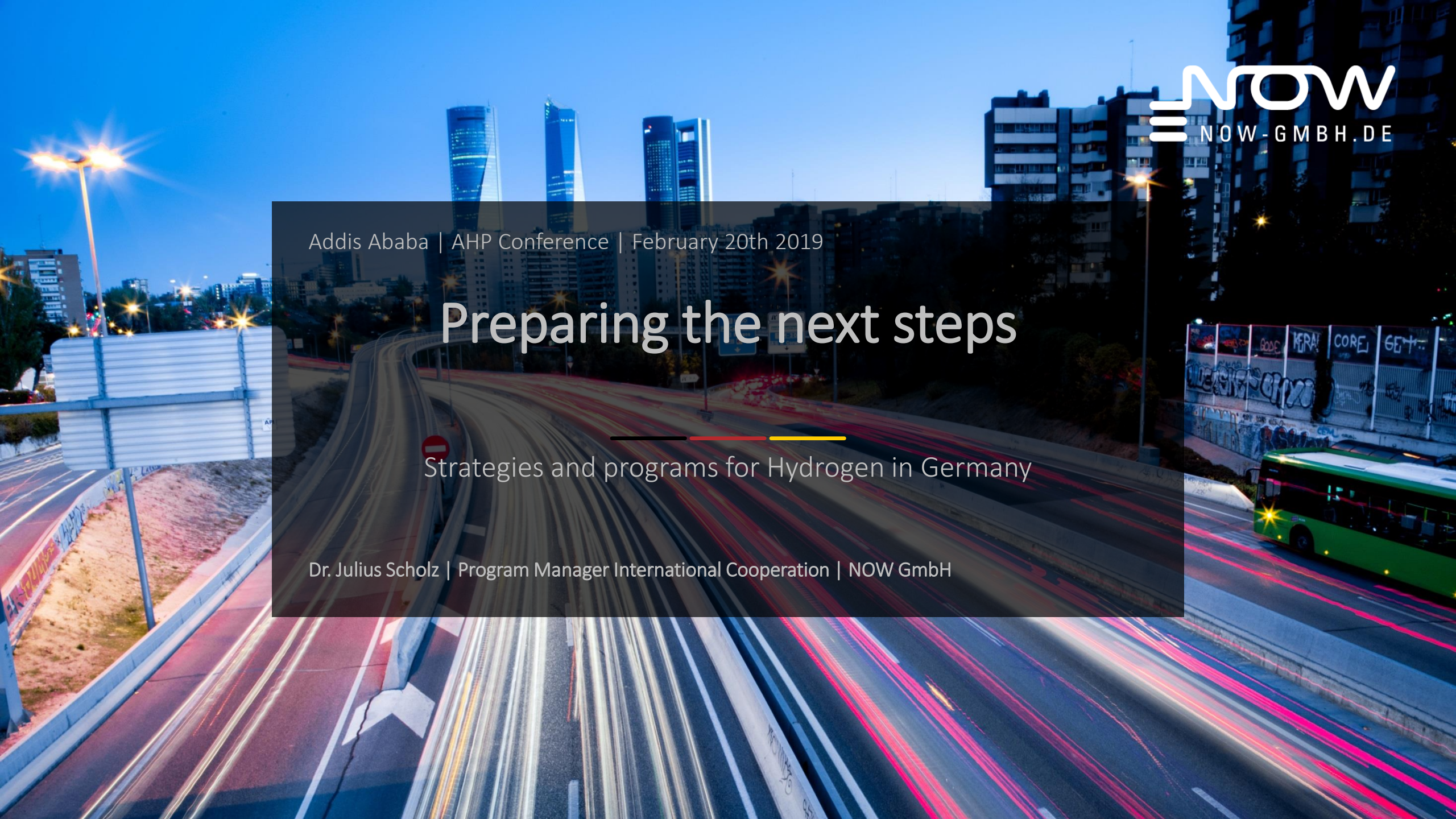

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Addis Ababa | AHP Conference | February 20th 2019

Preparing the next steps

Strategies and programs for Hydrogen in Germany

Dr. Julius Scholz | Program Manager International Cooperation | NOW GmbH

TOWARDS ZERO EMISSION MOBILITY

Integrated implementation of German national funding programmes by NOW GmbH

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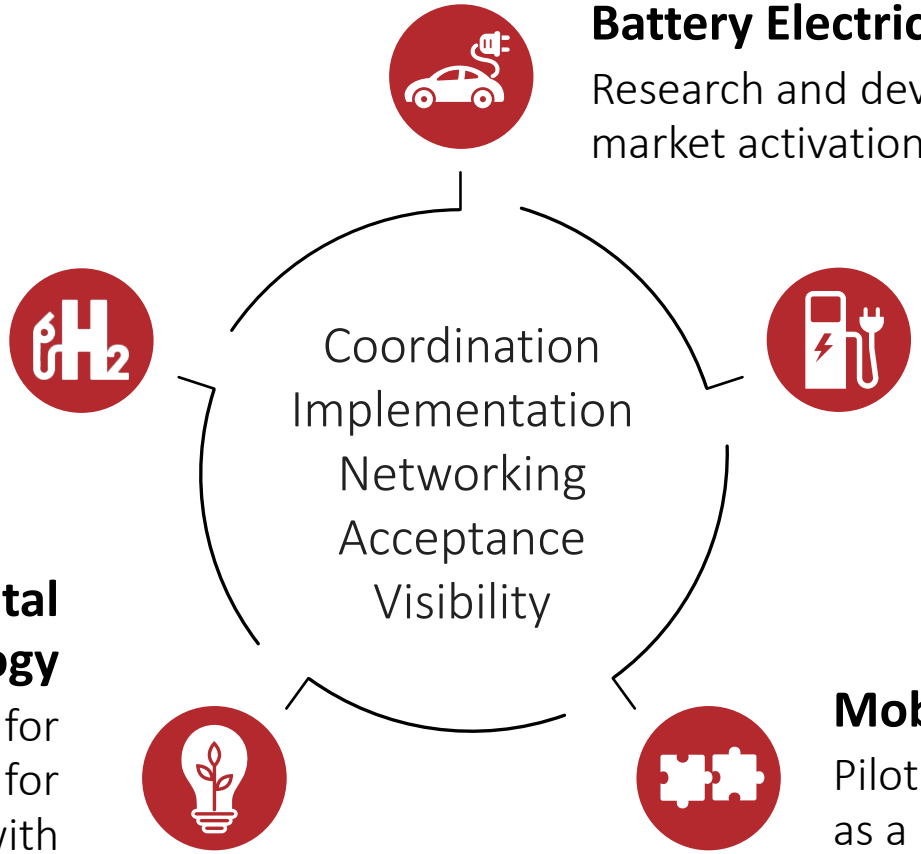


Battery Electric Mobility

Research and development, market activation, concepts

Charging Infrastructure+

Nationwide buildup, normal and fast charging

Mobility and Fuels Strategy

Pilot projects, alternative fuels, LNG as a marine fuel

NIP*

Research and development, market activation

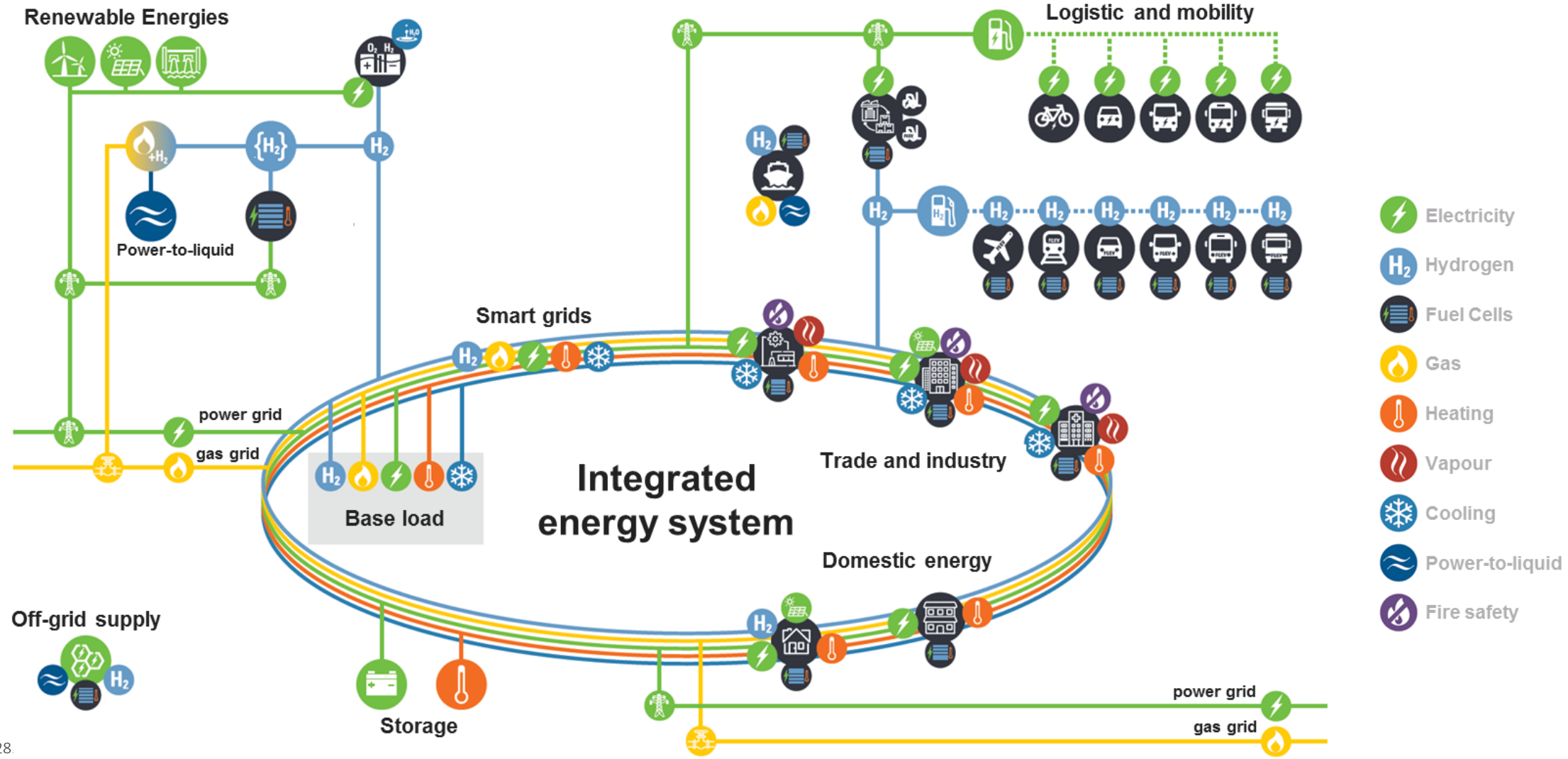
Export Initiative Environmental Technology

German-Japanese cooperation for PtG, development cooperation for H2/FC technologies, cooperation with the GIZ

*National Innovation Programme Hydrogen and Fuel Cell Technology

+ National centre for charging infrastructure

THE ROLE OF HYDROGEN IN TOMORROW'S INTEGRATED ENERGY SYSTEM



CURRENT POLITICAL DEVELOPMENTS

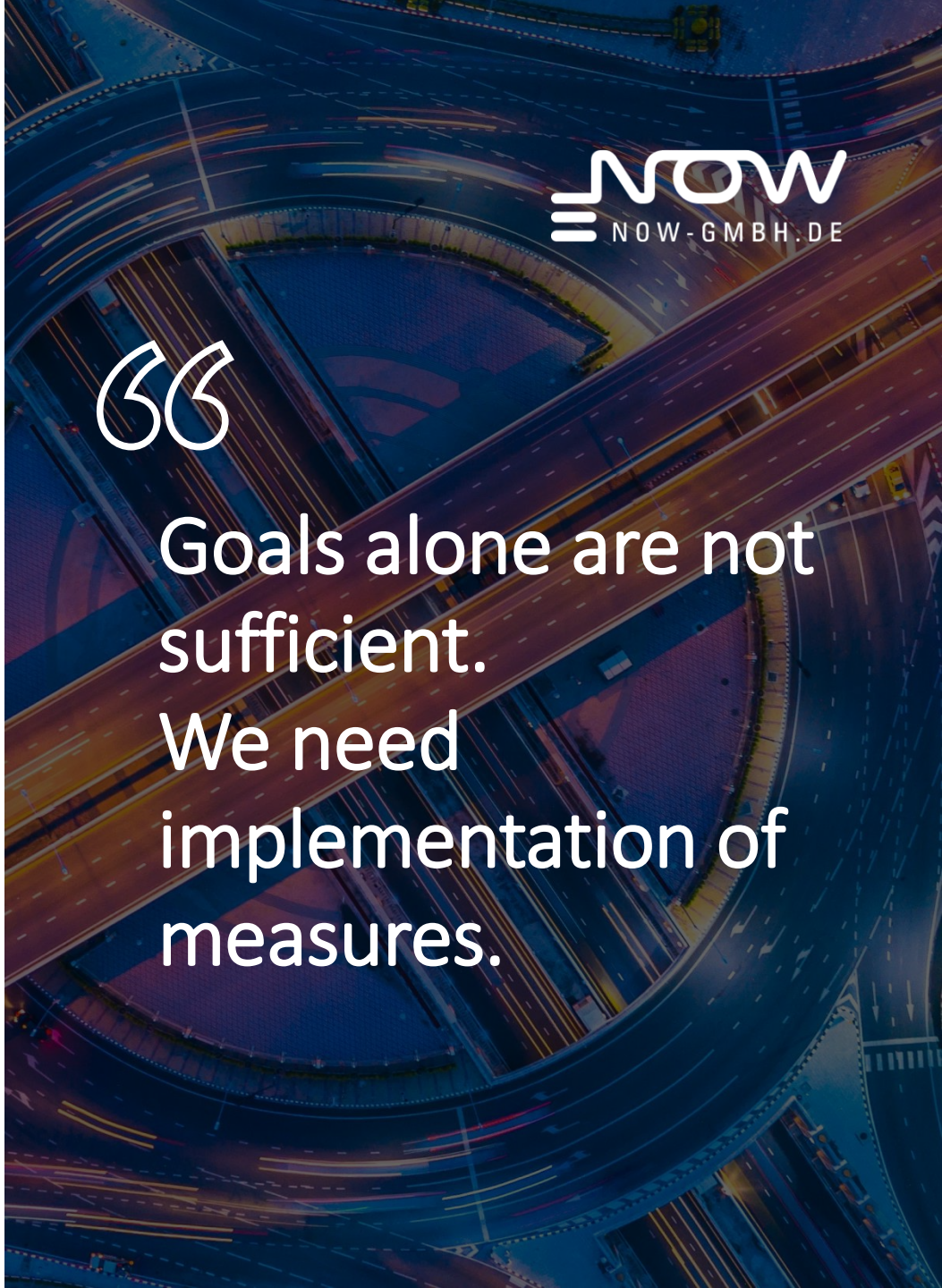
Various political Strategies & Funding programs

Strategies

- Hydrogen Strategy North-Germany
- National Hydrogen strategy
- Dialog-process Gas 2030
- Climate protection plan 2030
- PtX action plan

Funding

- International Climate Initiative
- Real life laboratories for the Energy-transition
- HyLand-Funding program
- Climate protection energy intensive industries
- National Innovation program



NATIONAL HYDROGEN STRATEGY (DRAFT)

Coordination of activities in different sectors and for different applications

The challenge:

- Seven ministries involved
- Stakeholder conferences with > 700 attendees
- Various existing programs and approaches

The draft:

- 31 measures to establish domestic market to scale technology and increase international collaboration
- Focus on industry and mobility
- Establishment of council to coordinate continuous stakeholder dialogue and re-evaluation of strategy

2023 **2030**

Establishment of Hydrogen council → First evaluation of strategy → 3-5 GW Electrolysis

Potential:

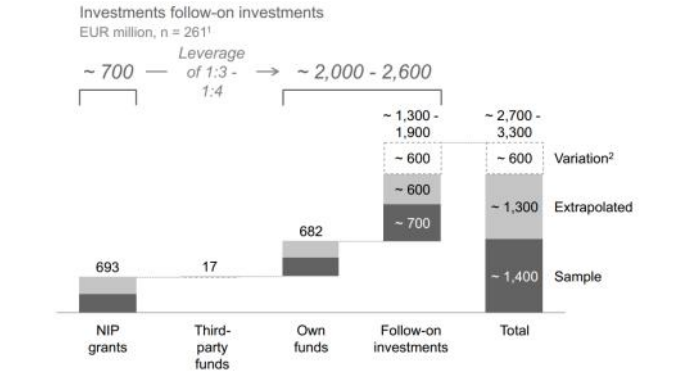
- Safeguard Germany's technology leadership
- Fulfilment of national climate targets
- Enable export of technology and resources

WHAT HAVE WE BEEN DOING SO FAR

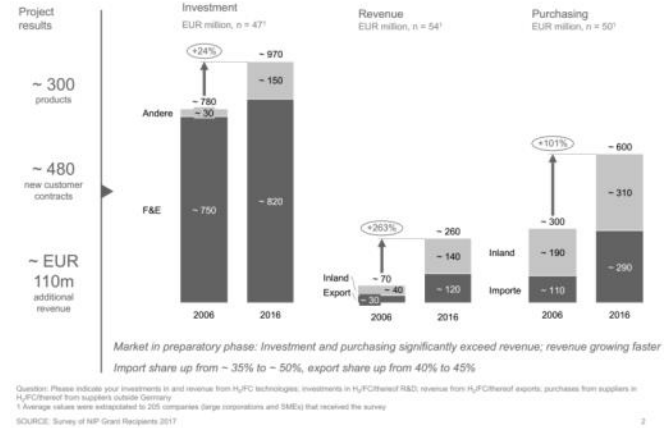
1

THE NATIONAL INNOVATION PROGRAM HYDROGEN AND FUEL CELL TECHNOLOGY (NIP) PHASE 1 (2007 – 2016)

…TRIGGERED FOLLOW-ON-INVESTMENTS



…ACCELERATED MARKET DEVELOPMENT



…710 MILLION EURO PUBLIC R&D FUNDING

Scale, EUR m: 10 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400

Total volume and grant proportion

	Basic research¹	Applied R&D¹	Demonstration projects¹	Market activation²	Support activities¹	Total
Transport	44 (46%)	471 (49%)	238 (49%)	-	0 (41%)	754
Household power	4 (49%)	165 (48%)	33 (49%)	13 (39%)	9 (48%)	223
Special markets	4 (46%)	109 (53%)	40 (48%)	3 (45%)	-	152
Industry	8 (46%)	32 (60%)	76 (46%)	-	1 (46%)	120
Transversal topics	6 (88%)	67 (60%)	1 (43%)	-	8 (43%)	83
H_2 production	5 (86%)	18 (59%)	30 (50%)	-	2 (100%)	55
Total	71	863	418	16	21	1,415³

…SAFEGUARDED GERMANY'S POSITION AS TECHNOLOGY LEADER

GOVERNMENT PROGRAMME 2016 - 2026

for the continuation of the NIP

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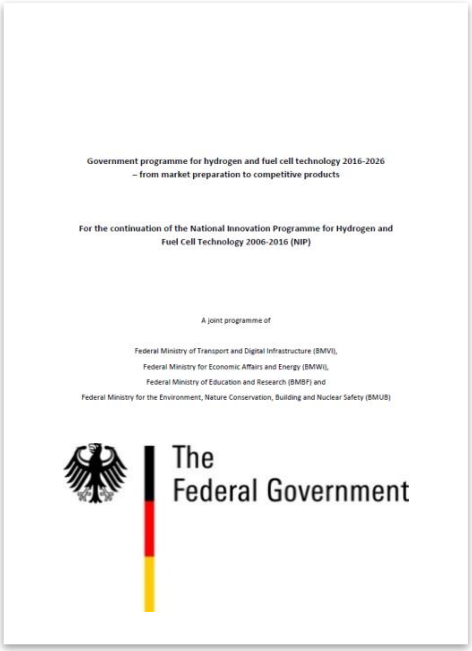
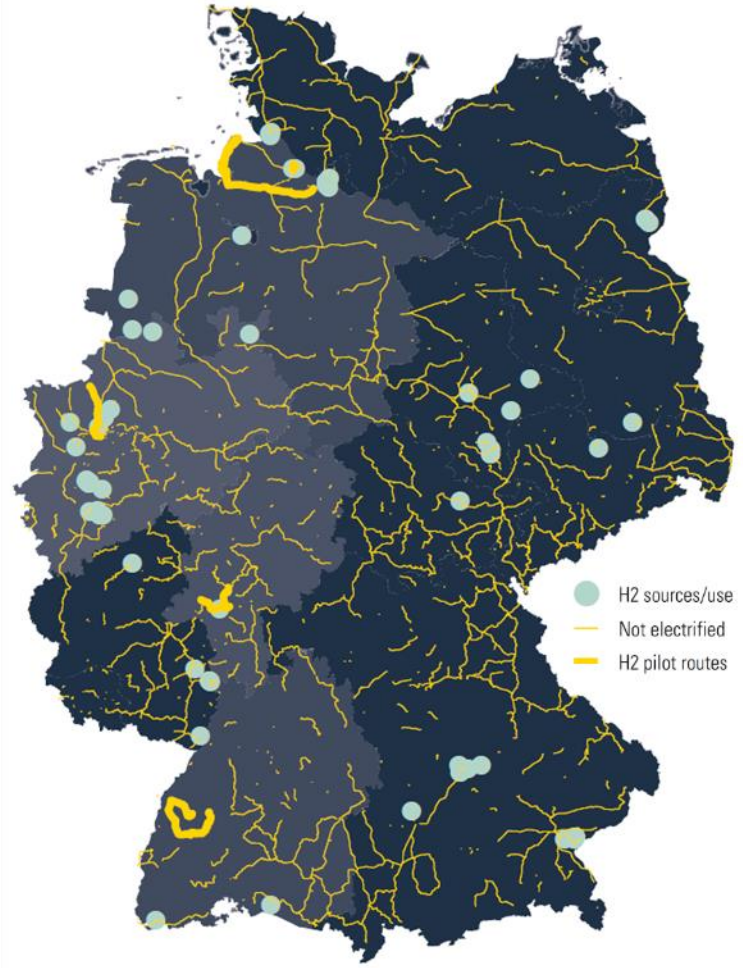
Research and development			Market activation		
Technical/cost targets			Milestones (quantities/costs)		
Fundamental research	Applied research and development	Demonstration	Hydrogen in transport	Hydrogen from renewable energy sources	Cogeneration (domestic energy supply/industry) secure power supply
Cost reductions			Lead market / lead supplier Germany		
Value creation / competitiveness Germany					



10 years → Federal funding € 1.4 bn → Combining R&D funding with market activation

RAIL

1000 km range, 15 minutes refueling



SUCCESS STORY CORADIA ILINT

From R&D to Market launch

Federal financial funding amounting to **9.04 million €** for the projects **BetHy & BetHy2** by **Alstom** for the development, validation and admission of the hydrogen train **Coradia iLint**

November 2014 – September 2019

Alstom receives the admission for passenger service within the German rail network for the Coradia iLint

July 2018

Publication of the study „**Hydrogen Infrastructure for Rail Transport**“ through the federal ministry for transport

2016

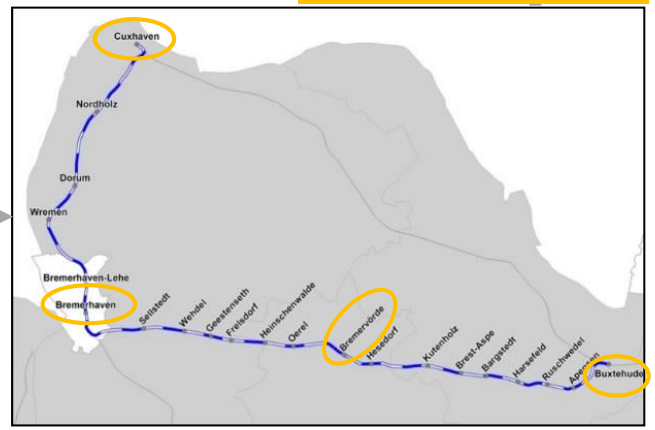
Start of the trial operation of the Coradia iLint on the route Cuxhaven – Bremerhaven – Bremervörde – Buxtehude in Lower Saxony

September 2018

December 2021

Start of regular operation with 14 Coradia iLint

Supported via the market activation guideline under NIP II



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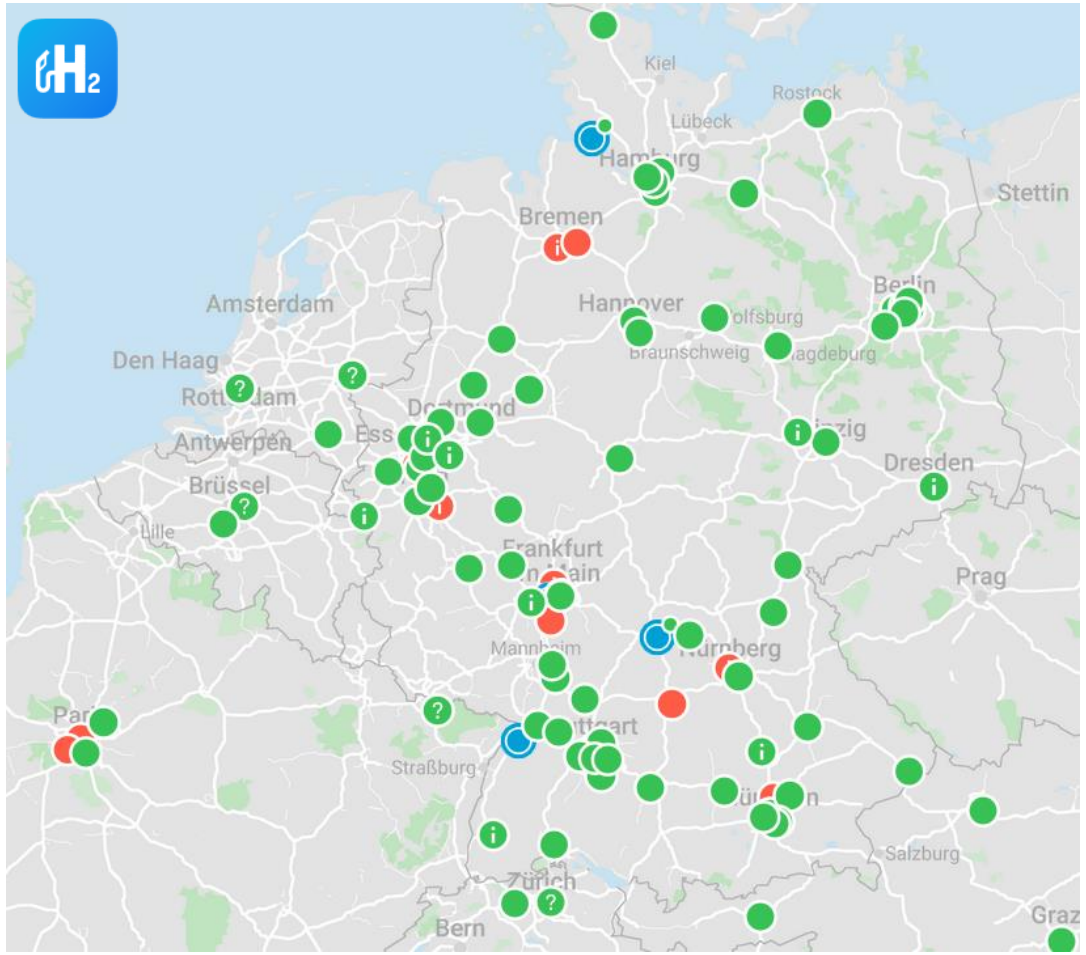
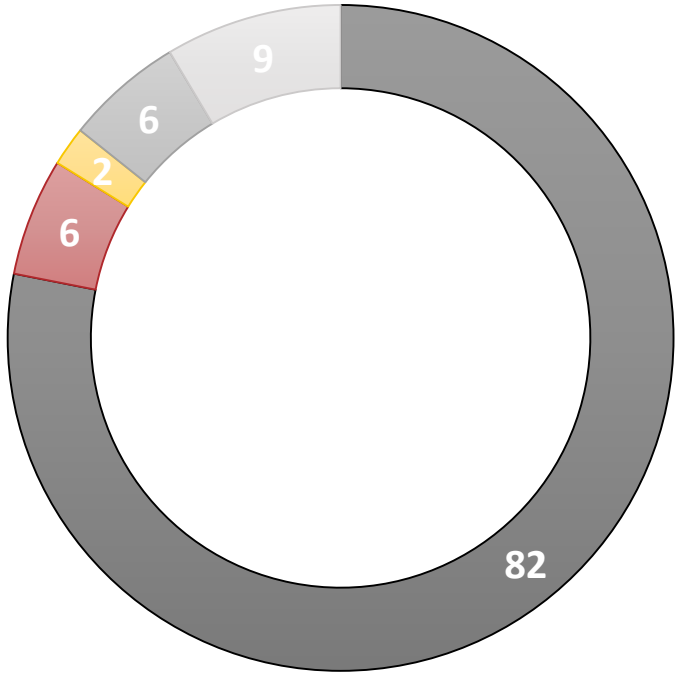
“

The budget of the federal ministry of transport and digital infrastructure (BMVI) will provide 52.7 Million Euros more in subsidies for sustainable rail transport by 2022.

H2 REFUELING STATION NETWORK – STATUS & OUTLOOK





in Operation completed under construction Approval planning

Great success of collaboration in long standing international expert workshops

NEXT STAGE OF DEPLOYMENT

2

Target

Support of regional concepts for the integration of hydrogen and fuel cells as well as measures to increase knowledge and increase acceptance (in the transport sector and in other sectors)

FUNDING POLICY BACKGROUND

Driver

– Climate protection goals => System change towards renewable energies necessary

Target

– Continuously increase the share of renewable energies => efficiently link sectors with each other

– Hydrogen and fuel cells => significant contribution as system technology

Task

– Funding instruments to prepare for the market upturn in a demand-oriented and flexible manner

CURRENT STATUS

Analysis

– H2 and BZ applications => ready for the market, low market penetration

Cause

– limited range of vehicles; initially higher investment and operating costs for vehicles and infrastructure; information and knowledge

Requirement

– Compare potentials and costs of the respective technologies (feasibility, economy) => basis for implementation

OTHER INITIATIVES

EU level

– Calling Hydrogen Regions => H2 Valleys

States

– Own measures => NRW and Baden-Württemberg

Industry

– CEP plans to initiate cluster => CEP H2 cluster

NIP COMPETITION FOR H2 REGIONS IN GERMANY

HYLAND
WASSERSTOFFREGIONEN IN DEUTSCHLAND

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HYSTARTER

Nine regions (138 applications)

Potential, not necessarily active so far

Service provider selects

2-year organizational and content consulting, network development, development of initial concept ideas

HYEXPERTS

13 regions (28 applications)

First experiences and expertise, local authority applied for

Competition, jury decision

Means for creating and calculating concrete project ideas (funding quota: 100%)

Budget: each Expert receives 300.000 € in funding

HYPERFORMER

three regions (6 applications)

Ready to implement

Competition, jury

Investment grants for the implementation of integrated regional concepts (production quotas analogous to NIP market activation)

Budget: each Performer receives a total of € 20 million in funding

KEY FEATURES OF HYPERFORMERS

All HyPerformers:

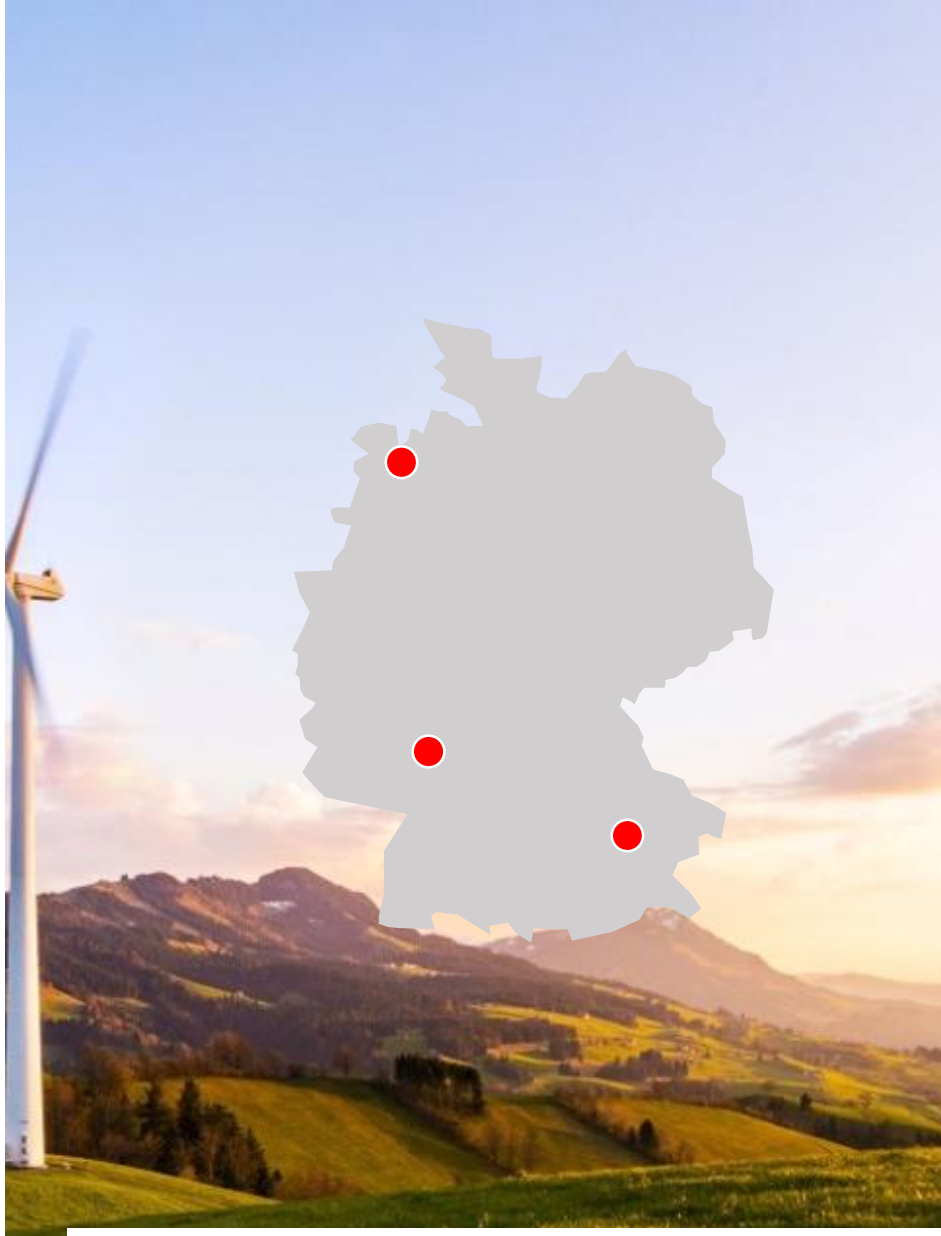
- Focus on mobility applications with foreseeable demand to trigger initial development
- Include regional hydrogen production from RE
- Link various sector and provide potential to link regions to form initial network
- Have strong industry commitment (Invest between 45 and 89 Mio. €)

Specific features include:

→ **Hy2Rivers** broad mobility applications linking stakeholder and projects along the Rhine-Neckar valley

→ **HyBayern** implementation of integrated concept with strong focus on intralogistics and buses

→ **Hyways for Future** leveraging the conditions in northern Germany with strong RE potential and gas caverns for long term storage and emphasis on logistics with trucks

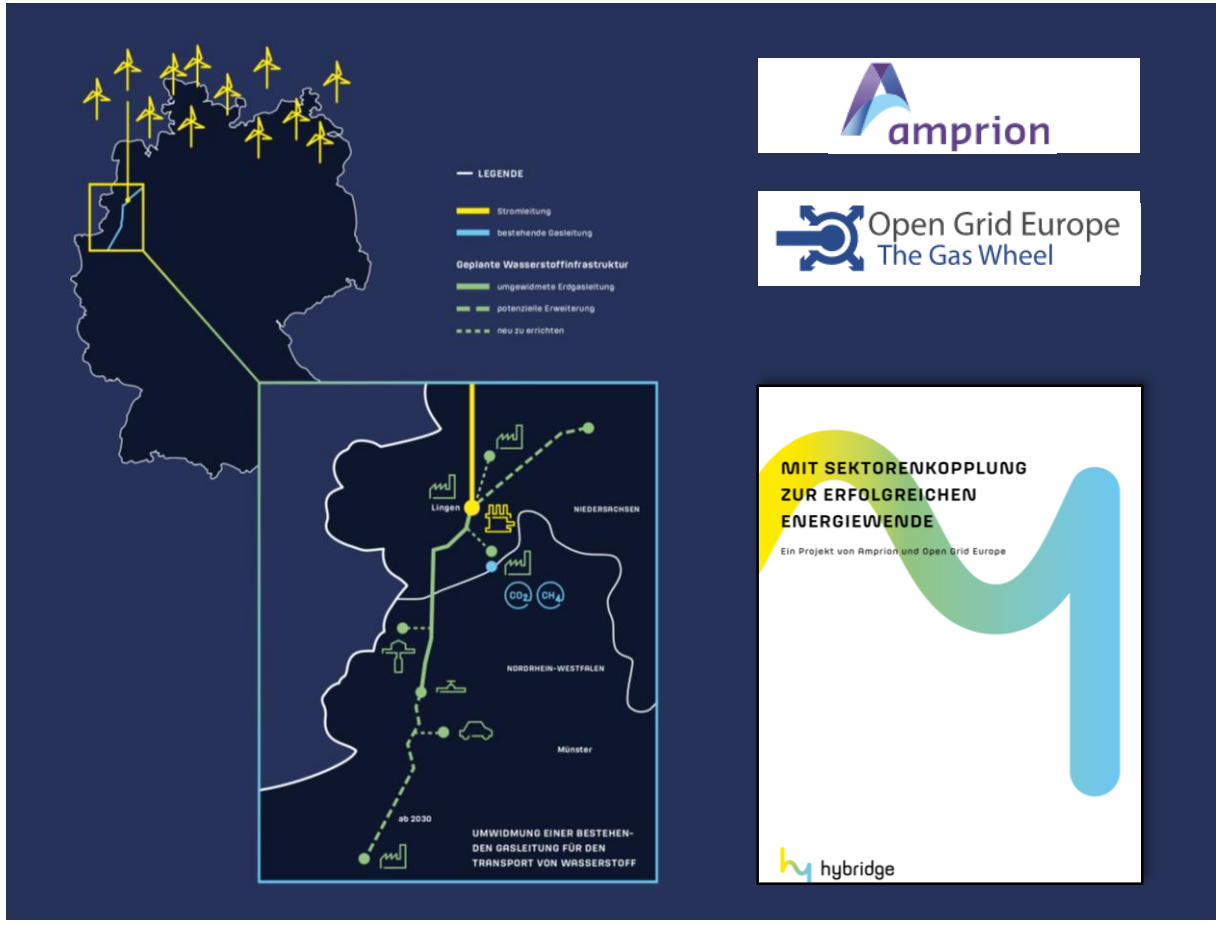


Gefördert durch: Bundesministerium für Verkehr und digitale Infrastruktur
Koordiniert durch: NOW-GMBH.DE
Projektträger: Projektträger Jülich Forschungszentrum Jülich

POWER AND GAS COMPANIES NEED HYDROGEN TECHNOLOGIES

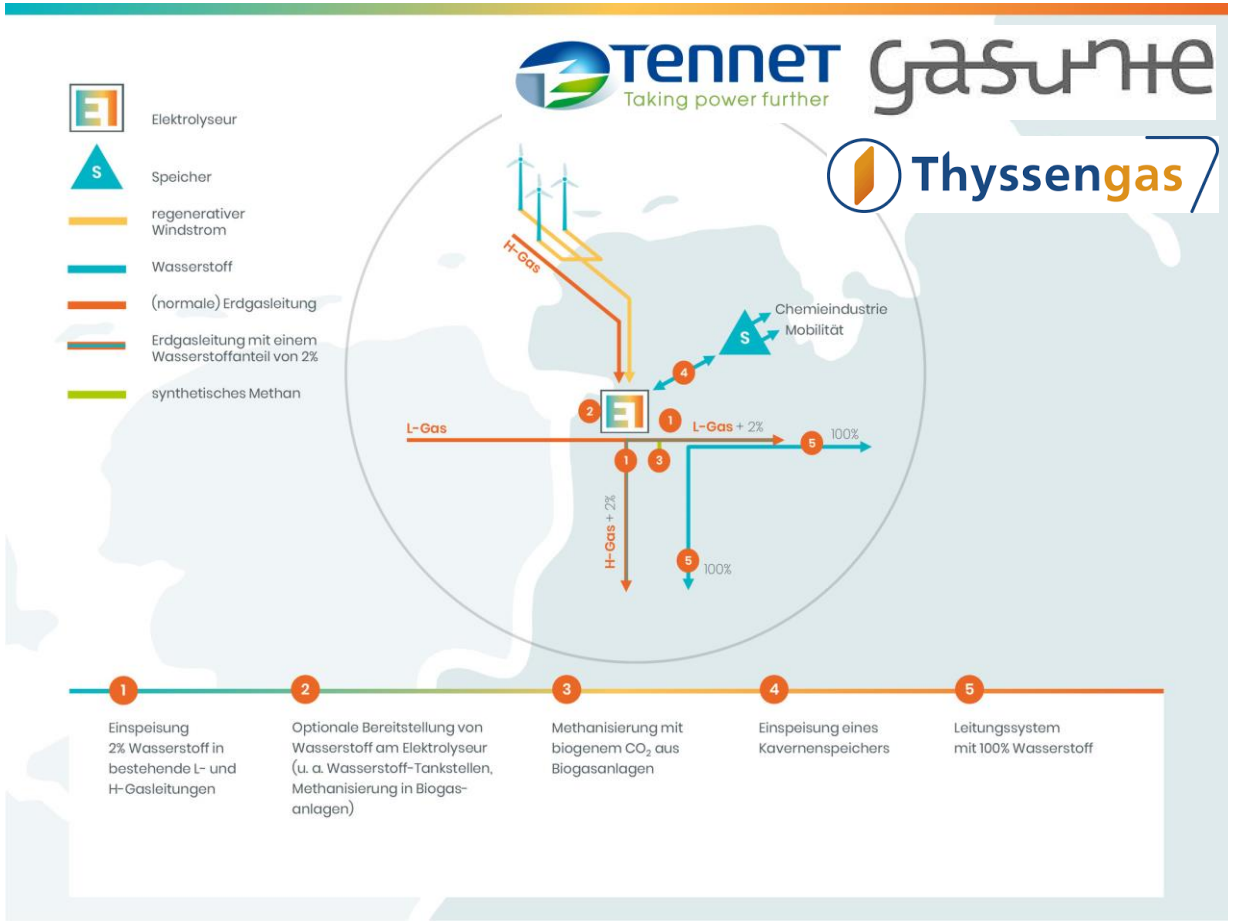
e.g. 100 MW projects proposed to manage increase of renewable energies

hybridge



Source: *www.ptg.amprion.net*

ELEMENT ONE



Source: *www.tennet.eu*

NATIONAL ACTIVITIES IN LINE WITH INTERNATIONAL APPROACH

Reallabore / HYLAND / …

H2 Valley

Mission Innovation IC#8

Potential of the Initiatives:

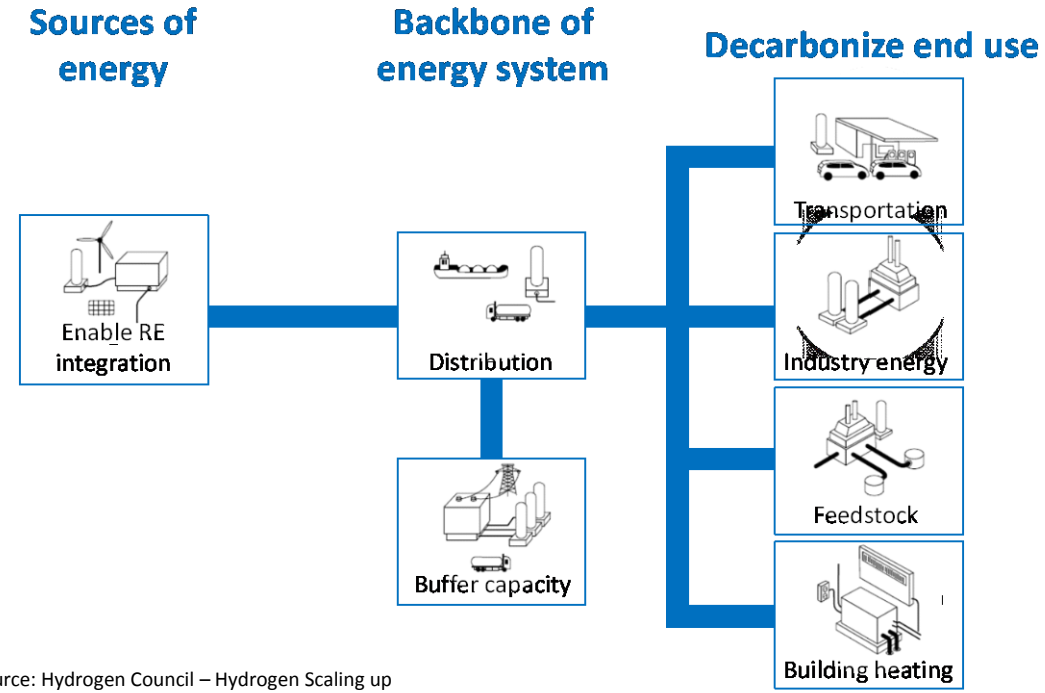
- Demonstration of and story line for H2 Technologies
- Stakeholder network
- Including existing initiatives
- Including national stakeholders in international activities
- Knowledge transfer and link between both national and international activities

Mission Innovation
Renewable and Clean Hydrogen Challenge

MISSION INNOVATION
accelerating the clean energy revolution

The approach

Recognizes hydrogen as a key technology for the energy transition



Source: Hydrogen Council – Hydrogen Scaling up

The objective

to accelerate the development of a global hydrogen market by identifying and overcoming key technology barriers to the production, distribution, storage and use of hydrogen at gigawatt scale:

- initiate R&D
- enable large scale projects
- information sharing platform

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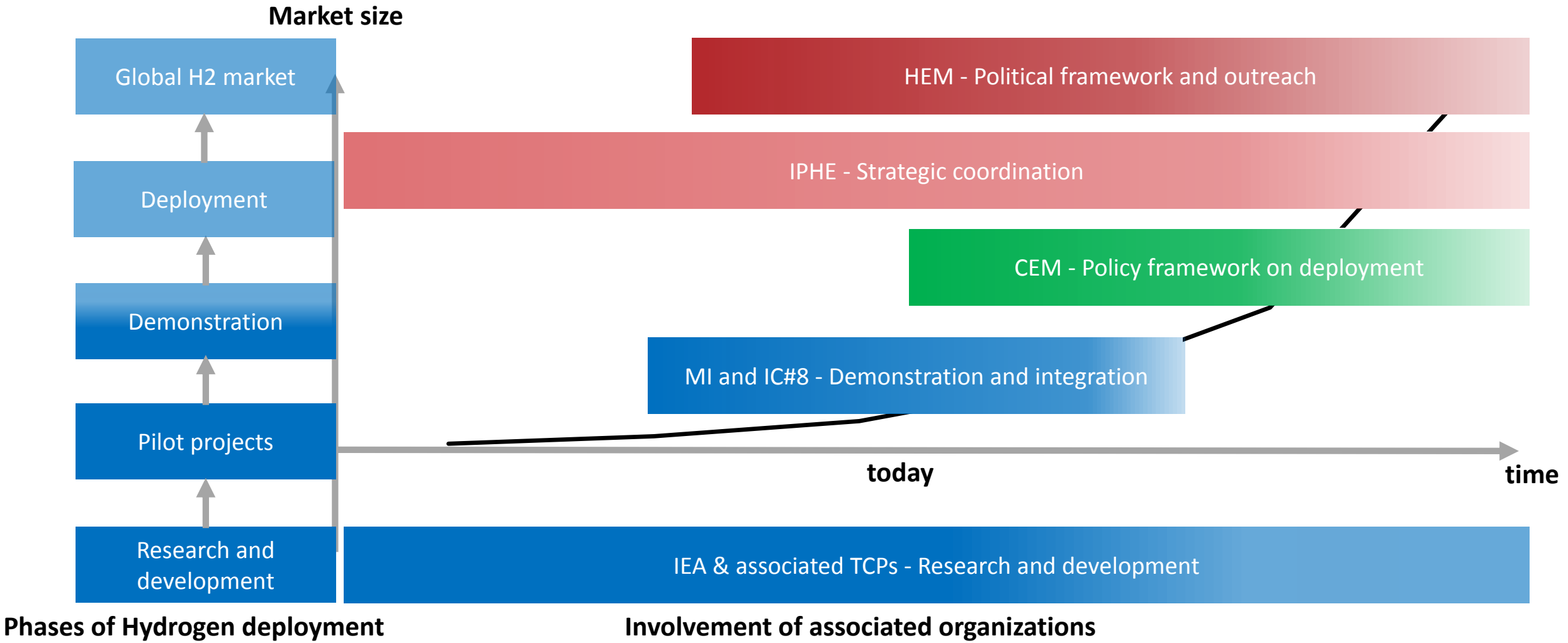
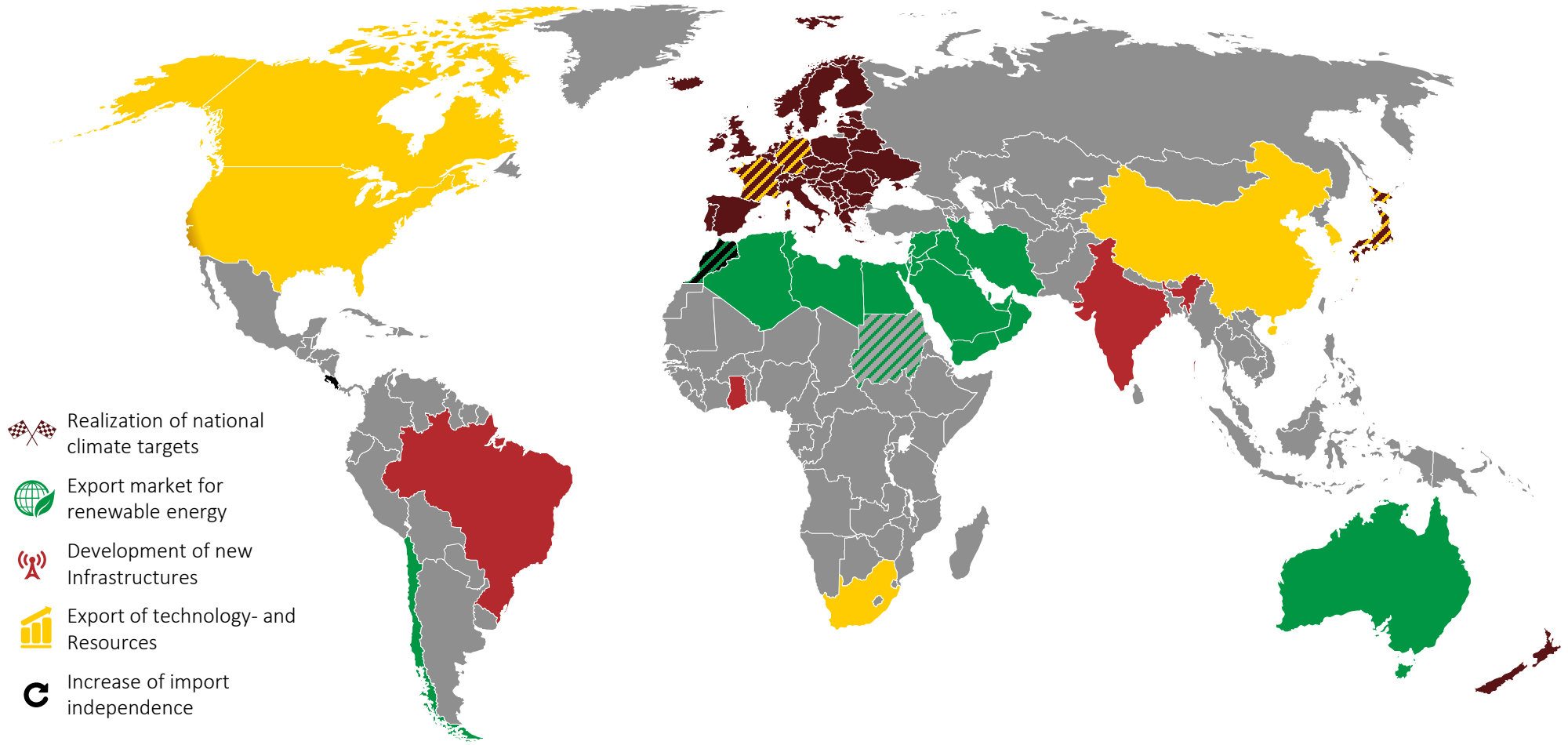
THE INTERNATIONAL HYDROGEN ECOSYSTEM

MISSION INNOVATION
accelerating the clean energy revolution



GLOBAL DRIVERS FOR HYDROGEN

Global motivation for Hydrogen



EXPORT INITIATIVE ENVIRONMENTAL TECHNOLOGIES

Hydrogen and fuel cell technologies (H_2/FC)

Environmental friendly use of H_2/FC-Technology

Knowledge transfer

Technology transfer

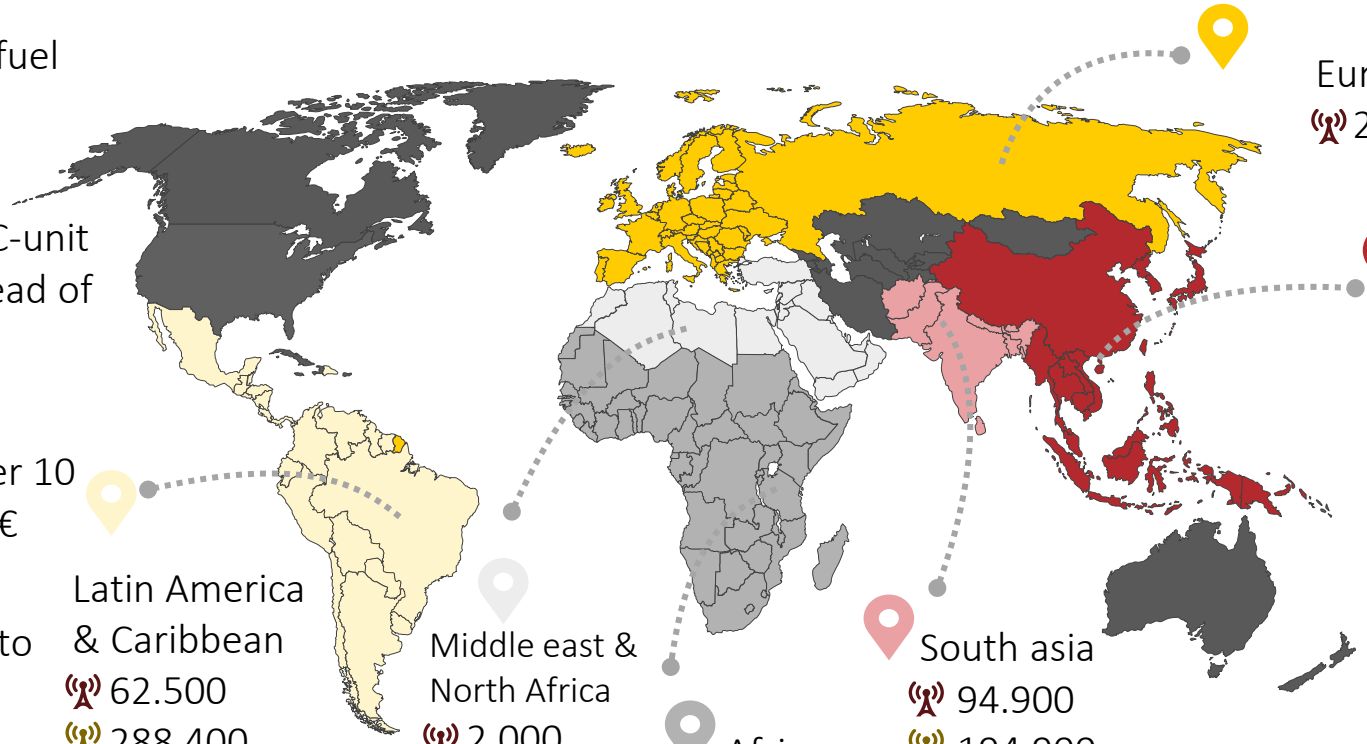
Improve Life conditions

Sustainable economy

MARKET AND ENVIRONMENTAL POTENTIAL ON SITE

Fuel cells for telecom towers

- Potential: Globally **1.2 Mio** units with **Diesel generators** in operation – adding up to 15 billion € fuel cost
- Savings: **Methanol** (MeOH)-FC-unit of 100 W consumes 365 l_{MeOH} /a instead of 9000 l_{Diesel} /a by diesel generator
- Substitution: by **fuel cells** over 10 years possible savings of ~ 25 billion. €
- Telecom could cause already in 2020 to **0.5 % of global CO_2 emissions**



Source: Pike Research, GSM Association, Heliocentris Analysen (2016), own representaion

Thank you for your attention!

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