

# Case study and application of P2X and H2 technology

Copenhagen, June 15<sup>th</sup>, 2023





# Three business segments cover the hydrocarbon value chain

## Energy



- **486<sup>1</sup> kboe/d oil and gas production**
  - Thereof 60% natural gas
- **4 core production regions**
  - Central & Eastern Europe
  - Middle East & Africa
  - North Sea
  - Asia Pacific

## Fuels & Feedstocks



- **~500 kbb/d refining capacity**
  - Thereof 369 kbb/d in Austria, Germany and Romania
  - Thereof 138 kbb/d (net to OMV) in UAE
- **~2,100 fuel retail outlets**
  - In 10 central European countries
  - 6.4 mn t retail fuel sales volume

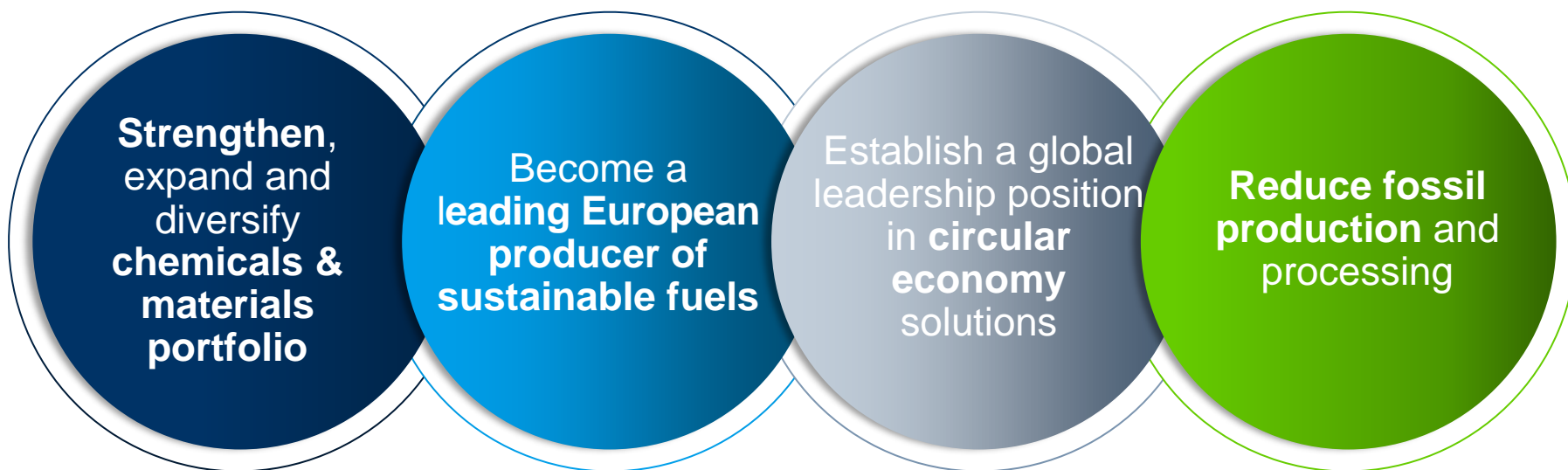
## Chemicals & Materials



- **7.0 mn t base chemicals capacity**
  - Top European producer
- **5.8 mn t polyolefins capacity**
  - Among top 10 producers globally
- **Joint Ventures in UAE and US**
- European market leader in fertilizer and plastic recycling

## Become a leading sustainable fuels, chemicals and materials company – with a strong focus on shareholder value

Net zero by 2050 in Scope 1, 2 and 3



High cash flow generation | Clear investment criteria | Progressive dividend policy

# All business segments will contribute to the transformation

## Business segments



- Become a **global leader in specialty polyolefin** solutions, with a significantly strengthened position in Asia and North America
- **Scale up the circular business** and diversify into **new high-value chemicals and materials** for long-life applications



- Reconfigure refining in the direction of **renewable fuels and chemical feedstock** production with deeper chemicals integration
- Provide **mobility solutions** by building a sustainable fuels business and **growing Retail** through non-fuel business and e-mobility



- Leverage existing capabilities to **provide sustainable energy solutions** (geothermal, CCS)
- **Reduce fossil production** gradually and shift to natural gas, as an energy transition fuel until 2030

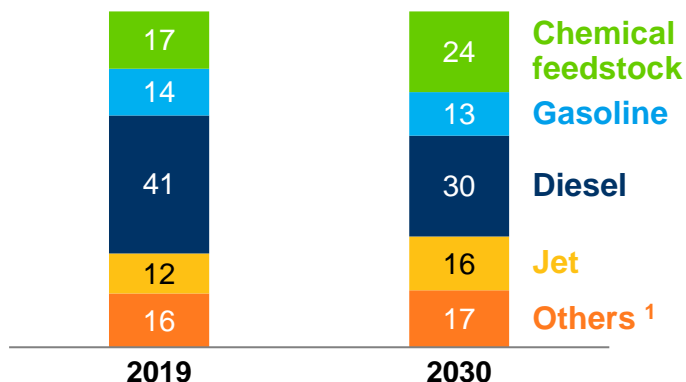


Build a **sustainable growth business model**, with focus on increasing returns for shareholders

## Refining 2030

# Increase sustainable fuels and reduce fossil throughput

Refining yield Schwechat and Burghausen  
%



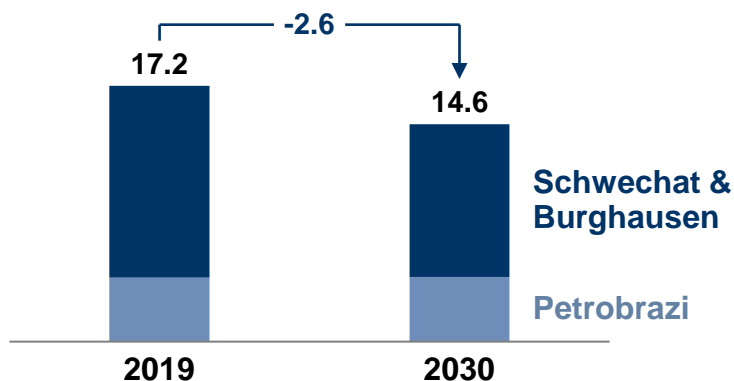
Increase **production of sustainable fuels and chemical feedstock** to

 **~1.5**  
mn t p.a.

Maximize **oil-to-chemicals integration** in Western refineries

 **24%**

Refining CDU throughput Europe  
mn t



Decrease **fossil throughput** by

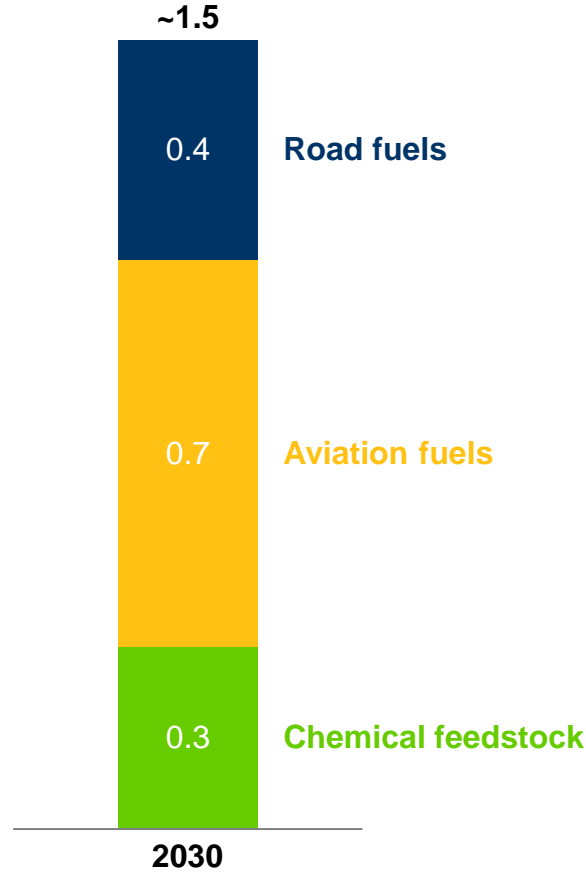
 **~2.6**  
mn t p.a.

Decrease **fossil road fuels production** by around

 **30%**  
vs. 2019

# Clear investment plan to deliver sustainable fuels

Sustainable fuels and feedstock  
mn t



**Road biofuels**

- Co-processing of first generation (e.g., vegetable oil) and advanced biofuels (e.g., waste, waste fat)
- Biogasoline (ethanol)
- Synthetic fuels from CO<sub>2</sub> (e-fuels)



**Aviation fuels (SAF) leader in the region**

- Investments in new units and unit revamps in Romania, Austria and Germany
- Investment in new assets beyond current refineries



**Chemical feedstock**

- High flexibility in blending HVO for SAF or chemical feedstocks
- Invest in a bio hydrocracker
- Synthetic feedstock from CO<sub>2</sub>

**~80% of 2030 feedstock requirements already has a clear sourcing plan**



# The role of Hydrogen

## Developing innovative e-feedstocks as well as e-fuels solutions



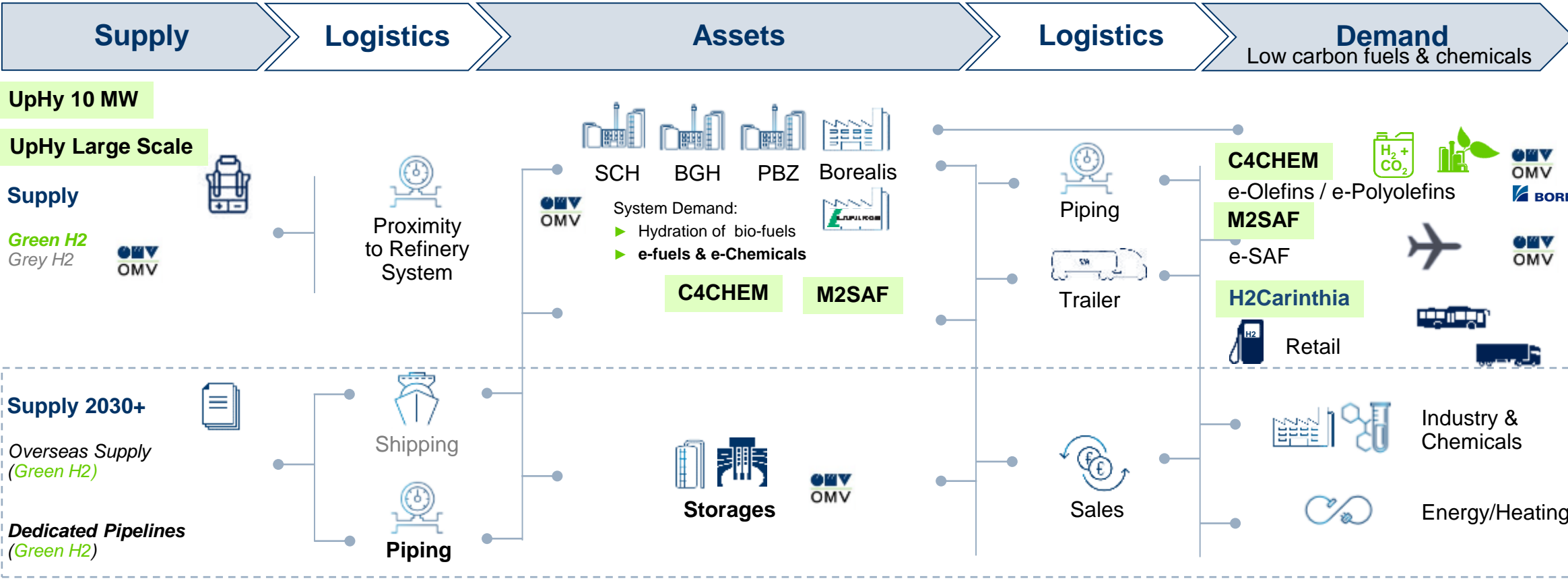
Becoming a leader in  
synthetic feedstocks  
and sustainable  
mobility fuels in  
Europe

Focusing on new  
technologies & reliable  
feedstock accessibility,  
as well as Hydrogen  
sourcing options

Demand for  
sustainable feedstocks  
and mobility solutions,  
e.g. e-SAF

Sustainable feedstocks  
and products

# Hydrogen is a key strategic lever to lower own asset footprint and a key enabler for sustainable feedstocks and fuels



Regulation in Europe & International

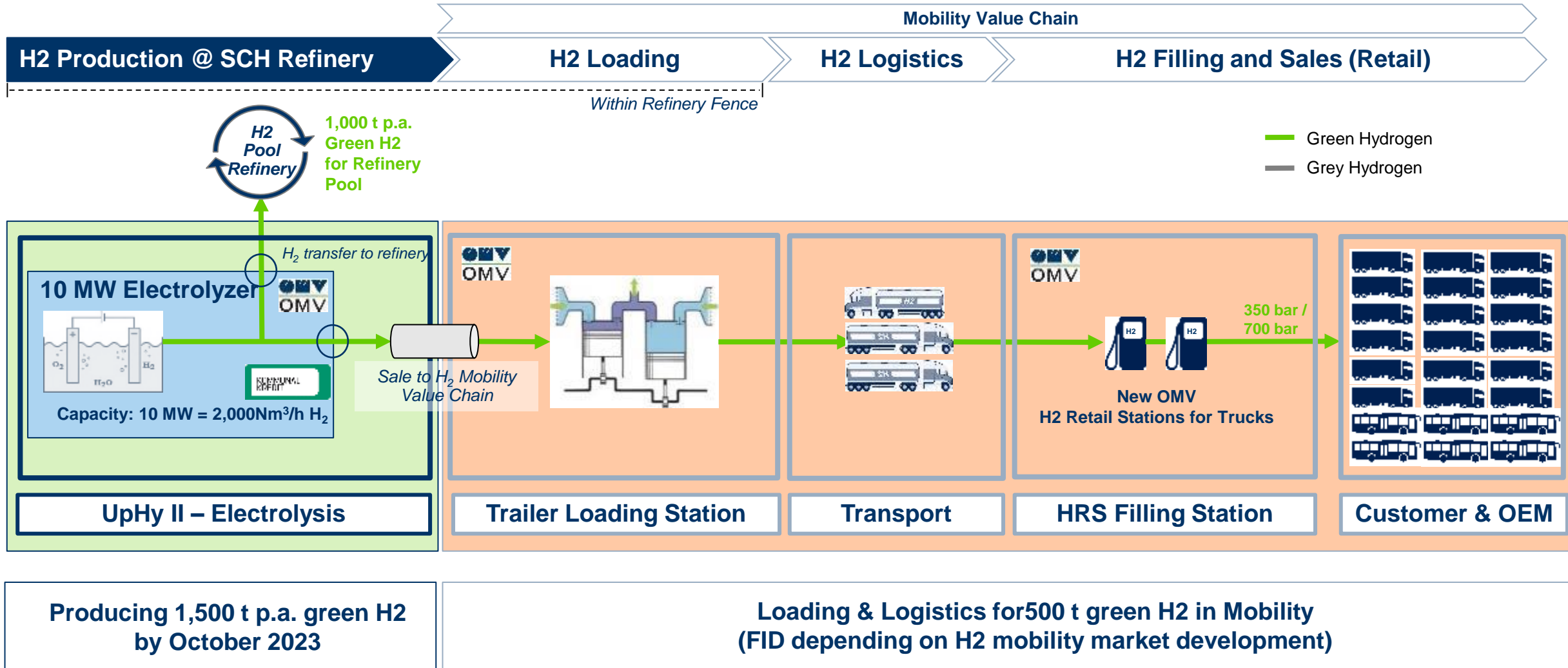
Technology Industry Scale-up



# Synthetic chemical feedstocks based on CO<sub>2</sub> & Green H<sub>2</sub>



# Green H2 for Refinery & Mobility





# 10 MW PEM Electrolysis within refinery Schwechat



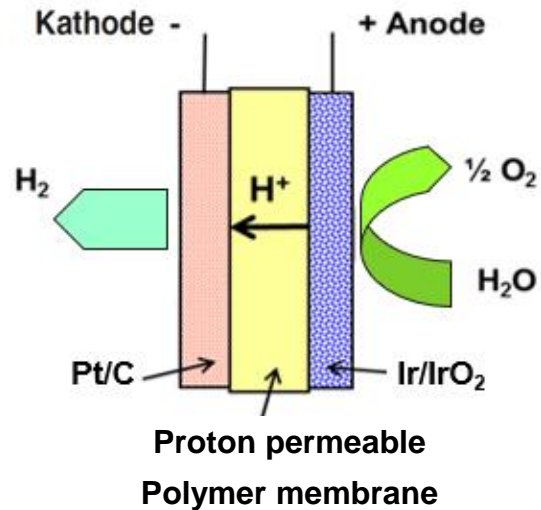
Refinery Schwechat

Richtung Flughafen



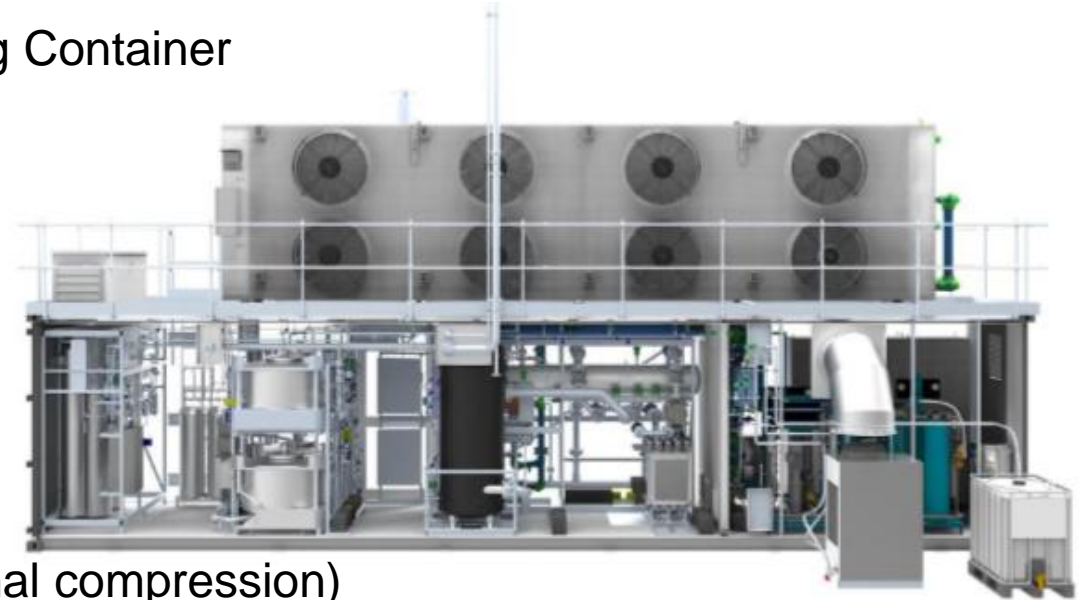


## Technical data of the PEM-Electrolyzer



### Key data

- ▶ ~ 4,5 kWh electricity split demineralized water into 1 Nm<sup>3</sup> H<sub>2</sub> and 0,5 Nm<sup>3</sup> O<sub>2</sub>
- ▶ Operating temperature: 50 - 80°C
- ▶ Demineralized water – Processing Container



### Technical realization of the 10 MW-Electrolyzer

- ▶ 4 x 2,5 MW PEM Electrolyzer Container, each 500 Nm<sup>3</sup> H<sub>2</sub>/h
- ▶ High quality H<sub>2</sub> (5.0, 99,999%, < 1 ppm O<sub>2</sub>, < 5 ppm H<sub>2</sub>O)
- ▶ 30 barg H<sub>2</sub> outlet pressure from electrolyzer (without additional compression)
- ▶ Durable membrane with a life-time of 10 years
- ▶ High system efficiency from 75% (SOR) to 68% (EOR) at full load
- ▶ Fully automatic operation with remote monitoring and maintenance by Cummins (Hydrogenics)

# 10 MW PEM Electrolysis: Status February 2023





# First Power Purchase Agreement (PPA) signed with W.E.B for a 5,6 MW windmill

OMV und W.E.B unterzeichnen  
den ersten Wind-  
Stromabnahmevertrag

04.2022 - [Zurück zur Übersicht](#)



LANGFRISTIGE KOOPERATION / FERTIGSTELLUNG IM NÄCHSTEN JAHR GEPLANT

OMV wird Windstrom nutzen, um grünen  
Wasserstoff herzustellen

Der erste Wind-Stromabnahmevertrag (PPA - Power Purchase Agreement) zwischen der OMV und dem Erneuerbare-Energie-Unternehmen W.E.B bedeutet konkret: Die WEB Windenergie AG wird auf Basis eines langfristigen Liefervertrages eine Windkraftanlage im Weinviertel errichten und betreiben; diesen Strom wird die OMV nutzen, um damit mittels eines Elektrolyseurs grünen Wasserstoff zu erzeugen. Was hier auf den ersten Blick wie eine simple Kooperation zweier Unternehmen erscheint, ist doch in vieler Hinsicht neu.

[OMV und W.E.B unterzeichnen den ersten Wind-Stromabnahmevertrag - W.E.B. Windenergie \(web.energy\)](#)

## Cornerstones

- ▶ 5,6 MW installed capacity
- ▶ Location: Velm-Götzendorf in Lower Austria
- ▶ State-of-the-art plant technology
- ▶ Expected electricity production per year 13,7 GWh (corresponds to the electricity demand of almost 4000 households)





# IATA Energy & New Fuels Infrastructure Roadmap



Source: IATA 2023

- Renewable energy plays a vital role
- Necessary infrastructure developments
  - Hydrogen
  - Electric

M2SAF



Gefördert durch:



Koordiniert durch:



Projekträger:



aufgrund eines Beschlusses des Deutschen Bundestages

# Development of a SAF process based on MeOH

## CO<sub>2</sub> Emissions of the Aviation Industry

- ▶ Emissions from aviation have become a focus of increasing **scientific interest** in recent years
- ▶ Globally civil aviation is **growing faster** than nearly all other economic sectors, with the notable exception of information technology
- ▶ Despite substantial progress in aircraft **fuel efficiency**, increased demand has led to a much **higher growth rate in fossil fuel use** by the aviation sector when compared to other transportation sectors or to world energy use overall.
- ▶ **Direct emissions** from aviation account for **about 3% of the EU's total greenhouse gas emissions** and more than 2% of global emissions.
- ▶ If **global aviation was a country**, it would **rank in the top 10 emitters**.
- ▶ Someone **flying from London to New York** and back generates roughly the same level of emissions as the average person in the EU does by **heating their home for a whole year**.
- ▶ By **2020**, global international aviation emissions are projected to be around **70% higher than in 2005** and the International Civil Aviation Organization (ICAO) forecasts that by **2050** they could grow by a further **300-700%**.
- ▶ In Europe, the average airline fuel **consumption per passenger in 2017 was 3.4 L/100 km, 24% less** than in 2005, but as the **traffic grew by 60%** to 1,643 billion passenger km, CO<sub>2</sub> emissions were up by 16% to 163 million tons for 99.8 g/km CO<sub>2</sub> per passenger



M2SAF



Gefördert durch:



Bundesministerium  
für Digitales  
und Verkehr

aufgrund eines Beschlusses  
des Deutschen Bundestages

Koordiniert durch:



Projektträger:



## Strategic context

- Net-zero emissions needed by 2050 at the latest to limit global warming to 1.5 degrees Celsius
- Demand for oil and gas will fall over the next three decades, with a reduction in oil demand beginning earlier and declining faster
- Natural gas will act as transition fuel
- Rising demand for sustainable feedstocks and fuels
- Demand for chemicals and materials will continue to grow, playing a significant role in a more sustainable future
- Circular economy will be a key driver to reduce waste and regenerate resources.





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