Australia's ENERGY FUTURE

Consumer Energy Resources

AUSTRALIAN ENERGY COUNCIL

Tapping the Benefits

The decarbonisation of the electricity system will play an important role in Australia reaching its goal of net zero emissions by 2050.

Over the past decade, the electricity system has made significant inroads towards decarbonisation, with increasing penetration of renewables and an increase in decentralised supply. Last year the National Electricity Market (NEM) saw very high levels of renewable generation, with 72 per cent of total generation coming from renewable sources on 24 October 2023 – a new record. The Australian Energy Market Operator (AEMO) expects that it will soon be regularly managing a power system that is supplied entirely by renewable energy.

Consumers are heavily involved in this energy transition. Residential and small business consumers have been adopting small-scale energy resources such as rooftop solar systems (nearly 4 million homes now have solar PV), behind-the-meter battery storage, energy management systems and electricity vehicles (EVs) rapidly. These Consumer Energy Resources (CER) are now a feature of the energy system. According to the AEMO's Draft 2024 Integrated System Plan (ISP):

"Rooftop solar is now three times as common in Australia as backyard pools, and is capable of meeting 48% of underlying energy demand across the NEM in the middle of a sunny day. Rooftop systems contributed 12.1% of the NEM's total generation in the summer (Q1) of 2023, more than utility-scale solar (7.5%), wind power (11.6%), hydro (6.1%) and gas (4.6%)."

The installation of more solar systems can also create challenges for local electricity networks in some areas where uptake is particularly high, or where the network isn't overly robust. For example, it can lead to localised grid stability issues.

In response governments have allowed for curtailment of output. In 2022 Western Australia followed South Australia in granting authorities the power to turn off solar when the local network is under greatest stress. Aside from localised network issues increasing amounts of solar are leading to increasing periods of low operational demand and increasing intraday swings between daily minimum and maximum demands. Managing these swings requires increased operational focus on factors such as system ramping capability – plant that can be turned on and off quickly – as well as how best to harness this output.

The challenge for the energy sector now is how to tap the full potential of CER – shift away just trying to manage these kinds of CER impacts to fully harnessing and tapping into the benefits it can deliver to our energy grid, as well as the households and businesses that have installed solar and batteries or have electric vehicles. Energy retailers are uniquely positioned to help consumers navigate this energy transition.

Consumer Role is Growing

The role of consumers in the energy transition will continue to grow in significance. The Australian Energy Council's members and other energy sector participants recognise the increasing role of CER in the energy transition as well as the value it can deliver to consumers. How best to harness, or integrate, the collective resources of customer-owned assets such as rooftop PV and batteries is the key question along with who should lead these efforts. CER is capable of delivering significant benefits to all consumers if it is properly coordinated and integrated as part of the electricity system.

There is a wide range of estimates of the value of integration of CER, but all are substantial and indicate it is worth trying to get policy settings right.

Key principles

The approach taken by the Australian Energy Council and retailers to advancing CER will be underpinned by the following principles:

- Supporting the pathway to net zero
- Delivering reliability
- Ensuring fair and equitable outcomes for all consumers - there is a risk of CER creating a divide between the haves and the have nots, it will be important to ensure outcomes can benefit all consumers.
- Providing for innovation in products and services
- The role of retailers will be important in a high CER environment.

As part of its approach to CER, retailers and the Australian Energy Council will:

- Seek to collaborate with energy stakeholders to enhance consumer outcomes.
- Participate in government processes to optimise consumer outcomes.
- Promote emerging markets – Virtual Power Plants (VPPs) and hot water load control project (see below) are examples of emerging markets for CER that retailers can provide. It will be important to ensure the evolving regulatory and policy settings continue to enable retailers to provide new products and services that meet their customers' needs.

Tailored Approaches

As consumers continue to take up CER, there are opportunities for retailers to develop products and services that tailor to different consumer needs, as well as considering the different CER integration initiatives across the energy supply chains.

Reforms by governments and market bodies in recent years are designed to create policies and regulatory frameworks that support the efficient integration of CER. Many energy market participants are undertaking trials or developing CER-related products (see examples below). All these programs impact energy users in some way, but almost all of them are discrete programs that focus on one part of the energy system and do not necessarily consider the whole of the supply chain.

Fragmented decision-making processes are likely to continue to be a feature – the states will continue to design bespoke policies, while the Commonwealth is taking a bigger role in energy given its link to Australia's climate ambitions. The near-term policy focus remains system reliability and managing the legacy impacts of unmanaged CER deployment. Longer term policies will likely consider how CER can reliably be part of an integrated electricity system.

CER integration is not a task that can be achieved by one organisation or one part of the industry alone. It will need greater coordination. An uncoordinated approach is not a sustainable or effective way to integrate a much higher level of CER into the energy system and is likely to lead to increased energy costs for consumers and inefficient outcomes. Greater collaboration between retailers and other parts of the energy supply chain will be vital.

Consumers want a cleaner energy system, but cost pressures are likely to continue to be the key factor in their decision making, while the gap between 'haves' and 'have nots' has the potential to widen. Coordinated integration efforts will be critical so the energy transition benefits all energy consumers, and not just those who can afford to invest in CER.

There are two key approaches for integrating CER - aggregation and orchestration.

Aggregation

This is the bundling together of many customers' resources to provide a larger potential resource that can provide network support or even participate in wholesale markets. Fortunately, there is already a natural aggregator in the electricity sector - the retailer. Retailers already "bulk buy" their customers' electricity supply and so have a pre-existing relationship, comprising contractual

arrangements and periodic communication. So, it's in principle a short step to "bulk sell" customers' CER on their behalf to help them trade and get more value from their CER assets. This approach is already manifesting in the form of Virtual Power Plants (VPPs), which utilise customer solar and batteries to balance supply and demand and participate in markets left Frequency Control and Ancillary Services (FCAS), which are important in maintaining grid stability, for example.

Retailers are not the only potential aggregators, and the existence of retail offerings that pass-through wholesale and network costs creates the opportunity for third parties to aggregate services too. Policymakers have looked over the years at other means of facilitating third party participation, which have typically included setting up systems to allow multiple suppliers through a single meter point. The costs of doing this on a widespread basis have, to date, however, appeared to outweigh the benefits.

Orchestration

Orchestration is the direct management of CER by another party to induce a "firm" response when requested. At its simplest, this has been used by distribution network service providers (DNSPs) for decades, primarily via timed electric hot water systems.

More recently, it has been extended to direct load control of air conditioners, such as Energex's PeakSmart program. However, DNSPs do not need to be the orchestrators.

Technological advances mean that aggregators can set up similar controls and sell these as network support services.

Aggregation and orchestration will be facilitated by adopting consistent protocols and standards across DNSPs as far as possible, given many aggregators will want to operate across multiple networks.

A key principle is customer sovereignty over their resources. Customers should have the ultimate right to choose which (if any) service provider they would like to manage their resources and on what terms.

Communications

While much of the potential of CER is only beginning to emerge to develop its potential further will require consistent communication of the benefits it can deliver to households and businesses, as well as the energy system overall. Clear, consistent communication will help encourage households and businesses to think differently about the energy system and the role they can play.

Examples of Getting Benefits of CER

There are a range of CER developments that retailers have been involved with. These include:

Virtual Power Plants (VPPs) – Energy retailers have been creating Virtual Power Plants (VPPs), which are an aggregated network of home solar and battery storage systems. Via IT platforms these can be remotely controlled, operated and coordinated to balance supply and demand on the grid. This coordination allows a series of individual batteries to operate like a single large battery. Retailers will offer these options with a payment or incentive to participate. ENGIE, AGL, Synergy, Origin Energy, EnergyAustralia, and Powershop are amongst many retailers tapping the potential of VPPs to support the grid and bring benefits to households.

ARENA has provided support to PLUS ES, a data, metering and energy services business, to develop a Hot Water Control Load demand management capability (the Portal) that will allow project partner AGL Energy to access and dynamically manage a fleet of up to 20,000 hot water systems in South Australia via their smart meter. This will maximise benefits from the optimisation of hot water demand and take advantage of SA Power Network's 'solar sponge' Time-of-Use tariff that incentivises daytime usage of electricity to enable higher renewable energy generation.

Retailers are offering EV plans through initiatives like low off-peak rates to encourage charging at times of less demand. While the potential of EVs to offer grid services has also been assessed under the Realising Electric Vehicle-to-Grid Services (REVS) trial in Canberra. Run by ActewAGL this investigated whether a coordinated fleet of electric vehicles could provide similar grid services to big batteries and virtual power plants. It has highlighted the potential for Vehicle-to-Grid (V2G) technology to provide services like Frequency Control Ancillary Services (FCAS) to help maintain a steady grid frequency.

Demand response can play an important part in managing the grid and electricity supply. For larger users systems can be introduced to automate and control on-site energy consumption, allowing for automatic adjustment as required. This lets you take advantage of opportunities when they arise.