

ENERGY EDUCATION

Mauri mahi, mauri ora

ENERGY NEWS FROM THE REGION, COUNTRY AND WORLD | JULY / AUGUST 2022



Automotive Engineering & Energy



It comes from her own life story of starting as an apprentice in the industry and obtaining her qualifications through the then Taranaki Polytechnic which had facilities at both Bell St and Liardet St.

WITT's 50 year celebrations will look back to its commencement (as the Taranaki Polytechnic) in 1972 when bell-bottomed pants were setting the fashion trends and Don Mclean's 'American Pie' was topping the music charts. Back then young women would turn up to Taranaki Polytechnic, fill in their application form and enrol in a 'A Senior Business course for girls training to be shorthanded typists and office secretaries.'

That is not what Kerrie did! She enrolled in automotive engineering in the early 80s and soon after, started her apprenticeship at Fitzroy Automotive. She recalls asking the owner Don, to talk to her that when he looked at selling Fitzroy Automotive. In 2004 she purchased the company off her first boss.

Kerrie Thomson-Booth, WITT Lead in both Automotive and Engineering (Trade), carries an unrelenting passion for Taranaki rangitahi to enter and succeed in the automotive industry.

... continued on next page

ENERGY EDUCATION

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energy@witt.ac.nz

Ph. 06 759 7065

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WITT's Solar Energy Course (6-8 September 2022)

- Grid-connected PV Systems: Design & Install (Microcredential Course 6-8 September / NPL).
- Grid-connected Battery Storage Systems: Design & Install (Microcredential course - date to be confirmed).
- Stand-alone Power Systems: Design & Install (Microcredential course - date to be confirmed).

New solar energy training courses to help equip New Zealand for the transition into clean energy are now being offered at WITT. Targeted at qualified electricians throughout New Zealand, these 10-credit NZQA approved micro-credentials solar energy courses will be delivered in blocks (three to four days face-to-face) in New Plymouth with the remaining learning taking place either side of the block learning. Participants will learn from an industry expert with more than 30 years of experience as an electrician including 15 years in the installation, design and training of solar systems throughout Australia.

Send all enquiries to info@witt.ac.nz or phone 0800 948 869. We will register your details and be in touch with confirmed start dates and further details for the remaining courses.

Enquire here now





Kerrie as a young apprentice, working alongside her first boss, Donald, on a Peugeot 404.

Between completing her apprenticeship and purchasing the company, Kerrie lived in Australia for fourteen years where she worked as an automotive engineer for the prestigious Rolls-Royce and Bentley company.

Kerrie says the hyphen in the Rolls-Royce name is very important. Claude Johnson was a British motor vehicle manufacturer who was instrumental in the creation of Rolls-Royce Limited. Johnson described himself as the hyphen in the Rolls-Royce name. When Royce fell ill and took his design staff home in 1908, and after the death of Rolls in July 1910, it was Johnson who was responsible for keeping the business running, until his own death in April 1926.

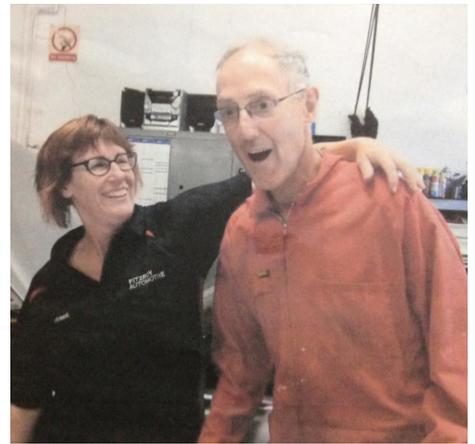
Kerrie has now turned full circle and brings her skill and passion to WITT in her role as Lead for Automotive and Engineering (Trade). In 2021 Kerrie introduced a new element to her role

and also became the deputy director for school of trades training primary and creative industries.

Part of her role is to support the EVelocity programme with WITT as a regional partner alongside Ara Ake.

Working with young people and helping them succeed is a huge motivator for Kerrie. She speaks with pride about one of her students Jarrod, who in July 2021, completed his apprenticeship to gain his New Zealand Certificate in Automotive Engineering after going through WITT's pre-trade programme. Now working at Fitzroy Automotive, Kerrie is thrilled to give Jarrod his start in the automotive industry, just as her old boss Donald gave her.

Success is about having a can-do attitude, supported by earning a WITT qualification, to give you your best start in your working life.



Donald who gave Kerrie her first start in an automotive engineering career.



Jarrod gained a NZ Certificate in Automotive Engineering after studying at WITT.



Kerrie with the puppy at Fitzroy Automotive called Pip, the companies mascot.



Even engineers can have a sense of humour.

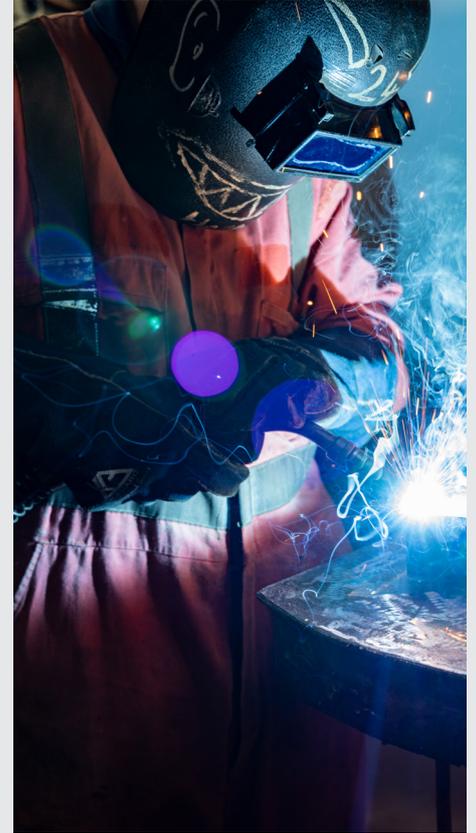
EVelocity, growing young engineers in 2022

The EVelocity programme has 70 students enrolled and it is a natural fit for Kerrie Thomson-Booth with her love for cars, student success and an eye for future innovation.

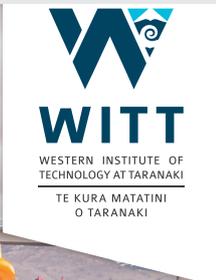
The EVelocity programme helps generate students' interest in the field of alternative and sustainable energy.

EVelocity was brought to the region in 2021, as a result of the programme's regional partnership with WITT and Ara Ake, with over 60 high school students from schools around Taranaki involved in the first year.

The EVelocity programme provides students with the opportunity to design and build an electric vehicle (EV) with the support of specialist mentors from WITT, to bring their creations alive and compete against their peers in the finals at the end of the year. It champions sustainability whilst inspiring young leaders to embrace careers in science, technology, engineering and mathematics.



EVelocity kart building at WITT's engineering department



Thought about a career where you can design, build and manufacture **the future?**



[Click here for further information](#)

WITT staff teach them how to use CAD design software, strength and rigidity considerations, steering, welding, drag and resistance, and Arduino programming.

WITT and Ara Ake are back on board as EVelocity partners in 2022, alongside the Motor Trade Association, and New Zealand-based EV charging producer, Evnex.

As the education partner, WITT are providing access to the support and resources that the students require for building their EVs, including classrooms for the build days, technology for the design sessions, and hands on guidance from the staff.

This year's programme has been adjusted, and the teams will be working towards a final scrutineering in September where students will ensure they are safe and ready to race.

The Taranaki regional finals are due to be held on Sunday, 16 October, and the National Finals are scheduled for Sunday, 4 December in Kartsport Hamilton.



"Stiletto" (centre) was a popular entrant from New Plymouth Girls High School and won the "Best in Show" award in 2021.



Energy Innovation Fund Navigator

Ara Ake
Future Energy Development

Click [here](#) to access Ara Ake's Energy Innovation Fund Navigator

www.araake.co.nz

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
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ENERGY IN NEW ZEALAND

21



2020 CALENDAR YEAR

Comprehensive information on and analysis of New Zealand's energy supply, demand and prices

"At WITT, students will be given an insight into a range of pathway and career options. Our tutors have created pathways and will discuss possibilities within engineering diplomas and degrees, fabrication courses, electronics and software programming that could be the next step after the EVelocity programme. The practical 'real world' focus of the programme could lead students to actively pursue this in their future and with opportunities growing both locally and internationally. Now is the perfect chance. This could open doors for rangatahi anywhere in the world. Students currently have so many options and the future is bright!"

Ben Naughton - WITT Director, Teaching Partnerships



WITT is part of Te Pūkenga - New Zealand Institute of Skills and Technology, together with all the other polytechnics in New Zealand. From 2023, all WITT learners will be enrolled with Te Pūkenga.

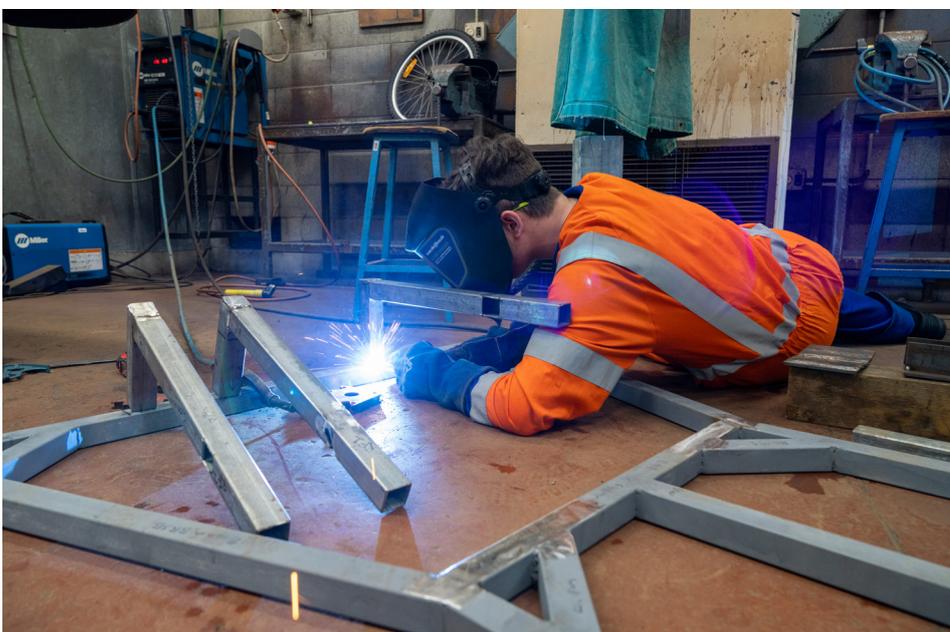
APPLY NOW

From degrees, diplomas and certificates to a wide range of part-time options, there's a programme to suit everyone, no matter what stage of your career journey you're at.

We can help you find the programme that is right for you, find jobs while you're studying and help you to be ready when your studies are done. WITT's Careers Advisor can help find the right study option or pathway for you, or chat through options if you're considering a new career.

Contact Nikki:

0800 WITT NZ (0800 948 869)
Phone - (06) 757 3100



A joint programme between WITT & Victoria University unlocks an exciting future

Te Kura Matatini o Taranaki, Western Institute of Technology at Taranaki (WITT) is very excited to be partnering with the Te Herenga Waka, Victoria University Wellington (VUW) to create opportunities for our rangatahi to stay in Taranaki and study then pathway to an exciting degree programme at Victoria University.

Study the first year of your engineering degree at WITT then pathway to Victoria University.

- **Joint BEng (Hons) Programme** (see right)
- **Joint BSc Programme** (see right)



Scholarships

WITT has scholarships available to study fulltime engineering in New Plymouth, either at diploma or degree level and welcomes enquiries regarding these.

If a student has a preference to focus on computer software and engineering and associated fields then WITT can now help you on that journey and better prepare you for life at university.

These scholarships are proudly sponsored by Ara Ake and GNS.



Joint BEng (Hons) Programme

First year WITT, years 2-4 Victoria

- Software Engineering
- Cyber Security Engineering
- Electrical and Electronic Engineering

Joint BSc Programme

First year WITT, years 2-3 Victoria

- Computer Science
- Computer Graphics
- Games or Artificial Intelligence



What is Geothermal Energy?

What is geothermal energy?

Geothermal energy is extracted from heat contained in the Earth's core. Areas of geothermal energy are usually close to the boundaries of tectonic continental plates. New Zealand has a number of geothermal areas as it sits over 2 active plates - the Indo-Australian and Pacific Plates

Geothermal energy has many benefits such as being relatively cost effective, reliable, sustainable, and relatively environmentally friendly.

History of geothermal energy use in New Zealand

Most geothermal use in New Zealand has occurred in the Taupo and Kawerau regions, within the Taupo Volcanic Zone. Some lower temperature geothermal has a wider geographical spread.

The first use of geothermal energy in New Zealand was by central North Island Māori for heating, cooking and therapeutic purposes. European settlers arriving in New Zealand discovered the charm and healing benefits of thermal springs, and a number of spa baths were set up in the Rotorua area from about 1870.

Geothermal waters were used for many years in Rotorua to heat homes, businesses and institutions. Since 1991, geothermal extraction has been managed to protect surface geothermal activity. Recent trends have been towards communal systems, with 10 or more households typically sharing a well.

In 1958 the second geothermal plant in the world was opened in Wairakei, New Zealand.

Several new plants and efficiency-enhancing second-stage equipment have since been added. Contact Energy's plant at Te Mihi went online in 2014, Top Energy is in the process of expanding the current 53 MW capacity of the Ngawha power station in Northland by 28 MW. A significant factor in recent geothermal projects has been the high level of commercial participation by Māori-owned enterprises.

Geothermal energy for electricity generation

The main use of geothermal energy in New Zealand is for electricity generation. In 2017, electricity generation from geothermal accounted for over 17% of New Zealand's total electricity supply.

Geothermal is currently one of New Zealand's cheapest sources of new electricity generation.

As of July 2018, there was about another 350MW of consented geothermal generation, much currently under construction. The temperature and conditions of particular geothermal reservoirs determine which type of generation technology is used: dry steam, flash steam, binary cycle, or a combination.

Most of New Zealand's installed geothermal generation (about 1005 MW) is situated in the Taupo Volcanic Zone, with a small amount in Ngawha in Northland.

Geothermal energy for direct use

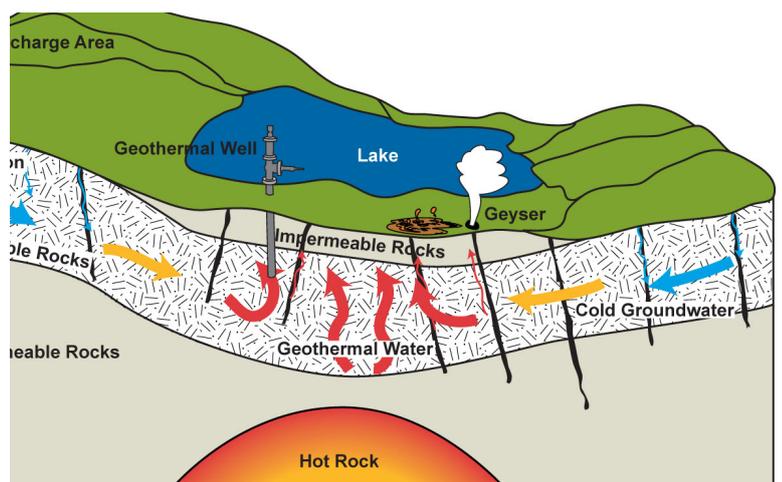
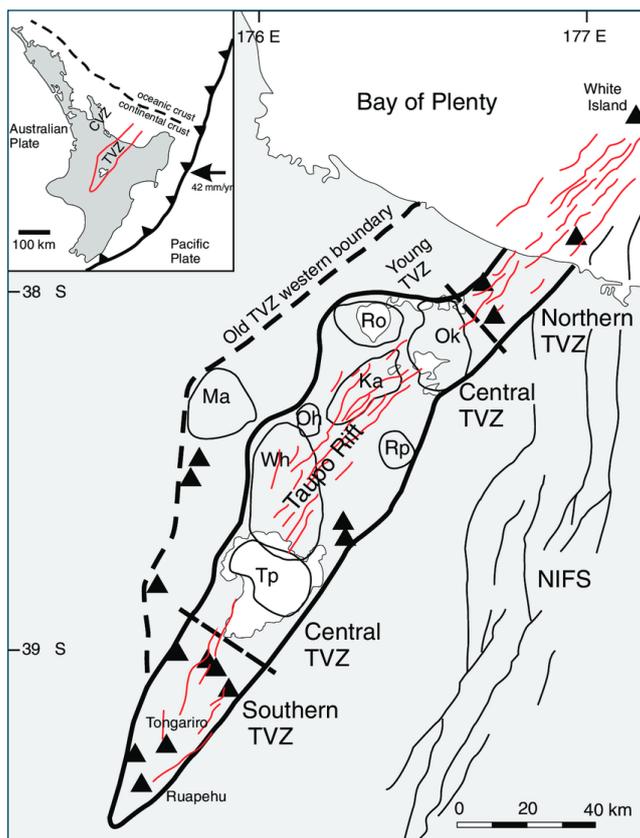
There is a wide range of direct uses of geothermal energy in New Zealand, which involves using geothermal heat directly, without a heat pump or power plant.

Currently there is about 8 PJ per year in direct geothermal heat use applications. Approximately 65% of this is used in industrial applications, 25% in commercial, and the remainder in residential and agricultural applications.

Kawerau, where geothermal steam is a significant source of energy for pulp and paper mills, was until recently, the world's largest direct geothermal heat use at a single location.

Other existing applications include:

- **Timber drying** – Tenon's wood processing plant near Taupō uses geothermal energy to heat its timber-drying kilns.
- **Aquaculture/tourism** – The Huka Prawn Park, near Taupō, is the only geothermally-heated prawn farm in the world. Heated



SUSTAINABLE GEOTHERMAL

discharge water from the Wairakei geothermal power station helps heat the ponds.

- **Horticulture** – The use of geothermal energy to heat the glasshouses of Rotorua-based PlentyFlora and Taupō-based Gourmet Mokai has reduced production costs for flowers (PlentyFlora) and tomatoes/capsicums (Gourmet Mokai).
- **Milk drying** – The Māori-owned dairy company Miraka, based near Taupō, is the first milk drying facility in the world to use geothermal energy.
- **Space heating** – Rotorua Hospital uses geothermal energy – via a heat exchanger – for space heating and hot water heating. The system, commissioned in 1977, has proven to be a very reliable source of energy. Geothermal energy for electricity generation.



Miraka dairy factory - powered by geothermal

Miraka is a dairy processing company based in Taupō, New Zealand.

The Miraka dairy factory is located in Mokai, 20 minutes north of Taupō.

Miraka has one of the lowest carbon footprints in the world as it is powered by renewable 'green' geothermal energy from Tuaropaki Trust's geothermal plant which enables them to achieve 92% less carbon emissions in comparison to coal powered plants.

Established in 2010, Miraka began production in August 2011. They process 300 million litres of milk annually and export their whole milk powder, UHT and frozen milk concentrate products to 17 countries around the world.



Geothermal generators see a strong and clean future

The New Zealand Geothermal Association (NZGA) Emissions Working Group was established in 2021 to facilitate cooperation, information sharing and collaboration between NZGA members to monitor, measure, manage, reduce and ultimately eliminate non-condensable gas emissions (CO₂, CH₄ and H₂S).

The Emissions Working Group provides a strong, collective industry voice and representation for the management and reduction of emissions from geothermal field operators and developers. It promotes geothermal energy use as a key renewable energy source which plays its part in meeting New Zealand's goal of net zero carbon emissions by 2050.

Geothermal is an abundant energy resource in Aotearoa that the world looks to with envy. We have the second highest installed geothermal energy profile per capita in the world (second only to Iceland) and are part of the elite group of countries who have more than 1000 MWe of installed geothermal electrical capacity.

Aotearoa currently has more than 12 TWh by 2030 of additional geothermal electricity generation ready to be tapped, with low-carbon emission profiles. The current construction of Tauhara power station near Taupō will bring some 150 MWe online. Expansion near Rotorua is being explored at Taheke with proposals for 25MWe+, expansion at Ngawha 25 MWe+ and growth at Kawerau are the shovel-ready geothermal areas ready to contribute to our renewable energy supply.

High-quality geothermal resources exist in Aotearoa - simply requiring the application of pilot studies, innovation, and desire to realise; the climate change emergency demands that we explore all options on the table and geothermal for all Aotearoa is one avenue to do this.

Baseload geothermal energy partners with and enables other renewable energy sources, such as solar, wind, hydrogen, and biomass. Maximising geothermal development (with its high availability of 90%-99%).

New Zealand geothermal expands to Japan

GNS Science and Geo40 will establish an office in Tokyo to target business opportunities in geothermal energy and technology.

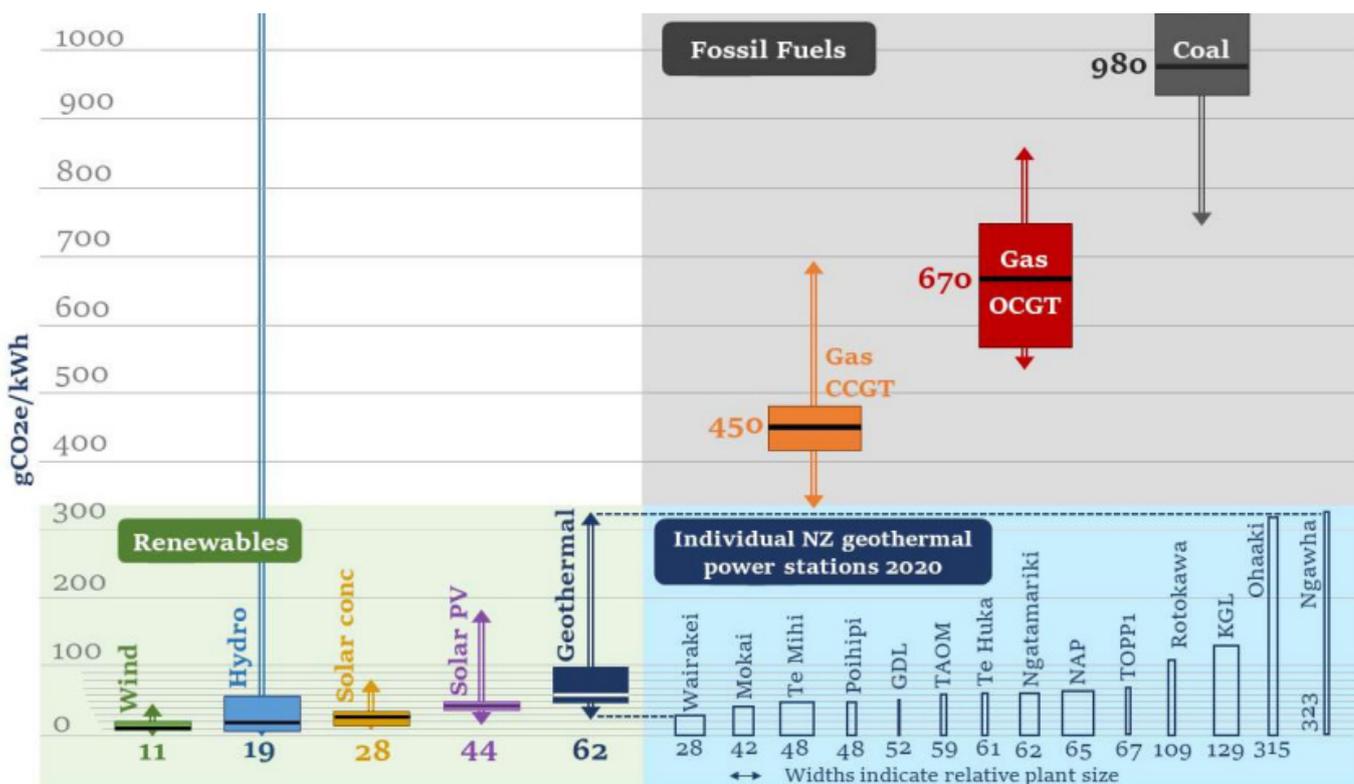
Their new geothermal coalition will employ a Japan-based country manager to seek partnerships with larger geothermal operators, owners, investors, researchers and consultants.

Under a co-investment model, New Zealand Trade and Enterprise's international growth fund will provide half the funds. GNS and Geo40 will make up the rest.

Geo40 is a private company that has developed the world's first commercial-scale plant to recover high-value silica from geothermal fluids. Geo40 opened its \$20 million Ohaaki Northern Plant northeast of Taupō early last year, in collaboration with Ngati Tahu Tribal Lands Trust and field operator Contact Energy.

The Tuaropaki Trust (Mokai Geothermal) already has a working relationship with one of Japan's leading infrastructure companies called Obayashi.

Grams of CO₂e emitted per kWh of electricity



"Geothermal Week" another great success in the hot volcanic zone of Aotearoa

Some geothermal facts and figures

Geothermal generators collectively produce 1000MW of electricity, enough to power nearly half of all New Zealand homes. Geothermal energy is the only renewable source of electricity currently available in New Zealand that is able to consistently deliver electricity 24/7 year-round, being independent of rainfall, sunshine or wind. This is the fifth largest installed geothermal generation capacity in the world, behind the United States, Indonesia, the Philippines and Turkey. And the industry continues to grow, with a further 168MW currently being installed by Contact Energy at Tauhara, a \$818 million investment due to be commissioned in 2023.

Taupo Volcanic Zone

Over 95% of NZ's geothermal industry is located in the Taupo Volcanic

Zone, which extends from the Central Plateau through to Bay of Plenty and White Island / Whakaari. There are nine developed geothermal reservoirs in the Taupo Volcanic Zone, and a further one in Ngawha, Northland.

Geoheat

Besides electricity, geothermal energy is used to supply 8 PJ of "geoheat" for industrial processes and primary production systems, displacing fossil fuels such as coal or natural gas. The industry aims to nearly double this usage by 2030, providing a renewable, cost-effective, low-carbon heat source for others. Geothermal resources are also providing a sustainable source of valuable minerals, such as silicon and lithium.

Te Ao Māori

Māori play a key part in realising this potential, as guardians, investors, operators and employees in the industry, and several iwi trusts own

and operate significant geothermal assets, reflecting Mauri values as they develop, operate and sustain this taonga.

Quadruple Bottom lines

In the inaugural event in 2021, the scale and breadth of the industry was showcased with a "Beyond Generation" theme. Over 2,700 people attended 16 events run over 6 days. This year, we have even more events in the line-up, and will be highlighting how the industry is delivering to quadruple bottom line goals, delivering not only economic, but also environmental, social and cultural benefits to our local communities and beyond.

Source: "Amplify". The economic development agency for the Taupo District, lead sponsors of Geothermal Week.



Building collaboration for student success

What does Victoria University, Canterbury University, Ara Ake and the Government's Crown Research Institute GNS, have in common?

They all have memorandums of understanding with WITT.

WITT understands that energy and engineering are inextricably linked and to be the best, you need to be connected to the best. With this in mind, WITT has established strong links and working relationships with some of the best institutions in the country when it comes to energy.

Victoria University and Canterbury University are two institutions which WITT has agreed to work with in a mutually supportive way. Students can begin a degree at WITT and then complete it at either Victoria or Canterbury. Both universities have agreed to help create development pathways which will enable WITT students to receive the best of both worlds; being in the energy province where learning is very much a part of the energy industry; and also receiving learning from the centres of proven excellence in academic achievement in renewable energy, engineering and business in the country. It creates an amazing opportunity for Taranaki students.

Added to this academic collaboration is the support of both GNS and Ara Ake.

The Institute of Geological and Nuclear Sciences (GNS - a Crown Research Institute), and Ara Ake (National new energy development centre) offer scholarships to WITT students.

GNS focuses on capability development to train engineers, scientists, and technicians to provide the workforce for a future green hydrogen industry in New Zealand.

Ara Ake will provide scholarships for Bachelor of Engineering Technology students who take energy related courses and who are well connected to their community and will use their learnings to make a difference.

Both GNS's and Ara Ake's scholarship offerings cover two students each for two years.

Ara Ake and WITT have also agreed to commit to developing an internship / mentoring programme based at Ara Ake's premises at 8 Young Street, New Plymouth. The collaborative space at Ara Ake's headquarters is available for WITT staff and joint appointments between WITT and the universities, for teaching their energy sector micro-credentials.



Growing an Energy Centre of Vocational Excellence

Taranaki is experiencing the emergence of alternative energy industries and usages that have the potential to create a range of new career pathways that WITT is preparing to support.

WITT is positively connected to many industries which will lead the transition, enabling WITT's teaching to maintain a level of relevancy and responsiveness to those industry needs, which many other academic and vocational institutions will struggle to have.

Some of the areas that are anticipated to emerge include electric vehicles; hydrogen fuel technology; renewable generation technologies (hydro, wind, solar, geothermal, wave, tidal etc.).

WITT is supporting the energy industry by developing a Centre of Excellence in Energy and Engineering, to provide work-ready graduates who are skilled in the latest technologies.

Strategic Collaborations

Collaborations between Victoria University, Canterbury University and Ara Ake, the national new energy development centre, creates strong relationships to ensure WITT is connected to other leading organizations in the energy field.

A Centre of Excellence must:

- Support the growth of excellent vocational education with a focus on teaching, learning and research.
- Support the development and sharing of high-quality curriculum and programme design.
- Be a consortium with expert representation from industry, the wider sector, and a range of other areas, for example iwi and vocational education representatives.
- Have a national focus.
- Be hosted by a regional campus of Te Pūkenga.
- Address issues and opportunities with a significant strategic impact, ideally with wide-reaching benefits across the sector
- Solve real problems and grasp viable opportunities.



Study engineering and connect your career to energy, structures, manufacturing, buildings, machinery, roads, products and more.

Study options include:

Bachelor of Engineering Technology (Mechanical/Civil, Level 7)

The Bachelor of Engineering Technology (BEngTech) is a three-year engineering degree, where students develop the capability to analyse and implement solutions to real-life, practical situations. It teaches students to understand and apply engineering science knowledge and provides a pathway into engineering, construction and related manufacturing industries. Students choose to major in civil or mechanical engineering. Graduates meet an industry demand for people who can actively apply engineering knowledge and integrate that knowledge into high level practical situations.

Job prospects for civil engineers

www.careers.govt.nz/jobs-database

Earn \$60K-\$70K a year

Engineering technicians/draughtspeople with one to four years' experience usually earn \$50K-\$70K per year. Senior civil engineers usually earn \$120K-\$180K per year.

Good job opportunities

Chances of getting a job as a civil engineer are good due to a shortage of workers.

Enrolment info@witt.ac.nz
Fees \$7,120 (Full time domestic)
\$885 (per paper domestic)

NZ Certificate in Infrastructure Works (Level 2 and 3)

The purpose of this qualification is to provide the infrastructure industry with people who have relevant knowledge and skills that can be applied to a range of infrastructure works processes. It is the cornerstone qualification for those graduates wanting to move into an infrastructure career pathway. Graduates of this qualification are able to carry out infrastructure works operations safely and to a quality standard in a variety of infrastructure work contexts. This programme can be studied part-time while you work and full time.

Enrolment info@witt.ac.nz
Fees Fees free (TTAF Funded)

Graduate Diploma in Engineering (Highways, Level 7)

This programme is designed to give those that have engineering qualifications a chance to gain technical knowledge in highway engineering and general knowledge of applied management. The goal is to provide the technical and management skills to function at middle management level.

Enrolment info@witt.ac.nz
Fees \$6,784 (Fulltime domestic)
\$843 (per paper domestic)

NZ Diploma in Engineering (Mechanical/Civil, Level 6)

This internationally recognised diploma gives students the knowledge and skills required of an engineering technician. You'll learn to apply theoretical and technical knowledge to practical situations and demonstrate the necessary strategies to work safely and effectively with contractors, communities, clients and authorities. Pathways include progressing to Bachelor of Engineering Technology.

Job prospects for engineering technicians

www.careers.govt.nz/jobs-database

Earn \$50K-\$70K a year

Engineering technicians/draughtspeople with one to four years' experience usually earn \$50K-\$70K per year.

Good job opportunities

Chances of getting a job as an engineering technician/draughtsperson are good due to a shortage of workers.

Enrolment info@witt.ac.nz
Fees TTAF Funded until 31 Dec 2022

Introduction to Engineering Maths (Level 3)

Build your mathematic skills and knowledge in an engineering context. This training scheme provides a pathway for students to meet the entry criteria for the NZ Diploma in Engineering.

Enrolment info@witt.ac.nz
Fees Fees free

WITT's extensive range of qualifications includes more than 60 options with study pathways that include postgraduate study and bachelor's degrees through to diplomas, certificates and micro-credentials that can be completed part-time or full-time.

Click [here](#) for further information