Connected eH_2 Cycle: Industrial Sector Coupling MCSA Industrial Network

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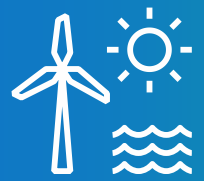
Climate protection becomes specific:

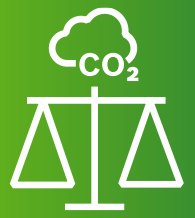
The four levers of CO2 neutrality

Increase energy efficiency



Supply with renewable energies

Green electricity purchase



Offset CO2 emissions

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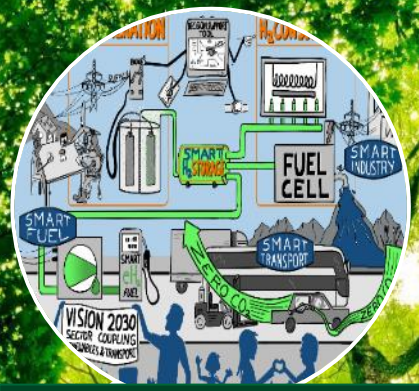
Reduced consumption through efficiency

Savings: **- 40% kWh/pcs.**



Connected eH_2-Cycle

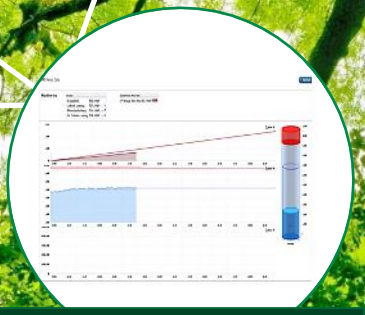
Storage & sector coupling

Energy Platform

Cross-linking:
Datapoints: **15.000 Stk.**

Self-generated energy

PV, Solar thermal, heat pump, SOFC
Actual: $3{,}8MW_{Peak}$
Plan: $8{,}3MW_{Peak}$



Cost reduction through flexibility

Actual : **2MW**

Challenges

- Rising **costs**
- New **mobility concepts**
- High **volatility**

Strategy

- **Efficient** and **flexible** use
- **Connection** through the Energy Platform
- **Optimized generation** in regard to consumption
- **Storage** and **sector coupling,** e.g. through **H2-Cycle**

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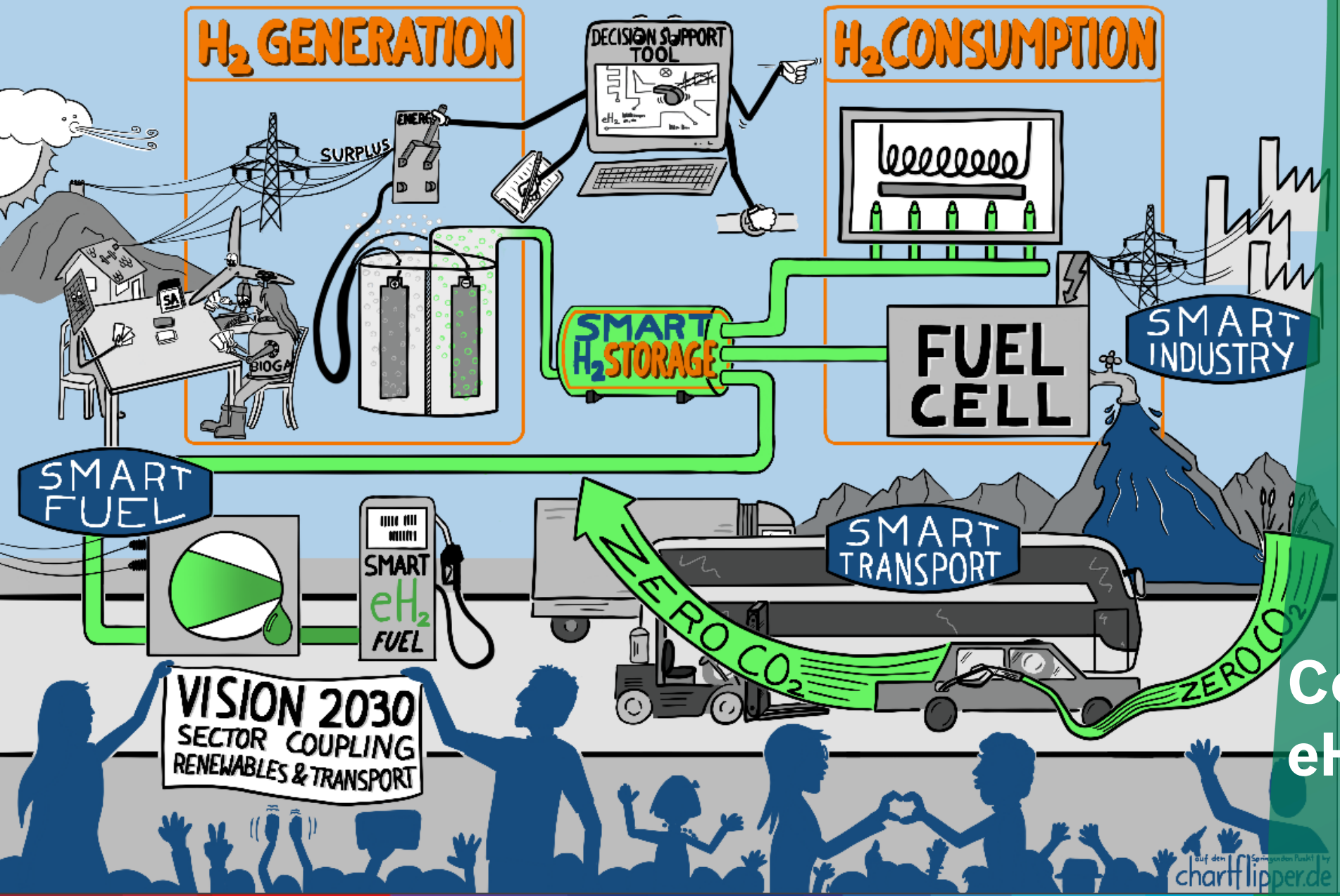

Connected eH_2-Cycle

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Connected eH_2-Cycle
Layout

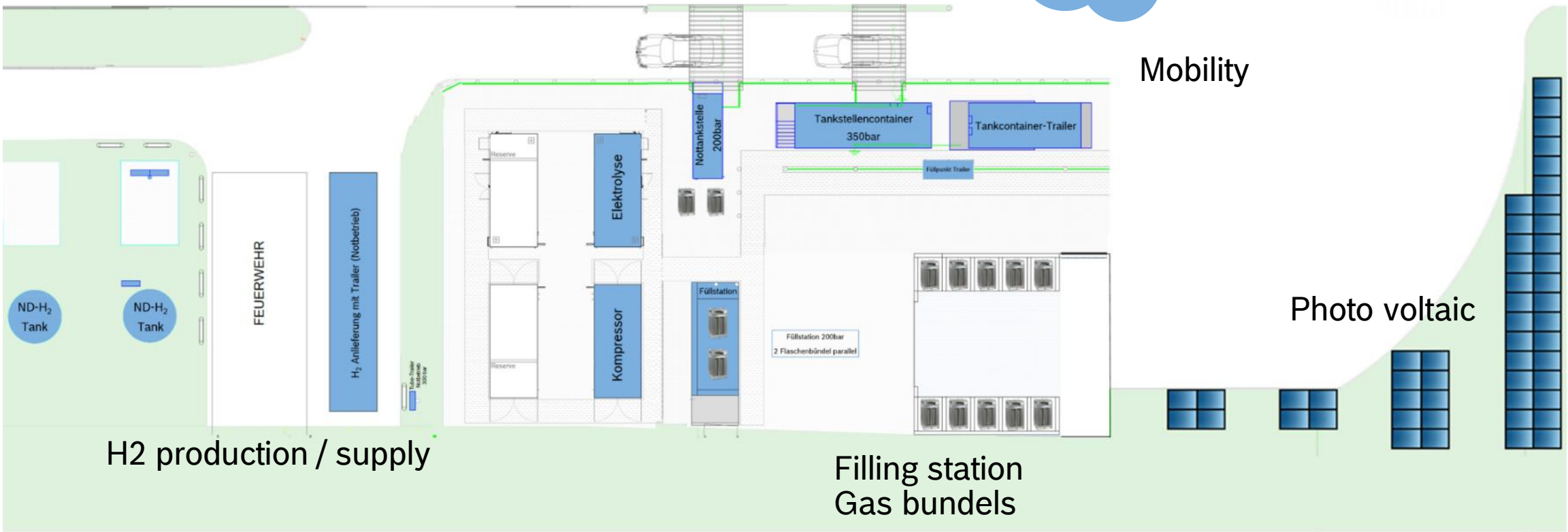
Wir bewegen die Zukunft
BOSCH HOMBURG

Smart Controls

Bosch Energy Platform

Mobility

Photo voltaic



H2 production / supply

Filling station
Gas bundels

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Connected eH_2 Cycle

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On
Status
29
Operating hours
0,2
Energy generated in MWh
60,5
Mean AC Energy Efficiency (in %)
Electrical AC Power Output
8,6 kW
Electrical AC Efficiency
61,1%

SOFC

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Performance and application of SOFC

Performance

> **60 %**
Electrical efficiency (AC)*

> **85 %**
Overall efficiency*

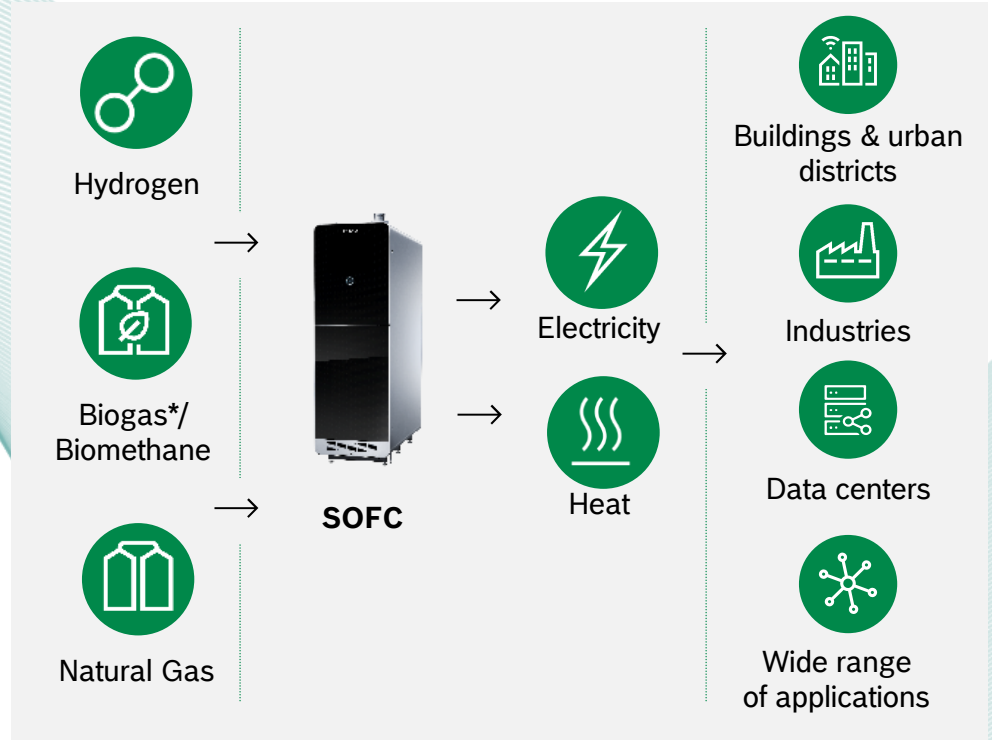
10 kW_{el}
Nominal power (AC)*

> **3 kW_{th}**
Thermal output*

* Currently in the pilot phase, the Bosch SOFC system is to be mass-manufactured by 2024. All technical specifications given in this informational document are development objectives.

* Beginning of life

Multi-fuel system & flexible application



* Biogas processed according to DVGW G260

1 A stack of several hundred cells

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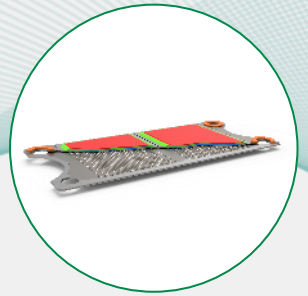
SOFC: Complete value stream covered at Bosch

Digital Twin

Bamberg plant



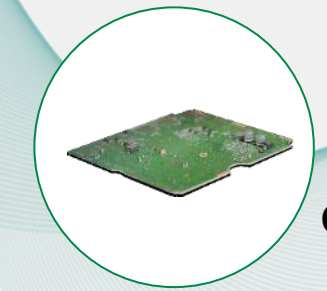
Cell

Stack

Homburg plant

Hotbox

Salzgitter plant

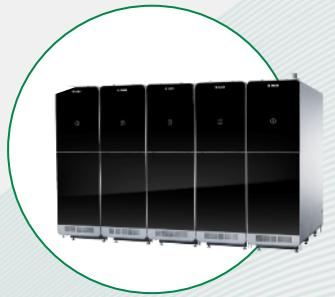


Control unit

Wernau plant

Unit

Point of use



Decentralized energy supply system

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Electrolyser

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Electrolyser

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H_2 Fueling Station

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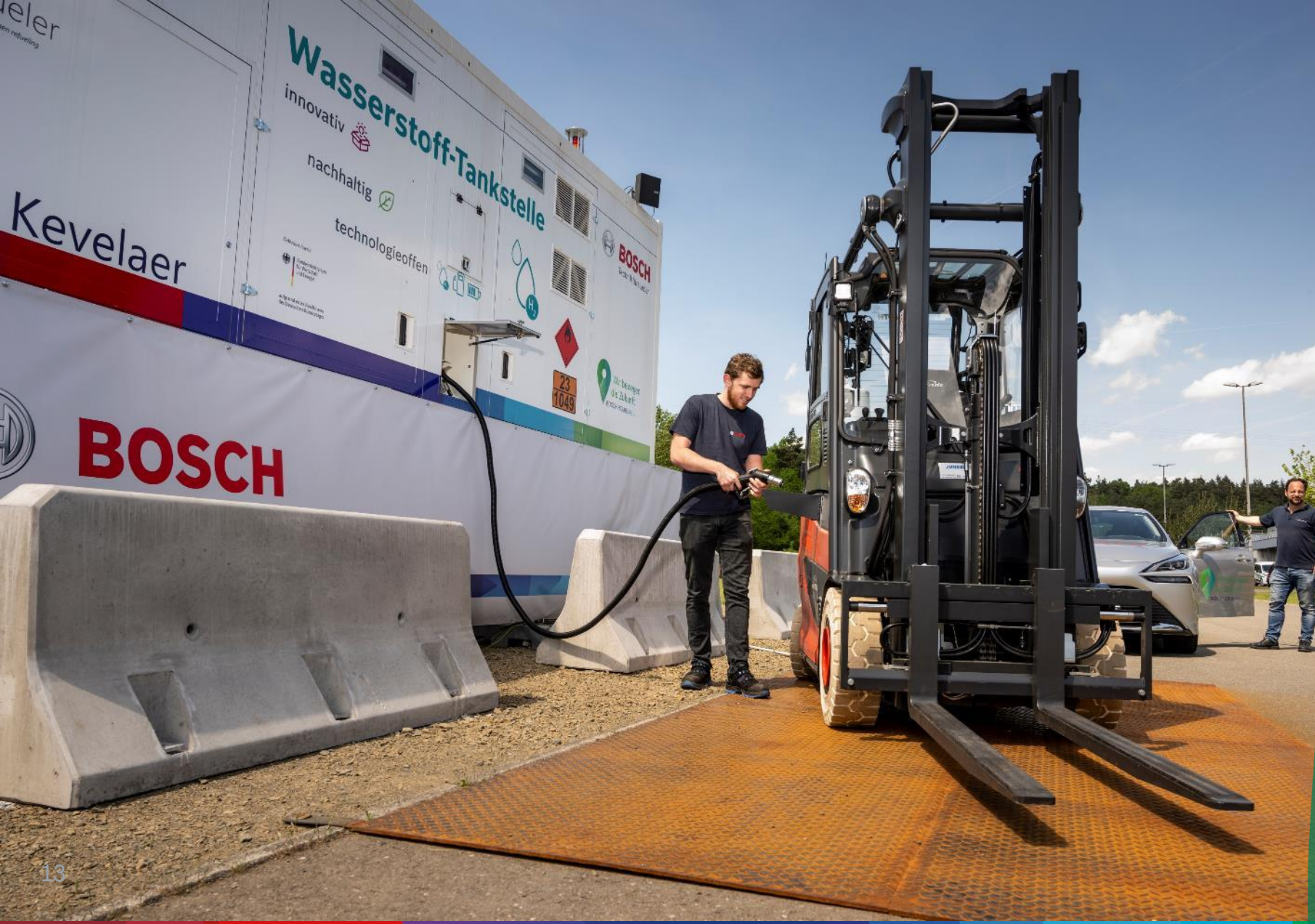

Electrolyser

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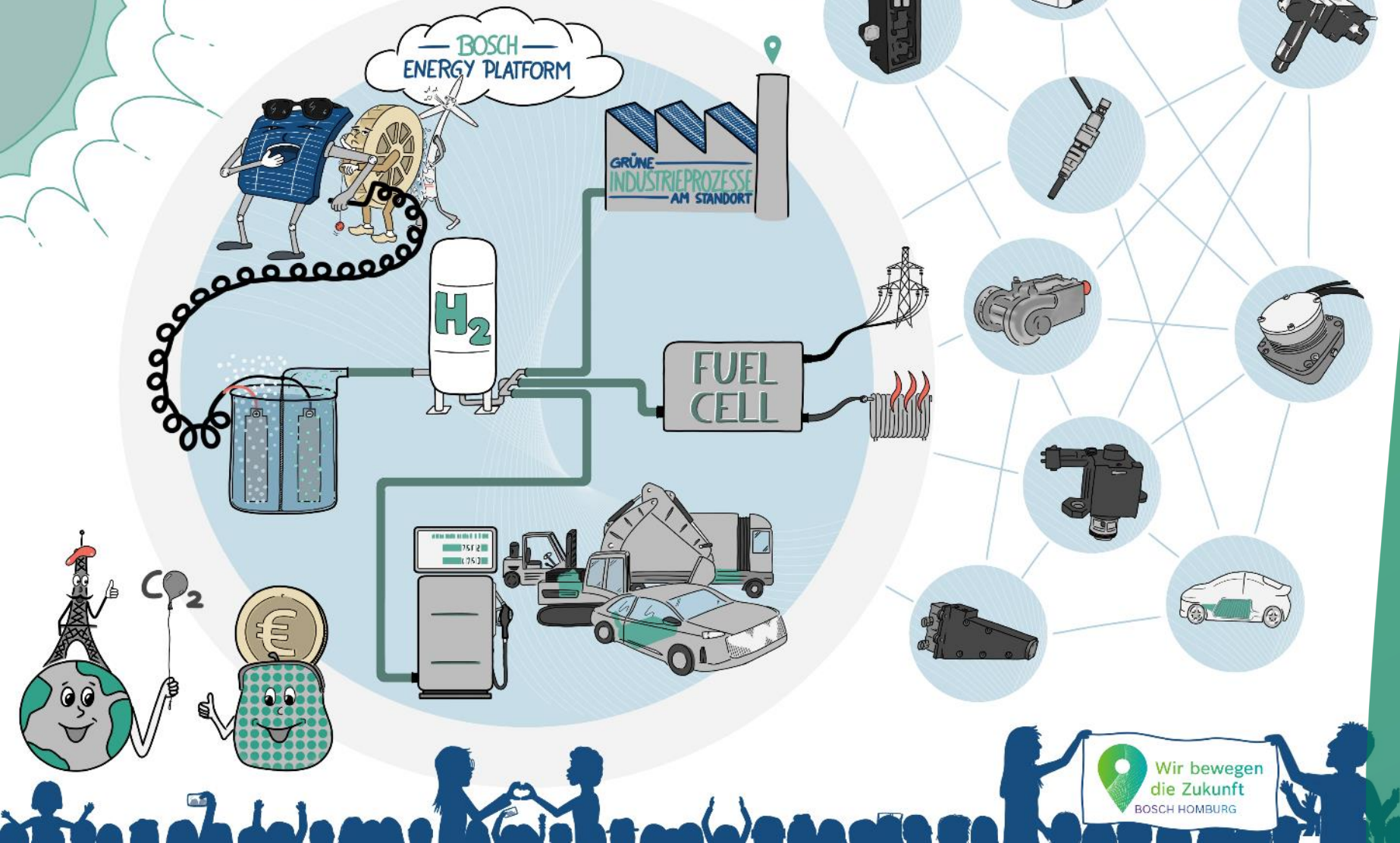
H_2 STRATEGIE BOSCH HOMBURG



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What is HALLIE

HALLIE – An European industrial doctoral network proposal under the MSCA-DN programme in Horizon Europe

- **H**ydrogen **A**pplications on a scientific/industrial **L**evel as a **L**eading **I**nstrument for decarbonisation of the future energy system in **E**urope (**HALLIE**)
- A project conceived within the framework of the Marie Skłodowska-Curie Actions (MSCA) for an Industrial Doctoral Network (DN-ID) as part of the Horizon Europe Programme.
- International consortium bringing together institutions from several different countries inside and outside of Europe.
- It brings together academia and industrial or non-academia knowledge to foster a new generation of PhD researchers in the field of Hydrogen technologies.
- It aims to accelerate the development of the Hydrogen economy, a fundamental pillar towards the decarbonisation of the highly industrialised nations and to abate climate change.
- No prior MSCA-DN project has aimed for such a wide scope of Hydrogen-related technologies. (All PhD project in HALLIE must be “Pioneer Projects”)

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Preparation of the Application

- IZES as lead partner is currently searching for potential partners interested in joining the HALLIE consortium.
- Direct participation is possible in two different ways:
  - Participation as a beneficiary:
    - Interested partners should ideally bring in a conceptual idea that can be developed as a PhD project and that is directly related to the storyline/conceptual argument of HALLIE.
    - Beneficiaries receive direct funding from the programme and are actively involved in the recruitment of the PhD students. Industrial or non-academic partners must participate as beneficiaries.
    - Beneficiaries take part in different steering boards, are involved in the training of the PhD students, are hosting secondments, summer schools, short stays and all other activities related to HALLIE.
  - Participation as an associated partner (AP):
    - AP do not receive direct funding.
    - AP should participate in the different steering boards, should be involved in the training of the PhD students, hosting secondments, summer schools, short stays and all other activities related to HALLIE.
    - AP can bring in PhD candidates that are interested in pursuing any of the given research opportunities.
    - AP are invited and encourage in bringing in their research teams to participate in the different events of HALLIE.

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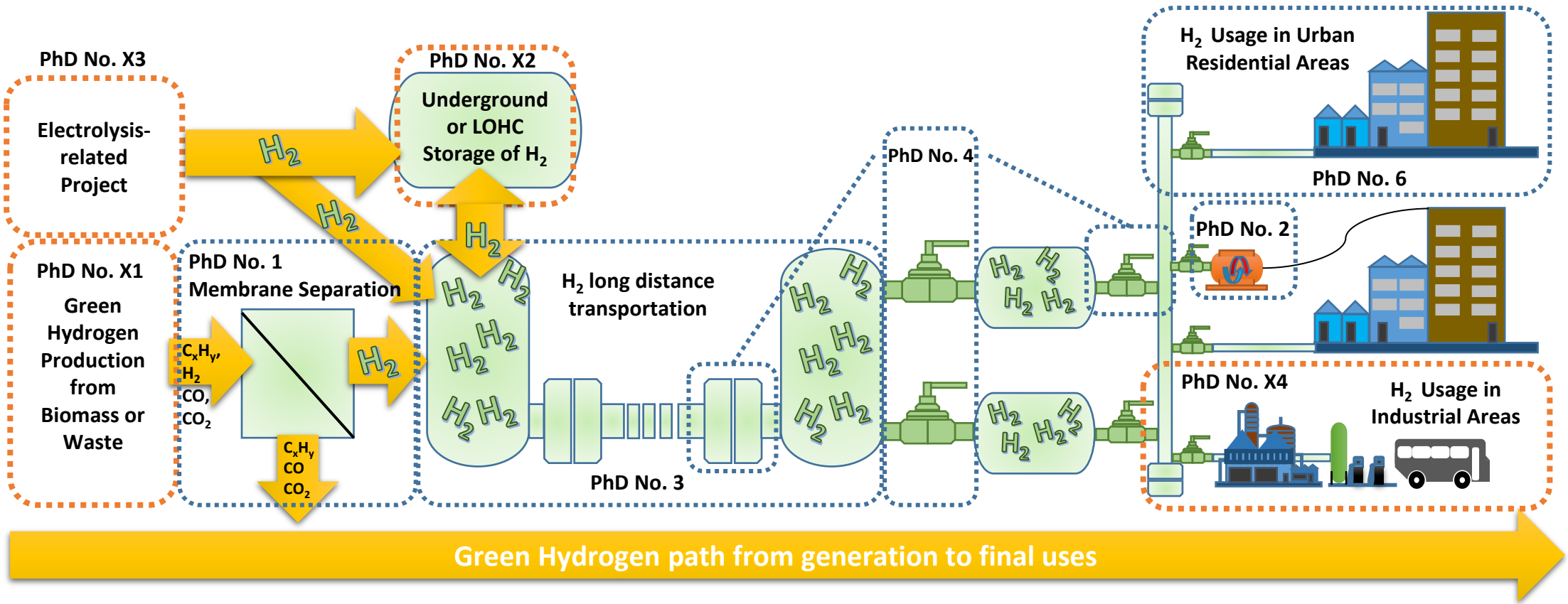
Potential Projects Joining HALLIE



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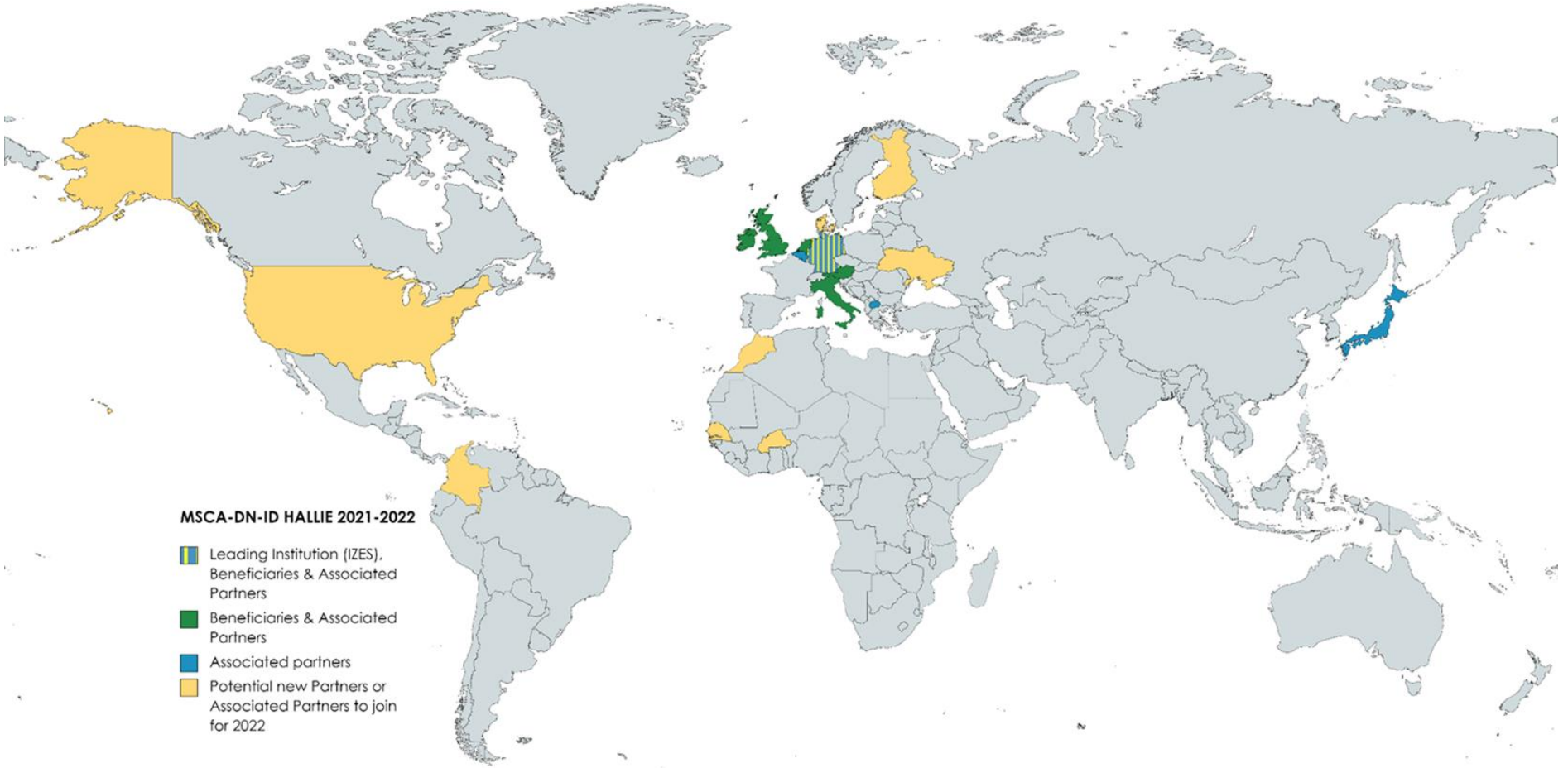
At present involved countries

- Current talks involve potential partners from North Africa, Ukraine, the United States, Colombia, Denmark and Finland.



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Thank you for listening!

Questions?

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