

10.3 STEEL—A SUSTAINABLE MATERIAL

Steel is one of the most important materials in our day-to-day lives. Whether buildings or households, whether industry or mobility: No sphere of life is conceivable without steel. Rising standards of living in many emerging economies go hand in hand with the continual increase in the consumption of steel. Yet the protection of both the climate and the environment call for a new view of raw materials. On the one hand, steel's footprint is good, because the possibilities for recycling it are almost unlimited. On the other hand, the production and processing of steel require lots of resources and energy. The research & development departments of technology groups such as voestalpine face major challenges against the backdrop of the envisioned decarbonization of the economy.

Even in terms of its applications, steel can contribute to a sustainable way of life, thanks especially to the opportunities that lightweight construction offers. For example, ultra-high strength

steel possessing higher degrees of malleability is used in lightweight automotive construction. The reductions in the weight of autobodies lower both fuel consumption and emissions. Low-loss electrical steel strip as well as inline-bonded lamination stacks are built into highly efficient electric engines, thus making an important contribution to electric mobility. Lifecycle-optimized turnouts equipped with diagnostic and assistance systems as well as tracks made of wear-resistant steel grades enable both high availability of a given rail infrastructure and the highest degree of passenger safety.

Special steels boost the efficiency of conventional power plants. Steel also plays a major role in the generation of electricity from renewable sources, for example, in wind turbines. In the toolmaking industry, high-performance steel equipped with special coatings ensures longer useful lives and lower maintenance expenditures.

10.4 INNOVATIONS FOR SUSTAINABLE PRODUCTION PROCESSES

The production of steel will remain an energy-intensive process even in the future. voestalpine works continuously to find new solutions for decarbonizing steel production. The company is endeavoring to replace coal with alternative sources of energy through bridging technologies—particularly based on natural gas, as in its new direct reduction plant in Texas. The next step is to develop the direct reduction process using hydrogen instead of natural gas.

A hydrogen electrolyzer plant is currently being built at the company's site in Linz in order to research the technology and its potential for

steel production. The groundbreaking, so-called "SuSteel" project serves to conduct research on the direct production of steel using hydrogen plasma. A pilot plant is being built to this end at voestalpine's site in Donawitz.

As far as the goal to lower the use of both resources and energy is concerned, digitalization contributes significantly to the continued refining and optimizing of existent production processes. Mechatronics, model-based controls, and artificial intelligence all contribute to sharp increases in process efficiency.