

German Mechanical Engineering and Hydrogen

Webinar, 17 November 2021

The VDMA in a nutshell



- **125 years of experience – founded in 1892**
- **36 sector associations – from agricultural to woodworking machinery**
- **Foreign and domestic subsidiaries, working groups, forums, competence centers, research associations, serve companies.**

With more than 3,400 members, the Mechanical Engineering Industry Association is the largest network organization and important voice for mechanical engineering in Germany and Europe. The association represents the common economic, technical and scientific interests of this unique and diverse industry. More than 500 VDMA employees worldwide support you with practical services to make the right decisions in your company - along the entire value chain.

Mechanical engineering industry in Germany: Facts & Figures

Employees:

1,032 Mio. (2020)

- » Engineers: 199.800 (2019)
- » Engineer quota: 17,1 % (2019)
- » Training ratio: 6,0 % (2020)

Companies:

ca. 6.647 (2019)

- » Ø number of employees: 184 (2019)
- » companies <250 staff: 86 % (2019)

Members:

> 3.400

- » Represented turnover: ca. 90% of German mechanical engineering turnover

Turnover:

203,5 bn € (2020)

Ø Revenues per employee:

ca. 197 Tsd. € (2020)

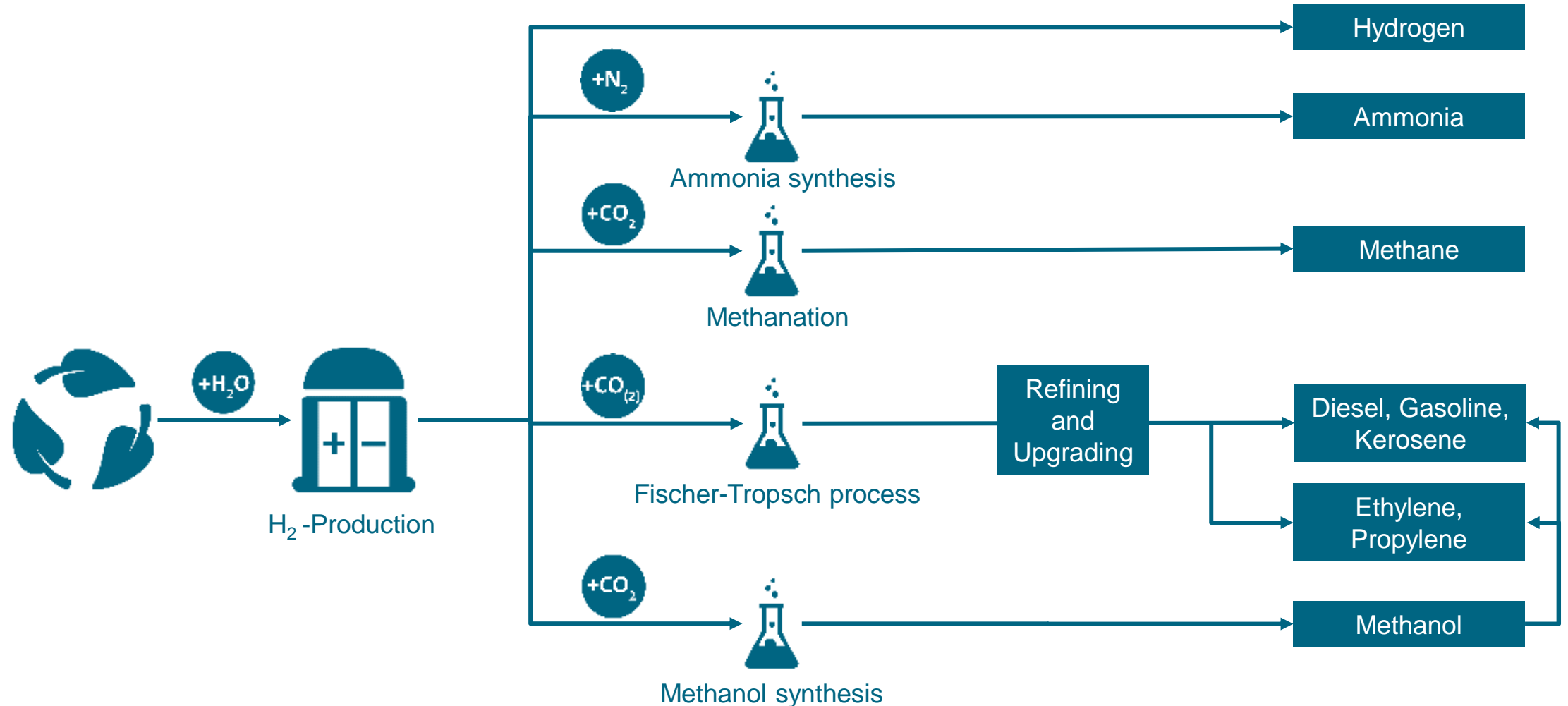
Export quota:

ca. 81% (2020)



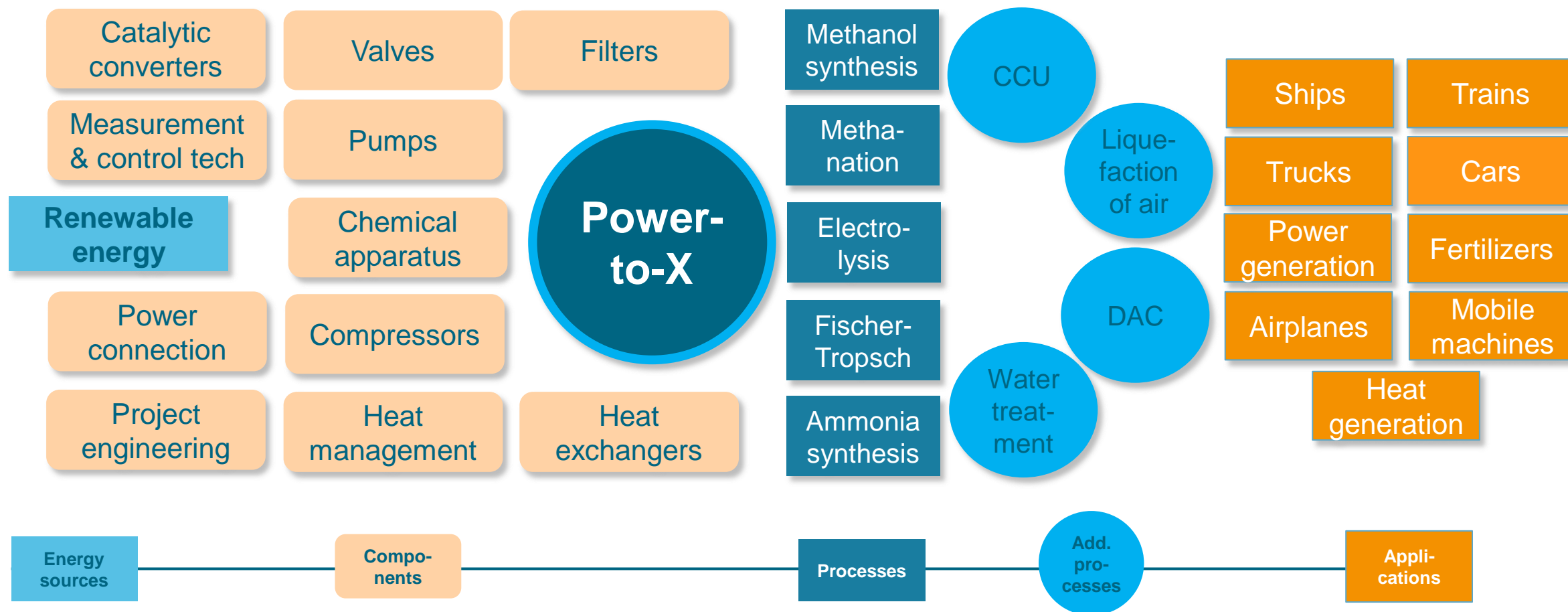
Power-to-X for Applications

Production and products

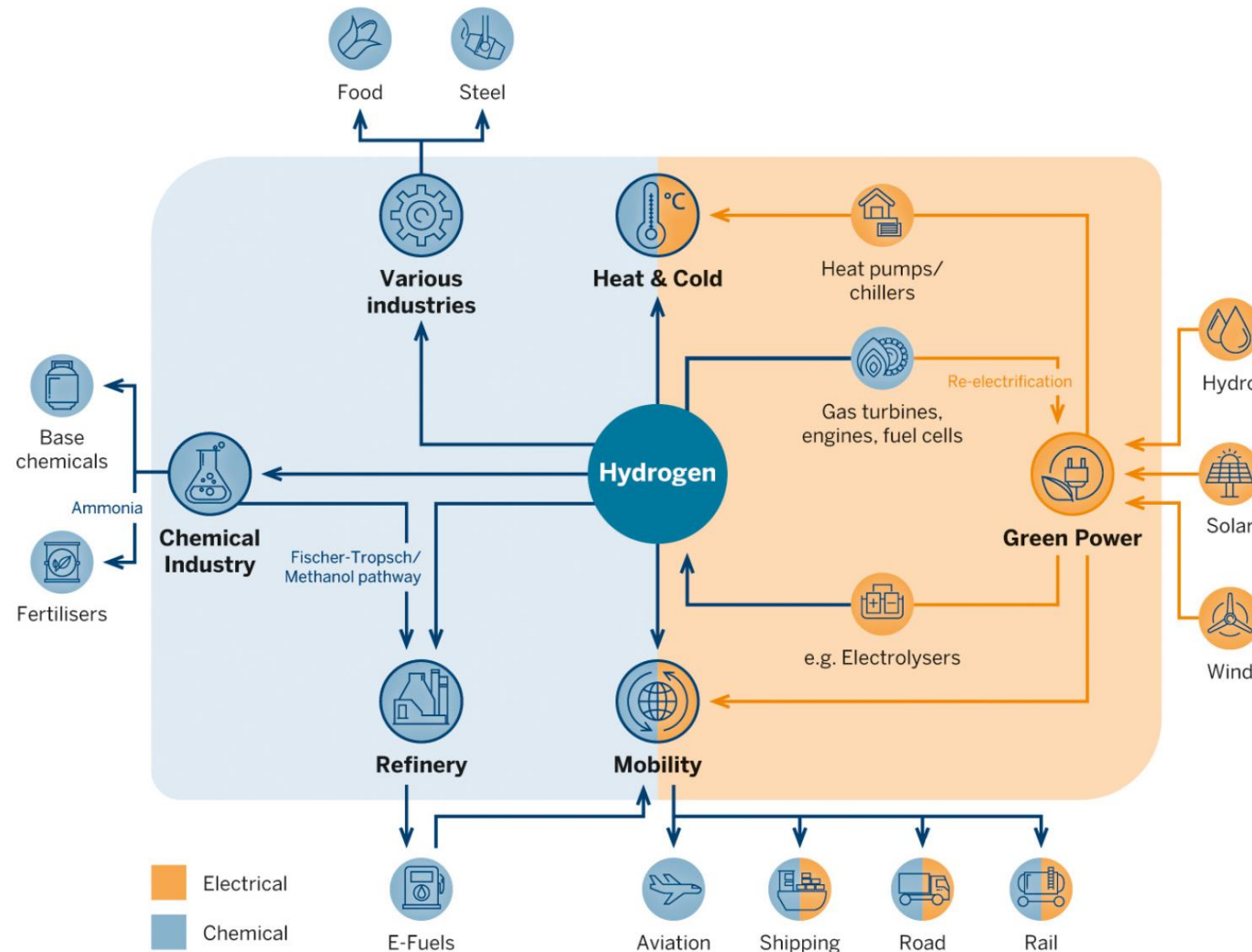


Power-to-X has a long value chain – European SMEs are leading

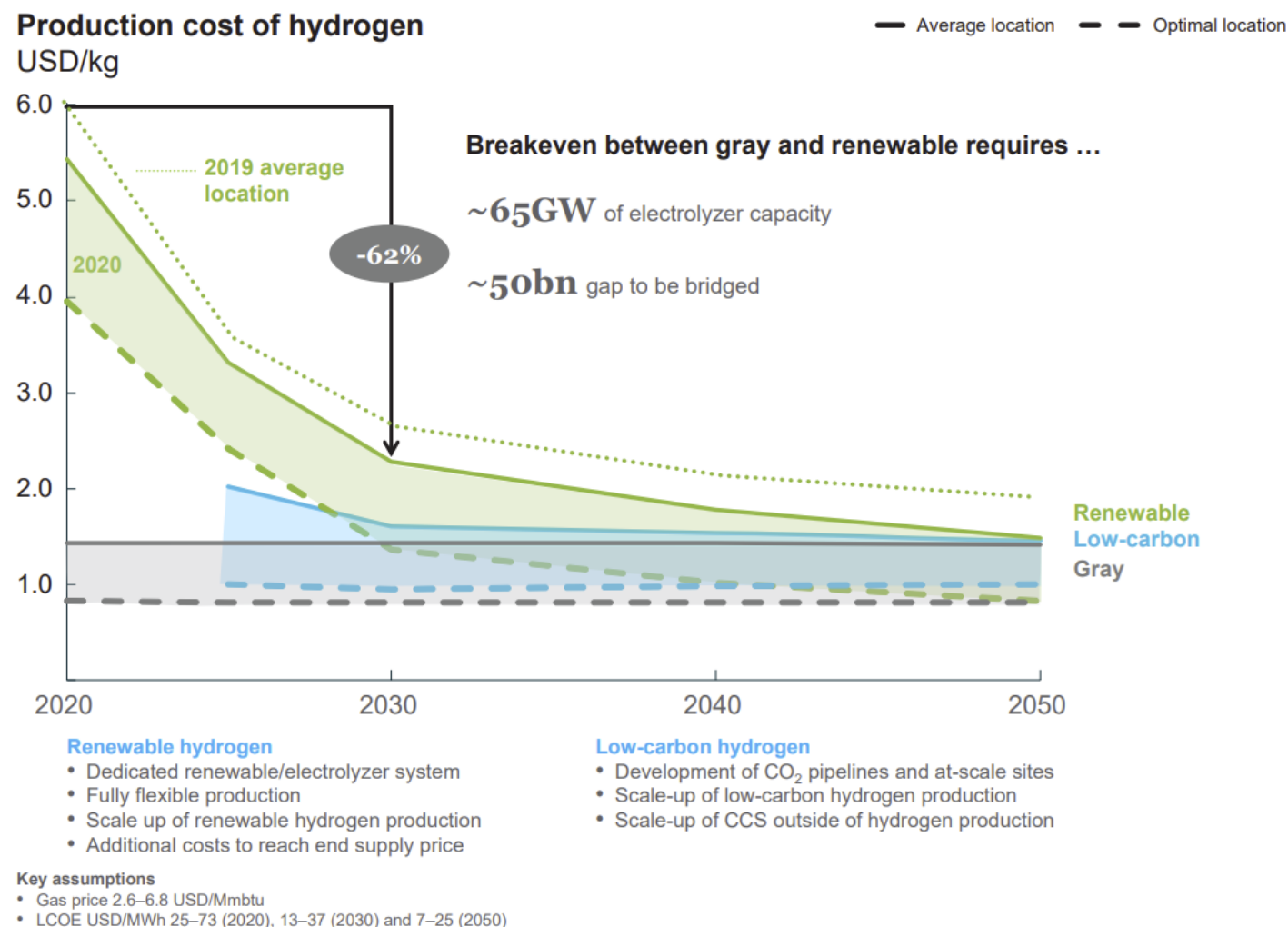
The PtX eco system



Hydrogen and derived products are universally applicable as energy carriers and feedstock



Renewable hydrogen could break even with grey H2 before 2030 in optimal regions



Three factors contribute to decreasing prices:

- » Drop in CAPEX due to faster scale-up of electrolyzer supply chains
- » Decrease of levelized cost of energy (LCOE) in optimal locations (best locations include Spain, Chile, and Middle East)
- » More large-scale, integrated renewable hydrogen projects achieving higher electrolyzer utilization levels

Emerging opportunities for the industry along the hydrogen value chain



- » The next decade will be characterized by a significant market ramp-up of green hydrogen production.
- » We will see a move from the currently installed base of electrolyzers in the lower megawatt range to gigawatt-size capacities. This will contribute to economies of scale for electrolyzers and drive down CAPEX.
- » Hydrogen and PtX fuels can become an important commodity for the international energy market and generation capacities can be built in regions with low electricity generation costs.



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