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Hydrogen and ammonia gas turbine R&D in KEPCO

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Abstract

Gas turbines play a crucial role in modern power systems, particularly as flexible and reliable generation sources that supports the increasing penetration of renewable energy. As the global energy transition accelerates toward carbon neutrality, significant efforts are being made worldwide to develop and demonstrate gas turbine technologies capable of operating with carbon-free fuels such as hydrogen and ammonia. These fuels are considered promising energy carriers that can enable large scale decarbonization of the power sector while maintaining the operational advantages of gas turbine systems. In line with this global trend, KEPCO has been actively leading R&D efforts on hydrogen and ammonia gas turbine technologies to support the transition toward low carbon power generation. The ongoing research activities focus on both near-term and long-term technological pathways. In the near term, KEPCO is addressing key technical challenges associated with retrofitting existing NGCC to hydrogen co-firing operation, including combustion stability, emissions control, and operational flexibility. In parallel, KEPCO is also pursuing the development of ammonia fueled gas turbine technologies as a long-term solution for zero-carbon power generation. This effort includes combustor technology development and experimental validation. This presentation mainly introduces KEPCO's ongoing R&D activities on hydrogen and ammonia gas turbine, highlighting key technical challenge and future deployment strategies. In addition, the presentation will briefly introduce KEPCO's research activities related to clean hydrogen production technologies that support the hydrogen energy value chain.