TOWARDS A LOW CARBON STEEL SECTOR

Steel manufacturing is a carbon intensive process. In order to limit global warming to less than 2°C by 2050, the carbon intensity of steel production needs to be reduced by at least 70% globally.

By 2050, developing regions like India and Africa will continue to experience further growth in the iron and steel demand. Demand for iron and steel has already plateaued and declined in the developed countries and China’s demand will follow a similar trajectory.

It is essential that India transitions towards a zero carbon steel pathway in order to deliver upon its climate commitments. Strategies toward iron and steel sector transition need not be ‘All or Nothing’. We can start by implementing certain measures that increase the energy efficiency of the sector and help it transition to a zero-carbon pathway without any negative economic impacts.

THE THREE PILLARS OF TRANSITION

Pillar 1: Improve Energy Efficiency, Resource Efficiency and Material Circularity

The average Indian iron and steel manufacturing plant could lower energy consumption per unit output by between 24-38%, depending on the production route. Adoption of best available energy efficiency technologies could reduce overall emissions by up to 15% by 2050, versus the baseline (where some energy efficiency measures are adopted). A scenario combining resource efficiency and increased circularity could further reduce emissions by 20% by 2050.

Pillar 2: Implement Transition Strategies by the 2030s and Deep Decarbonization Options by the 2040s

Even with the implementation of the energy and resource efficiency measures described in Pillar 1, the iron and steel sector would still emit around 500 Mt of CO2 by 2050. Our research shows that implementing radical decarbonization technologies can have a drastic impact on the reduction of CO2 emissions from the sector. Taking the hydrogen route, which involves the substitution of coal or natural gas as a reducing agent with hydrogen, can further help reduce emissions by 8% by 2050. More importantly, owing to this technology, India would be the first ever country to industrialize while decarbonizing its steel production.

Pillar 3: Promote International Collaboration, Innovation and Technology Diffusion and Develop a Domestic Low Carbon Steel Strategy

India’s steel demand will continue to rise even while the pressure to reduce global CO2 emissions increases. India should therefore actively promote international innovation, technology learning and diffusion, and become a major driver of the push to zero-carbon steel. Development of a domestic pathway towards a low-emissions iron and steel sector by 2050 is another aspect of this. Finally, keeping in mind issues like carbon border adjustments and other climate related trade measures, India should engage in the sensitive topic of international trade and potential measures to protect domestic industry in a world of uneven carbon prices and climate policy efforts.

Read more about how low carbon measures may be incorporated into steel manufacturing can be found in this report - Towards a Low Carbon Steel Sector: Overview of the Changing Market, Technology, and Policy Context for Indian Steel

References: