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Innovative Māori geothermal development partnership between Tauhara North No.2 Trust and Mercury NZ. Reflections on the 26 year journey.

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1 ABSTRACT

This paper explores the evolution of the partnership between Tauhara North No.2 Trust and Mercury NZ Ltd. These two pivotal New Zealand entities played a crucial role in advancing the nation's geothermal growth story and have done it in a way that respects the vital contributions from Indigenous Geothermal Peoples. Over four decades, this collaboration has delivered pioneering commercial models and sustainable practices through the development of the Rotokawa and Ngā Tamariki geothermal fields, now generating over 260 MW with an additional 50 MW due in 2025. Founded on shared principles of trust, stewardship of whenua (land) and sustainable geothermal reservoir development for current and future generations, the joint venture enabled TN2T to secure long-term revenue and equity options without risking land assets, while Mercury leveraged capital and expertise to support 8,000 GWh of renewable generation. Supportive governance, cultural integration, and capacity-building have underpinned this success, creating enduring benefits for both partners and their communities.

2 INTRODUCTION

Geothermal energy development in New Zealand is not just a technical and scientific achievement; it is a story of cultural resilience, strategic foresight, and collaborative innovation. This paper revisits the journey of Tauhara North No.2 Trust (TN2T) and Mighty River Power (MRP), now Mercury, whose partnership transformed geothermal resource ownership into a model of indigenous empowerment. The formation of partnership was very significant at the time because it represented one of the first examples (after the iwi-led initial development of the Mokai geothermal field by Tauropaki Trust) of a modern, commercial joint venture between a New Zealand state-owned State Owned Enterprise (SoE) and an Ahu Whenua Lands Trust. This indigenous ownership model allowed Māori to be key participants in geothermal projects through their ownership of land that provides access to world class geothermal resources. From the early days of cautious development with the Rotokawa A station to the groundbreaking Ngā Awa Pūrua project, this narrative illustrates how Māori values of kaitiakitanga (guardianship) and tino rangatiratanga were woven into the fabric of modern energy development. Fast-forward to today and beyond geothermal, TN2T's vision now extends to diversified ventures in tourism, science and food production, reflecting its philosophy: 'Kia mau ki te whenua, Whakamahia te whenua, Hei painga mo ngā uri whakatipuranga'—hold fast to the land, make use of the land, for future generations.

3 HISTORICAL BACKGROUND

Lake Rotokawa ('bitter lake') and the associated geothermal system is located approximately 10 km north-east of Taupo. The lake and surrounding thermal area were used for hunting, bathing, cooking, and medicinal/therapeutic purposes although there was no pre-European settlement at the site (Pogacnik et al (2019).

Tauhara North No.2 Trust whenua (land) is located around and to the north of Lake Rotokawa in the rohe of Ngati Tahu and are affiliated and have a strong relationship with the Ngati Tahu, Ngati Whaoa Runanga Trust. Tauhara North No.2 Trust is a small land block, that is set upon the expansive original land block, known as Tauhara North, which the government awarded, albeit returned to the tribal people of Ngāti Tahu.

Classification: General

The owners/shareholders of Tauhara North No.2 Trust are descendants of their tūpuna (ancestor) Tahumatua. The Trust represents over 900 individuals who collectively own 326 ha of the original whenua.

For many decades Māori were known to be rich in land assets and cash poor. There is only a small number that made bold decisions at the right time to develop their hanawhatu (geothermal) on behalf of the owners they represent. Historically Māori were only considered to lease their land for the term of the resource consent with further rights to extend, no participation, little to no communication, no relationship and certainly no partnership in the project.

4 EARLY STAGE GEOTHERMAL DEVELOPMENT

The first exploration wells at Rotokawa were drilled by the New Zealand government in the 1960s, confirming the presence of a hot convective geothermal system. Well RK01 recorded a maximum temperature of 307 °C, making it the hottest geothermal well in New Zealand at that time. Further wells were drilled in the mid-1980s to depths of around 2,500 m and encountered temperatures as high as 330 °C. Early testing suggested that RK05 had an estimated generation capacity of approximately 15 MWe (Pogacnik et al (2019).

In 1993, Tauhara North No. 2 Trust, Taupo Electricity Ltd, and WORKS Geothermal Ltd were granted resource consents from the Waikato Regional Council to extract steam from the Rotokawa Geothermal Field for electricity generation. In 1998 Tauhara North No.2 Trust and Power New Zealand commissioned the Rotokawa A geothermal Combined Cycle technology power station utilizing a back-pressure steam turbine and four binary cycle power units for a combined 24 MWe. The plant was later extended to 34 MWe in 2003 (Goh and McLellan, 2024).

This was Tauhara North No. 2 Trust's first geothermal venture and was developed under a low financial risk, resource royalty payment model (Legmann, 1999). This approach reflected limited commercial experience and a cultural imperative to safeguard ancestral land. The philosophy of this development was focused on ensuring sustainable use of the whenua and reservoir resource. The small scale development allowed for the owners to learn about the development cycle and reservoir management (Tauhara North No.2 Trust, 2024)

This sustainability focus at Rotokawa was partly driven by Tauhara North No. 2 Trust's lived experience of the earlier Ohaaki power station development commissioned in 1989 and the environmental problems and cultural impacts that localised subsidence had on key areas of significance for the Trust (Tauhara North No.2 Trust, 2024).

5 PARTNERSHIP EVOLUTION

The relationship started between Mighty River Power (now Mercury) Chief Executive Doug Heffernan and Makere Rangitohereri (Tauhara North No.2 Trust Trustee/Chair). Tauhara North No.2 Trust was in its infancy, other Trustees were Phillip Sulivan, Rangimarie Ngamotu, Aroha Campbell and Buddy Nikora. Buddy was appointed by the Maori Land Court because he was the accountant for the Trust at the time.

The initial joint venture structure for the Rotokawa A development involved Tauhara North No.2 Trust and Power NZ. In 1999, Power NZ was seeking to sell their interest in the new power station and Tauhara North No.2 Trust had negotiated an option to purchase post sale. The new temporary owner was TransAlta an Canadian company with energy interests in New Zealand at the time. Tauhara North No.2 Trust initiated a tender process for a geothermal partnership and an option to purchase the Rotokawa A power station from TransAlta. Mighty River Power (now Mercury) was the successful partner of choice in the tender.

So, in 2000, Mighty River Power acquired an interest in the Rotokawa field and combined with Tauhara North No.2 Trust to join the Rotokawa Joint Venture (RJV) which is core to the partnership between both organizations. The Rotokawa Joint Venture is a 50:50 partnership that governs the long-term development and sustainability of the māpuna (reservoir). The commercial purpose of the Rotokawa Joint Venture is to provide geothermal fluid and injection capacity services to the operating and future power stations located on the reservoir by drilling wells and managing the reservoir.

Mighty River Power owned 100% of the Rotokawa A power station. Tauhara North No.2 Trust did not opt to take shares in the power station but selected an ongoing resource payment. At the time, it felt prudent that the Tauhara North No.2 Trust had limited financial involvement in Rotokawa A as it had little experience with commercial issues relating to equity ownership and limited financial resources.

The following period included the successful expansion of the Rotokawa A development and the maturing of the initial joint venture partnership. Throughout that period there was a lot of time spent together sharing information, knowledge, building geothermal capacity and expertise within both organisations. All this helped to build trust, establish routines for communication and governance and ensure alignment between groups (Tauhara North No.2 Trust, 2024).

Off the back of this, the partners started to discuss further development planning at Rotokawa. The original strategy identified an additional unit. Mighty River Power was also building a 100MW flash plant at Kawerau at the time and it was clear that geothermal development would become a large part of the company's electricity generation and growth pathway. With this emerging strategy in place, Mighty River Power developed a bolder plan that could harness the geothermal potential at Rotokawa and Nga Tamariki through a series of staged developments that could substantially grow value for both partners and create a ten year development plan. Around the same time the joint venture purchased the geothermal rights at the Ngatamariki geothermal field, signaling TN2T and Mighty River Power strategic foresight for future developments.

As Tauhara North No.2 Trust evolved they decided to employ a dedicated person that they trusted as Executive Trustee and 2006 Aroha Campbell was appointed. At that time Tauhara North No.2 Trust had limited financial resources, little to no communications with owners and a staff of one. To secure a long term lease for further development the required owner approvals. They targeted and planned for a Special General Meeting (SGM) to take place and set about determining the owners list of known address details and another list of owners with unknown addresses. It took three to four months to gather the information and make contact to meet with them one-on-one about the proposal. The owners' main concerns were based on the previous experiences at Ohaki, where the landowners received no benefit from the development. Tauhara North No.2 Trusts proposal was that they would become partners and participate throughout the project to the opening of a new power plant, with the ability to provide dividends and a vision for the other benefits being available the trustees and wider whanau (family). The SGM did take place in May 2007 with strong owner attendance and support for the development. The application to the Maori Land Court for a long-term lease was granted.

This longer-term plan triggered the requirement to substantially revise the joint venture agreements to now accommodate two geothermal reservoirs and at least three geothermal power station projects. This new joint venture model allowed Tauhara North No.2 Trust to buy into projects post-commissioning, financed entirely through debt secured against the ongoing resource payments. Mighty River Power was to be the main developer, operator and majority owner for new power stations. This evolution from resource payment involvement to equity participation marked a significant shift in Tauhara North No.2 Trust commercial maturity and confidence (Tauhara North No.2 Trust, 2024).

Working together and being together was critical to the early success of the relationship. The Tauhara North No.2 Trust moved its office from Rotorua to Taupo and shared an office with Mercury initially. Later on both organisations moved their offices to Rotorua in the same building where are they are still there today. The communications between the JV partners were exceptional at all levels from the board to shop floor.

6 INNOVATIVE COMMERCIAL MODEL

The long-term development plan included the 138MW Ngā Awa Pūrua station and the 85MW Nga Tamariki development. The revision to the joint venture arrangements resulted in improved resource payments for the Tauhara North No.2 Trust in exchange for development rights for Mighty River Power. These planned developments had preferential buy-in options for Tauhara North No.2 Trust but placed the majority of the development risk on the Mighty River Power, who by this stage had a large geothermal development team working across multiple reservoirs (McLoughlin et al., 2010).

As part of the revised joint venture agreements, Tauhara North No.2 Trust developed an innovative commercial model to enable investment into the soon to be built 140MW Ngā Awa Pūrua power station. Fundamental to the ownership of Māori titled land is the desire not to expose the land to risk of forfeiture through commercial default of any form. Tauhara North No.2 Trust was not prepared to offer banks any form of security over the land. As an alternative they offered security over the resource payments stream, as well as General Security over the interest in the joint venture. This position was accepted by the banks that were prepared to provide 100% financing of the Trust's equity investment (McLoughlin et al., 2010). Legal advisors recommended a Limited Partnership structure to ring-fence commercial risk and allow tax-efficient profit distribution. This model balanced cultural integrity with financial ingenuity, setting a precedent for indigenous ventures globally (Tauhara North No.2 Trust, 2024).

In 2010 the Ngā Awa Pūrua power station was commissioned with Tauhara North No.2 Trust a 25% owner in the Ngā Awa Pūrua Joint Venture. In 2012 they increased ownership to 35% via existing option rights.

7 CULTURAL INTEGRATION & GOVERNANCE

Governance at Rotokawa is structured through both the Rotokawa Joint Venture (50:50) and Ngā Awa Pūrua Joint Venture (65:35) via separate Boards ensuring balanced oversight and decision-making. This has been a core strength of the partnership from day one. The partnership operates under formal joint venture agreements that defines ownership rights, operational responsibilities, and strategic objectives. Governance processes emphasize transparency, environmental sustainability and kaitiakitanga, and alignment with both commercial and iwi values, supported by regular reporting and joint board representation to maintain accountability and shared benefits. An example of this is the Rotokawa Joint Ventures holistic approach to reservoir management that is independent of the generation assets and is focused on sustainable geothermal reservoir management (Pogacnik et al., 2019).

Cultural protocols are observed and celebrated at multiple levels within both organisations. Operational teams work to produce annual cultural reporting and Directors regularly review reservoir health assessments. Blessing ceremonies mark project milestones including recent drilling activities, and the name Ngā Awa Pūrua is drawn from Ngāti Tahu heritage, supporting the important identify of the land and people (Hoyer et al., 2010).

8 TECHNICAL & ENVIRONMENTAL INNOVATION

The Rotokawa Upgrade Project represents a major technical innovation aimed at mitigating reservoir gradual enthalpy decline and improving generation sustainability across the Rotokawa A and Ngā Awa Pūrua stations. Commissioned in 2021, the project introduced a novel steam-field separation system to reallocate brine and steam flows, enhancing Ngā Awa Pūrua's enthalpy to design levels while converting Rotokawa A into a lower-enthalpy station capable of processing higher brine volumes. Key design features included installation of two horizontal separators, a new brine dump facility, and an acid dosing system to control silica scaling risks. Additionally, the OEC21 binary unit was converted from steam-and-brine to brine-only operation, increasing its output by 3 MW. These upgrades not only extended the operational life of both plants but also improved flexibility and resilience, supported by advanced process control and automation strategies for long-term optimisation (Goh and McLellan, 2024).

Mercury's work at the Ngā Tamariki field has pioneered environmental innovation through active reinjection of non-condensable gases (NCGs), significantly reducing greenhouse gas emissions. Since October 2021, a 25% NCG reinjection system has been operational, cutting annual emissions by approximately 8,000 tonnes of CO_2e. This approach, which routes CO_2 and methane back into the reservoir, complements the plant's binary-cycle design that already minimises emissions by reinjecting cooled geothermal fluids. Recent expansions now include reinjection to all existing units and integrating the technology into new developments, such as the fifth OEC unit currently due for commissioning 2025. These initiatives align with both joint venture partners environmental stewardship goal and demonstrate how geothermal operations can actively contribute to climate targets while maintaining reliable baseload generation (McLean et al, 2024).

Beyond electricity generation, the Xphiles project showcases a groundbreaking use of geothermal resources for sustainable food systems. Led by Tauhara North No.2 Trust and research partners, this initiative develops protein-rich bio-feedstocks from extremophilic microorganisms sourced from Māori-owned geothermal ecosystems. These microbes are cultivated using geothermal waste gases such as CO_2 and methane, converting emissions into valuable biomass for animal feed and nutraceutical applications. The process leverages geothermal heat and low-carbon electricity to power bioreactors, creating a circular economy model that decarbonises food production, reduces Scope 3 emissions, and generates new employment opportunities. With $2.5 million co-funding from MPI's Sustainable Food & Fibre Futures Fund, the project is moving from pilot-scale optimisation toward commercial deployment, positioning geothermal as a catalyst for climate-positive agriculture (Blair, 2024).

9 GEOTHERMAL INDIGENOUS PEOPLE'S DECLARATION

The partnership between Tauhara North No.2 Trust and Mercury reflects many of the principles outlined in the Indigenous Geothermal People's Declaration 2024. It has maintained the Trust's ownership of ancestral land while creating opportunities for participation in decision-making and project governance. The relationship has emphasized early engagement and transparent communication, particularly during key development phases, and has provided pathways for benefit-sharing through resource payments and later equity participation. Cultural values such as kaitiakitanga have been incorporated into reservoir management and the governance model ensures ongoing collaboration and accountability.

10 OUTCOMES & IMPACT

The legacy created over the last 26 years has create material value for Tauhara North No.2 Trust and Mercury while supporting the growth of New Zealand with over 300MW of baseload geothermal electricity. Collectively the partners have helped shaped the New Zealand geothermal sector, lifted the profile of Māori participation in the energy sector and helped to train and share geothermal knowledge across a wide range of communities, staff, contractors, academics and regulators.

Tauhara North No.2 Trusts activities are improving the health, wellbeing and wealth of our owners and their whānau. Manaaki, or caring for their owners and whānau is our heredity obligation. The Trust have invested in key areas such as Energy, Tourism, Land & Food Businesses. These ventures aim to create culturally authentic tourism experiences and sustainable farming operations, aligning economic growth with environmental stewardship and cultural preservation. These investments provide growth but also provide employment and training opportunities for Trust members and allow whānau support from a range of grants and initiatives.

For Mercury, the partnership has created the large-scale geothermal business unit that now supplies around 7% of New Zealand's electricity. This growth has enabled Mercury to develop a world class, in-house geothermal team and reinvest in the communities and regions where they operate. It strengthens Mercury's social license and supports long-term operations that continue delivering reliable geothermal baseload electricity for the country and a diverse range of customers.

11 CONCLUSION

The Tauhara North No.2 Trusts and Mercury partnership exemplifies how indigenous values and modern engineering can coalesce into a model of sustainable development. By embedding cultural principles within technical and financial frameworks, this collaboration has not only generated renewable energy but also offers a blueprint for indigenous participation in global energy transitions.

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