



ORIX Begins Operation of Minami-Kayabe Geothermal Power Plant, Japan's Largest Binary Cycle Geothermal Power Plant in Hokkaido

TOKYO, Japan – May 1, 2024 – ORIX Corporation (“ORIX”) announced today that it has begun commercial operation of the Minami-Kayabe Geothermal Power Plant in the Minami-Kayabe region of Hakodate City, Hokkaido*¹. The power plant has a generation capacity of 6,500 kW (6.5 MW), and is the largest*² binary cycle geothermal power plant in Japan.

The power plant uses binary cycle power generation, which involves vaporizing a working fluid with a boiling point lower than water, using the heat from hot water drawn from underground, and using the resulting steam to turn a turbine, generating power. Most geothermal power plants in Japan are flash steam power plants*³, which directly utilizes steam or hot water extracted from underground to turn a turbine. With a working fluid, binary cycle power plants can generate electricity with lower temperature geothermal resources (primarily below 200°C).

Additionally, the power plant is the first geothermal power plant in Japan*⁴ to install a downhole line shaft pump*². By using durable pumps designed for prolonged operation in geothermal environments, it is possible to extract sufficient heat even from low-temperature hot water, making large-capacity geothermal power generation possible in regions where it was previously challenging.

From a design perspective, installing the pump reduces the number of wells and required development area while preventing trees from freezing, which can cause them to wither, by using air-cooled condenser*⁵ instead of water for cooling the heated working fluid. Furthermore, it was designed with environmental consideration. For example, all extracted hot water is injected underground to promote water resource circulation. Additionally, forest maintenance activities will be conducted near the power plant in cooperation with the local community to promote environmental conservation. This project has been selected by the Japan Organization for Metals and Energy Security (JOGMEC) as a debt guarantee business for geothermal resource development.

ORIX is actively engaged in power generation businesses that utilize solar, geothermal, wind, and other forms of renewable energy. In the field of geothermal power generation, ORIX currently owns and operates*⁶ a private geothermal power generation plant located on the site of the Beppu SUGINOI HOTEL (Beppu, Oita), an onsen resort operated by the ORIX Group. ORIX has been working on developing its geothermal business at multiple locations across Japan; this includes conducting surveys to develop a geothermal power plant for a publicly tendered geothermal power generation business in Hachijojima.

ORIX will continue its efforts to achieve carbon neutrality by carrying out initiatives to make renewable energy the primary source of power and contribute to the realization of a sustainable society.

*1 [ORIX to Begin Construction of 6.5 MW Geothermal Power Plant in Hokkaido \(August 8, 2019\)](#)

*2 According to in-house research.

- *3 A method that directly turns turbines with steam from high-temperature geothermal fluids, mainly above 200°C.
- *4 A pump that lifts hot water using only the propeller at the tip of a shaft (rod-like rotating axis), with the motor installed on the surface.
- *5 A heat exchanger in which the vapor of a medium flows through a heat-transfer tube and the outer surface of the tube is cooled by air to liquefy the medium and release heat.
- *6 Currently, temporarily suspended due to facility updates, etc.

■ Business overview

Power plant name	Minami-Kayabe Geothermal Power Plant
Location	722 Usujiri-cho, Hakodate City, Hokkaido
Operator	OR Geo Minami-Kayabe Corporation (100% sub-subsubsidiary of ORIX Corporation)
Generation capacity	6,500 kW(6.5MW)
Annual power generation	Maximum of approximately 56,940,000 kWh
Construction company	NIPPON STEEL ENGINEERING CO., LTD.; KINDEN CORPORATION

■ Minami-Kayabe Geothermal Power Plant exterior view



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About ORIX Group:

ORIX Group (ORIX Corporation TSE: 8591; NYSE: IX) was established in 1964 and has grown from its roots in leasing in Japan to become a global, diverse, and unique corporate group. Today, it is active around the world in financing and investment, life insurance, banking, asset management, real estate, concession, environment and energy, automobile-related services, industrial/ICT equipment, ships and aircraft. Since expanding outside of Japan in 1971, ORIX Group has grown its business globally and now operates in around 30 countries and regions across the world with approximately 35,000 people. ORIX Group unites globally around its Purpose: “Finding Paths. Making Impact.” combining diverse expertise and innovative thinking to help our world develop in a sustainable way. For more details, please visit our website: <https://www.orix.co.jp/grp/en/> (As of November 1, 2023)

Caution Concerning Forward Looking Statements:

These documents may contain forward-looking statements about expected future events and financial results that involve risks and uncertainties. Such statements are based on our current expectations and are subject to uncertainties and risks that could cause actual results that differ materially from those described in the forward-looking statements. Factors that could cause such a difference include, but are not limited to, those described under "Risk Factors" in the Company's annual report on Form 20-F filed with the United States Securities and Exchange Commission and under "(4) Risk Factors" of the "1. Summary of Consolidated Financial Results" of the "Consolidated Financial Results April 1, 2022 – March 31, 2023" furnished on Form 6-K.