

Distribution/transport:

# Intelligent networks



TÜV®



TÜV NORD GROUP

# H<sub>2</sub> competence @ TÜV NORD

## 1. Energy generation

Wind energy ■ ■ ■

## 2. H<sub>2</sub> generation

Electrolysis ■ ■ ■

Seawater desalination plants ■ ■ ■

## 3. Distribution/transport

Electrical grid ■ ■ ■

Pipelines ■ ■ ■

District heating ■ ■ ■

Intelligent networks ■ ■ ■

Pipelines ■ ■

Refuelling stations/  
filling systems ■

Tankers (lorry,  
train, ship) ■

## 4. Storage

Battery storage ■ ■ ■

Gas tanks ■ ■ ■

Cavern storage  
(H<sub>2</sub> and CO<sub>2</sub>) ■ ■ ■

Pressure vessels ■ ■ ■

H<sub>2</sub> hybrid storage ■

## 5. Consumption/use

Fuel cell systems ■ ■ ■

Methanol synthesis  
units ■ ■ ■

Refinery ■ ■ ■

Mobility ■ ■

**In every field of services, we support you in the following phases:**

■ Concept/planning

■ Production

■ Operation



## Concept/planning

We support you in the concept phase with comprehensive services that will give your project the security it needs in technical and legal aspects from the very start. From product design through the assessment of requirements and technical specifications to plant development and process optimisation, our specialists have the details and the desired goal in view and are equipped and prepared for your tasks with ultra-modern IT and AI instruments as well as a broad spectrum of risk analysis, certification, test and evaluation services.



## Production

With specific testing, auditing and approval services, we provide neutral and technically competent support as a notified and accredited body for manufacturers. This includes assessment and certification as a material manufacturer, obligatory for the production of certain products. Our range of services also includes the assessment of manufacturing processes, material assessments, stress tests, damage appraisal and product certifications. In addition, on top of monitoring production, we also support commissioning, assembly works and personnel instruction in production processes.



## Operation

After setup and commissioning, we help you when operations are up and running to avoid shutdowns, eliminate technical sources of danger and reduce costs with the use of software-supported maintenance systems. We take on the task of carrying out all recurring inspections and specific tests of electrical and mechanical plants and systems. We can also create risk-based maintenance plans and provide you with tailor-made strategies to reduce operational risks and increase plant safety over the long term.

# Intelligent networks – much more than just power lines

Taking the step from fossil, highly available energy media to volatile renewables requires new flexibility in our energy infrastructure and more interlinking of its components. Information and communication technologies play a central role here, with so-called “smart grids” taking on the communicative integration of all actors in the system – from generation through transport, storage and distribution to consumption by the industrial and private sectors. Modern measurement systems and controls allow extensive automated adjustment, contributing to releasing some of the burden on the grid, reducing costs during peak load times and maintaining security of supply.

We are your partner for the implementation of the energy transition on the grid – particularly with a view to cross-sectoral solutions to integrate various producers and with regard for the safety, resilience and operational efficiency of systems. We are at your side with the most modern technologies and competent specialists to execute grid extension projects successfully and let you benefit from subsidies. Do get in touch.

# Smart grid pilot projects

The use of information and communication technologies in the energy sector has been successfully researched and tested in Germany for several years now. State subsidy, legal frameworks and standardisation have laid the

foundations today for the development of model regions in which a high portion of electricity from wind and solar power plants, alongside hydrogen, contributes to a secure grid.




## H<sub>2</sub> project SmartQuart Kaisersesch

To drive forward the transition to decentralised energy and heating at the district level, the TÜV NORD Group is supporting the H<sub>2</sub> project SmartQuart Kaisersesch from development through to approval and operation. Along the entire value chain of renewable energy in the heating, electricity, mobility and industrial sectors, the project makes it clear how the development of a hydrogen infrastructure can be combined with the use of further energy media, leading in the end to the systemic integration of many individual solutions to form a networked whole.




The knowledge gathered through practical experience will serve as a blueprint for the development of comparable modular solutions in which intelligent networks communicate via a digital platform. Thus, SmartQuart Kaisersesch serves as a real-life laboratory for sector coupling where new energy-optimised concepts are developed for future use in new-built or converted residential areas and as part of sustainable energy planning for cities.

# Our services

We support commercial and municipal actors in developing smart grids for the cross-sectoral use of renewable energies. We enable the integration of information and communication technologies and intelligent systems for grid control and automation by providing comprehensive services in the fields of testing, inspection and certification in the following phases of the project in question:

	Concept / planning	Production	Operation
			
Inspection of concepts to current legal requirements, standards and regulations	■		
Inspection of requirements specifications	■		
Inspection of technical specifications	■		
Inspection of component designs on the basis of standards, third-party requirement catalogues or customer demands	■		
Certification of protective devices	■		
Inspection of staggered power system protection plans, protection tests	■		
Analysis of electrical grids	■		
Certification of the grid connection	■		
Certification of protective devices, inspection, safety design	■		
Conformity assessments of electronic components/systems	■		
Inspection of the design, construction, functioning and reliability of hoists, cranes and load handling equipment	■		
Inspection of risk analyses to determine the potential risk of intervention by unauthorised persons	■		
Inspection of safeguarding concepts	■		

Services along the hydrogen value chain: Distribution/transport

	Concept / planning	Production	Operation
			
Inspection on determination of intervention measures by guarding/security company or police	■		
Inspection on determination of administrative security measures	■		
Inspection commissioning and periodic inspection concepts	■		
Technical due diligence	■		
Technical, financial, legal due diligence (with external partners)	■		
Testing electromagnetic compatibility	■		■
Inspection on installation and operation of alarm receiving stations		■	
Production monitoring and auditing		■	
Inspection and support for commissioning and assembly works		■	
Acceptance and functional tests		■	
Acceptance tests (commissioning, periodic inspection) of isolated grids with involvement of e.g. decentralised generator units, electrolysers and any necessary storage systems (on and offshore)		■	
Inspection of switchgears/control cabinets to EN 61439-1			■
Inspection of electrical and mechanical safeguarding systems			■
Recurring inspections			■

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