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EXISTING AND POTENTIAL GEOTHERMAL RESOURCE FOR ELECTRICITY GENERATION

1 This note provides information on New Zealand's existing and potential geothermal resource for electricity generation. This information is intended to supplement the Ministry's project to identify waterbodies of national importance in relation to existing and potential hydro generation.

Existing geothermal electricity generation

2 The majority of New Zealand's geothermal generating capacity is situated in the Taupo Volcanic Zone in the upper North Island. In this region over 400 MW of plant has been installed. Another 9 MW has been installed at the top of the North Island with plans to expand this plant further. Geothermal generation accounts for approximately 7% of New Zealand's total electricity generation.

3 Figure 1 shows the location of high temperature geothermal fields in the North Island of New Zealand. Table 1 shows a summary of existing electricity generation by geothermal field.

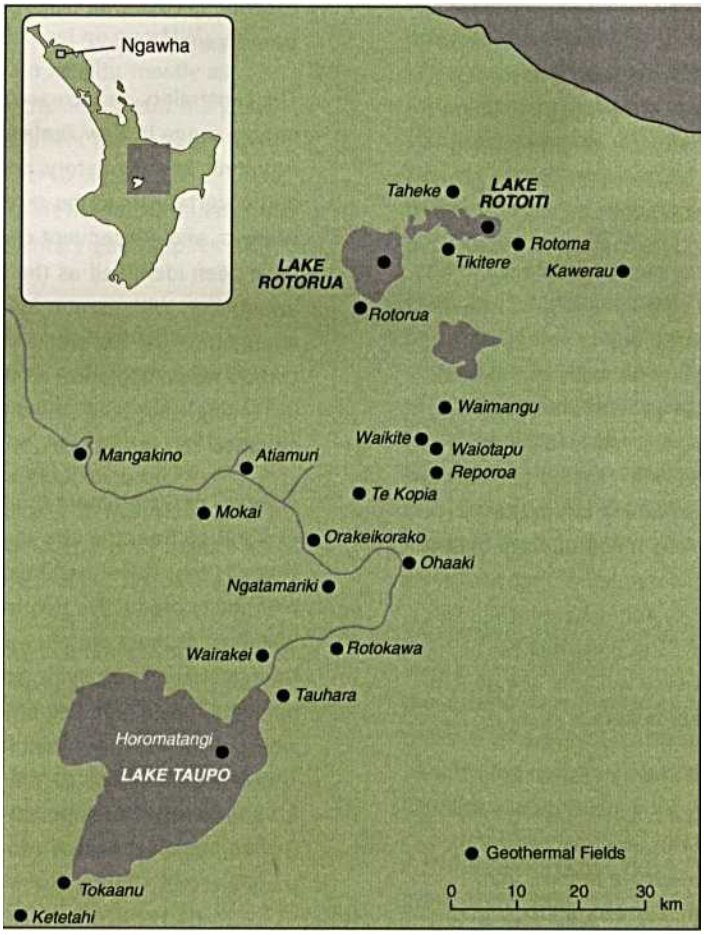

Figure 1: High Temperature Geothermal Fields in New Zealand.

Source: CAE: New Zealand's Energy Future, August 2003.

Table 1: Existing electricity generation by geothermal field

Rank	Geothermal field name	Total installed capacity (MW)	Annual electricity production[1] (GWh)	Number of power plants	% of GWh p.a.	Nationally important at a threshold of 230 GWh?
1	Wairakei	220	1,734	2	51.0%	Yes
2	Ohaaki	104	820	1	24.1%	Yes
3	Mokai	55	434	1	12.8%	Yes
4	Rotokawa	28	221	1	6.5%	No
5	Kawerau	15	118	2	3.5%	No
6	Ngawha	9	71	1	2.1%	No
TOTAL		**431**	**3,398**	**8**	**100%**	

4 At a threshold of 230 GWh per annum, the Wairakei, Ohaaki and Mokai geothermal fields are considered nationally important in terms of existing electricity generation.

[1] In calculating annual electricity production, a load factor of 90% has been used.

Potential geothermal energy generation

5 Geothermal energy could make a significant additional contribution to New Zealand's generating capacity. Delays and uncertainties in the resource consent process and subsequent compliance costs have been identified as the biggest obstacles to investment.

6 Table 2 shows a summary of potential electricity generation by geothermal field. The table is based on opportunities deemed to have a high to medium probability of progressing by 2025. It is derived from information collected by East Harbour Management Services in their 2002 report "Availabilities and costs of renewable sources of energy for generating electricity and heat."

Table 2: Potential electricity generation (with a high to medium probability of proceeding by 2025) by geothermal field

Rank	Geothermal field name	Potential additional capacity (MW)	Potential electricity production (GWh p.a.)	% of GWh p.a.	Nationally important at a threshold of 230 GWh?
1	Kawerau	357	2,810	26.8%	Yes
2	Rotokawa	303	2,390	22.8%	Yes
3	Wairakei	182	1,430	13.6%	Yes
4	Ngatamariki[1]	140	1,104	10.5%	Yes
5	Mokai	97	770	7.3%	Yes
6	Tauhara	70	550	5.2%	Yes
7	Mangakino[1]	65	512	4.9%	Yes
8	Ngawha	64	500	4.8%	Yes
9	Rotoma	35	280	2.7%	Yes
10	Tikitere-Taheke	10	80	0.7%	No
11	Horohoro	9	70	0.7%	No
TOTAL		**1,332**	**10,496**	**100%**	

7 At a threshold of 230 GWh per annum, the Kawerau, Rotokawa, Wairakei, Ngatamariki, Mokai, Tauhara, Mangakino, Ngawha and Rotoma geothermal fields are considered nationally important in terms of potential electricity generation. Note that the Wairakei field is considered nationally important in terms of both existing and potential electricity generation.

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[1] The East Harbour report gave ranges of electricity generation potential for the Ngatamariki and Mangakino geothermal fields. The lower thresholds of these ranges have been used in Table 2.