

OMV Refining& Petrochemicals

Innovation Portfolio

Vienna, September 2019

OMV Downstream

Agenda

1

► Co-Processing

2

► UpHy

3

► CCU – Green Methanol

4

► ReOil

Co-Processing

Project description, status and CO₂ reduction potential

- ▶ Modification of existing refinery hydrotreating unit for continuous, full-year introduction of renewable feedstock as co-feed enabling production of premium quality diesel fuel with renewable share and reduced greenhouse gas footprint
- ▶ Since 2016 temporary field test with >5000 tons renewable feedstock co-processed have been successfully completed. Biofuel produced received certification according to RedCert. Currently know-how derived from field tests is transferred to co-processing revamp project, enabling full-year application of co-processing in modified hydrotreater unit.
- ▶ Feedstock: Variety of oily biomass such as low ILUC vegetable oil, used cooking oil, free fatty acids, animal fats. In future algae oil or other non-food competing oil plants will be potential feedstock.
- ▶ CO₂ reduction potential > 65% in accordance with RED2



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UpHy

Upscaling of green hydrogen for mobility and industry

Target

- ▶ Upscaling of green H₂ for mobility and industry by investment in green H₂ value chain from production in electrolysis, trailer loading and FCV- refueling station (Phase 1: 15 busses + 25 taxis)
- ▶ Development of novel measurement techniques for gas quality and mass to fulfil legal requirements and to enable official operation of H₂ refueling stations

Key Figures

Indicative capacities: up to 10 MW electrolysis

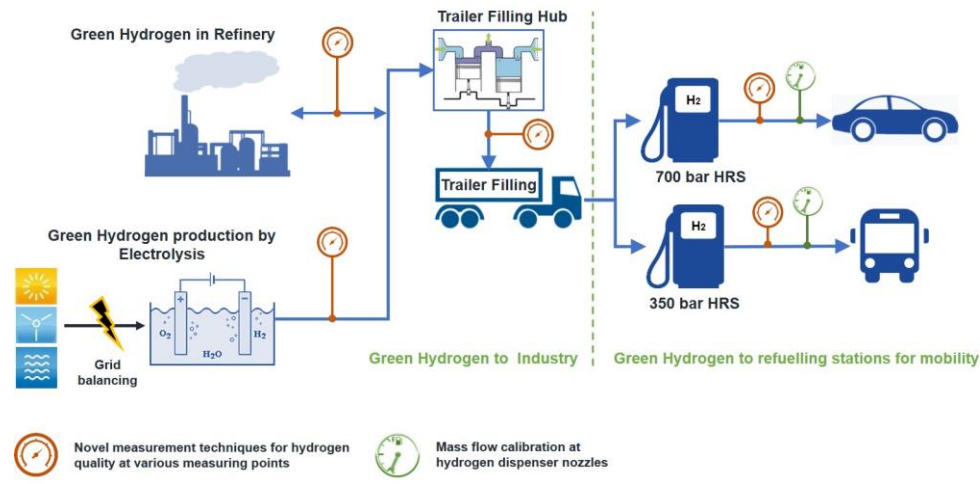
Participation of Verbund on electrolysis investment, size of electrolysis not finally defined

Indicative CO₂-reduction potential: 4600 t /a (Phase 1 from 2022 onwards)

Scope /Duration of research project

UpHy I – development of investments and novel metering technics Q3/2018 – Q2/2022

UpHy II – Investment in value chain and test of metering technics Q2/2020–Q1/2024



Konsortium Partners UpHy I

OMV R&M (Lead), Verbund, HyCentA, EI JKU, VF Services GmbH, WIVA P&G

Achievements

- ▶ OMV became member of WIVA P&G Energy Model Region
- ▶ Concept study HyCentA (electrolysis & trailer loading) concluded
- ▶ FFG funding granted for UpHy I
- ▶ Basic engineering: trailer loading concluded , Electrolysis ongoing
- ▶ Bus fleet concept for green/grey H₂ in development
- ▶ Outsourcing concept for H₂ purifier & trailer loading developed
- ▶ Site selection of electrolysis in refinery Schwechat concluded

Next steps

- ▶ Award SELECT Study for electrolysis
- ▶ Evaluate electrolysis JV with VERBUND
- ▶ Application for FFG/KPC funding

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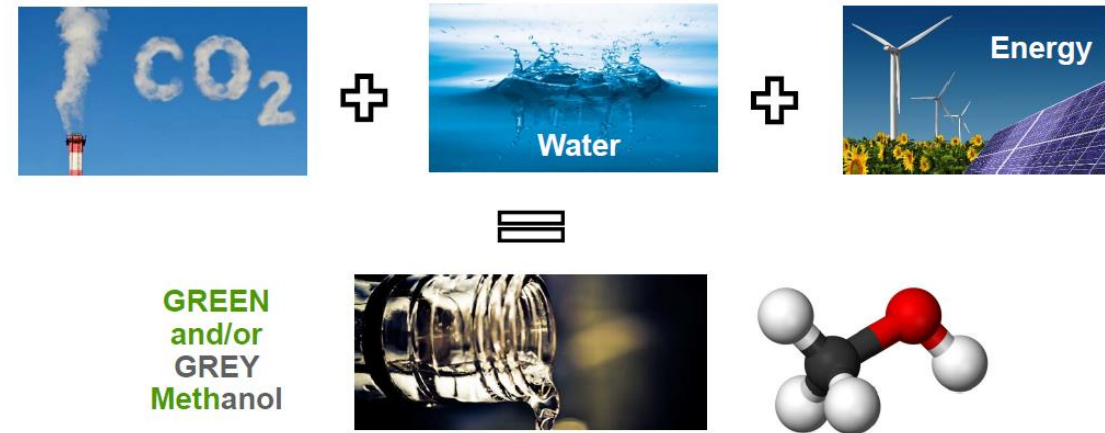
Green methanol

Project description, status and CO₂ reduction potential

- ▶ OMV pursues the idea to convert a stream of CO₂ from its operations in Austria into green Methanol via hydrogenation with green hydrogen from an electrolysis powered with green power
- ▶ Green methanol is a valuable blend stock for OMV's fuel production in Schwechat
- ▶ The production 1 t of green methanol absorbs about 1.4 t of CO₂
- ▶ The project is in idea phase. Economics, optimal location, capital requirements, adequacy of CO₂ gas streams and other parameters are currently in investigation

Next steps

- ▶ Analysis of CO₂ stream, lab testing, concept engineering



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ReOil

Project description, status and CO₂ reduction potential

- ▶ The ReOil development targets a chemical recycling by the conversion of post consumer plastic PCP (“plastic waste”) into usable secondary raw materials through thermal depolymerisation. Thereby, the polyolefin fraction of the plastic waste is cracked at higher temperatures into a syncrude which is further processed in existing refining assets into fuels and petrochemical intermediate products (liquids and gases).
- ▶ A pilot plant with a feedstock capacity of 100 kg/h (“ReOil100”) is in operation since Jan. 2018. Test series with different feedstock qualities and plant optimizations are running aiming for maximum process stability and run length with optimized product yield and minimum energy input.
- ▶ CO₂ reduction potential shall be trimmed to the half of normal virgin crude processing in a refinery

Next steps

- ▶ Design, Engineering and Erection of a Demonstration Plant with a capacity of 15 to 40 kt/a **tbd**

