



清洁地热 绿色地球

CLEAN GEOTHERMAL
GREEN EARTH

2023年世界地热大会
World Geothermal Congress 2023 (WGC2023)

SEPTEMBER 2023 BEIJING CHINA

AOTEAROA NEW ZEALAND

2020 – 2023 Country Updates

Paper 685

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From where on the globe?



New Zealand

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ENVIRONMENTAL AND REGULATORY ASPECTS

STATUTORY OVERVIEW

REGIONAL COUNCILS

RESPONSIBLE FOR THE DAY-TO-DAY MANAGEMENT OF THE GEOTHERMAL RESOURCES IN NEW ZEALAND UNDER LEGISLATION (STATUTES) PASSED BY THE CENTRAL GOVERNMENT

RESOURCE MANAGEMENT ACT 1991

PRIMARY STATUTE TO SUSTAINABLY MANAGE AND ALLOCATE GEOTHERMAL RESOURCES

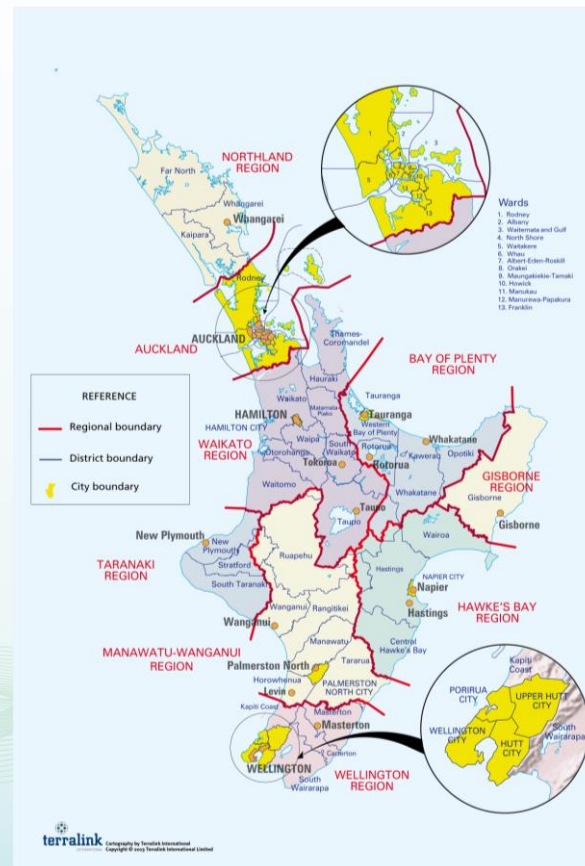
RESOURCE CONSENTS (PERMITS) – RESOURCE ALLOCATION

NATIONAL POLICY STATEMENTS – CENTRAL GOVERNMENT DIRECTION

REGIONAL POLICIES – POLICIES TO GIVE EFFECT TO THE NPS

GEOTHERMAL STAKEHOLDERS

RELEVANT GOVERNMENT MINISTRIES, LOCAL GOVERNMENT, IWI (MAAORI) AUTHORITIES AND LAND TRUSTS, CROWN RESEARCH INSTITUTES, TERTIARY INSTITUTES, NEW ZEALAND GEOTHERMAL ASSOCIATION, GEOTHERMAL NEW ZEALAND INC.



CLIMATE CHANGE LEGISLATION – NZ GOVT

01

DECLARATION OF A CLIMATE EMERGENCY

02

REFORMS TO EMISSIONS TRADING SCHEME

03

END TO OFF-SHORE FOSSIL FUEL
EXPLORATION

04

ESTABLISHMENT OF INDEPENDENT CLIMATE CHANGE
COMMISSION

05

ENACTMENT OF A CLIMATE CHANGE RESPONSE (ZERO
CARBON) LEGISLATION

06

RELEASE OF FIRST EMISSIONS REDUCTION PLAN

REPEAL AND REPLACEMENT OF RMA 1991

01

NATIONAL AND BUILT ENVIRONMENTS ACT (NBEA) – IN EFFECT

02

SPATIAL PLANNING ACT (SPA) – IN EFFECT

03

CLIMATE ADAPTATION ACT (CAA)

PURPOSE OF REFORM

- Aims to uphold *Te Oranga o te Taiao* (Health of the Environment)
- Aims to enable development and allow use of resources that help's people's well being, done in ways that protect the natural environment

OPPORTUNITIES FOR GEOTHERMAL

01

REINFORCE KEY ROLE IN NEW ZEALAND'S EFFORTS TO TRANSITION TO A NET ZERO CARBON EMISSIONS TARGET

02

SUPPORT GEOTHERMAL DEVELOPMENT THROUGH CENTRAL GOVERNMENT INCENTIVES

03

ENSURE GEOTHERMAL BENEFITS FROM THE CARBON ZERO ACT AND RMA REFORM

04

STRENGTHEN PARTNERSHIP WITH TANGATA WHENUA

ELECTRICITY GENERATION

SUMMARY UPDATES

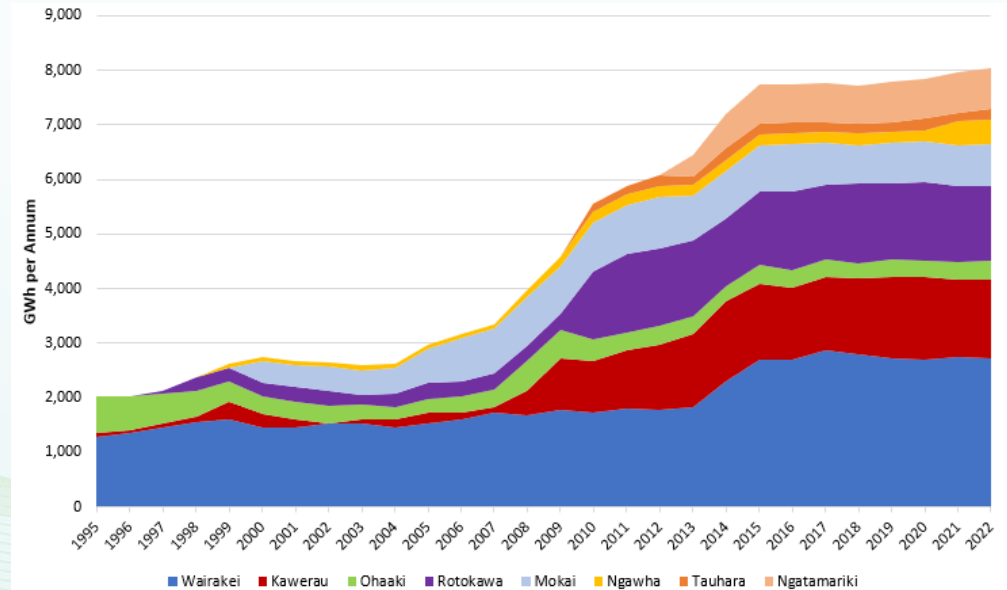
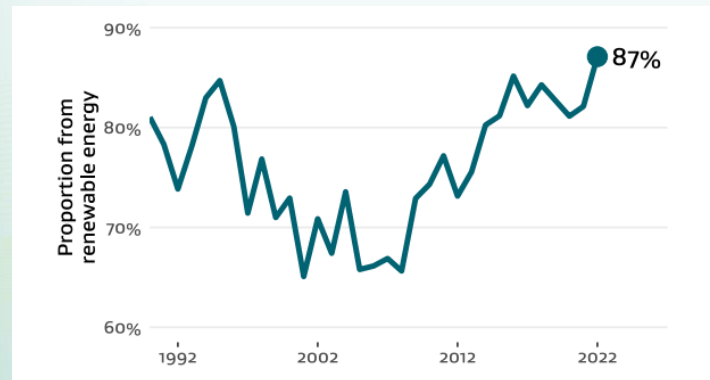
2022 – RECORD HIGH 8,033 GWh

GEOTHERMAL PLANTS OPERATING AT CAPACITY

SMALL CAPACITY ADDITIONS THROUGH OPTIMISATION

TAUHARA GEOTHERMAL PLANT – 174 MW (END OF 2023)

RENEWABLES IN ELECTRICITY GENERATION



GEOTHERMAL: 18% (SECOND ONLY TO HYDROELECTRIC)

NEW ZEALAND GEOTHERMAL OUTLOOK TO 2026 – NEXT WORLD GEOTHERMAL CONGRESS

IN CONSTRUCTION – 224 MWe(net)

TAUHARA 174 MW BY 2023

TE HUKA 50 MW BY 2024

IN DEVELOPMENT – 162 MWe(net)

NGA TAMARIKI OEC5 37 MW BY 2026

NGAWHA OEC5 37 MW BY 2026

WAIRAKEI REPOWER 45 MW BY 2026

TOPP2 50 MW BY 2026

+ 386 MWe(net) INSTALLED CAPACITY
+ 3,111 GWh BASELOAD RENEWABLE TO THE GRID

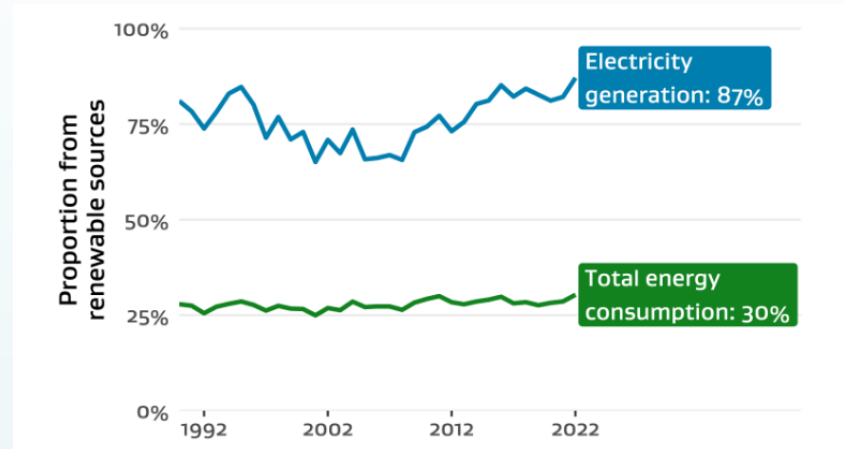
DIRECT HEAT UTILISATION

SUMMARY UPDATES

2022 – GEOTHERMAL DIRECT USE AT 7.3 PJ

- + GEO40 OPENS FIRST COMMERCIAL SILICA RECOVERY PLANT (GREEN MINING)
- + ESSITY (TISSUE) INVESTS IN GEOTHERMAL STEAM DRYING (PULP AND PAPER)
- + TĪAROPAKI/OBAYASHI JV (HALCYON POWER) STARTED GREEN HYDROGEN PRODUCTION (GREEN HYDROGEN)
- + HE AHI, THE TAUHARA CLEAN ENERGY PARK (INDUSTRIAL PARK)
- + ROHE HOTHOUSE RESOURCE CONSENT – 18 HA GEOTHERMALLY HEATED GREEN HOUSES (HORTICULTURE)
- CLOSURE OF NORSKE SKOG TASMAN IN 2021 (NEWSPRINT)

RENEWABLES IN NZ ENERGY CONSUMPTION



CARBON EMISSIONS

SUMMARY UPDATES

2022 – GEOTHERMAL AT 63 gCO₂e/kWh

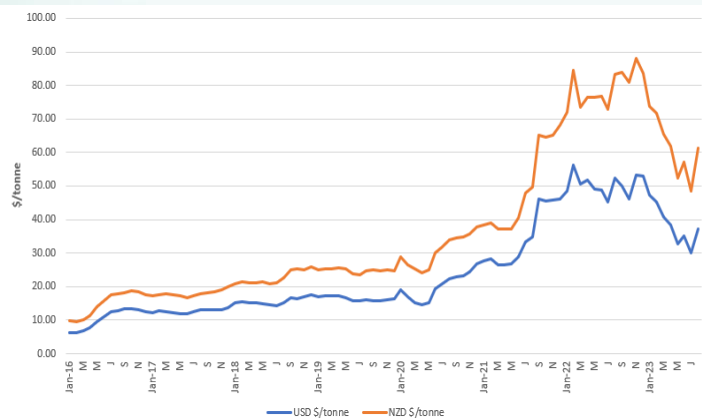
EMISSIONS DATA PER NEW ZEALAND REGULATIONS

(OPERATIONAL EMISSIONS ONLY – NOT LIFE CYCLE EMISSIONS)

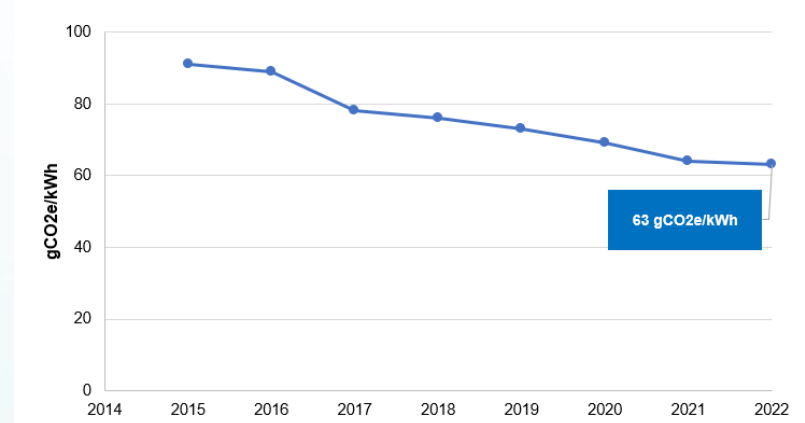
+ TRENDING DOWNWARDS, 69 IN 2020

+ DECLINING BY 6% (EXP.) PER YEAR

NEW ZEALAND CARBON PRICES – 2X TO 3X FROM 2020



GEOTHERMAL CARBON INTENSITY IN NEW ZEALAND



REDUCING GEOTHERMAL CARBON EMISSIONS

- + APPLICATION OF CO₂ REINJECTION TECHNOLOGY
- + ALL NEW ZEALAND GEOTHERMAL COMPANIES HAVE ACTIVE TRIALS OR PLANS FOR CO₂ REINJECTION
- + EXAMPLES: MERCURY AT NGA TAMARIKI, CONTACT AT TE HUKA, NGAWHA GENERATION AT NGAWHA OEC1, ETC.

DRILLING AND COMPLETIONS ACTIVITY

SUMMARY UPDATES

2022 – AVERAGING 6 DEEP WELLS PER YEAR

DRILLING AT TAUHARA, TAHEKE AND KAWERAU SINCE 2020

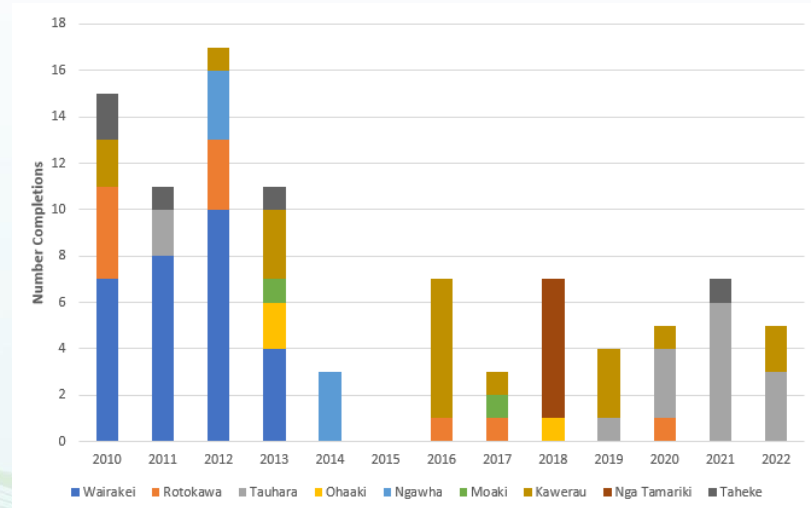
TRENDS INDICATE STEADY ACTIVITY SINCE 2016

HIGHEST DRILLING IN KAWERAU (11), FOLLOWED BY TAUHARA (10)
AND NGAWHA (6)

OUTLOOK TO 2026

DRILLING ACTIVITY TO SUPPORT 162 MW IN DEVELOPMENT

NEW ZEALAND DEEP DRILLING BY FIELD



PERSONNEL, EDUCATION AND TRAINING

SUMMARY UPDATES

2022 – NZ PROGRAMME ACTIVE DURING COVID PANDEMIC

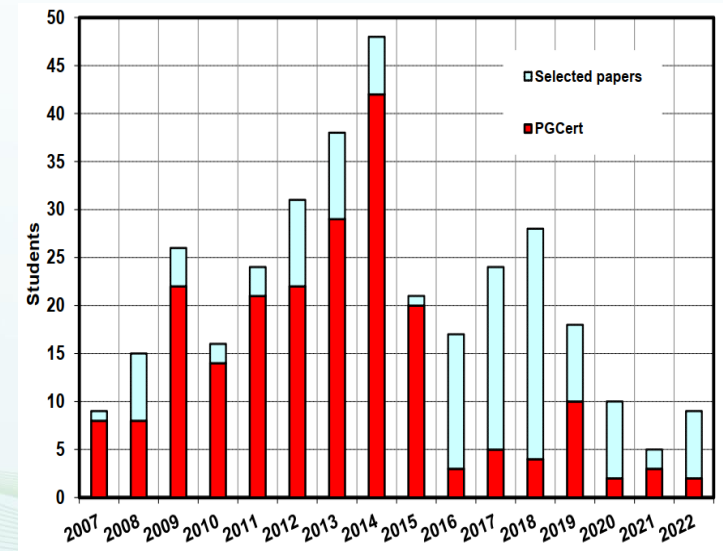
NUMBERS AFFECTED BY THE PANDEMIC

REMOTE LEARNING WAS CHALLENGING FOR FIELD-BASED PROGRAMS

2022 NUMBERS TRENDING UPWARDS – LIFTING OF RESTRICTIONS

2023 PLANNED TO RETURN TO PRE-PANDEMIC LEVELS

PGCERT (GEOTHERMAL) ENROLMENT NUMBERS



SERVICES SECTOR ACTIVITIES & INVESTMENT

SUMMARY UPDATES AS OF 2022

MINISTRY OF FOREIGN AFFAIRS AND TRADE (MFAT)

GLOBAL INITIATIVES ONGOING THROUGHOUT THE PANDEMIC

+ GLOBAL ENERGY PROGRAM DELIVERED ONLINE AND REMOTELY

+ TECHNICAL SUPPORT AND CAPACITY BUILDING

EAST AFRICA

+ DJIBOUTI, TANZANIA AND ETHIOPIA

CARIBBEAN

+ OECS, GOVERNMENT OF GRENADA, ST LUCIA

INDONESIA

+ GEO-INZ (EBTKE, BADAN GEOLOGI, PT SMI), NZ STIGS, INDUSTRY

WORKSHOPS WITH ORMAT



SUMMARY UPDATES AS OF 2022

JACOBS

SUBSURFACE PROJECT MANAGEMENT CONSULTANT FOR THE
DIENG AND PATUHA EXPANSION PROJECT IN INDONESIA
LEAD THE EAST AFRICA DRILLING SUPPORT FOR NZ MFAT

MB CENTURY

HI-TECH MAAORI KAMUPENE O TE TAU/MAAORI COMPANY OF
THE YEAR (HTCC-MF)

SEEQUENT

LEAPFROG SOFTWARE DEVELOPER ACQUIRED BY US-BASED
BENTLEY SYSTEMS IN 2021 – STILL BASED IN CHRISTCHURCH,
NEW ZEALAND

MTL

WORKING WITH FICHTNER AS OWNER ENGINEER (OE)
FOR OLKARIA 1 UNIT 6 IN KENYA, STEAMFIELD
ENGINEERING IN NEW ZEALAND PROJECTS

AECOM

LENDER'S ENGINEER BY ADB FOR THE DIENG AND
PATUHA EXPANSION PROJECTS BY GEODIPA
OE ON A PROJECT IN PALINPINON FOR EDC
CONSULTING ENGINEER FOR STAR ENERGY FOR
VARIOUS PROJECTS

KIA ORA!

