



**Steel solutions for energy supply
– now and in future**



Sustainable energy availability

Solutions in steel

Establishing sustainable energy supply is one of the biggest technological challenges for countries and companies around the globe. With numerous innovative solutions installed in today's power generation plants, steel is among the most important materials in the energy turnaround.

Salzgitter AG is a broad-based steel and technology Group. Many of our affiliates and associated companies enjoy an excellent reputation in industrial supply chains for power generation plants. Salzgitter Mannesmann Renewables concentrates and expands the Group-wide know-how and portfolio in this area.

From a single source

Salzgitter Mannesmann Renewables coordinates the activities of our steel producers and manufacturers of tube, pipe and hollow sections, our trading companies and the Group-internal research center. We also cooperate closely with strong partners from the construction and energy sectors. Thanks to our superb industry connections, our product developments are always closely aligned to current market needs.

We offer steel products and components as well as complete system solutions for steel structures from a single source. This one-stop capability ensures quality and safety while at the same time minimizing costs.



A successful network

Our network comprises companies from various business units of Salzgitter AG.





Offshore wind

The foundation of the future

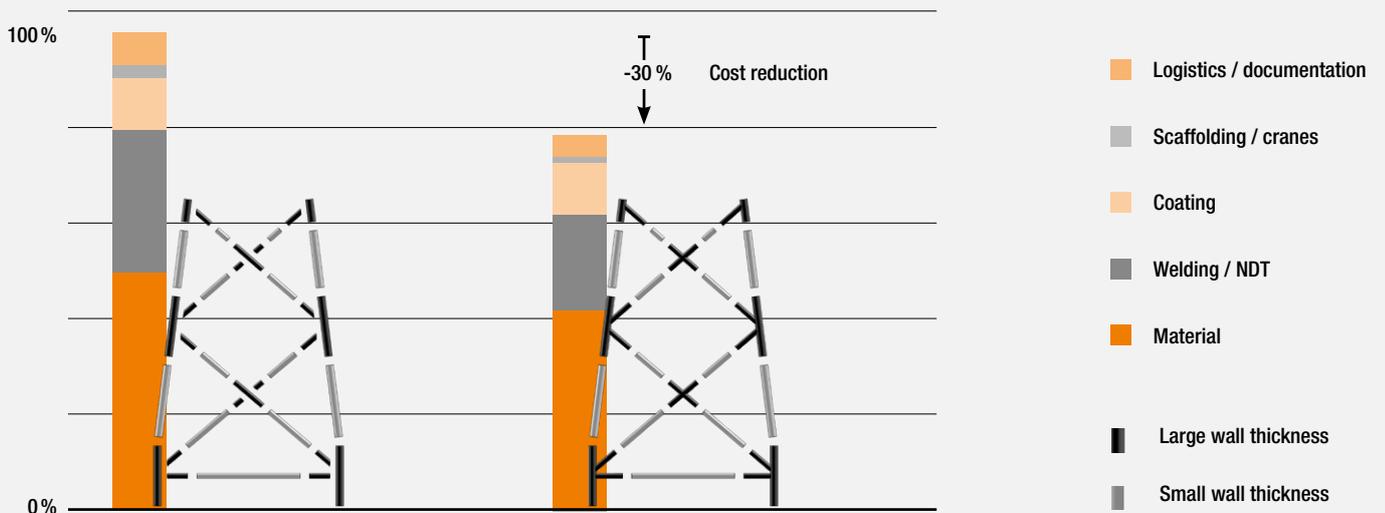
Offshore wind energy is an established element of the energy mix in many countries and is continuously growing in importance. Increasing turbine performance and rotor diameters plus ever greater water depths outline the direction of the sector's future trend. One that calls for ever stronger, innovative foundations since the conventional monopiles in use today will be unable to withstand the stresses of tomorrow's mega wind parks. Salzgitter Mannesmann Renewables possesses the technical innovations and capacities to come up with the sustainable solutions required now and in the future.



Supply Chain – from a single source

Offshore wind jackets are foundations that can stand up to the increasing loads and rough requirements posed by deep-sea environments. The design of the supporting structure is based on standardized steel products. Their serial manufacture and our exemplary supply chain strategy combine to create significant cost savings in wind park projects. The high-strength steel elements and components meet the utmost quality requirements in terms of longevity and safety.

Cost benefits in the manufacture of standardized 3 und 4-legged jackets



Automated welding technology

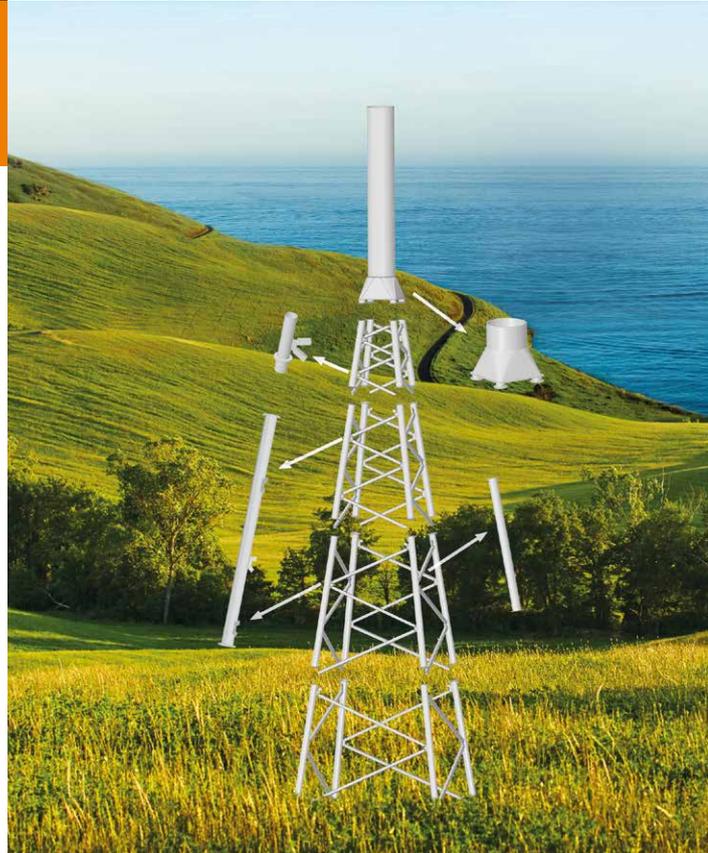
In the construction of offshore wind jackets we have developed a new automated welding technology for critical components to application maturity. The jacket nodes that connect the legs and the braces are now automatically welded by robots. That way, the weld geometry is significantly improved and the welding costs are reduced at the same time.



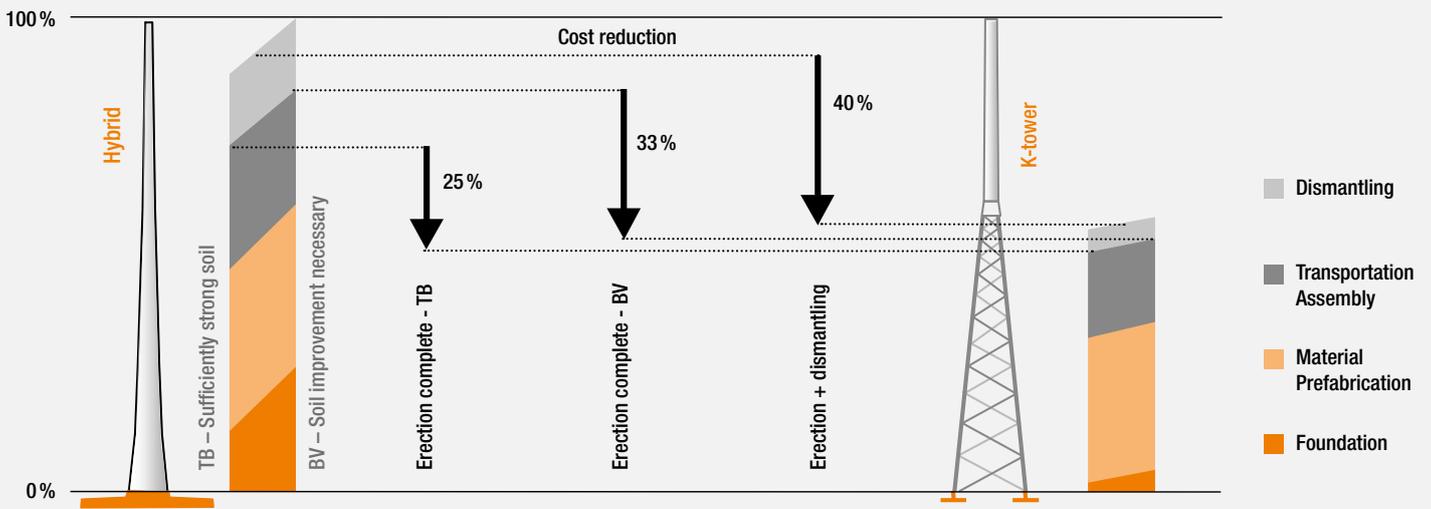
Onshore wind

Monumental challenges

Onshore wind power plants are important drivers towards more sustainable energy production. To ensure that these plants can compete with other energy sources in the long term, cost reductions are essential in their construction and operation. In addition, the architecture of wind towers must stand up to increasing loads from taller turbines and larger rotor blades – under conditions of the utmost diversity.



The cost savings associated with onshore K-towers are based on their straightforward foundation, low material consumption, easy transportation as well as quick erection and dismantling.

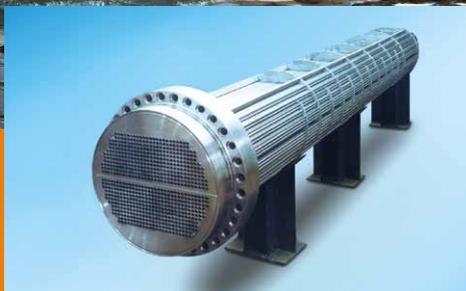


Onshore K-tower

The onshore K-tower is a material-saving system solution for wind towers, which we developed together with leading turbine manufacturers. The towers, based on a lattice structure of standard elements (tubes/hollow sections), are strong enough to support modern large-capacity turbines. Industrial manufacture of the individual components leads to significant cost savings, while the design can be flexibly adapted to local conditions. The small individual elements of K-towers can be readily transported on trucks to the construction site without any logistical efforts. The tower design with multiple legs will compensate for even major unevenness in the soil without any problem. The foundation volumes and the necessary quality of the concrete used are significantly lower than for conventional steel tube and hybrid towers.



Geothermal energy

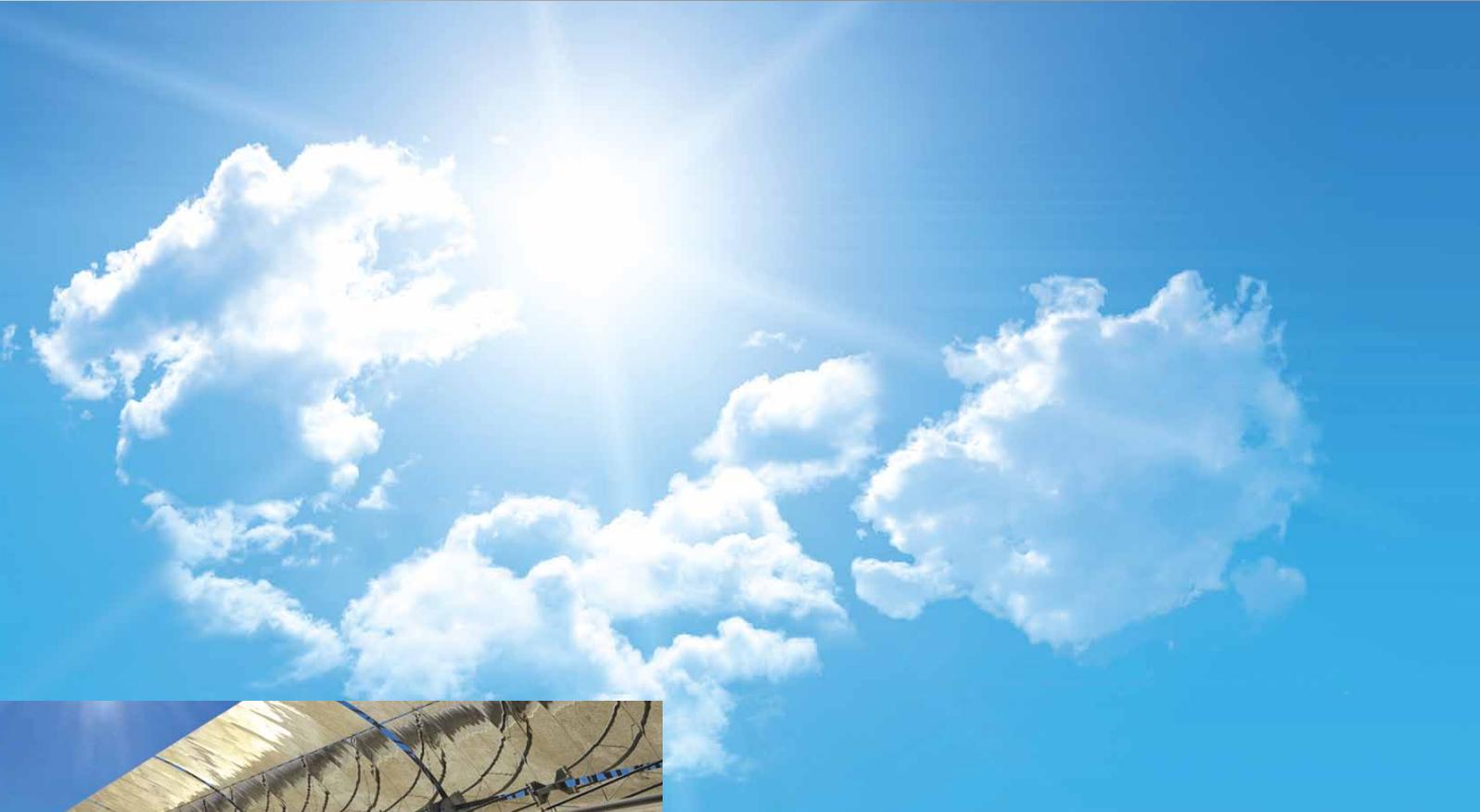


Reliable production systems

Geothermal energy would seem to be an inexhaustible energy source, whether used directly to heat buildings or in geothermal power plants for producing electricity. Our tubes and pipes are employed in numerous applications – from the exploration and exploitation of energy reservoirs right down to the supply of district heat. The high service temperatures involved as well as the partly corrosive media place exacting demands on the properties of tube and pipe.

Exploration, production & supply

With our proprietary materials, coatings and insulations, we have what it takes. The Drillmax® tubes from our Precision Tubes group are the perfect candidates for exploratory drillings. For the subsequent drilling of production wells, we have our HFI-welded steel pipes, the benchmark in the oil and gas industry for many years. For above-ground applications, we offer precision steel tubes for heat exchanger systems, and line pipe for reliable heat transportation over long distances.



Solar energy

Tube and pipe for solar-thermal plants

One of the solar key technologies is the conversion of solar energy into thermal energy, which can either be used directly for heating or for the generation of electricity in solar thermal power plants. In the latter case, an efficient and reliable heat transfer network is essential.

Reliable heat transport

Our high-grade precision steel tubes are used in several areas in solar-thermal power plants. They ensure long-term safe transportation of heat transfer media in solar fields or cookers, and they serve as heat accumulators and exchangers.



Future technology hydropower

Hydropower can provide base load energy, thus practically replacing conventional power plant capacities almost 1:1, thanks to its close to fluctuation-free power generation process. Hydropower potentials with conventional waterwheel and turbine technology are considered largely developed and tapped. Salzgitter Mannesmann Renewables has established itself as a partner in a project for the development of a new waterwheel technology which will probe previously untapped hydropower potential while at the same time respecting the environment.

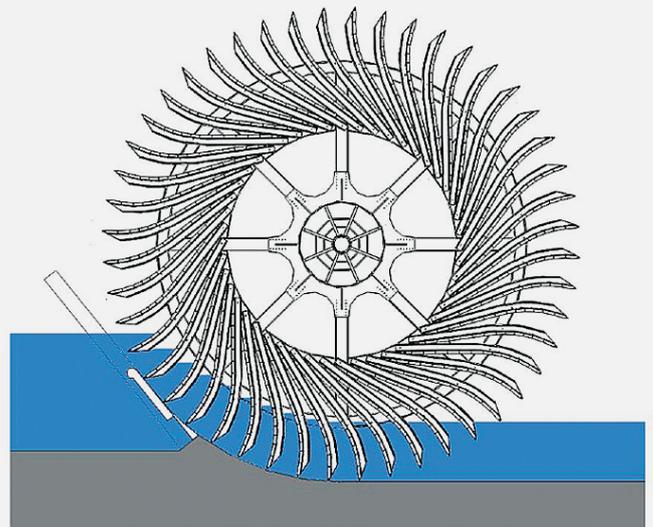
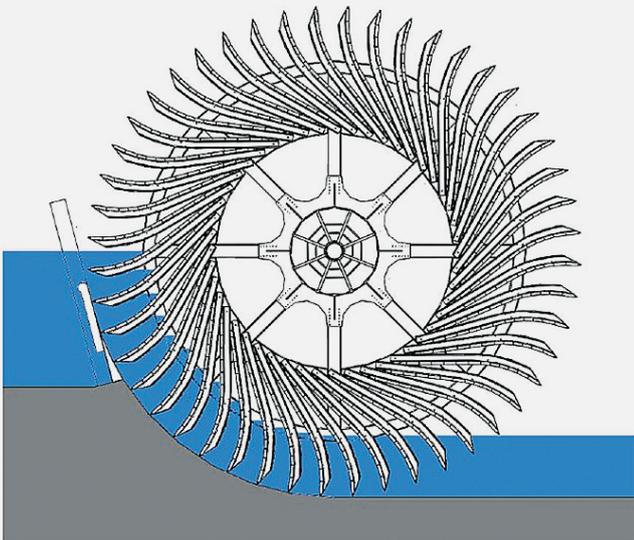
High-performance steel waterwheel

The high-performance steel waterwheel, a technology developed together with the Technical University of Braunschweig is being tested in a sponsored project at the Aller weir in Bannetze-Hornbostel. This technology has the potential to plug the gap existing between waterwheel and turbine technology in rivers with high water flow rates and low hydrostatic heads. In its development, special importance was attached to environmental protection, including high fish compatibility. This innovative technology will make it possible to build sustainable hydropower plants in many places around the world.



Technical data of the research power plant

Mean flow rate	42.14 m ³ /s
Wheel diameter	11 m
Wheel width	12 m
Number of blades	60
Speed	1 – 3.75 rpm
Rated capacity	500 kW
Household supply	1,000
CO ₂ savings	2,500 tpy



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