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Europe's steel industry must invest over EUR 100 billion in CO₂ reduction

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- **Technology transition needs to start within the next 5-10 years to meet European climate targets by 2050**
- **Steel industry currently emits around 22 percent of industrial carbon emissions in the European Union**
- **Hydrogen-based technologies are key to successful transformation**
- **Financial viability and international competitiveness depend on state support, all the more given the fatal impact of the Covid-19 crisis**

Munich, April 2020: Europe's steel industry is under pressure. The steel-producing sector is currently the largest industrial CO₂ emitter in Europe, accounting for 22 percent of total emissions. At the same time, the European Union has resolved to become climate neutral by 2050 in order to comply with the Paris climate agreement. With the methods currently applied to make pig iron and steel, this target will not be met. Companies must therefore convert their production to a new, large-scale and, above all, climate-neutral technology. And time is pressing. Because there are only five to ten years left to decide which new technology to invest in – and the transition has to be completed within 30 years. Roland Berger's new study "The future of steelmaking – How the European steel industry can achieve carbon neutrality" evaluates possible technologies and shows how the transformation can succeed.

"Europe's steel industry will need to invest heavily if it is to reach the EU's climate targets. We calculate that it will cost around EUR 100 billion just to

take the production of crude steel from iron ore and make it climate neutral," says Akio Ito, Partner at Roland Berger. However, even this sum could be understated, as global crude steel production is growing and is set to be between 30 and 50 percent higher by 2050. "If companies have to bear the investments alone, they will no longer be able to offer the steel at competitive prices in an already highly competitive market, and that's if they can finance the transformation at all," warns Akio Ito.

Hydrogen-based processes technologically advanced

For the steel industry, there is as yet no conclusive answer to the question of which is the right technology solution for extensive CO₂ reduction. Carbon emissions could be reduced by a combination of carbon storage and partial use of biomass in the blast furnace, for example, but not to zero. Other options such as plasma direct steel production or electrolytic reduction processes are at a very early stage of development. That brings great uncertainties for industrial application. "We have examined a range of processes to assess their technological availability, feasibility in large-scale plants and economic viability," says Bernhard Langefeld, Partner at Roland Berger. "In our opinion, hydrogen-based direct reduced iron (DRI) is the most advanced method and – as soon as there is enough green energy available – makes the most sense from a climate perspective.

However, hydrogen-based reduced iron processes cannot be implemented for steel production overnight. Hydrogen production requires very large amounts of energy. "The total energy requirement for climate-neutral steel production amounts to about 120 terawatt hours (TWh) per year," says Bernhard Langefeld. By way of comparison, the world's largest hydrogen electrolysis plant is currently being planned in Hamburg. It can generate just under 1 TWh per year when operating at optimum performance.

Political support needed

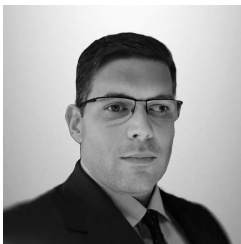
The steel industry cannot proceed with developing these capacities for hydrogen electrolysis from renewable energies and corresponding DRI furnaces without risking the competitiveness of its end products. The share of European steel production in the world market has already fallen significantly in recent decades. "Without political support, it is very likely that large parts of the value chain will be shifted from Europe to countries with cheap energy and less regulation," warns Akio Ito. In addition to the potential negative

consequences for Europe's steel industry, this would mean that global steel production would continue to be very carbon intensive and thus harmful to the climate.

The EU should therefore take action itself to ensure, among other things, that imported steel and imported steel products meet the same regulatory requirements as domestic production or are taxed accordingly in the future. In addition, a clear framework must be agreed upon to secure the necessary investments long term. "The EU or individual governments should offer such additional tax breaks, subsidies and financing as are necessary to enable steel producers to make the switch. The aftermath of the Covid-19 crisis will add to the financial stress of European steelmakers, making stimulus packages to support green steel transformation even more an imperative," advises Akio Ito.

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