Information for the media
German Steel Federation · Steel Institute VDEh
in the Stahl-Zentrum

March 22, 2010

Steel's CO_2 balance: A contribution to climate protection

Steel will play a key role in climate protection. One-third of the CO_2 reductions planned in Germany by 2020 can only be achieved with the help of innovative steel products and their applications. This is the conclusion of a joint study by The Boston Consulting Group (BCG), the Steel Institute VDEh, and the German Steel Federation. The study compares the CO_2 savings from important innovative steel applications (such as more efficient power stations, wind turbines, or lighter vehicles) with the CO_2 emissions caused by steel production. The study shows that the savings potentials achieved through the use of steel are higher than the emissions resulting from steel production in Germany.

The steel industry is responsible for a considerable share of industrial CO_2 emissions because CO_2 is a by-product of the reduction of iron ore to hot metal, and its processing to create steel. But it is not enough to merely consider CO_2 emissions during the production process – a forward-looking climate policy must also take into account the contribution of steel towards cutting emissions in the energy, automotive, and household sectors.

By adopting this comprehensive perspective, the study for the first time provides a CO_2 balance for the material steel by comparing the CO_2 reductions made possible through innovative steel applications with the CO_2 emissions resulting from steel production. The balance was calculated for Germany on the basis of eight selected innovative steel applications for the period 2007 to 2020, whereby the CO_2 emissions caused by steel production were considered throughout the entire life cycle of the particular steel use.

For the examined examples, the use of innovative steels resulted in a total savings potential of 74 million tonnes of CO_2 in 2020.

The greatest savings potentials can be found in the overhaul of fossil-fuel power stations (29.5 million tonnes), the expansion of wind energy (14.2 million tonnes), the reduction of passenger car weight (11.2 million tonnes), the increased use of combined heat and power generation (9.2 million tonnes), and in other renewable energy sources such as geothermal, biomass, and hydroelectric power (5 million tonnes). The calculations are based on conservative assumptions; for example, the reductions would be even greater if exports of CO_2-saving steel applications, such as cars or power station technology, were taken into account.

The production of steel in Germany, including the extraction of raw materials, causes annual emissions of approx. 67 million tonnes of CO_2. This would be more than compensated by the calculated CO_2 savings of 74 million tonnes. The balance is even more positive if one only considers the eight steel applications examined in the study: Only about 12 million tonnes of CO_2 per year are required to produce the steel required for them. Innovative steel use thus saves six times as much CO_2 as is generated by producing the necessary steel.

Steel will play a key role in achieving Germany's ambitious climate targets. By 2020, the German government plans to cut greenhouse gas emissions by 40 percent compared to 1990 levels. This is equivalent to a reduction of 220 million tonnes between 2007 and 2020. The reduction potential of 74 million tonnes determined for steel is 33 percent of this total. In other words: One-third of the German government's CO_2 reduction plans can only be achieved with innovative steel. For technical and economic reasons, it is often impossible to replace steel with alternative materials. Steel is practically indispensable for power stations or the use of wind energy. About 80 percent of the reduction potentials offered by the sample sectors examined can only be achieved through the use of steel, and not with other materials. An efficient steel industry that can supply the necessary innovative steel products is an important contribution towards a successful climate policy.

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