



Backup Boost Knowledge Sharing

Report #2
30 October 2020

enel x



Overview of the trial

We are proud to partner with the South Australian government to provide support to local businesses by changing the way they use energy.

Enel X and the South Australian government are investing \$2 million each over three years to unlock the potential for cheaper more reliable electricity, supporting backup generator upgrades across a number of South Australian businesses.

The upgrades will be partially funded by the South Australian government's Demand Management Trials Program, with no requirement to repay, accelerating sites' entry into the market. The remaining costs are recovered from earning revenue under our demand response programs.

This project will upgrade existing backup generators in SA and test the ability to:

- > create an aggregated portfolio of fast-responding, dispatchable generation
- > improve liquidity in the contract market
- > show that demand response can bring financial benefits to participating businesses and consumers more broadly.

This is the second of a number of knowledge sharing reports we will publish to share our findings on the effectiveness and challenges of using backup generation in the wholesale market and to sell financial products.

Meeting the objectives of the trial

The purpose of the trial program is:

To show how businesses' existing backup generators can provide dispatchable demand response capacity in the NEM and to assess the viability of selling a cap product in relation to the aggregated generation capacity.

The first year of the trial focused on recruiting customers. We spoke with a lot of South Australian businesses over the year and found that many have a strong interest in using their backup generators more flexibly and benefitting from opportunities to participate in the spot market.

Enel X has met its first milestone and now has over 5 MW of dispatchable capacity contracted for participation in the trial program. This generator capacity is located at three sites for businesses in the manufacturing and cold storage sectors. An outline of the lessons learnt in achieving this milestone, and trial outcomes to date, is set out in this report.

The next stage of the project will focus on:

- > enrolling more businesses for participation
- > enabling more sites for market participation
- > offering that capacity into the market
- > selling a cap product in relation to that capacity.

Lessons learnt to date

The opportunity is big, and interest is strong

Since the trial program started, Enel X has searched across South Australia's commercial and industrial sectors for sites that might be suited for participation. Businesses have approached Enel X directly, too. This has unearthed a great number of businesses that have backup generator capacity and are interested in an opportunity to maximise the value of that investment.

Conversations with customers have expanded to discussions about the future of the energy grid and the NEM, and the need for alternative supply sources including virtual power plants. This shows a genuine interest in the energy system and the objectives of the demand management trials program.

However, not all sites are suitable for participation

We have had a significant amount of interest in this project from a range of businesses, with many contacting us and keen to be involved. However, not all sites are suitable for participation. Many have been deemed technically and/or commercially unviable for a range of reasons, including:

- The site doesn't already have a generator, and the cost of installing one would be prohibitive
- The site has an old, under-sized or poorly maintained generator
- The cost of connecting the generator to the network is prohibitive (explained further below)
- The site has a solar PV system and/or reduced operations, which means the generator does not have much load to support
- The site has a peaky or unpredictable load profile.

Over the past year we've learnt a lot about the types of businesses that are likely to encounter the above issues. This has helped us narrow down which types of sites are likely to be best suited for participation in the trial.

Many businesses are also interested in battery storage solutions.

It's important to really understand the site's load profile

A stable and predictable level of demand is important to be able to rely on the customer to provide the anticipated level of demand response.

Our experiences so far have shown that we need to have a very accurate and detailed understanding of the site's load during expected dispatch timeframes (e.g. late afternoon to early evening) and the generator's likely output.

We now conduct more comprehensive tests before enrolling a customer. To do this, we request consumption data for the individual loads on site, as well as interval data at the gate/parent meter, including any customer SCADA data available, for the past 12-36 months.

This information helps to manage both our expectations and customers' about what demand response capability will be available when an event occurs.

The costs of connecting a generator to the network is a significant barrier

We have found that network connections are the most significant barrier to participation. A network connection is required if the customer wants to earn additional revenue from exporting energy, rather than just displacing their load.

The cost of connections, and therefore the financial viability of export, can vary greatly depending on the geographic location of the site within the network, and whether generator export is permitted.

If there are constraints on the network, the network service provider may either:

- > not permit any additional generation to connect, or
- > require the installation of additional protection and control solutions.

This appears to be particularly the case for sites in the Adelaide CBD.

Protection and control solutions increase the cost of site enablement substantially. So, even if connection is technically achievable, the costs of connection can deem many projects financially unviable.

Therefore, Enel X's ability to recruit customers with grid export capability is likely to be limited.

It's important to identify the decision makers early

Another lesson we have learnt is the need to progress as quickly and efficiently as possible to a business's decision makers. Sometimes the interest shown by staff at the site level is not matched by higher management, who may not see participation in the trial as a business priority.

If we are able connect with the right people within each business early on, we are likely to get a better understanding of the priority of program participation compared to other business objectives and see a faster turnaround for decision-making.

Businesses prefer firm availability payments

Enel X's standard pricing structure is to provide businesses with a steady and ongoing stream of "availability payments" for their capacity, and then "energy payments" to cover the costs of running the generators, such as fuel. An alternative is to offer no availability payments but higher energy payments during dispatch events, typically when spot prices are forecast to be high.

We have found that most prospective participants prefer for firm availability payments over energy-only payments for energy delivered during events. Like most businesses in general, they prefer ongoing and predictable revenue streams year-around as opposed to uncertain but potentially very lucrative energy payments.

Trial outcomes to date

Customers recruited

Enel X has met its first milestone and now has over 5 MW of dispatchable capacity contracted for participation in the trial program using backup generators. These generators are located at three sites owned by businesses in the manufacturing and cold storage sectors.

The manufacturing sites have stable year-round load profiles, including through summer. One has recently completed a site upgrade and will provide increased generator running capacity to support its load.

The cold storage site provides storage and distribution services for frozen products to customers across South Australia. Cold storage facilities tend to have a fairly stable baseload demand all year round, dipping slightly in the winter months due to lower ambient temperatures, and increasing between November and March when more cooling is required.

All customer sites have on-site backup generators to ensure continuous operations in the event of a power outage. These generators have been upgraded by Enel X to enable market participation. These customers are looking forward to receiving a greater return from these assets whilst contributing to grid reliability in tight conditions.

Many commercial and industrial businesses have standard retail contracts, which do not include exposure to the wholesale spot price. While the backup generators on site certainly provide protection against power outages and brownouts/blackouts and allow business continuity, they are not required to provide a hedge against price volatility.

In future we may recruit customers who have some degree of exposure to wholesale spot prices, and will provide an update on whether their backup generators are effective at being used as a hedge against wholesale price volatility.

Individual customer experiences

Feedback from the customers we have signed has been generally positive.

Enel X's ability to recruit trial participants has been supported by positive experiences of working with Enel X in other jurisdictions or demand response programs. One of the manufacturing customers cited positive experiences from being enrolled in a previous demand response program with EnerNOC (now Enel X) in 2010-11. The same customer also cited positive experiences with Enel X at one of their sister sites enrolled in a demand response program in Western Australia.

As noted above, interest from potential trial participants is strong and many are eager to participate provided their site is technically and commercially viable.

Patterns in customer experience

As it is still early in the trial program and we have relatively few participants, we are not yet able to identify any clear patterns in customer experience across industry sectors, generator size or geographic location. We hope to do so in the later stages as more businesses are enrolled and enabled for market participation.

However, our experiences to date indicate that:

- > sites that have a stable and consistent load during high demand periods, in both summer and winter, are likely to be better performers in this program
- > sites located in the Adelaide CBD are likely to experience greater barriers to participation if export capability is sought, given network constraints in the area
- > most customers appreciate being able to earn a predictable and steady revenue stream via availability payments, and recover their costs when required to run their generators during dispatch events.

Impact of dispatch during high solar PV output

We are not yet able to comment on the impact of the portfolio's operation during periods of high solar PV output.



Enel X will dispatch generators during periods of forecast high spot prices. These events usually coincide with periods of high forecast demand (due to weather) and periods of low wind and/or low solar PV generation output. In many cases, these periods will occur in the late afternoon to early-mid evening, when there is lower solar PV output compared to during the middle of the day.

We will be able to provide a better assessment of the impact of the portfolio's operation during periods of high solar PV output later in the trial when we have a larger portfolio that is regularly participating in the market.

Dispatch performance

Trial participants' generator capacity is offered into the market as soon as Enel X has completed all site enablement activities. There were four dispatch events across June to August 2020. Dispatches tended to occur during periods of cold weather, low wind output and large generator outages.

From these events, we've learnt that sites that can remotely respond to an Enel X dispatch instruction (via Enel X software) generally deliver stronger dispatch performance. Sites that retain manual control can take up to 10 minutes to turn on their generators, whilst automated sites can respond within 1-2 minutes of a price spike. Automated sites therefore deliver greater certainty and speed of dispatch, which means we can negotiate more favourable pricing for this capacity.

Something else we have learnt is the need for sites to make sure that they are continuously monitoring their generator fuel levels and the generator's status, particularly during quieter "shoulder seasons". Unfortunately, one of our customers experienced technical issues at their generators on the first of back-to-back dispatch events during June, which meant the generators stopped halfway through the first event and did not run at all on the next day. Upon further investigation it was discovered that the generators will trip if stored fuel levels fall below a certain threshold. We were able to work with the customer to put in place more robust checks and processes for monitoring fuel levels on a regular basis (particularly after dispatch events) and checking that all hardware is working as intended.

Finally, customers have appreciated regular and timely communication about market conditions and the likelihood of dispatch events. Whilst the sites are now largely remotely operated by Enel X, customers still appreciate receiving a "heads-up" for potential events, as there can be a few minutes of interruption when the generators are starting up and site operations switch from grid supply to backup generator supply. This also gives customers time to ensure adequate fuel levels and make sure that all hardware is working.

These are important lessons that we will apply to all participants in the Backup Boost program.

Financial performance

Trial participants received energy-only payments in accordance with their contract with Enel X for the two dispatch events in June. The spot price reached \$2549.63/MWh and \$1093.84/MWh during these events.

Overall, the portfolio's financial performance in Q2 and Q3 was low due to market prices remaining very low by historical standards. However, cap prices and therefore revenue for Q4 was much healthier, reflecting warmer conditions and greater chance of high prices going into summer 2020-21.

Once we build the number of trial participants and have more sites participating in the market, we will be able to provide more insights about the portfolio's financial performance.

Sale of cap products, and impact on contract market liquidity

Enel X did not sell any cap products for Q2 2020, as market prices were not favourable due to mild forecast conditions.



Enel X sold 1 MW of caps for Q3 and Q4 2020. Cap products provide a firmer and more reliable source of revenue for customers than energy-only payments, which are paid if, and when, high price events occur.

At this stage, while the portfolio is still relatively small, we are not able to draw any conclusions about the impact of the sale of cap products on liquidity in the contract market.