



Services along the hydrogen value chain

Distribution/transport:

District heating



HydroHub

H₂ competence @ HydroHub

Our services run along the entire value chain in the hydrogen industry – from generation through transport and storage to use in various fields of application.

Energy generation

Renewables
(e.g. wind, solar)

Conventional power plants

Geothermal

H₂ generation

Electrolysis
Seawater
desalination plants

Reforming processes

Methane pyrolysis

Distribution/transport

Electrical grid
Pipelines
District heating

Intelligent networks
Refuelling stations/
filling systems

Tankers
(lorry, train, ship)

Storage

Battery storage
Gas tanks

Cavern storage
(H₂ and CO₂)

Pressure vessels
H₂ hydride storage

Consumption/use

Fuel cell system
Methanol synthesis unit

Carbon capture and utilisation
Mobility (e.g. e-fuels)
Reconversion to electricity

Power to gas (gas, heat, liquid)
Industrial applications
(e.g. refinery)

H₂ competence @ HydroHub

We give comprehensive support to hydrogen projects and offer a broad spectrum of services in the concept/planning, production, operation and decommissioning/disposal phases.



Concept/planning

We support you from the start with research and project planning measures and specific tasks. Already at the conception phase, we are there at your side with feasibility studies, strategic and financial consultation and a broad range of organisational and technical services. Alongside concept creation with consideration for legal, technical and economic conditions, we take on the task of analysing the requirements and support you in the process of determining feasibility through basic and design planning all the way to the approval process.



Production

For over 150 years, it has been one of our tasks to analyse and manage technical sources of risk. With our wide range of specific services, we are thus able to offer you competent help in the integration of hydrogen technologies into the industrial value chain. Our range of services runs from fact-finding and construction through project management, administering documentation and operator's obligations, basic and detailed process engineering all the way to project support through geological, environmental and engineering services during the production process.



Operation

We support frictionless operation with our extensive range of services and our primary goal of optimising operational reliability and preventing damage. Our services support you in the implementation of your operating strategies and in the accompanying optimisation, maintenance and upkeep concepts. Our safety-oriented process with operational monitoring and the creation of damage-limitation concepts contributes, in the final account, to establishing hydrogen in the popular conception as a safe and controllable technology.



Decommissioning/disposal

Just as we are there for you in the first concept phase, we are also at your side at the decommissioning phase, providing all the required services for dismantling and disposal – including project management and comprehensive services to handle your operational obligations. We create concepts to the current legal requirements, standards and regulations and support you in identifying, analysing and avoiding the potential risks of your intervention.

Integrating renewables efficiently into the heating network

District heating both supplies buildings with hot water and heat and provides industrial consumers with process heat – largely still using fossil energy sources to do so. Against the backdrop of the climate goals that need to be fulfilled, the task is to gradually replace cogeneration plants and combined heat and power facilities running on coal and gas with those that integrate and make usable energy from renewable sources.

The measures to decarbonise heating include the direct use of solar energy, geothermal, biomass, industrial waste heat and synthetic natural gas from renewable excess electricity, alongside the use of heat pumps, electric boilers and power-to-heat plants. The intelligent networking of these technologies poses new challenges for infrastructure and the management of district heating networks. To drive forward the development of central and decentralised solutions for a climate-neutral heating network, demonstration and pilot projects are being subsidised to allow

greater flexibility in heat provision using the existing systems and to find feasible paths and cross-sectoral concepts to depart from fossil energy generation and achieve electricity-based, renewable heat supplies.

We are your experienced partner in the development of networks to transport local and district heat, particularly with a view to the design of innovative, cross-sectoral solutions and storage facilities. With competent specialists and the most modern analytical and measurement methods, we are there for municipal and commercial actors to improve existing systems, integrate renewables efficiently into heating and let you benefit from subsidies. Do get in touch.



The heating network on its path towards a greenhouse gas-free future

The development of renewable energies in the field of heating will lead to an increase in decentralised generator units and the growth of local and regional network solutions. As part of this development, municipal companies such as utilities could become the operators of innovative energy platforms. To investigate this within the framework

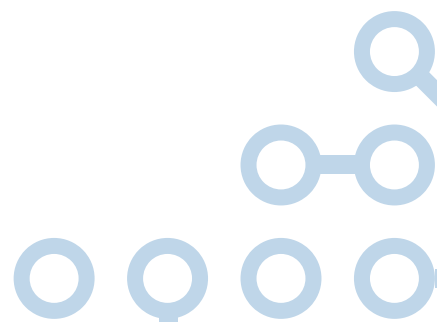
of the regulatory possibilities, the cross-sectoral use of renewable energies is being tested at suitable sites in the form of real-laboratories at district level, say, by networking the heating, electricity and mobility fields and thus both saving CO₂ emissions and reducing energy consumption.

Requirements of the heating network of tomorrow

Already today, district heating networks are able to integrate various sources of heat. In the future, they will be part of intelligently linked solutions in which heat is transparently and efficiently traded with a high level of automation from various different suppliers. This requires the digital linking of heat networks, the use of suitable information, communication and control interfaces and intelligent feed-in stations and home connections.





A characteristic of future heating networks will be the comparatively low supply temperature compared to





today's levels, which makes a new generation of piping necessary. Thus, it will be possible to integrate a wide range of heat generators such as solar-thermal plants and large-scale heat pumps, as well as the waste heat from hydrogen electrolyzers, into the network. In combination with large-scale storage and power-to-heat plants, virtual power plants will also arise, allowing for better load management in the heating and electrical grids.



Our services

Whether it's reinforcing or optimising existing plants, trying out innovative processes or executing complex construction work, with comprehensive services in the fields of consulting, engineering and training, we support industrial, institutional and academic actors in the following phases of the project in question:

	 Concept/ Planning	 Production	 Operation	 Decommissioning/ Disposal
Creation of concepts to current legal requirements, standards and regulations	•			•
Creating requirements specifications	•			•
Creating technical specifications	•			•
Creating commissioning and periodic inspection concepts	•			
Weak-point analysis, identification and analysis of potential risks	•			•
Consultation, creation of staggered power system protection plans, protection tests	•			•
Conception and consultation (commissioning, periodic inspection) of isolated networks including the incorporation of e.g. decentralised generator units, electrolyzers and any necessary storage facilities (on and offshore)	•			
Creation of risk analyses to determine the potential risk of intervention	•			•
Creation of safeguarding concepts	•			•
Consultation on and evaluation of electrical and mechanical safeguarding systems	•			•
Consultation, evaluation on installation and operation of alarm receiving stations	•			•
Consultation, evaluation on determination of intervention measures by guarding/security company or police	•			•

	 Concept/ Planning	 Production	 Operation	 Decommissioning/ Disposal
Consultation, evaluation on determination of administrative security measures	•			•
Technical advisory services	•			
Project management and document administration	•	•	•	•
Damage assessments and analyses of the causes of damage, creation of avoidance concepts			•	
Analysis and evaluation of damages and measures to prevent comparable faults			•	
Maintenance of breakdown statistics to assess operational reliability in comparable plants/components			•	
Analysis of electrical grids: e.g. short circuit, load flow calculations, efficiency and optimisation assessments			•	





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