The green wave for the steel industry

wire and Tube in June: Exhibitors present sustainable solutions on the way to the Green Transformation

The steel industry is already working on nothing less than a historic technological transformation. Direct reduction based on hydrogen will replace the conventional production method as a clean production process – and experts agree with this. Steel production based on carbon will lose its place at the top.

The steel industry has the target to reduce emissions by around 30 percent by 2030. A development that the wire, cable and tube industries are also paying close attention to. For them, climate-friendly steel as the basis for their products is also an important aspect when it comes to being environmentally friendly and competitive. The green transformation covers all industrial sectors – from suppliers to users.

The European steel industry is responsible for 5.7 percent of the total greenhouse gas emissions in the European Union – which means that reducing emissions is a mammoth task. By 2050, it must be producing in a climate-neutral manner. This is stipulated in the Paris Climate Agreement of 2015. But the steel industry has already got off to a strong start.

The steel industry is setting the course

thyssenkrupp Steel is a shining example of this. “If production is converted to climate-neutral steel by 2045 at the latest, we will be the largest single European consumer of CO_2-neutral hydrogen”, says Dr Arnd Köfler, Chief Technology Officer (CTO), with confidence. In principle, the steel industry will be one of the main consumers of green hydrogen. What in turn shows they are leading the way when establishing hydrogen technologies as the key to decarbonisation.

thyssenkrupp Steel aims to save 30 percent CO_2 in this decade alone. To achieve this, four blast furnaces will be gradually replaced by direct

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reduction plants operated with green hydrogen from 2025, each supplemented by smelting units, in order to turn the solid raw material into liquid pig iron. According to thyssenkrupp, two billion euros will be needed for implementation by 2030, and up to eight billion euros in investments will be needed for the complete transformation.

Decarbonisation cooperation

Salzgitter AG has also initiated the decarbonisation of its processes and products. It plans to start production of low-carbon on a new production route from the end of 2025. “The expected CO_2 saving after completion of the transformation will be more than 95 percent”, the company explains.

Salzgitter is entering into cooperation to push forward decarbonisation. The Group has entered into an agreement with Uniper to create the SALCOS® project, which is part of the ‘Salzgitter AG 2030’ strategy. This project is to be supplied with green hydrogen for the production of climate-friendly steel by the international energy company Uniper. SALCOS® (Salzgitter Low Co_2 Steelmaking) is a transformation programme to convert production to a hydrogen-based route.

In Wilhelmshaven, Uniper is developing two projects with green hydrogen. Here, the company is planning an import terminal that converts ammonia back into hydrogen. In addition, large-scale electrolysis is provided, which will generate green hydrogen with an output of up to 1,000 MW. For this purpose, a direct connection of new offshore wind farms to be built in the North Sea will be examined.

Low-carbon steel for the automotive industry

Salzgitter has already agreed with Volkswagen AG to supply low-carbon steel from the end of 2025. Volkswagen plans to use this steel in future projects such as the Trinity 1 e-model. The automobile group wants to focus on reducing CO_2 emissions where they are primarily generated, i.e. during automotive production. “In addition to the battery-powered electric powertrain and aluminium components, this is especially the case with steel”, the Group explains. For Volkswagen, the reduction of CO_2 emissions in the supply chain “is a central component in order to

gradually become a mobility provider with a neutral CO_2 balance by 2050, as part of the Group's goTOzero strategy".

In addition, a closed recycling cycle for steel is to be set up between Volkswagen's parent plant in Wolfsburg and the integrated smelter plant in Salzgitter. Volkswagen is again making the steel remnants of the production available to Salzgitter AG, which melts them down, processes them into new steel products and delivers them to Wolfsburg for car production.

Expansion of hydrogen infrastructure

ArcelorMittal aims to achieve carbon-neutral steel production at its European sites by 2050 and to reduce emissions by 30 percent by 2030. "The German flat steel sites in Bremen and Eisenhüttenstadt are fully integrated into the Group's strategy on climate neutrality", the company explains. Two blast furnaces will be converted at the sites in order to blow in natural gas and reduce CO_2 emissions. With the planned expansion of the hydrogen infrastructure in Germany, ArcelorMittal intends to build a large industrial plant for the direct reduction of iron ore (DRI) in Bremen and a DRI pilot plant in Eisenhüttenstadt in combination with electric arc furnaces by 2026.

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Own process gases and hydrogen

With 'H2Syngas', Saarstahl and Dillinger rely - together with the engineering company Paul Wurth (part of the SMS group) -, on the use of their own process gases and the use of considerable amounts of hydrogen in the blast furnace process. The corresponding pilot plant was built in cooperation with Paul Wurth.

"The new process developed by Paul Wurth – known as dry reforming – enables the conversion of the coking plant gas produced in the coking plant into a hot reducing gas or synthesis gas", explains Saarstahl. This is enriched with hydrogen and then used as a reducing agent for the reduction of the iron ores. The injection of the hot reducing gas into the blast furnace "leads to a considerable reduction in coke consumption and thus to a reduction in CO_2 emissions".

The green transformation is also digital

The green transformation has already begun and is setting itself high targets – but it needs digital support. According to the ifo Institute, the digital transformation of the energy industry – and ultimately the steel industry – is an integral part of the energy transition. It is one of the biggest IT projects of all time. In the future, many new and decentralised producers of renewable energy will enter the market. “These must be connected to the grid and their fluctuating production must be controlled. As a result, suppliers will have to manage large data streams, including data on feed-in or local consumption”, explains the ifo Institute. Digitisation therefore not only supports efficient production, but also a sustainable distribution of energy to steel companies. A mammoth task that must now be mastered.

he exhibitors at wire and Tube 2022 are prepared for this and will present new technological solutions from the wire, cable, tube and pipe industries at the Düsseldorf Fairgrounds from 20 to 24 June 2022. For further information, industry and company news on both trade fairs, please visit: www.wire.de and www.Tube.de.

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