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Integrated Assessment of Air Quality Improvement Plan for Korea and China Using the GAINS Model

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The Korean government has been putting tremendous efforts to improve air quality of its territory, especially against fine particle pollutions. In this research, we have tried to set up the multiple emission scenario pathways for Korea and China using IIASA's GAINS (Greenhouse gas – Air pollution Interactions aNd Synergies) modeling framework. And we have analysed emission controls and following air quality, control cost, health impact from each scenario.

Four major scenario pathways, 1) Base (Baseline: current legislation), 2) OTB/OTB(On the book/On the way : existing control measure/planed control measure), 3) BOTW_GHG(Beyond on the way : OTW with GHG reduction plan), 4) BOTW_NH3 (OTW with additional NH3 reduction measure) were developed to represent air quality improvement pathways in consideration of both Korean and Chinese efforts.

Emission reductions of year 2030 for the various control scenarios were estimated as 37∼53%(NO_x), 36∼48%(SOx), 44∼55%(PM2.5), 20∼29%(VOC), from the baseline(BASE). For BOTW_ NH3 in particular, NH3 emissions reduction could reach up to 59%, PM2.5 air quality were improved by 6.0 ug/m3, and life loss could reduced by 3.6 month/capita. Inclusion of air quality control of China could additionally improve PM2.5 air quality over Korea by 3.6∼7.2 ug/m3 and extend people's life by 2∼4 month/capita. Step-by-step emission controls and following air quality, control cost, health impact from each scenario will be presented.

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