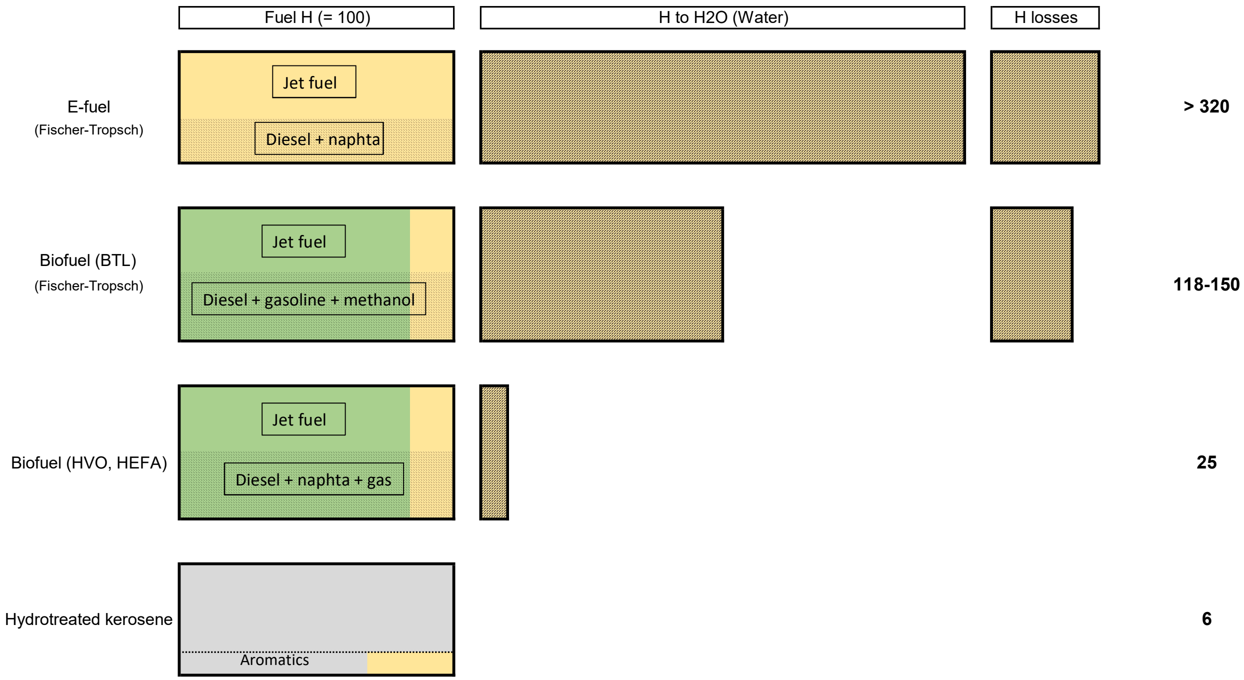
Hydrogen requirements for various aromatics free jet fuels

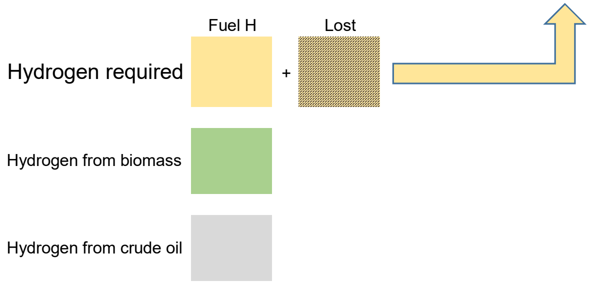


Sources:
E-fuel: G. Zang et al. (2022): The Modeling of the Synfuel Production Process: Process models of Fischer-Tropsch production with electricity and hydrogen provided by various scales of nuclear plants. https://www.osti.gov/biblio/1868524
The very high quantity of hydrogen required seems to be a minimum. Other sources quote a even higher quantity. The hydrogen lost to water is incompressible and inherent to the FT process in which hydogen is required to transform CO2 into CO and then CO into C.

Biofuel (Biomass to Liquid): S. Dossow et al. (2021): Improving carbon efficiency for an advanced Biomass-to-Liquid process using hydrogen and oxygen from electrolysis https://www.sciencedirect.com/science/article/abs/pii/S1364032121009424
0.19–0.24 t_{H2}/t_{fuel} or 118-150 $g_{H}/100\ g_{fuel\ H}$ (assuming 16% H in the fuel)

Biofuel (HVO, HEFA): F. Müller-Langer et al. (2019): PTG-HEFA Hybrid Refinery as Example of a SynBioPTx Concept—Results of a Feasibility Analysis https://www.mdpi.com/2076-3417/9/19/4047
With jatropha oil, the specific hydrogen consumption is about 35.7 kg per ton of feedstock, ie 17.8 kt. The total output (all products, not only jet fuel) is 428 kt, of which 70 kt is H (16% H). 17,8/70 = 25 %

Hydrotreated kerosene : Theoretical calculation for a jet fuel containing 17 % of aromatics



Notes:
1. Biofuel and e-fuel processes are not selective : other products than jet-fuel are produced. We consider here that these by-products have a market value that can include the cost of their share of hydrogen.
2. HEFA biofuel can be produced without external input of hydrogen, if part of the naphta and gas produced are used to make hydrogen by reforming, hence at the expense of the product yield.

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