

NEW ZEALAND, DISPATCH OF DAY 3.



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Thursday, May 9 - Nga Awa Purua (Day 3)

Today we all woke up to be ready by 9am for the Mighty River Power Company to pick us up. They took us to their geothermal farm, Nga Awa Purua. Their representatives told us how sustainable their systems are and told us even more about their Rotokowa Field. The Rotokowa Field is partnered with Tauhara North No. 2 Trust to generate a lot of power. They claim that the Nga Awa Purua Farm sells forward their energy at a fixed hedge (which is apparently a really complicated process). This was a neat concept and really showed how variable their markets were. They touched upon the resource management act and said how the Waikato Regional Council is responsible for their consent regulations. The resource consent further determines the rate of extraction and the rate of injection. The Nga Awa Purua farm extracts a total of about 48,000 tons a day! Our class was very intrigued on the figures that the Mighty River Power Company were showing us but they said how there were no specific limits on megawatt usage but there are in fact limits on the amount of H₂S coming out from the geothermal plant.

Our talk with the Mighty River Power Company (MRPC) continued and we were all surprised to find out that there are no complaints from the community about smell or noise from the plant. Due to extensive development, leaking H₂S problems have occurred but have not been detrimental to the field's production. Compared to a lot of other fields we will visit, it is surprising that there are only about 17-20 people employees at the plant and how they still manage to keep the plant magnificent. The plant is so excellent because it is run at base load, meaning they are making the most amount of energy possible. The representatives tried to further describe to us the difficult process of hedging. They say that the plant sells their energy price at a flat rate because demand is low so buying at a flat rate is better but that it is a freely traded market that is constantly changing.

The Mighty River Power Company has a Research & Development budget in which they partner with the University of Canterbury in order to conduct a research on geothermal power. Their 'Source to Surface' project researches isotopes emission in order to find geothermal areas to further research. Unlike in the United States, in New Zealand, there are no union issues among workers. The meeting with the MRPC was really informative because we learned that they have 1/10 of the CO₂ emissions compared to natural gas. We also learned that the United States pays close to 10 cents for their energy per kilowatt-hour while New Zealand pays closer to 20-28 cents. All in all, the meeting was very informative, as it was the first geothermal plant that many of us have visited. After the Nga Awa Purua farm, the professors took us out to a nice, light lunch with the people from the Mighty River Power Company. This was the perfect time for

casual conversations between the professors and MRPC representatives. After lunch we stopped at the Huka Falls and saw the beautiful falls into Lake Taupo. After the Huka Falls we went to GNS for a tour of Geothermal Nuclear Science area and learned exactly what they do there.

Similar to the MRPC, GNS had a representative give us an informational session about their work. They claim to be very similar to USGS in the United States and have roughly 95 workers. Their job is to assess the risk management of hydro and geothermal plants. It was really cool to hear the commitment that New Zealand has to target 20% of their electricity to geothermal power and how they are currently at about 13%. There have been minimum effects on community developments with respect to the GNS. They have a geothermal research program that looks into exactly where geothermal can be placed around New Zealand. They do this by taking chemical surveys to identify potential problems that can arise from different geothermal field locations. They also research 3-Dimensional maps to model how geography and geothermal can go hand and hand in determining geothermal locations. Similar to a lot of other renewable energies in New Zealand, they are required to work with the local regional authorities to regulate and protect the geothermal fields.

After the presentation, they took us to Rig 32 to show us a geothermal drill site. It was hands down the coolest place we have seen here so far. It was so awesome to see an actual drill site and be able to walk up there and see how the entire process works. Many of us have seen pictures of drill sites for other things like oil and natural gas, but it was awesome to see a real life geothermal rig site. We got about 20 minutes to walk around and see anything we wanted to. Many of us touched the different drill bits and this made us actually understand the process much better. They were much larger than we imagined but being able to see the whole rig site and the process really helped us comprehend geothermal power better. After the rig, the GNS representative Gregg took us to an overview to look at the Wairaki Geothermal Field. It was getting dark but similar to the other geothermal field we visited in the morning, the Wairaki Field was similar in size and production. Today was all things geothermal and we got to see the entire process as a whole, from the fields to the rigs. After a very informational day 3, the nightlife in Taupo did not disappoint, rather it was really fun and interesting.

Attached are some pictures taken on Day 3 at the many different locations that we went to... the Nga Awa Purua Field, the Geothermal Nuclear Science Area and Rig 32.



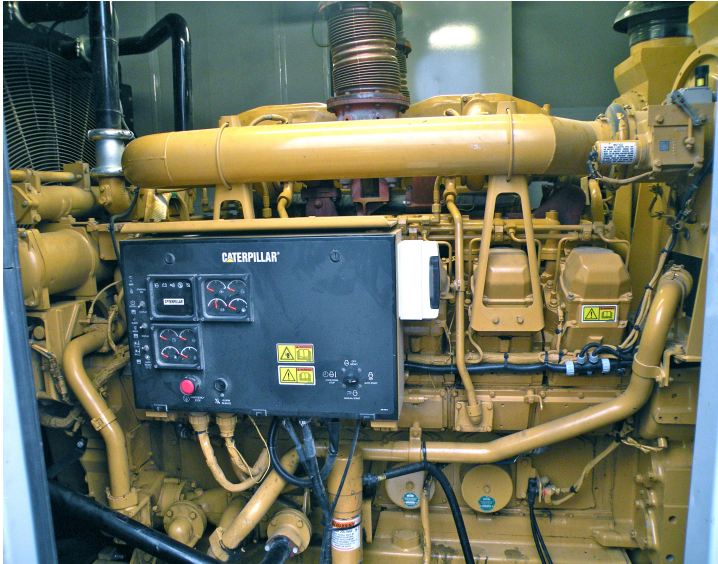
The Nga Awa Purua Field



Talking with the Mighty River Power Company



Taking a tour of the Nga Awa Purua Field



Tour of Rig 32



Drill bits at Rig 32



Getting to further explore the Rig



Some candid at the Rig site