Forecasting uncontrolled load for load management purposes

Orion use ripple control to signal peak pricing and switch hot water cylinders on and off during peak periods, especially during cold winter days. This is important to minimise the need to build infrastructure that wouldn't be required most of the time, saving their customers money. Knowing how much load management is necessary is crucial to adhere to hot water level of service obligations for residential and commercial customers.

About Orion

Orion owns and operates the electricity distribution network that provides power to central Canterbury. As one of the largest electricity distribution networks in New Zealand, Orion covers remote rural areas, regional towns and the city of Christchurch.

TESLA's Involvement

Orion are a key part of managing load on the Upper South Island of New Zealand. Orion sought to gain a more accurate uncontrolled load forecast and decided to employ TESLA's services.

Automated nightly load and weather data that feeds back to TESLA allows their economists to analyse and update the models, a standard part of the delivered system. Likewise, sending and safely installing the resulting recalibrated models was all handled automatically, thus eliminating IT overhead.

Orion needed a mid-morning forecast of the load for the rest of the day.

Orion

> "By providing TESLA with historical load and load management data, they were quickly able to produce an in-house system to forecast our uncontrolled load."

Richard Moylan
Network Analyst
Orion

Richard Moylan explains:

> "The TESLA service supports load management decisions that maintain hot water for customers without creating unnecessary peak loads."

Handling Changes

TESLA were with Orion throughout the destructive earthquakes of 2011. Adapting to the dramatically changing load profile during and for many years after the Christchurch earthquakes, combined with changing irrigation and industrial load were certainly a challenge. TESLA's proprietary load forecasting methodologies were capable of handling such radically changing levels.

As TESLA models are hand crafted by their economists and inputs are carefully screened, they aren't susceptible to "running off the rails" that some other methodologies are prone to when fast changing load profiles and/or outages and spikes occur.

Further Improvements

With TESLA's accuracy, the biggest source of error came from the weather forecast. TESLA trialled several additional weather vendors for Orion and it was found that having an additional weather forecast benefited decision making by highlighting days of uncertainty. As TESLA have strategic alliances with several weather vendors, they could take care of sourcing additional weather vendors and integrating their data, including from a local vendor Orion wished to try.

After five years of using the TESLA system through the Transpower sponsored Upper South Island load management period, Orion decided to continue using TESLA's load forecasts as they became a useful tool for Orion's load management team.

Benefits

- **Key information** now supplied to enable efficient load management

- **Lower cost** than dedicating staff to produce load forecasts

- **Minimal overhead** to trial and implement

- **Easy integration** with existing systems

"TESLA's proprietary load forecasting methodologies were quite capable of handling the radically changing levels we saw after the Christchurch earthquakes"

ORION'S ELECTRICITY NETWORK BOUNDARIES