



## **Contact Energy Completes a Geothermal Generation Station that Provides 3.5% of New Zealand's Electricity**

*3D Subsurface Modeling and Visualization Efficiently Utilizes Complex Geothermal Reservoirs with a Lesser a Footprint*

### **Expanding Renewable Energy Generation**

Contact Energy, one of New Zealand's largest energy generators, is working to help the country eliminate its carbon emissions. During Contact Energy's last fiscal year, they generated 8.3 terawatt hours of low-carbon electricity. As part of their commitment to expanding their portfolio of renewable energy sources, they recently completed the 174-megawatt Tauhara Geothermal power station, their sixth in the Central North Island area. The NZD 818 million project uses geothermal production and injection wells to connect the reservoirs, which are complex mixes of high-temperature steam, liquids, and harsh volcanic rocks, with the station itself.

### **Targeting and Drilling Deep**

During the station's development, the design team estimated that the expense of drilling the wells represents a substantial portion of the overall project cost. Due to the area's geology and the location of the reservoirs, the wells range in depth from 1.7 kilometers to 3 kilometers. Effectively targeting the reservoirs required significant technical expertise and thinking in a 3D space. Traditional 2D design methods could not effectively determine how to place the wells, keep costs under control, and meet the power generation target.

### **Visualizing for Optimal Design**

Contact Energy realized that 3D subsurface modeling and visualization could help them determine the best way to position the wells. By fully visualizing the geological data and gaining a full understanding of the location of the geothermal reservoirs, teams could review multiple well plans simultaneously to determine the optimal design. Reviewing the flow within the reservoir helped them avoid problems with setting the concrete cases. With near real-time data updates, the teams stayed aware of the area's geological status even as they drilled the wells.

### **Same Power, Smaller Footprint**

With careful, informed digital design, the project team at Contact Energy determined how to drill multiple wells from the same location, resulting in a smaller environmental footprint while still accessing all reservoirs in the area and reaching the projected power levels. The operational plant now generates 3.5% of New Zealand's electricity, providing power for 200,000 households. Tauhara station's productivity will replace older power generation sources, eliminating over 500,000 tons of carbon emissions per year and increasing the proportion of geothermal electrical generation in New Zealand to 12% of the country's total demand.

**Project Playbook:** Leapfrog, Sequent Central

### Outcome/Facts:

- With digital design, Contact Energy determined how to lessen the project's environmental footprint by drilling multiple wells from the same location.
- Tauhara station's productivity will replace older power generation sources, eliminating over 500,000 tons of carbon emissions per year.
- This project has increased geothermal electrical generation in New Zealand to 12% of the country's total demand.

**Quote:** Tauhara station's productivity will replace older, carbon-intensive power generation sources, generating low-carbon power for 200,000 households. – Matthew Sophy, Senior Engineer, Contact Energy



### [Image link](#)

**Image caption/courtesy 1 (header image):** Tauhara station's productivity will replace older power generation sources, eliminating over 500,000 tons of carbon emissions per year. *Image courtesy of Contract Energy.*

Bio: Richard Irwin, solution marketing manager, industry and product marketing, joined Bentley Systems in 2015 following the company's acquisition of C3Global Ltd. He has been a solution marketing manager for several years in asset performance. Irwin has been supporting Bentley's Asset Performance Advancement team's marketing activities in energy production and process. Irwin holds a master's degree in Information Technology from Heriot-Watt University, Edinburgh, and a master's degree in Sociology from Aberdeen University. He can be reached at <mailto:richard.irwin@bentley.com>.

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