

5 questions to Dr. Arnd Köfler



Q&A on the subject of hydrogen with Dr. Arnd Köfler, Chief Technology Officer thyssenkrupp Steel Europe (10 June 2020)

You want to secure hydrogen with RWE for your steel mill in Duisburg. Why is thyssenkrupp Steel banking on hydrogen?

To produce iron in the blast furnace we need fossil fuels – coke and pulverized coal. This generates large amounts of carbon dioxide. Although blast furnace technology has been continuously improved over the decades, we are increasingly reaching the technical optimum. This is where hydrogen comes into play as an alternative. If we use hydrogen as a reducing agent, water or water vapor is produced instead of carbon dioxide. The partnership now announced with RWE will enable us to secure significant volumes of green hydrogen to implement an initial concrete project. One very important aspect in this context is that the use of hydrogen in steel production provides enormous leverage for CO2 reduction. There is hardly any other area in which climate protection can be implemented more effectively. That's why we also welcome the National Hydrogen Strategy that has now been adopted. It gives us a further boost and sets the course for the future of hydrogen-based steel production.

How exactly will the hydrogen be used in steel production?

In Duisburg in November 2019 we launched a series of tests into the use of hydrogen in a blast furnace. Our aim is to reduce blast furnace CO2 emissions by up to 20 percent. The advantage is that we can reduce CO2 emissions in the short term and with the existing equipment. But it's also clear that for full climate neutrality this will not be enough, because a blast furnace will always also need coal. That's why in the medium term we want to use hydrogen in new direct reduction plants. These operate on the basis of gas, without coal, and therefore permit a significant reduction in CO2 emissions.

What are the challenges of using hydrogen?

The path towards climate-neutral and hydrogen-based steel production will be long and costly. We need completely new facilities. So massive investment will be needed to create the new production base. A further challenge is the availability of hydrogen. Steel production with hydrogen will only be truly climate-neutral if the



hydrogen itself is produced on a climate-neutral basis. It helps nobody if CO2 emissions are simply moved to a different place. So-called "green" hydrogen, i.e. hydrogen produced through electrolysis with renewable energies, is still a luxury item today. To produce our roughly 11 million tons of steel, we will need very large volumes of green hydrogen.

What quantities are we talking about?

We aim to be completely climate-neutral by the year 2050. We currently expect that for this we will need around 750,000 tons of hydrogen annually. To produce this on a climate-neutral basis, large amounts of green electricity will be needed – the equivalent of over 3,000 wind turbines

Compared with that the amount now to be supplied by RWE is pretty small.

When we say 750,000 tons we're talking about the year 2050, i.e. the final phase of expansion. We will reach this step-by-step, which means our hydrogen requirement will also increase step-by-step. To this extent our planned cooperation with RWE is an important building block. We're at the start of a long transformation and the start of a hydrogen economy. In the coming years and decades, it will be a matter of consistently pursuing this path.