

MAX BÖGL

HIGHEST PERFORMANCE

Renewables at Max Bögl



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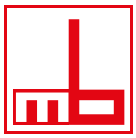
Hybrid Tower Bögl

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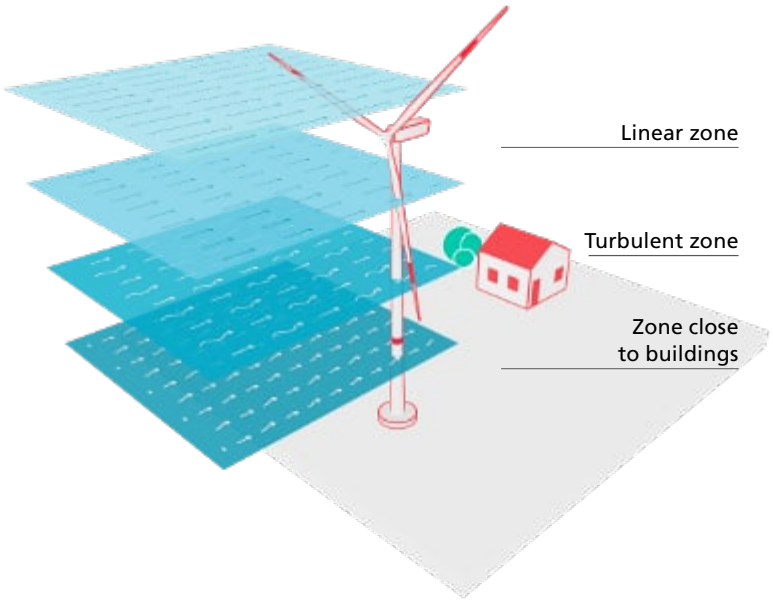
REACHING NEW HEIGHTS

Wind energy is considered a key technology for the energy transition. The tower of a wind turbine plays a crucial role: it serves as the anchor between the heavy turbine and the forces of nature. To meet the demands of powerful turbine generations and large rotors, we at Max Bögl Wind AG continuously work on innovative tower concepts together with our customers.

With many years of experience and constant development, we are market and technology leaders in hybrid towers for wind turbines up to 199 meters hub height. From planning and development to tower assembly - we provide solutions from a single source as a reliable partner, actively contributing to our energy future.

To the top and beyond

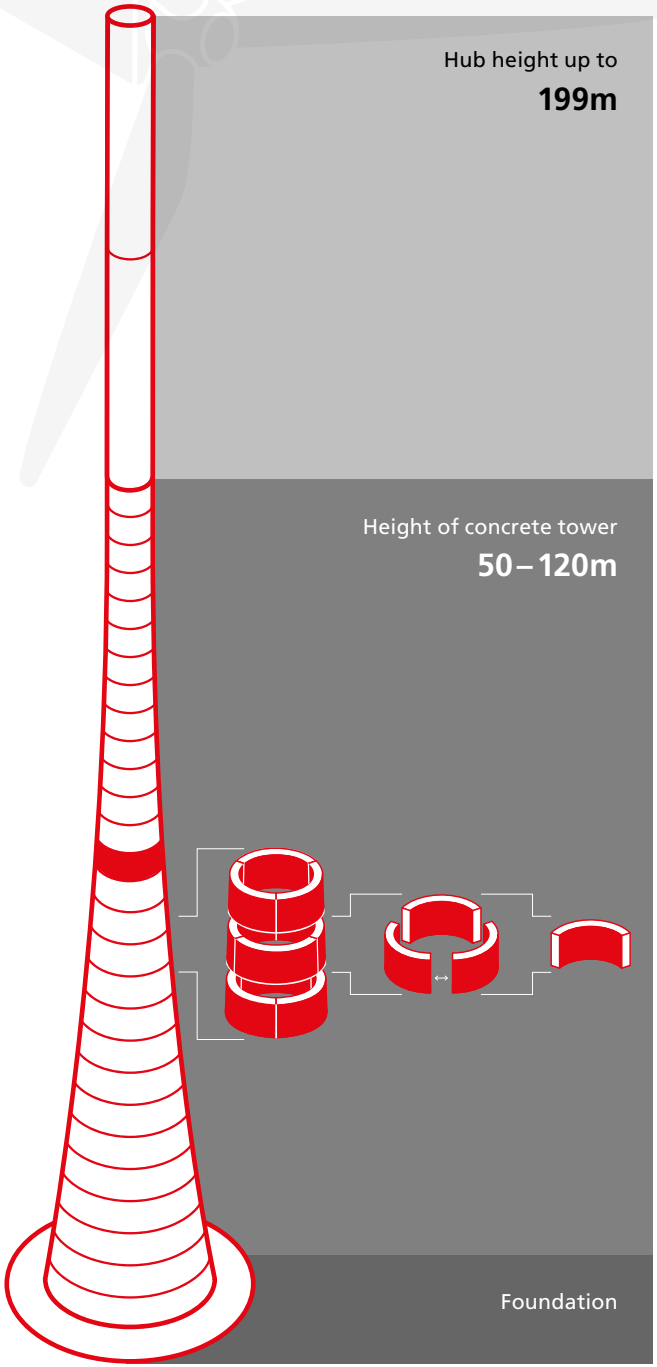
The higher, the more productive: For wind turbines with high hub heights, the yield increases by 0.5 to one percent with each meter of hub height. This allows you to utilize low-wind locations more efficiently and significantly boost the profitability (ROI) of your turbines.



70% Market leader in the tower systems segment for wind turbines in Germany

In the past, a small wind turbine supplied electricity to around 1,000 households. Today's turbine generations surpass that by a large margin. The reason for this is innovative solutions such as our hybrid tower system, which raises the turbines into the productive, linear wind zones, enabling new ways of energy generation. Our ability to achieve hub heights of up to 199 meters with the Hybrid Tower Bögl is due to our special combination of concrete and steel.

While the concrete provides stability and reliably dissipates the increasing loads, our smart material mix allows us to avoid the highly volatile steel prices. Additionally, this combination enables us to accommodate customer-specific requirements to a certain extent.



Tower component:

Steel tower
- Steel sections adapted to the turbine type
- Pre-assembled internal fittings
- Height of the steel tower is variable

Transition Piece

Concrete Tower
- Conical rings with a height of 2.80 m each, divided into three segments
- Dry vertical joints (no grouting)
- Dry and CNC-grinded horizontal joints (no grouting)
- External coating as desired, purely for aesthetic purposes (optional without coating)
- Height of the concrete tower is individually adjustable based on the number of rings (in 2.80 m increments)

Internals
- Pre-assembly in the factory
- Installation parallel to concrete tower assembly
- Optionally: subsequent installation also possible

Post tensioning Technology
- Internal tendons
- Anchor points within the foundation and the transition piece

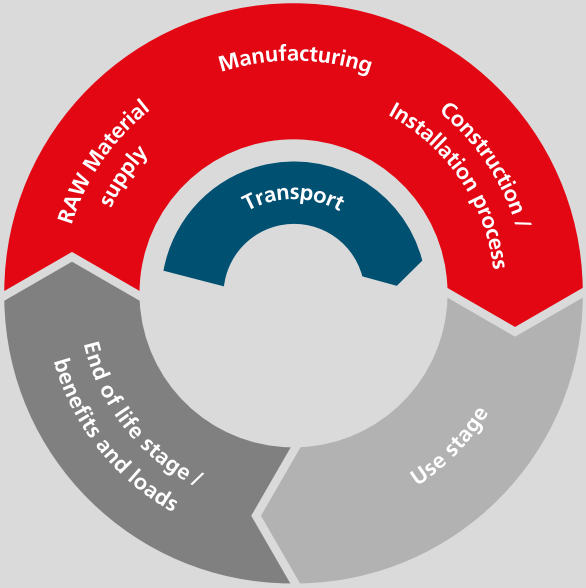
Foundation
- Ring foundation made of in-situ concrete
- Integrated tendon anchoring

Advantages Hybrid Tower Bögl

- Proven and tested technology „Made in Germany“
- Economical and standardized solution made of steel and concrete
- Low-maintenance and price-stable concrete tower
- Serial production of all tower components
- Patented CNC grinding of horizontal joints high grinding precision
- Transport with standard trucks without the need for complex permits
- Short delivery and assembly time
- Dry joints, no grouting, and no grout-related waiting time on-site
- Long lifespan of the concrete tower
- Mechanical dismantling similar to assembly and reusability of all tower components

Discover more!
Click here or scan the QR code to learn more about this topic.

Advantages over conventional steel towers:



- Lower CO_2 footprint at the material level compared to a pure steel tower; made from steel produced using conventional carbon steel manufacturing processes
- More cost-stable (less affected by steel price fluctuations)
- Height and stability: better load-bearing capacity with the concrete tower
- Lower maintenance than steel (fewer screw connections)
- Cheaper and less complex transport due to third segments

Dedicated to the future

The energy transition is accelerating the expansion of renewable energies. At Max Bögl Wind AG, we are well aware of our responsibility as an innovation driver toward society and the climate.
For this reason, we have adopted a new approach since last year. With the aim of increasing the transparency of our activities and products to customers, suppliers, employees, and all other stakeholders, we have conducted a life cycle assessment (LCA) of the Hybrid Tower Bögl.

Based on this, we have identified potential improvements in the ecological sustainability of our products, as well as potential in data accessibility and management.
By conducting additional, regular life cycle assessments, we can identify measures aimed at continuously reducing the environmental footprint of our products

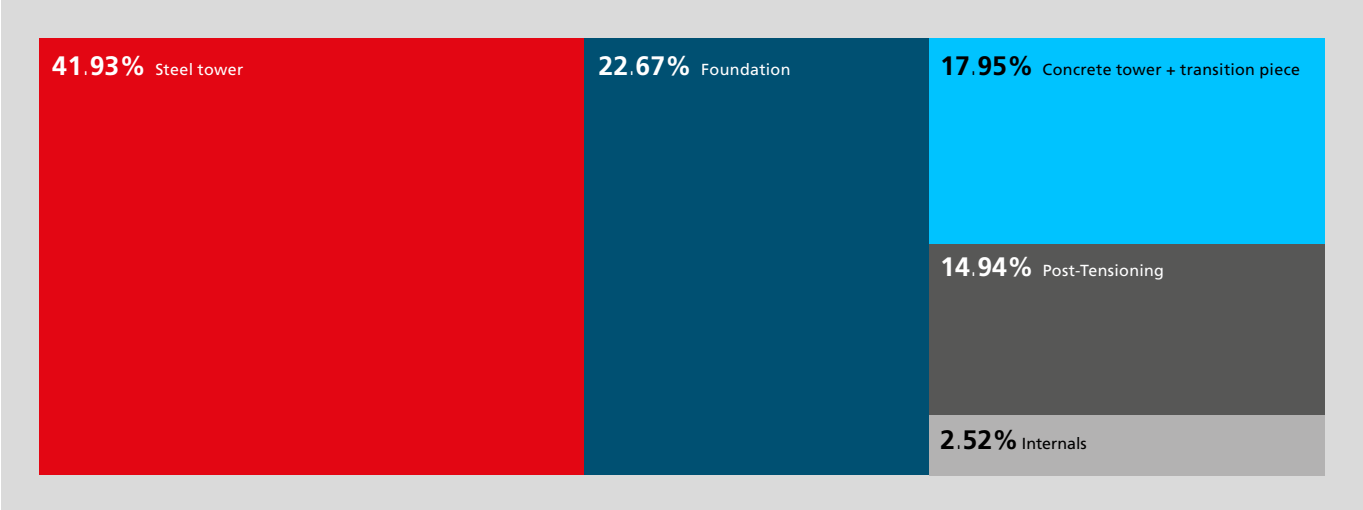
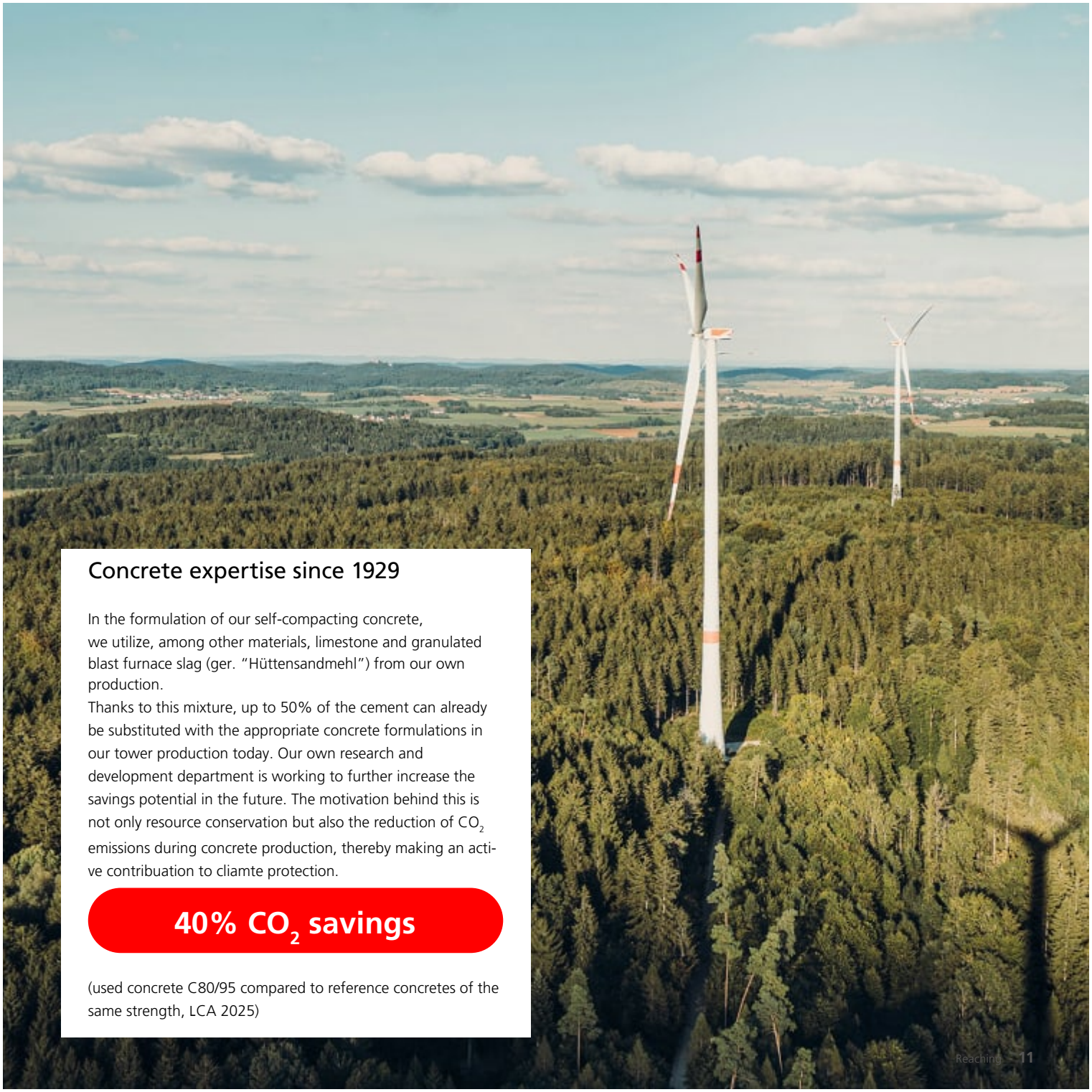


Figure: Share of GWP by tower components at material level A1, LCA 2025



Concrete expertise since 1929

In the formulation of our self-compacting concrete, we utilize, among other materials, limestone and granulated blast furnace slag (ger. "Hüttensandmehl") from our own production.
Thanks to this mixture, up to 50% of the cement can already be substituted with the appropriate concrete formulations in our tower production today. Our own research and development department is working to further increase the savings potential in the future. The motivation behind this is not only resource conservation but also the reduction of CO_2 emissions during concrete production, thereby making an active contribuation to cliamte protection.

40% CO_2 savings

(used concrete C80/95 compared to reference concretes of the same strength, LCA 2025)

From a single source

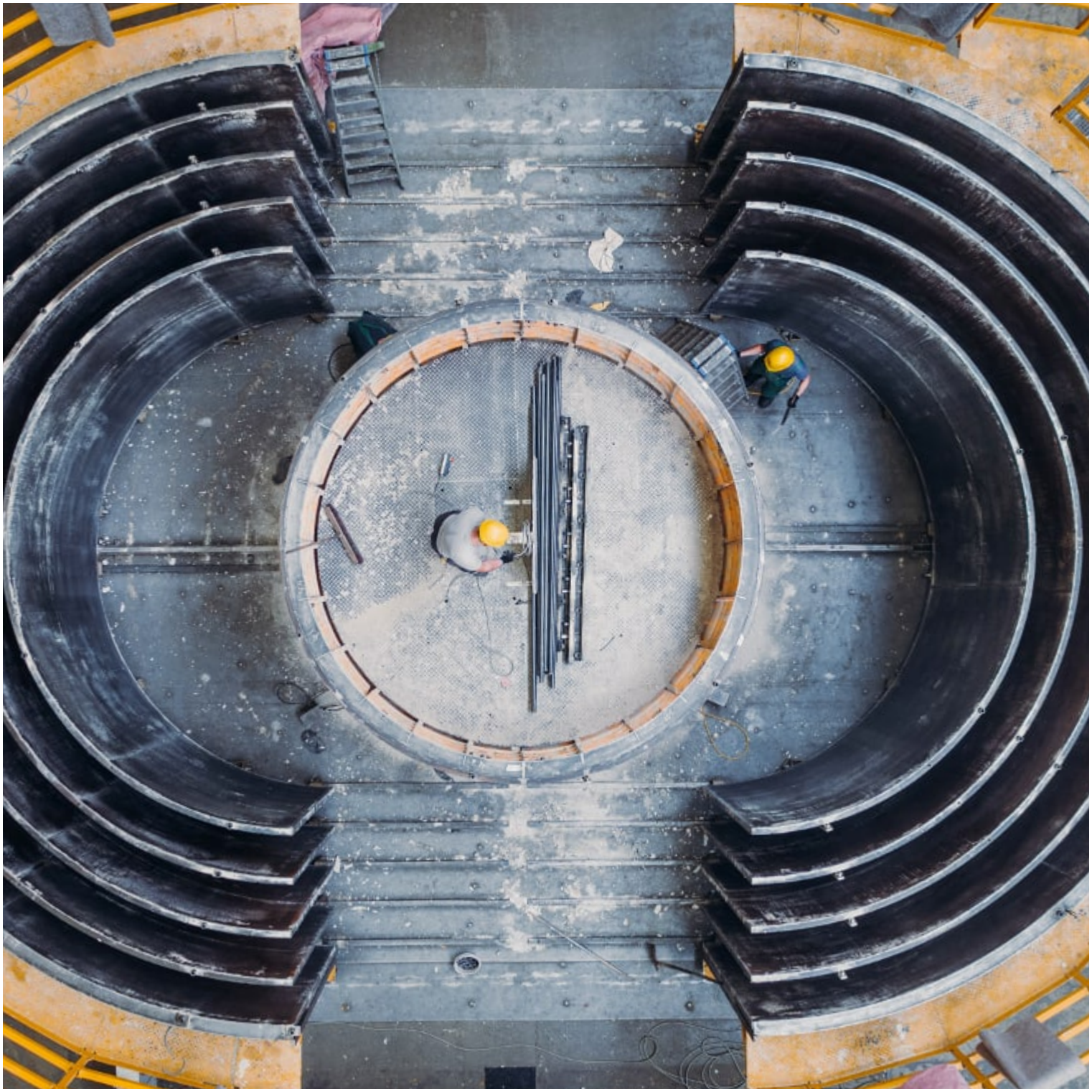
Customer satisfaction is our top priority. Therefore, the most important goal of our team is to convince with many years of experience and the highest quality products. With the comprehensive package for our Hybrid Tower Bögl, we minimize cost- and time-intensive interfaces between the various trades and construction phases. This allows wind energy projects to be implemented more quickly and economically.

Production and Manufacturing

At three production sites in Germany, up to 600 Hybrid Tower Bögl are produced annually to meet the growing demand driven by ambitious expansion targets for onshore wind turbines. In doing so, we make a significant contribution to providing the necessary capacities for the rapid expansion of renewable energies.

The depth of value creation in our internal services is remarkable:
Both the concrete tower segments, the internals system, as well as the tendons and part of the steel sections, are produced serially and standardized in our factories and are largely pre-assembled.
Plant production ensures constant quality control of the production process. The individual components can then be directly assembled and installed on-site.

From the beginning, we have worked with our own departments on both the further development of the product and our processes. In parallel our own concrete laboratory monitors the quality of our high-performance concretes.



Engineering and development

Together with our customers, we develop custom tower types that are perfectly tailored to the requirements of latest turbine generations and large rotor blades.
We are very flexible up to a hub height of 199 meters: Hub heights, as well as the concrete and steel tower portions, can be variably adjusted in height increments of 2.80m depending on project needs and load input.

Logistics

Our three locations are ideally connected to the surrounding infrastructure. In addition to transport by standard trucks, we also use rail and waterways – this ensures our hybrid towers reach their destination quickly and safely across the EU.
We ensure the safe and timely transport of all tower components directly to the wind farm.

Foundation work

To safely transfer the loads from wind and the weight of the turbine and tower structures into the ground, the Hybrid Tower Bögl is founded on a ring foundation made of in-situ concrete. Our experienced foundation construction team handles the entire construction process: from the creation of the blinding layer to the installation of the reinforcement, the pouring of the concrete, the curing of the foundation, and, if required, any special foundations.

Assembly and post-tensioning

On-site, we ensure the smooth installation of the concrete tower components. With specially developed assembly technologies, the segments produced in the factory are assembled into entire rings on-site. The precast elements, grinded with a CNC machine, are then precisely and quickly stacked using a “dry joint” technique and subsequently tensioned with tendons. This construction method allows us to erect towers in almost any weather condition.







WE ENABLE ENERGY

In the age of the energy transition, innovative energy concepts and services are becoming increasingly important. We see ourselves as a competent partner for energy projects – from the first idea to the operation of the plants and subsequent energy management.

Our services also include technical and commercial operations management and the development of custom energy concepts for energy-autonomous companies and buildings.

Our spirit: hands-on

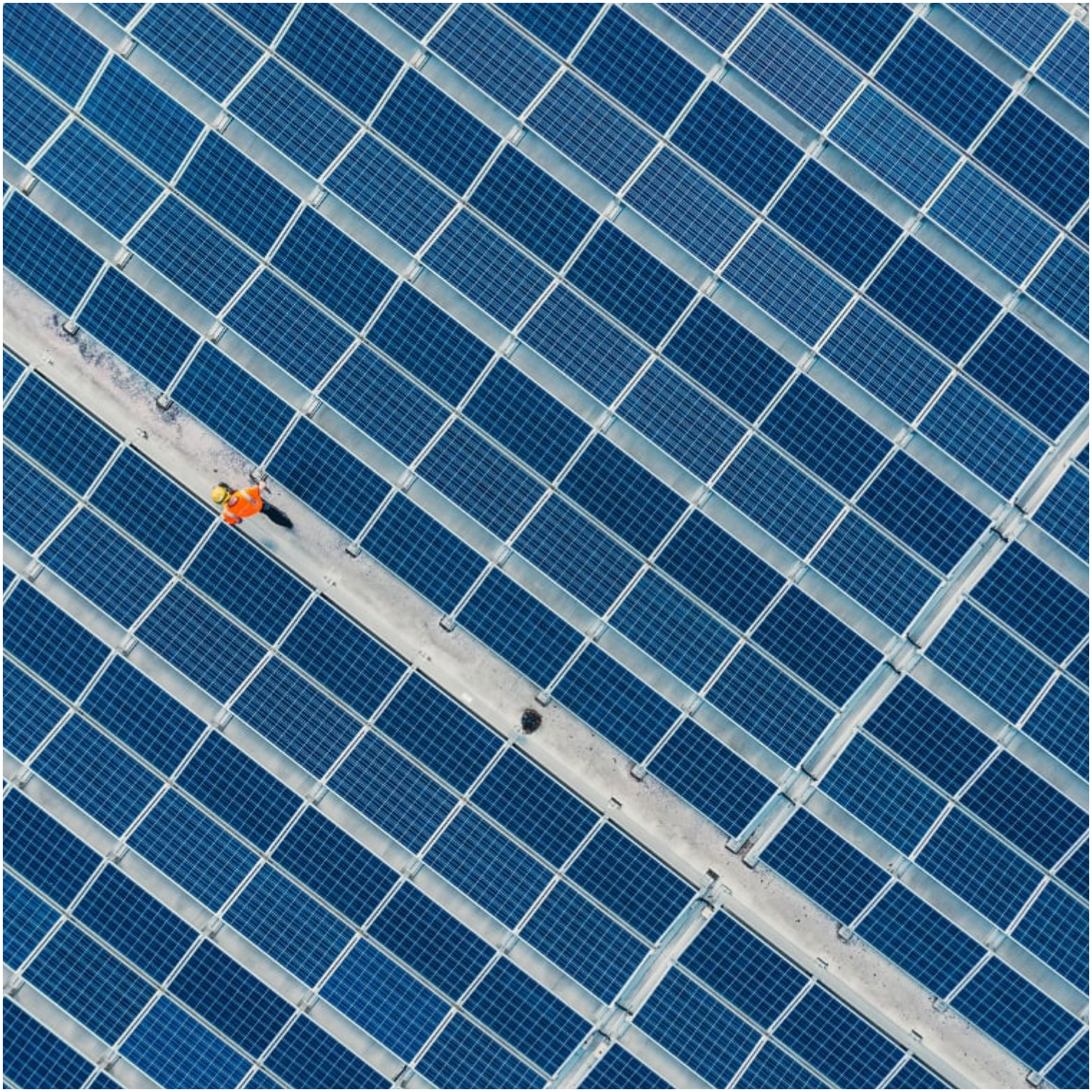
Our technicians and engineers get the maximum performance out of every energy plant. To do this, they use software solutions specifically designed to optimize energy plant behavior. We also place great importance on work safety. All employees are familiar with the latest and highest safety standards and train for evacuation and rescue scenarios on the world's largest plants. If necessary, qualified employees can also carry out expert inspections during site visits. This saves time, reduces travel costs, and minimizes plant downtime.

Even in the early planning phase of a project, we consider the entire grid connection – from registration to infrastructure, to the final conformity declaration, and the planning of the communication connection.

Project Management
- Planning of grid connection
- Planning of communication connection

Technical Operations Management
- Wind energy, photovoltaic systems, substations, etc.
- Technicians and engineers with medium-voltage switching authorization
- 24-hour monitoring and emergency service
- Expert inspections and regular maintenance
- Yield loss and availability management
- Compliance, insurance, contract, and direct marketing management
- Optimization management and vulnerability analysis
- Support for repowering projects

Commercial Operations Management
- Accounting, financial reporting, and organizational management
- Contract, liquidity, and cash management
- Full-service customer support
- Handling of necessary operational offers and orders



Power-to-heat

The energy transition is also a heat transition. It presents us with significant challenges in supplying buildings with heating and cooling energy. The goal of the German government to reduce greenhouse gas emissions to zero by 2045 can only be achieved with more efficient and sustainable supply systems using renewable electricity.

The Air-Ice Storage Bögl offers a reliable and attractive heat source for brine/water heat pumps. When the energy content of the outside air is high, the system can use the integrated air heat exchanger to capture environmental heat from the air, transfer it directly to the heat pump, or store it temporarily in the short-term ice storage. The special feature of this system: Part of the heating energy comes from the freezing process of water into ice, known as crystallization energy.
In summer, this principle can be reversed for cooling. With our specially developed pre-cooling function, the ice storage can be cooled down and even frozen overnight to cover peak loads during the day. In addition to active cooling via the heat pump, there is also the very energy-efficient option of passive cooling without a heat pump. By integrating the Air-Ice Storage into a building management system, the system can shift excess electricity loads, such as from an in-house photovoltaic system.

Advantages of the Air-Ice Storage Bögl

- Peak load shifting through the ice storage
- easy planning
- Modular design and fast assembly times
- Simple approval processes
- Low maintenance and efficient
- Efficient air conditioning
- Installation in water protection areas is usually possible
- Significant cost advantage compared to similar systems
- Complete solution from a single source



Planning and managing energy

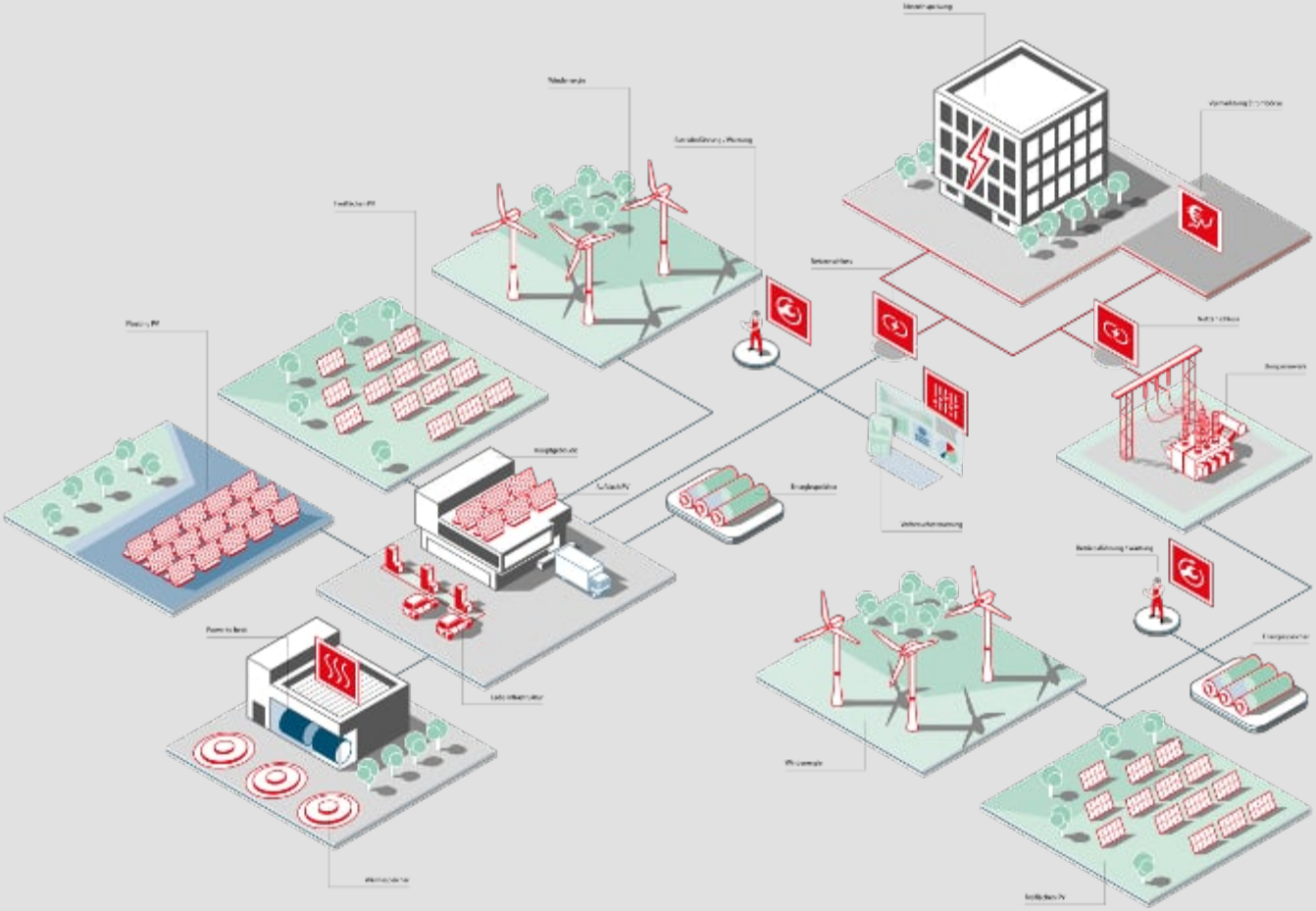
Another key element of the energy transition and climate protection is energy concepts. The central idea: produce as much energy as possible yourself and use it optimally. All technical, commercial, and regulatory requirements and possibilities should be considered. We work with our customers to develop energy solutions with the goal of achieving optimal benefits and the highest possible efficiency.

With our expertise, we cover a wide range of conceptual experience. This ranges from building energy concepts to operational and marketing concepts for generation plants. For the development of all individual energy solutions, we combine our many years of know-how in renewable energies, direct marketing, and the construction industry.





Discover more!
Click here or scan the QR code to learn more about this topic.







MASTERING THE CHALLENGES OF TOMORROW

Think ahead, rethink, think further: The shift from conventional to renewable energy generation is inevitable to protect our planet and its inhabitants from the consequences of climate change. This is only possible if a long-term and global understanding of sustainability, environmental protection, and energy efficiency is established. As an industry leader and pioneer, we set standards for innovative solutions in wind energy with our unique hub heights.

Our vision is to shape a sustainable and green energy future. Our commitment to innovation and performance helps us realize this vision. With comprehensive energy concepts that go beyond mere energy generation, we help companies achieve independent and renewable energy supplies – regionally, nationally, and internationally.

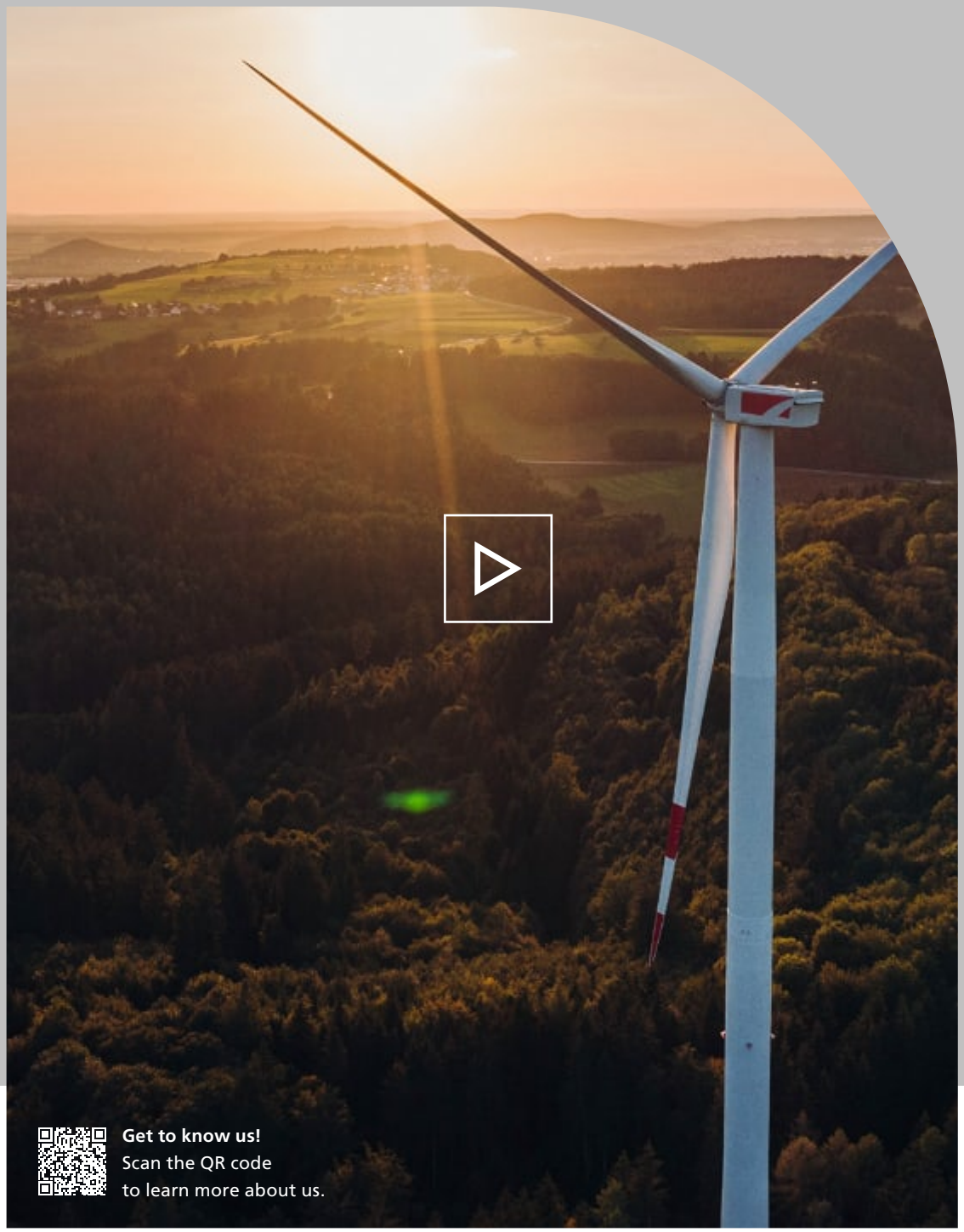
Making history through innovations

Our products combine the highest quality, proven expertise, and visionary ideas. Shape the energy future with us. With the Hybrid Tower Bögl, we have developed a unique product that is established as a technology and market leader. Extensive energy services, such as the development of energy self-sufficiency concepts, operations management, or power-to-heat solutions, complement our range of services.

With our many years of experience and expertise in renewable energies, we stand by your side as a reliable partner and cater individually to your needs.

As a subsidiary of the Max Bögl Group, we are among the top 10 in the German construction industry. With over 7,500 specialized employees at 40 locations worldwide, an annual turnover of over 3 billion euros, and over 95 years of construction industry history, we are well-positioned for the future.

Join our
#WindWorker
Team!



Get to know us!
Scan the QR code
to learn more about us.

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Progress is built on ideas.