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Energy and Earth Resources

The Challenge of Addressing the Impact of China's Crude Steel Production on Climate Change

### **Abstract**

As greenhouse gas emissions from human activities rise, they accumulate in the atmosphere, warm the climate, and lead to a variety of other effects around the planet. The iron and steel industry has played a crucial role in shaping the modern world as we know it today, and is indispensable material that has been instrumental in driving economic growth and development globally. However, it contributes broadly to the overall carbon footprint of the economy and its environmental impacts. Steel production requires a lot of energy and often makes up a large portion of a nation's energy consumption. This paper discusses the status of steelmaking in China, the current CO<sub>2</sub> intensity and emission rates, and the potential for advanced technologies and policies for reducing future emissions in the steel industry. Technologies include green hydrogen as a reducing agent, use of the direct reduced iron-electric arc furnace (DRI-EAF) process, and coupling with optimizing the EAF production process, blast furnace (BF) structure, and nuclear hydrogen transformation to reduce coal consumption. Moreover, the paper discusses where improvements in energy efficiency, steel recycling, carbon capture and storage, and alternative energy sources could help reduce carbon emissions in the long term. This research also analyzes existing policies and strategies that guide development of the iron and steel industry, and explores the CO<sub>2</sub> emissions from steel production. Proposed policy ideas for regulating or encouraging industry to decrease its contribution of CO<sub>2</sub> emissions, include financial incentives and support for enterprises adopting DRI-EAF steelmaking and hydrogen technology. China's commitment to low-carbon industrial development and green manufacturing is crucial to changing how steel is produced and the degree of emission reductions. A rapid change in the iron and steel industry is essential for sustainable development in the face of the climate crisis.