

UpHy

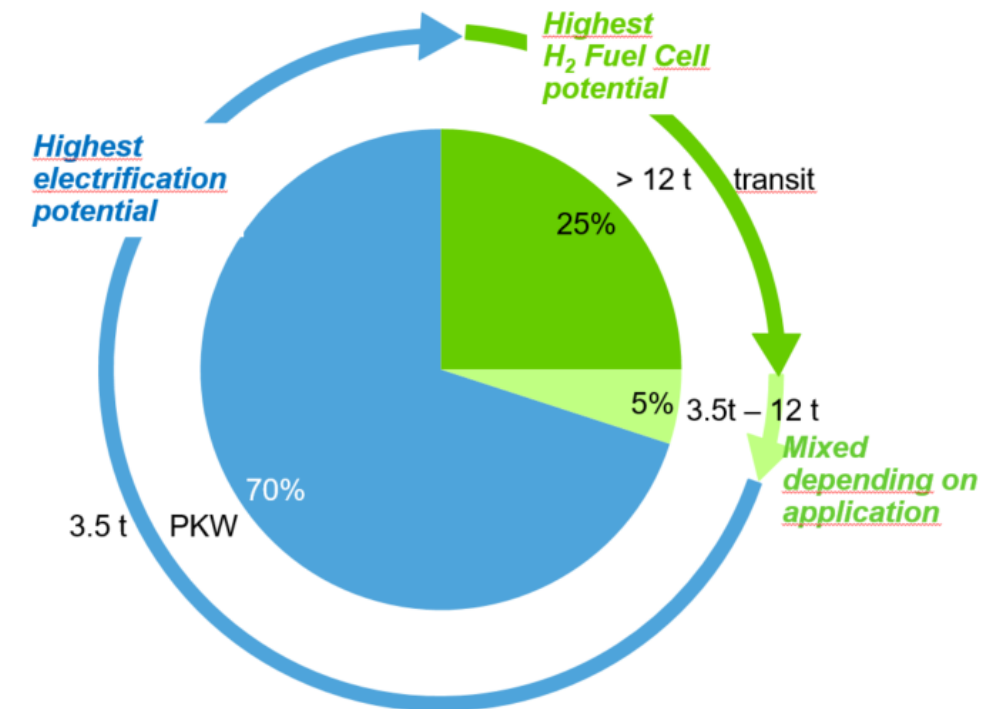
„Upscaling of green hydrogen for mobility industry“



OMV Aktiengesellschaft

Motivation for UpHy

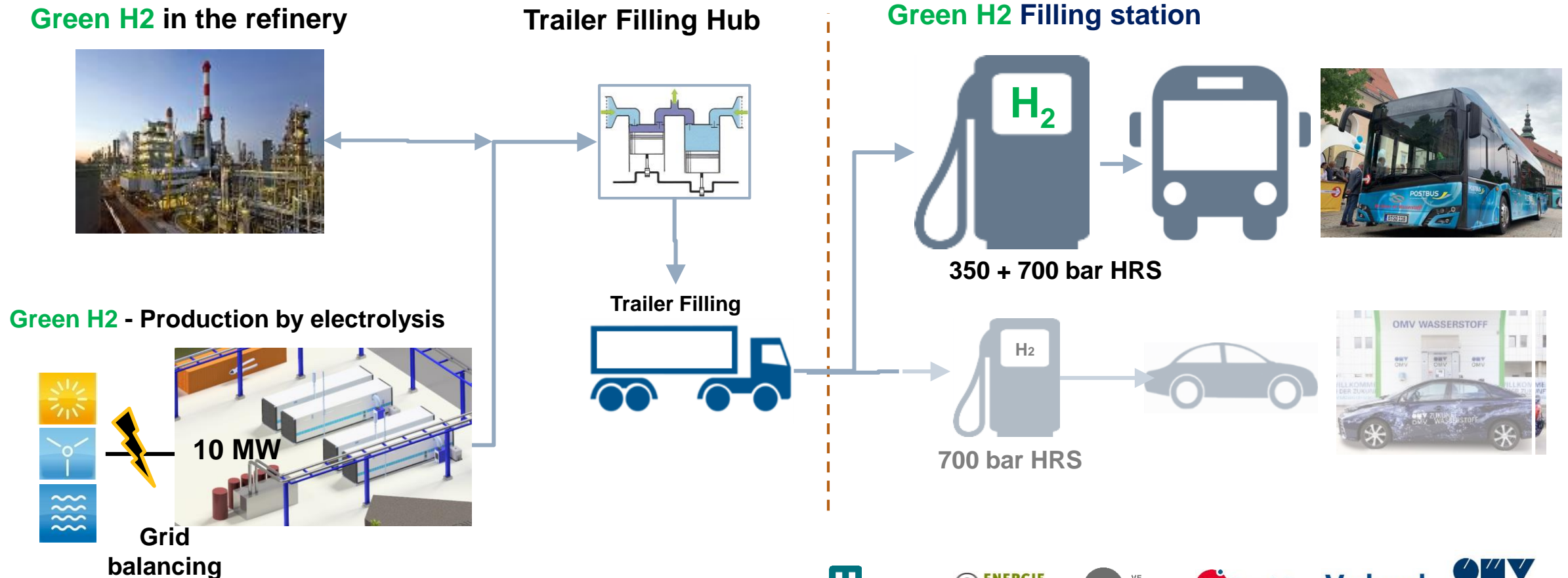
- ▶ Demonstration of “**Zero emission**” mobility in “**hard to electrify**” **Mobility-Segment** (Bus, HDV, MDV) (25% to 30% share of mobility in AT)
- ▶ **Reduction of up to 20.000 t/a CO2-Emissions** during hydration of fuels
- ▶ Utilization of H₂-Hub at the refinery for **economy of scales production of green H₂**
- ▶ **Position green H2 as ecological & commercial attractive**
- ▶ Development of calibrated **mass- and quality metering** as basis for the roll-out of the H2 filling station infrastructure



Austria, 2019, %

UpHy - green H₂ production for refinery & mobility

“*First-of-its-kind*” green H₂ project in refinery with infrastructure to supply “*Hard-to-electrify*” segment



Finally the customer has to decide, which technology fits to his needs

Criteria for commercial mobility application
(typical decisive factors)



▶ Energy efficiency	▶ High	▶ medium
▶ Range	▶ ~150 km	▶ ~450 km
▶ Charging-/Filling time / waiting time	▶ hours, o.k. if daily utilization allow longer waiting times	▶ Minutes, important for short waiting times
▶ CO₂ savings vs. Diesel (Life cycle analysis)	▶ High	▶ Very high
▶ Available loading space / payload	▶ Up to 3.5 t o.k.	▶ Beneficial > 7.5 t
▶ Availability of required Infrastructure	▶ Network expansion dependent	▶ Filling station network dependent
▶ Operation mode	▶ Inner-city Stop&Go beneficial (e.g. postal delivery)	▶ Long distance traffic/ log haul beneficial

Efficient logistic chain and distribution is key for H₂-mobility

Key aspects considered in UpHy

- ▶ First industrial scale green H₂ 350 bar trailer loading station in Austria
- ▶ 300 bar energy optimized trailer logistics concept (first time in Austria!)
- ▶ Highly reliable and fully automated industrial scale refuelling station for H₂ busses & trucks
 - ▶ 350 & 700 bar HRS for broad application
 - ▶ Trailer as buffer tank to save OPEX & CAPEX



Tube trailer

200 bar
360 kg



Container trailer

300 bar
750 kg



Sustainable opportunity for OMV to take final investment decision in Q1 2021

Unique Project in EU

- ▶ **10 MW-Electrolysis** → Largest electrolysis in Austria, among the largest in Europe
- ▶ Up to **35 mn EUR** investment including long term commitment in logistic contracts
- ▶ **Integrated logistic chain** (Tie-in, compression, trailer loading & transport, buffer tank)
- ▶ **OMV-filling station** and supply of **first H₂ powered heavy duty fleet in Austria planned**
- ▶ **Strong partnerships** from industry and Research & Development:
Verbund (green Power), **Air Liquide** (Logistic) and **ÖBB-Postbus** (bus fleet operator),
R&D-Partners: **HyCentA & V&F** (metering technology), **EI-JKU-Linz**, **EVT-Leoben**
- ▶ **Nucleus for roll-out of Austrian H₂-mobility:**
Sufficient green hydrogen for **10 additional H₂-Filling stations**
up to 150 buses in Austria or 17 mn km without emissions
Several further heavy duty operators are in discussion

Thank you for your attention

DI Dr. Michael-Dieter Ulbrich, OMV R-T Business Transformation

Vienna, 19. November 2020



H₂
Hydrogen
OMV.com

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