YONSEI UNIVERSITY
GRADUATE SCHOOL OF INTERNATIONAL STUDIES

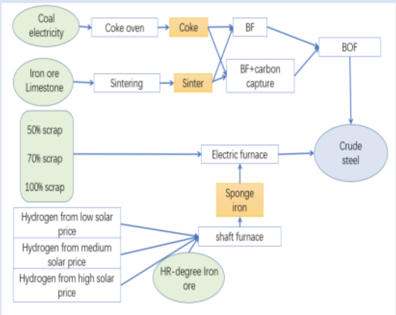
Zero-Carbon steel production technology pathway analysis in China

Jiang Weiyi , Jung taeyong

• Introduction

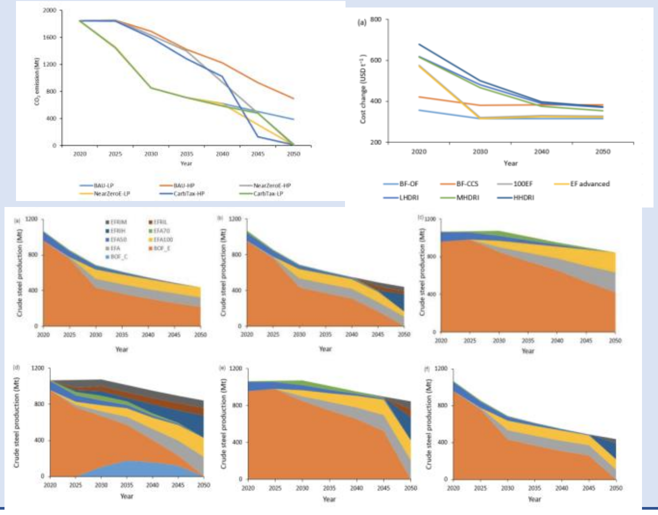
China is the largest steel producer in the world and steel industry has large potential to reduce CO_2 emission. So, this study aims to analyze future pathways to realize near-zero CO2 emissions levels in steek industry in China by 2050 via analyzing technology details. It also attempts to solve feasibility issues in technology using least-cost modelling to present least-cost near-zero carbon emission pathways, technology diffusion roadmap and production cost competitiveness.

• Model structure



Min Ctot = ∑Capex + ∑energy + ∑opx + ∑RMC

• Result



• Result:

Figure Top-right indicate the CO2 emission in different scenarios, 4 scenarios can achieve near-zero emission in 2050. Figure Top-right indicate the unit production cost by different technologies. The advanced technologies cost will keep decreasing.

Figure below indicate the different technologies share in different scenarios.

• Discussion:

China’s steel industry could achieve near-zero emissions by 2050. However, no scenario can present zero emissions. Near-zero missions in this sector depend on electrification and innovative technologies including H-DRI and BCC. Due to the sufficient supply of scrap steel, EFs can meet half of the demand for crude steel in 2050. The decline in scrap price may impact the iron ore price. The share of H-DRI starts to increase after 2040, and by 2050, it will become a major steel production technology. This is mainly due to a decrease in hydrogen cost.