

Energy Consumers Australia – Consumer Electricity Resilience

Defining consumer electricity resilience

Context

To explore whether the frameworks that electricity network businesses operate within support consumer electricity resilience, it is necessary to define what consumer electricity resilience is.

Electricity is an essential service that could be seen as a right¹. As we decarbonise, the reliance on electricity will increase, encompassing heating, hot water and transport. Other critical services, such as water, sewerage and telecommunications², are already dependent on electricity.

The climate has changed, bringing severe weather of increased intensity³ that increasingly results in damage to the electricity network with prolonged outages that have significant impacts on households and communities⁴. Both the reliance on electricity to mitigate climate change and the increase in the severity of bad weather drives a focus on *electricity resilience*⁵.

Electricity network businesses already have performance standards for *reliability*. The *reliability of the electricity network* is the ability of the *distribution electricity network* to operate under *normal conditions* to successfully deliver electricity to consumers.

When there is a major event, such as severe weather that damages the electricity network equipment, the loss of power and the performance of the electricity network business in restoring that power excluded from the measurement of *reliability* performance, on which networks are assessed and may receive a reward or be penalised⁶.

Reliability of the electricity network should not be confused with the *reliability of the power system*. For the electricity market, operated by the Australian Electricity Market Operator (AEMO), the *reliability of the power system* means the ability of electricity generation to meet the demand for electricity from consumers. It is very rare for generation to not meet demand however damage to the electricity network is much, much more common and frequently prevents electricity from reaching consumers⁷.

In Australia, governments and rule makers focus on the resilience of *the equipment* that delivers the electricity to customers. This includes requirements to undertake risk assessments on electricity network equipment⁸ and to invest in solutions that might make the *equipment more resilient*, such as stronger poles⁹, or solutions that might provide a resilient source of electricity, such as batteries and microgrids^{10,11}. These solutions might be better delivered by parties other than the network business.

Consumers and communities focus on a *resilient supply of electricity*. Households and communities may be able to (temporarily) access a resilient *supply of electricity* without relying on the electricity network. Regardless, consumers expect any loss of electricity due to the failure of *electricity network equipment* will be rapidly resolved, through responsive temporary solutions like diesel generators at a community location¹² or for households¹³ and then permanently recovered through electricity network repairs.

Ensuring households and communities have a *resilient supply of electricity* can be achieved through many different approaches that are not necessarily the responsibility of the electricity network company and not necessarily dependent on *resilient electricity network equipment*.

In rural communities, where everyday *reliability* is poor, households and consumers that can afford to do so may invest in their own *electricity resilience* solutions, such as batteries and diesel generators¹⁴. The electricity network companies have already demonstrated that, for rural customers, they do not always deliver a *reliable* supply of electricity, let alone a *resilient* supply of electricity¹⁵ and so rural consumers invest in what the rule maker calls “rational alternatives”¹⁶. But not all consumers, urban or rural, can invest in a “rational alternative” like a battery or diesel generator to deliver a *resilient supply of electricity*.

Even where the electricity network business invests in more *robust* equipment and solutions, severe weather may impact parts of the network that are less robust. Electricity network investment may improve the resilience of the supply of electricity for targeted consumers and communities, but not for all customers of the network business.

This means that unless the electricity network business upgrades the entire network, network equipment will still fail, leaving consumers without electricity. And even supposedly *resilient network equipment and solutions* might fail¹⁷.

Electricity network businesses invest in *more robust different infrastructure* as an approach to ensure supply

Consumers invest in *alternative sources of electricity* to provide a resilient supply of electricity
 Consumers require a *resilient electricity supply* sufficient to meet their *essential needs*



How others have defined electricity resilience

For consumers and networks, resilience to a severe event is not a single approach. Resilience encompasses four key aspects: how an event might impact electricity supply and **reducing the risk** and vulnerability to the event. It is also **being ready** for an event, **responding** in the immediate aftermath of an event and **recovering fully** from the event. Addressing one aspect does not deliver a resilient electricity system or supply.

Industry definitions

Industry definitions focus on the resilience of the *system, infrastructure or assets* to events. Some definitions mention the services and people that are dependent the system.

Market operator (AEMO): The ability of a *power system* to limit the extent, severity, and duration of system degradation following an extreme event¹⁸.

Rule enforcer (AER): a performance characteristic of *a network and its supporting systems* (e.g. emergency response processes, etc.). It is the *network's* ability to continue to adequately provide network services and recover those services when subjected to disruptive events¹⁹.

Victorian electricity network business: Resilience is the capability of *an electricity network* to recover quickly from unexpected events or disturbances, such as severe weather, accidents, or equipment failures. A *resilient system* can bounce back from these challenges, minimising downtime and ensuring *your power supply* remains stable²⁰.

US Department of Energy: Energy resilience is the ability of *the grid, buildings, and communities* to withstand and rapidly recover from power outages and continue operating with electricity, heating, cooling, ventilation, and other *energy-dependent services*²¹.

UK Cabinet Office: Resilience is *the ability of assets, networks and systems* to anticipate, absorb, adapt to and / or rapidly recover from a disruptive event²².

For communities and consumers

There are very few definitions available for consumer or community energy (electricity) resilience. There are definitions of community resilience, but they are not specific to electricity and typically focus on the role of local social connections in supporting community resilience. These social networks will be important in supporting community electricity resilience, for instance, by sharing access to resilient electricity supplies.

Energy Consumers Australia: Community energy resilience is *a community* with the capacity and resources to adopt and *utilise local appropriate energy solutions* that help [the community] to learn and anticipate, withstand, and quickly recover from climate disasters²³.

International (Sweden, academic): *Household energy resilience* is to *ensure a good life* through adjusting what activities that are performed, when they are performed and how they are performed in the face of *expected and unexpected power outages and shortages* as well as to prepare for future adjustments of activities and to more fundamentally change to reduce the need for adjustments²⁴.

How do we define consumer electricity resilience?

We need to create a definition for *consumer electricity resilience* as none currently exists.

Suggested definitions

1. Consumer electricity resilience ensures that all consumers have a supply of electricity to meet their essential needs during and after an extreme event or disturbance.
2. Consumer electricity resilience ensures that all consumers are ready, can quickly respond and recover from a loss of network electricity, while continuing to meet their essential needs with a supply of electricity.

Note: a resilient supply of electricity is not necessarily continuous or via the connection point.

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The views expressed in this document do not necessarily reflect the views of Energy Consumers Australia

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Glossary

AEMO	Australian Energy Market Operator: company that operates the National Electricity Market (NEM) and maintains power system security
AER	Australian Energy Regulator (AER): company that oversees and enforces the National Electricity Rules (NER). The AER also administers incentive schemes and guidelines that cover electricity network business performance
Community	A group of customers, encompassing individuals, households and businesses
Consumer	Any customer who relies on and uses electricity, including businesses and industry
Electricity network business	Distribution Network Service Provider (DNSP): company that owns, operates and maintains the equipment and assets that allow electricity to reach consumers
National Electricity Market	The electricity market operated by AEMO, encompassing the eastern states of South Australia, Tasmania, Victoria, New South Wales, Australian Capital Territory and Queensland
National Electricity Rules	The rules are made and maintained by the Australian Energy Market Commission (AEMC). They are complex and cover all business entities that operate in the NEM to ensure that the long-term interests and rights of consumers are protected