

Analysis of GHG Reductions in Energy Transition Sector Based on National New and Renewable Energy Plan Scenarios in Korea

Haneul Kim¹ and Teahyeung Kim^{2*}

¹Department of Environmental Engineering, Changwon National University, Changwon 51140, South Korea

²school of Smart and Green Engineering, Changwon National University, Changwon 51140, South Korea

ABSTRACT

South Korea has announced 2050 Carbon-Neutrality Scenario and 2030 Nationally Determined Contribution (NDC) to achieve carbon neutrality. According to the 2050 Carbon-Neutrality Scenario, South Korea has proposed energy transition as the primary strategy to reduce greenhouse gas (GHG) emissions. Specifically, the government has finalized the National New and Renewable Energy Plan (NNREP) to achieve the carbon neutrality goal in the section of energy transition. However, 2050 Carbon-Neutrality Scenario and NNREP do not provide specific GHG emission reduction in each year. Therefore, it is essential to quantitatively analyze whether the carbon neutrality goal could be achieved by the national plans. The NNREP consists of renewable energy 3020 implementation plan (plan A), the 5th basic plan for the development and utilization of new and renewable energy technology and supply (plan B), and the 10th basic plan of long-term electricity supply (plan C). In this study, GHG reduction scenarios was constructed for each plans A, B, and C. Then, energy supply capacity was estimated, based on the scenarios by using regression analysis. Finally, GHG reduction was estimated based on the supply capacity of each energy technology. The GHG reductions was analyzed by electricity generation amount of each energy technology. If GHG emissions are reduced to current rates, the year of achieving carbon neutrality was analyzed as 2057 for Plan A, 2061 for Plan B, and 2047 for Plan C. To achieve carbon neutrality, the analysis shows that 14.8% and 23.7% additional GHG reductions are required of Plan A and Plan B, respectively.

Keyword: Carbon neutrality/ Energy transition/ New and renewable energy plan/ Scenarios/ Greenhouse gas (GHG) reduction