**Topic:** Greenhouse gas emission mitigation options in Iron and Steel production in Thailand

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## ABSTRACT

The purposes of this study are to study energy and carbon dioxide intensities of Thailand's steel industry by using the 2006 IPCC guidelines in the boundary of the production process (gate to gate). The plant specific data in years 2004-2010 was collected. Greenhouse gas emission projection toward the year 2050 under three plausible scenarios from the Iron and Steel Institute of Thailand, S1: without integrated steel plant, S2: with a traditional integrated BF-BOF route and S3: with an alternative integrated DR-EAF route. The iron making technology in Thailand was evaluated by using Multi-Criteria Decision Analysis (MCDA) based on environmental, economic and technology availability. The scope of assessment was focused on three iron-making technologies, which are blast furnace, corex and midrex. Additionally, the $CO_2$ abatement cost curve in 2030 for the Thailand's steel industry was proposed. The results showed that energy intensity of semi-finished steel product was 2.84 GJ/t semi-finished steel and $CO_2$ intensity was 0.37 $tCO_{2e}$/t semi-finished steel. Energy intensity of steel finishing process was 1.86 GJ/t finished steel and $CO_2$ intensity was 0.16 $tCO_{2e}$/t finished steel. In 2050, the $CO_2$ emissions from S1 (baseline scenario) was 4.84 million tonnes, S2 was 21.96 million tonnes increasing 4.54 times from baseline scenario. The $CO_2$ emissions from S3 was 7.12 million tonnes increasing 1.47 times from baseline scenario. Furthermore, this finding showed that blast furnace was the most preferred iron-making technology in Thailand followed by midrex and corex. The $CO_2$ abatement cost curve in 2030 showed potential $CO_2$ emission reduction following S2 was 2.46 million $tCO_{2e}$ with total cost of 485.71 million USD.

**Keyword:** Greenhouse gas; Energy intensity; Carbon dioxide intensity; Thailand's steel industry; Multi-Criteria Decision Analysis; $CO_2$ abatement cost curve