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DRIVING THE ENERGY TRANSITION

Hydrogen refuelling stations in Germany

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The National Hydrogen Strategy (2020)

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Discussion

THE NATIONAL HYDROGEN STRATEGY (2020)



- Inter-ministerial strategy of the federal government
- Acknowledgement of the role of hydrogen in the energy system
- Integration of ongoing and planned programs of the government
- Definition of additional necessary measures
- 38 concrete measures across the complete value chain
- Budget: 7 billion Euro (national) + 2 billion Euro (international)
- Focus on green hydrogen

THE NATIONAL HYDROGEN STRATEGY COMBINES 38 MEASURES

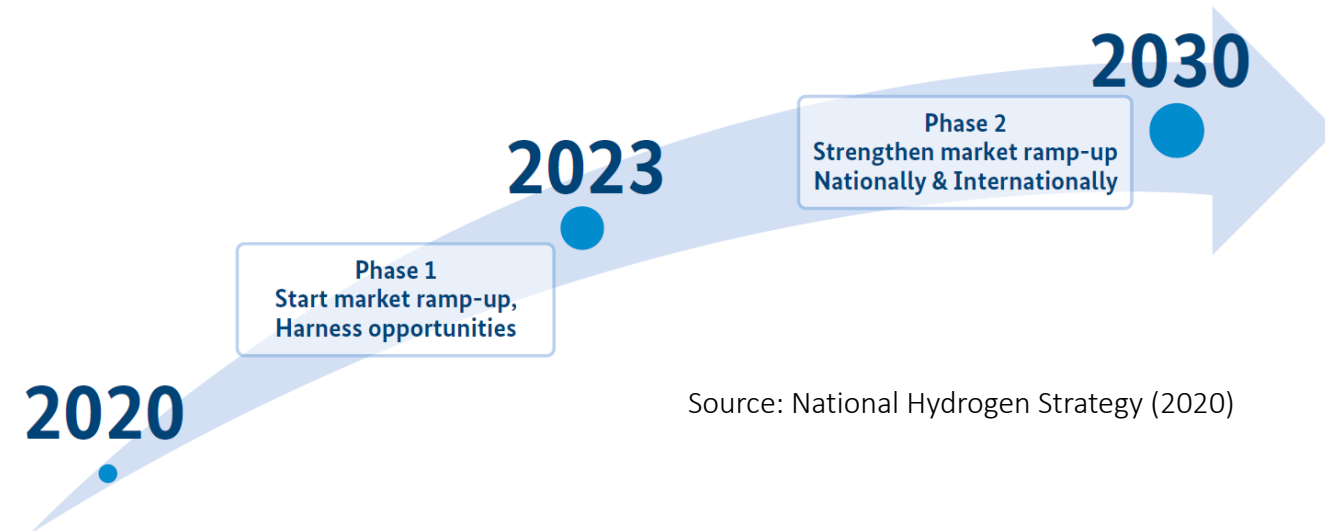
Integration of new, planned and ongoing measures of the federal ministries



- 7 billion €
 - H2 Production** (4 measures)
 - H2 Applications**
 - Mobility (9 measures)
 - Industry (4 measures)
 - Heating (2 measures)
 - H2 Infrastructure & Supply** (3 measures)
 - Research, Development & Innovation** (7 measures)
- 2 billion €
 - European H2 Activities** (4 measures)
 - International H2 Market** (5 measures)

Overall target

Initiation of the market ramp-up and value creation in Germany



Source: National Hydrogen Strategy (2020)

HYDROGEN USE IN TRANSPORT SECTOR

Measures 5 to 13: Fuel cell applications and power-based fuels

Goal

Ramp up of fuel cell applications over all segments and respective infrastructure as well as power-based fuels.

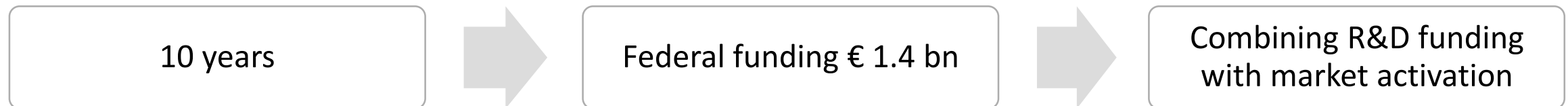
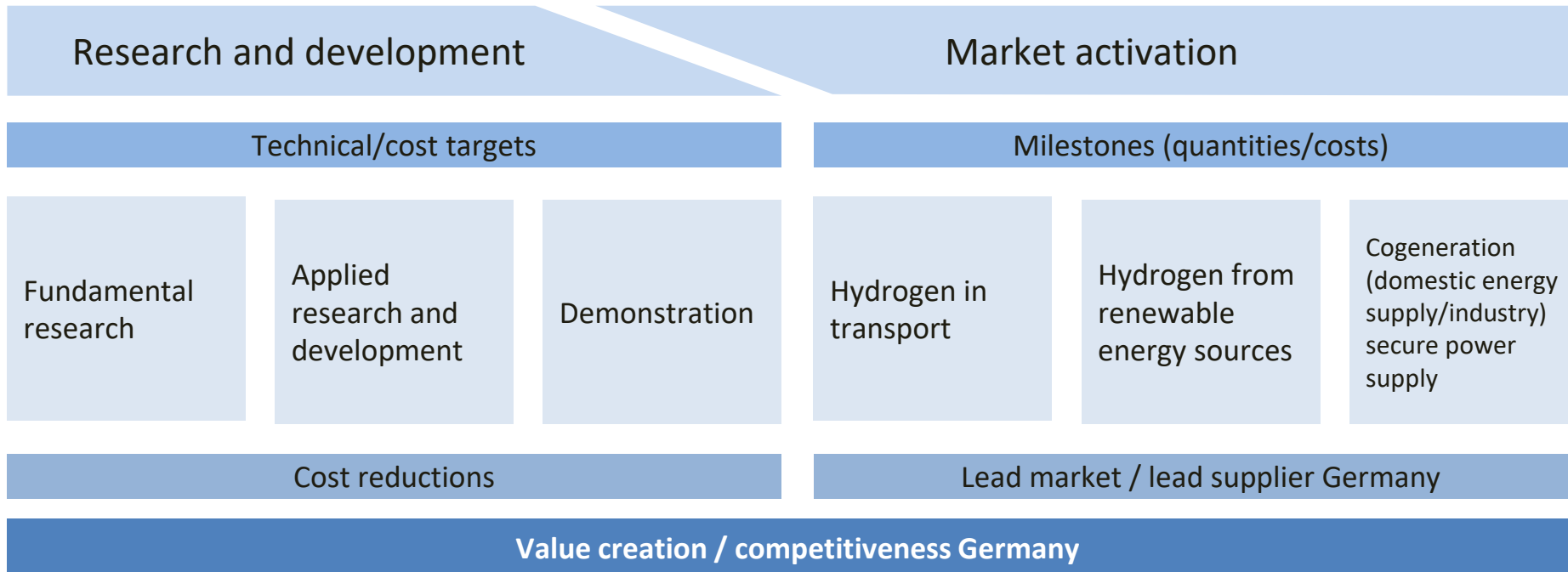
Measures

5. Implementation of Renewable Energy Directive II
6. Strengthen National Innovation Program HFC
7. Support for power-based liquid fuels
8. Support a respective infrastructure for hydrogen powered vehicles
9. Support the development of next phase of AFID (Alternative Fuels Infrastructure Directive) on the European Level
10. Establishment of a supply industry for fuel cell systems
11. Target driven development of Clean Vehicle Directive
12. Carbon-based differentiation of truck toll
13. International harmonization of standards (RCS)













NIP2 2016 - 2026

Measure 6: National Innovation Program Hydrogen and Fuel Cell Technology (NIP)



CURRENT FUNDING PROGRAMS AND CALLS

Focus on busses and commercial vehicles (plus infrastructure)

	 Vehicles		 Infrastructure	 Renewable Fuels	
Topic	Commercial Vehicles	Buses	Hydrogen refueling station	R&D funding for renewable fuels	CAPEX funding for renewable fuels
Funding directive / -call	Funding for <ul style="list-style-type: none"> vehicle procurement (N1, N2, N3) operational refueling/charging infrastructure BEV, FCEV, trolley system (only vehicles) Feasibility studies 	Funding for <ul style="list-style-type: none"> vehicle procurement (M2, M3) operational refueling/charging infrastructure BEV, FCEV Feasibility studie 	National Innovation Programme Hydrogen and Fuel Cell Technology (NIP) Call for public HRS 	Submission of projects started (1. Deadline 30.09.) 	Expected until end of 2021 
				Development platform for PtL fuels Call for funding available 	Market ramp-up Power-to-Liquid Kerosene Market test call in progress 

INVESTMENT FUNDING OF HRS

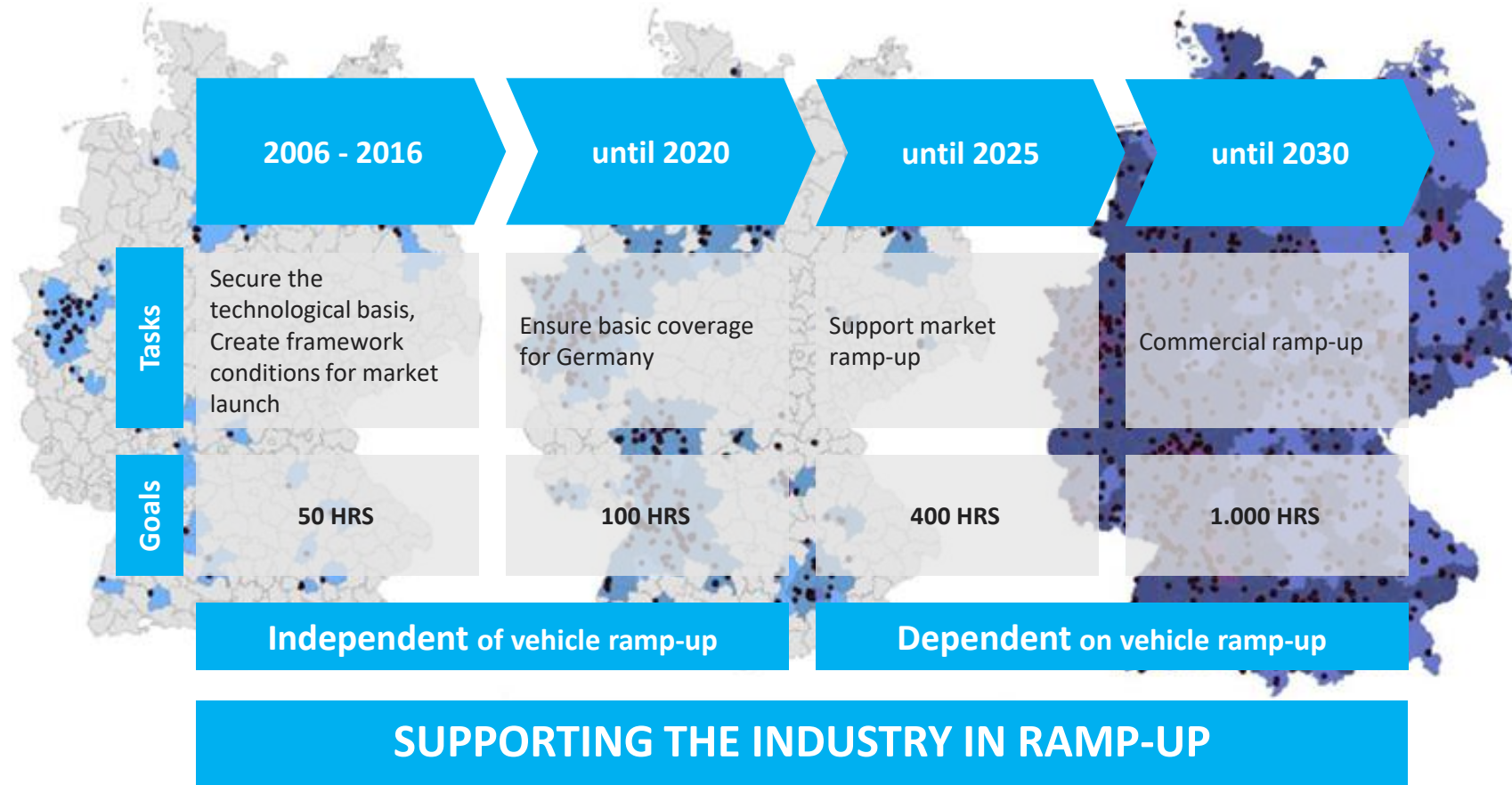
By federal ministry of transport and digital infrastructure on basis of GBER

Subject of funding	<ul style="list-style-type: none">• Construction and expansion of publicly accessible hydrogen refuelling stations for refuelling of road vehicles (with focus on commercial vehicles).• Electrolysis plants for the production of hydrogen from 100% renewable electricity
Funding rate	<ul style="list-style-type: none">• Filling station: up to 80% of eligible investment expenditure• Electrolyser: up to 45% of eligible investment expenditure
Conditions	<ul style="list-style-type: none">• Supply of the funded refuelling infrastructure with 100% renewable hydrogen*.• Presentation of an economically viable operation of the filling station in the medium to long term
Information	<ul style="list-style-type: none">• Submission possible until 31.01.2022• In connection with calls of commercial vehicles funding programme

* 'renewable hydrogen' means hydrogen produced through the electrolysis of water (in an electrolyser, powered by electricity stemming from renewable sources), or through the reforming of biogas or biochemical conversion of biomass, if in compliance with sustainability criteria set out in Article 29 of Directive (EU) 2018/2001 of the European Parliament and of the Council (2).

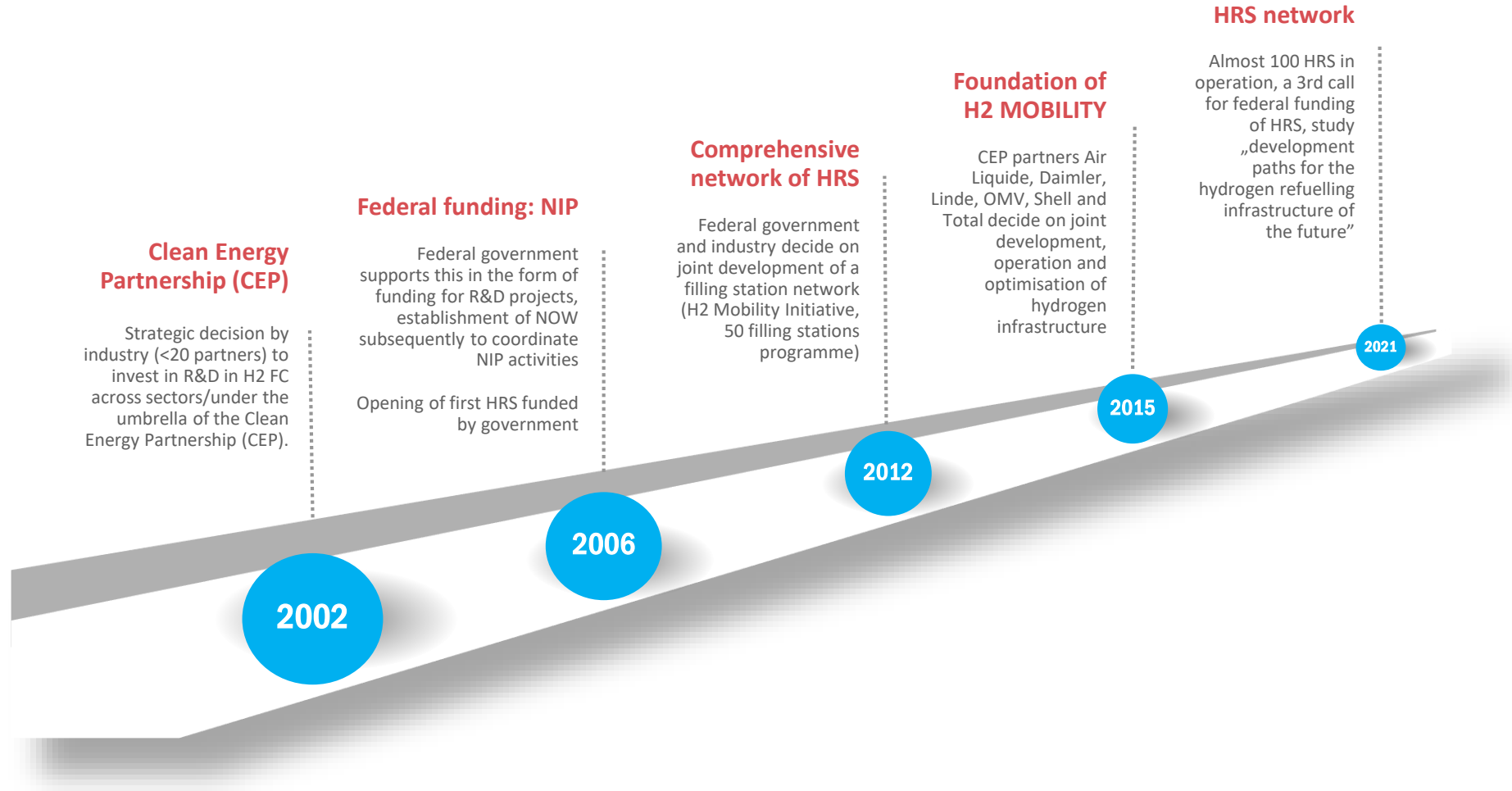
FEDERAL GOVERNMENT SET GOALS FOR HRS NETWORK

based on AFID



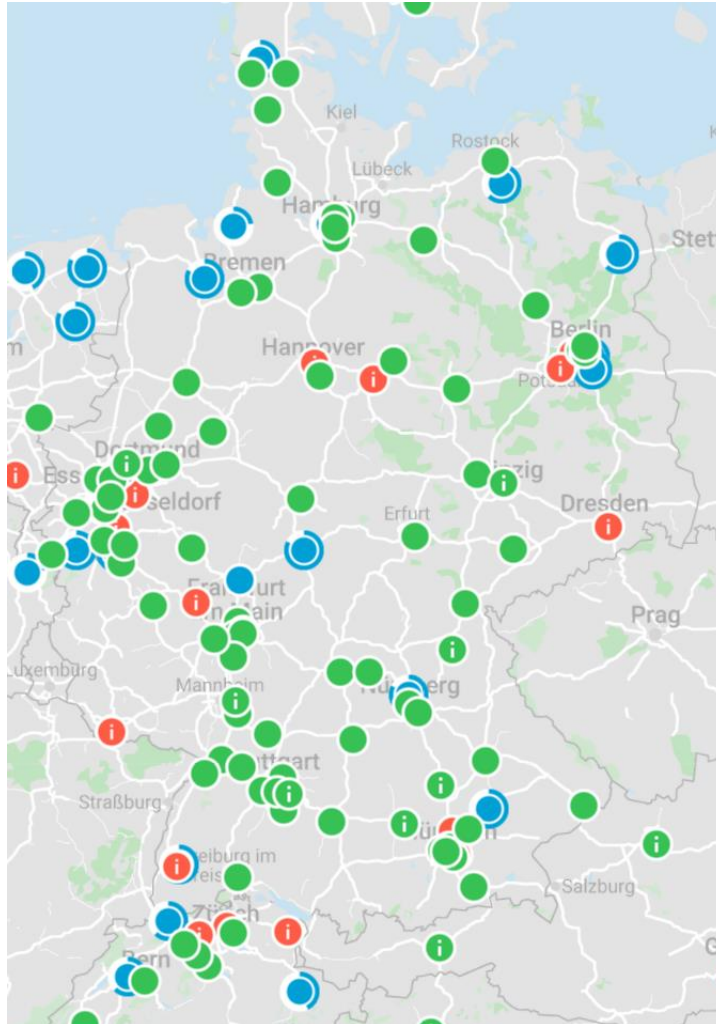
IT WAS QUITE A JOURNEY

until a basic HRS network was established



700 BAR: 91 HRS ARE IN OPERATION IN GERMANY

For passenger vehicles and waste collection vehicles



Current status

- 91 in operation (H2 MOBILITY: 85)
- 2 completed
- 6 under construction
- 5 in approval process
- 2 in planning

Funding programme

- Regional funding: 2
- National funding (NIP I&II): 69
- EU funding (H2ME, COHRS, SWARM): 39

350 BAR: 10 HRS ARE IN OPERATION IN GERMANY

For busses and LDV



Current status

- 10 in operation (H2 MOBILITY: 6)
- 3 completed
- 4 under construction
- 2 in planning

HYDROGEN IS IN PRICE PARITY TO GASOLINE

For passenger vehicles



EUR 9,50 / kg



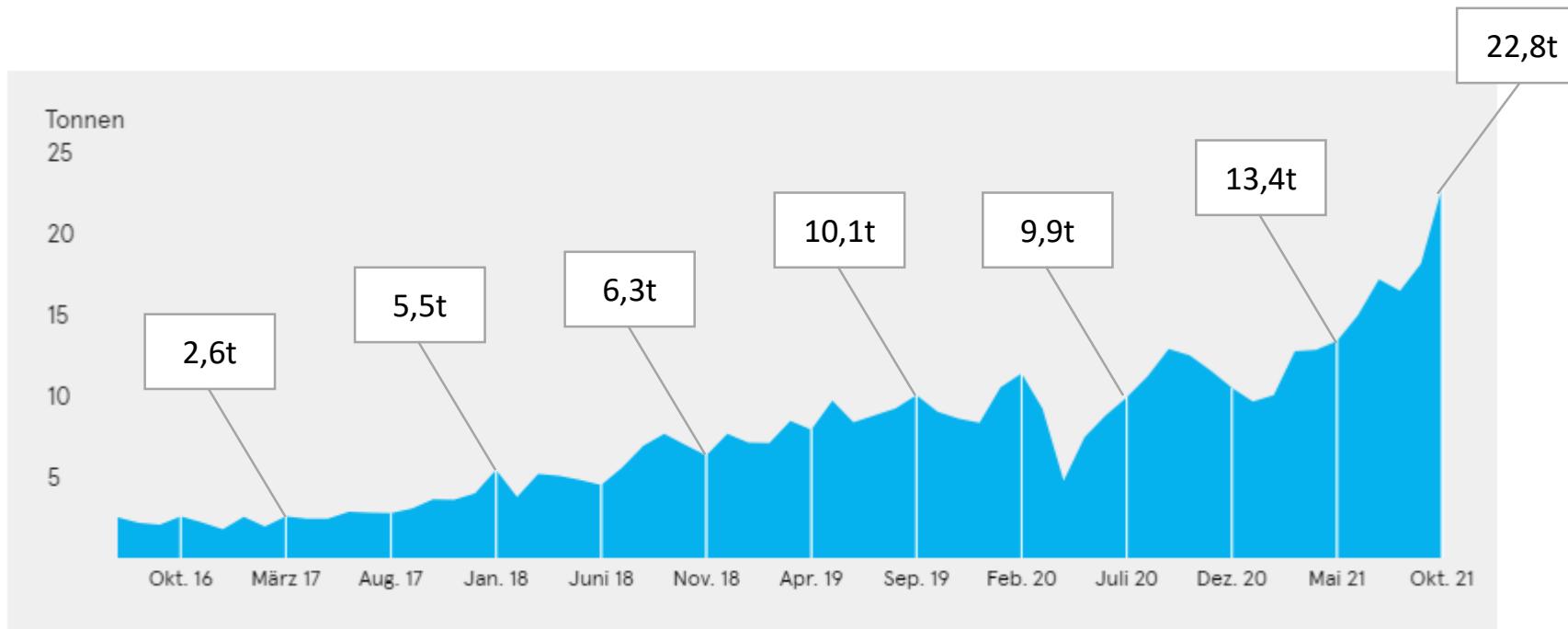
EUR 10,00 / kg



700 bar: ø 4 kg/refueling process

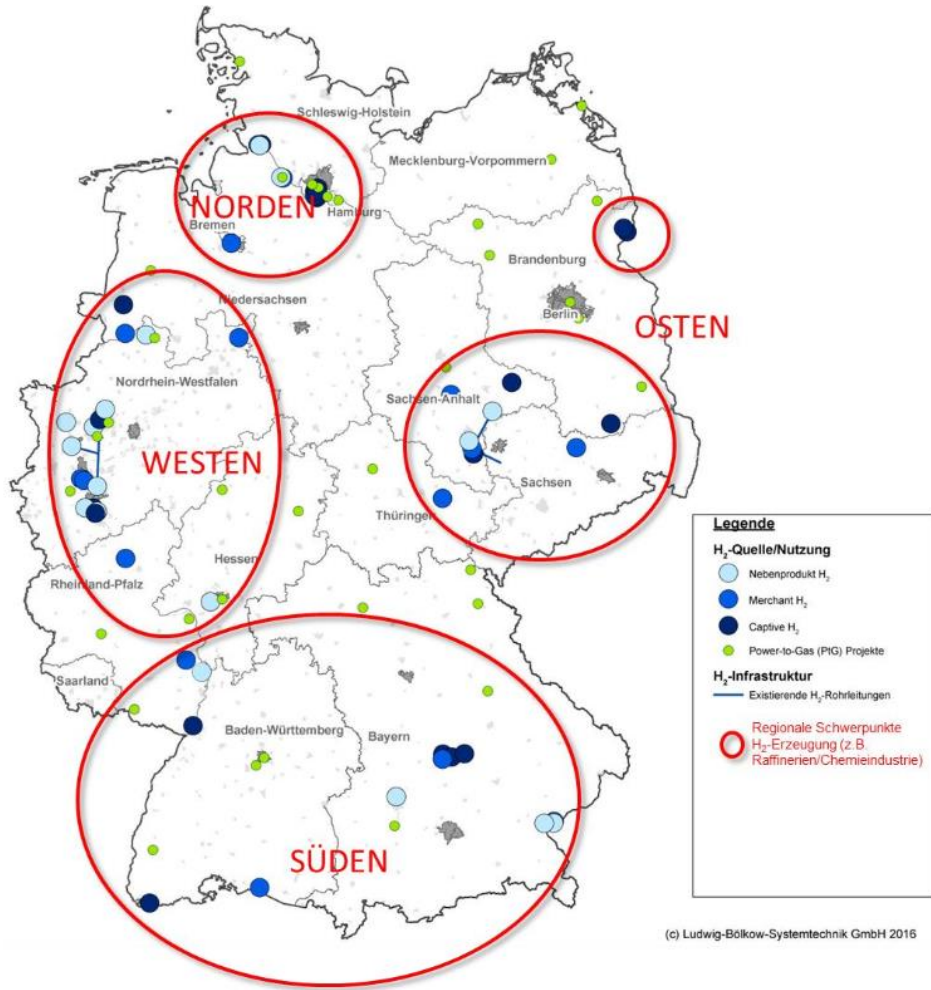
HYDROGEN DEMAND RISES

At H2 Mobility stations



HYDROGEN SOURCES IN GERMANY

Currently: H₂ delivery to HRS mostly by trailer

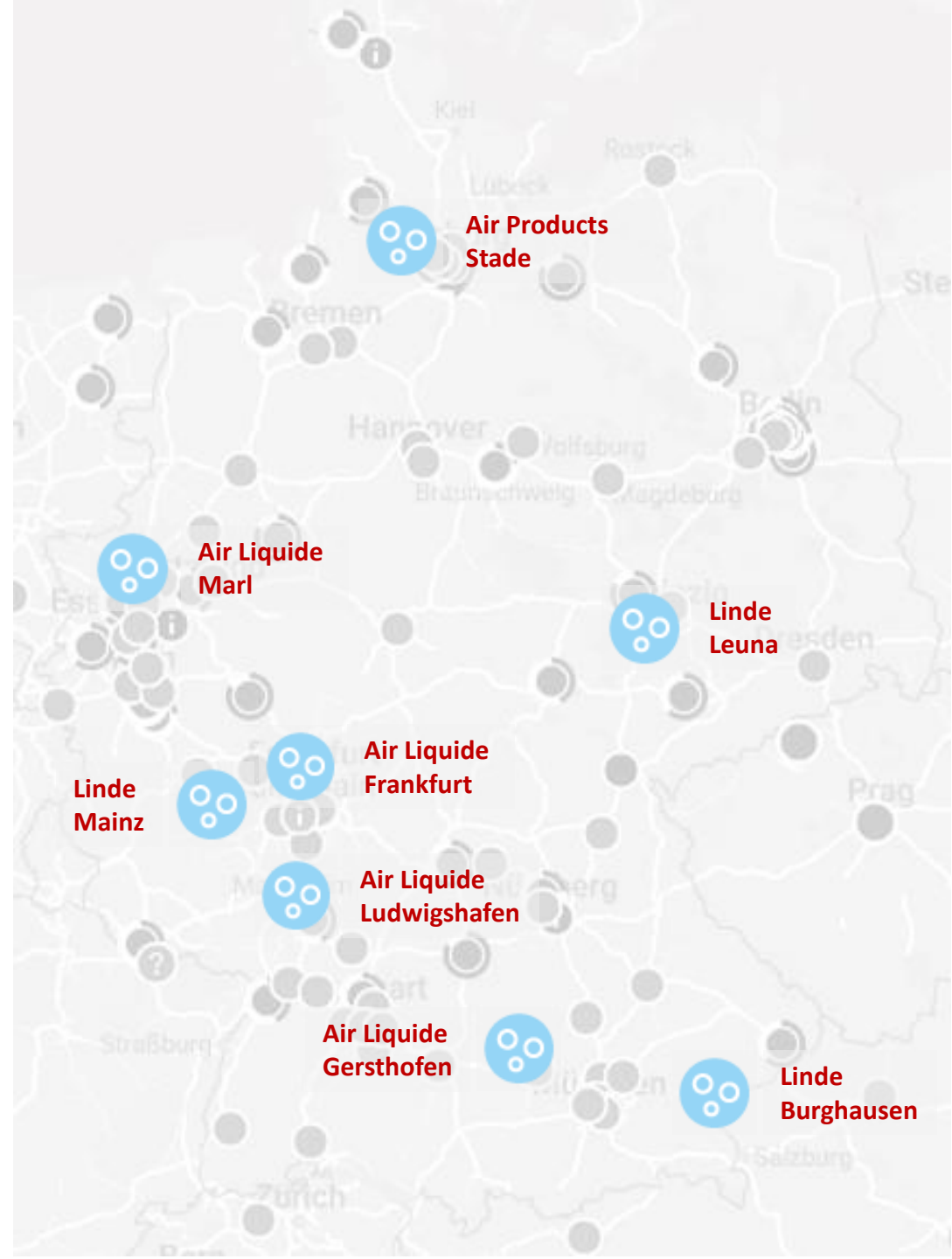


(c) Ludwig-Bölkow-Systemtechnik GmbH 2016

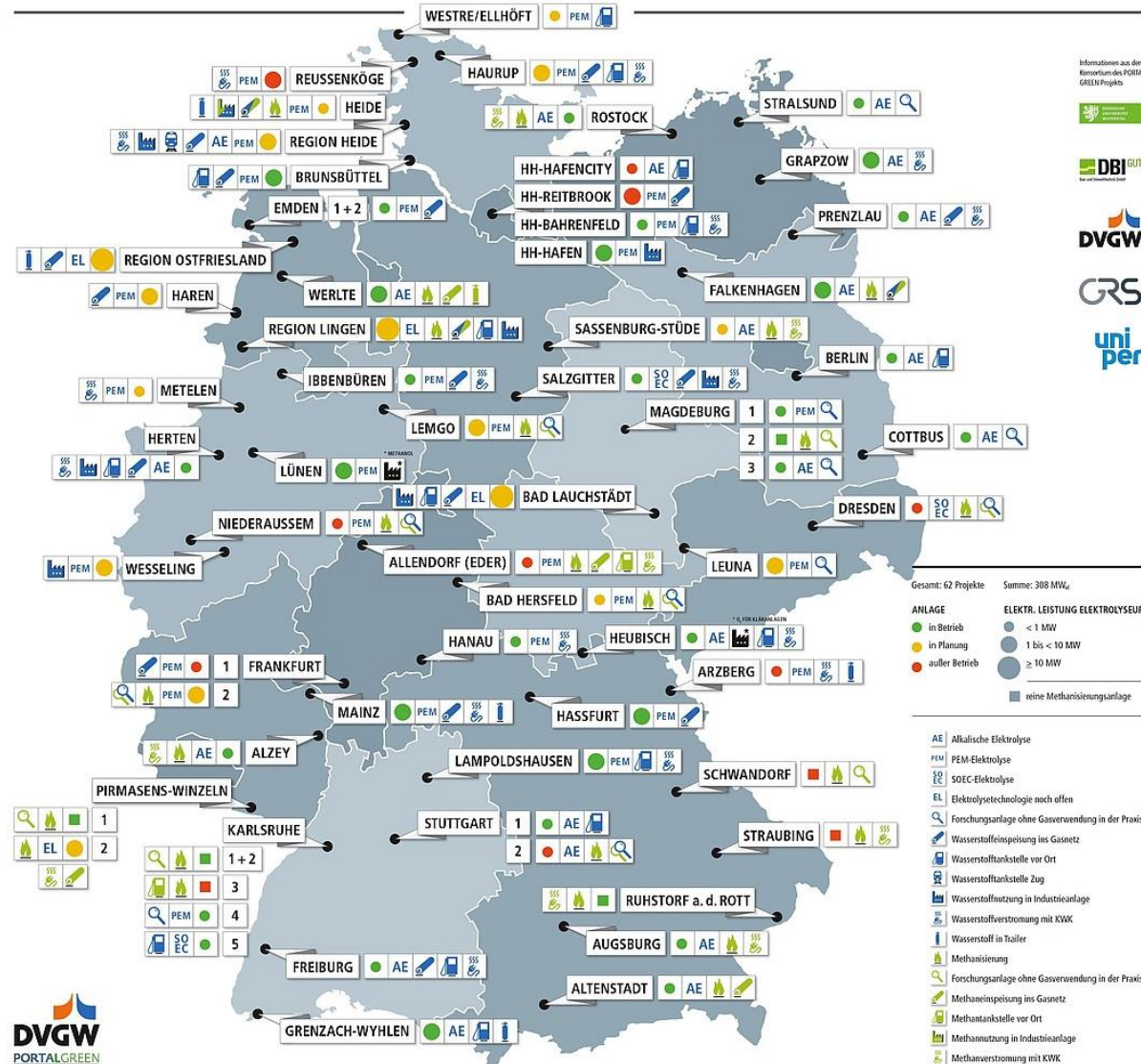
- Linde**
- Leuna (Pipeline)
 - Mainz
 - Burghausen

- Air Liquide**
- Marl (Pipeline)
 - Ludwigshafen
 - Frankfurt/Hoechst

- Air Products**
- Stade



MORE THAN 35 PLANTS PRODUCE GREEN H2 IN GERMANY



Thank you for your
attention.
Time for your questions!



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