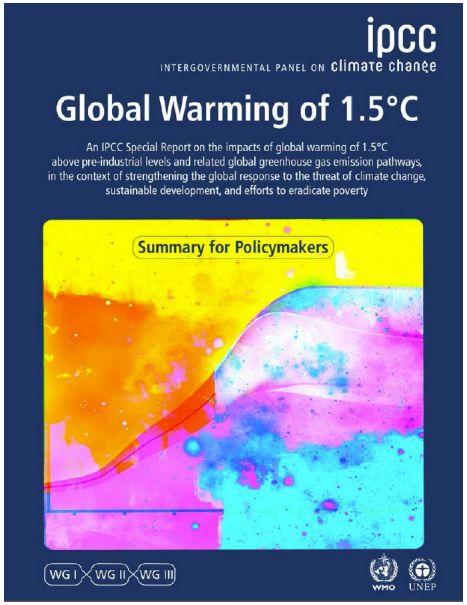
Greenhouse gas emissions of Norwegian seafood products

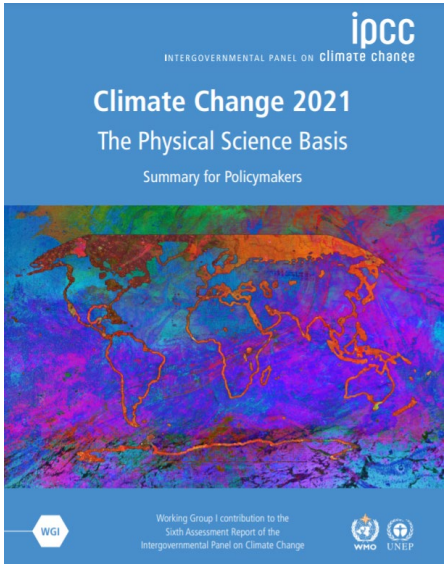
North Atlantic Seafood Forum

June 2022, Ulf Johansen, SINTEF Ocean

The challenge

- The damaging effects of 1.5 degrees global warming are dramatically less than a 2 degrees warming
- To limit global warming to 1.5 degrees, it is necessary to remove CO2 from the atmosphere and the ocean in addition to reducing emissions
- Food production is estimated to emit between 20–30 % of global anthropogenic carbon emissions





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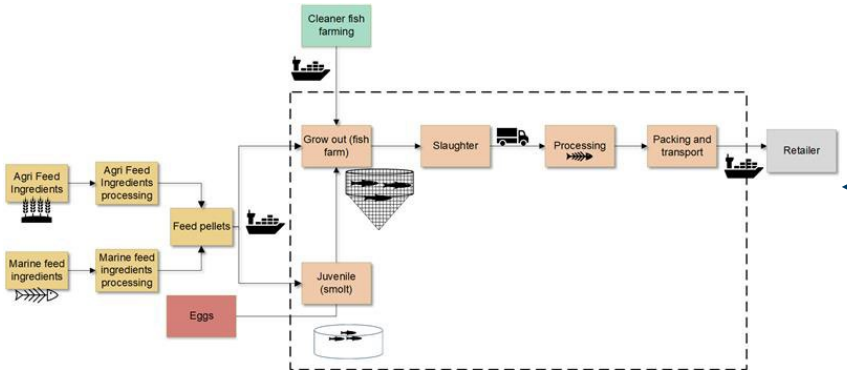
What is climate accounting?

- Clarification of concepts: Climate trace, climate accounts, carbon footprint, GHG assessment, LCA…
- Common to them all: A transparent accounting of consumption and activities that cause greenhouse gas emissions and other climate impacts.
- The methodology used in complete climate accounts / tracks is LCA (life cycle analysis) or EEIO (Environmentally extended input–output analysis)
- Climate accounts and climate tracks prepare accounts for the DIRECT and INDIRECT climate impact (Scope 1,2 and 3)

Two Methods:
1.) Lifle cycle assessment (LCA)
2.) Environmentally extended input–output analysis (EEIO)

LCA

Bottom-up
Material flows
Process based
Truncation error



EEIO

Top-down
Monetary flows
Complete description of value-chain
Aggregation error

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Salmon

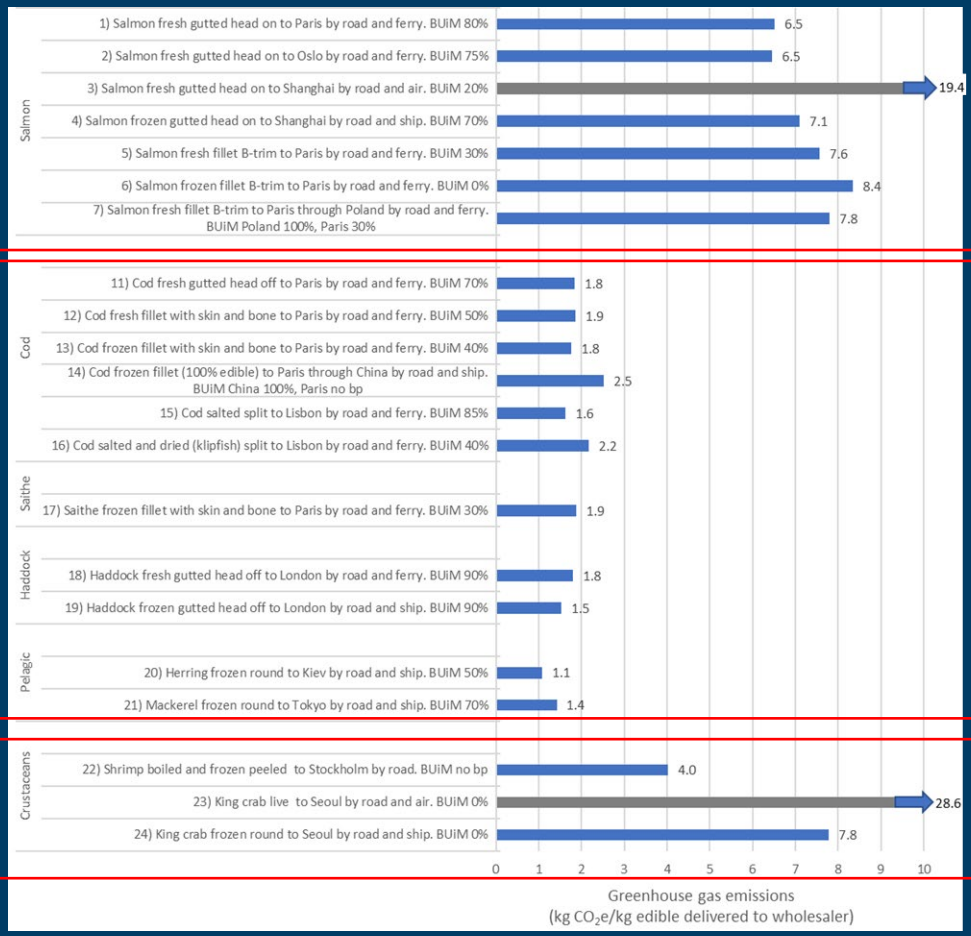
Cod

Saithe

Haddock

Pelagic

Shellfish



Shows greenhouse gas emissions included transport to market –

kg CO_2-equivalents per kilo edible product

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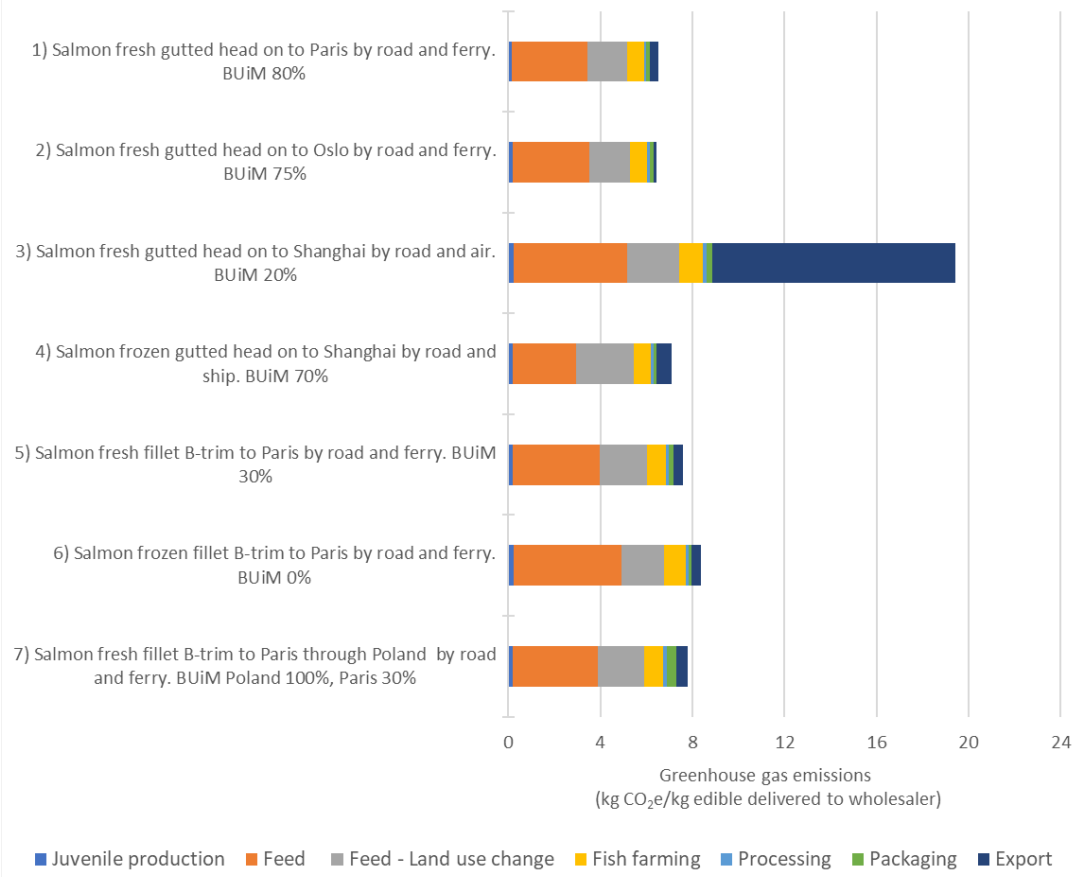

- Feed dominates the emissions from salmon products
- Except when fresh salmon is transported by air to distant markets

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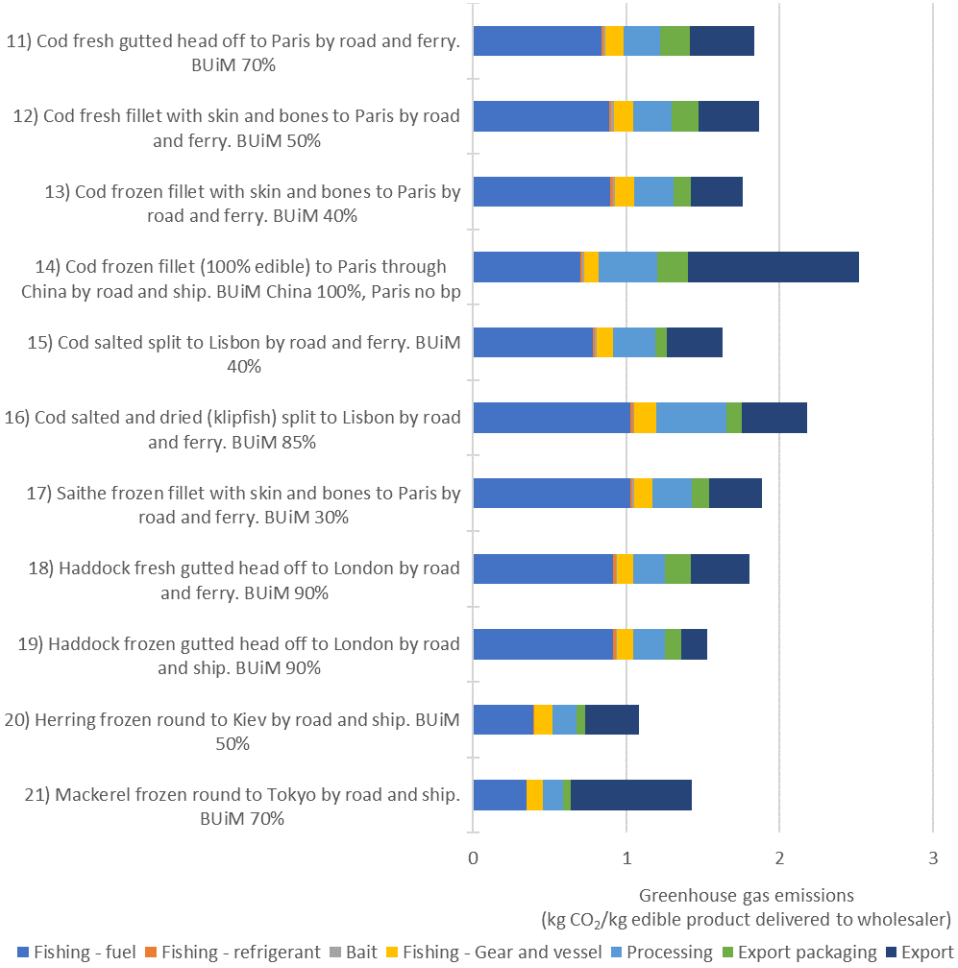

- Fuel use in fisheries dominates fisheries emissions

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Selected key points - salmon

- The feed is overall the largest contributor:
  - Land Use Change (LUC) for Brazilian soy is included - basis in new rules
  - Micro-ingredients in the feed are also included - an innovation
- High mortality in production - loss of large fish - leads to a high economic feed factor - and that much of the salmon that is fed does not end up on a plate
- Well boats and service boats contribute to the increase in emissions - but not as much as one might think
- The use of by-products is included and contributes to reduce the emissions pr. ton

- and some measures…

- Reduce mortality and loss of biomass
- Replace feed ingredients with a high climate footprint
- Increasing energy efficiency and change to renewable energy carriers
- Ensuring full by-product utilization along the entire seafod supply chain
- Minimize the need for transport and switch to more climate-efficient modes of transport of the products to the market

Comparison with European animal-source foods

- Used data for European beef, pork and chicken from Leip et.al 2010
- To be able to compare:
  - Not included "land use change"
  - *Taken results from salmon on delivery to slaughterhouse*
  - *Results for wild fish and shellfish on landing*
  - Used factors for edible yield without the use of by-products
  - Presents only relative results

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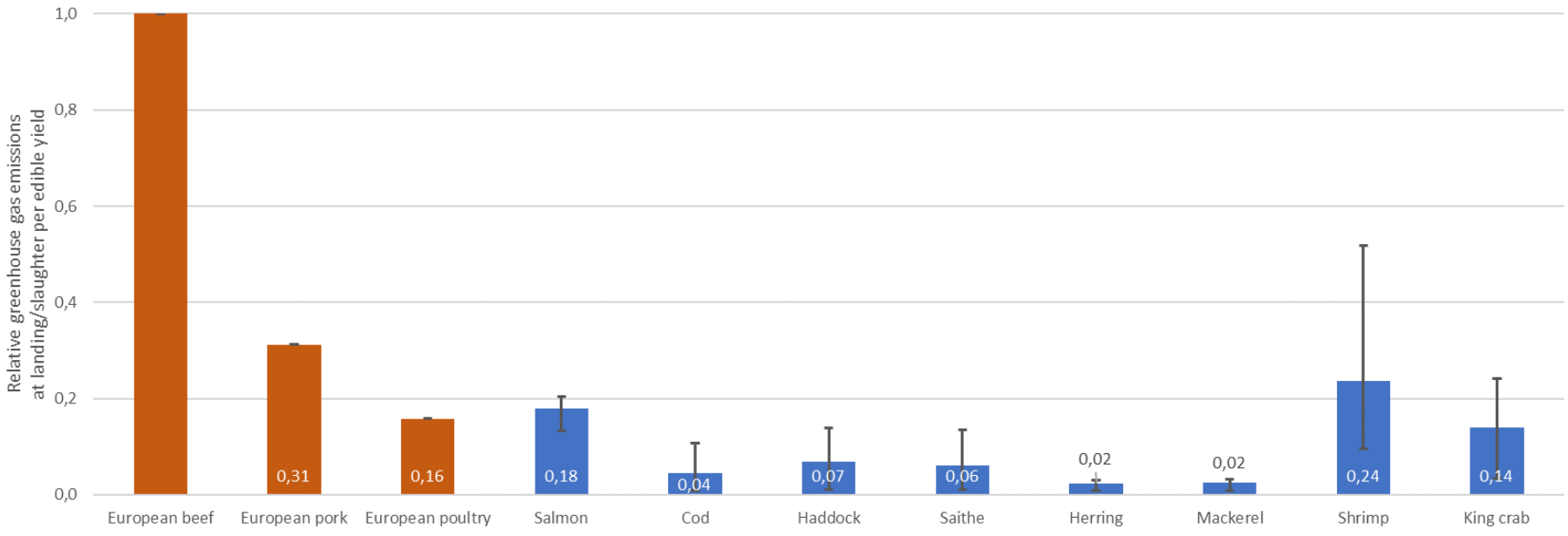
Comparison with European animal-source foods



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Thoughts about the future

- The footprint should be updated every 2 to 3 years - can then see how different measures work
- Easier to this analysis in 2022 as more and more companies make their own reports
- The carbon accounting results have since 2008 given the Norwegian seafood industry the knowledge they need to manage their climate risk (risk adjustment) and provided the basis for them today to be able to position themselves in the green economy.

New aspects in this year analysis is to compare carbon emissions from different production systems


Illustration: Bulandet Miljøfisk

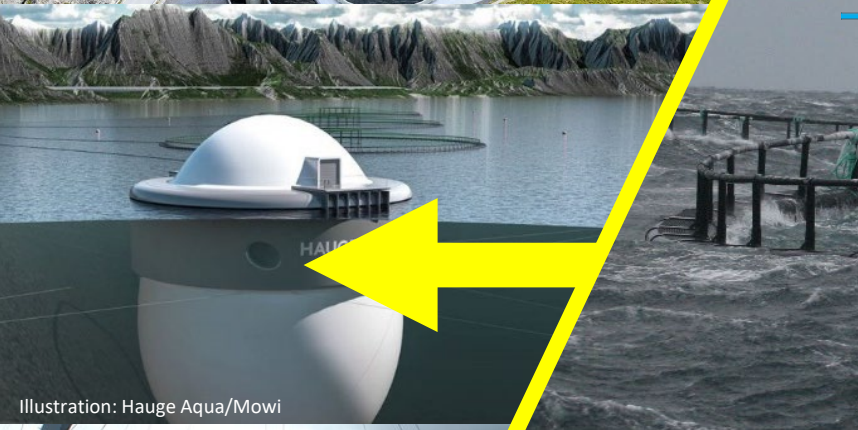


Illustration: Hauge Aqua/Mowi


Photo: Aquafarm Equipments/MOWI

Photo by Marius Dahle Olsen


Illustration: NRS/Aker

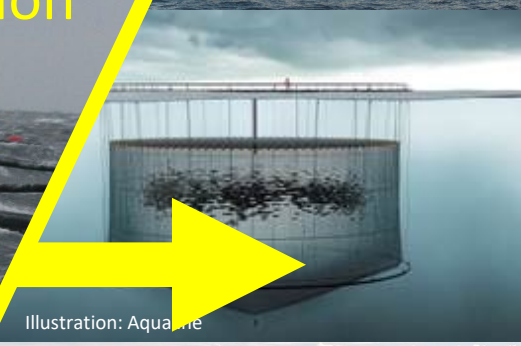


Illustration: Aqua[illegible]

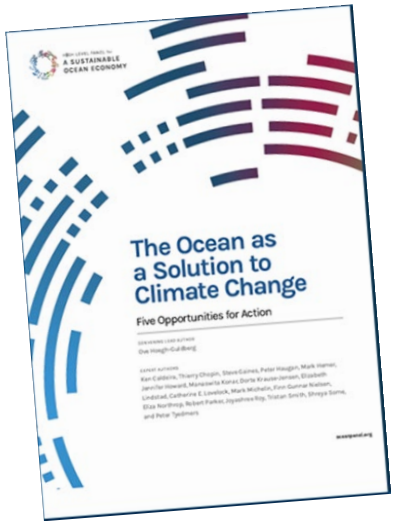

Photo: Salmar

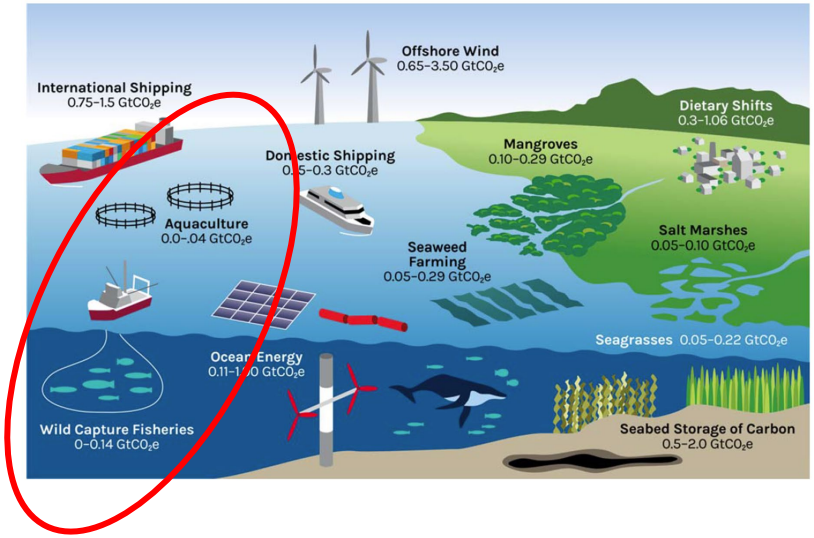

Illustration: Nordlaks

EXPOSED

Remember that fisheries and aquaculture should be part of the solution!

Thank you for your attention!





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Teknologi for et bedre samfunn