

Feasibility of Iron Scrap Recycling with Considering Demand-Supply Balance

Authors : Reina Kawase, Yuzuru Matsuoka

Abstract : To mitigate climate change, to reduce CO₂ emission from steel sector, energy intensive sector, is essential. One of the effective countermeasure is recycling of iron scrap and shifting to electric arc furnace. This research analyzes the feasibility of iron scrap recycling with considering demand-supply balance and quantifies the effective by CO₂ emission reduction. Generally, the quality of steel made from iron scrap is lower than the quality of steel made from basic oxygen furnace. So, the constraint of demand side is goods-wise steel demand and that of supply side is generation of iron scap. Material Stock and Flow Model (MSFM_demand) was developed to estimate goods-wise steel demand and generation of iron scrap and was applied to 35 regions which aggregated countries in the world for 2005-2050. The crude steel production was estimated under two case; BaU case (No countermeasures) and CM case (With countermeasures). For all the estimation periods, crude steel production is greater than generation of iron scrap. This makes it impossible to substitute electric arc furnaces for all the basic oxygen furnaces. Even though 100% recycling rate of iron scrap, under BaU case, CO₂ emission in 2050 increases by 12% compared to that in 2005. With same condition, 32% of CO₂ emission reduction is achieved in CM case. With a constraint from demand side, the reduction potential is 6% (CM case).

Keywords : iron scrap recycling, CO₂ emission reduction, steel demand, MSFM demand

Conference Title : ICEEWM 2015 : International Conference on Environment, Energy and Waste Management

Conference Location : Zurich, Switzerland

Conference Dates : January 13-14, 2015