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Effect of technology development in the industrial high efficiency boiler using TIMES model

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Energy saving potential and carbon dioxide (CO₂) reduction potential of boiler technologies in the Korean industrial sector up to 2035 were analyzed using TIMES (The Integrated MARKAL-EFOM System) model based on bottom-up optimization. Final energy consumption by industrial indirect heating boilers in 2013 accounts for 7% of Korea's industrial energy consumption and 8% of the manufacturing sector's consumption. Energy consumption of industrial indirect heating boilers is expected to increase about 25% between 2013 and 2035 in the baseline scenario. Economic potential against the baseline scenario through market competition between existing and new technologies is 5.6% for energy saving and 6.1% for CO₂ reduction by 2035. Technical potential against the baseline scenario by deploying only the most efficient technologies in new installation demand is 7.9% for energy saving and 20.7% for CO₂ reduction by 2035. The most efficient technologies by boiler technology categories were gas-firing super boilers. CO₂ reduction potential is higher than energy-saving potential because fuel substitution toward gas was added to the energy-saving effect due to efficiency improvement. Regulation, incentives, information disclosure, and research and development of high-efficiency boiler technologies are necessary to realize technical potential beyond economic potential in industrial indirect heating.

Biography

Nyun Bae Park has completed his PhD from Seoul National University. He is a Senior Researcher in the Energy Policy Team, Korea Institute of Energy Research. He has published more than 12 papers in the Energy and Environment Policy journals in Korea.

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