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Development of Hybrid Geothermal Power Plants in Japan -Final Report-

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Abstract

Geothermal energy is the clean and sustainable heat that lies beneath the earth's surface, and it is considered a renewable energy resource. GPP (Geothermal Power Plant) has negligible environmental impact (approximately 0.015kg-CO2/kWh) and can help reduce carbon dioxide emissions to the atmosphere. Although geothermal energy is potentially a very valuable domestic power source for Japan, much of the geothermal resource base in Japan cannot yet be economically used. Therefore, many industries and research institutes in Japan have researched and developed technologies to harness geothermal energy.

Since 2013 we have started to develop a "highly efficient hybrid GPP" combined with other thermal energy sources such as biomass, solar heat and exhaust heat from fuel cells. It is expected that the thermal efficiency of a GPP can be improved by super-heating the main flow of steam through the use of other energy sources above.

We have also looked into the feasibility of these hybrid GPPs in terms of their engineering, economic performance, environmental laws and regulations. To report the latest status of this project executed by CRIEPI in 2017, we discuss system concept of the hybrid GPP and the experimental results performed at the Takigami GPP in Japan.

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