NRW.ENERGY 4CLIMATE
Landesgesellschaft für Energie und Klimaschutz

NRW.Energy4Climate - Objectives and Projects in the Hydrogen Mobility Sector in North Rhine-Westphalia

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March 16, 2023
Tokyo

NRW.Energy4Climate

Our vision is ambitious and involves several challenges

NRW should continue to be Germany's most important industrial location,

become entirely climate neutral

and take the lead in the energy transition!

#NRWGoesClimateNeutral

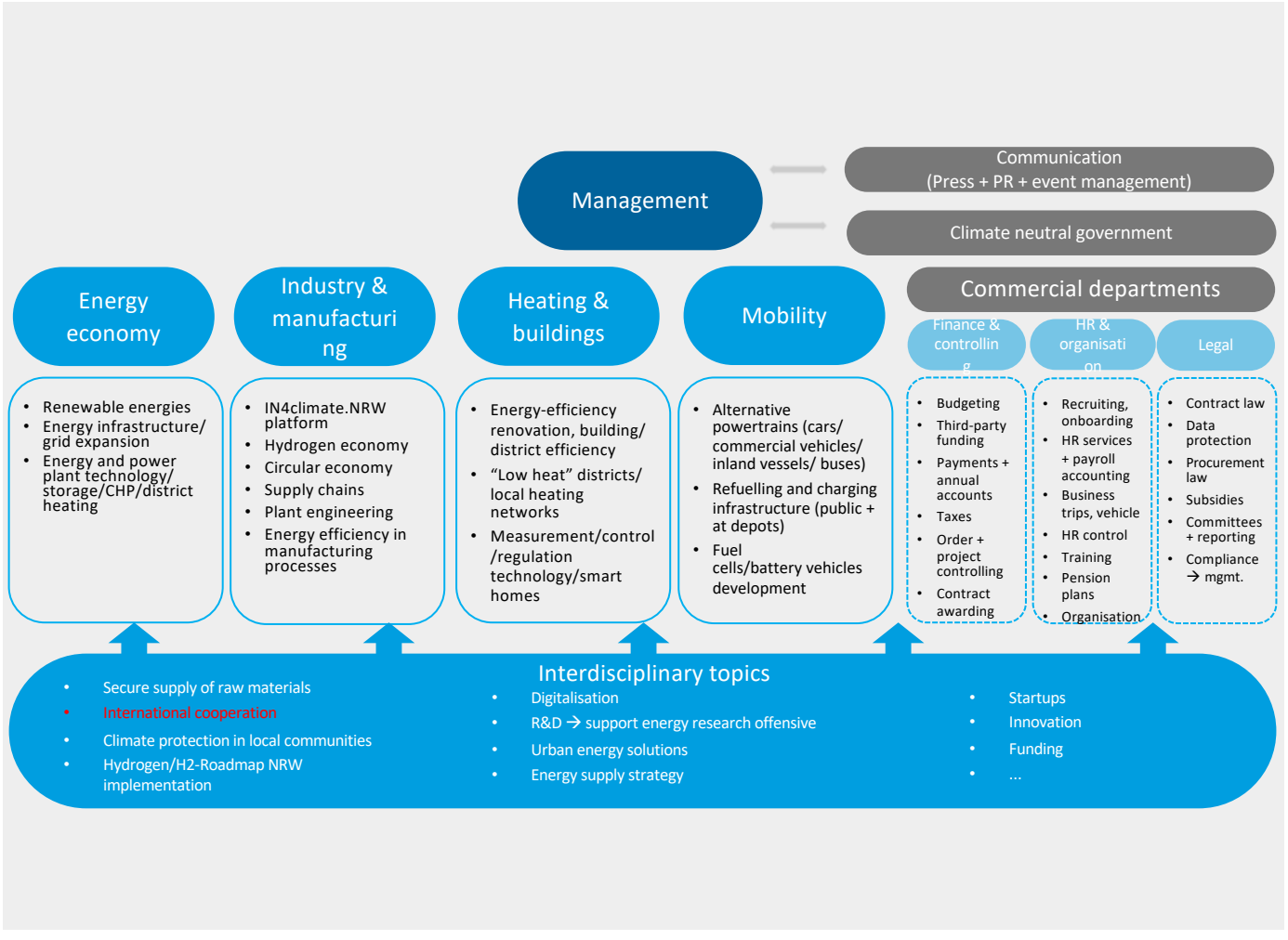
NRW.Energy4Climate…

- …is a **state-based organisation** and a wholly-owned **subsidiary of the State of NRW** (Ministry of Economics).
- …is **headquartered** in **Düsseldorf**'s Medienhafen and is currently on target to employ **104 people**.
- …is establishing **branches in all key regions** of NRW to create a network across the whole state.
- …is a **driving force** and **key point of contact** for energy and climate protection in NRW.

NRW.Energy4Climate…

- …is responsible for all climate protection activities in the State of NRW in the fields of the **energy sector, industry, heating & buildings and mobility**.
- …is helping drive **structural change across sectors**.
- …is working to identify **scalable projects** and above all help bring them to life.
- …is committed to **providing information** as well as **raising awareness**.
- …is the **main player** in energy and climate protection, bringing together expertise from politics, business, science and the general public to create synergies.

Our Organisation


Management
Communication
(Press + PR + event management)
Climate neutral government
Energy economy
Industry & manufacturing
Heating & buildings
Mobility
Commercial departments
Finance & controlling
HR & organisation
Legal
Renewable energies
Energy infrastructure/ grid expansion
Energy and power plant technology/ storage/CHP/district heating
IN4climate.NRW platform
Hydrogen economy
Circular economy
Supply chains
Plant engineering
Energy efficiency in manufacturing processes
Energy-efficiency renovation, building/ district efficiency
"Low heat" districts/ local heating networks
Measurement/control /regulation technology/smart homes
Alternative powertrains (cars/ commercial vehicles/ inland vessels/ buses)
Refuelling and charging infrastructure (public + at depots)
Fuel cells/battery vehicles development
Budgeting
Third-party funding
Payments + annual accounts
Taxes
Order + project controlling
Contract awarding
Recruiting, onboarding
HR services + payroll accounting
Business trips, vehicle
HR control
Training
Pension plans
Organisation
Contract law
Data protection
Procurement law
Subsidies
Committees + reporting
Compliance → mgmt.
Interdisciplinary topics
Secure supply of raw materials
International cooperation
Climate protection in local communities
Hydrogen/H2-Roadmap NRW implementation
Digitalisation
R&D → support energy research offensive
Urban energy solutions
Energy supply strategy
Startups
Innovation
Funding
...

International cooperation

- 2 fields: **Foreign Trade Activities** and **International Climate Protection**

Foreign Trade Activities

- **Aim:** support companies from NRW in establishing on international energy markets, exchange of Best Practices & Know-how, international delegation visits
- **Activities:** information events, business trips, B2Bs, fairs and exhibitions
- **Thematic areas:** Renewable Energies, Hydrogen & Fuel Cells, Mobility, District Heating, Smart Cities, etc.
- **Close partnerships** with Japan, Netherlands, Denmark, Sweden, Norway, France, Chile, Brasil, etc.

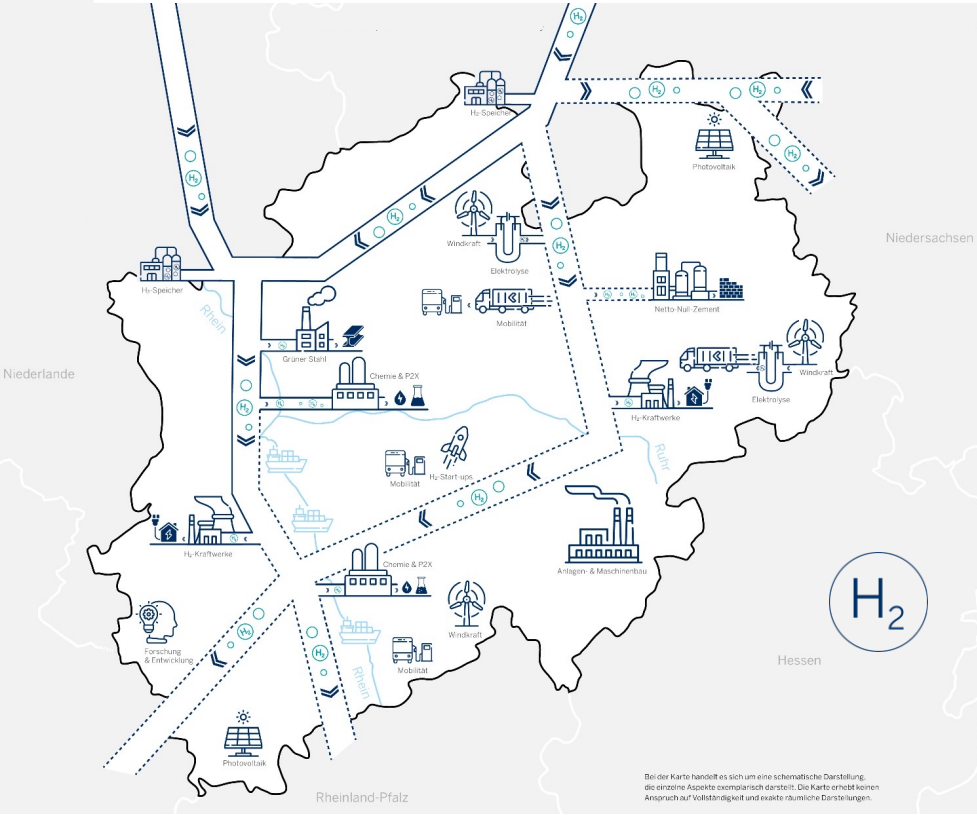
International cooperation

International Climate Protection:

- **Political exchange** and Peer-Learning on EU- and international level
- Member in subnational climate protection networks, i.e. Under2Coalition
- **Representation of NRW** on international level, i.e. COP
- Exchange on innovative **climate protections projects** in NRW

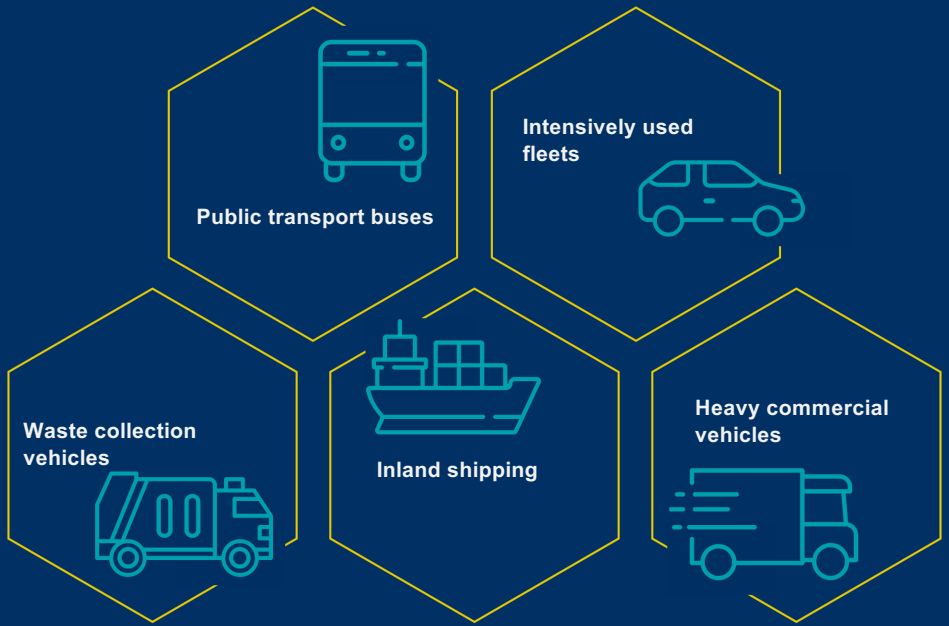
Our vision

Our goal is for North Rhine-Westphalia to be part of a concentrated, strongly networked and unique hydrogen technology landscape in North-West Europe.

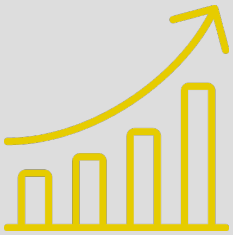


H₂

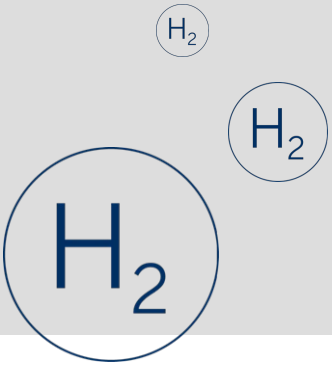
Hydrogen in the transport sector: The potential for use



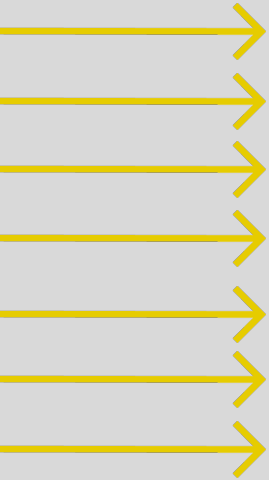
Our targets till 2025



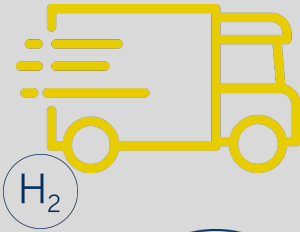
- More than 400 FC trucks
- At least 20 truck filling stations
- 60 car filling stations
- 500 hydrogen buses for public transport
- Hydrogen-powered inland waterway vessels
- Hydrogen-powered shunting locomotives



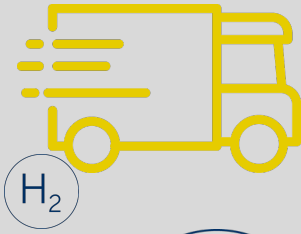
Our plan: Create focal points



- regional and industry-specific
- Networking and public relations
- Bundling demand potential
- Addressing vehicle manufacturers
- Create filling station infrastructure
- Promotion via federal state programmes
- Support in the use of federal and EU subsidies



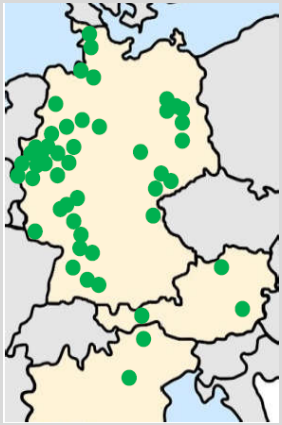
HyTruck.NRW



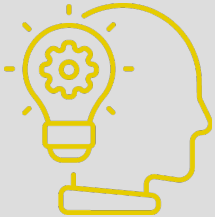
- Target: By 2024: More than 400 FC trucks and at least 20 truck refuelling stations (20 X 20).
- Implementation together with HDE, VCI, VVWL and HyTruck duisport, Antwerp and Rotterdam.
- Currently in NRW: 43 LOIs with interest in 630 trucks and 40-50 HRS under consideration. (Range 800 km sufficient, ADR approval important)
- Matchmaking processes for sale, rental or pay-per-use of the trucks and identification of location-based demand potentials started already.
- First trucks can be delivered from 2023.
- Company filling stations can be made available quickly. The construction of new filling stations requires a two-year lead time. (50:50 > Company : publicly accessible filling station)

1.000 Fuel-Cell-Busses for NRW

- Target: By 2025: 500 FC Busses in operation
- Implementation together with VDV NRW (Association of German Transport Companies NRW) in cooperation with “Buscluster Deutschland (including north Italy).
- Central to this is the preparation of a specification sheet with details of the chassis, door spacing and driver's cab.
- Currently in NRW: 200 FC Busses in operation, 100 FC Busses ordered, 100 FC Busses in application, 100 FC Busses open



RH_2INE – Rhine Hydrogen Integration Network of Excellence

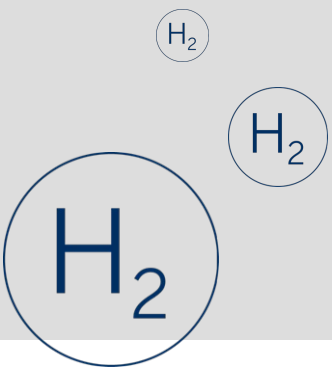


Goal:

The overall objective of the project is to achieve a **climate-neutral "Rhine-Alpine" transport corridor** and to accelerate the use of hydrogen in the freight transport sector. Objective of this programme is therefore to facilitate the implementation of **hydrogen as a fuel for inland waterway transport.**

This approach leads to specific goals for the next 4 to 5 years:

- 3 H_2 “refueling stations”,
- 8-12 H_2 inland vessels,
- 12 H_2 locomotives and
- 6 H_2 reach stackers.



Hydrogen Technology and Innovation Centre
(Technologie- und Innovationszentrum Wasserstofftechnologie (TIW)

Innovation environment especially for start-ups and SMEs:
- from idea to development (development phase)
- from development to market (testing and approval phase)

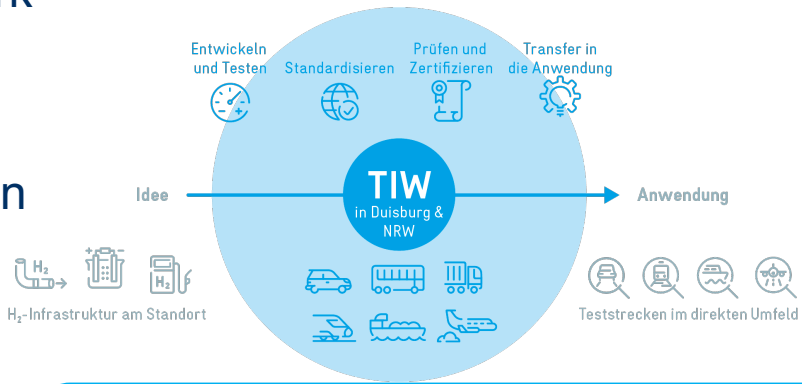
Core technologies of hydrogen-based drives completely and independently of the area of application (focus: heavy transport)

Focus on fuel cell stacks, subsystems and system components as well as complete systems as energy supply for the powertrain

In the eco-system: Detailed research and application integration

Central idea: Development support from the idea to the product

- Supporting start-ups - realising ideas
- Check and test
- International standards and pre-normative work
- Training and further education
- Support users - run fleets



application-oriented - market-opening - cross-modal - ready for take-off

Ministerium für Wirtschaft, Innovation,
Digitalisierung und Energie
des Landes Nordrhein-Westfalen

Our Eco-System
Hydrogen and mobility research in NRW

Straße
1. Aldenhoven Testing Center (ATC)
2. Future Mobility Park GmbH (FMP)
3. Rollenprüfstände (FEV)
4. Euregio Center (FEV) – in Planung
5. Center for Mobile Propulsion (CMP)
6. Rollenprüfstand (vka)
7. Elektromobilitätslabor (eLAB)
8. Center for Ageing, Reliability and Lifetime Prediction of Electrochemical and Power Electronic Systems (CARL) – im Bau
9. Zentrum für nachhaltige Mobilität (Avantis) (PEM Motion, AEDS)
10. Ford Forschungszentrum
11. H2Neuss (Rheinmetall) – in Planung
12. Zentrum für BrennstoffzellenTechnik ZBT
13. MOTION – MObility TransformaTION (UDE) Duisburg
14. Infrastruktur für Wasserstoffbrennstoff-zellen-Busse

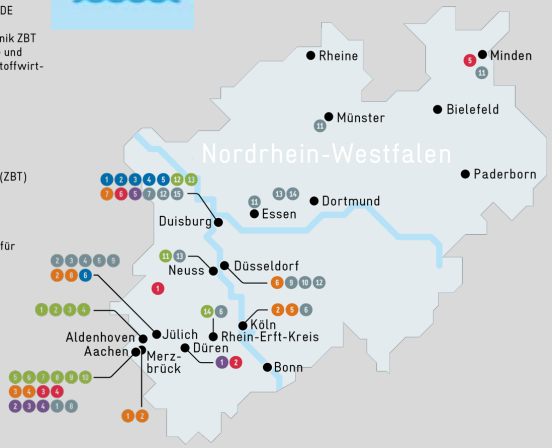
Luft
1. Forschungsflugplatz Aachen-Merzbrück
2. DLR
3. e.SAT GmbH
4. Center for Mobile Propulsion (CMP)
5. Flughafen Köln/Bonn (CGN)
6. Flughafen Düsseldorf (DUS)
7. Zentrum für BrennstoffzellenTechnik ZBT
8. Forschungszentrum Jülich

Schiene
1. Prüfcenter Wegberg-Wildenrath
2. Infrastruktur der Rurtalbahn
3. Gleise für Funktionstests (IFS)
4. Center for Mobile Propulsion (CMP)
5. Rail Campus OWL
6. Infrastruktur Werkbahnen HKM und duisport

Wasser
1. Testfeld Dortmund-Ems-Kanal
2. Testzentrum H2-Schiffsantriebe
3. Entwicklungszentrum für Schiffstechnik und Transportsysteme e.V. DST
4. Versuchs- und Leitungszentrum UDE Schiffstechnik
5. Zentrum für BrennstoffzellenTechnik ZBT
6. Helmholtz-Cluster für nachhaltige und infrastrukturkompatible Wasserstoffwirt-schaft, LOHC

H_2-Tank/Betankung
1. Infrastruktur NPROXX
2. Multifilament-Wickelanlage (ITA)
3. Tapewickelanlage (IPT)
4. Nasswickelanlage (IKV)
5. Tanksystem-, Tankstellentechnik (ZBT)

Weitere Infrastruktur/Netzwerke
1. Fraunhofer (IPT)
2. Fertigungstechnikum (FZJ)
3. Werkstoffe und Diagnosezentrum für elektrochemische Prozesse
4. Living Lab Energy Campus (LLEC)
5. BrainEnergyPark
6. HyCologne – Wasserstoff Region Rheinland e.V.
7. WISDOM4E – in Planung
8. Zukunftscluster H2 – in Planung
9. Land NRW
10. EnergieAgentur.NRW
11. HyExperts
12. Modellregion Wasserstoff-Mobilität Nordrhein-Westfalen
13. h2-Netzwerk Ruhr
14. Elektrolyse-Zentrum Herten
15. startport GmbH
16. Modellregion Wasserstoff-Mobilität NRW – H2R – Wasserstoff Rheinland



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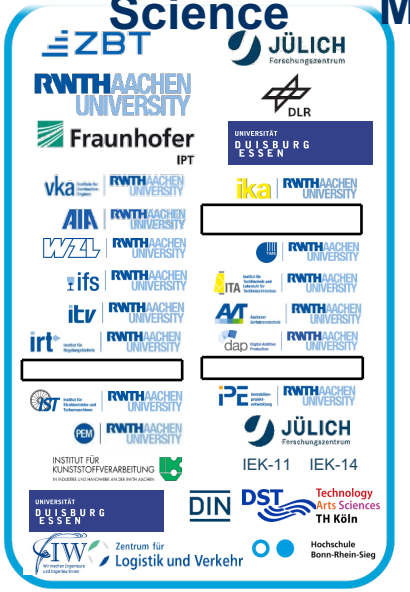
Some of the 110 LoI-Partner of the TIW

Science

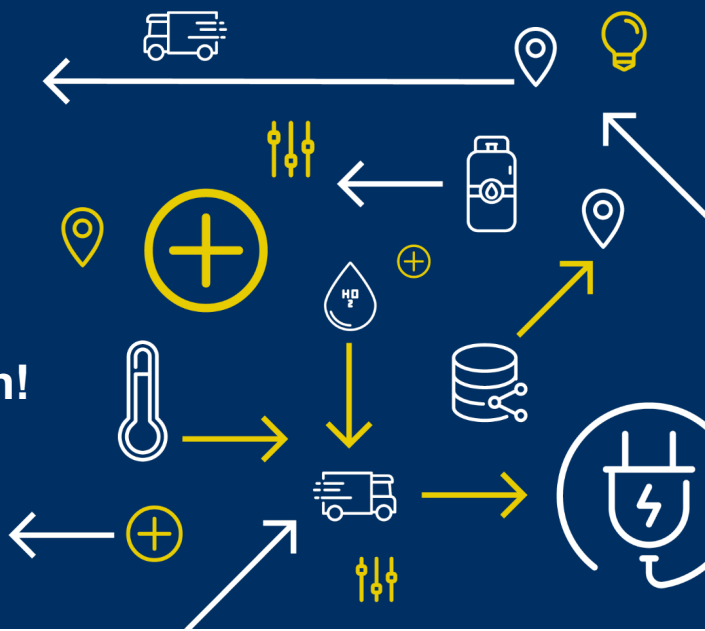


Manufacturers, suppliers, certifiers and users

H_2 Roadmap and R&D

North Rhine-Westphalia

Thank you for your attention!



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See you at our booth!