



SkyFuelH2 – SAF production in Northern Sweden

Dr. Harald Hecking

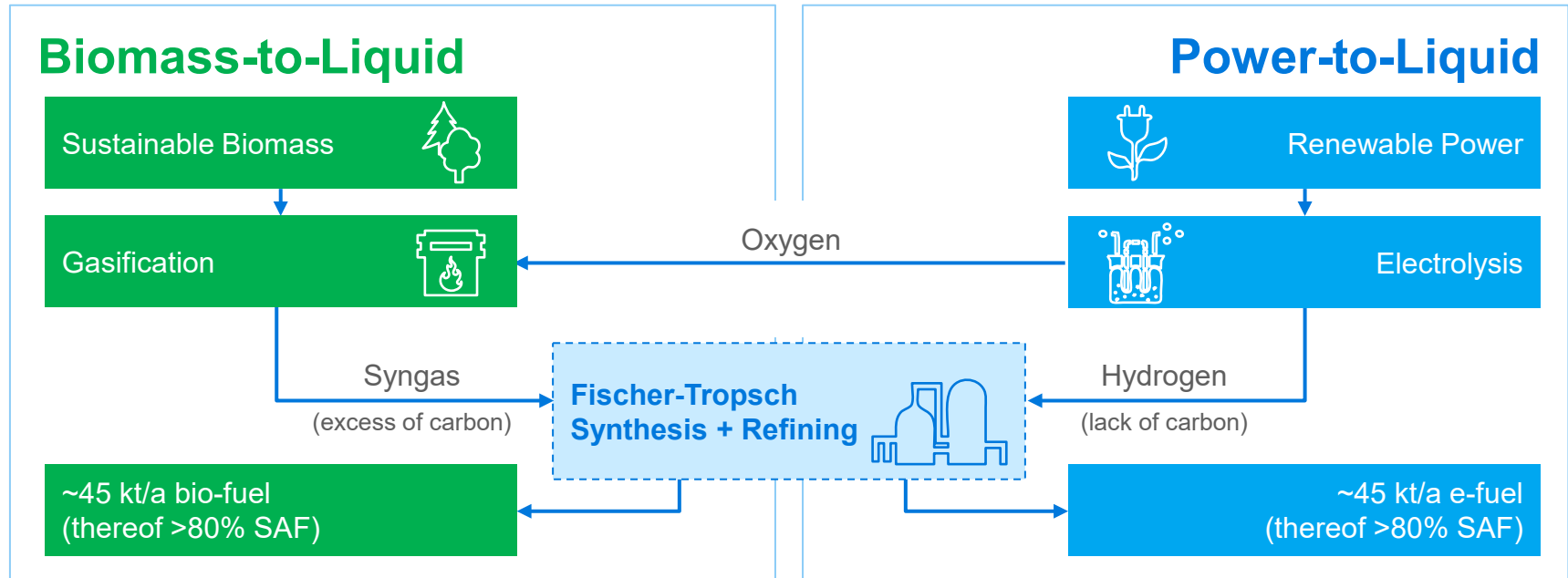
SkyfuelH₂

Uniper and Sasol ecoFT to develop, implement and operate a fully integrated facility for SAF production

- Start in H2 2028
- 75 kt/a SAF
- 15 kt/a Sustainable Naphtha
- 11 mEUR grant for FEED by Swedish Energy Agency



2 in 1: Combining strengths from BtL (rich in carbon) and PtL (rich in hydrogen and oxygen) to ensure highest efficiency



Success factors of SkyfuelH2: First-of-its kind, established technologies, cost efficiency, sustainability

First-of-its-kind industry scale production of SAF,

located in Northern Sweden based on green H₂ and biomass



Combining established technologies

to minimize technical risk and reducing time to market



Cost efficiency

through scaling, and a location beneficial regarding renewable electricity prices and availability as well as biomass availability



Sustainable product





Highest **carbon efficiency**, thus high degree of utilization of valuable and sustainable biomass, **>90% CO₂ reduction** vs. fossil kerosene, **100% RED2 compliant** renewable electricity and bio-feedstock (Annex IX a)



Uniper and Sasol jointly develop the project combining the experience of two industries. Strong support from Solleftea municipality.





Uniper



-  Project development
-  Power sourcing
-  Biomass sourcing
-  Site sourcing

Sasol

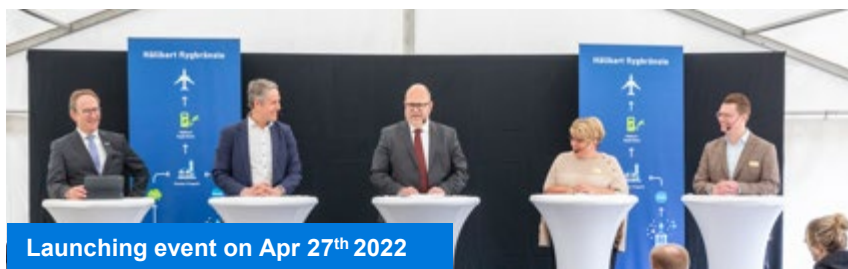


-  Project development
-  FT equipment
-  FT license/catalyst
-  SAF product quality

Supporters



Municipality of Solleftea (site)



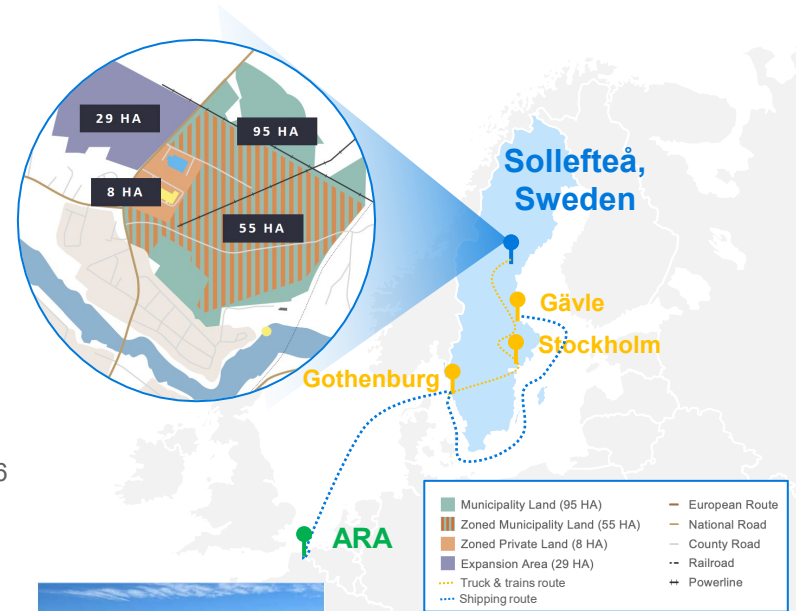
Sollefteå: One of the most competitive project sites in Europe, with respect to biomass feedstock, electricity access and logistics

Site characteristics

- Approx. 95 ha available, of which 55 ha already zoned (former industrial area)
- Power zone SE2
 - Sufficient grid availability (DSO: EON)
 - Share of renewable electricity >90%; relevant for RED II Delegated Act
- River very close to site, Uniper hydro plan “Hjälta” in direct vicinity
- Road connection directly to site, railway runs directly next to site

Logistics

- Intermediate on-site tank storage, then loaded into trains or trucks
- Quality and renewable certification in batch processes according to ASTM D7566
- Transport towards the Baltic port or North Sea port
- Entry into the European market for fuel products is ARA (Amsterdam, Rotterdam and Antwerp). Alternative option Hamburg or other international ports
- Delivery of “neat” (raw) SAF

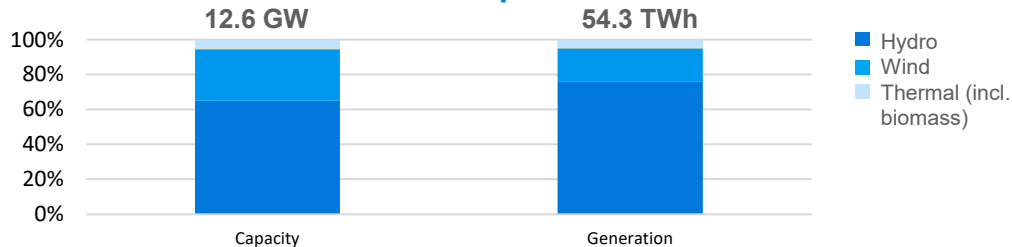


Land option agreement
signed in Oct 2023

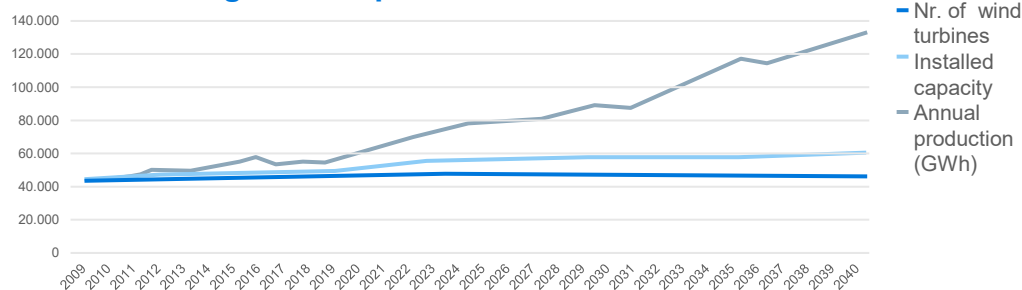


Securing renewable power: Northern Sweden is ideal for PBtL, combining hydro power and wind onshore

SE2 has a almost 100% renewable power mix¹



Wind: Further growth expected till 2040²



● Uniper hydro power assets

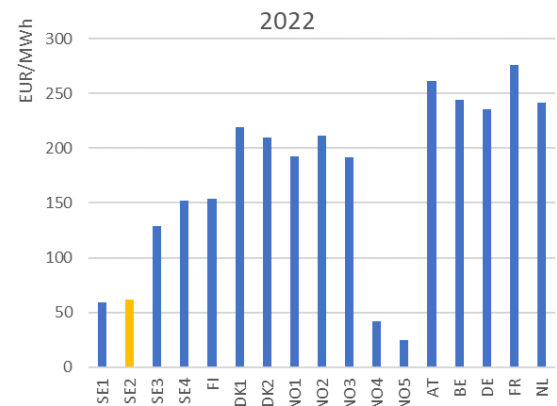
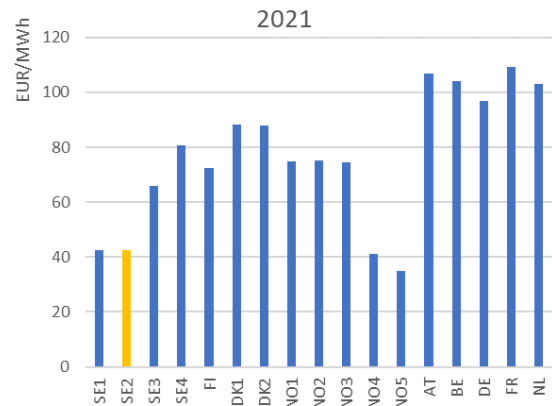
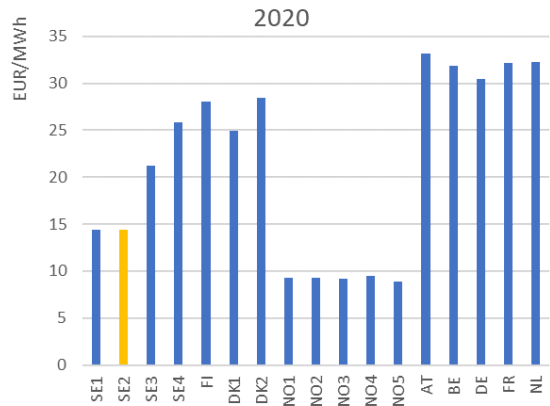
Uniper has a relevant portfolio of own assets and PPA.

The combination of assets enables a steady state operation at full capacity.

The power use chosen cannibalizes to a lesser extent other power applications, as it is trapped in Northern Sweden



SE2 is among the cheapest power price zones in the EU



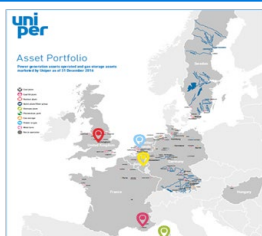
Source: Nordpool (2023)

Uniper has long-year experience in sourcing, trading, portfolio optimization, logistics and operations of various biomass types

Overview of Biomass Activities

- **Source** and **trade** biomass as well as to appropriately manage the **portfolios** through the buying and selling of biomass resources and through the optimization of the value chain.
- Team is executing a mix of commercial activities, onsite **operations** as well as strategic business development activities, in addition position management and optimization, Regulatory Affairs (RA) activities and penalty and claim optimization and management
- Fuel **supply** for various projects: e.g. industry heat, biochemistry, alternative liquid fuel production

Current Asset Supply Areas



Since	2018
Station	MPPS (NL)
Capacity	1100 MW
Technique	Co-Firing
Fuels	Wood Pellets
Indicative volume	600 kt/a



Historical asset supply area's
-2019, 3.5 mton/annum
pellets/chips/misc. biomass

Uniper's Biomass Capabilities

Commercial

- Contract management
- Sourcing, security of supply and trading
- Freight strategy development

Operations & logistics

- Day-to-day position management
- Management of operational interfaces
- Deal execution

Business Development

- Development of new fuel concepts
- Operational optimisation and cost reduction activities
- Complex contractual arrangements

Regulatory Affairs

- All regulatory matters and external stakeholder engagement, audit execution
- Managing global sustainability & subsidies
- Sustainability management and interfaces with HSSE

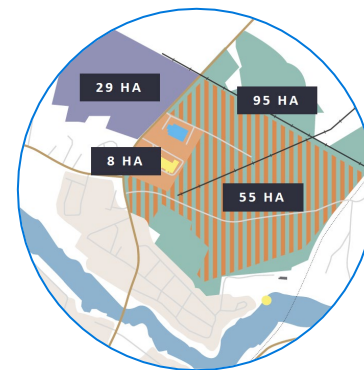
Certification



Securing biomass supply for SkyfuelH2

Key challenges and strategies

- Sourcing and hedging strategy (e.g. biomass types)
- Long-term vs. short term supply
- Biomass logistics
- Biomass seasonality (intermediate storage)
- Matching feedstock spectrum and pre-treatment/gasification process
- Certification, sustainability criteria (e.g. RED2 Annex IXa), GHG footprint
- Matching timelines of project development and biomass sourcing
- Creating bankability (feedstock security, counterparty risk)





Thank you!

Contact

Dr. Harald Hecking

Head of Innovation

Tel +49 151 50 63 98 33

E-Mail harald.hecking@uniper.energy