



TRANSFORMATION



SECURITY OF SUPPLY

STRUCTURAL CHANGE

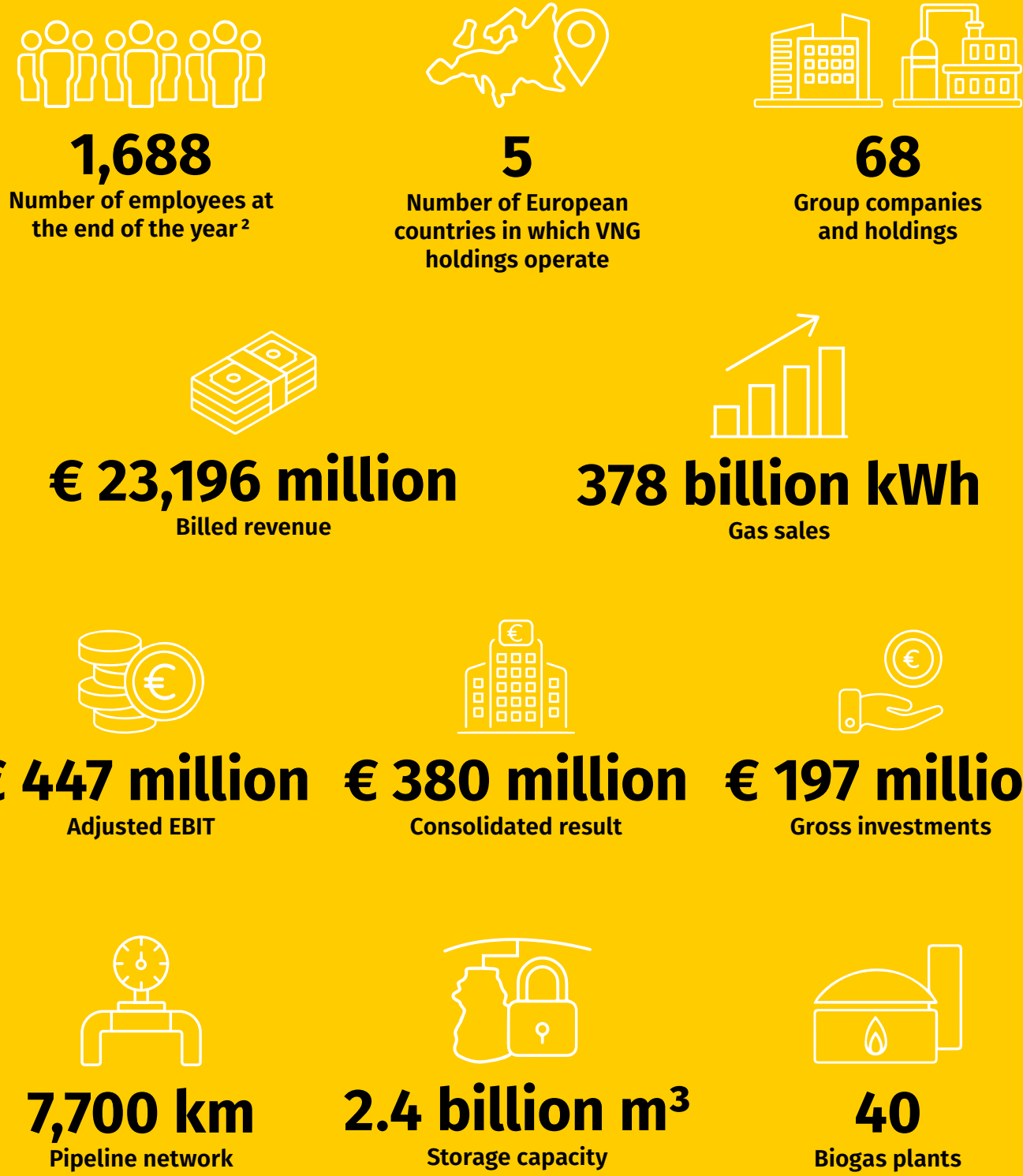
VNG at a glance

CREATING ADDED VALUE

TOGETHER



KEY PERFORMANCE INDICATORS ¹



¹ As of: 31/12/2023
² Total employees of all fully consolidated companies

THE ENERGY WORLD IS CHANGING – WE’RE HELPING SHAPE THE CHANGE

For more than 65 years, VNG has stood for the reliable supply of its customers. VNG’s comprehensive technical and economic know-how is underpinned by decades of reliable operation of critical energy infrastructure from the transmission system to the gas storage facilities and successful trading in natural gas and biogas.

From this strong basis, we continue to evolve to meet the challenges of the various energy markets. We see the transformation from fossil fuel natural gas to renewable and decarbonised gases as an opportunity.

With numerous projects in the field of generation, transport and provision of hydrogen and biogas, we are consistently positioning ourselves for the future. In all our activities, we feel connected to our East German base and are firmly anchored in the region. In this region we want to support structural change, facilitate the creation of a sustainable and longterm affordable energy supply that secures jobs for people, and create added value for the region with a strengthened economy, modern infrastructure and also support for voluntary work.

Our financial year 2023

After the previous crisis-struck year, VNG has ended the 2023 financial year with an exceptionally positive result. The basis for this was the outstanding performance of all business areas in a market environment that remains highly volatile. This success will enable VNG to make pioneering investments in the future as part of the “VNG 2030” strategy.

All financial information on the financial year:
www.vng.de/en/investor-relations

CONTENTS

- 04 VNG at a glance
- 08 Securing Energy Supplies
- 14 Helping Shape the Energy Transformation
- 30 Supporting Structural Change
- 39 Publication details

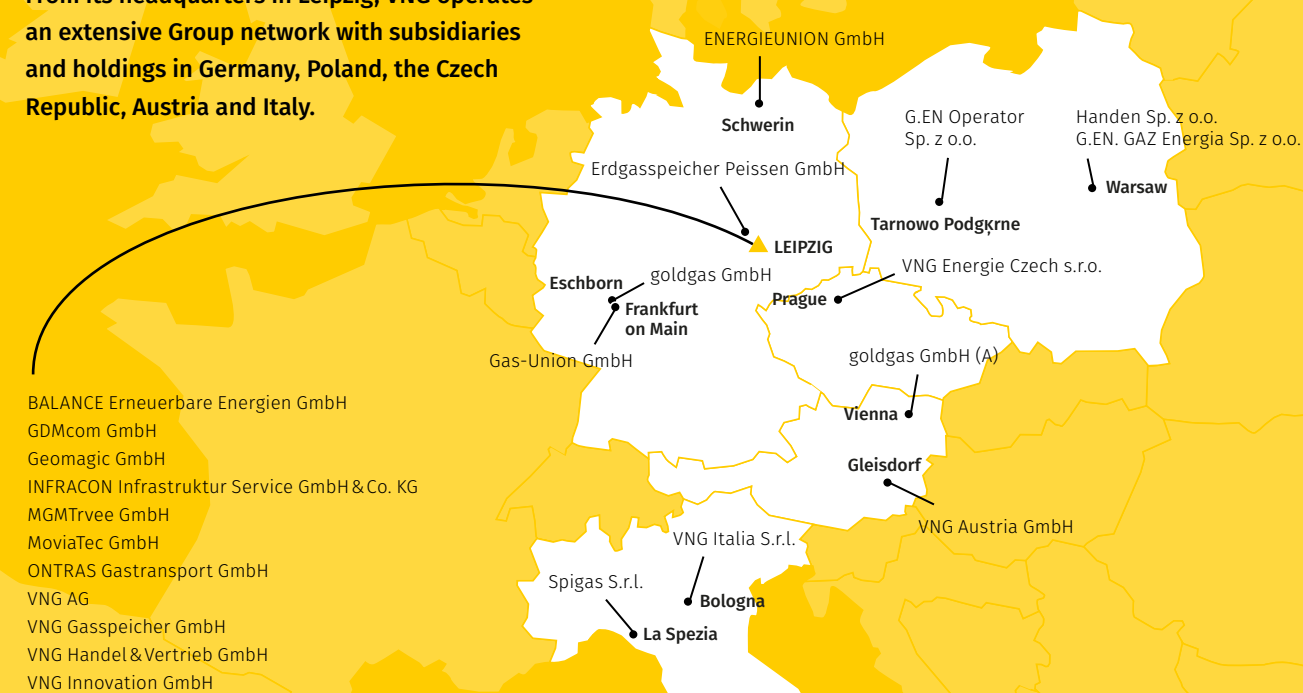
VNG COMPANY PROFILE

VNG is a group of over 20 companies active in the European energy industry with around 1,700 employees. As a gas importer and wholesaler as well as an operator of critical gas infrastructure, the Group, which is headquartered in Leipzig, is central to assuring the security of the gas supply in Germany. With the “VNG 2030” strategy, VNG is also pursuing an ambitious path for the full market roll-out of

renewable and decarbonised gases such as biogas and hydrogen, paving the way for a sustainable, secure supply and, in the longer term, a climate-neutral energy system. VNG makes its investments in infrastructure and future projects primarily in Central and Eastern Germany, with the aim of significantly contributing to structural change as a Group firmly anchored in its home region.

PRESENT IN FIVE COUNTRIES

From its headquarters in Leipzig, VNG operates an extensive Group network with subsidiaries and holdings in Germany, Poland, the Czech Republic, Austria and Italy.

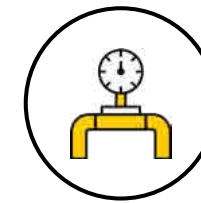


OUR BUSINESS AREAS



TRADING & SALES

As one of Germany's major gas importers and gas traders, **VNG Handel & Vertrieb GmbH** (VNG H&V) offers a wide range of products and services to around 400 municipal utilities and industrial companies. VNG H&V has deep regional roots and has holdings in companies in Germany and abroad.



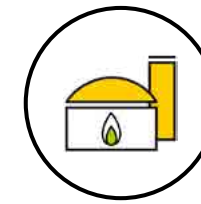
TRANSPORT

The independent transmission system operator **ONTRAS Gastransport GmbH (ONTRAS)** operates the 7,700-kilometre high-pressure pipeline system in Eastern Germany and is responsible for the reliable and efficient transport of gas. ONTRAS supports the European gas market and makes an important contribution to security of supply. ONTRAS is also a pioneer in hydrogen projects in the gas network.



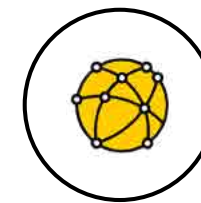
STORAGE

Underground storage facilities are an integral part of the gas infrastructure and essential for the security of supply. The Group subsidiary **VNG Gasspeicher GmbH (VGS)** – the third-largest gas storage operator in Germany – efficiently, safely and reliably stores its customers' gas, successfully markets storage capacities and offers innovative storage products.



BIOGAS

BALANCE Erneuerbare Energien GmbH (BALANCE) operates 40 biogas facilities in Eastern and Northern Germany. The production of green energy is just as much in focus as the intensification of value creation and the development of new products related to biogas and biomethane.



DIGITAL INFRASTRUCTURE

The Digital Infrastructure division, which was only established in 2022, bundles the activities of several subsidiaries and joint ventures. Its activities range from the fibre optic backbone and the fibre optic distribution network to services related to digital infrastructure.

Helping shape the energy transformation

We are helping shape the energy transition and driving the transformation from fossil gas to a renewable and decarbonised supply of biogas and hydrogen (H₂). Our projects extend all the way up and down the gas value chain. In realising these projects, we leverage experience gained over decades and work together with expert partners.

► Seite 14

Supporting structural change

As a structurally significant company in Eastern Germany, we want to maintain the strength of the regional economy, and contribute to the prosperity and quality of life of society with our investments in modern infrastructure, green gas projects and our social commitment.

► Seite 30

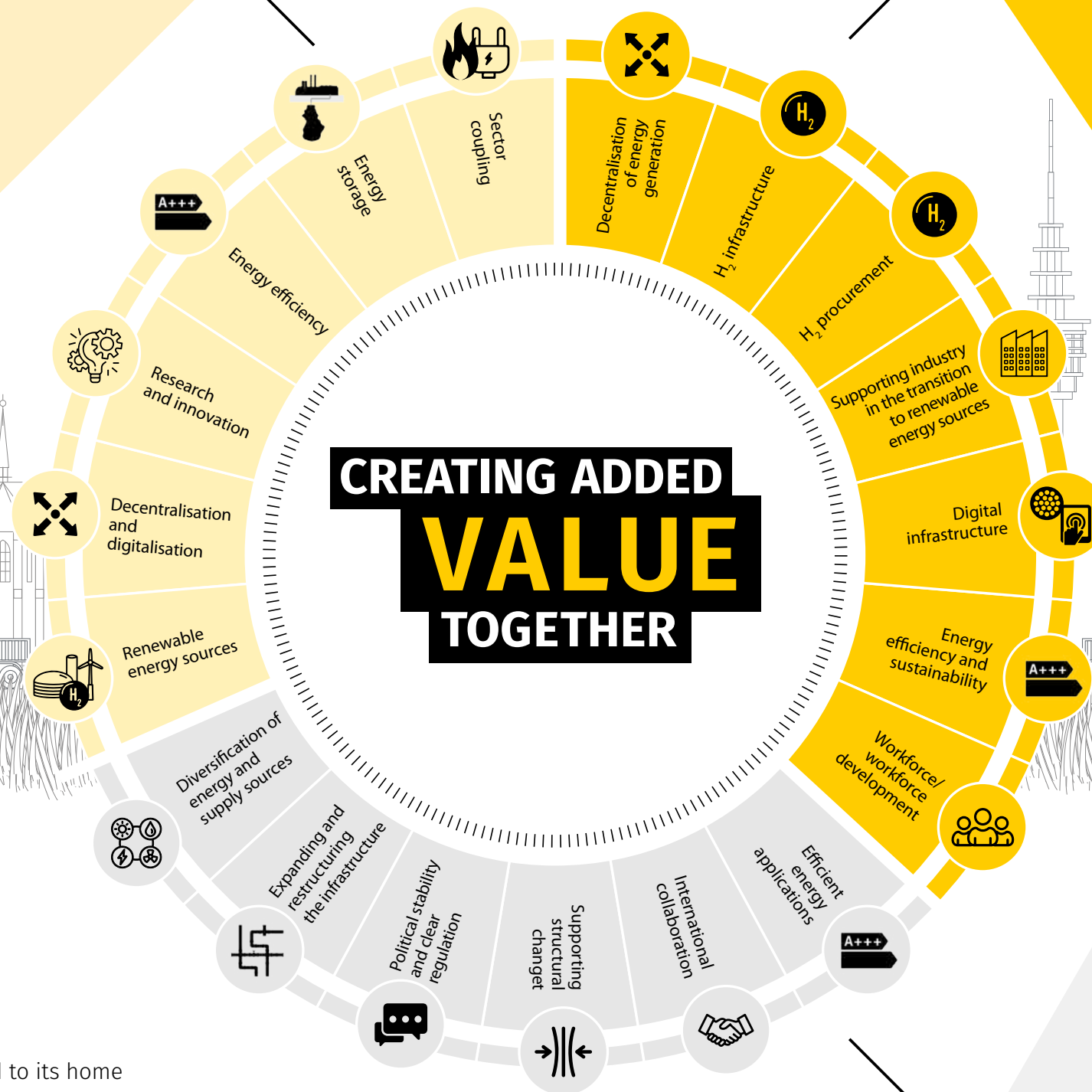
CLOSELY CONNECTED

As a Leipzig-based company, VNG feels closely connected to its home region and makes an important contribution to the future viability of the regional economy in Eastern Germany. We create value for the region with customised solutions and various projects. These projects have three dimensions: **security of supply, transformation** and **structural change**.

Securing energy supplies

We see ourselves as a key player in securing supplies of gas in Eastern Germany. Accordingly, we ensure that our customers always receive the energy they need, both now and in the future. We guarantee this with diversified sources of supply, the reliable operation of our gas infrastructure and international partnerships.

► Seite 08



SECURING ENERGY SUPPLIES

We see ourselves as a key player in securing supplies of gas in Eastern Germany. Accordingly, we ensure that our customers always receive the energy they need, both now and in the future. We guarantee this with diversified energy sources, a reliable gas infrastructure and international cooperation.

CHANGE IS IN OUR DNA

VNG has proven time and again how well it masters change processes and upheavals. The constant factor: even in turbulent times, security of supply was always assured. In this interview, CEO Ulf Heitmüller explains how VNG is applying the experience and skills it has acquired over decades for its role in the energy system of the future.

► How important is security of supply in the transition to the green gas business?

Procuring, transporting and storing gas-based energy sources is an absolute priority for us today and in the future. We are well prepared for this. After all, guaranteeing security of supply has been part of our DNA for more than 65 years. Even in turbulent times and in different social and economic systems, we have always fulfilled this requirement.

► Which milestones make this particularly clear?

Since our Group was founded in 1958, our task has been to supply households and companies in Eastern Germany with gas, initially with town gas produced from coal. We later switched to natural gas. At the beginning of the 1990s, we expanded our pipeline

network westwards together with Ruhrgas, thereby gaining access to the European gas markets. As a result, we were later able to source natural gas from countries such as Norway and increase our trading activities on the international market.

► How important was the transformation at the beginning of the 1990s for VNG?

Looking back, we completed our first energy transition with the switch from town gas to natural gas. The transformation continued in the mid-2000's, when we had to reposition our company as a result of liberalisation and regulation. We have also entered the renewable energy business in the form of biogas. That was our first step into the decarbonised business. In future, our focus will increasingly be on green and

decarbonised hydrogen. The history of our Group has always been marked by change and transformation. And this is what has made us grow.

► VNG has refocused its strategy for 2023. How will VNG position itself in the future?

In light of the experience gained in 2022, we want to step up a gear in order to complete the transformation of our company towards a decarbonised business. We want to invest around five billion euros in this area by 2035. The majority of this is to be channelled into the hydrogen ramp-up, i.e. into H₂ pipelines and H₂ generation infrastructure as well as the conversion of storage facilities. With our strategy update, we are focusing even more strongly,

increasing the pace of the transformation to green gases and charting even more clearly the direction we want to take as a Group.

► Does this mean that VNG is placing all its bets on green?

Our mission is to supply energy and this includes ensuring a reliable gas supply with a broad procurement mix, secure infrastructure and consistent risk management. We see the traditional natural gas business as a major pillar and have refined it further in the strategy update. We are also accelerating our transformation and driving forward the hydrogen and biogas ramp-up in eastern Germany. We are doing this with our customers and for all our infrastructure assets.

In future, our focus will increasingly be on green and decarbonised hydrogen.”

– Ulf Heitmüller
Chairman of the Executive Board



Ulf Heitmüller

Ulf Heitmüller has been Chairman of the Executive Board of VNG AG since 2016. Under his leadership, the Group-wide transformation of the company has been and continues to be driven forward.

7,700
kilometres

is the network
of the transmission
system operator
ONTRAS.

► **What conditions must be met for VNG to achieve the targets set out in the strategy?**

What we need is a stable and reliable political framework in order to guarantee security of supply and at the same time invest as planned and thereby drive forward the transformation. In an international context, cross-border cooperation in the procurement and trading of gas and, in the long term, of hydrogen is important. Our business is also highly influenced by the political climate in Germany. Firstly, because the optimal design and utilisation of future energy sources depend on the regulatory framework. Secondly, because the basis of our success is an open and diverse society in which democratic values are practised. Such a society promotes innovation and creativity, which generate solutions in a dynamic environment. It also improves our access to talent and new ideas. This is exactly what we need to continue to supply markets, companies and ultimately every single person in the region with energy, now and in the future.

**FIVE BILLION EUROS
BY 2035 FOR
DECARBONISED
BUSINESS
AND TO SECURE GAS
INFRASTRUCTURE**

SECURITY OF ENERGY SUPPLIES – TODAY AND TOMORROW

A modern society needs energy to ensure growth and prosperity. Both depend on a stable supply of electricity and heat. VNG plays a central role in meeting the demand for gas-based energy sources, particularly in Eastern Germany.

For many years now, people in Germany have taken it for granted that energy would always be available in the required quantity. This certainty was seriously shaken for the first time in 2022, when Russian supplies had to be replaced by other sources.

The role of natural gas in particular became the centre of attention. After mineral oil, it is still the most important source of energy in Germany and a mainstay of the energy mix. Every second home still heats with natural gas. The 1.8 million commercial and industrial companies in Germany are an important consumer group. They use natural gas to generate heat and electricity for their processes or utilise it directly as a raw material for their products. In other words, the availability of natural gas is still of vital interest to our society today. In Eastern Germany, VNG has stood for a secure supply for more than 65 years – and continues to do so.

Security of supply is the central task for all business areas at VNG 24 hours a day, 365 days a year. Our trading and sales companies ensure the reliable supply of gas to regional utility companies, industry and commercial and household customers in Germany and abroad. In Germany alone, we supply 400 municipal utilities, commercial and industrial companies with the required and contractually agreed gas volumes at all times. To achieve this, we draw on a broad procurement portfolio.

Since our pipeline imports from Russia are no longer available due to the Russian suspension of supplies, we are diversifying our sources of supply even more in the interests of security of supply. The largest share of our natural gas imports today comes from Norway.

A modern grid is essential for the security of energy supply.

We also procure volumes of gas from Algeria, via the commodity market and with purchases of LNG.

During the 2022 energy crisis, we succeeded in procuring the contractually agreed delivery volumes at all times – despite significantly higher procurement prices and high business risks. This was the only way we could avoid domino effects that would have led to much greater damage for municipal utilities and companies in the region.

Our trading and sales companies are also involved in cross-border European energy trading, thus stabilising the supply of gas to our neighbouring countries.

Gas transport is a joint endeavour

Our Transport division is an additional guarantee for security of supply. At the centre is the independent transmission system operator ONTRAS. With a 7,700 kilometre network, it makes an important contribution to the smooth operation of the European gas market.

The flexibility of the transport sector was particularly evident during the 2022 energy crisis, when the direction of flow in long-distance pipelines changed as a result of the arrival of new suppliers. ONTRAS

supports the integration of additional quantities of liquefied natural gas supplied via LNG terminals into the grid. These measures also improve the security of supply in Germany.

Gas storage facilities and the gas reserves stored in them are another pillar for the security of supply in Germany. They make energy available when it is needed. Our subsidiary VNG Gasspeicher operates four of these storage facilities in Northern and Central Germany. They have a combined storage capacity of 2.4 billion cubic metres. VGS customers store natural gas to cover fluctuating demand, especially in winter. However, they also use storage to compensate for volatile procurement costs. In this way, gas storage facilities help stabilise the markets and make supply more secure.

A fourth pillar for security of supply is regionally produced biogas and biomethane. VNG has been active in this business area since 2006. In Northern and Eastern Germany, the VNG subsidiary BALANCE now operates 40 plants that produce biogas and biomethane from renewable raw materials and biomass. In contrast to solar and wind energy, it is always available. It is base-load capable and can be utilised at any time for the reliable generation of electricity and heat.



CONVERSION OF GAS PIPELINE FOR THE TRANSPORT OF HYDROGEN BETWEEN BAD LAUCHSTÄDT ENERGY PARK AND LEUNA CHEMICAL PARK

A decarbonised world also needs security of supply

Natural gas is needed for the competitiveness of our industry and the prosperity of our society.

In the future, hydrogen and biogas will replace today's natural gas and, together with renewable electricity, provide a climate-neutral supply. The same safety and reliability requirements must apply to the new energy molecules.

We are already committed to this today. In all of VNG's business areas, transformation is also informed by the necessity of maintaining security of supply.

In the trading sector, we are growing the import, production and sale of renewable and decarbonised gases. We help our customers to transition to biogas and hydrogen, and work hand in hand with them to develop decarbonisation solutions.

In the transport sector, ONTRAS is working on the development of the H₂ core network in Eastern Germany and on other pipeline-based H₂ pilot projects.

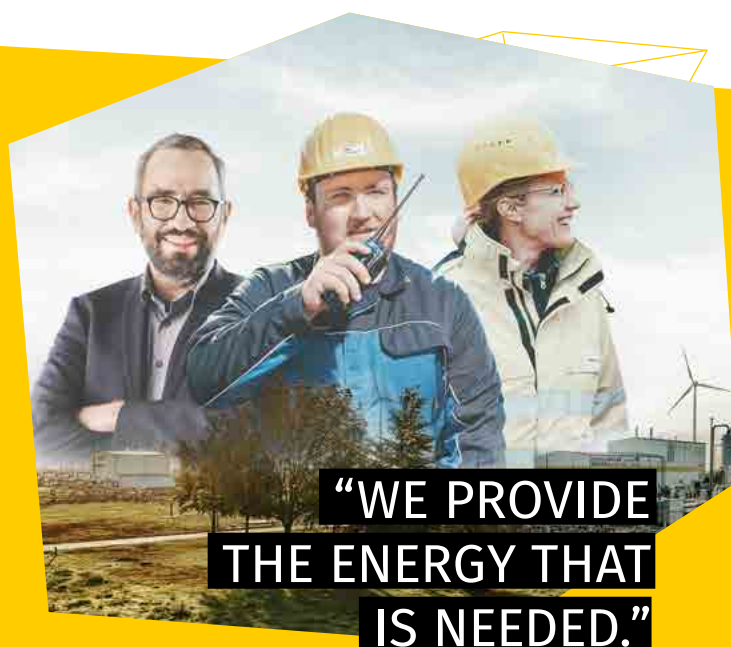
At our storage site in Bad Lauchstädt, we are also researching the requirements for the operation and introduction of new plant technology in hydrogen storage.

On the way to the new energy world, we will continue to ensure a reliable supply for our customers. In the following sections, you can read about what the Group is specifically doing to drive forward the transformation of the energy sector (from page 14) and the structural change in the region (from page 30).

Group's new mission statement

At the end of 2023, VNG adopted a new mission statement that spans all companies of the Group. In line with our corporate purpose "We provide the energy that is needed.", we define ourselves in our mission statement as a leading energy company with a key role in assuring reliability of supply now and in the future, with a regional identity in our DNA and as a strong regional partner. Two components of the mission statement embody our guiding principles and our core values. These inform all our daily activities and, at the same time, form a binding framework for our business policy decisions.

More information at: www.vng.de/en/mission-statement



**"WE PROVIDE
THE ENERGY THAT
IS NEEDED."**

HELPING SHAPE THE ENERGY TRANSFORMATION

We are helping shape the energy transition and driving the transformation from fossil gas to a renewable and decarbonised supply of biogas and hydrogen (H₂). Our projects extend all the way up and down the gas value chain. In realising these projects, we leverage experience gained over decades and work together with expert partners.



TINY MOLECULES FOR THE BIG TRANSFORMATION

We are on the way to a climate-neutral society. To achieve this goal, we need to fundamentally change our energy supply. This is not possible with electricity alone. VNG is driving forward the gas-based transformation of the energy and heating market in all its business areas.

The energy transition is often only viewed in connection with renewable electricity supply. The vast majority of the energy we consume is not provided by electricity, but by solid, liquid or gaseous molecules. Hydrocarbons will continue to be needed in many fields of application in industry and the heating sector in the future, as they are difficult to electrify or only partially electrifiable.

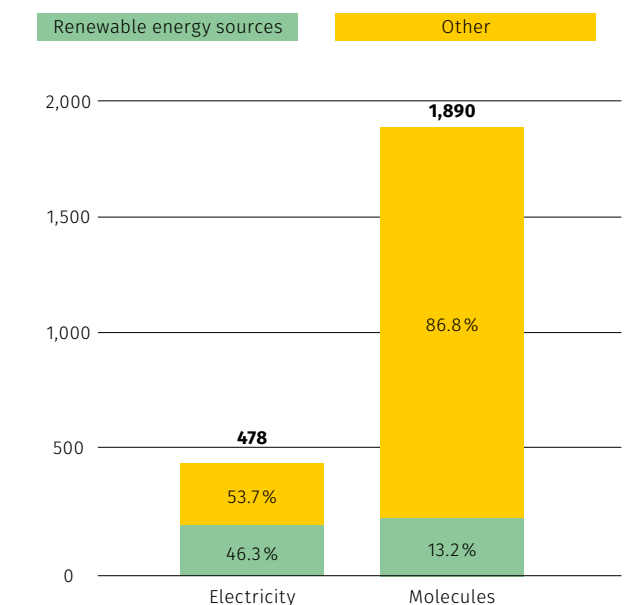
While the majority of the hydrocarbons currently is usually obtained from fossil fuels, these are set to be increasingly replaced by renewable and decarbonised gases such as biogas and hydrogen in the future. They are the hydrocarbon-based energy sources of the future.

Only **20.2** percent is the share of electricity in the energy supply in Germany.

As an integrated gas group, VNG has a special role to play in this project. With new solutions and technologies, we also want to make our contribution to making the energy system renewable and CO₂-neutral. Our ambition is to drive forward the gas-based transformation and provide the energy that will contribute to the performance of the economy and the quality of life of our society.

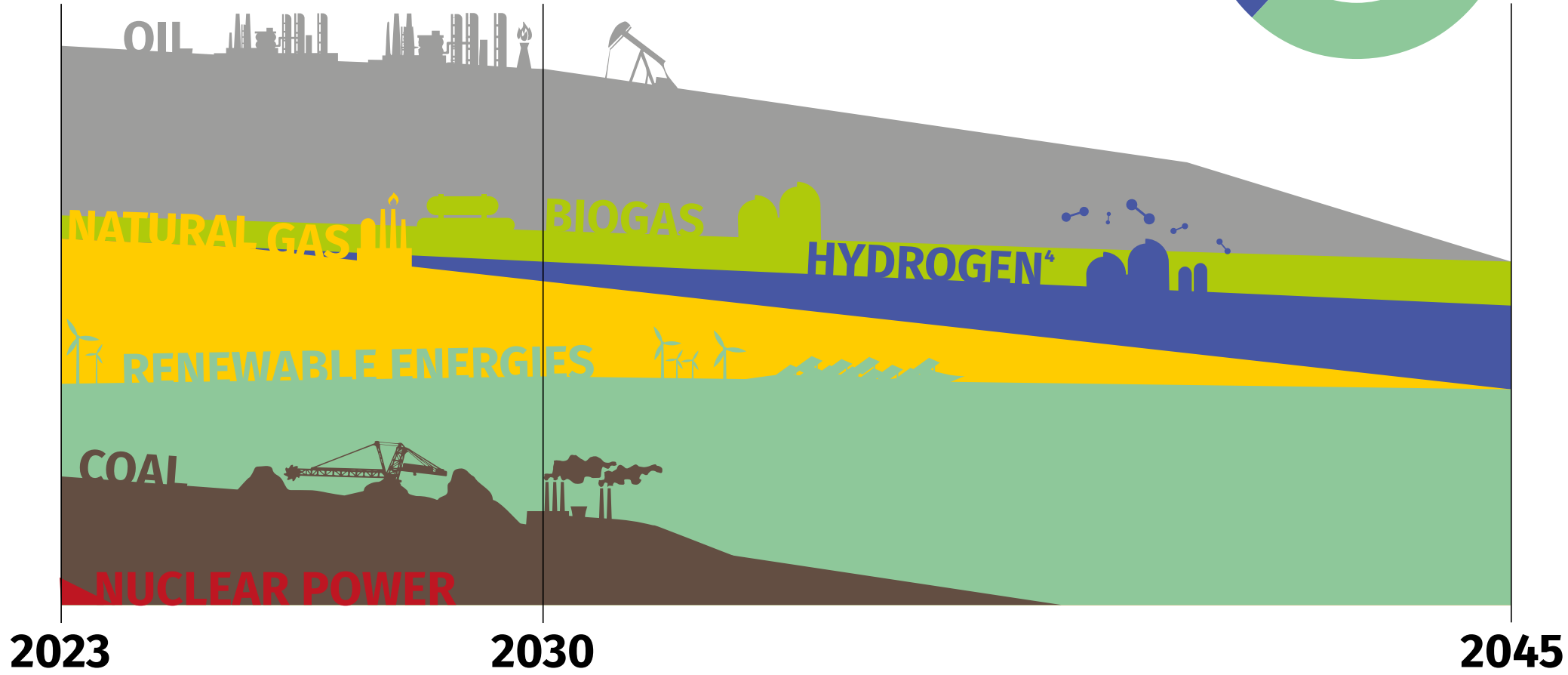
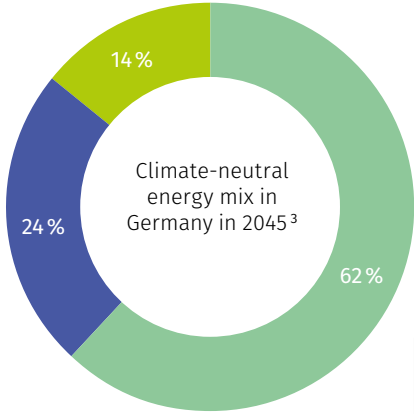
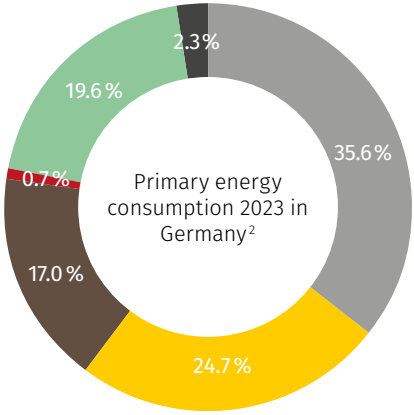
We are therefore pressing ahead with the expansion of our biogas generation and with the ramp-up of hydrogen, that is to say with the transformation to green gases. This has implications for trading and sales, gas transport and storage. The following pages provide an overview of our projects for the molecular world of tomorrow.

Energy supply of final energy consumption 2022 in TWh



Sources: Own estimates based on Federal Environment Agency (2023), AG Energiebilanzen (11/2023) and Federal Statistical Office (2023)

THE FUTURE LIES WITH GREEN GASES¹



1 This simplified diagram shows the forecast changes in energy supply by energy source in Germany.
2 Primary energy consumption 2023 (renewable energies including biogas); Source: AGEB Energiebilanzen e. V.; Status: December 2023.
3 Climate-neutral energy mix from 2045; Source: own projections and estimates
4 This relates to green and decarbonised hydrogen.

“VNG 2030+” strategy

Together with our partners and customers, we aim to offer the right services and products for gas and energy, notwithstanding the increasing complexity of the energy market. We regularly refine our strategy, which was updated again in 2023.

By increasing the investment sum to five billion euros (gross) by 2035, we are accelerating the implementation of our roadmap for the transformation to renewable gases and driving forward the hydrogen and biogas ramp-up in Northern and Eastern Germany. We aim to play a key role in the value chain for climate-neutral gases – especially in the infrastructure sector. The goal remains a reliable gas supply in the long term, with which we can successfully contribute to an increasingly decarbonised economy and society.



**THE GOAL REMAINS
A RELIABLE GAS SUPPLY**

FUTURE PROJECTS OF VNG ¹

At many different locations and in a variety of projects, VNG is working on the future with green gases. In addition to the 40 biogas facilities currently in operation, the focus is on the import, generation, trade, transport and storage of hydrogen.

Overview of current projects in preparation, development and implementation

H₂ Import

TEM
Import of green ammonia

H₂ Production

H2GE
Production of blue low-carbon hydrogen

GreenRoot
Production of green hydrogen by electrolysis on an industrial scale

Bad Lauchstädt Energy Park
Real-world laboratory for the energy transition, which replicates the entire hydrogen value chain for green H₂
energiepark-bad-lauchstaedt.de

AZAN
Construction of an ammonia cracker for the production of green hydrogen

greenHyBB
Creating a value chain for green hydrogen
[Find out more](#)

Biogas projects

Biogas facilities of BALANCE
Erneuerbare Energien GmbH

H₂ Transport

A doing hydrogen
Around 600 kilometres of pipelines from Rostock via the Greater Berlin area to the Eisenhüttenstadt steel region and the Leipzig / Halle economic region
doinghydrogen.com

B Green Octopus Central Germany
Around 300 km of hydrogen lines between the Salzgitter steel region via industries in the federal state of Saxony-Anhalt to the Central German “Chemical Triangle” region

C H₂ pipeline in Bad Lauchstädt
Hydrogen pipeline between the Bad Lauchstädt Energy Park and the Leuna Chemical Park

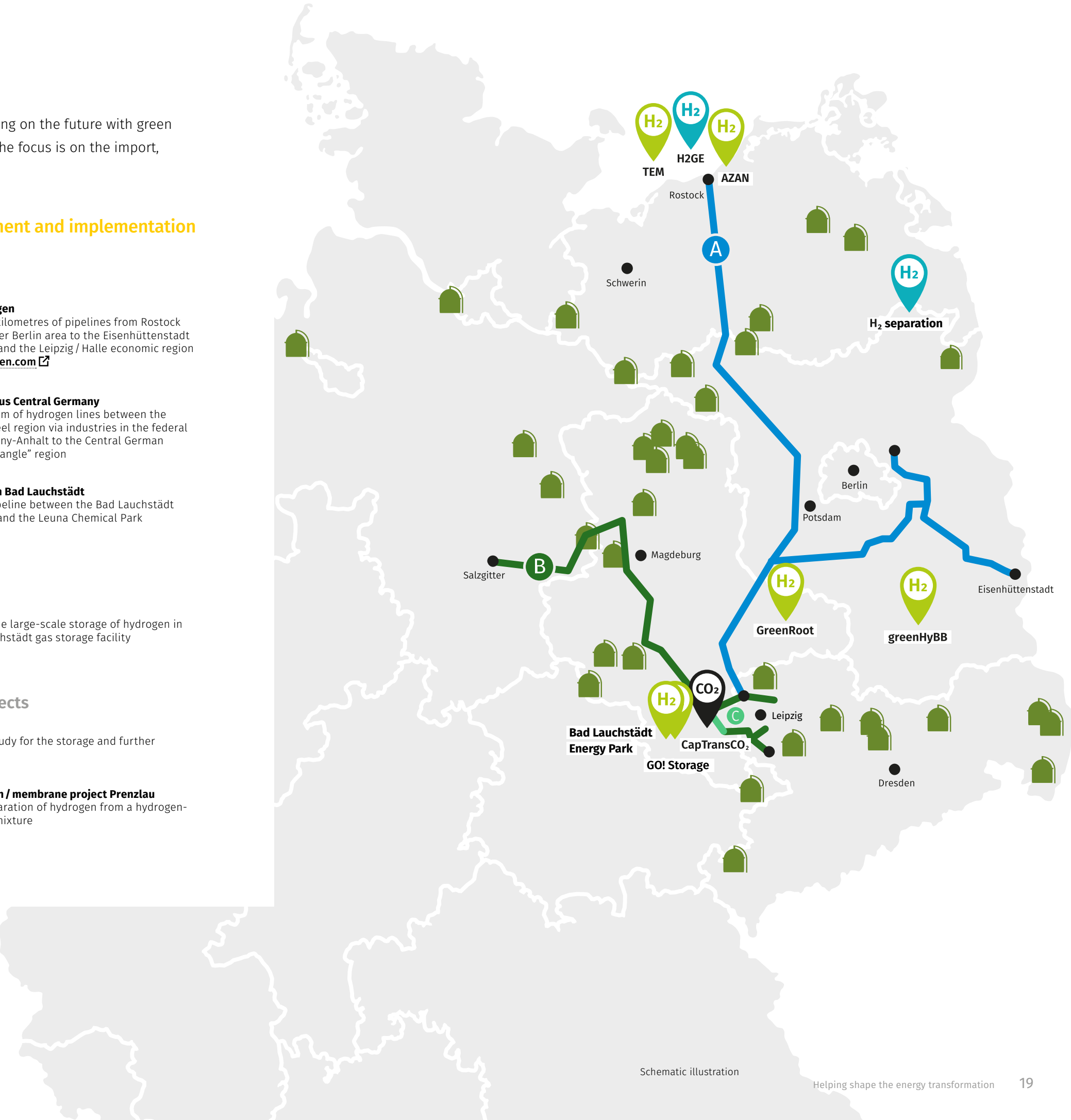
H₂ Production

GO! Storage
Project for the large-scale storage of hydrogen in the Bad Lauchstädt gas storage facility

Research projects

CapTransCO₂
Feasibility study for the storage and further use of CO₂

H₂ separation / membrane project Prenzlau
Efficient separation of hydrogen from a hydrogen-natural gas mixture



¹ Status of planning and implementation: 31.12.2023

HYDROGEN FLAGSHIP PROJECT FOR THE ENERGY TRANSITION

The Bad Lauchstädt Energy Park will replicate the entire green hydrogen value chain and could soon be supplying large industrial companies with energy. The real-world laboratory of the energy transition sponsored by the BMWK (German Industry Ministry) makes VNG's future strategy tangible today. The project will help us and the participating companies and partners to acquire expertise and paves the way for the success of further projects.

How the gas industry of the future will work can soon be observed at the Bad Lauchstädt Energy Park: eight wind turbines supply the renewable electricity to the electrolyser in which the hydrogen is produced. From there, the green gas is to be supplied to potential customers from 2025 via a transport pipeline converted for H₂. These are, for example, industrial companies from the Leuna region that require hydrogen as an energy source or raw material. VNG has already concluded its first supply contract with the energy company TotalEnergies Raffinerie Mitteldeutschland.

In a later phase, after completion of the real-world laboratory project, the green hydrogen could be stored in a converted salt cavern of the underground gas storage facility in Bad Lauchstädt. This ensures that generation and consumption can be decoupled from each other in terms of time – a prerequisite for the flexible supply of other customers. The plan is to produce around 27 million cubic metres of hydrogen per year in Bad Lauchstädt. By 2030 at the latest, the system should be self-supporting.

VNG is the consortium leader in the project and is supported by experienced partners: Terrawatt is building the wind farm that will go into operation in summer 2024. In a joint venture with Uniper, VNG H&V will construct and operate a large-scale electrolyser with a capacity of 30 megawatts. VGS is assuming responsibility for H₂ storage on site. ONTRAS will be taking care of H₂ transport to Leuna. DBI Gas- und Umwelttechnik GmbH is providing scientific support for the project. In close cooperation with all partners, the future will soon become the present in Bad Lauchstädt.

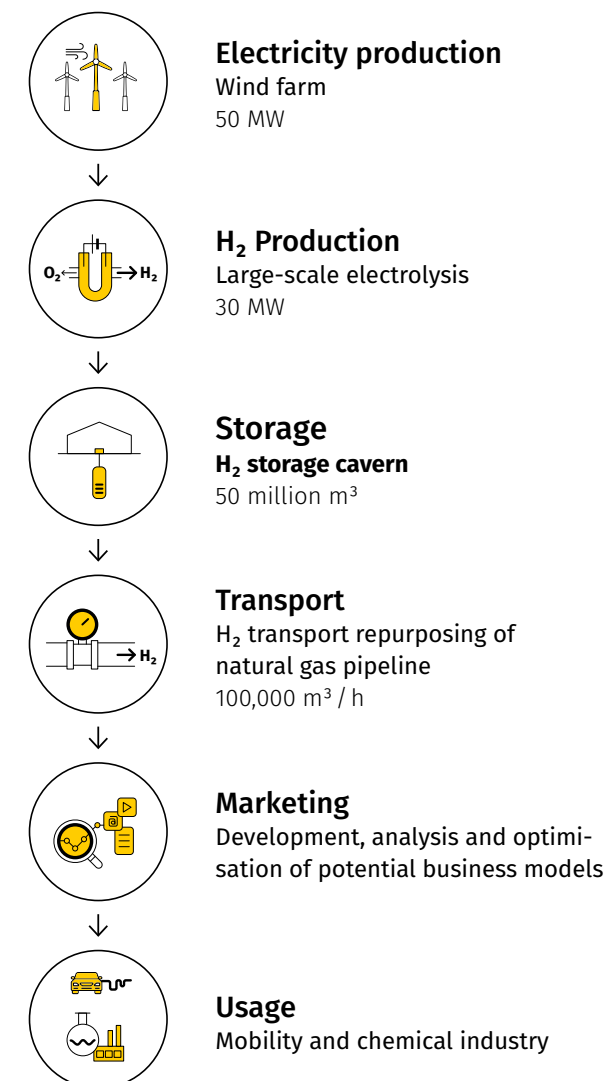
**FROM 2025,
HYDROGEN FROM THE
BAD LAUCHSTÄDT
ENERGY PARK WILL
INITIALLY BE SUPPLIED
TO POTENTIAL
CUSTOMERS IN THE
REGION**

Bad Lauchstädt energy park – the future of green hydrogen

The experience and knowledge that we are gathering at the Bad Lauchstädt Energy Park along the entire value chain will help us for future transformation projects. It will bring fresh ideas and make us more effective and efficient.

One of the most important findings so far is that with many reliable partners pulling together, we are able to press ahead with the hydrogen ramp-up quickly and purposefully. The Bad Lauchstädt Energy Park is a first hydrogen flagship project that has been recognised and valued as such by national and international partners in the field of green gases.

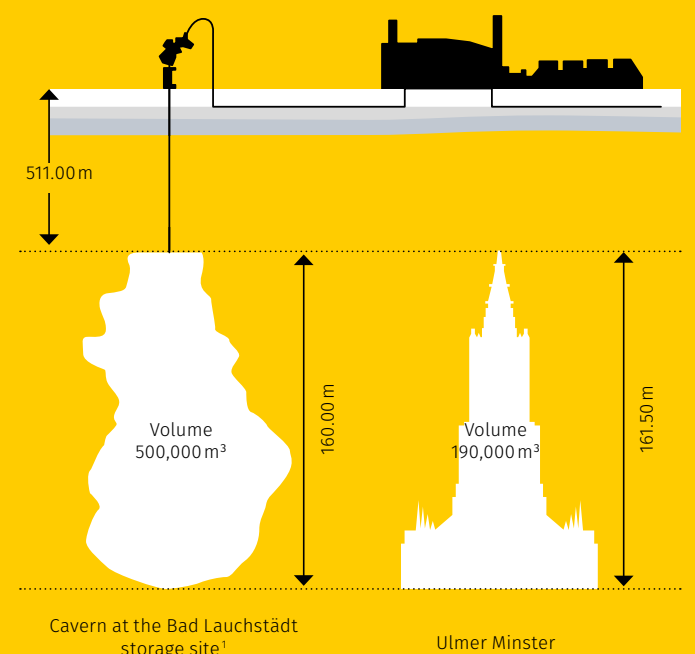
Mutually reinforcing activities at the Bad Lauchstädt Energy Park



Hydrogen storage in Bad Lauchstädt

VNG Gasspeicher GmbH (VGS) is the owner of four underground storage facilities that currently store natural gas for customers. The largest VGS storage facility is located in Bad Lauchstädt. It consists of 17 individual caverns, one of which is to be prepared for the storage of hydrogen. The project is named GO! Storage is a sub-project of Green Octopus Central Germany and has been notified by the EU Commission as an Important Project of Common European Interest (IPCEI). The capacity of the underground cavern is 500,000 cubic metres. This is more than twice the size of Ulm Minster. The gas is highly compressed for storage. This allows the volume of the caverns to be optimally utilised. The pressures correspond to around 60 times the value of a car tyre. This enormous overpressure is generated by powerful gas or electric compressors.

Comparison of the dimensions of an H₂ cavern at the Bad Lauchstädt underground gas storage facility



¹ The overpressure enables a storage capacity of around 50 million cubic metres of hydrogen.

OUR PROJECTS FOR HYDROGEN PRODUCTION

Ammonia import by ship to Rostock

Green gas from Chile to supplement energy supply in Germany

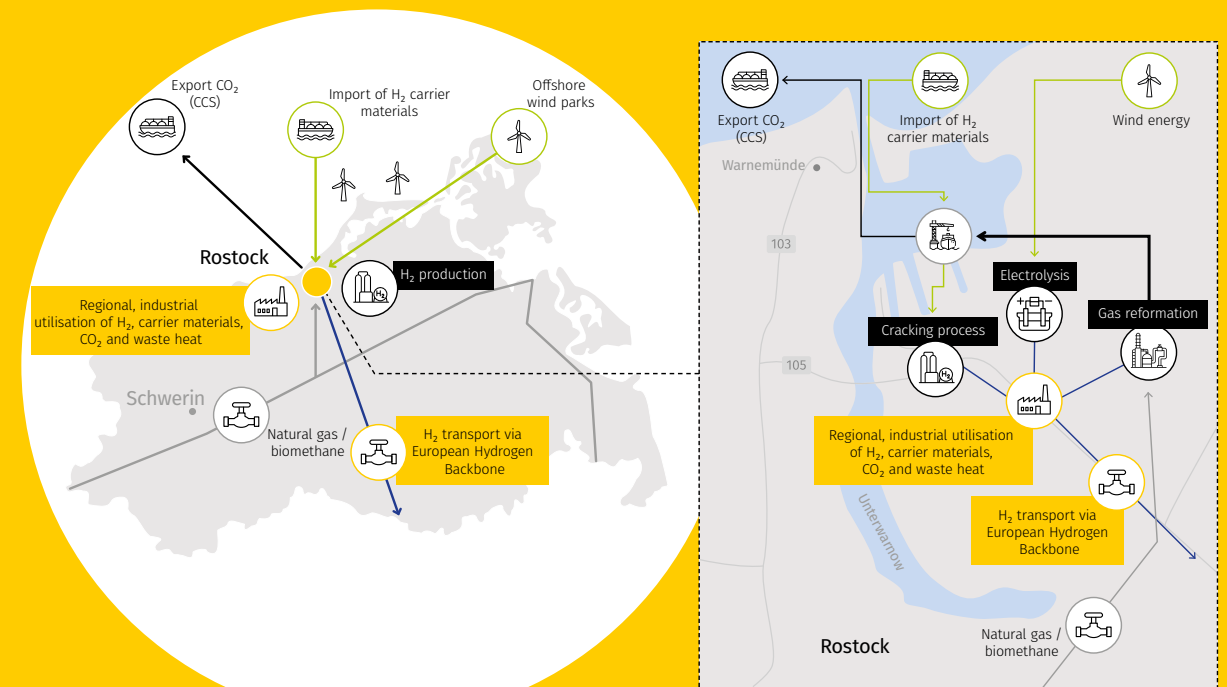
Large volumes will have to be imported, however, to satisfy the demand for hydrogen in Germany. That is why we are cooperating with TE H₂, a subsidiary of the French company TotalEnergies. In the windy Magallanes region of Chile, a 2 GW electrolyser is to be operated using 3 GW of wind power. In order to transport the hydrogen produced in this way by ship, it is converted into ammonia on site. Under the **TEM** project, VNG plans to import around 600,000 tonnes of green ammonia to Germany by ship from 2030. In Rostock, the ammonia will be converted back into green hydrogen.

Focus on decarbonised hydrogen

German-Norwegian project plans low-CO₂ production of blue hydrogen

As part of the **H2GE** (H₂ to Germany) project, we are working with our partner Equinor on solutions to establish Rostock as a central hub for low-CO₂ hydrogen and carbon management solutions in Eastern Germany.

The H2GE project will produce up to
230,000
 tonnes of hydrogen
 each year



Development of the Rostock site

Energy and Chemical Hub Rostock

Development of the Rostock region into a hydrogen and CO₂ hub, thereby strengthening regional value creation in Eastern Germany.



The plan is to build a gigawatt decarbonisation plant to convert Norwegian natural gas. According to the current project status, the resulting CO₂ will be liquefied and transported back to Norway by ship for permanent offshore storage. The aim of the project is to contribute to a secure base load supply of hydrogen for industry in Eastern Germany.

Ammonia cracker in Rostock harbour

VNG is researching with partners how H₂ imports can be realised

In future, green hydrogen produced in sunny and windy regions will be transported to Germany by ship. Ammonia (NH₃) is an ideal carrier substance for this purpose. The compound of hydrogen and nitrogen can be broken down and converted back into its

component molecules in what are called crackers. The port of Rostock could be a suitable location for an ammonia cracker, as there is already a convenient terminal there. The construction and operation of a corresponding plant is planned under the **AZAN** project. To this end, VNG has signed a letter of intent with its parent company EnBW Energie Baden-Württemberg (EnBW) and the Japanese energy company JERA. The aim is to first conduct a feasibility study. Depending on the outcome of the study and the potential expansion stages, 70,000 to 140,000 tonnes of hydrogen could be produced annually and fed into the future hydrogen network.

OUR HYDROGEN PROJECTS FOR IMPORT, TRANSPORT AND STORAGE ¹

Transport pipeline – H₂ starter network: Foundation stone for an Eastern German hydrogen network

With the ONTRAS H₂ starter network, **ONTRAS** intends to lay the foundation for an Eastern German hydrogen pipeline network that connects hydrogen producers and consumers as well as import points and storage facilities in a system-optimised way. The two major projects selected as IPCEI (Important Projects of Common European Interest) – doing hydrogen and Green Octopus Mitteldeutschland – and the H₂ transport pipeline in the Bad Lauchstädt Energy Park form the core of the network, which covers over 900 kilometres.

All three pipeline projects of the ONTRAS H₂ starter network are included in the draft application for the Germany-wide hydrogen core network. With the planned border crossing point, the ONTRAS H₂ starter network is also firmly integrated into the European hydrogen network (European Hydrogen Backbone). The pipeline projects associated with the hydrogen core network are currently the subject of discussions in relation to economic viability and implementation, in accordance with the criteria and framework conditions of the 3rd amendment to the Energy Industry Act passed by the Bundestag on 12 April 2024. Implementation of these projects requires stable, reliable and legally secure framework conditions. These long-term investment decisions can only be made under financing conditions that are compatible with capital market requirements.

Long line from Leipzig to Rostock

Everything from a single source – **doing hydrogen** is intended to connect numerous producers, downstream grids and consumers in Eastern Germany. From the planned H₂ hub in Rostock, it is envisaged that the pipeline network of around 600 kilometres will run via the greater Berlin area to the Eisenhüttenstadt steel region and the Leipzig economic region. In the long term, doing hydrogen can also be extended to Poland and Thuringia. Several partner companies are involved in the project, which produce hydrogen or require it as a consumer.

Hydrogen hub for industrial regions in Central Germany

The Central German “Chemical Triangle” region will need green hydrogen in the future, just like the industrial companies in Saxony-Anhalt and the Salzgitter steel region around 200 kilometres away. In future, **Green Octopus Central Germany (GO!)** will interconnect these areas. In addition to the pipelines, there are plans to connect a hydrogen cavern with a working gas volume of 50 million cubic metres in Bad Lauchstädt. A hydrogen ring main around Leipzig is also planned as part of a sub-project.

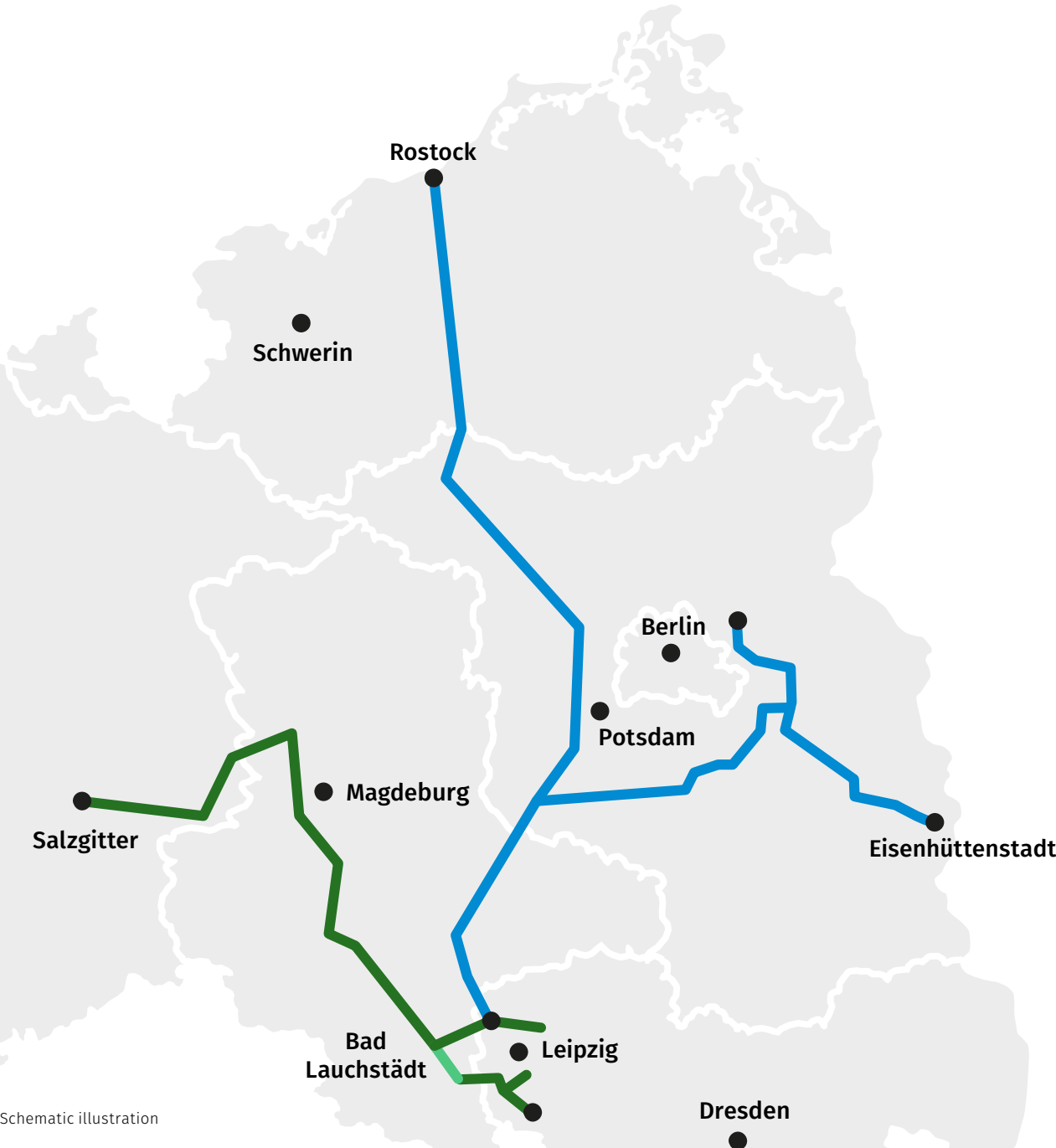
The initially independent IPCEI project called LHyVE Transport has been merged with the IPCEI project Green Octopus Central Germany.

According to the current planning status, GO! is set to go into operation before 2030 with a pipeline length of around 300 kilometres and become part of the European hydrogen pipeline network. GO! will utilise existing natural gas pipelines wherever feasible in order to work as cost-effectively as possible. The remaining connections will be newly built.

Further information on the **Green Octopus Central Germany** project can be found here:
<https://www.ontras.com/en/go>
<https://www.lhyve.de/>

Further information on the **doing hydrogen** project can be found **online**

- Green Octopus Mitteldeutschland (GO!)
- EBL-Leuna connection line
- doing hydrogen



¹ As of 31/12/2023

OUR PROJECTS FOR HYDROGEN PRODUCTION

Hydrogen for Saxony-Anhalt

Exploring what is possible with feasibility studies

Numerous industrial companies in Central Germany are facing the challenge of decarbonising the energy requirements for their production facilities. We are supporting and accompanying them, with for example, our **GreenRoot** project. We work together with the company HyCC from the Netherlands. The hydrogen company is a joint venture between the chemical

company Nobian and the Australian investor Macquarie. Together, we want to build an industrial-scale electrolysis plant in Central Germany to supply the local chemical industry with green hydrogen. The first stage of the Greenroot project consists of a study that analyses the demand potential and technical feasibility of building electrolyzers on site.



Green gas for Brandenburg

Complete H₂ value chain for the federal state

As part of the **greenHyBB** (green Hydrogen for Brandenburg) project, VNG is working with EnBW and ONTRAS to establish a complete value chain for green hydrogen in Lausitz. The renewable electricity is to come from subsidy-free wind and solar parks built by EnBW. A 100 MW electrolyser is to produce green hydrogen from this renewable electricity and ultimately make it available to companies in Brandenburg. Surplus hydrogen can also be transported to other regions via the future European H₂ network. The necessary grid connections will be created by ONTRAS.



**IN THE FUTURE, IT
WILL BE POSSIBLE FOR
EXCESS HYDROGEN TO
BE TRANSPORTED TO
OTHER REGIONS
THROUGH THE EURO
PEAN HYDROGEN
NETWORK**

Further information
on the greenHyBB project
can be found **online** 

CLIMATE-NEUTRAL SUPPLY THROUGH BIOGAS AND BIOMETHANE

Biogas – an option for climate-neutral energy supply already available today

Biogas is an important component of the decentralised energy system of the future and already offers the possibility of permanently increasing the proportion of green gases in the grid. Together with our subsidiary BALANCE, we are driving forward various biogas projects.

Biogas offers a decisive advantage over renewable energies from wind and sun: production is not dependent on the weather. Biogas is therefore base load-capable, which means that it can be made available at almost any time. Biogas is used in combined heat and power plants to produce heat and electricity, and can also be processed into biomethane and fed into the conventional natural gas grid. As a regionally produced and base load-capable energy source, biogas therefore makes an important contribution to security of supply.

As a rule, almost CO₂-neutral biogas production only produces as much CO₂ as the plants have absorbed during their growth. Biogas from liquid manure and residues from animal production can even be CO₂-negative because natural GHG emissions can be avoided during liquid manure storage, and residues left over after biogas production can also be recycled as natural fertiliser. This approach enables VNG to secure a climate-friendly energy supply as well as regional value creation. Biogas provides a sustainable alternative income for farmers and secures jobs in rural areas. In 2023, BALANCE and its 172 employees will operate a total of 40 biogas facilities with a rated thermal output of 178 MW.

Twelve plants also have a processing plant and feed biomethane with natural gas quality into the gas network. The conversion of further systems is planned. This option will become particularly interesting when the first biogas facilities cease to be subsidised from 2026 under the EEG (Renewable Energy Act).

**BIOGAS IS AN
ENERGY SOURCE
THAT CAN BE
PRODUCED AT ANY
TIME, REGARDLESS OF
THE WEATHER**

Wide range of utilisation options

Balance supports sustainable local structures

We are also driving forward the transformation of the energy system with small biogas projects on a decentralised basis. In their entirety, they symbolise the variety of possibilities that biogas facilities offer the region. We generate renewable electricity and heat using our own combined heat and power plants. Both are fed into municipal grids to supply customers with climate-friendly energy. In addition to municipal utilities, this includes commercial enterprises and large nurseries. Agricultural businesses also benefit from biogas facilities nearby, for example by putting liquid manure and other residues to further use. This provides them with a sustainable and secure alternative source of income.

By-products from biogas production

Carboxylic acids can be used for lubricants, medicines or cosmetics

The production of biogas becomes more economical if by-products are created that can also be commercially marketed. The **CapUp** project of the Helmholtz Centre for Environmental Research and the German Biomass Research Centre is investigating how this is possible. BALANCE is involved as an associated partner. The focus is on a process with which carboxylic acids can be obtained – these are valuable speciality chemicals that can be used in a variety of ways, for example in the lubricant sector, in medicines, cosmetics, animal feed or foodstuffs. Carboxylic acids obtained from biogas production can also be a sustainable alternative to palm kernel and coconut oil.

We are in the middle of a fast-paced transformation process towards green energy sources such as biogas and hydrogen. Both areas are a key component of our “VNG 2030+” strategy and the focus of our investments. We draw on the knowledge and experience we have acquired over decades and, together with experienced partners, apply it to forward-looking projects.”

– Hans-Joachim Polk
Member of the Executive Board, Infrastructure / Technology



SUPPORTING STRUCTURAL CHANGE

As a structurally significant company in Eastern Germany, we want to maintain the strength of the regional economy, and contribute to the prosperity and quality of life of society with our investments in modern infrastructure, green gas projects and our social commitment.

SHAPING STRUCTURAL CHANGE, SECURING PROSPERITY

As a Leipzig-based company, we feel a strong connection to our home region and have clearly defined our mission: We want to play a key role in supporting structural change and regional development in Eastern Germany with our business activities, projects and initiatives.

For us, structural change means that we are primarily looking at the changes in the energy industry that our region is facing 34 years after reunification. Eastern Germany wants to transform itself from an industrial region relying on fossil fuels into a model region that leads the way in the transformation to climate-friendly energy generation and use. The common denominator is renewable and decarbonised energies, above all hydrogen and biogas.

In particular, we are focusing on the necessary infrastructure such as transport lines, storage facilities and electrolyzers, as well as the provision of green energy for industry and society. With our operational

facilities, experience and future investments, we are part of the transformation and are helping shape the changeover to a reliable, economical and increasingly climate-neutral energy system in Eastern Germany.

However, structural change means more than just decarbonising the energy and raw materials base. It encompasses many other facets: industrial, ecological and digital transformation processes as well as demographic, social and cultural change. This complexity must be recognised and managed. This makes VNG's social and civic activities, which are largely organised under the umbrella of the VNG Foundation, all the more important.

Our strengths: gas infrastructure, the power to change and committed employees

We believe we are well positioned for the major transformation tasks in the Eastern German energy supply. With the long-distance pipeline network of our independent subsidiary ONTRAS and the natural gas storage facilities of VNG Gasspeicher, we are well placed to convert pipelines to hydrogen and build clusters for the hydrogen economy. This expertise has grown historically at VNG: this is because the town gas used until the early 1990s already contained up to 50 percent hydrogen and was transported via pipelines,

**STRUCTURAL
CHANGE MEANS
MORE THAN THE
DECARBONISATION
OF THE ENERGY
AND RAW
MATERIALS BASE**



many of which are still intact today. By converting these natural gas pipelines to hydrogen, considerable costs can be saved as part of the energy transition.

As an energy group with more than 20 companies, we bundle many H₂ competencies under one roof. Thanks to the expertise, the power of change and the commitment of our 1,700 employees, this results in numerous synergies along the entire gas value chain.

The energy transition is a task for generations and can only be solved together. Networks, initiatives and cooperation models are necessary for successful implementation. VNG has maintained close partnerships with many different players in Eastern Germany for many decades. These primarily include our customers, the municipal utilities, distributors and industrial companies in the region.



“As a key player in the economic structure, we also want to invest in the future viability of the region. We ensure that our customers reliably receive the energy they need today and tomorrow. At the same time, we are aware that a democratic, cosmopolitan and diverse society is a prerequisite for success in the competition between regions in a closely interwoven Europe.”

— Bodo Rodestock
Member of the Executive Board, Finance / Human Resources

GOOD CONDITIONS FOR THE HYDROGEN ECONOMY

Eastern Germany is equipped for the energy transition and the ongoing structural change. In particular, the federal states of Mecklenburg-Vorpommern and Brandenburg can generate significant amounts of sustainable energy. Both of these states also have considerable expertise in the field of power plant technology. Saxony-Anhalt has wide-ranging experience in the chemical industry and a sophisticated gas storage infrastructure. The federal state of Saxony has a high level of expertise in mechanical and plant engineering. Thuringia's strengths lie in safety, measurement and control technology and instrumentation.

Eastern Germany is particularly suitable as a model region for the hydrogen economy because it is home to a large number of industrial companies that require a lot of energy that does not lend itself to electrification.

These include the refineries in Schwedt and Leuna, the Central German “Chemical Triangle” region and the iron and steel industry in Eisenhüttenstadt. Companies

will have to make their production climate-neutral in the coming years and are dependent on renewable and decarbonised gases.

In addition, import points on the Baltic Sea, potential border crossing points on the Polish border and projects for the regional production of hydrogen are being planned. VNG is involved in many of these hydrogen projects.

**COMPANIES
MUST MAKE THEIR
PRODUCTION
CLIMATE-NEUTRAL
IN THE COMING
YEARS**

The refineries in Schwedt and Leuna will need renewable and decarbonised energy in the future as will the iron and steel production in Eisenhüttenstadt.



HYDROGEN: DRIVER OF ENERGY TRANSFORMATION

Model projects along the entire value chain

We see ourselves as pioneers in the development of the hydrogen economy in Eastern Germany and are working on a variety of projects relating to switch to green gases. Our focus encompasses the entire value chain, that is from import through production and trading to transport and storage of hydrogen.

In Rostock, we are working together with the Norwegian energy company Equinor, and with other local and regional partners to turn the largest German sea port on the Baltic coast into a hub for hydrogen and CO₂ (see page 22).

We are also testing the entire value chain of green hydrogen on an industrial scale on the site of our underground gas storage facility in the federal state of Saxony-Anhalt. The hydrogen flagship project in Bad Lauchstädt has already attracted two superlatives: It is currently the only real-world laboratory for the energy transition in Germany that is actually in the realisation and construction phase, and it is the first such project with a contractually fixed customer for green hydrogen (see page 20).

In other East German federal states, we are also cooperating with companies from the chemical, steel, building materials, glass and paper industries. In Central Germany macro region, for example, we are planning industrial-scale electrolysis plants with our Dutch partner HyCC to supply local chemical companies with green hydrogen. In the Lausitz region, we are also examining what local hydrogen production, including the regional value chain, could look like (see page 26).

A reliable hydrogen transport network is crucial for the future hydrogen economy. It is one of the pioneering infrastructure projects in the roll-out of the hydrogen economy. As part of the planned nationwide H₂ core network, ONTRAS intends to use its pipelines to open up large parts of Eastern and Central Germany as markets for hydrogen gas and to connect the generation and consumption centres, import points and storage facilities. Links to the emerging European hydrogen system are also planned (see page 24).

The preliminary planning and feasibility studies for the hydrogen network in Eastern Germany have long since begun and the ONTRAS subsidiary INFRACON is playing a key role in this. In various studies, including for the Lausitz, Chemnitz and Dresden regions, ONTRAS has analysed potential expansion scenarios and pipeline routes in order to connect local large-scale consumers and industry to the future H₂ infrastructure.

Rostock, which boasts the largest German harbour on the Baltic Sea coast, is an ideal hub for hydrogen and carbon dioxide projects.

DRIVERS OF DIGITALISATION

Broadband for the economy, society and the energy transition

Fast internet is needed for the digitalisation of the economy and society. It has an influence on how we live, how we work and how we communicate. At the same time, it is the basis for economic activity and driving innovation forward.

One of the prerequisites for digitalisation is the digital infrastructure. It is the basis for the increasingly decentralised energy system of the future. If you want to balance energy supply and demand efficiently or control it smartly, you need high-quality, high-speed, reliable internet.

6 FTTX projects

in the region, VNG operates GDMcom with its subsidiaries and holdings.

VNG has been involved in this area for many years and will continue to extend its commitment. The focus is on activities in the fibre optic backbone, the fibre optic distribution network (FTTx) and services in connection with digital infrastructure. Our focus region is on Eastern Germany, with the emphasis on our gas pipeline assets and rural areas. We have built up a broad network of equity stakes and partnerships that covers almost all areas from planning, construction and operation of digital infrastructures to house connections. Current expansion projects for new fibre optic lines are currently under way in five towns and municipalities in the federal state of Saxony as well as via the joint venture wittenberg-net GmbH of Stadtwerke Lutherstadt Wittenberg and GDMcom in Lutherstadt Wittenberg in Saxony-Anhalt. Further construction projects in Central Germany are currently being planned and prepared.

Expansion of the digital infrastructure with new fibre optic lines in Lutherstadt Wittenberg.





OUR BIOGAS FACILITIES CREATE REAL ADDED VALUE IN THE REGIONS IN WHICH WE OPERATE

BIOGAS AS A DRIVER

Regional added value

While the realisation of most of our hydrogen projects still lies in the future, we are much further along in establishing and expanding our biogas portfolio. Our subsidiary BALANCE operates 40 biogas facilities in Northern and Eastern Germany, generating regional and renewable energy with a rated thermal output of over 178 MW. In purely mathematical terms, this corresponds to green electricity for around 57,000 households and green gas for up to 63,000 households. In addition to the efficient operation of the systems, we also invest in existing and new system concepts, and in developing them further.

Our biogas facilities are integrated into a vital and sustainable circular economy that benefits all partners involved. They secure jobs in agriculture, are

closely networked with the local economy and are therefore an impressive example of regional value creation.

As a regionally produced energy source, biogas also contributes to the security of supply of renewable electricity, gas and heat in Central and Eastern Germany.

40

Biogas
plants

are operated by VNG subsidiary BALANCE in Northern and Eastern Germany.

SOCIAL COMMITMENT IN EASTERN GERMANY

Social commitment to promote a lively civil society has always been anchored in our corporate identity. We are focusing our activities in the regions of Central and Eastern Germany. Social issues, education, sport, art and culture are at the top of the agenda, as are diversity and tolerance. At the forefront of its social activities are the VNG Foundation and its initiative “Verbundnetz der Wärme” [Network of Warmth].

More momentum for voluntary work

Voluntary work often remains unrecognised, even though it is one of the mainstays of our society. VNG therefore launched the Verbundnetz der Wärme (VdW) back in 2001. The aim is to promote engagement and voluntary work in Eastern Germany so that these projects can contribute to solving social challenges. The VdW sees itself as a joint learning engagement platform that builds a network between associations, foundations and political institutions. Each year, the VdW also awards 5 x 5,000 euros in prize money in the areas of knowledge and learning, nature and climate, health and sport, participation and integration as well as culture and history. The VdW has been supported by the VNG Foundation since 2009. For many years, it has also been networking with other regionally active foundations and

umbrella organisations in order to jointly achieve an even greater reach. In 2023, the VNG Foundation conducted its first study on the topic of “Voluntary work in Eastern Germany – challenges and opportunities”. The results were presented at the National Foundation Day 2023 in Berlin, among other events. Since then, the study has been repeated annually. The VNG Foundation is also regionally involved in the Leipzig Public Welfare Round Table and in awarding the City of Leipzig’s Future Prize.

Award of the VdW Engagement Prize to five German associations in September 2023.



Cooperation between business and science

Cutting-edge research, high-performing universities and the rapid transfer of expertise to companies are of central importance in shaping change processes. This makes it all the more important for business and academia to work closely together and jointly shape the transformation in Central and Eastern Germany. We have been cooperating with universities, universities of applied sciences and scientific institutions for many decades in the form of practical lectures, accompanying studies and sponsoring students doing master's, diploma and doctoral theses. The VNG Foundation also supports young students by awarding Germany Scholarships at the Universities of Leipzig, Dresden and Chemnitz, the Freiberg University of Mining and Technology, the Leipzig University of Applied Sciences (HTWK) and the Erfurt University of Applied Sciences. Young women are also supported at HHL Business School Leipzig through the awarding of "women's scholarships". We also work closely with the University of Leipzig, where the VNG Foundation is actively involved in the University Society.

Diversity and tolerance for democracy and an active civil society

Since 2024, the VNG Foundation has been part of the initiative "Zukunftsweg Ost" [Way Forward East] under the patronage of the Federal Government Commissioner for Eastern Europe. Among other things, the initiative is committed to sustainably strengthening democratic civil society – especially in rural areas of Eastern Germany.

THE VNG FOUNDATION SUPPORTS YOUNG STUDENTS BY AWARDING SCHOLARSHIPS FOR GERMANY



Welcome Day 2024 for the German holders of scholarships from the VNG Foundation.



VNG Foundation

Year founded: 2009
Place established: Leipzig
Sphere of activity: Ost- und Mitteldeutschland

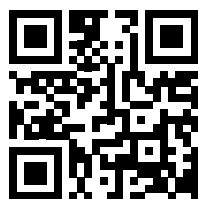
Focal points: Promotion of sustainable and innovative projects in the social sector, in the education and science sectors, in sport, in the arts and culture and in the voluntary sector

Partnerships with universities: Support for students with scholarships, research projects on the topics of raw materials, hydrogen and AI solutions, lecture and seminar series on the topics of hydrogen, the energy transition in heating and AI solutions

Voluntary project: Engagement platform "Verbundnetz der Wärme"

PUBLICATION DETAILS

- Publisher
VNG AG
Braunstraße 7
04347 Leipzig
- Concept, design and layout
IR-ONE AG & Co., Hamburg
www.ir-one.de
- Coordination and editorial responsibility
VNG AG
Kommunikation / Politik
Leipzig
- Contact
Phone +49 341 443-0
info@vng.de
www.vng.de/en
- Copy deadline
30 April 2024
- Fotos
S. 1. 9. 10. 11. 15. 29. 31. 32. 33 und S. 35: Torsten Proß, Jeibmann Fotografik
S. 12. 20 und S. 39: VNG AG
S. 13: Tom Schulze
S. 22: Shutterstock 1755309998
S. 26 und S. 36: Anika Dollmeyer
S. 27: Dirk Brzoska
S. 34: Adobe 20927031
S. 37: Alice End Mediendesign



VNG AG

Braunstraße 7 | 04347 Leipzig

PO Box 24 12 63 | 04332 Leipzig

Phone +49 341 443-0 | Fax +49 341 443-1500

info@vng.de | www.vng.de/en