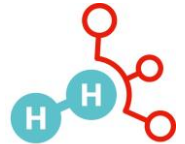


HydroNet —
The joint project for creating a
hydrogen region in North
Rhine-Westphalia with global
network connection

HydroNet Sauerland model region for climate protection

westnetz

HydroNet
Klimaschutz-Modellregion
Sauerland



HydroNet project — The start of a hydrogen economy



Arnsberg, 20/07/2021





From left to right: Maria Tillmann, Andreas Breuer, Carl-Julius Cronenberg, Dirk Wiese, Katherina Reiche, Friedrich Merz, Jochen Renfordt, Dr Karl Schneider, Ralf-Paul Bittner, Dr Johannes Kirchhoff

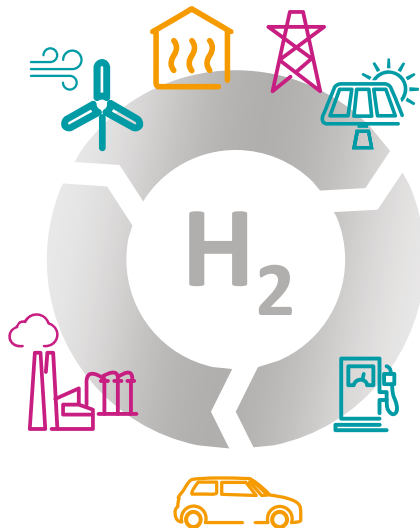


Hydrogen is no longer optional. It's now essential. We need hydrogen to provide a reliable energy supply for our society, to ensure the future viability of our economy and to preserve jobs. Against a backdrop of multiple recent crises, we must find ways to rethink our energy system. Companies and district authorities are therefore all seeking to increase energy efficiency, reduce energy consumption and invest in future-proof technologies.

Katherina Reiche,
CEO of Westenergie and Chairwoman of the German
National Hydrogen Council

Hydrogen — Energy of the future

	<p>Flexible and versatile use or general all-rounder: as an admixture (up to 20 percent for natural gas), energy and fuel, e.g. fuel cells/ vehicles, building heating systems, steel production</p>
	<p>Climate neutrality/decarbonisation: CO₂-free raw material, the combustion product of hydrogen is water</p>
	<p>Highly reliable transport and storage: safe handling, dependable supply, backbone of the NRW (North Rhine-Westphalia) economy</p>
	<p>Compatibility: existing gas network potentially also suitable for hydrogen</p>



Energy-rich resource:
high energy density
based on mass



Resource availability:
almost **infinitely available**,
90 percent of all atoms in the
universe are hydrogen atoms



Sustainability/chem. properties:
non-toxic, tasteless/**odourless**,
burns with a colourless flame and
leaves no residues



HydroNet — Sauerland model region for climate protection

In the context of the Sauerland model region for climate protection, the HydroNet project demonstrates **how to manage structural transformation**.

Sector coupling and future technologies are implemented on an **innovative, regional and integrative** basis.

The goal is to **promote climate protection and energy transformation** and to **preserve jobs**.

Key industries:

metal production/processing, vehicle supply, lime production, paper production, specialist chemicals, mechanical engineering and mobility



The **aim** of the Sauerland model region for climate protection is to **develop a hydrogen economy**. This goal will be systematically implemented by the proposed NRW project, **HydroNet**.



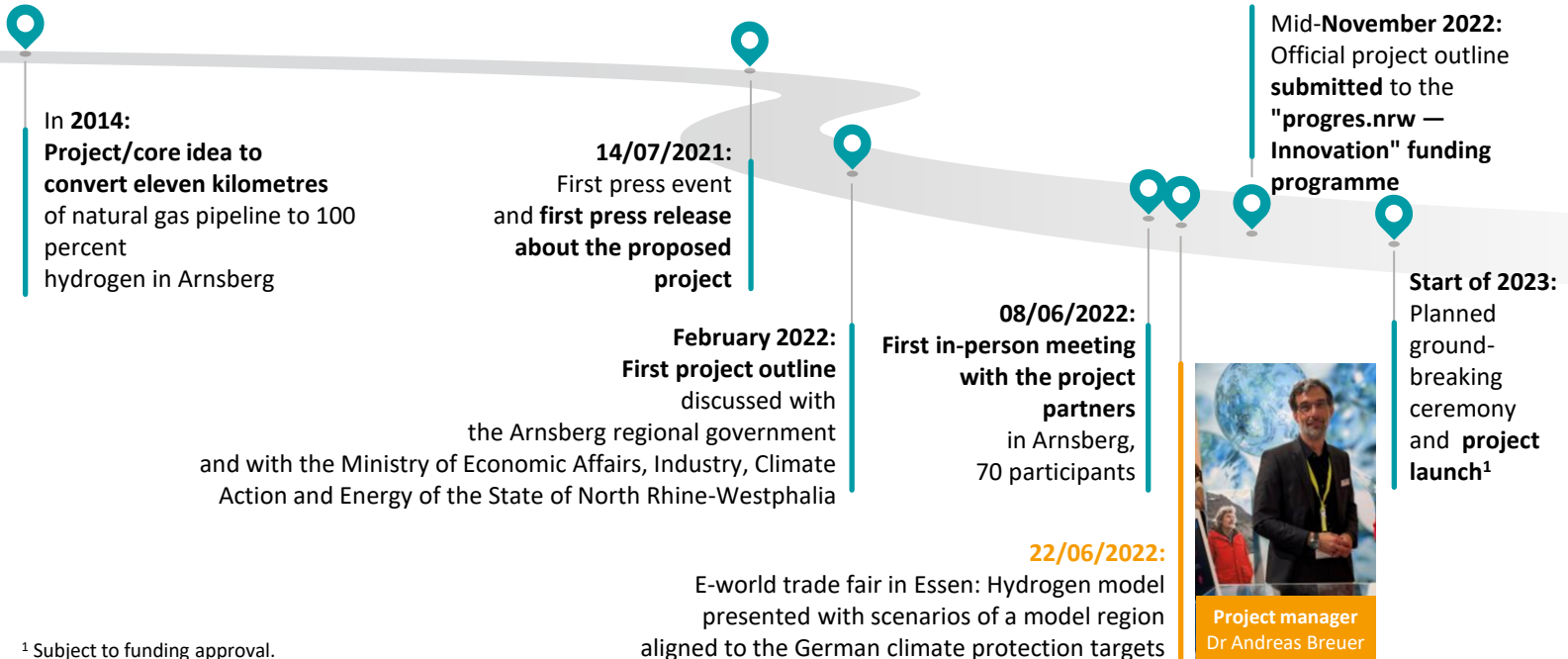
The **HydroNet** project integrates regional stakeholders along the entire **hydrogen value chain**. It promotes **innovation, research and development** in the production and **distribution of hydrogen** and in the **decarbonisation** of various industrial plants.



This **pilot** approach for an entire region serves **as a model** for other regions affected by structural transformation.



HydroNet — Milestones



¹ Subject to funding approval.

HydroNet — USP and benefits

The project ...



HydroNet Sauerland model region for climate protection



... is **sustainable** as it exploits existing infrastructure and gas pipelines in several regional districts.



... plans for step-by-step and therefore **risk-free conversion until it is ready for connection to the global backbone network (from 2028)**.



... uses **green hydrogen**.



... demonstrates the hydrogen transformation path in **the here and now**.



... is a **joint project** for an entire region with more than 28 project partners.

HydroNet — Climate-neutral energy system of the future

Expansion of existing gas infrastructure and innovative connection of decentralised solutions



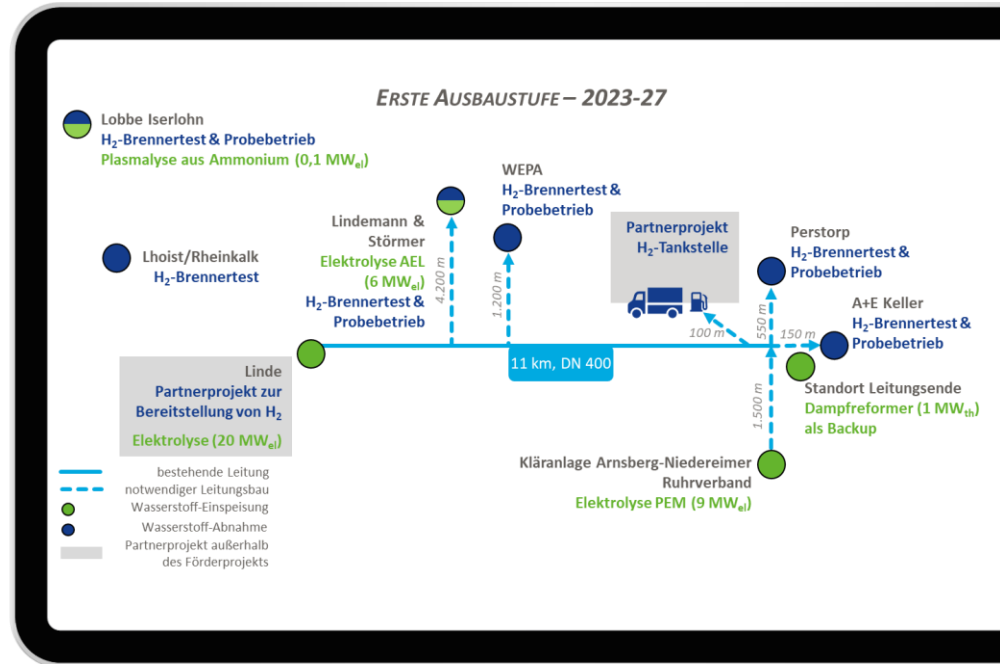
- Decentralised hydrogen production
- Integration of locally generated green electricity
- Hydrogen applications in industry and mobility

Partners from the industry, energy and science sectors collaborate and apply for funding



- Project launch planned for the start of 2023¹
- CapEx approx. €50 million and OpEx approx. €30 million
- Project duration: five years

¹ Subject to funding approval.

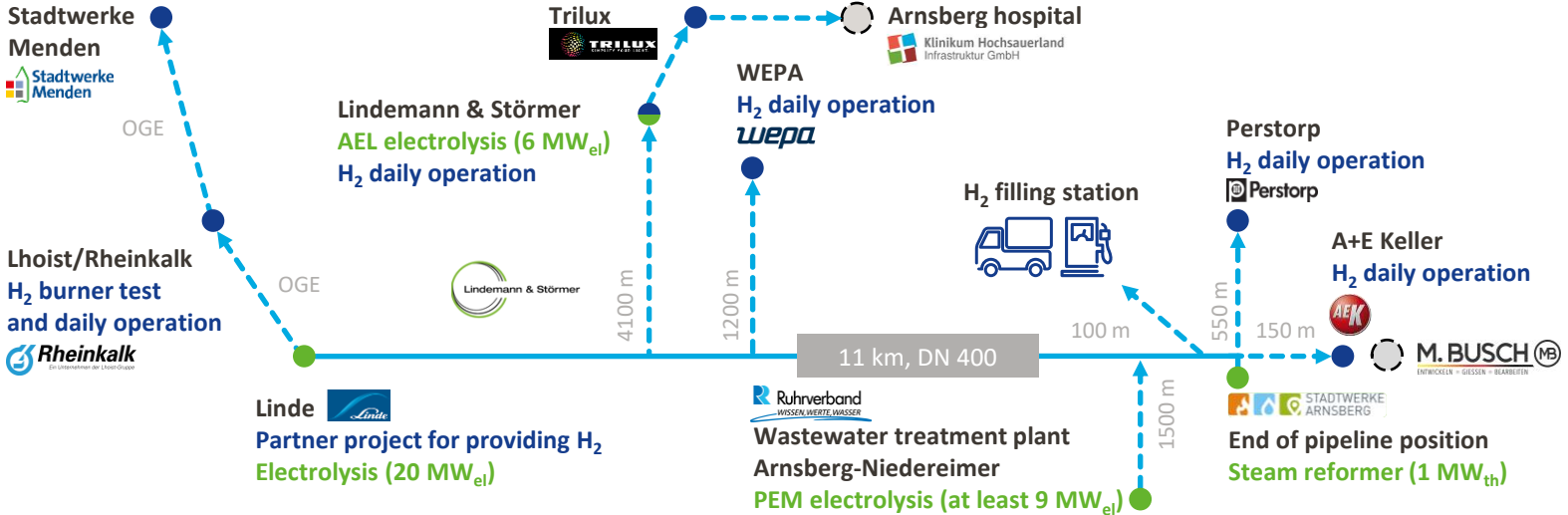


Forecast for 2028 onwards

Lobbe, Iserlohn *LOBBE*

H₂ burner test and daily operation

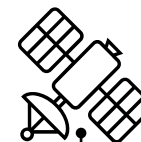
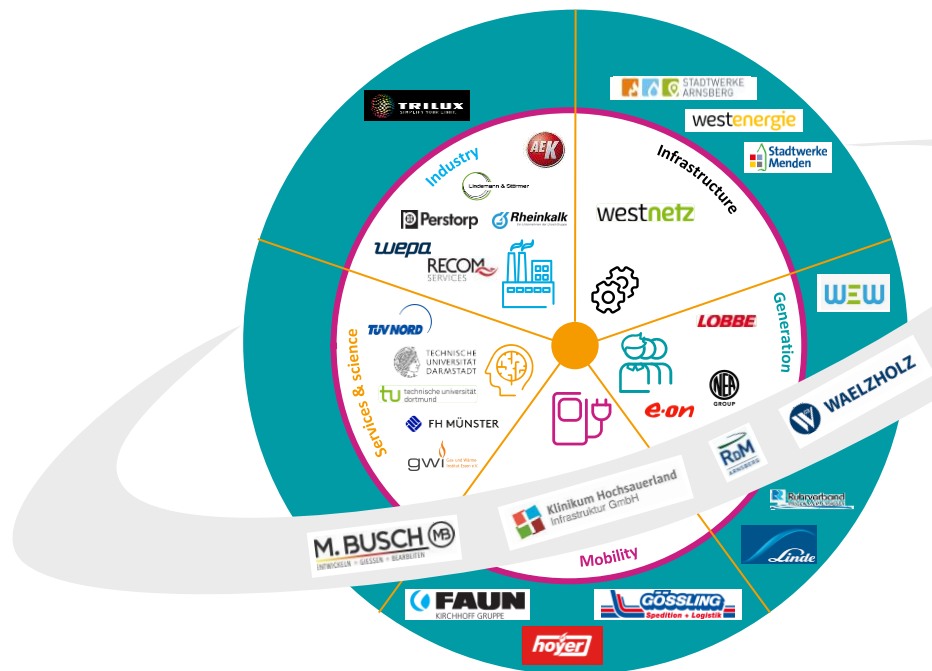
Plasmalysis from ammonia/ammonium (0.1 MW_{el})



● Hydrogen infeed
 ● Hydrogen outfeed
 — Existing pipeline
 - - - Required pipeline construction

HydroNet Sauerland model region for climate protection

Project HydroNet — Partner network



Political advisory council

- Friedrich Merz (CDU), member of the German Bundestag
- Carl-Julius Cronenberg (FDP), member of the German Bundestag
- Dirk Wiese (SPD), member of the German Bundestag
- Maria Tillmann (Greens)
- And others

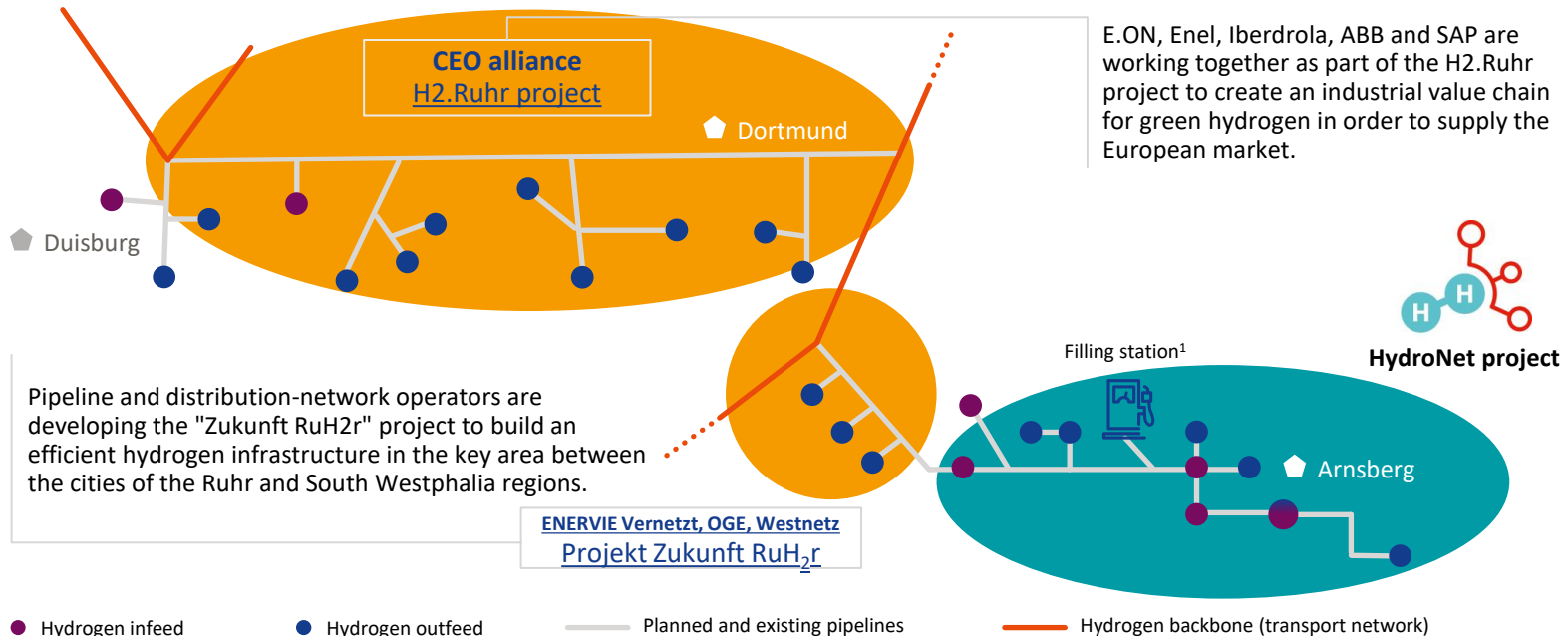
HydroNet forum

The number of interested parties grows nearly every day!

 Joint partners

 Associated partners

HydroNet – The joint project for creating a H2-region in North Rhine-Westphalia with global network connection



¹ Subject to a separate funding application.

HydroNet Sauerland model region for climate protection

HydroNet project — Overview of work packages

WP1	<ul style="list-style-type: none">• Coordination and publicity of the innovation and demonstration project
WP2	<ul style="list-style-type: none">• Development and demonstration of the hydrogen network
WP3	<ul style="list-style-type: none">• Technological/empirical comparison of innovative production and transformation paths for the hydrogen economy
WP4	<ul style="list-style-type: none">• Construction of a hydrogen filling station infrastructure¹
WP5	<ul style="list-style-type: none">• Systemic test operation of the hydrogen network
WP6	<ul style="list-style-type: none">• Development and implementation of a techno-economic model for green electricity generation and hydrogen operation
WP7	<ul style="list-style-type: none">• Determination of the potential for the exploitation, transferability, scaling and profitability of the innovation and demonstration project
WP8	<ul style="list-style-type: none">• Multidisciplinary analysis of the sustainable development of the regional hydrogen infrastructure
WP9	<ul style="list-style-type: none">• Planning, implementation and verification of safety aspects for an innovative hydrogen infrastructure with special focus on new types of generation technologies

¹ Subject to a separate funding application |

Project **HydroNet** — Points of contact



WP1 contacts

Dr Andreas Breuer (manager)

andreas.breuer@westnetz.de

René Lorenz

rene.lorenz@westnetz.de

Claudia Lehmkuhl

claudia.lehmkuhl@westnetz.de

Stefan Greve

stefan.greve@westnetz.de

Dr Jochen Schneider

jochen.schneider@westnetz.de