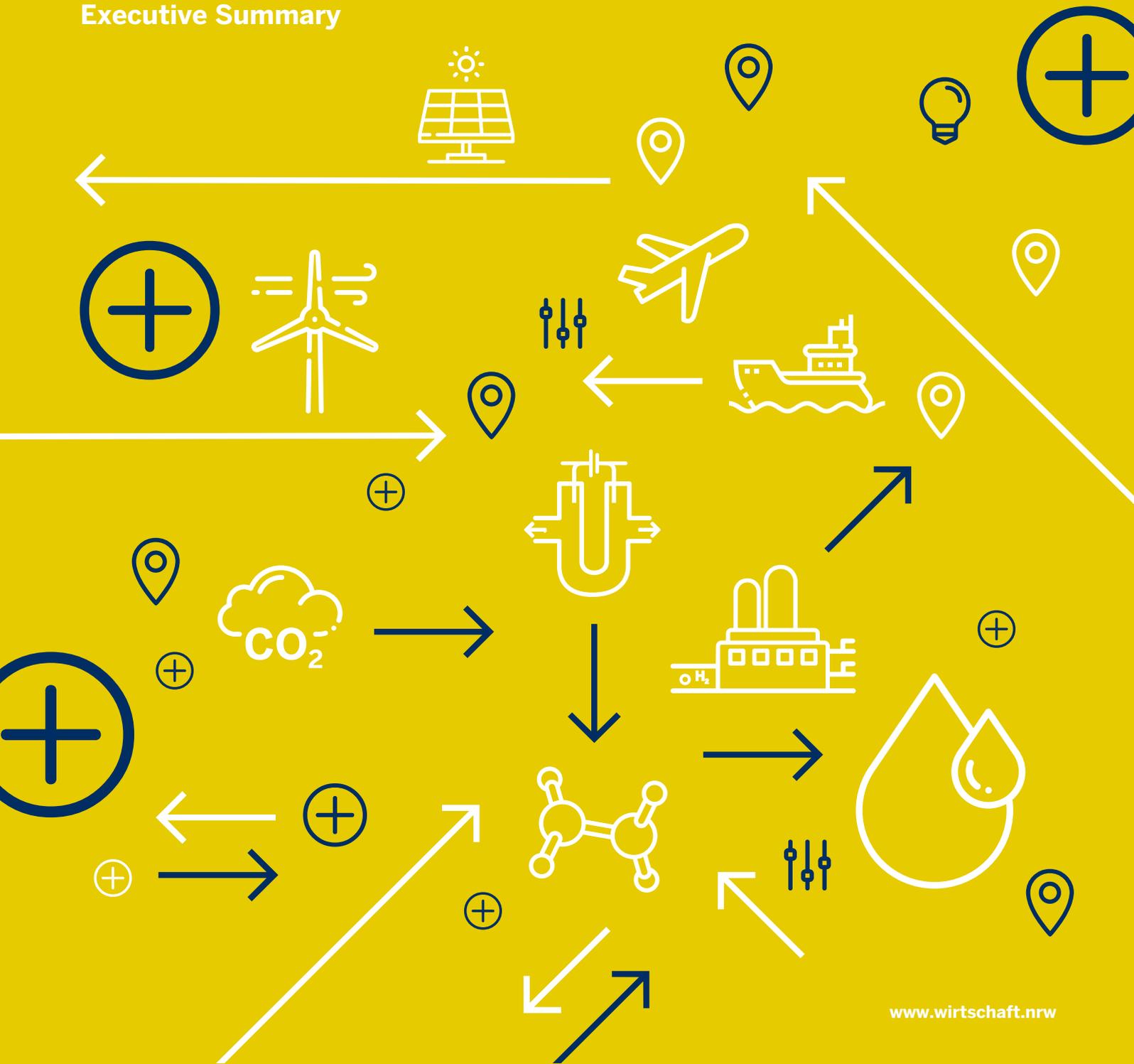




# Synthetic Fuels Action Plan North Rhine-Westphalia

## Executive Summary



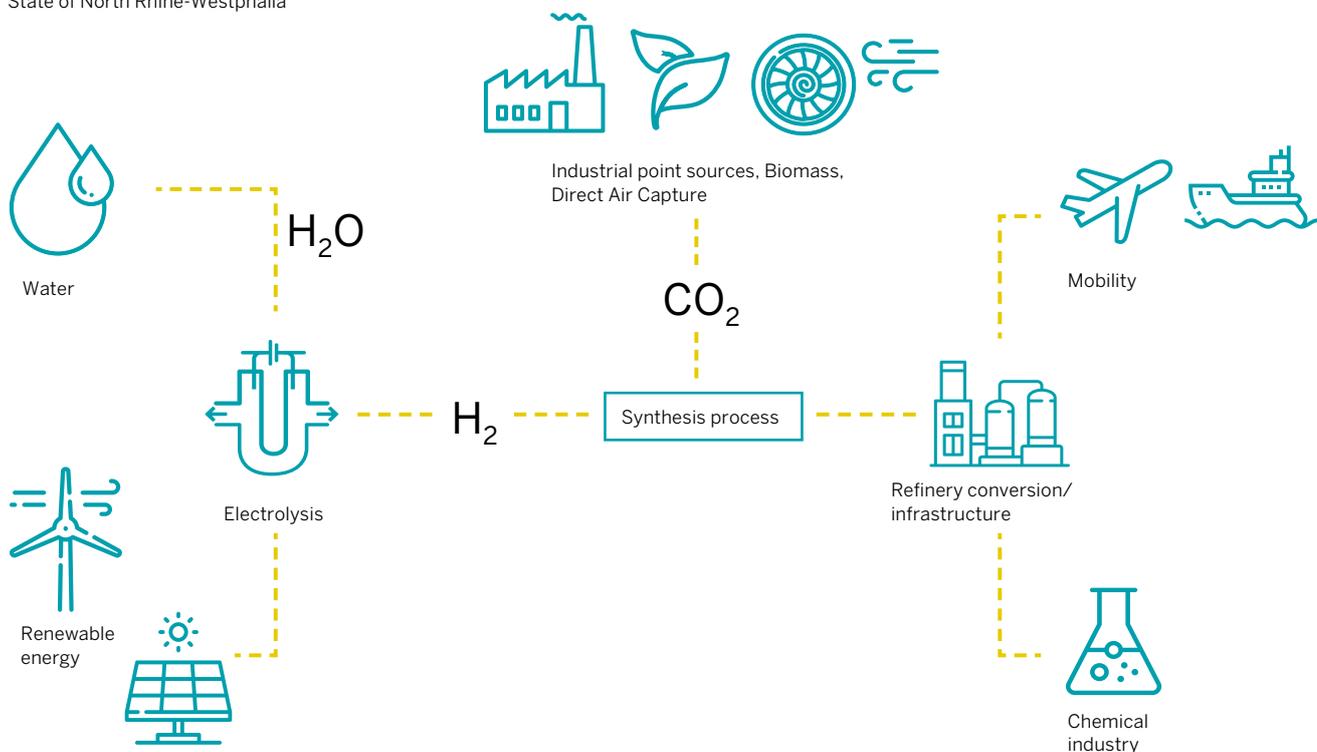
North Rhine-Westphalia is not only Germany's, but also Europe's industrial core region and has committed to becoming climate neutral by 2045.

This requires a far-reaching social and economic transformation. Innovative technologies, such as synthetic fuels, are the key to a successful transformation. Synthetic fuels can be produced in a climate-friendly way using renewable electricity, water and carbon dioxide.

Synthetic fuels not only contribute to achieving climate neutrality, but also offer great economic potential for the North Rhine-Westphalian industry. The Ministry of Economic Affairs, Innovation, Digitalization and Energy of the State of North Rhine-Westphalia (MWIDE) shows with its Synthetic Fuels Action Plan NRW how the opportunities of synthetic fuels can be utilised and their production supported.

Figure 1: Simplified production process of synthetic fuels

Compiled by the Ministry of Economic Affairs, Innovation, Digitalization and Energy of the State of North Rhine-Westphalia



## Key facts:

# 1

Synthetic fuels are key to achieving the North Rhine-Westphalian climate protection goals.

# 2

Synthetic fuels should be used particularly in areas where electrification or the direct use of hydrogen is not feasible, especially in (long-haul) aviation, (sea) shipping and as base materials in the chemical industry.

# 3

Annual demand for synthetic fuels in North Rhine-Westphalia is expected to reach 139 TWh by 2050. Current calculations predict that 129 TWh of that total will be imported to North Rhine-Westphalia each year and 10 TWh produced locally.<sup>1</sup>

# 4

In the long term, there will still be a need for liquid fuels with a high energy density in the aviation sector in particular, and for base materials in the chemical industry. That demand should be met with climate-neutral products such as synthetic fuels.

# 5

Demand for synthetic fuels is expected to increase significantly from 2030 onwards. However, investments must be made now in building production facilities and infrastructure.

# 6

The production of synthetic fuels has to be climate-neutral in order to contribute most to climate protection. On the long run, this means that production will be based on green hydrogen and the required CO<sub>2</sub> will be obtained from biogenic sources or through carbon capture. The goal is to create a closed carbon cycle. Facility operation and transport must also be climate-neutral. However, there will be a transition phase in which blue hydrogen and CO<sub>2</sub> from industrial processes can also be used to support the development of the market.

# 7

Synthetic fuels will be a globally traded product. The renewable electricity accounts for the largest share of production costs. Synthetic fuels are therefore likely to be produced predominantly in regions offering significant renewable power generation potential. International partnerships must be established to ensure that the North Rhine-Westphalia demands can be met.

# 8

North Rhine-Westphalia can benefit from the global demand for climate protection technologies and export plants, components and ideas developed in North Rhine-Westphalia worldwide.

# 9

Synthetic fuels offer great opportunities for North Rhine-Westphalia in terms of industrial policy. They will be part of the transformation of refineries and the chemical industry in North Rhine-Westphalia, and create new business cases in those fields.

# 10

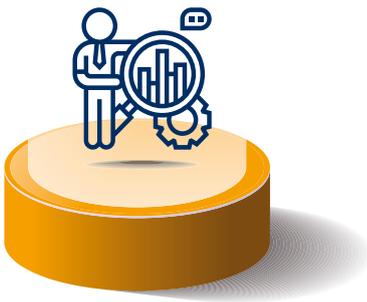
Cross-industry partnerships will be the key to a transformation process across all sectors on the way to climate neutrality in 2045. North Rhine-Westphalia will be a frontrunner for innovative Power-to-X value chains.

<sup>1</sup> The data is based on the results of the supporting research study by Forschungszentrum Jülich and assessments by MWIDE within the framework of the NRW Hydrogen Roadmap.

For coordinated and comprehensive climate protection action, we need synthetic fuels at competitive prices. The Synthetic Fuels Action Plan NRW launched by the Ministry of Economic Affairs, Innovation, Digitalization and Energy of the State of North-Rhine Westphalia. Synthetic fuels are an important element on the path to climate neutrality. Incentives must now be set for the market to evolve.

Planning certainty and the right framework conditions are crucial to increase production capacities and thus reducing production costs. North Rhine-Westphalia can be a frontrunner, demonstrating that climate protection and economic opportunities go hand in hand.

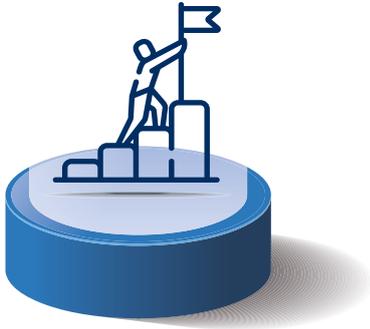
To make this happen, MWIDE supports the market development of synthetic fuels in the following fields of action:



## A1 Implementing the Hydrogen Roadmap NRW on a fast track

Large quantities of hydrogen are needed for the production of synthetic fuels. The State Government will quickly implement the Hydrogen Roadmap NRW so that sufficient low-cost hydrogen is available. The market development is driven in particular by the following activities:

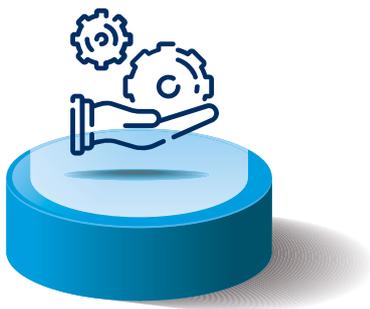
- Supporting the rapid build-up of electrolysis capacities in North Rhine-Westphalia.
- Developing the hydrogen transport and import infrastructure as quickly as possible. This includes rapid implementation of the Important Project of Common European Interest (IPCEI) "Get H<sub>2</sub>".



## A2 Establishing the right framework conditions for the market development of synthetic fuels

The framework conditions must be right for synthetic fuels to become economically viable. Production facilities must be able to operate economically. A harmonized certification system is needed as well. MWIDE carries out the following action points:

- MWIDE is advocating on federal and EU level to develop the necessary conditions for production and import of synthetic fuels. Such a framework includes a harmonised PtX certification system at a federal German, EU and international level.
- MWIDE is committed to the rapid realization of the blending quota of synthetic kerosene in aviation. This is decisive for planning certainty when building up production capacities.



## A3 Promote research and development: leverage optimisation and efficiency potential

While many of the technologies have reached a high maturity level, there is still potential for optimization and efficiency improvements. This reduces production costs. North Rhine-Westphalia provides funding for research and development projects:

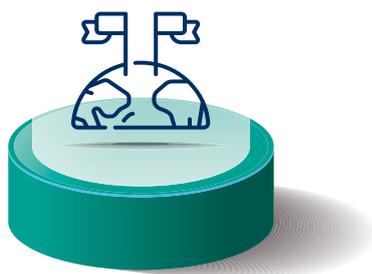
- Funding for research and development projects that assess the feasibility and implementation of synthetic fuel production in North Rhine-Westphalia.
- Funding for research and development projects on utilization CO<sub>2</sub> and on the technologies required for this (such as direct air capture).
- Funding for innovation projects that contribute to optimize production processes.



## A4 Expand production capacity and develop infrastructure

North Rhine-Westphalia is becoming a flagship region for new value chains. The aim is to build production plants for Fischer-Tropsch products and methanol. Only if sufficient, high-purity CO<sub>2</sub> is available, synthetic fuels can be produced at refineries and chemical sites. The necessary CO<sub>2</sub> infrastructure needs to be in place in North Rhine-Westphalia as quickly as possible to implement the NRW Carbon Management Strategy:

- Building at least one pilot plant for the production of synthetic fuels and raw materials using Fischer-Tropsch synthesis in North Rhine-Westphalia with a capacity of 100,000 tonnes of PtL per year.
- Construction of the first climate-neutral methanol synthesis facility with a capacity of at least 15,000 tonnes of methanol per year. The IPCEI project “ChemCH2ange” is being supported for this purpose. Co-financing by the State of North Rhine-Westphalia is planned.
- Planning for CO<sub>2</sub> infrastructure in North Rhine-Westphalia and beyond and technical testing of CO<sub>2</sub> transport.
- Launch of a “CCU pilot regions in North Rhine-Westphalia” (CCU-Modellregionen in Nordrhein-Westfalen) competition. The MWIDE is initiating a competition to identify three to five pilot regions (with their local stakeholders) in North Rhine-Westphalia where CO<sub>2</sub> capture and utilization will be incentivized.

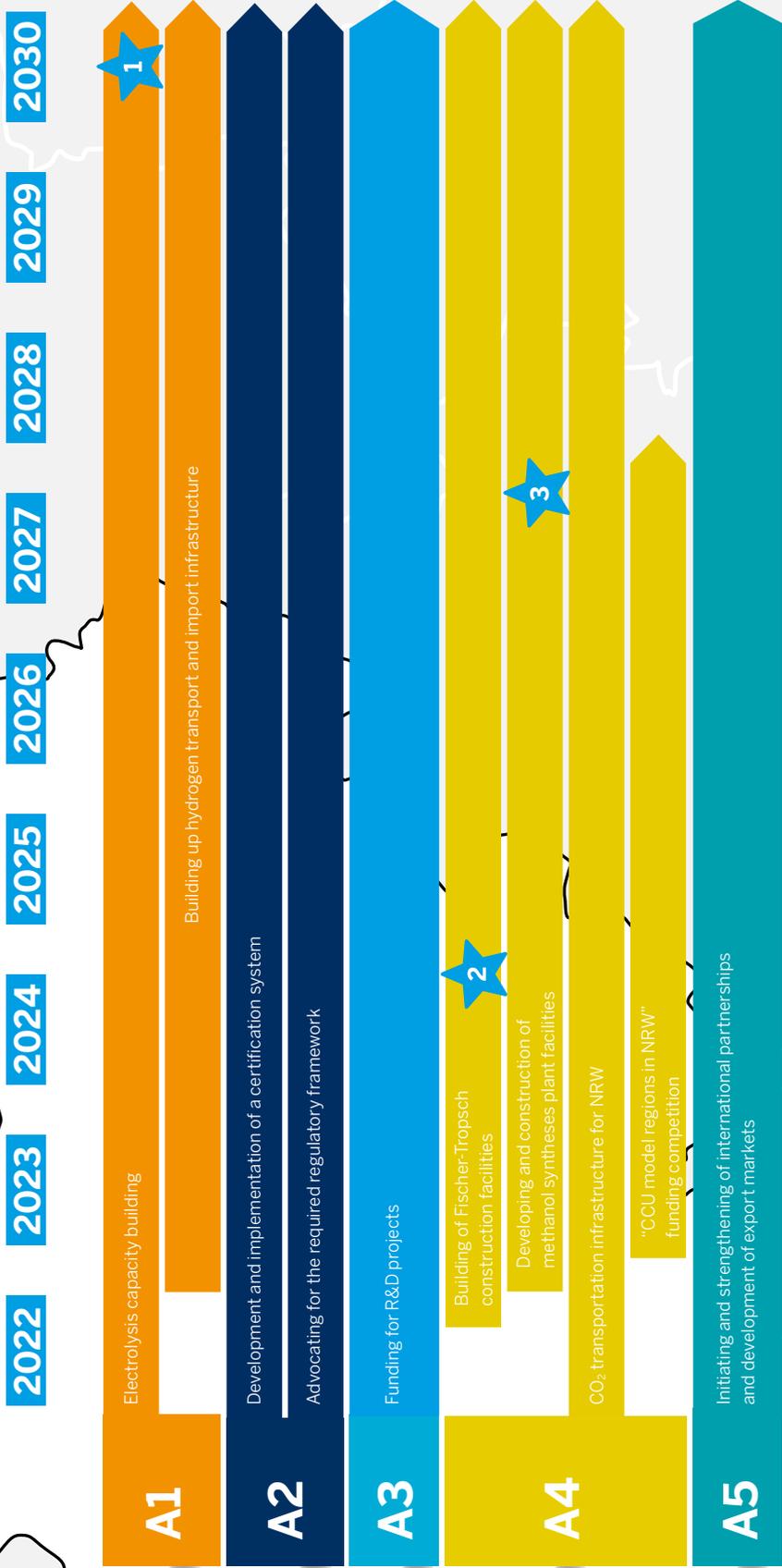


## A5 International partnerships

The market for synthetic fuels will be an international one. Synthetic fuels will mostly likely be produced mainly in countries with large renewable energy potentials and then traded globally. International partnerships and collaborations are therefore crucial for North Rhine-Westphalia to import the required quantities cost-effectively and reliably. North Rhine-Westphalian companies will be supported in using export opportunities for climate protection technologies.

- MWIDE will initiate and implement European and international partnerships to develop import chains.
- At a federal level, the MWIDE will advocate for long-term and comprehensive support for the H2Global mechanism and for a coherent import strategy for hydrogen and synthetic fuels.
- Information events on potential markets (for example MENA) and on funding opportunities at an North-Rhine Westphalia, federal German and EU level will be organized to help businesses to develop export markets.
- PtX matchmaking events for businesses will be organised.

Figure 2: Action plan timeline



**Milestones**

- ★ 1** 1 GW to 3 GW electrolysis capacity in North Rhine-Westphalia
- ★ 2** Installation of a Fischer-Tropsch production plant with a capacity of 100,000 t/a
- ★ 3** Commissioning of a methanol synthesis with a capacity of 15,000 t/a

# Publishing information

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Ministry of Economic Affairs, Innovation, Digitalisation and Energy  
of the State of North Rhine-Westphalia

Berger Allee 25

40213 Düsseldorf

Tel. +49 (0) 211/61772-0

Fax: +49 (0) 211/61772-777

Internet: [www.wirtschaft.nrw](http://www.wirtschaft.nrw)

Department VII.5

Energy System of the Future, Hydrogen and Climate Protection in  
Industry

**Designed by:**

[www.heimrich-hannot.de](http://www.heimrich-hannot.de)

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**Ministerium für Wirtschaft, Innovation,  
Digitalisierung und Energie  
des Landes Nordrhein-Westfalen**  
Berger Allee 25, 40213 Düsseldorf  
[www.wirtschaft.nrw](http://www.wirtschaft.nrw)

