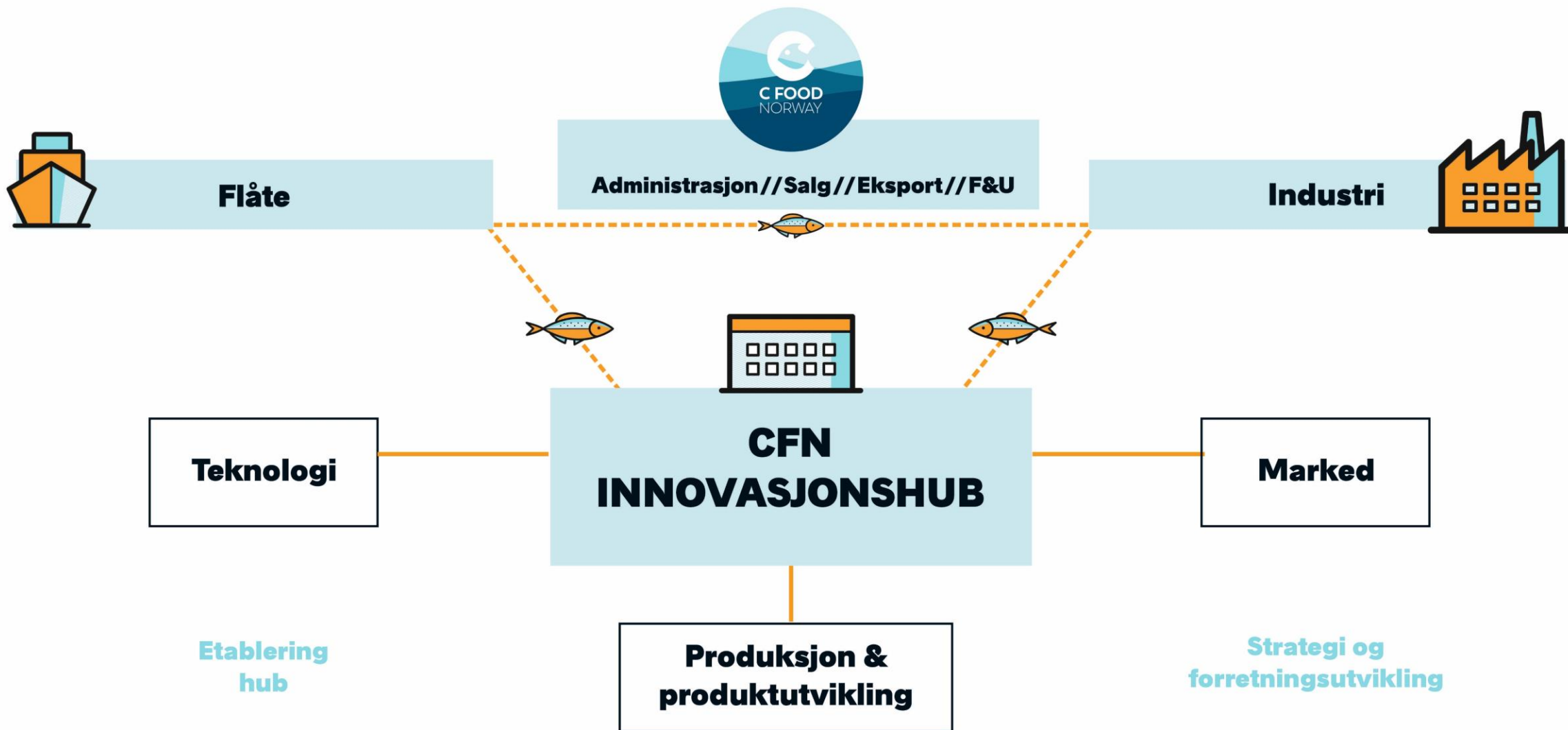


Good for you. Essential for our planet

C Food Norway will develop sustainable seafood based on processing of residual raw material from wild-caught whitefish in Norway



Head with ear bones 25%
Back 20%
Liver 10%
Leather 5%
Other 5%



«Zero emissions of residual raw materials»

«With that we can triple the amount of raw material for land, all with quality for human consumption. In short, increase quota and resource utilization».

Tore Roaldsnes
CEO, Bluewild



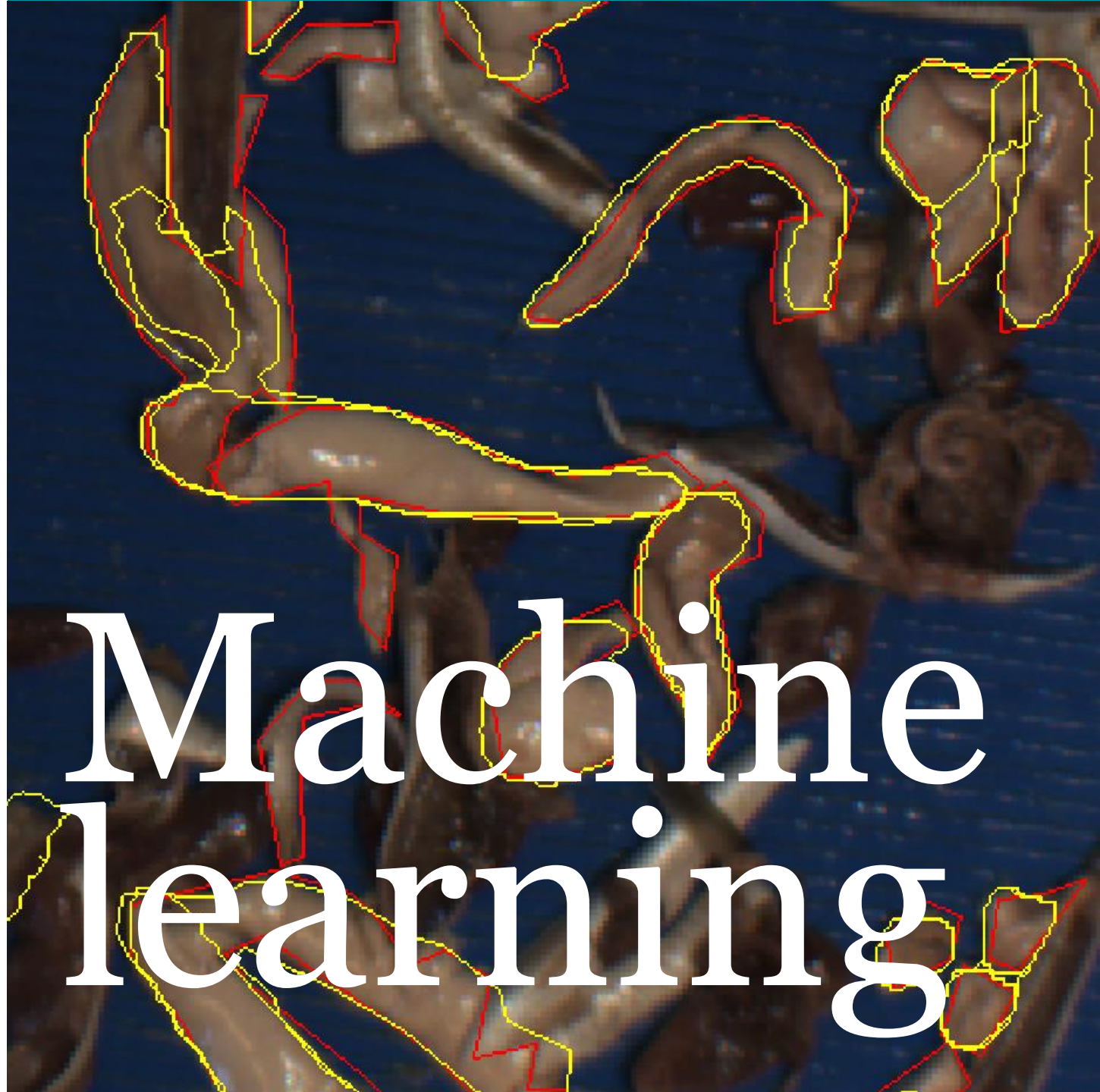
Herring milt and new technology





Detecting herring milk

Trained vision system to detect the herring milk from the heap of viscera using machine learning methods



Machine learning

Detecting herring milk





Nuas Technology

NUAS has developed a food grade hydrolysis process that converts residual raw material and biomass into high quality oil, bone and protein.



Use
the fish

Nuas Technology



Scalable



First in first out



Controlled process



No oxidation



Modular solution



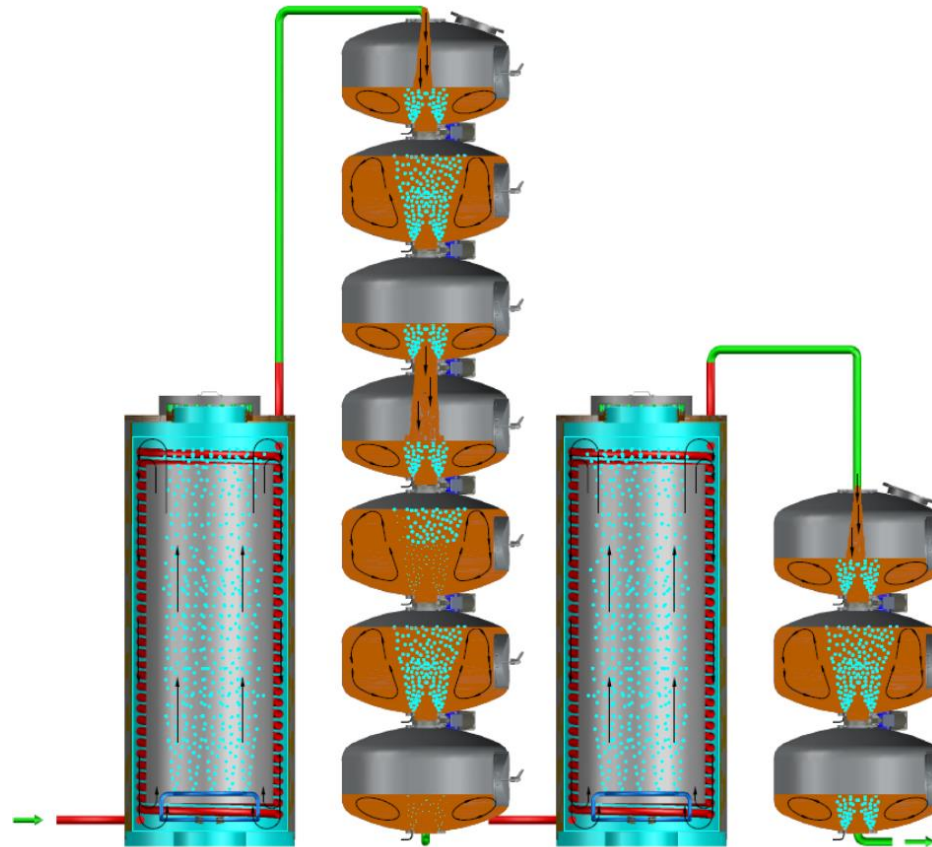
Energy efficient



Ozon treatment



Fresh raw material



Pilot plant with a capacity of 2 tons per hour



Hydrolysate from first test run



Protein-powder from first test run





From dietary supplements to pharmaceuticals



Herring roe

From dietary supplements to pharmaceuticals



HAVETS GULL: Høgne Hallaråker og Arctic Bioscience skal starte produksjon av legemiddelskandidat til prematurfødte barn basert på ekstrakt fra silderogn. Elevene fra helse og oppvekstlinja ved Ørsta videregående skole er på bedriftsbesøk og følger spent med på dissekering av sild. Foto: Arne Rovick /TV 2

Silderogn skal hjelpe prematurfødte barn



Silderogn kan bli medisin

Den marine klynga slår seg sammen med forskningskrefter i helseforetaket. De vil satse tungt innen både medisin og helsekost. Ørstabedrifta Arctic Nutrition med gründer Høgne Hallaråker vil lage medisin på egen fabrikk innen fem år. **NYHETER, SIDE 6**

Byggestart for ny fabrikk:

Tok første spadetak for ny industrisatsing

- Dette er ein merkedag. No skal vi lage gull av havets sølv, seier gründer Høgne Hallaråker før han tek første spadetak på legemiddelfabrikken i Hovdebygda.



A fish is more than a fish

- Diversity and complexity
- Need of documentation and to deal with regulatory limitations
- Market access and competitiveness



100%

use



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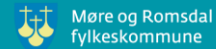
Sparebanken
Møre



Innovasjon
Norge



Forskningsrådet



Møre og Romsdal
fylkeskommune