Major Electricity Users' Group

Promoting a robust electricity market

Case study:

NZAS

Rio Tinto operates the New Zealand Aluminium Smelter (NZAS) at Tiwai Point, Southland. The plant uses 572 MW per annum. As part of its 20-year electricity arrangements with Meridian Energy and Contact Energy, Rio Tinto recently signed up for a first-of-its-kind demand response contract.

As part of the discussions to assess new electricity supply arrangements, it became apparent very quickly that generators needed new products to add to their 'tool kit' to manage dry year risk. Meridian publicly stated very early in the process that demand response during dry years was a key requirement for any new electricity contact with NZAS . Establishing how this could work within any new electricity supply contracts agreed with the smelter became a key part of the discussions. It saw the signing of the largest long-duration, single-site demand response agreement anywhere.

How does demand response work for NZAS?

Under this demand response arrangement, NZAS may be requested to reduce electricity consumption. The arrangement provides for four demand response options that the Meridian can trigger. These options range from 25 MW to 185 MW. The maximum option being the equivalent of one potline being taken out of production (or 1/3 of NZAS' production capacity). Three-quarters of any called option will come off Meridian's contracted volume; the remaining quarter comes off Contact Energy's supply contract. Meridian holds the sole right to call the demand response provisions to ensure the agreement could work seamlessly between the two companies. The new demand response agreement replaces and builds on the smaller 50MW demand response agreement NZAS entered into with Meridian in 2023.

The arrangement also provides for a maximum demand response of around 800 GWh in any given year, with an average of 400 GWh per annum over the 20 year term of the contract. The arrangements have defined minimum and maximum durations for which the reduction can be called, a limited number of calls over the contract terms, and defined profiles for removing and restoring NZAS load. Each option also has stand-down periods between calls – an important operational feature or the smelter.

Commercial barriers to demand response.

NZAS says long-term contracts were vital for them to engage in demand response, to ensure the avoided cost of electricity was sufficient to offset the cost of altering production processes. Also essential was the ability for Rio Tino's global aluminium business to fill the gap left by lost production in New Zealand, and continue to supply the customers who rely on Tiwai product globally.

In addition to lost production income, the costs associated with taking load off and ramping back up needed to be taken into consideration and are built into the demand response agreement. A full aluminium potline takes approximately 200 days to restart once turned off. Therefore, under the contract, it can only be turned off for a maximum of 75 days before NZAS is given an uninterrupted 200 days to restart.

NZAS notes that everyone's processes are different and the learning from the NZAS experience has been to engage in discussions with gentailers early, and approach these conversation as ones that seek to solve problems for both parties.

What is the benefit to New Zealand from these kinds of demand response arrangements?

The agreements are a collaborative effort that works for all parties. NZAS say that they hope Meridian will call on the demand response at times of national need, for the benefit of New Zealanders.

At times when the lakes are low and hydro output is down, demand response is an alternative to burning coal and gas. This generates fewer greenhouse gases and gives the System Operator more options.

The ink on the new 20-year contract (signed on 31 May 2024) had only just dried when, on 21 July, Meridian called for the highest load reduction of 185MW. This has demonstrated the immediate value of the demand reduction contract.

Shortly after this, Meridian called for an additional 20MW, which was outside the scope of the existing contractual arrangements. Given the positive relationship that had been formed, it was possible to quickly reach terms for the additional 20 MW that worked for both parties. Being agile and flexible needs to be a feature of demand response agreements, NZAS believes, given how quickly metrological circumstances can change.