

## Mighty River Power's Geothermal Program

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### 1. INTRODUCTION

Mighty River Power has committed to an ambitious geothermal exploration and development program. Mighty River Power is aiming to build a NZ\$1 billion geothermal business that will make New Zealand a world leader in geothermal energy production. In partnership with Maori, Mighty River Power is now active in four geothermal fields: Kawerau, Rotokawa, Mokai, and Ngatamariki. This paper outlines Mighty River Power's geothermal development projects undertaken in conjunction with its Maori partners to help meet demand for renewable energy in New Zealand.

### 2. GEOTHERMAL DEVELOPMENT IN NEW ZEALAND

Thirty years ago, New Zealand had some of the best geothermal capability in the world. Two of the three major geothermal consulting firms were based here, research programs saw New Zealand leading the field in geothermal development methods and postgraduate programs deepened the global talent pool and put New Zealand at the leading technology edge. When geothermal development was put on hold in favour of cheaper gas in the early 1980's those skills were lost as geothermal experts switched careers, moved overseas, or returned. Mighty River Power is now leading the reversal of that brain drain, recruiting internationally and training recent university graduates to rebuild New Zealand's geothermal expertise.

In 2000, we had no geothermal capacity and no geothermal-specific capabilities in the company. In 2009 we employ 90 skilled technical staff and operate more than 270MW of geothermal power. We have recruited expert technical people with experience in over 30 developed geothermal fields across 10 countries and more than 100 geothermal exploration prospects worldwide. By 2010 we will operate more than 400MW of geothermal power and by 2012 we expect to have at least 120 people in our geothermal team, with additional capability through an international partnership.

### 3. MIGHTY RIVER POWER'S GEOTHERMAL PROGRAM

Mighty River Power has committed to developing, in co-operation with its partners, 500MW of geothermal resources by 2012. Our shared ownership model for geothermal is delivering results. In 2008 the geothermal plants we are involved in produced 1,159GWh, an increase of 9% on the previous year and a 58% increase since 2002.

All of Mighty River Power's geothermal power stations and development projects involve partnerships with Maori and other land owners. The Kaitiakitanga approach of our partners is integrated with the environmental guardianship

and sustainability objectives of our geothermal business model. Our track record as responsible managers of geothermal resources is, we believe, important to our credibility in these partnerships.

#### Rotokawa Geothermal Field

For many years we've had a 50:50 joint venture with the Tauhara North No. 2 Trust in the Rotokawa Geothermal Field. We have shown ourselves to be responsible managers, delivering positive outcomes for both parties. That's led to an agreement to build a second geothermal power station at Rotokawa – called Nga Awa Purua – and to commence exploration on the nearby Ngatamariki field. The Nga Awa Purua Joint Venture is a partnership between Tauhara North No.2 Trust and Mighty River Power.

The Nga Awa Purua power station will be built close to the existing Rotokawa geothermal power station and will generate an average 1,100GWh annually. The construction project began in April 2008. The consents for the project were awarded in December 2007 just six months after lodgement, illustrating the value of the partnership's approach and its record of responsible resource management. The NZ\$450 million development will provide 132MW (net) of generation capacity, bringing the total generation of the Rotokawa geothermal field to around 165MW. It will extract a daily average of 45,000 tonnes of geothermal fluid and will inject all fluids apart from those lost during the cooling process. On completion in 2010 it will be the second largest geothermal power station in New Zealand, satisfying nearly 3% of New Zealand's annual electricity needs. The Nga Awa Purua station will include the largest geothermal turbine in the world.

#### Kawerau Geothermal Field

A milestone in our program was the completion of our 106MW (net) geothermal power station at Kawerau. Originally due for commissioning in October 2008, the plant, which is capable of meeting around a third of residential and industrial demand in the Bay of Plenty region, successfully supplied power into the national transmission grid prior to the end of June 2008 (Spinks et al, this volume).

#### Mokai Geothermal Field

The Tuaropaki Trust and Mighty River Power are together exploring options for the further development of the Mokai geothermal resource. Mighty River has a 25% interest in the Tuaropaki Power Company (TPC) which owns the Mokai plant, and we operate the plant on TPC's behalf. An upgrade in 2008 increased station capacity from 95MW to 112MW.

#### Ngatamariki Geothermal Field

Exploration drilling is underway at the Ngatamariki field with success in the first three deep wells drilled to establish the extent of the geothermal reservoir. Consent applications

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will be lodged in 2009 for a station expected to have a capacity of at least 80MW.

#### **4. PARTNERSHIPS**

Development of partnerships in a shared ownership model, creating the scale to undertake exploration risk in Greenfield reservoirs, and proven construction capability, are all important to the achievement of our strategic goals in geothermal. By 2012 we, along with our partners, aim to be

producing enough geothermal energy to reliably supply approximately 8%, or around 3,500GWh of New Zealand's national electricity requirements each year.

#### **REFERENCES**

Spinks, K., Powell, T., Siega, C. & Bardsley, C. Mighty River Power's Resource and Development Strategy at Kawerau Geothermal Field, New Zealand (*this volume*)