



FUEL CELLS AND HYDROGEN  
JOINT UNDERTAKING



Bundesministerium  
Nachhaltigkeit und  
Tourismus



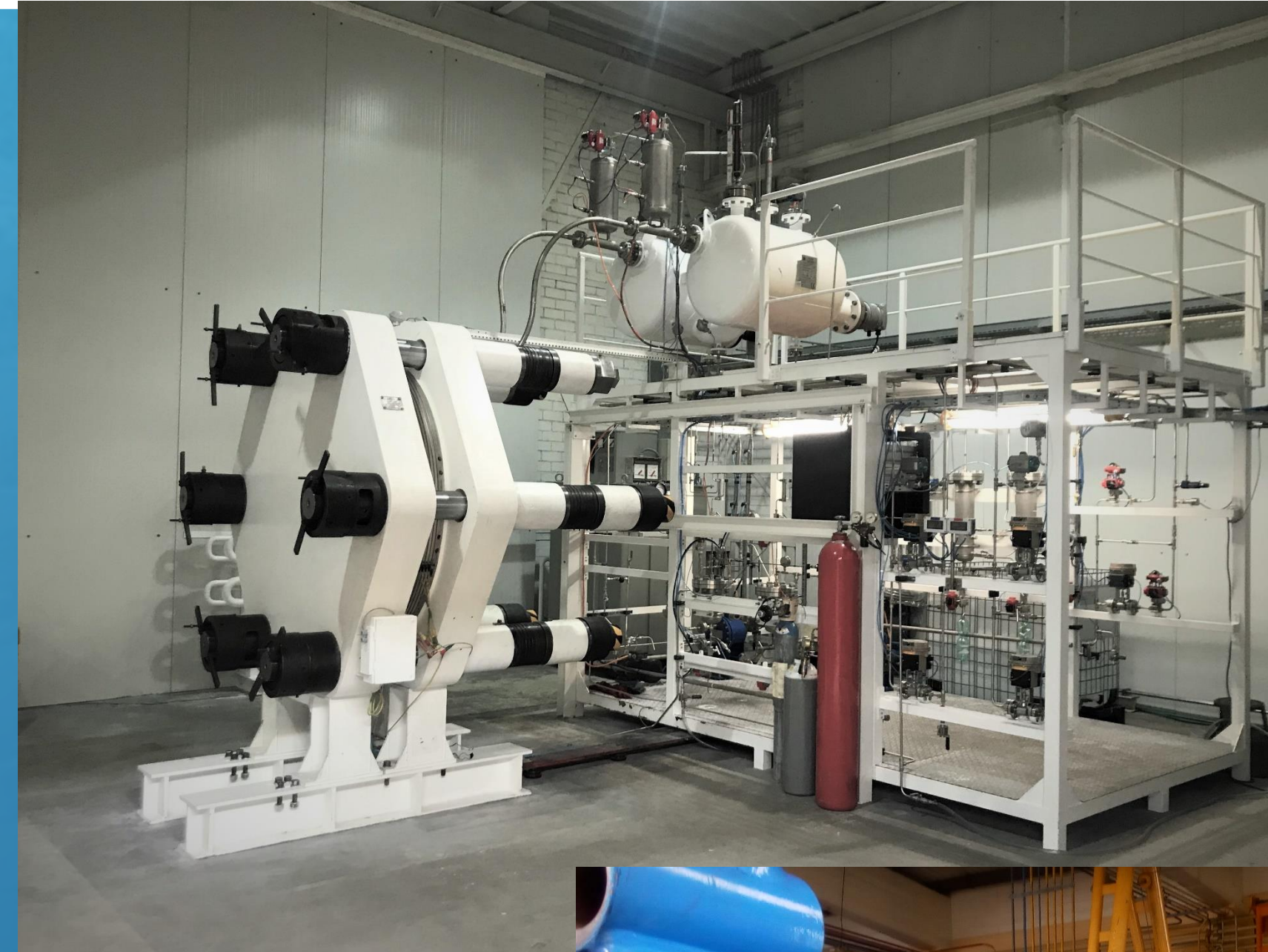
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Confédération suisse  
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# MPREIS H2-Initiative

*Von der Theorie zur Praxis*

Ewald Perwög  
WKÖ, 30.1.2020







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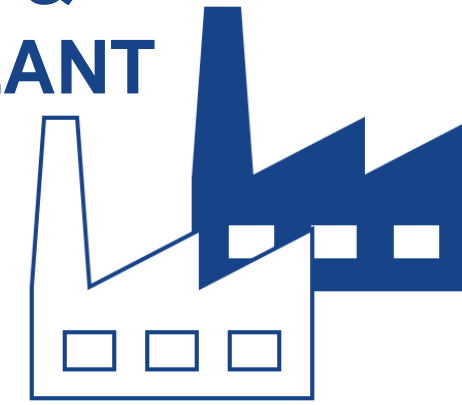
# ABOUT US...

FAMILY OWNED FOOD RETAIL COMPANY

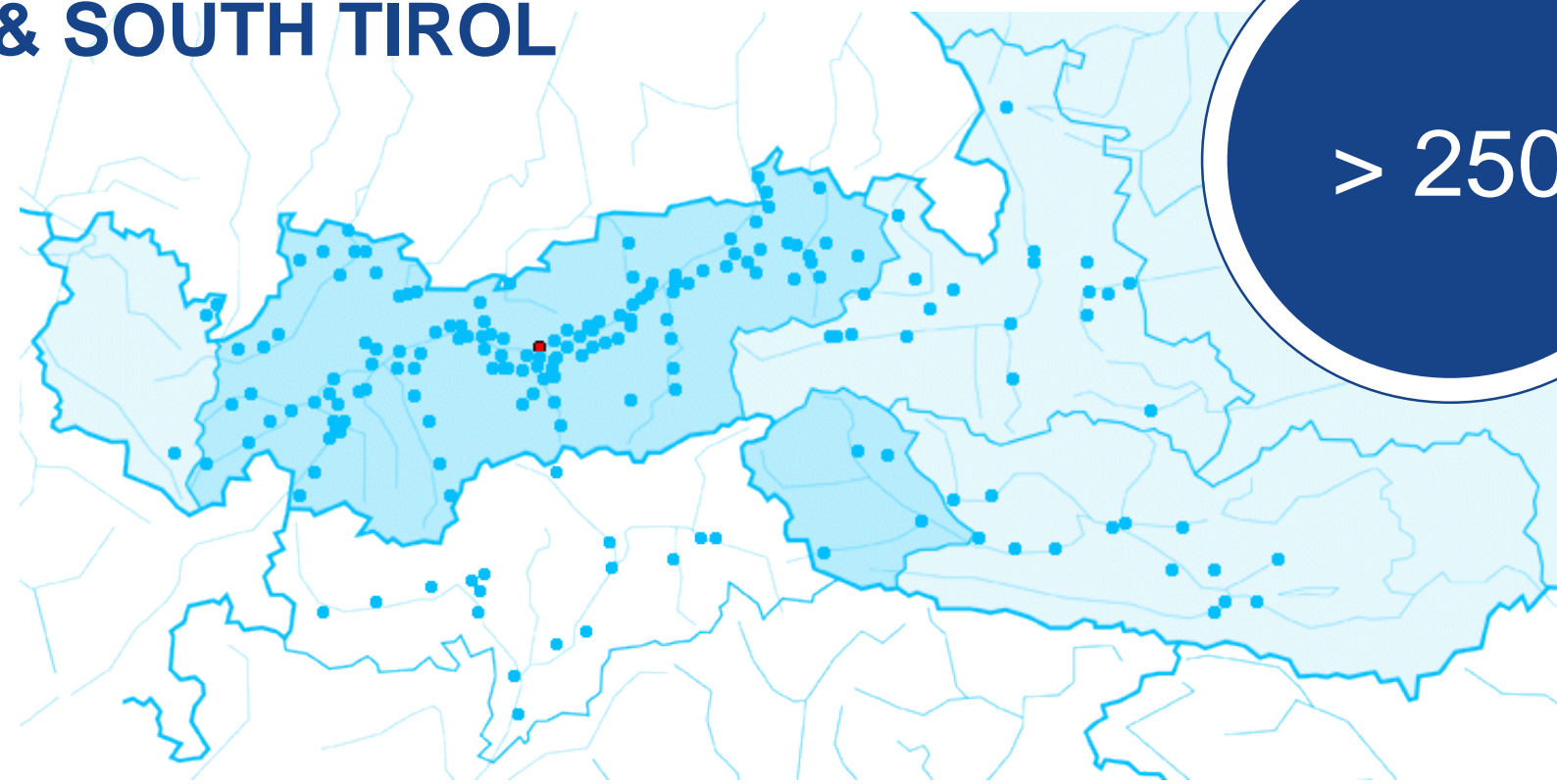


SINCE 1925

OPERATING A BAKERY &  
MEAT PROCESSING PLANT



MARKETS OWNED in WESTERN AUSTRIA  
& SOUTH TIROL

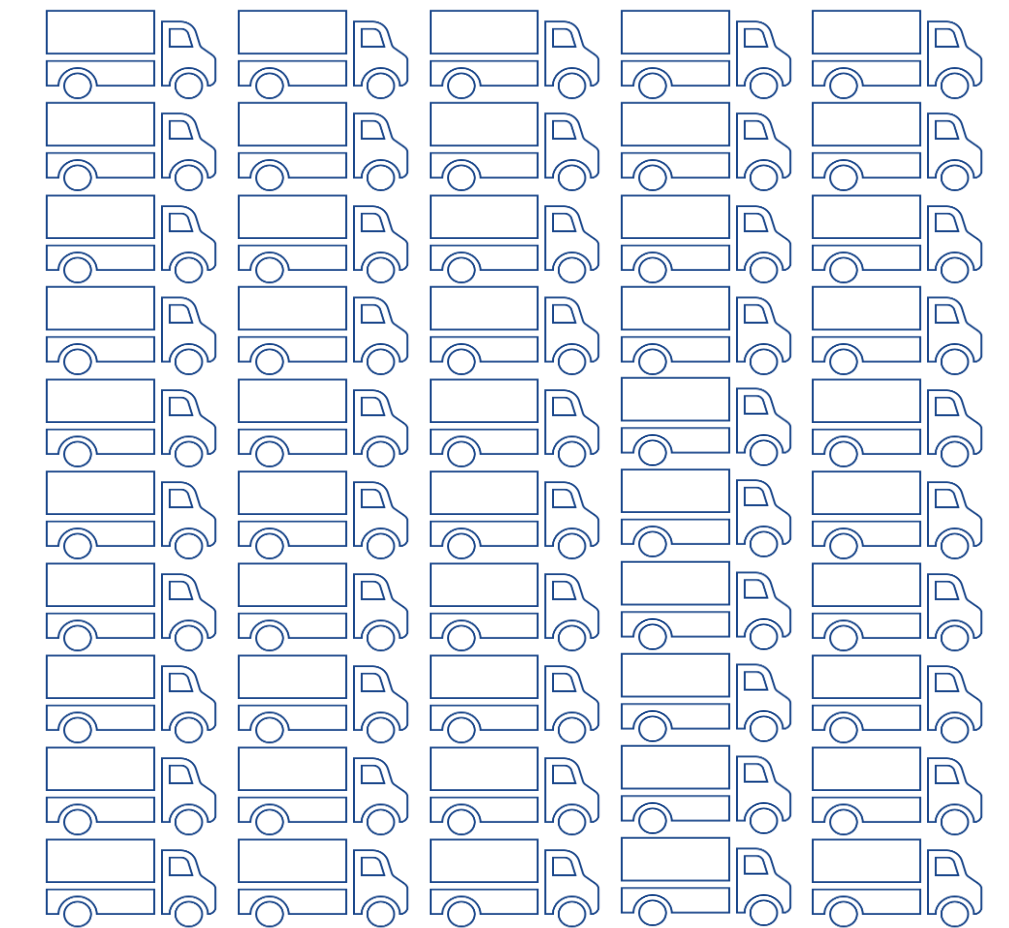


> 250

MPREIS ENCOMPASSES THE BRANDS



THERESE MÖLK  
Bäckerei | Konditorei seit 1925



OPERATING A LOGISTIC  
FLEET OF

**50**  
**TRUCKS**



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# Demonstration for Grid Services

FUNDED BY



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State Secretariat for Education,  
Research and Innovation SERI

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Duration: 2017 to 2023

TYPE: Demonstration

CONSORTIUM MEMBERS





INDUSTRIE  
HAUTE  
TECHNOLOGIE



FUNDACIÓN PARA EL  
DESARROLLO DE LAS NUEVAS  
TECNOLOGÍAS DEL HIDRÓGENO  
EN ARAGÓN




FCH-02-7-2016:

Demonstration of large-scale rapid-response electrolysis to provide grid balancing services and to supply hydrogen markets

OBJECTIVE:

to deploy and monitor an improved electrolyzer-system, configured to attract revenues from grid services and leveraging timely power price opportunities, in addition to providing hydrogen for high value markets.





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## PROJECT OVERVIEW

- **Call year:** 2016
- **Call topic:** FCH-02-7-2016 Demonstration of large-scale rapid response electrolysis to provide grid balancing services and to supply hydrogen markets
- **Project dates:** 01/03/2017 > 31/08/2023
- **Stage of implementation 30/01/2020:** 30%
- **Total project budget:** 13 Mio €
- **European Commission:** 3 Mio €
- **Swiss Confederation:** 1,4 Mio €
- **Austrian federal aid program:** 1,5 Mio €





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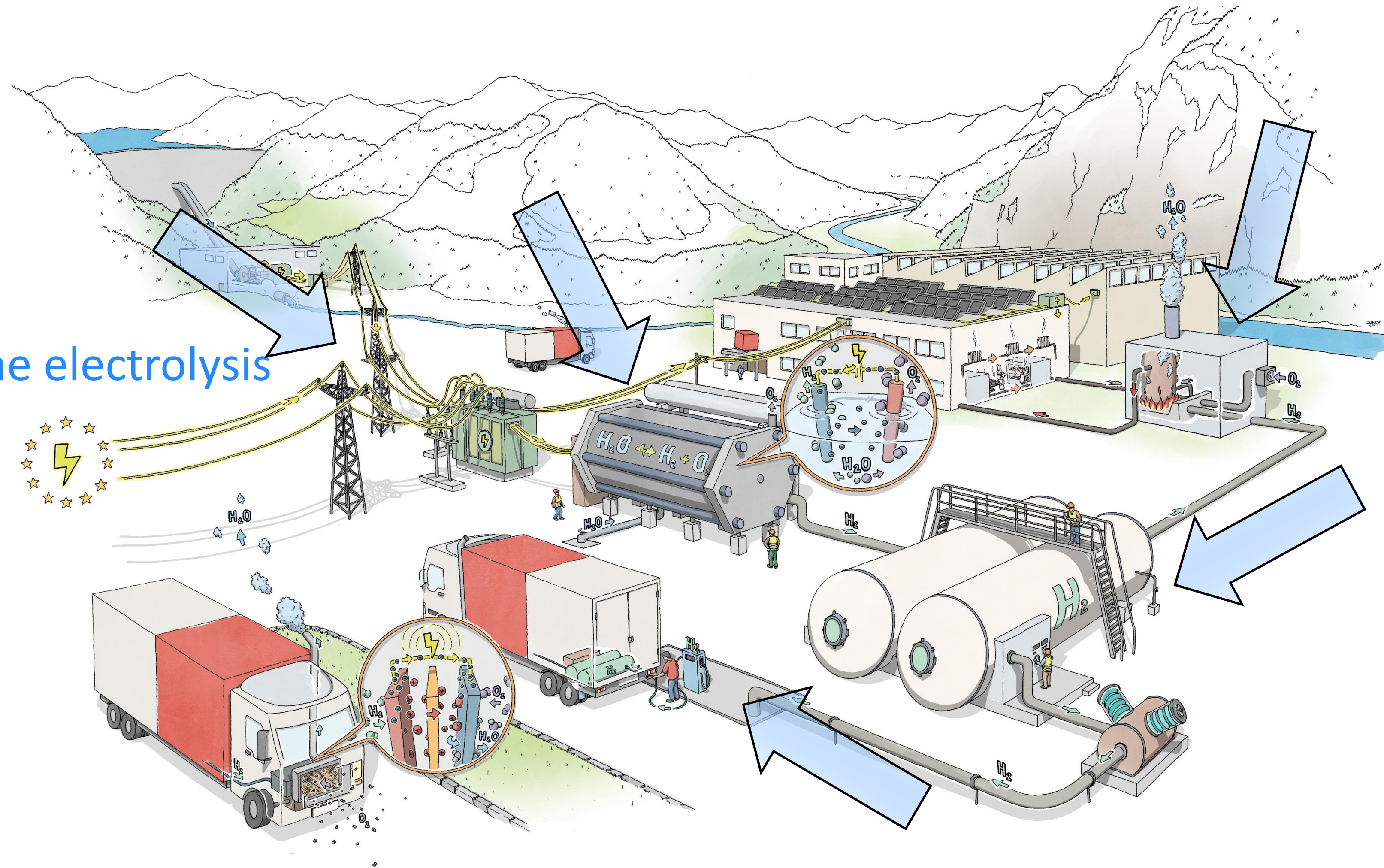
# MPREIS H2 - Initiativ

## Objectives:

- Availability
- Rapid-response pressurized alkaline electrolysis
- Large scale (3,2 MW single stack)
- Production of Green Hydrogen
- Integrated Plant Efficiency > 90%

## Applications:

- ❖ Industrial process heat 60°C;300°C
- ❖ Mobility market







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## SoA reference

### Demo4Grid PAE technical targets vs. state-of-the-art and 2020 KPIs

	<i>Internat. SoA PAE specifications</i>	<i>D4G PAE technical targets</i>	<i>MAWP FCH-JU Objectives</i>	<i>Water electrolysis in the EU FCH-JU Study</i>
	Base Load PAE Technology for Chemical Market	Dynamic PAE technology Grid Balancing/Energy Market	2020 KPIs	
Efficiency [kWh/Nm <sup>3</sup> ]	4,6	4,6	4,67	4,67
Stack lifetime [y]	15	15	-	11
System lifetime [y]	30	30	-	28
Availability [h/y]	8585	8585	-	8585
Current densities [A/cm <sup>2</sup> ]	0,18	0,35	-	0,7
Prod. range [% full load]	25-100	15 – 130	0-200	15 min. part load
Ramp-up [%full load/s]	5	15 (<6s)	-	17
Ramp-down [%full load/s]	10	25 (<4s)	-	25





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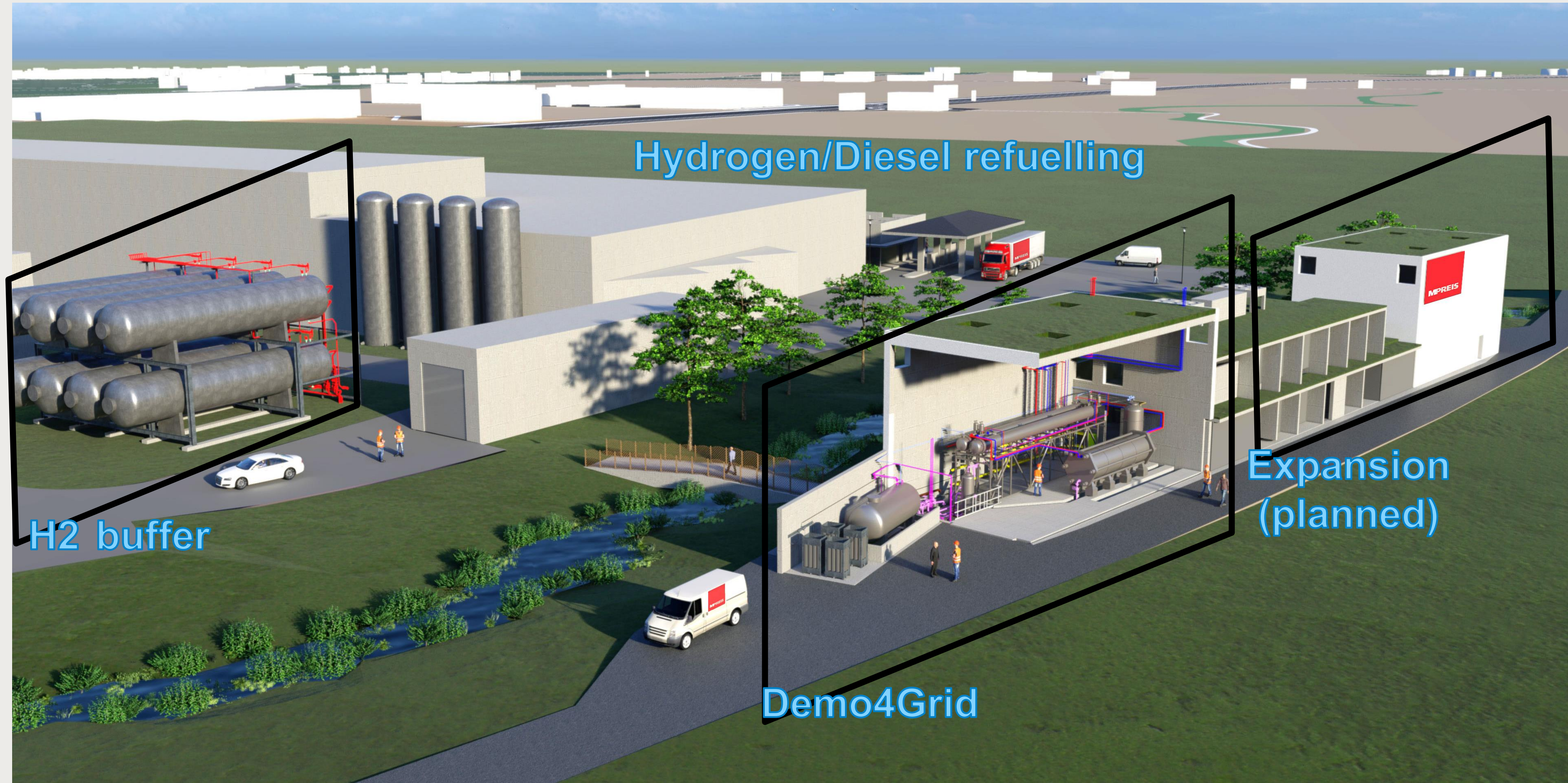
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# PROJECT PROGRESS: Site implementation I



H2 buffer

Hydrogen/Diesel refuelling

Demo4Grid

Expansion  
(planned)





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# PROJECT PROGRESS: Site implementation II

Engineering Plant, H2 buffer, H2/CH4-burner

Stack & BoP manufacturing

Engineering done

Stack operation



25%

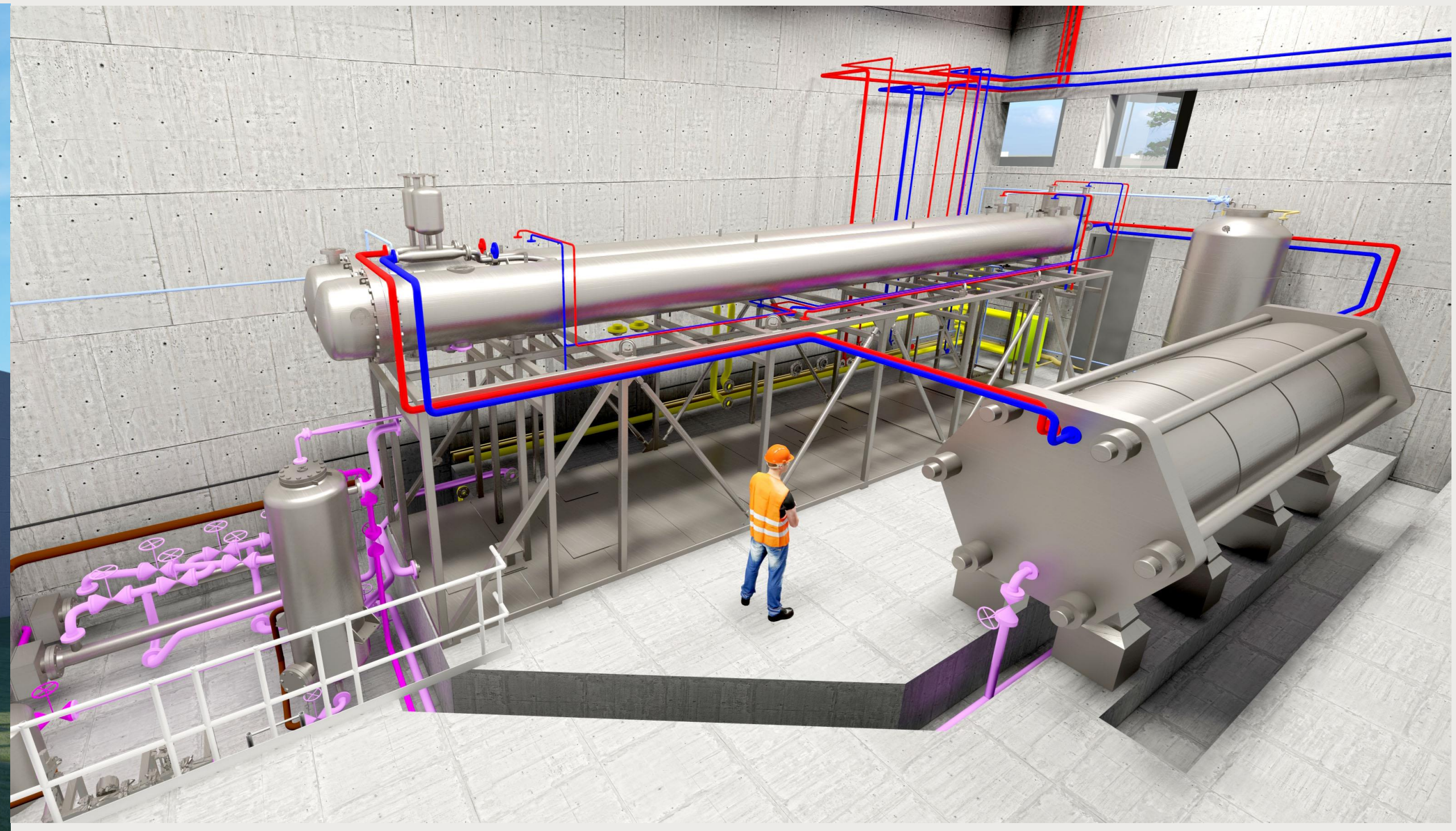
50%

75%

25%

50%

75%







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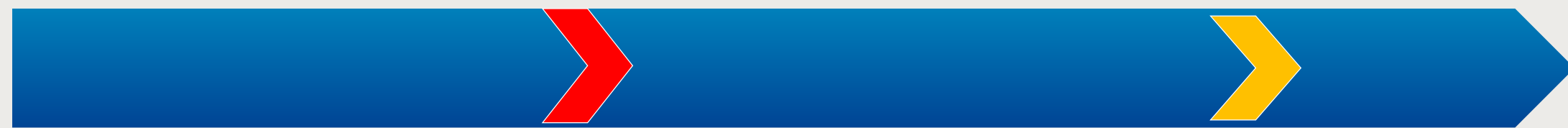
# PROJECT PROGRESS: Site implementation III

**Grid service provision,  
rapid-response engineering**

**Building permit, operation permit**

Prequalification

Start building  
(I/2020)



25%

50%

75%

Start Plant testing  
(III/2020)

25%

50%

75%

Operation permit  
received (II/2020)

HRS modular 3.2kg/min up to 1.400  
kg/day

Heat recovery @ 60°C

Dualfuel-burner

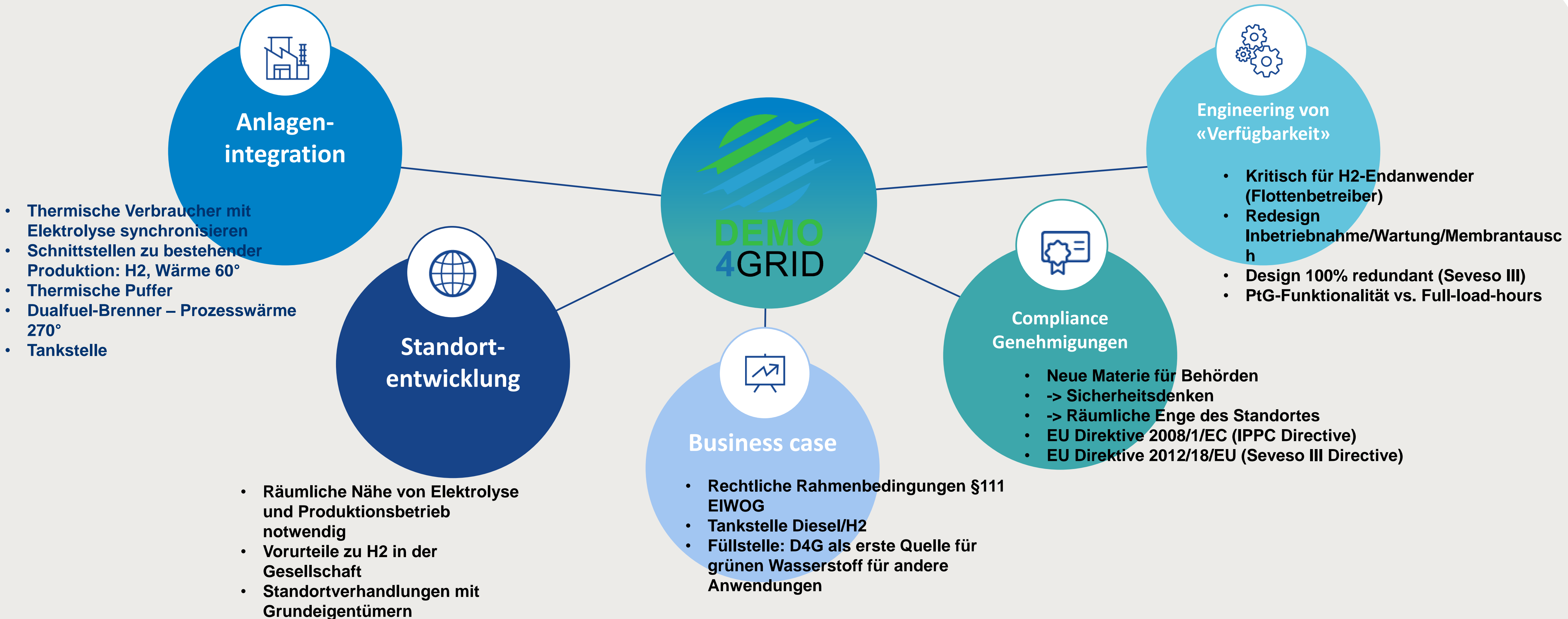
@300°C



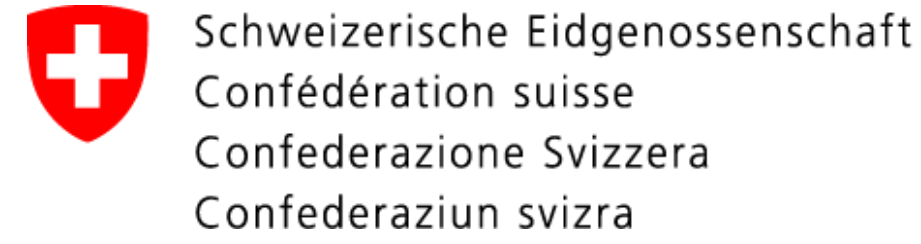




# Risiken und Herausforderungen



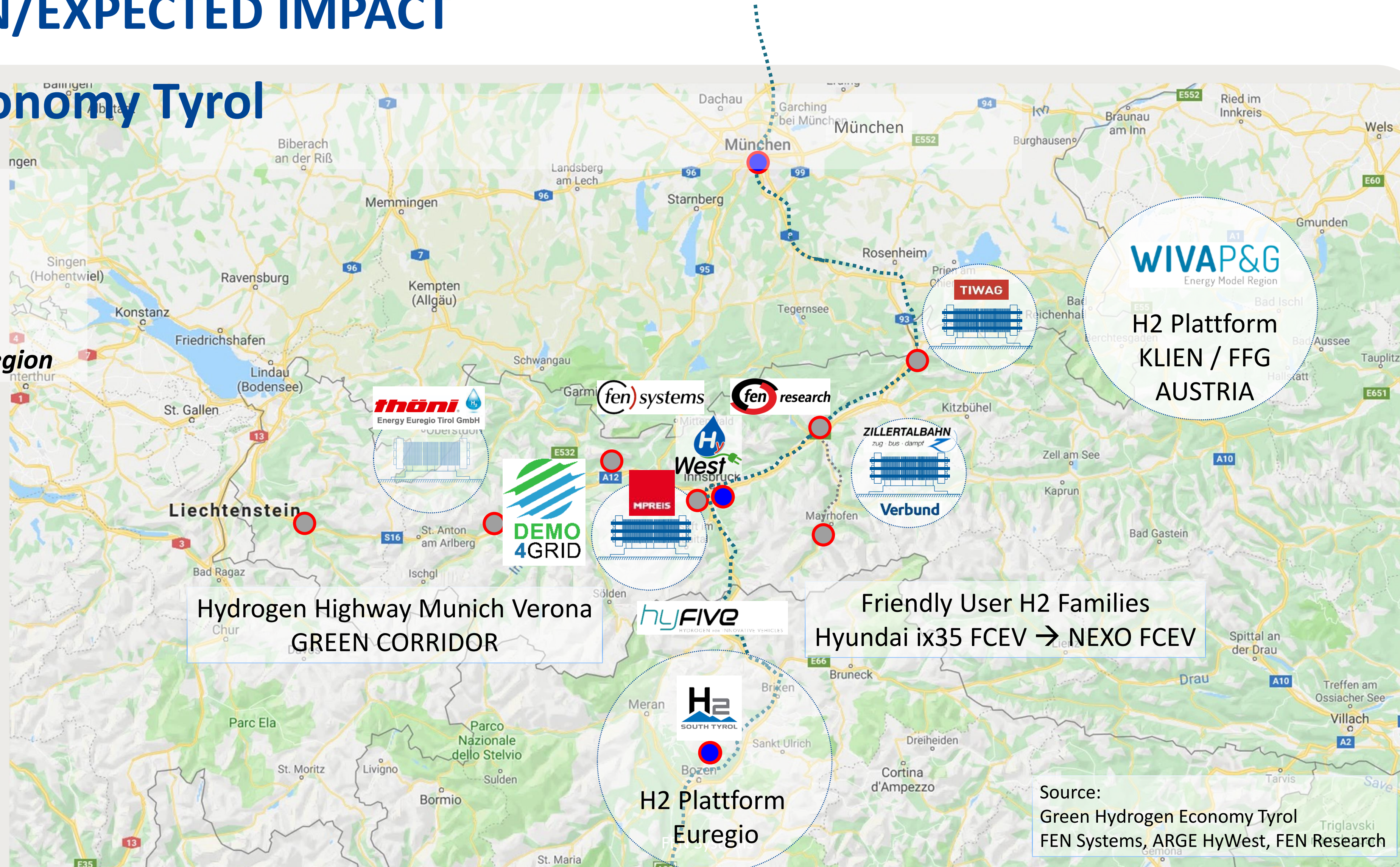




# EXPLOITATION PLAN/EXPECTED IMPACT

## Green Hydrogen Economy Tyrol

- FCH2JU Project HyFIVE
- FCH2JU Project Demo4Grid
- WIVA Project HyTruck
- WIVA Project HyTrain
- FFG Project HySnowGroomer
- WIVA Project HyWest Green H2 Region



**WIVAP&G**  
Energy Model Region  
H2 Plattform  
KLIEN / FFG  
AUSTRIA

Hydrogen Highway Munich Verona  
GREEN CORRIDOR

Friendly User H2 Families  
Hyundai ix35 FCEV → NEXO FCEV

H2 Plattform  
Euregio

Source:  
Green Hydrogen Economy Tyrol  
FEN Systems, ARGE HyWest, FEN Research





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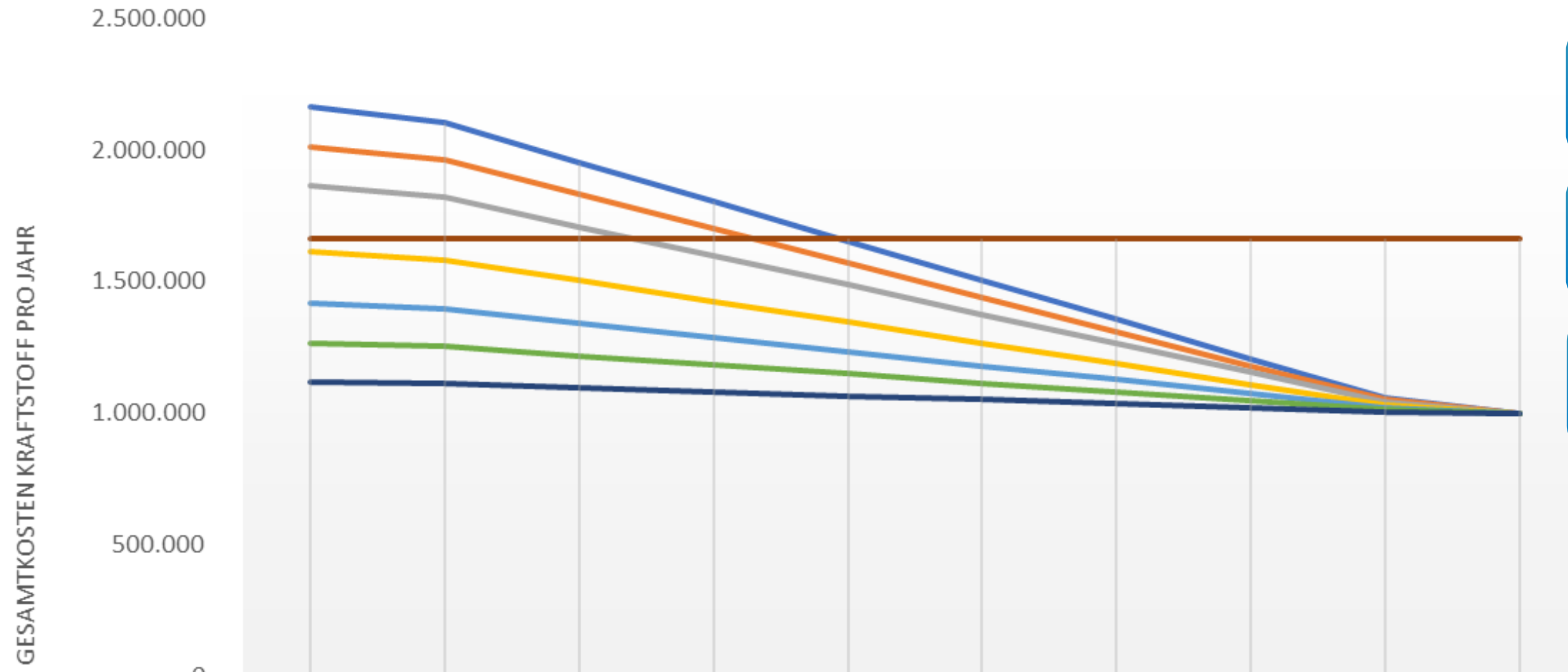
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# Wasserstoff und Mobilität

Warum sind Brennstoffzelle-Nutzfahrzeuge ein Schlüssel für die Entwicklung eines H2-Ökosystemes?

MPREIS fuel costs development in substitution scenario "Diesel- to FC-trucks 2020 to 2027"  
Sensitivity analysis of price difference electricity vs. diesel



	2020 (3)	2021 (5)	2022 (10)	2023 (15)	2024 (20)	2024 (25)	2025 (30)	2025 (35)	2026 (40)	2027 (42)
— Diesel 1,35 €/Liter	2.162.249	2.102.540	1.953.267	1.803.994	1.654.721	1.505.448	1.356.175	1.206.902	1.057.629	997.920
— Diesel 1,25 €/Liter	2.012.913	1.960.862	1.830.735	1.700.608	1.570.480	1.440.353	1.310.226	1.180.098	1.049.971	997.920
— Diesel 1,16 €/Liter	1.863.577	1.819.185	1.708.203	1.597.221	1.486.240	1.375.258	1.264.276	1.153.294	1.042.313	997.920
— Diesel 1 €/Liter	1.615.680	1.584.000	1.504.800	1.425.600	1.346.400	1.267.200	1.188.000	1.108.800	1.029.600	997.920
— Diesel 0,88 €/Liter	1.415.570	1.394.152	1.340.607	1.287.062	1.233.517	1.179.973	1.126.428	1.072.883	1.019.338	997.920
— Diesel 0,77 €/Liter	1.266.234	1.252.475	1.218.075	1.183.676	1.149.277	1.114.878	1.080.478	1.046.079	1.011.680	997.920
— Diesel 0,66 €/Liter	1.116.899	1.110.797	1.095.543	1.080.290	1.065.036	1.049.782	1.034.529	1.019.275	1.004.021	997.920
— Nur Diesel-LKW, 1 €/Liter	1.663.200	1.663.200	1.663.200	1.663.200	1.663.200	1.663.200	1.663.200	1.663.200	1.663.200	1.663.200

Elektrolysestrom aktuell bis Ende 2020:  
Netzentgeltbefreiung §111 (3) EIWOG

Dieselpreis direkt und indirekt (CO2)

Andere Länder....Roadpricing Schweiz

