# EU and IMO policy developments
# &
# A review of existing practices on sustainability aspects/certification and third-party verification issues for the IMO's LCA guidelines

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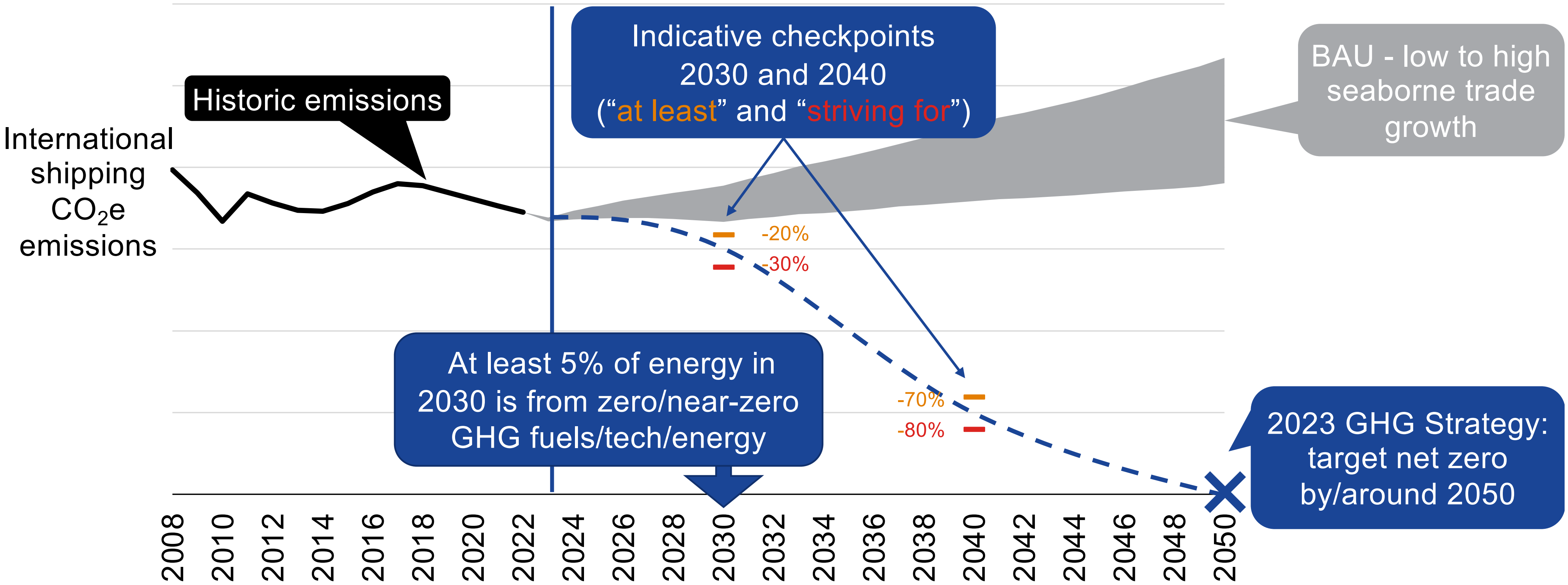
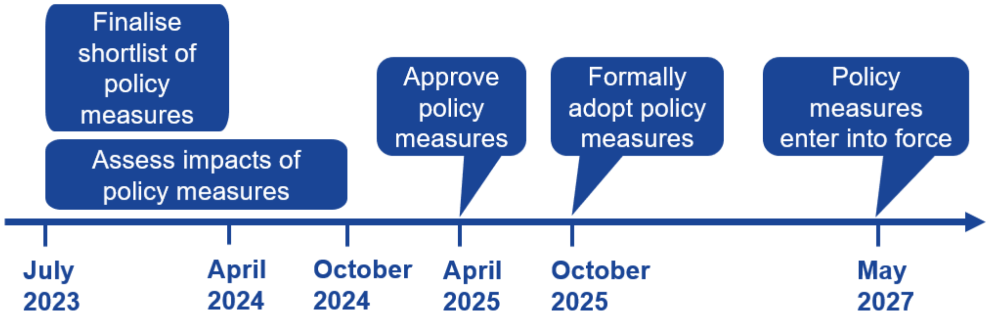
# The IMO agreed a more ambitious decarbonisation strategy for 2050 with checkpoints for 2030 and 2040 and a 2030 fuels target

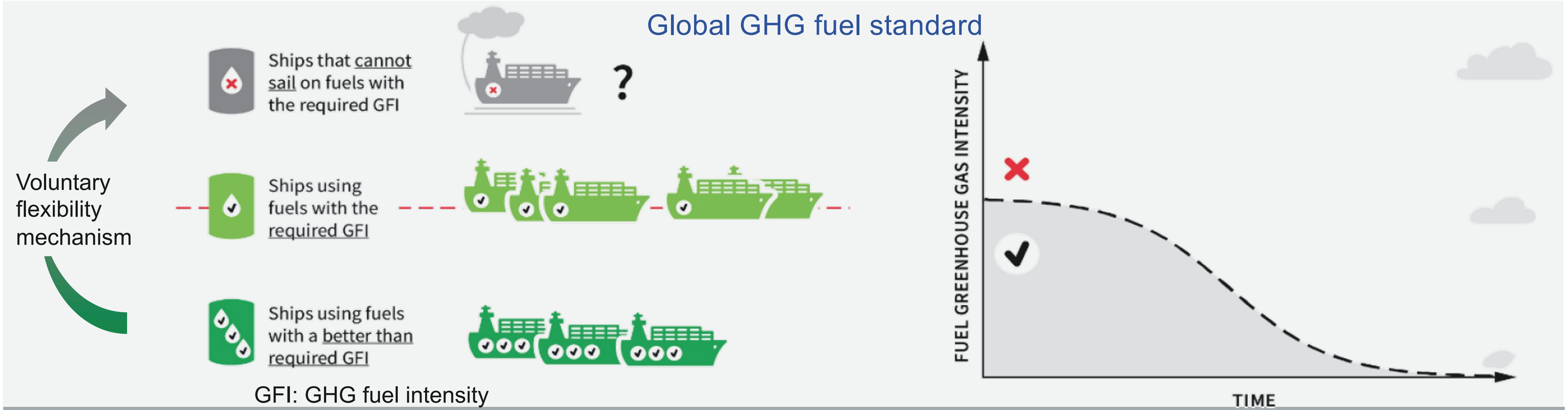



Source of historic and BAU emissions: Ricardo & DNV paper MEPC 80/INF.10

# IMO policy measures to implement the 2023 Strategy are not yet in place, but discussions advanced to shortlisting possible 'basket' of measures

- Combine technical + economic measures
- Global GHG fuel standard + ?
  + additional (revised) energy efficiency measures
- Timetable: agree 2025 → come into effect 2027




GFI: GHG fuel intensity

# 2030 target for at least 5% (striving for 10%) zero or near-zero GHG fuels aims to kick-start the transition

**IMO has provided interim guidance on the use of biofuels** for the DCS and CII (MEPC.1/circ 905 )

- Be certified by an international certification scheme
- Meet its sustainability criteria
- Provide well-to-wake GHG emissions **reduction of ≥65%** compared to fossil MGO of 94 $gCO_2e/MJ$

Then will be provided GHG factor as certified and accounting for its lower calorific value

**IMO LCA Guidelines to provide full clarity on biofuels**

- Thus far WtT GHG intensities provided for FAME (20.8 $gCO_2e/MJ$) and HVO (14.9 $gCO_2e/MJ$); TtW factors pending
- Other pathway factors TBC
- Qualitative risk-based approach taken for ILUC:

> ***Low-ILUC risk*** *qualifies and characterizes biofuel production projects that supply additional feedstock without disrupting existing land uses. When productivity is increased on an area which is in agricultural production, only additional yields should be considered as low-ILUC rather than the entire production.*
>
> ***High-ILUC risk*** *qualifies and characterizes biofuel production projects based on, or displacing, food and feed crops resulting in a significant expansion of the feedstock production area shifting into land with high-carbon stock.*

# The EU has made significant progress introducing requirements tackling maritime GHG emissions

## EU ETS: tonnes of GHG

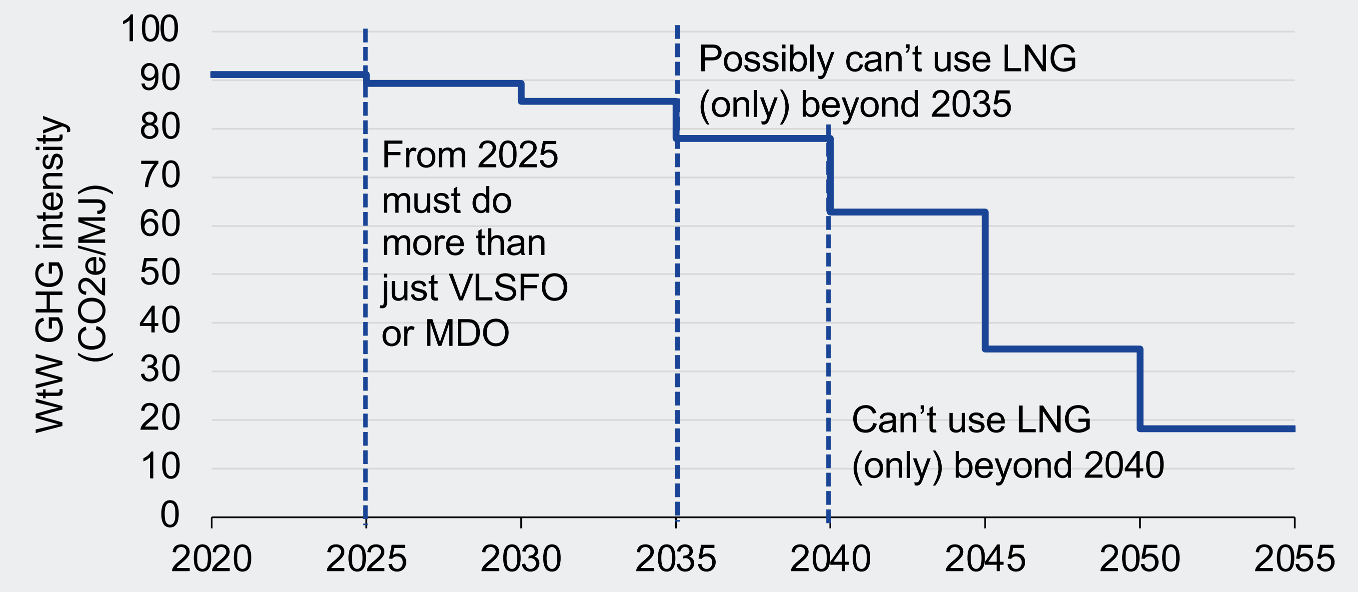
- Phase in 2024-25-26 surrender 40-70-100% allowances
- Tank-to-wake
- $CO_2$ (from 2024), $CH_4$ and $N_2O$ (from 2026)
- 100% intra-EU and 50% extra-EU
- >5000 GT cargo and passenger ships<br>From 2027 also >5000 GT offshore ships
- Biofuels: same treatment as other ETS sectors. If compliant with RED sustainability criteria, $CO_2$ factor = 0

## Fuel EU Maritime: GHG intensity

- Applies from 2025. Monitoring plans from 2024
- Well-to-wake
- $CO_2$, $CH_4$ and $N_2O$ (all from 2025)
- 100% intra-EU and 50% extra-EU
- >5000 GT ships
- Biofuels: must be >65% GHG saving and meet RED sustainability requirements. $CO_2e$ factors to be certified.

# At EU level, a GHG fuel standard has already been agreed. FuelEU Maritime provides further clarity on fuels

Regulation (EU) 2023/1805 of 13 September 2023 on the use of renewable and low-carbon fuels in maritime transport



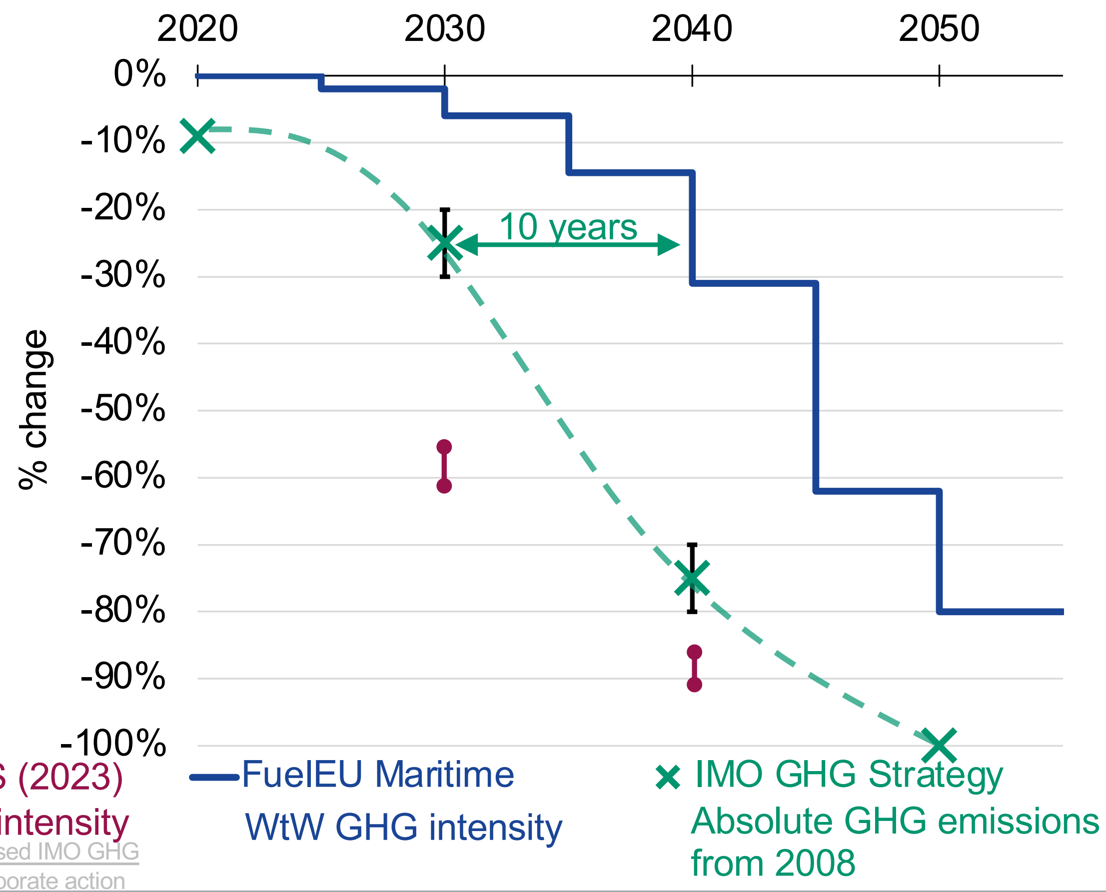

- WtT ($gCO_2e/MJ$)
  - Fossil fuels: default emission factors
  - Other fuels: defaults or certify (RED)
- TtW ($gCO_2e/g$ fuel)
  - Fossil fuels: default emission factors
  - Other fuels: defaults or test/measure
- Benefit for wind assistance
- RFNBOs: incentivised until 2033
  required from 2034 (>2%)
- Flexibility mechanisms:
  - Banking/borrowing compliance surplus (same ship)
  - Pooling compliance (multiple ships)

Linked to Renewable Energy Directive (RED)
- Emission factors /methodology
- **Biofuels (Art. 29): >65% GHG saving + sustainability requirements**
- RFNBOs (Art. 25): >70% GHG saving
- Approach for **certification** of GHG WtT emission factors

# Investments should be made based on reductions expected to be needed for IMO regulations as these should be more stringent than FuelEUMaritime

- Revised IMO Strategy targets more stringent than Fuel EU Maritime requirements
- To achieve Revised IMO Strategy *emissions* targets requires even greater GHG intensity reduction per ship due to trade growth
- Expect forthcoming IMO's technical measure (on fuel GHG intensity) to implement *GHG intensity* targets that enable achieving Revised IMO Strategy *emissions* targets




UMAS (2023) Implications of the Revised IMO GHG Strategy for national, regional and corporate action

# Implications of the IMO Strategy and EU legislation

| | |
|---|---|
| **Substantial investments needed to implement zero- / near-zero GHG fuels to reach IMO targets** | EU's Fuel Maritime GHG intensity standards will drive progress but at slower rate |
| **Well-to-wake basis helps to further spur demand for truly green fuels** | IMO LCA Guidelines mean biofuels can play a part in that, subject to meeting GHG intensity certification and meeting wider sustainability requirements |
| **Clarity for owners/operators' investment decisions is increasing** | Lifecycle assessments to support Fuel EU Maritime and IMO LCA Guidelines will further the evidence base |
| **Fuels meeting shorter-term requirements with lower GHG reductions offer incremental change through to 2030s** | Although lower cost now, short window of commercial viability / risk of stranded assets if don't meet longer term policy requirements |
| **Scalable fuel options reaching near-zero GHG emissions offer long-term step change for deployment in 2040s** | Can biofuels scale to the demand for shipping?<br>And meet sustainability criteria?<br>And meet other sectors' needs (e.g. SAF)? |

# Review of existing practices on sustainability aspects/certification and third-party verification issues

Tim Scarbrough, Ricardo

25 January 2024

# AGENDA

Introduction and background

Sustainability criteria for marine fuels

Review of existing practices

Case studies

Findings

# Background and objectives of the study

- **Background**: Request at MEPC 80 for IMO to **review existing practices on sustainability aspects / certification and third-party verification issues** and organise an expert workshop on the life cycle GHG intensity of marine fuels
- Ricardo was commissioned by the IMO Secretariat (MED's FFT Project) to carry out this review to inform the further development of a robust framework to account for the sustainability criteria of marine fuels
- **Project timetable**: October 2023 – January 2024, including draft findings presented at expert workshop held December 2024
- **Output**: Final report submitted in January 2024 to ISWG-GHG 16; to be formally discussed during MEPC 81 in March 2024
- **Tasks**:
  - Review sustainability themes/aspects of marine fuels, and regulatory frameworks, voluntary standards and certification schemes, to see how these account for different sustainability themes/aspects
  - Prepare case studies for marine fuel production pathways to illustrate how sustainability aspects/certification are applied across the existing sustainability practices
  - Compare results with the IMO LCA Guidelines to identify possible gaps and areas of good practice to follow and recommend courses of action to consider when developing sustainability schemes and relevant guidance for marine fuels

*Specifically, for biofuels, the study delves into the practical implementation of a risk-based approach for addressing Indirect Land Use Change (ILUC)*

*Disclaimer: The analysis and recommendations in this study are the sole responsibility of the authors of this study. The study presents exploratory work that is scientific and policy neutral. It does not prejudge any future policy developments at IMO and does not constitute IMO's views on the development of its Life Cycle Assessment (LCA) framework. In particular, the choice of fuels and fuel production pathways studied does not constitute IMO's views on the eligibility of the considered fuels to comply with existing and upcoming regulations.*

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## The methodology for accounting for ILUC is considered the weakest amongst the 10 sustainability themes/aspects because of significant variation in the methodology among different schemes

- Methodologies assessed for robustness
- To account for sustainability criteria
- Qualitative rating based on:
  - How comprehensive the methodology is
  - How standardised the methodology is
  - Reliability of data needed for assessment

| Sustainability theme/aspect | Robustness of methodology |
|---|---|
| GHG emissions | Strong |
| Carbon Source | Strong |
| Source of Electricity/ Energy | Moderate |
| DLUC | Moderate |
| ILUC | Weak |
| Water | Moderate |
| Air | Strong |
| Soil | Moderate |
| Waste and chemicals | Moderate |
| Conservation | Moderate |

# Rating the uncertainty for different fuel types: conventional biofuels have the greatest level of uncertainty when considering the sustainability themes/aspects, notably ILUC

Qualitative rating of uncertainty when accounting for sustainability themes/aspects:

| | |
|---|---|
| Low uncertainty | There is low uncertainty when accounting for this fuel type as methodologies are in place and straightforward to follow. |
| Moderate uncertainty | The level of uncertainty is moderate as although the methodologies used to account for the sustainability themes/aspects are in place there may be some uncertainty around data. |
| High uncertainty | There is a high degree of uncertainty and variability when accounting for sustainability themes/aspects for this fuel type. |

| Sustainability themes/aspects | E-Fuels | Blue fuels | Conventional biofuels | Advanced biofuels | Electricity |
|---|---|---|---|---|---|
| GHG emissions | Low | Low | Low | Low | Low |
| Carbon Source | Low | Low | Low | Low | Low |
| Source of Electricity/Energy | Moderate | Moderate | Moderate | Moderate | Moderate |
| DLUC | Low | Low | Moderate | Moderate | Low |
| ILUC | Low | Low | High | Moderate | Low |
| Water | Moderate | Low | Low | Low | Low |
| Air | Low | Low | Moderate | Moderate | Low |
| Soil | Low | Low | Moderate | Moderate | Low |
| Waste and chemicals | Low | Low | Low | Low | Low |
| Conservation | Low | Low | Moderate | Low | Low |

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# Regulatory frameworks/standards and certification schemes assessed

- None of the regulatory frameworks / standards or certification schemes assessed currently apply to the full range of marine fuels
- *Voluntary* standards and certification schemes address a broader range of sustainability themes / aspects than *regulatory* frameworks
- GHG emission is the most well-accounted for sustainability theme/aspect, and water the least

| | Regulatory Frameworks/Standards | | | | | | Certification schemes | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mandatory | | | Voluntary | | | | | |
| **Sustainability themes/aspects** | **EU RED** | **California LCFS** | **RenovaBio** | **Bonsucro Production Standard** | **RSPS** | **CORSIA** | **RSB** | **ISCC** | **CertifHy** |
| GHG | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Carbon Source | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | |
| Source of Electricity/ Energy | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ |
| DLUC | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| ILUC | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Water | | | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Air | | ✓ | | ✓ | | ✓ | ✓ | ✓ | |
| Soil | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Waste and chemicals | | | | ✓ | | ✓ | ✓ | ✓ | |
| Conservation | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Applicable to marine fuels | ✓(*) | | ✓(*) | | ✓(*) | | ✓(*) | ✓(*) | ✓(*) |

** Partial coverage: i.e. a selection of marine fuels are covered by this regulatory framework/standard/certification scheme*



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# Five case studies were evaluated to assess how various sustainability themes/aspects are practically applied across four different regulatory frameworks and relevant production standards

**1. Soybeans for HVO production**

- Common approach to **quantitatively** account for GHG and DLUC
- Approaches to **ILUC** differ for this crop feedstock
- Water, soil, air quality and conservation **qualitatively** assessed

**2. Palm Fatty Acid Distillate (PFAD) for HVO production**

- **Unclear feedstock categorisation** can lead to uncertain sustainability credentials of the finished fuel
- **Categorising PFAD**: co-product, by-product or residue?
- WtT emissions estimates in literature **vary 11– 280** gCO2e/MJ

**3. Used cooking oil for HVO production**

- Concerns on **fraudulent production**
- Uncertainty not captured in regulatory frameworks
- **Challenges in certification** process
- GHG emissions generally calculated from the point of collection

**4. Forestry residues for FT-diesel**

**5. Renewable electricity and captured carbon for methanol production**

- Regulatory frameworks generally define ‘no-go’ areas
- EU **RED has the most stringent requirements** around the use of forestry biomass and adopts a risk-based approach
- GHG emissions generally calculated from the point of collection.
- DLUC, ILUC, water, soil, air quality, conservation are **generally n/a**

  

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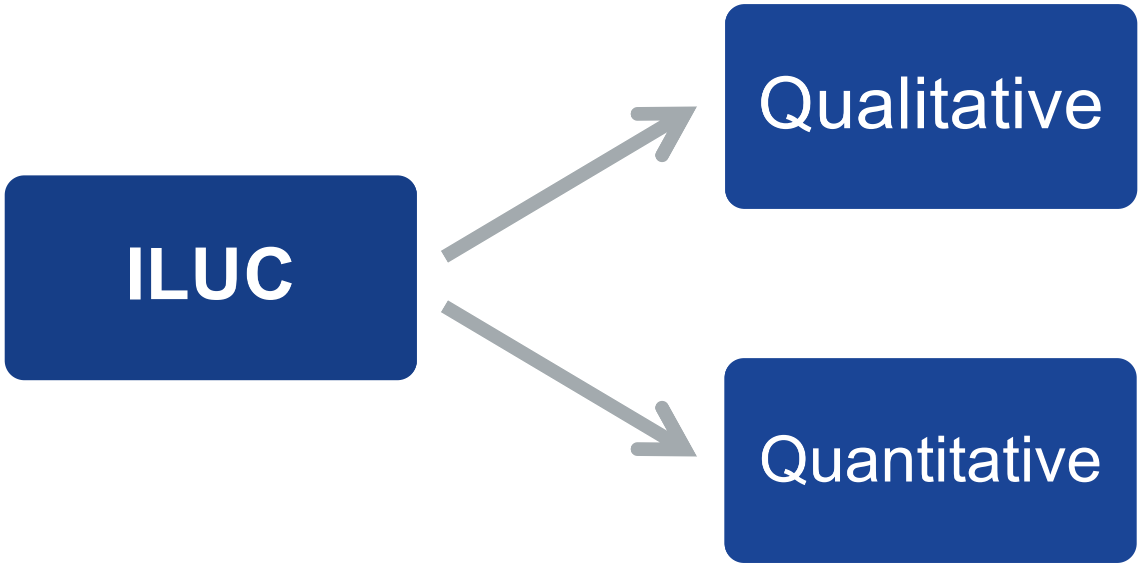
## Comparison with the IMO LCA Guidelines

- The IMO LCA Guidelines provide a consistent definition of DLUC in line with the other regulatory frameworks. This is calculated as part of the WtT emissions.
- The IMO LCA Guidelines adopt a qualitative risk-based approach to ILUC which is consistent with EU RED however, definitions of high/low risk feedstocks are not yet present. Other regulatory frameworks utilise a quantitative approach.
- The IMO LCA Guidelines go beyond other regulatory frameworks to consider fugitive emissions which were not considered in other frameworks as they were not developed specifically for the maritime sector.
- The IMO LCA Guidelines provide definitions of feedstock categories → some ambiguity on "co-product" definition i.e. what is the economic value threshold for it to be classed as a co-product
- The IMO LCA Guidelines provide default values for specified fuel pathways → it does not provide a list of eligible feedstocks under each pathway

# Approaches to ILUC with existing schemes

- The California LCFS and CORSIA adopt a quantitative approach to assessing ILUC:




**Qualitative**

- Requires development of a methodology/criteria for high/low-ILUC.
- Works on the basis of excluding feedstocks outright.
- Overall, a more robust approach to prevent ILUC.

**Quantitative**

- Requires calculation of default ILUC values on a feedstock basis.
- ILUC default value is included as an emission factor in LCA.
- Works on the basis of disincentivising high-ILUC feedstocks.
- Overall, a less robust approach to prevent ILUC.

## Based on the previous findings, we have suggested three potential actionable areas for the IMO to consider when further developing the LCA Guidelines

**Sustainability aspects** | Sustainability certification | Third-party verification

| Main findings and gaps | Recommendation | Timetable |
|---|---|---|
| Current definitions for high and low ILUC risk are high level especially compared to EU RED definitions. | **2. Develop more robust definitions on categorising feedstocks as high or low ILUC risk.** | Short-term |
| Quantitative approaches for addressing ILUC are implemented in existing regulatory frameworks/standards (California LCFS and ICAO CORSIA). | **3. The IMO could reconsider adopting a quantitative approach to ILUC as a neutral approach.** *Noting this approach is less robust and IMO have already progressed with a qualitative approach.* | Short-term |

*This is important to help limit the use of high ILUC risk fuels.*

## Based on the previous findings, we have suggested three potential actionable areas for the IMO to consider when further developing the LCA Guidelines

**Sustainability aspects** | Sustainability certification | Third-party verification

| Main findings and gaps | Recommendation | Timetable |
|---|---|---|
| Other mandatory regulatory frameworks/standards provide constraints around the sourcing of feedstock and production of fuel on high-carbon stock land and converted land, this is included in the IMO LCA Guidelines but the wording could be clearer. | **4. Review the wording around utilising high-carbon stock and converted high carbon stock land.** *This could reduce the risk of high carbon land being used for feedstock cultivation and fuel production.* | Short- to mid-term |

# Thanks for listening

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