Fonterra submission on potential solutions for peak electricity capacity issues

March 2024

Fonterra welcomes the opportunity to comment on the Electricity Authority's (EA) consultation on potential solutions for peak electricity capacity issues.

Fonterra is a dairy co-operative owned by around 9,000 New Zealand farming families with 27 manufacturing sites across the country, making us the country's largest exporter and a major supplier of dairy products to the domestic market. With manufacturing operations spread throughout New Zealand, Fonterra is a major energy user and participant in the electricity markets.

Fonterra agrees that the Electricity Authority needs to find a solution for the peak capacity risk and we also agree that there needs to be a balance between eliminating the capacity issues and minimising the cost implication to end users as the system moves to 100% renewable generation.

As the paper identifies, there is more than sufficient installed generation at over 9,000MW versus the system peak at over 7,000MW, suggesting a need to focus elsewhere. Fonterra proposes that the correct problem statement is "How does the electricity market flatten 24-hour demand to better utilise the entire electricity system, from generation, through to transmission and distribution".

The solution to this problem statement should align to the energy trilemma:

- Affordability: Aim to reduce cost to end users wherever possible through better utilization of all assets to reduce capital spend on overbuild which is eventually paid for by end users;
- Security: Identify an enduring the solution that will work now and into the future.
- Sustainability: Ensure alignment with New Zealand's wider climate and sustainability obligations and targets.

The capacity issue is not just short-term. While there were tight capacity margins in 2023 and commentators expect the same for 2024, we believe this will be an ongoing issue and therefore the solution needs to be enduring. The historic accelerating withdrawal of thermal plant from the market starting with Otahuhu, Southdown, and one of the Huntly Rankine units is making the issue more pressing.

The elimination of the Regional Coincidental Peak Demand (RCPD) signal has also contributed to the peak capacity issue, as noted in the EA's report "The impact of the RCPD charge removal on peak demand" (2022). That report noted that, effectively, 150MW of demand response was removed from the system due to the elimination of any financial benefit to modify demand.

This aligns well with the indicative winter capacity margin of approximately 200MW that must be maintained for minimum security of supply.

The other impact has been that industrial and commercial end users are more likely to be utilising electricity contracting methods due to consistent high spot market prices that remove trading period price risk, eliminating the capacity shortfall price signal.

We commend the EA's work so far on information sharing, but there is unfortunately limited value to drive demand side flexibility. We do not support the proposed options that the EA has put forward as solutions as they are too narrowly focused on encouraging more generation at peak, typically by overly complex auxiliary financial arrangements.

Fonterra's view is that there are some solutions that could be implemented quickly that would deliver significant benefits:

1. Modify the existing Demand Dispatch process in Real Time Pricing (RTP) to pay at spot market trading period settlement price any demand response that has been bid into the price stack and subsequently dispatched (discussed further below).
2. Implement a day-ahead market to signal the upcoming generation or demand response needs and thereby provide financial security to potential slow start thermal plants to be ready, or battery system owners to charge up, or for demand response participants to build storage or cover multiple trading periods if a longer dispatched off period is needed.
3. Enable compensation for residential and commercial end users via retail tariffs if their load is used for demand response.
4. Introduce a very fast frequency response reserves (VFF) product to compensate/encourage Battery Electric Storage Systems (BESS) to be built. Real world studies (AEMO re Hornsdale BESS response) have shown that VFF can halt a system under frequency collapse faster with smaller energy injection compared to traditional FR and also handle frequency overshoot which traditional FR cannot handle. OFGEM in the UK have introduced this ancillary service.

Demand Response

The importance of Demand Response (DR) in addressing peak capacity challenges cannot be understated, as detailed in the "Incentives for Demand Response" section. The critical question revolves around the financial incentives necessary to motivate participation in DR.

Despite the introduction of the RTP system, uptake by potential DR participants has been limited. This indicates a gap in the current incentive structure. For the RTP system to function optimally, it is imperative that the System Operator has comprehensive visibility into DR capabilities, facilitating accurate price discovery for each trading period.

A straightforward solution to enhance DR visibility involves mandating retailers with bilateral DR agreements to submit their DR commitments into the price stack at their contracted volumes and prices. This not only ensures transparency but also integrates DR more seamlessly into market operations.

The economic rationale traditionally used to argue against treating DR equivalently to generation, as outlined in footnote 35, is increasingly seen as outdated. This argument posits that because generators incur fuel costs, they should uniquely receive compensation based on the volume of electricity provided during a trading period. However, this perspective fails to account for the evolving dynamics of our energy system, particularly the rise of renewable energy sources and the intrinsic costs and benefits associated with DR, as well as any costs to install the ability to provide demand response via storage systems or procure additional energy costs to switch to an alternative energy supply source.

Renewable energy sources such as wind, solar, hydro, and geothermal do not incur traditional fuel costs. Their primary expenses are related to upfront capital investments and ongoing maintenance. This cost structure is markedly different from fossil fuel-based generation but shares similarities with the economic model of DR.

For instance, DR may involve switching operational modes, such as moving from an electrode boiler to a biomass boiler, which entails alternative fuel costs and significant logistical considerations. Moreover, when DR is achieved by halting production, there's a tangible economic impact in terms of lost production time and the subsequent need to catch up, which can incur additional costs.

There is a good argument that renewable generation and DR bring similar value to the electricity grid beyond simple fuel consumption metrics. They enhance grid flexibility, contribute to system reliability, and offer environmental benefits by reducing the need for fossil fuel-based generation.

Compensating DR participants at the same rate as electricity generators in the price stack creates a strong incentive for participation. It treats demand flexibility as a resource comparable to generation, recognising the value of reducing consumption in times of peak demand. This approach ensures that those who contribute to balancing supply and demand by reducing their electricity use are fairly rewarded for their contributions, making the electricity market more efficient.

Fonterra has explored other financial tools for managing peak price risk and we have found that, at this time, the cap or peak products do not make financial sense and it is more prudent to purchase flat products. A day-ahead market would resolve the issue of thermal generation or DR being dispatched back too soon as it will enable the participants to clearly indicate the number of trading periods and price that they will need to be dispatched for.

Other Issues

Another aspect of the peak capacity issue is the different demand profiles that residential and commercial users have compared with industrial users. A significant portion of daily movement in demand is from residential and commercial end users, while industrial users typically operate 24 hours a day and therefore have a flat profile.

Because of this, we recommend the EA pushes for retailers to implement time-of-use reflective tariffs that can also be used to reward the use load shifting out of peak periods manually or via the use of smart connected appliances such as EV chargers or hot water cylinders with timers. These time-of-use tariffs can also help signal transmission and distribution peak constraints and incentivise the installation of solar PV and/or batteries.

We also recommend a focus on why persistently high spot market prices above the Long Run Marginal Cost have not accelerated the development of existing consented projects by major generators.

The EA needs to continue to improve wind and solar forecasting and subsequent dashboards showing impact on the spot market. Multiple trading relationships study needs to move from a trial to actual implementation as this will give end users choice of DR aggregator.

We welcome further engagement on our submission.

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