

# **Potential impact of the national plan for future electric power supply on air quality in Korea**

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Korean Ministry of Trade, Industry and Energy (MOTIE) announced the national plan for Korea's future electric power supply (2013 – 2027) in 2013. According to the plan, the national demand for electricity will be increased by 60% compared to that of 2010 and primary energy sources for electric generation will still lean on the fossil fuels such as petroleum, LNG, and coal, which would be a potential threat to air quality of Korea. This study focused on two subjects: (1) How the spatial distribution of the primary air pollutant's emissions (i.e., NO<sub>x</sub>, SO<sub>x</sub>, CO, PM) will be changed and (2) How the primary emission changes will influence on the national ambient air quality including ozone in 2027. We used GEOS-Chem model simulation with modification of Korean emissions inventory (Clean Air Policy Support System (CAPSS)) to simulate the current and future air quality in Korea. The national total emissions of CO, NO<sub>x</sub>, SO<sub>x</sub>, PM in year 2027 will be increased by 3%, 8%, 13%, 2%, respectively compared to 2010 and there are additional concern that the future location of the power plants will be closer to the Seoul Metropolitan Area (SMA), where there are approximately 20 million population vulnerable to the potentially worsened air quality. While there are slight increase of concentration of CO, NO<sub>x</sub>, SO<sub>x</sub>, and PM in 2027, the O<sub>3</sub> concentration is expected to be similar to the level of 2010. Those results may imply the characteristics of air pollution in East Asia such as potentially severe O<sub>3</sub> titration and poorer O<sub>3</sub>/CO or O<sub>3</sub>/NO<sub>x</sub> ratio. Furthermore, we will discuss on the impact of transboundary pollution transport from China in the future, which is one of the large factors to control the air quality of Korea.

**Key words:** Air quality of Korea, electric power supply, air pollutant emissions, Ozone, transboundary transport of pollution