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Development and Verification of MHI Carbon Neutral Solutions (NH₃, H₂ and CO₂)

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Abstract

Because carbon neutral solutions vary by regions and countries, Mitsubishi Heavy Industries is developing various technologies to prepare to provide carbon neutral solutions to customers in the world. In the power generation field, we are developing hydrogen-fired gas turbines(both co-fired and 100%), 100% ammonia-fired gas turbines and high mixing rate ammonia-fired boilers. We have conducted combustion tests using a single can combustor and then conducted demonstration operations of actual engine. We are also developing hydrogen production systems such as SOEC, a water electrolysis system with higher efficiency than alkaline water electrolysis, and methane pyrolysis, which can utilize existing LNG infrastructure and gather solid carbon. In addition, we are also developing technologies for CO₂ capture equipment and liquefied CO₂ ships and are preparing to provide a variety of solutions that support carbon neutral society.

In this presentation, I will explain the status of the above-mentioned carbon neutral technology development, as well as the Nagasaki Carbon Neutral Park, where we are conducting elemental experiments for hydrogen production and ammonia co-fired boiler, and the Takasago Hydrogen Park, which started operation in 2023 and allows for actual engine testing in actual small size and large size gas turbines by burning hydrogen generated by commercial-scale hydrogen production systems.