Brad Flavall Guest Lecture Summary

Jos Craw
35046080

August 13, 2019

Brad's lecture was on industry structure. He works at Beca where he worked on an indoor substation in Christchurch. First Brad talked about the New Zealand power distribution network and its various stages.

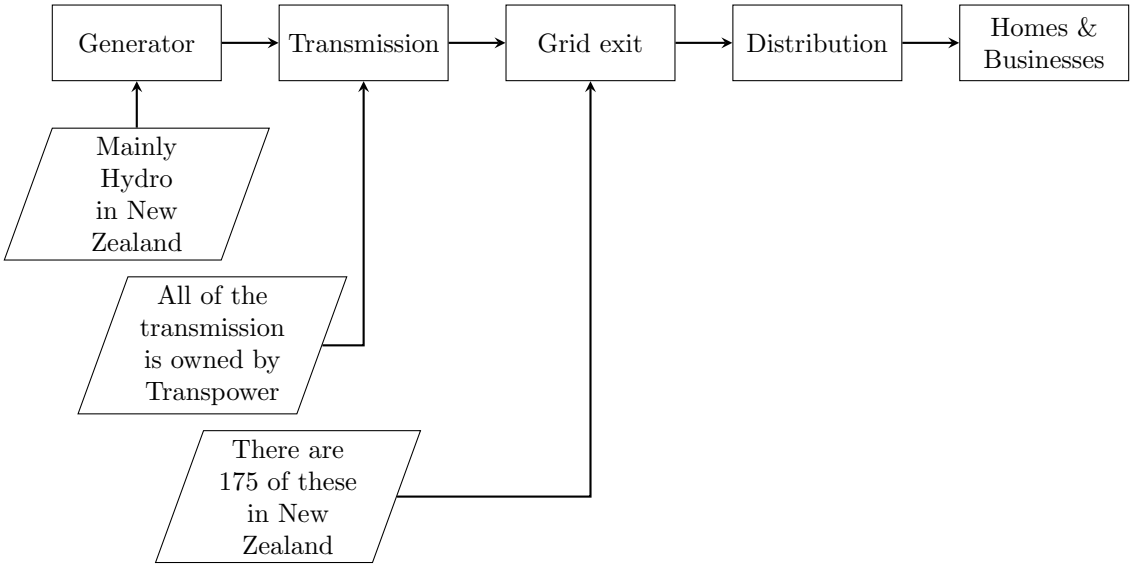

Figure 1: The New Zealand power distribution network

The next item that brad discussed was the statistics for New Zealand energy usage. New Zealanders use 27% of their energy on heating, 17% on refrigeration, 13% on lighting, and 3% on drying.

The next topic discussed was the seasonal effects on the Transpower grid. These changes can be observed in the winder when the area on the Alps increases energy usage dramatically. These changes can be due to population shift and seasonal changes such as weather. This causes lots of strain on the grid however, none of the major companies wants to do anything. This is because upgrading the grid is very expensive and there is no huge benefit to the company that upgrades versus all other suppliers.

Brad then moved on to the design and construction of the indoor Christchurch substation. Brad talked about some facts about the process for adding this substation. The design took 20,000+ hours to construct, with 86 people. The design itself took 4,800 design hours. Brad talked about the complexity of design and the coordination between many different engineering disciplines, such as electrical, structural and coordination with the local council to build the design.

Brad next went over the difficulties and potential issues encountered. The first was that the pipes under the transformer were bent at 90°this issue was found one day before concrete was poured. The angle was changed to a shallower one to allow the cable to be routed through.

Brad then talked about the benefits of the addition of this new substation. As there used to be only one substation for Christchurch when an issue occurred with it much of the electricity failed but with this new substation redundancy was introduced, this allowed one of the substations to have issues and the grid remain functional.