An overview of the international SAF commercialization activities – a European perspective

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SAF demand: pre-covid estimate EU-28

- EU meta-study by PoliTO and JRC assessing ranges of possible volumes.
- Meta-analysis of 56 scenarios elaborated by various research groups and Institutions.
- Expected alternative fuel volumes at 2030: 1.0 - 3.4 MTOE, depending on incentivising/mandate regimes
  - Assumptions and methods in scenario-making not often transparent and clearly declared
- These volumes would cover 1.6-5.6% of the expected demand at 2030 (estimated at 60-65 Mt/y).
- This work to be updated after ReFuel EU Aviation/FitFor55 is finalised

ReFuel EU & MS initiatives

- All these initiatives are under revision as the ReFuel EU regulation is currently under discussion.

- Being part of the «Fit-for-55» package, the Refuel EU aims at stimulating the uptake of alternative fuels in EU aviation sector.

- In the first version, the “Central scenario”, targeted a minimum SAF share of 5% at 2030, with a specific sub-mandate for RFNBO/Synthetic Fuels (PtL) of 0.7%.

<table>
<thead>
<tr>
<th>Country</th>
<th>SAF mandate (%v/v)</th>
<th>Notes</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>30%</td>
<td>For all aviation fuel uplifted in the country.</td>
<td>2030</td>
</tr>
<tr>
<td>France</td>
<td>5%</td>
<td>Based on the “French roadmap for the deployment of sustainable aeronautical biofuels”</td>
<td>2030</td>
</tr>
<tr>
<td>Germany</td>
<td>200,000 t</td>
<td>Based on the “The PtL roadmap”. The annual 200,000 tonnes of SAF corresponds to a third of the current domestic flights fuel use.</td>
<td>2030</td>
</tr>
<tr>
<td>Netherlands</td>
<td>14%</td>
<td>This was established on the basis of a “Study on the potential effectiveness of a renewable energy obligation for aviation in the Netherlands”</td>
<td>2023</td>
</tr>
<tr>
<td>Norway</td>
<td>0.5% (30%)</td>
<td>The Norwegian government established a blending obligation for a 0.5% minimum content of advanced biofuel from January 2020. The goal is to reach 30% by 2030.</td>
<td>2020 (2030)</td>
</tr>
<tr>
<td>Sweden</td>
<td>1% (30%)</td>
<td>Obligation for jet fuel suppliers to promote the use of SAF from 2021. SAF blend ratios will be needed to meet the reduction obligation, increasing from 1% by volume in 2021 to 30% in 2030.</td>
<td>2021 (2030)</td>
</tr>
</tbody>
</table>

Table 3 – Central SAF ramp-up trajectory (volume based approach).
### EU-IT installed/announced capacity

<table>
<thead>
<tr>
<th>EU Memb.State</th>
<th>COMPANY</th>
<th>CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>ST1</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Preem</td>
<td>199</td>
</tr>
<tr>
<td>Finland</td>
<td>Neste</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>UPM</td>
<td>100</td>
</tr>
<tr>
<td>Norway</td>
<td>Norsk e-Fuel</td>
<td>8</td>
</tr>
<tr>
<td>Belgium</td>
<td>SkyNRG/LanzaTech</td>
<td>30</td>
</tr>
<tr>
<td>France</td>
<td>TOTAL</td>
<td>170</td>
</tr>
<tr>
<td>Spain</td>
<td>REPSOL</td>
<td>50</td>
</tr>
<tr>
<td>Netherlands</td>
<td>SkyNRG</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>UPM</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Neste</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td>Synkero</td>
<td>50</td>
</tr>
<tr>
<td>Italy</td>
<td>ENI</td>
<td>375</td>
</tr>
<tr>
<td><strong>Total (kt/y)</strong></td>
<td></td>
<td><strong>1772</strong></td>
</tr>
</tbody>
</table>

**EU**
- Potential jet fuel volumes of major Initiatives.

**Italy**
- ENI main actor, which converted Porto Marghera (Venice) and Gela (Sicily) to bio refining:
  - Cumulated feedstock capacity at 2020: approx 1 Mt/y.
  - Future plans: doubling installed capacity by 2024, 5 times by 2050
- Other major stakeholders preparing new initiatives on SAF
  *Maritime is next...*
Roadmaps needed

- Beyond setting targets, **roadmaps** to achieve these decarbonization goals are needed.

- These paths must be **industrially doable in the set timeframe**, as well as economically doable.

- As an example, NL proposed roadmap distinguishing Goals and Actions for the following terms:
  - **Track 1 - Short term (2021-2024)**
  - **Track 2 - Medium term (2024-2028)**

- Indeed, 2030 is the main focus, but also post 2030-35 to 2050 needs roadmap definition.
The EU TULIPS project

- **€25** million awarded by EC to the TULIPS consortium of **29 partners** (H2020).
  - This funding is part of the European Green Deal, to develop innovations that facilitate the transition to low-carbon mobility and enhance sustainability at airports.

- To realize these challenges in the hard to abate aviation sector, commitment from the entire chain is needed.
  - The collaboration of airports, airlines, knowledge institutes and industrial partners in this unique European consortium makes it possible to contribute significantly to sustainable aviation.
  - PoliTO supports the decarbonisation pathways of Torino Airports + Larnaka/Schipol

- In TULIPS, a very focused action target the possibility to set up an **EU Clearinghouse**. *This work is complementary to the action carried out by other stakeholders (e.g. EASA)*

- EU-CH will likely have similarities but also a different structure and organization than the US-CH
Biochar : Spain (BIO4A) & Italy/Larnaka (TULIPS) trials

→ Biochar as Offsetting for Aviation

**Biochar use in soils - The EU Soil Strategy for 2030** was published in 2021*. The following elements potentially relate to biochar production or use, although biochar is not explicitly mentioned.

The new EU **“fertilizers regulation”** covers fertilizing products and soil improvers. It **contains a provision to add biochar as soil improver** after a positive biochemical and health risks assessment.

* **Regulation EU 2019/1009** allows for several feedstocks, such as biochar, to be used as soil amendment.

Biochar use in agriculture: the **“organic production regulation”** + Implementing regulation**

→ Biochar can be considered as a mean to **stably Sequester&Use Carbon**. This possibility **fit under the term e_sca**, as per the REDII IA, just voted by MS

→ Biochar as PyCCS (or BioCCS/U): to be discussed in ICAO FTG

→ Innovation deal on Biochar in ETS: under preparation

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Conclusions

• It is a unique historical moment: both sides of the Atlantic are taking strong policy action on SAF

• We should consider strengthening the international dialogue (Europe/US, as well as Multi/Bilateral cooperation) to address common approaches, to deal with the implementation challenges we are identifying, such as
  ✓ Coexistence of Sustainability schemes and regulatory documentary requirements
  ✓ Claiming emissions under different regimes.
  ✓ Developing the EU Clearinghouse
  ✓ Developing the value chains

• This could also drive to bring common approaches to the global community at the 2023 ICAO Conference on SAF.

• It would be very interesting to organize a joint workshop to share ideas (as we have done with European stakeholders).
Thanks for your attention!

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