Challenges and Opportunities of the German H2 market

Insights from a Producer's Perspective

Hynamics Deutschland GmbH

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HYNAMICS IS EDF'S HYDROGEN BUSINESS

01 100 % EDF SUBSIDIARY

02 PRESENT IN 3 COUNTRIES

2019 2020 2023

03 150+ EMPLOYEES

04 THREE MARKETS

INDUSTRY MOBILITY E-FUELS

05 MORE THAN 1 GW OF ELECTROLYSIS

3 MW in operation

60 projects in development

06 COVER THE COMPLETE H2 PLANT LIFECYCLE

Development – Investment – Execution – Operation & Maintenance

GREEN & LOW-CARBON H2 & DERIVATIVES – ONSITE, OFFSITE OR IMPORTED

Hydrogen

Green & Low-Carbon Hydrogen

produced via water electrolysis

E-Fuels & Derivatives

eMethanol, eAmmonia, eSAF

produced with green and low-carbon H2

ONSITE

Dedicated containerised electrolyser units

in the vicinity of customers

OFFSITE

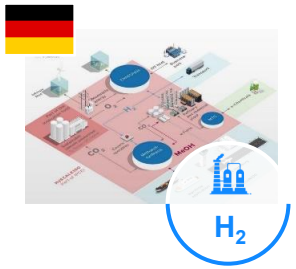
Large scale centralized production plants

for the supply of large quantities via pipeline

IMPORTS

- **Green & Low-carbon H2 from Europe**
- **Green derivatives from Overseas**

LARGE-SCALE PROJECTS IN GERMANY, EUROPE & OVERSEAS



HyScale 100

Steyerberg

Offsite Project Portfolio

ABC Ottmarsheim

Fawley Green Hydrogen

HyDrom

Partners	Holcim	*Confidential*	*Confidential*	LAT Nitrogen	ExxonMobil	EDF (RE), J-Power, Yamna
Elektrolysis	200 MW	300 MW	> 400 MW	50 MW	120 MW	2,2 GW
Product	Methanol	Hydrogen	Hydrogen	Ammonia	Hydrogen	Ammonia
Offtake	Chemicals, Maritime	Chemicals, Refineries, Steel	Chemicals, Refineries, Steel	LAT Nitrogen, Chemicals	Chemicals, Petrochemicals	Chemicals, Refineries, Steel

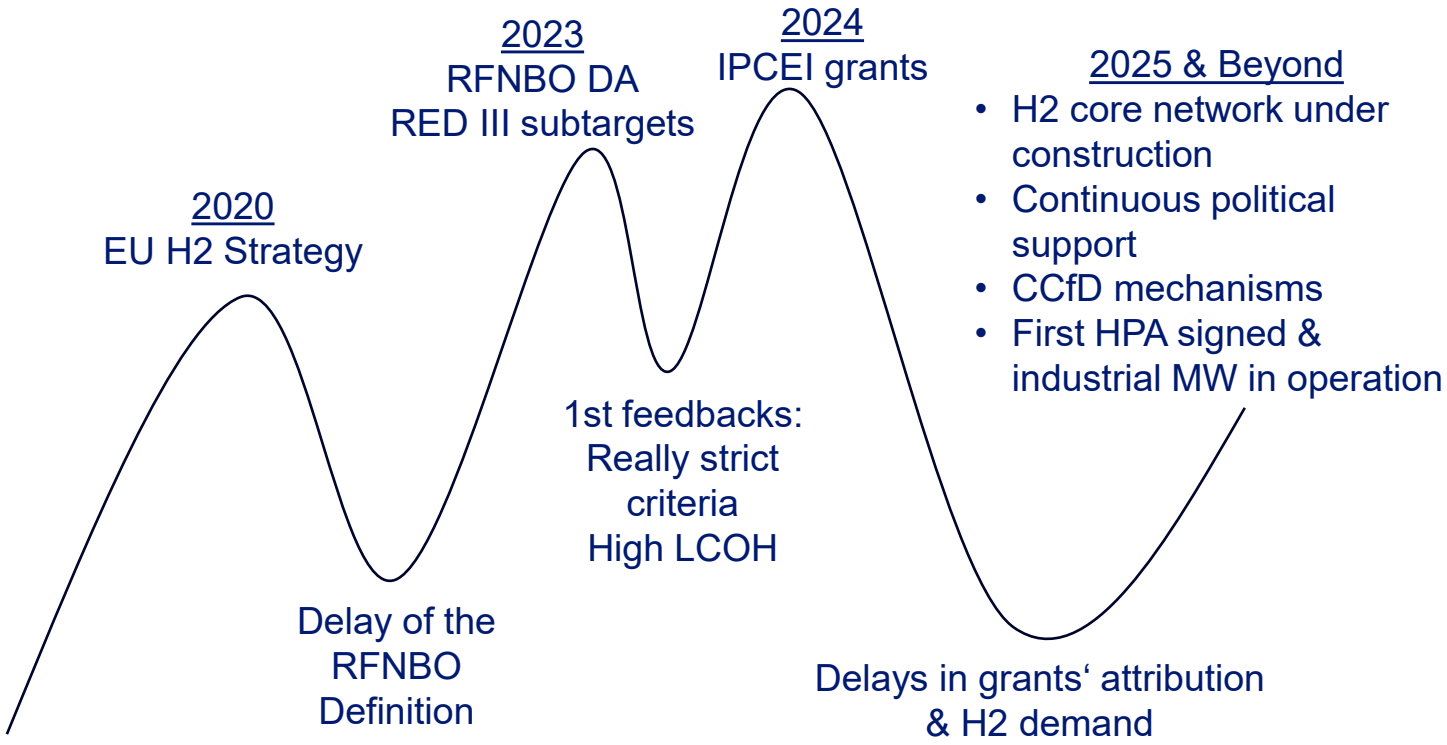
THE H2 ROLLERCOASTER: A RISE WITH HEAVY UPS & DOWNS

Decade Perspective

Clean H2 set to grow faster than wind, solar & LNG

Source: Hy24, Data 2023

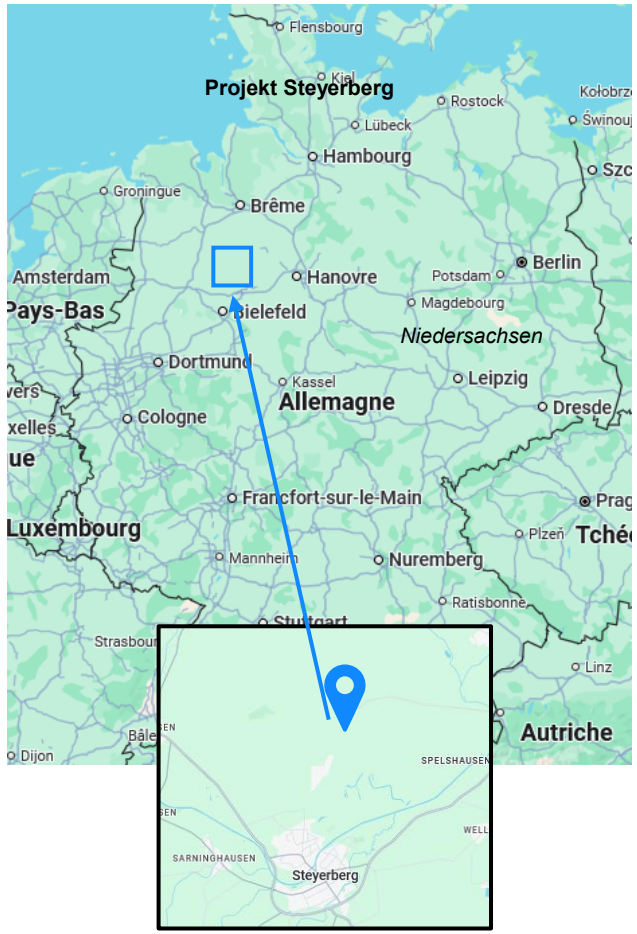
5-Year Perspective



- **Momentum slower and later than expected but the necessity of H2 is not being questioned**
- **Industrial demand peaks ahead:** Core demand from refining, ammonia & methanol sectors exp. to peak around 2030
- **Long-term success depends on policy certainty, de-risking mechanisms & global collaboration**

PROJECT STEYERBERG

RFNBO AND LOW-CARBON HYDROGEN PRODUCTION WITH CONNECTION TO THE HYDROGEN CORE NETWORK



Overview

- 300 MW Electrolyser
- Direct connection to the German H2-backbone (connected to the European H2 backbone in the 2030s)
- Up to 11,000 tons H2 / year
- RFNBO & low-carbon hydrogen according to EU regulation
- Public funding: submitted to EU call for projects PCI (Projects of Common Interest)
- Estimated first H2 delivery: 2030 (local) / 2032 (via the pipeline)

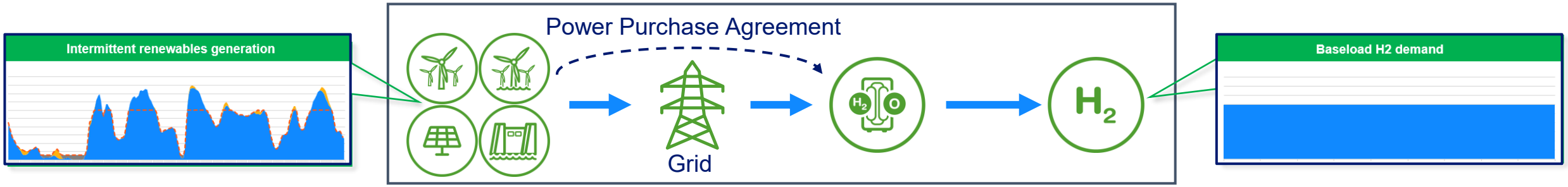
Status & Next Steps

- ✓ **Land secured** in the industrial Greentec Park "Am Hasenberge“
- ✓ **Power supply**: Network connection capacity available
- ✓ **H_2 core network connection**: Network connection study completed with Nowega

hynamics EDF GROUP

HYNAMICS OPTIMIZES H2 PRODUCTION COSTS

Producing baseload green hydrogen for industry is a complex task



Hynamics works on a wide range of input parameters and constraints to optimize H2 production schemes

Our expertise in H2 cost optimization

- Smart energy sourcing
- In-House optimization tool + GIS-based analyses
- Commercial and tech-driven efficiency
- Regulatory and public funding expertise
- Assessment and classification of electrolyser suppliers and OEM

Practical outcomes & benefits

- ✓ Optimized H2 production costs i.e. LCOH
- ✓ Right-sized, future-proof plant designs
- ✓ Optimized power and PPA mix
- ✓ Resilient and cost-effective operational strategies for the electrolyser

THANK YOU !

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