

Sustainable criteria for zero and near-zero marine fuels

As of today, there are no true zero-emission fuels on the market. However, **some renewable fuels have the potential for emitting zero GHGs over their entire life cycle**, while others will continue to emit substantial residual emissions throughout their production chain. To ensure the supply of potential zero-emissions fuels, we proposed the following definition.

Sustainable fuels are hydrogen-derived electrolytic fuels that provide

-90%

WtW CO_{2e} emissions reductions from **2030**

-95%

WtW CO_{2e} emissions reductions from **2040**

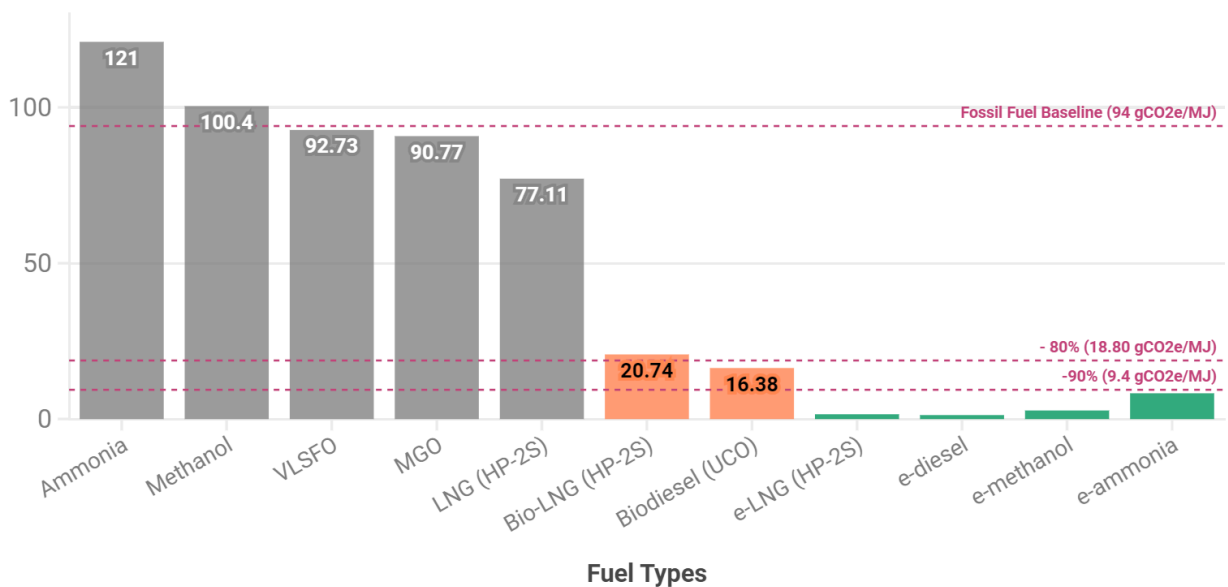
-100%

WtW CO_{2e} emissions reductions from **2050**

Potential sustainable fuel thresholds

■ Fossil fuels ■ Biofuels ■ e-Fuels

WtW Fuel GHG Intensity (gCO_{2e}/MJ)



Source: T&E Analysis based on FuelEU and the Renewable Energy Directive (REDIII). The GWP for CH₄ is 25 and the GWP of N₂O is 298 (as per REDIII). For bio-LNG, the assumed feedstock is biowaste produced from close digestate, off gas combustion production process.

Biofuels: A Slippery Slope

Several countries emphasise the advantages of biofuels to reach the 2023 GHG Strategy’s objectives. This is problematic, as very few biofuel feedstocks can be considered sustainable if we consider competing uses and proven emissions savings compared to fossil fuels.

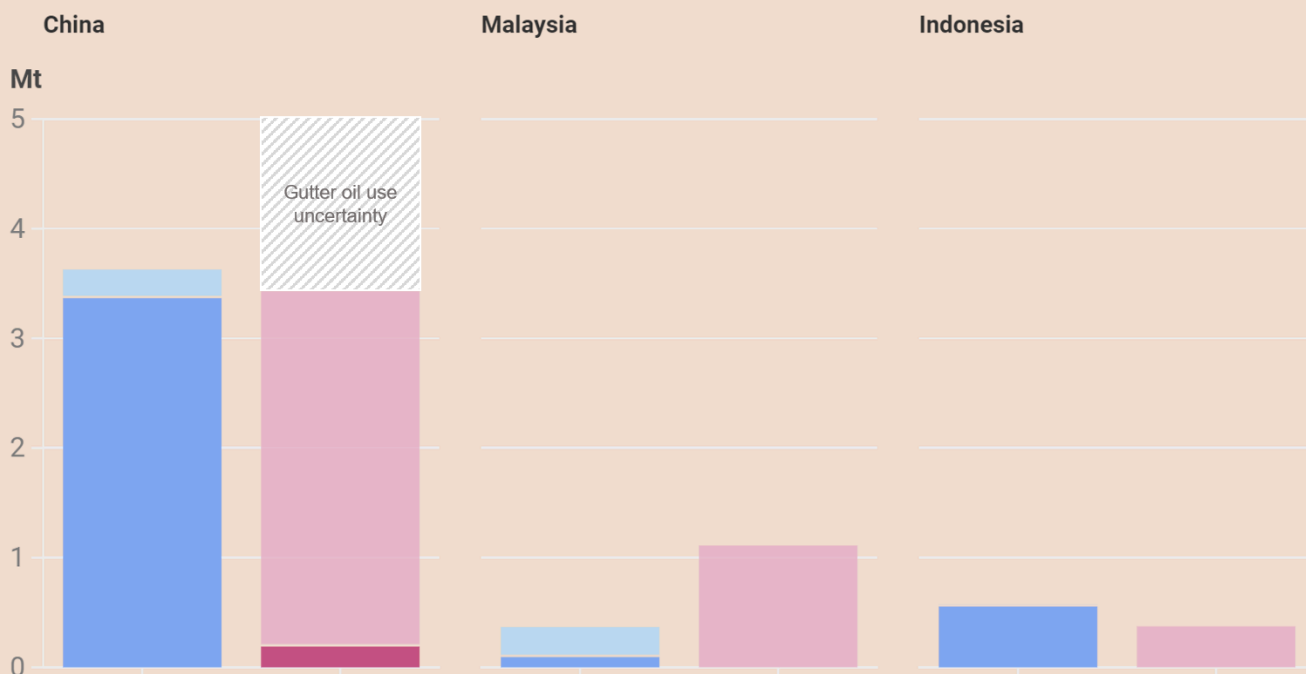
18%

of the global vegetable oil production feeds into biodiesel. Burning even more corn, rapeseed, soy and palm dries up prices and risks food security. Many crop-based biofuels pose a high risk of deforestation. This is why the EU decided to phase out **palm oil** from its fuel mix by 2030.

Some “advanced biofuels” such as **used cooking oil** (UCO) appear to comply with sustainability criteria. However, the supply of used cooking oil is already insufficient to meet the demand from road and aviation sectors. In addition, recent investigations suggest that a large share of UCO imports could be fraudulent and potentially repurposed virgin palm oil.

Discrepancy between UCO collection and exports suggests likely fraud

Collection Imports Domestic use Exports



Source: Transport & Environment, based on data from Stratas Advisors and the ICCT

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How to guarantee the uptake of green e-fuels

Biofuels have been subsidised and promoted for decades. This means that if the GFS is not properly calibrated, biofuels will become the easiest way to comply given their affordability. It is important to implement mechanisms that will generate early uptake of green hydrogen-based fuels.

5%

sustainable e-fuel sub-target would create a guaranteed demand of 596 PJ (or 14.26 Mtoe) which could be met by e-fuel projects announced for 2030 worldwide (800 PJ or 19.10 Mtoe).

A green e-fuels sub-target complemented by an e-fuels reward factor/multiplier could **signal early demand for green e-fuels**, leading to quicker adoption, without affecting other compliance options.

Announced e-fuels projects could fulfil the 5% sustainable fuels sub-target by 2030

Annual marine fuel oil consumption - Mtoe

285.1

Planned e-fuels projects (2030) - Mtoe

19.1

5% e-fuels sub-quota - Mtoe

14.26

Notes: The announced e-fuels production volumes are based on the DNV & Ricardo Study. Source: DNV & Ricardo (2023), T&E (2024), IMO Fourth GHG Study (2020)