

Session 10

Feasibility of Iron Scrap Recycling with Considering Demand–Supply Balance

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<Objective>

This research analyzes the feasibility of iron scrap recycling with considering demand-supply balance base on the quality of scrap and steel and quantifies the effective by CO₂ emission reduction in the world. One of the effective countermeasure to reduce CO₂ emission from a steel sector is recycling iron scrap and shifting to electric arc furnace. 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 scrap.

<Method and Scenario>

Material Stock and Flow Model(MSFM) was used to estimate steel demand and scrap generation. For scenario.

Two cases are set for future steel demand; BaU case (No options) and CM case (With options). Each case has three types of constraints for scrap recycling; supply-side constraints (recycling rate of scrap is 100% or 90%.) and demand-side constraint (quality of steel by goods). Worldsteel set the target of recycling rate of scrap in 2050 as 90%. The recycling rate of 100% means a theoretical potential of scrap generation. A part of steel input to produce a certain goods, such as vehicles and machines which relatively require a high quality steel, should be a virgin steel.

<Results>

For all the estimation periods, steel production is greater than a generation of scrap. Even though 100% recycling rate of 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 of demand-side, the reduction potential is 6% (CM case.). This is because the high-performance steel, which is made by BOF, is introduced and all the generated scrap is not used to produce steel.

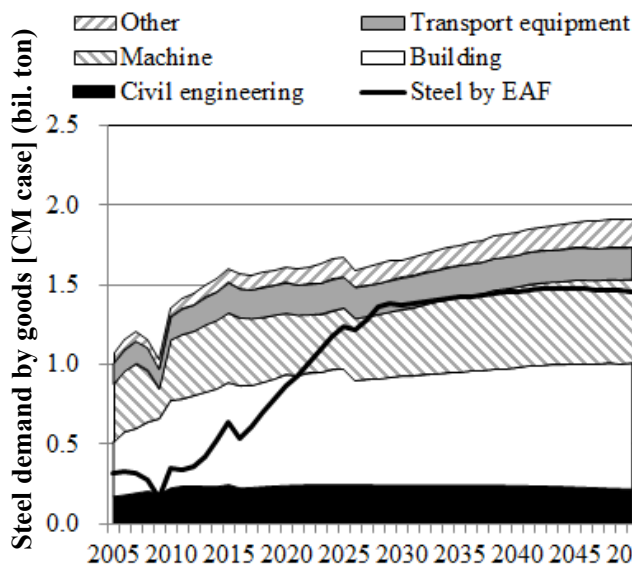


Fig. Steel demand by goods (CM case)