MAN Energy Solutions
Future in the making

Green H2 powered e-Fuels

IPER 2024

DWE Reactors

Made in Deggendorf, Germany

Over 65 years of experience with tubular reactors

We handle exothermic and endothermic gas phase reactions within fixed-bed reactors.

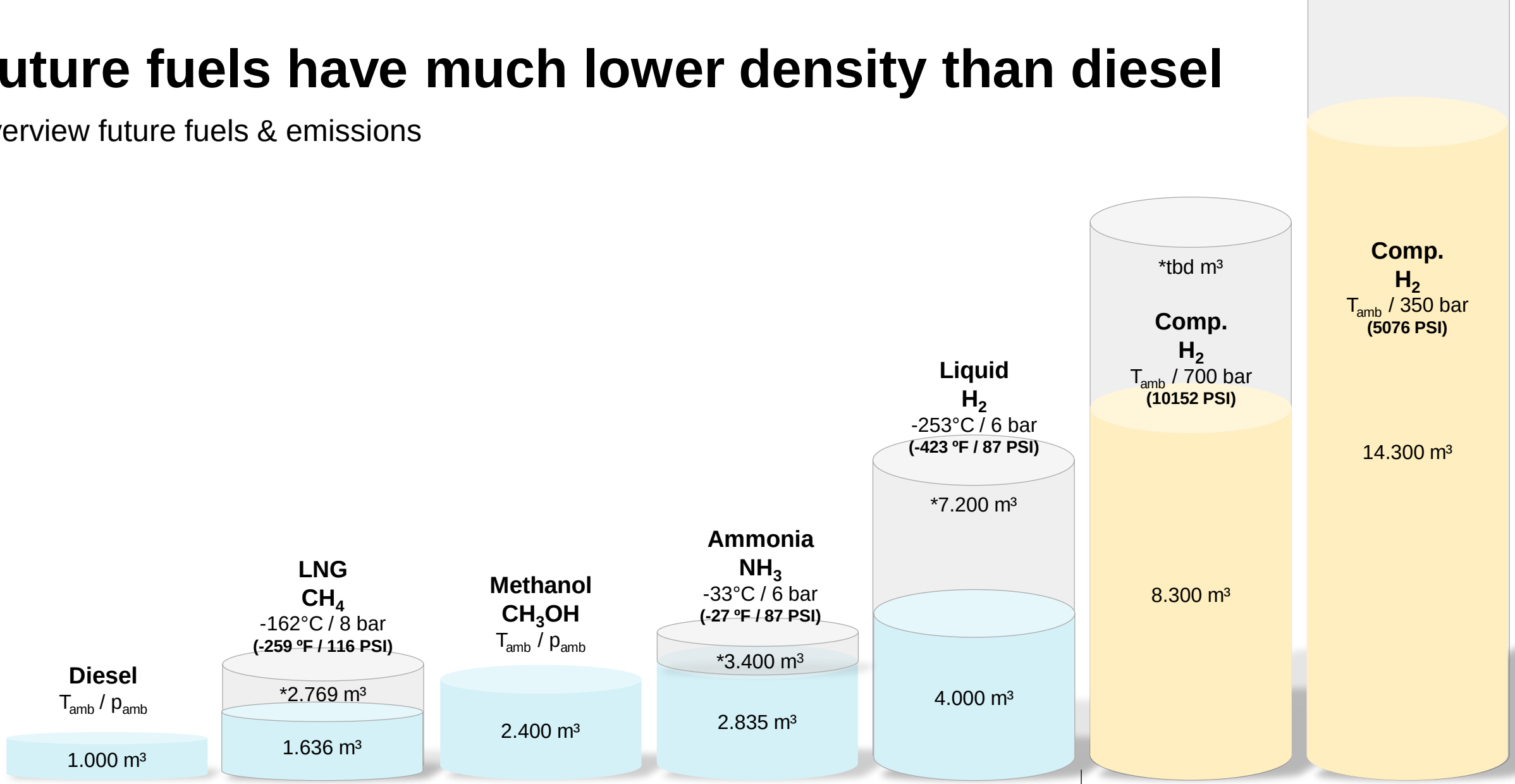
Since 1955 to date: More than 800 reactors supplied to all major chemical companies

Highly customized MAN DWE® tandem reactor

We engineer systems for deep decarbonization in sectors that matter most

Future fuels have much lower density than diesel

Overview future fuels & emissions



Comparison of storage volume for the same energy amount

***additional space (grey) for cylindric shaped tanks of cryogenic fuels**

Source: DNV Comparison of Alternative Marine Fuels

1 GW of Power at the electrolyzer makes...

In metric tons per hour (mt/h) assuming standard efficiencies for electrolysis (approx. 70%)

mt/h	
18	H_2
36	CH_4
100	CH_3OH
110	NH_3

mt/h	
20	SAF (MtJ)
33	Gasoline (MtG)

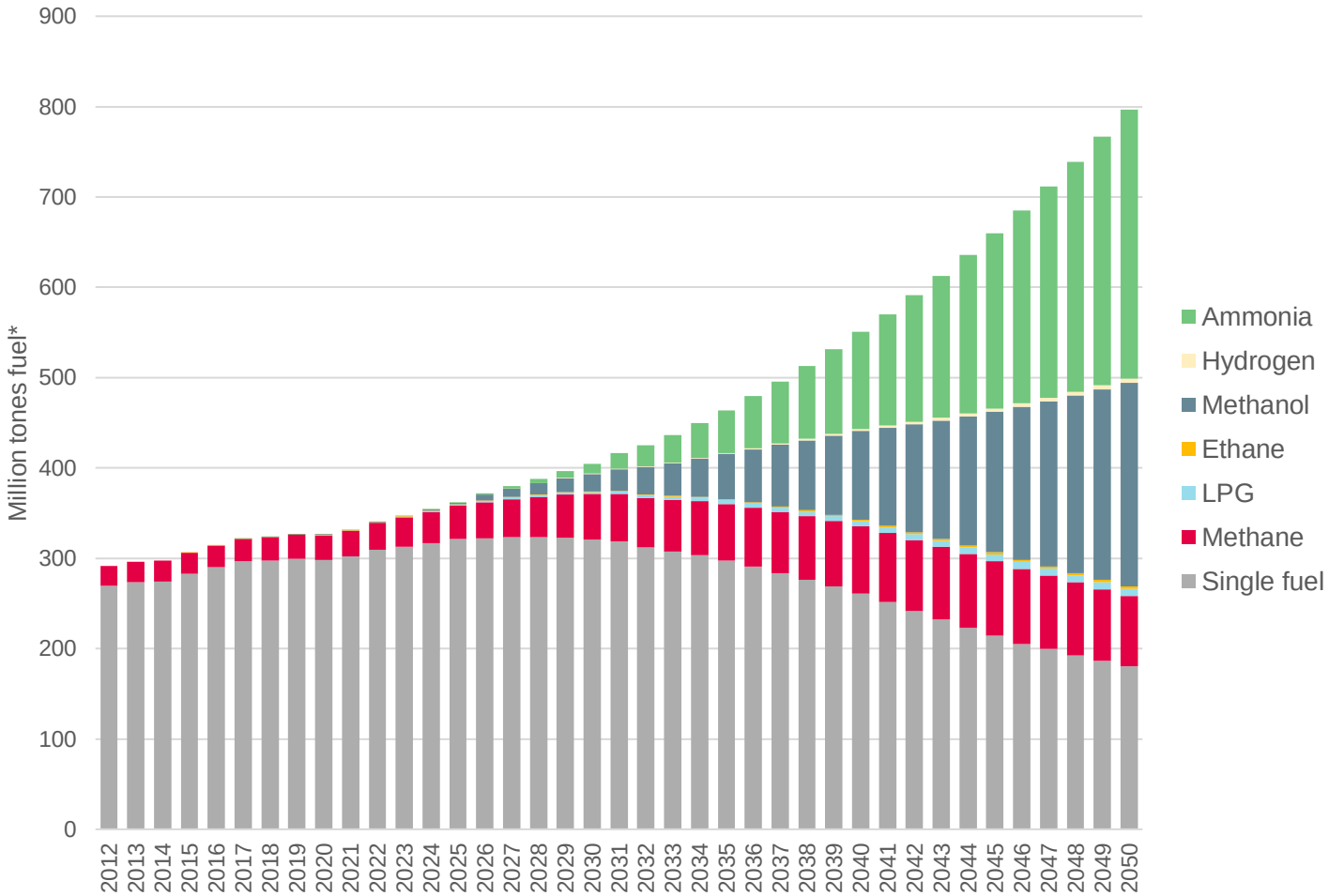
How much eFuel?

A glimpse on the maritime sector alone (Millions of tons/year)

Year	2030	2040	2050
Ammonia	22	141	345
Methanol	40	128	255
Methane	55	80	83

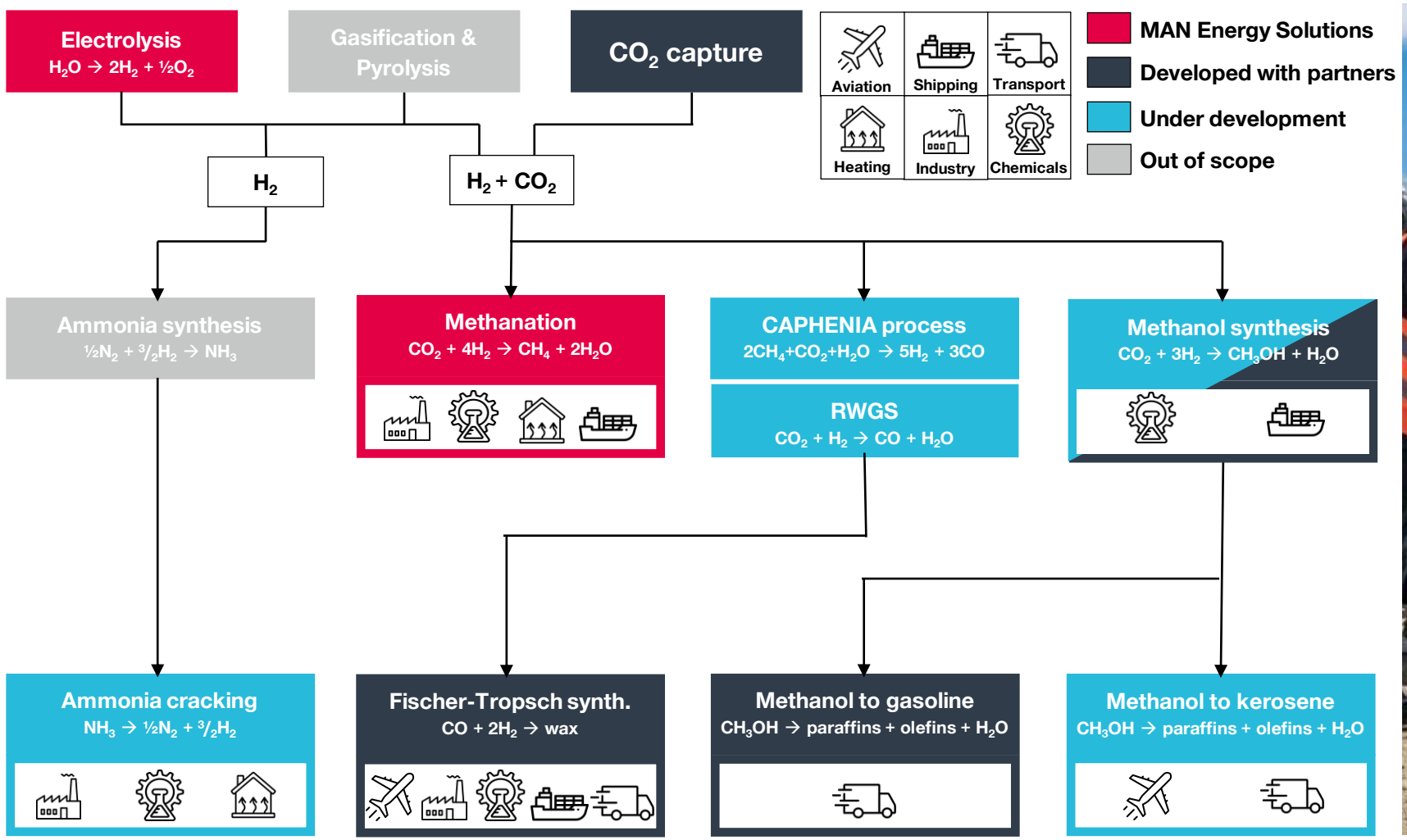
If all above was to be provided through eFuels (electrolysis),
1 TW of Renewable Power would be necessary by 2050.

The global installed power capacity as of 2021 (worldwide)
is of roughly 11 TW. USA (as of 2023) had 1.27 TW



* These fuels must be produced in a carbon neutral way
* Assuming 8000h/year

Power to X & Synthetic Fuels



MAN along the PtX value chain

Methanol to
Gasoline & Kerosene

Methanation

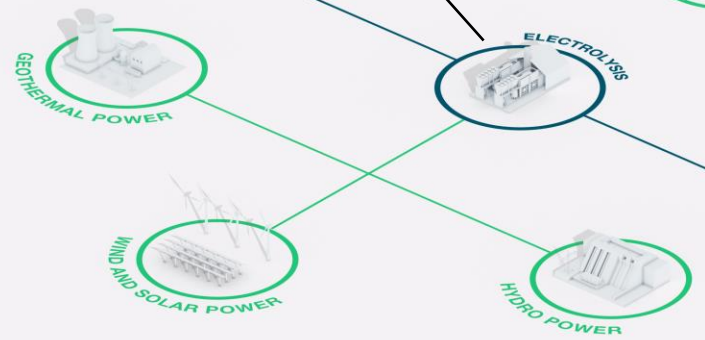
PEM Electrolysis

eFuel-ready engines

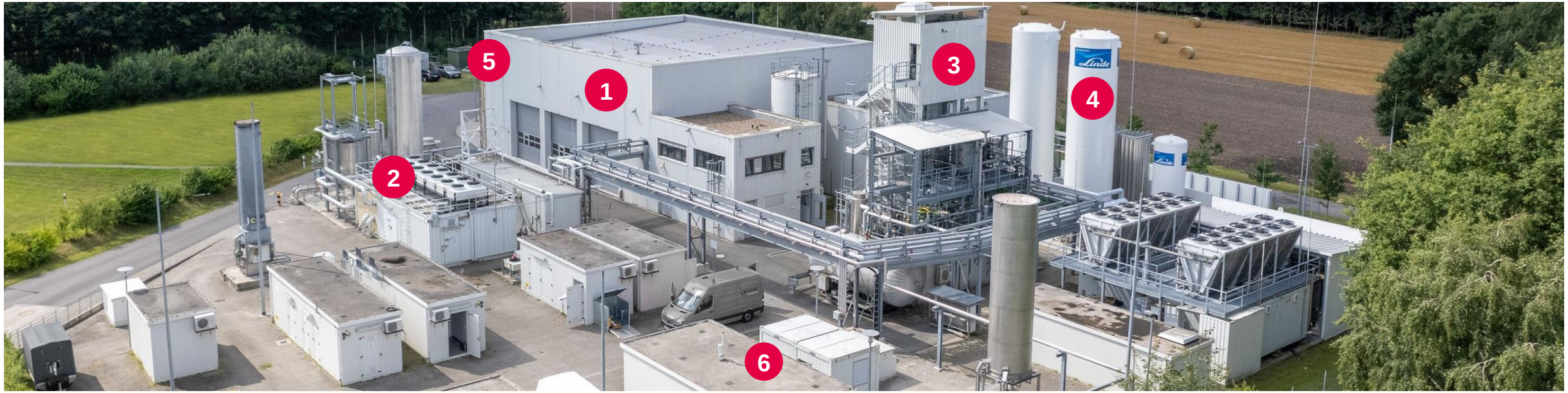
CO2 / H2
Compression

Methanol Synthesis

Carbon Capture



Kiwi’s industrial SNG plant is the 6.3 MW “demo factory” for the SNG and PtX rollout



1 

Electrolyzer

2 
CO2 scrubber

3 
Methanation reactor system

4 
CH4 liquefaction

5 
H2 filling station

6 
CH4 feeding into gas grid

MAN DWE® reactors: Power-to-X

Converting renewable energy into synthetic fuels

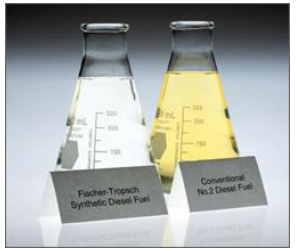
MAN Energy Solutions supports Porsche AG and HIF in its Haru Oni PtL project in Chile

Methanol skid based on JM technology ready to ship

Fischer-Tropsch

Mature Technology – SAF based on FT already ASTM certified (50% blending)

- 12 GtL reactors for Shell in Qatar (Pearl)
- Demonstration plant with 5 BtL reactors
- Experimental investigation (catalyst testing >10a)
  - Installation and operation of an FT pilot plant



Comparison of FT diesel (left-hand side) and diesel

- Testing and optimization of the process performance:
  - Activation of the catalyst
  - Operation
  - Deactivation of the catalyst
- Investigation: Separation of FT crude mixture

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Thank you very much!