Sustainable Marine Fuels - Perspectives from a global shipping and logistics company

26 January 2023 – Giovanna Croxatto Vega – Senior Sustainability & LCA Specialist

MAERSK

Sustainability definitions

A complex problem

- The UN World Commission on Environment and Development: “Sustainable development is development that **meets the needs of the present without compromising** the ability of **future generations** to meet their own needs.”

- The UCLA Sustainability Committee “The integration of environmental health, social equity and economic vitality in order to create thriving, healthy, diverse and resilient communities for this generation and generations to come. The practice of sustainability recognizes how these issues are interconnected and requires a **systems approach** and an acknowledgement of complexity.”

Figure 5. A nature-positive goal recognizes that the Sustainable Development Goals can only be realized if the Biosphere related goals are met. The Biosphere (nature) related goals are not competing interests to be balanced with societal and economic goals, they are the foundation of Society, and Society is the foundation for all Economic activity. Folke, C., R. Biggs, A. V. Norström, B. Reyers, and J. Rockström.

MAERSK

Challenges for sustainable fuels

- *The tropics lost **11.1 million hectares** of tree cover in 2021 (source: University of Maryland)*
- ***3.75 million hectares** of that loss occurred in tropical primary rainforests — areas of critical importance for carbon storage and biodiversity — equivalent to a rate of **10 football pitches a minute**.*
- *2.5 Gt of carbon dioxide emissions, equivalent to the yearly emissions of India*
- *New deforestation frontiers in the Amazons (image)*

WORLD RESOURCES INSTITUTE

New article in Nature Energy:

*"Further, some of the released nitrogen would **ultimately resolve to N2O**, which would offset at least some of the climatic benefits afforded by switching maritime shipping fuels"*

https://doi.org/10.1038/s41560-022-01124-4

Using ammonia as a shipping fuel could disturb the nitrogen cycle

Ammonia has been proposed as a shipping fuel, yet potential adverse side-effects are poorly understood. We argue that if nitrogen releases from ammonia are not tightly controlled, the scale of the demands of maritime transport are such that the global nitrogen cycle could be substantially altered.

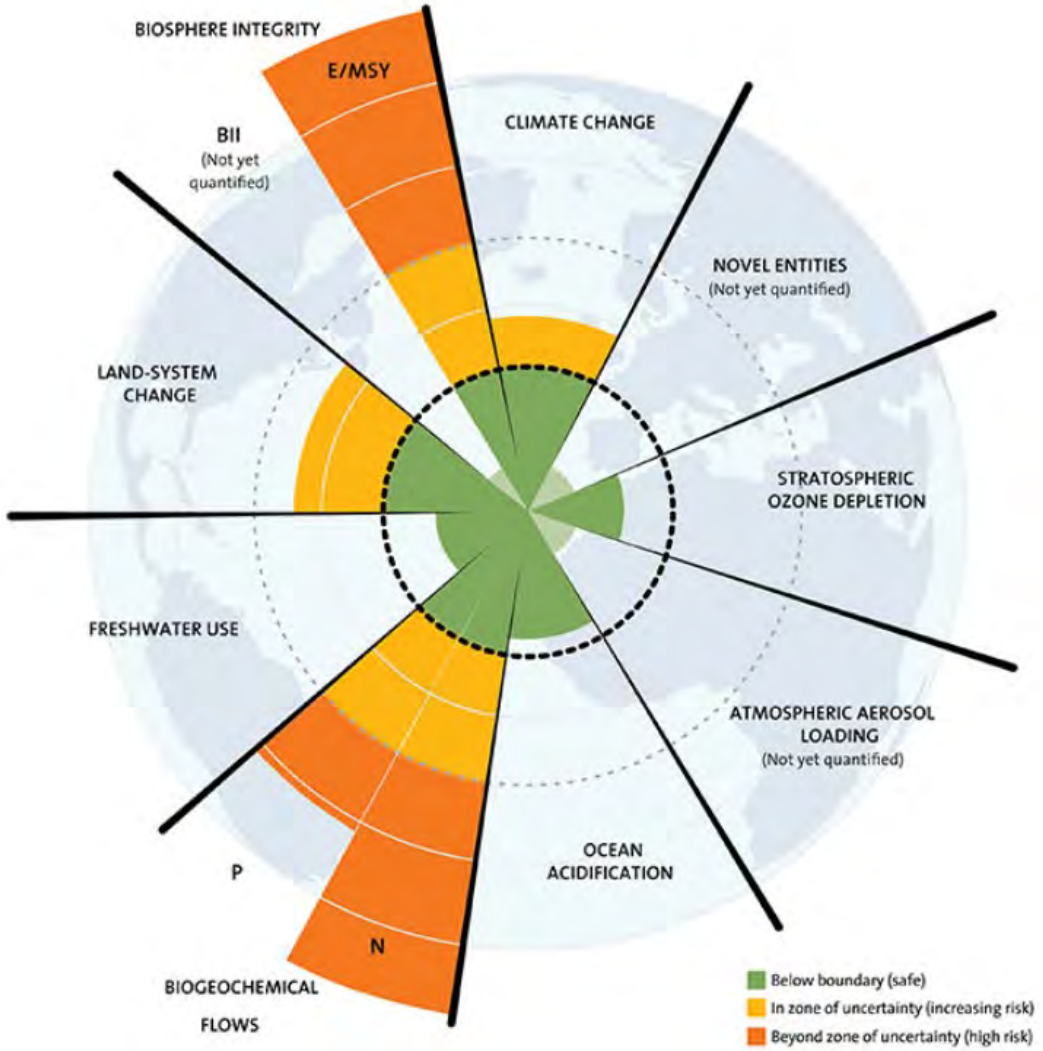
Paul Wolfram, Page Kyle, Xin Zhang, Savvas Gkantonas and Steven Smith

MAERSK

Advances in quantification of sustainability and new global goals

- Definition of **the safe operating space** by Stockholm Resilience Center
- What we do today is relative sustainability.
  - Is fuel A better than fuel B, rather than is fuel A (or B) sustainable (staying within the safe operating space)

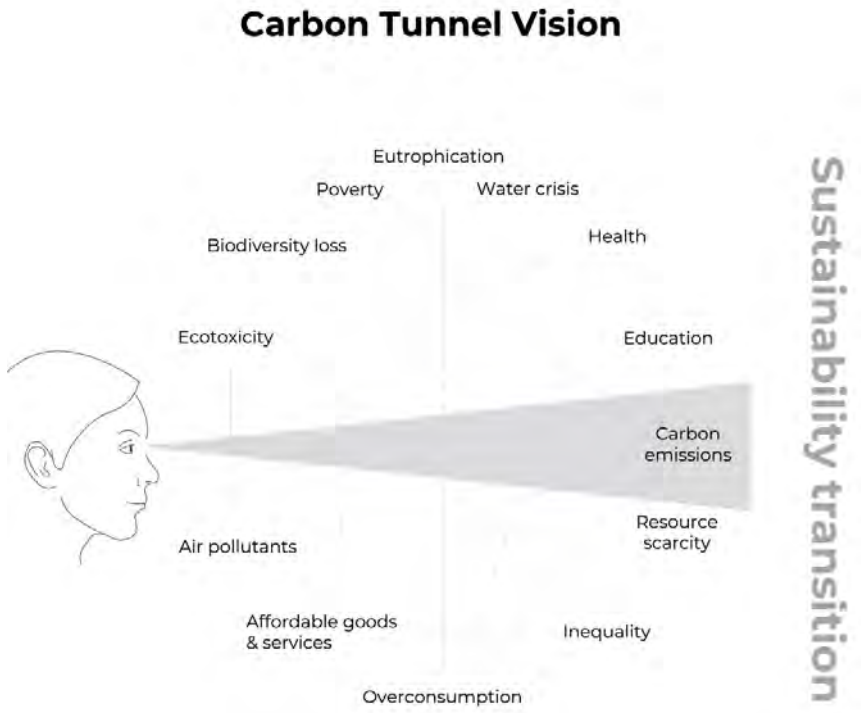
- **New goals from COP15**
  - Effective conservation and management of at least 30 per cent of the world's land, coastal areas and oceans
  - Restoration of 30% of terrestrial and marine ecosystems
  - Halting human-induced extinction of threatened species and reducing the rate of extinction of all species tenfold by 2050

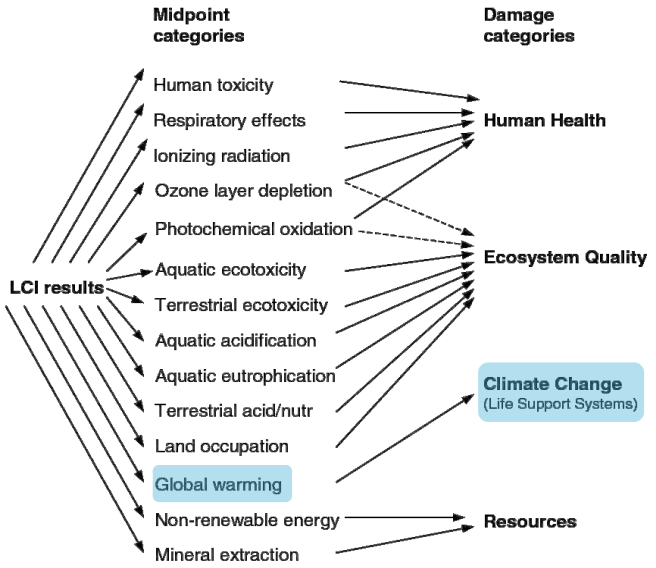


Our Responsibility

- Safeguard the journey towards full decarbonization of our operations and customer's supply chains by using science-based methods that ensure sustainability throughout the full life cycle of the fuels, energy, and solutions we deploy at A.P Moller Maersk

- Fuels are analyzed for these parameters
  - Sustainability
    - **Biodiversity impacts project**
  - Scalability





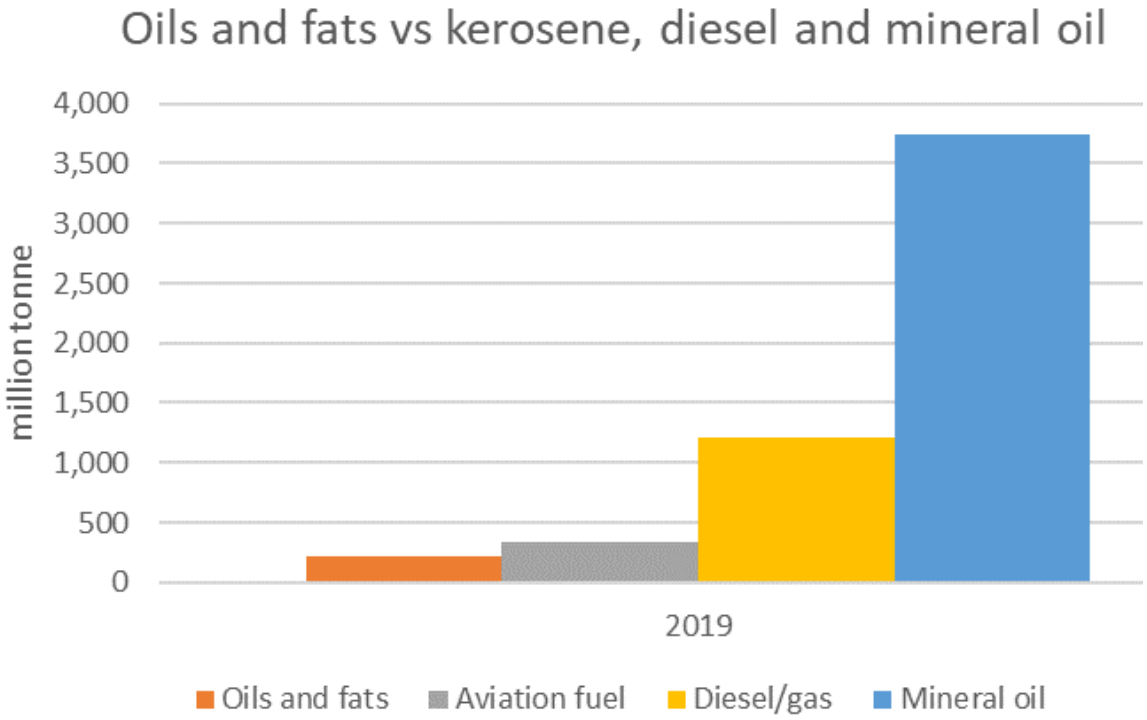
Graphic by Jan Konietzko

MAERSK

Our Responsibility – how we chose methanol?

- Safeguard the journey towards full decarbonization of our operations and customer's supply chains by using science-based methods that ensure sustainability throughout the full life cycle of the fuels, energy, and solutions we deploy at A.P Moller Maersk

- Fuels are analyzed for these parameters
  - Sustainability
    - **Biodiversity impacts project**
  - Scalability
    - **Biomass availability study**
  - Safety
    - **More work needed on ammonia (both on GHGs and ecosystem impacts)**
    - **Project on ammonia**
  - Price



- 'Oils and fats' have little potential to replace fossil fuels
- Biodiversity: Vegetable oils cause major impact

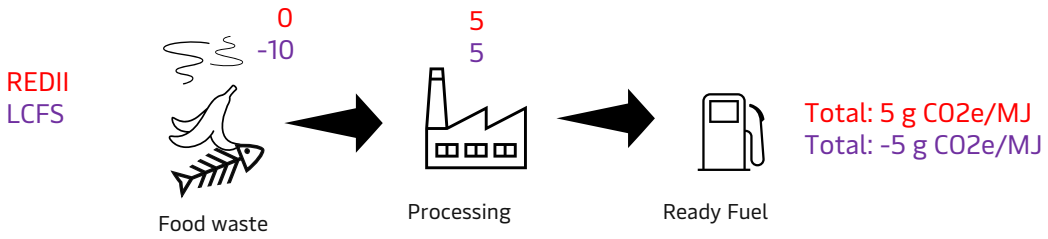
References:
- **Schmidt (2015)**. Life cycle assessment of five vegetable oils. Journal of Cleaner Production 87:130-138.
- **International Energy Agency (2022)**

MAERSK

Challenges and needs to increase the uptake of green fuels

We need:

- Consistent **greenhouse accounting** and standards that safeguard **sustainability holistically**
- A biofuel certified to e.g. the LCFS Standard is likely to have a very different GHG footprint than the same fuel certified to the REDII.



- Clear guidelines on renewable electricity additionality
- Robust book and claim systems with reliable registries
  - Fuel production is often far from ports
- We advocate for leaning on the existing science to evaluate sustainability
  - ISO standard with defined choices

Shipping needs **globally recognised** standards and **robust** greenhouse gas accounting across continents, regions and countries (and preferably also across transport modes like trucking and aviation) that emphasize **consistency**.

MAERSK

How to get the transition to green fuels going

Our needs for a global certificate:

- ✓ Robust sustainability criteria
  - ✓ Including indirect effects (land use changes)
  - ✓ Focus on prospective, not historical changes
- ✓ Consistent GHG accounting globally
- ✓ Flexible fuel bunkering logistics (book and claim)
- ✓ Inclusion in incentive schemes

MAERSK