Large scale Bio-Electro-Jet fuel production integration at CHP-plant in Östersund, Sweden

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Agenda

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- Electro fuel production
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  - Expectations and opportunities

Aviation climate challenge

- Society needs renewable fuels to meet climate goals.
- Going electric everywhere is not the best answer.
- Limited supply of biomass for biofuels.
- Aviation will need access to energy-dense hydrocarbon fuels for the foreseeable future.
- And they need to be renewable to contribute to goals set by policy.
- Bio-electro Jet fuel is an attractive option.

Electro fuel production

- Large scale electro fuel production requires needs lots of electricity.
- Production close to feedstock.
- A local well-developed district heating system is beneficial.
- Drop-in fuels.
- Help to balance intermittent power generation.
- Marketable by-products.

Introduction

- This project is an in-depth feasibility study
- Bio-electro Jet fuel production facility (but the project does not include the construction of any facility)
- Promotes bio-based economy
  - re-utilization of carbon
  - production of a high-value product.
- The site at Jämtkraft
  - Renewable electricity
  - green carbon dioxide

Goals

The project will deliver results on:

The process:

1. **Best available technology** for sub-processes and unit operations.
2. **Integration design and total efficiency** of the process for both of the evaluated production paths (FT and AtJ).

The plant:

3. **Estimation of plant size, and the capital- and operational costs** for the new plant.
4. Identification of at least **three possible stakeholders** to operate the prospective company Fabriken AB at an organizational level.

The product:

5. Comparative **Life cycle assessment.**
6. Identification of at least **two sustainable business models.**

Communication-goals:

7. Presentation of results.

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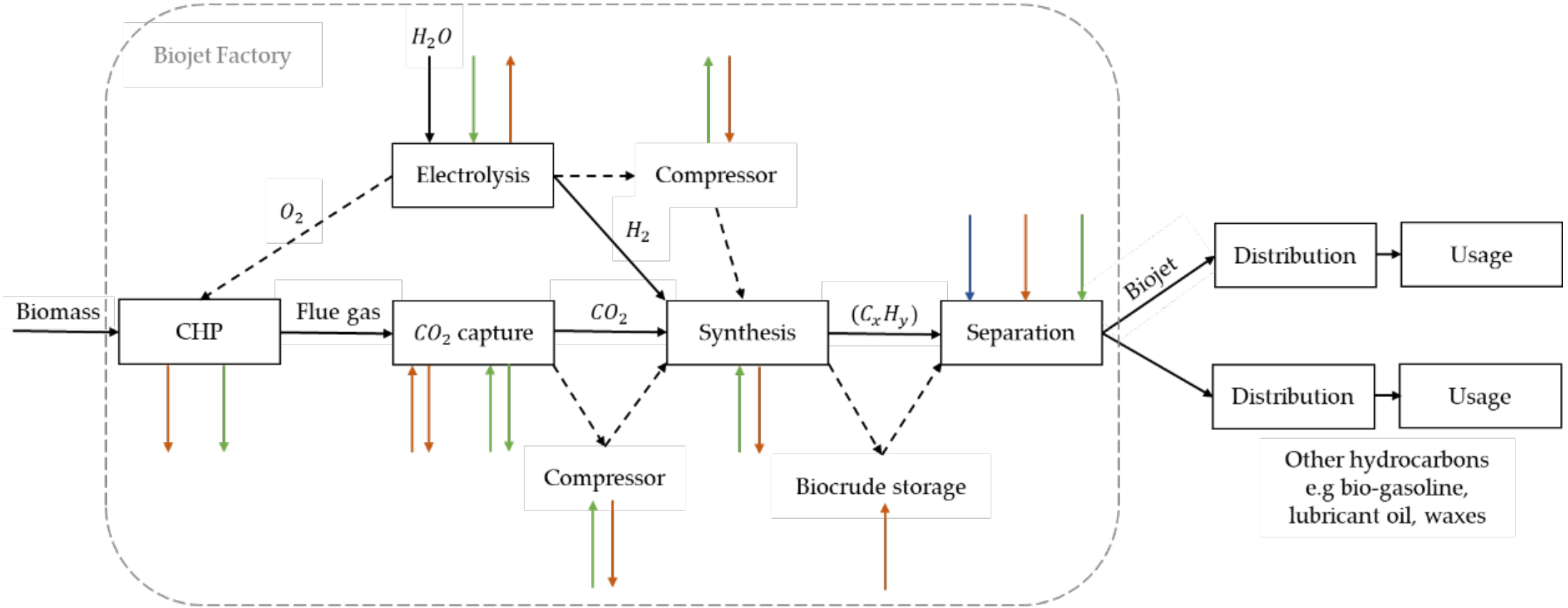
Process overview



Preliminary results

- Our bio-electro jet fuel show a significant reduction in environmental impact compared to fossil alternatives.
- Business model relates to:
  - The main product
  - By-products
  - Distribution pathways
  - Stakeholders
- Modified Alcohol to Jet reaction shows progress.
- The preliminary results for the mass balance with the current simulation input show the yields Bio-electro:
  - Jet fuel 1/3
  - Petrol 1/3
  - Diesel 1/10
- Corresponds to close to 30 000 tonnes of ready bio-electro jet fuel.
  - Total amount of products is around 80 000 tonnes annually.
  - Can be scaled up almost linearly.

Expectations and opportunities

- This project has a very strong potential to contribute to the development and increased use of biofuels for flights in Sweden.
- The cost and resource efficiency of the concept is high due to:
  - all raw-materials are already in place at the site,
  - good access to large amounts of renewable electricity,
  - there is a dedicated site,
  - economy of scale applies,
  - efficient process integration,
  - there is strong demand for the product,
  - efficient use of by-products,
  - CO_2 is captured and utilized in this process,
  - promotion of circular- and bio-based economy.

- The sustainability aspects of the project are high due to:
  - incoming streams are of completely renewable origin (electricity and CO_2),
  - the product will have a very high degree of renewability,
  - unnecessary transport of raw-materials is avoided,
  - unnecessary transmission of electricity is avoided, and transmission bandwidth is freed up for other purposes,
  - minimal additional investments in infrastructure are required.

Thank you!

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