



Electricity Distribution Network Resilience Review

Final Recommendations Report

Expert Panel

May 2022

Author

This document has been prepared by the Electricity Distribution Network Resilience Review Expert Panel and supporting Secretariat within the Department of Environment, Land, Water and Planning.

Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.



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Message from the Expert Panel

We are pleased to present our Final Report on the Electricity Distribution Networks Resilience Review (the Review) to the Minister for Energy, Environment and Climate Change (the Minister).

About this report

This report sets out the Panel's recommendations for improving distribution businesses' preparedness for, and response to, prolonged power outages arising from storms and other extreme weather events, including the role of distribution businesses in strengthening community resilience to prolonged power outages.

This work completes Phase 2 of the Review established by the Victorian Government in response to the June 2021 storm and builds on the work completed in Phase 1 by Advisian, who made eight recommendations for implementation ahead of summer 2021-22. Actions to implement these recommendations were underway by the end of 2021, and before the second major storm event which impacted Victoria in October 2021.

In Phase 2, the Panel consulted broadly with stakeholders and local communities impacted by the June and October storms and undertook an analysis of Australian and international regulatory approaches and strategies to address the increased impact of hazard events on distribution network resilience. Based on these inputs, the Panel has identified the longer-term (beyond the summer 2021-22) reform measures, policies and regulatory changes needed to ensure that distribution businesses can undertake work to mitigate the risk of, and better respond to, prolonged power outages.

Impact and learning

The recent storms in June and October 2021 had devastating impacts for the communities that were left without power for prolonged periods. Following the June storms, 68,000 electricity customers remained off supply after 72 hours and 9,000 customers were still without power seven days after the event. Following the October storms, 23,983 customers remained off supply 72 hours later and just over 2,500 customers were still without power seven days after the event.

The Panel heard from affected residents and whole communities that a key problem was the loss of all phone and internet communications due to these systems having limited redundancy to prolonged power outages. Many were unable to contact services or family and friends to check on welfare, request assistance or receive updates from distribution businesses. Electricity is increasingly essential to the way in which we now communicate and conduct daily transactions. In cold winter conditions, prolonged loss of power affected people's ability to heat homes and keep warm, prepare food, shower and wash clothes. Refrigerated food supplies were lost. For the elderly, those with disabilities and those with young families, these impacts were exacerbated. For businesses and those residents working from home (during COVID lockdown) the lack of access to the internet was a significant issue. Some residents and businesses also lost access to water and sewage services.

A significant frustration for many was receiving insufficient information from distribution businesses on which to base a decision about whether to stay or leave. Many said that information was only being provided via communication systems that had themselves been significantly disrupted. The updates that distribution businesses did provide were often inaccurate and unhelpful, with estimated time to restore power messages being clearly unrealistic and changing frequently through the duration of the outages. People understood that the extent of the damage meant it was a very difficult operational situation for the distribution businesses and greatly appreciated the efforts of their field staff. However, there was a widespread sense of disappointment and even dismay about the poor quality of information provided by distribution business head offices and the dysfunctional internal systems they appeared to be employing. For example, in addition to the need for far more realistic restoration information, many expressed extreme frustration that distribution business systems inconsistently captured information about local faults that had previously been reported to them. This resulted in the need for repeated reporting and further delays and inconvenience. Overall, the widespread experience of these communities, both during and outside of extreme events, in seeking to interact with their distribution businesses was opaque, unsatisfying, and disempowering.

In this context, the Panel noted that many individuals and businesses had chosen to invest in their own backup generation sources, often at a personal cost of exceeding \$6,000. While this provides an insight into the true value of electricity reliability and resilience under such conditions, it comes with significant safety and fire risks, as well as localised air and noise pollution issues.

Encouragingly, the Panel gained insight as to the value of local knowledge and its importance in preparedness and response in affected communities. As well as personal hardship, we heard about the strength in community support by neighbours and services and how resilience was greatly aided in those communities that had established hubs where people could go for information, food, fuel, to charge phones or computers, showers and general support.

Finally, the Panel noted the appreciation expressed by affected residents and community members for the opportunity to communicate the scale of impact these prolonged outages had on their lives and livelihoods. In this context, however, a key message reiterated by many was the sincere hope that the Panel's report would result in substantial action and enduring change.

Package of recommendations

The Panel has developed a comprehensive package of recommendations including for reforms in the immediate, medium and long term.

- a. **Immediate reform in the short-term:** The Panel's recommendations to be implemented in the short term (by 2025, within the current distribution regulatory period) include new obligations for the distribution businesses under the Victorian legislative framework, with penalties for non-compliance. Implementation would require amendments to Victorian regulation or legislation. These obligations would result in capital and operating investments, by 2025, in locations that are at the highest risk of prolonged power outages due to extreme weather, and aim to reduce the likelihood of prolonged outages such as those experienced in 2021. These recommendations will also provide the Minister with additional powers to direct distribution businesses to take actions to ensure that the impact of future outages is reduced and communities are more resilient through better planning, and access to information and support.
- b. **Enduring reform in the medium-term:** The Panel's recommendations for action in the medium term (to be established from 2025) would require distribution businesses to regularly (at least every 5 years) assess and report on the risk of extreme weather to their networks, and identify and implement solutions to reduce the risk of prolonged outages, with penalties for non-compliance. Implementation would require amendments to Victorian regulation or legislation. These obligations would result in an enduring requirement for distribution businesses to reduce the likelihood of prolonged power outages in highest-risk locations.
- c. **Longer term reform:** The Panel's proposed recommendations for longer-term reforms will seek to ensure that the national regulatory framework is amended to require investments in distribution network resilience from the next regulatory period (from 2026 onwards). To implement these changes, the Panel proposes that the Victorian Government should seek to shift the dial on the Australian Energy Regulator (AER)'s framework, through a series of National Electricity Rules (Rules) changes, which would seek to embed resilience in the framework and avoid the need for government intervention in the long term.

Further, the Panel has also considered the manner in which these recommendations will be implemented and has set out a series of principles to guide this process.

Acknowledgments

The Panel would like to thank everyone who provided input to the Review. In particular, the Panel thanks those who contributed to the community consultations held in April 2022, for sharing their personal experiences and learning. The input provided by stakeholders has enabled the Panel to develop a comprehensive and practical set of recommendations which, when implemented, will strengthen both network and community resilience in Victoria in the face of increasing extreme weather due to climate change.

The Panel would also like to acknowledge the DELWP Secretariat, whose excellent support and hard work, particularly through difficult conditions created by COVID-19, facilitated our endeavours.

We commend this report to you, Minister.

Jo Benvenuti – Chair

Claire Noone

Mark Paterson

Distribution Network Resilience Review Expert Panel

1. Introduction

The Victorian Government is investigating reforms to the state's electricity distribution network following prolonged power outages caused by severe storms in June and October 2021. Instigated in August 2021, the Electricity Distribution Network Resilience Review (the Review) examines how distribution network businesses can improve their preparedness for, and response to, prolonged power outages arising from storms and other extreme weather events. The Review also considers ways to strengthen community resilience in the face of prolonged power outages, as the incidence of major storm events, such as those that occurred in June and October 2021, is expected to increase with climate change.

1.1 Phases 1 and 2 of the Review

The Review is divided into two phases.

Phase 1 comprised two stages. Stage 1 of Phase 1 was conducted from September to October 2021 and resulted in a report, by consultants Advisian, which made recommendations to be implemented for summer 2021-22. Eight recommendations were made, and responses to all of these were underway prior to the 29 October 2021 storm. These included improvements to communication with critical infrastructure operators, enhanced public messaging to support community preparedness, and faster and more streamlined support for power-dependent customers. Stage 2 of Phase 1 was conducted from November to December 2021, identifying opportunities for longer-term regulatory reforms (beyond the summer of 2021-22) to be investigated in Phase 2.

On 20 January 2022, the Minister for Energy, Environment and Climate Change, Lily D'Ambrosio, established the Electricity Distribution Network Resilience Review Expert Panel (the Panel) to lead Phase 2 of the Review, building on the work completed by Advisian in Phase 1 prior to the Panel's appointment. The Panel is led by Chairperson Jo Benvenuti, a former Executive Officer at Consumer Utilities Advocacy Centre and an experienced consultant across consumer engagement and energy and water policy. She is joined by Dr Claire Noone, a Principal at NOUS Group who has experience in regulatory design and led reform work at Consumer Affairs Victoria; and Mark Paterson, the Managing Director of low-carbon energy systems firm Strategen who has previously worked across distribution networks in a CSIRO leadership role.

Phase 2 was completed between February and May 2022. It has considered community feedback from both the June and October storms and has sought to identify appropriate reform measures, policies and regulatory changes to enable distribution businesses to mitigate the risk of, and better respond to, prolonged power outages in the future.

1.2 Terms of reference for Phase 2

Phase 2 of the Review provides expert advice to the Minister on distribution network resilience and specifically the role played by electricity distribution businesses in Victoria following the 9 June 2021 and 29 October severe storm events, and the resulting widespread power outages. It focuses on the distributors' obligation to:

- a. improve distribution network preparedness for, and response to, prolonged power outages arising from storms and other extreme weather events
- b. strengthen community resilience to prolonged power outages.

Phase 2 of the Review also:

- considers the effectiveness of the current response and relief role and obligations of distribution businesses in relation to prolonged power outages
- considers regulatory and policy reform to ensure distribution businesses invest in targeted hardening of the network before a prolonged outage occurs. This could include strengthening infrastructure resilience through undergrounding, microgrids, batteries, large scale generators and other measures
- assesses whether distribution businesses could better anticipate specific locations on their network map that are more vulnerable to reconnection delays (e.g. by correlating various risk and geographical factors)

- considers what legislative powers may be necessary for the Minister and regulators to enact or enforce any recommendations, including actions needed during an emergency event, or in preparation for storms or extended outages
- involves consultation with distribution businesses, energy industry experts, the emergency management sector, community representatives, and local communities and businesses impacted by the storm events of June and October 2021.

1.3 Focus of the Panel's considerations on the role of the distribution businesses

The purpose of this Final Report is to present the Panel's recommendations and advice to the Government on how the distribution businesses can help reduce the likelihood and impact of prolonged power outages, to help build community resilience, consistent with the terms of reference (ToR).

Building resilience requires a collective effort from distribution businesses, government, regulators, critical infrastructure owners, local councils, relief agencies, small businesses, customers and communities to minimise the impact and likelihood of extreme climate events. However, the Panel's terms of reference are centred around the *role of the distribution businesses* in reducing the likelihood and impact of prolonged power outages, including through strengthening community resilience. Therefore, the focus of the Panel's considerations is the role of the distribution businesses. The Panel acknowledges the need for a collective effort from a broad range of stakeholders to build community resilience and has accordingly made broader recommendations to be led by other stakeholders (with input from the distribution businesses), where appropriate, including DELWP, critical infrastructure owners and local councils.

The underlying principle of a robust emergency management framework is that responsibilities must sit with those best placed to manage them. Distribution businesses have a fundamental role to play in building resilience to extreme weather events. This includes roles that the distribution businesses are best-placed to lead (such as the restoration of supply and provision of information to customers off supply, emergency management agencies and essential services providers), and roles that parties (such as government, critical infrastructure owners, local councils and relief agencies) are better-placed to lead (including emergency management co-ordination), where distribution businesses can provide critical support.

This report considers both the roles that the distribution businesses are best placed to lead, and functions best led by other parties where the distribution businesses have a role to play in providing critical support to help build community resilience.

1.4 Terminology used in this Final Report

Throughout this Final Report, we have used some phrasing or terminology for ease of reference. We have explained below how we define the term 'resilience'. In addition, a glossary of other commonly used terms is available in Appendix D.

Definition of resilience

In the context of this Review, the capacity of electricity networks to prepare for and recover from natural hazard events (such as those experienced on 9 June and 29 October) is referred to as resilience.

Natural hazard events may be caused by a number of factors, including high winds, high rainfall, hail storms, lightning strikes, localised or widespread flooding, localised or widespread bushfires, and coastal surges.

These events may lead to outages that are prolonged (longer than 12 hours) and/or widespread (in terms of the geographic area and the number of customers affected)

Resilience does not require the complete prevention or avoidance of impact on the power system, but a degree of mitigation and containment of impact for the long-term benefit of energy consumers.

1.5 Structure of this Report

The remainder of this Report is structured as follows.

- Section 2 outlines the background to this review and summarises the feedback received from the Panel's community consultations, to contextualise the lived experience of communities through the June and October storms, and the devastating consequences that they had on peoples' lives.
- Section 3 summarises the Panel's recommendations, the proposed principles for their implementation, and the resilience outcomes that their implementation will deliver. Each recommendation is further explored in the body of this Final Report, along with a discussion of considerations for implementing each of the recommendations.
- Section 4 provides a detailed discussion of the Panel's recommendations to help reduce both the likelihood and impact of prolonged power outages.

Further detail is provided in the following appendices.

- Appendix A (Section 5) provides a summary of recommendations from Phase 1 and sets out the measures that are already underway to action these recommendations. It also identifies areas where the Phase 1 report had identified a need for further assessment from the Panel in Phase 2 and cross-references the relevant section of this report where this further assessment has been provided by the Panel.
- Appendix B (Section 6) sets out the Panel's work program for Phase 2.
- Appendix C (Section 7) provides brief bios of the Panel members.
- Appendix D (Section 8) provides a glossary of terms.
- Appendix E (Section 9) provides further detail on the Panel's community consultation locations and the written feedback received from community members.

2. Lived experience of the June and October 2021 storms

The storms in Victoria in June and October 2021 highlighted the vulnerability of distribution networks to major disruption. Following the 9 June storms, at peak more than 297,000 customers were without power. On 29 October 2021, Victoria experienced another extreme wind event which had an even larger impact, with 526,000 customers losing power at the peak of the event. This latter storm approached the impact of the very large wind storms in April 2008 which saw over 665,000 customers lose supply.¹

In the 2021 instances, however, the power outages were more prolonged. Following the June storms, 68,000 electricity customers remained off supply after 72 hours and 9,000 customers were still without power seven days after the event. Following the October storms, 23,983 customers remained off supply 72 hours later and just over 2,500 customers were still without power seven days after the event. (By comparison, all customers had supply restored within seven days following the April 2008 wind storms).

	9 June 2021	29 October 2021
At peak	At peak, more than 297,000 customers lost power	At peak, more than 526,000 customers lost power.
Wires down	More than 1200 wires down as a result of the storm	More than 1000 wires down as a result of the storm
Critical and Community Infrastructure	Outages affected telecommunications, water treatment facilities, health services, supermarkets, food and grocery distribution centres	Outages affected telecommunications, water treatment facilities, health services, schools, supermarkets and food and grocery distribution centres
First day	130,000 households were reconnected within the first day	300,000 households were reconnected on the first day
72 hours later	72 hours later – 68,000 customers remained off supply	72 hours later - 23,983 customers remained off supply
7 days after the event	just over 9,000 customers still without power	just over 2,500 customers still without power.
When network damage was repaired	All network damage arising from the storm was repaired by 5 July 2021	All network damage arising from the storm repaired by 9 November 2021.

Losing electricity supply for long periods can cause huge disruption to people's lives and livelihoods, and considerable distress. As well as finding themselves without power and the ability to heat their homes, in some cases customers were also without water and sewerage services, communications and other services that are dependent on the power supply.

At the same time, staff in all the electricity distribution businesses worked hard in challenging circumstances (including COVID lockdowns) to get customers reconnected. Due to prolonged, high-velocity winds, some distribution businesses experienced widespread and significant damage to the networks. Damage was mainly caused by high wind forces that snapped or uprooted trees that fell onto the overhead lines. Damage was also caused to some underground lines on private properties, as tree roots moved and damaged equipment.² Road blockages caused access issues with a large number of fallen trees. The distribution businesses explained that they experienced difficulties gaining access to damaged networks during and immediately after the storms.

1 Esplin, Bruce 2008 "Review of the April 08 Windstorm - Melbourne, Victoria." Victorian Emergency Services Commissioner, August. <https://web.archive.org/web/20110312201856if/http://www.oesc.vic.gov.au/wps/wcm/connect/justlib/OESC/resources/6/4/64c9a7804056994bbecfbee505682c73/Review+of+the+April+2008+Windstorm.pdf>.

2 Feedback received from community member in Kalorama.

This section summarises the feedback received from the Panel's community consultations, to contextualise the lived experience of communities through the June and October storms, and the devastating consequences that the prolonged power outages had on peoples' lives.

As mentioned, losing electricity supply for long periods can cause huge disruption to people's lives and livelihoods and considerable distress. The Panel heard many stories substantiating this:.

At my house no power meant no light, lost food storage, no water, no septic (and untreated sewage leakage!!), no internet, mobile phone was also out, so no communication.

*We did thankfully have heating as we use wood fire for warmth but I knew many who struggled with the cold, especially the elderly who had moved away from wood heating as they couldn't manage the lifting.*³

*It's important too to appreciate that for many of us, no power means no water as the pumps stop. My house is not on mains water or sewer & has black water treatment on site, so no power also means the septic system does not work... the tank has capacity for about 3 days before... well.. you can imagine!!!!*⁴

*And the other nightmare was not having any cash!!!! No power meant no eftpos & no atm & no power to charge phone to use applepay or bank transfer & the Telstra network was also out, so most mobiles were useless. So, cash economy, but who carries cash these days??!!*⁵

*I couldn't stay on the property. Everything ran on electricity. Was hard not having running water for the essentials. I could cook on gas, use candles to see, wood heater kept me warm, but couldn't go to the bathroom*⁶.

*Our property was without power for 17 days. In our case we were fortunate to have gas as well as electric hot water and backup gas cooking. However, we were unable to heat the house which has gas ducted heating powered by an electric fan. It was particularly cold.*⁷

*Our oven and hot plate is electric - we could use our BBQ - fortunately there was gas in the gas bottle*⁸.

*To work from home, I require constant internet connection. Without the WIFI Booster, I was not able to work and my children were not able to do their required school work as they could not charge their computers and did not have internet access due to the power outage*⁹.

*Local General Store/Australia Post was unable to process tracked package deliveries due to online system being down*¹⁰.

*Many residents were paying to go "swimming" at Eltham leisure centre to just use their showers*¹¹.

The loss of power in homes also affected refrigeration leading to food spoilage and the inability to store food at home:

*All of our food was destroyed*¹².

*Power was eventually restored, by this stage I lost everything in my freezers*¹³.

*To allow people to store their food, we sold ice and drinking water at cost price, especially when we found that there was no ice available in the shire, people were saying that all the ice was sold out in DC and Eltham*¹⁴.

*We could not have hot meals or keep perishable food. Could not restock perishable food supplies as no way to keep cold. No supermarket in Pyalong, 50km round trip to Heathcote or Kilmore. Local store keeps some perishables but lost all their stock*¹⁵.

3 Feedback received from community member in Warburton/ Yarra Junction

4 Feedback received from community member in Warburton/ Yarra Junction

5 Feedback received from community member in Warburton/ Yarra Junction

6 Feedback received from community member in Traralgon

7 Feedback received from community member in Kalorama

8 Feedback provided by a community member in Yinnar South

9 Feedback provided by a community member in Yinnar South

10 Feedback provided by a community member in Pyalong

11 Feedback received from community member in Eltham

12 Feedback provided by a community member in Yinnar South

13 Feedback received from community member in Traralgon

14 Feedback received from community member in Eltham

15 Feedback provided by a community member in Pyalong

The loss of power was particularly problematic from a health perspective for those with septic water systems in place:

Power outages of 1 week or more cause significant problems not only with the normal first world problems such as fridges and freezers not working, but from a health perspective when a septic water treatment system is in place. These systems need power 24/7, they use all the wastewater from the home then disperse it within the property on garden beds and lawns. With long power outages this obviously cannot happen, and the wastewater builds up. Normally the water gets pumped to the gardens at least twice a day, when it can't, the tanks fill very quickly, they start to smell, and we found toilets/sinks/showers were not working to remove the water as they should as the waste was staying (or starting to come up) in the pipes.

Once the power comes back on the septic systems go into overdrive to remove the wastewater that has built up over a few days and pumps continuously into the garden. This causes another issue with the garden/lawns not being able to cope with the amount of wastewater needing to be removed from the tanks. We have found the ground gets saturated and then runs off down our property and into the stormwater drains. While this water is "Treated" it is to be contained on property and cannot be used where children play, veg or fruit are grown. YV water do not want this surplus water in the stormwater drains. We had to get after a few days our septic pumped out to avoid raw untreated sewerage in our home and garden¹⁶.

Yarra Valley water has put these water treatment systems in around 100 properties to run all day and night on power but certainly didn't think about what happens when we have no power, nor did they think about the extra cost of electricity to run these systems¹⁷.

We are thankful we have been part of the Yarra Valley Water septic to sewerage trial and now connected to mains sewerage so we are no longer reliant on the septic system. Power outages when on septic creates significant and serious health risks with occupants of homes being without access to flushing toilets for an extended period of time¹⁸.

These consequences were particularly pronounced for people who were left stranded in their homes owing to fallen trees:

It is believed that there were so many fallen trees as to fill the MCG. Many of these trees fell on or near roads not only restricting movement but causing massive and extensive power outages. At the beginning movement was impossible but gradually fallen trees were cut to allow single traffic through. The magnificent work of the local CFA and SES has been well documented but, basically, they were overloaded in what they could do.¹⁹

Our driveway is quite long, it is 1.5kms in length and was blocked by approximately 30 trees. It took us 3 days to be able to cut our way out so we had no means of communication and no way of getting fuel for our generator²⁰.

I was stuck on my property due to fallen trees as the roads were blocked. Took a couple of days to be cleared. Neighbour called and checked on me, my son came up to clear some of the mess from the storm²¹.

At the same time, the loss of power also led to the loss of all mobile phone and landline services. Some had to drive or walk several miles to find information:

Lack of phone service became a real issue. The Hurstbridge telephone exchange stopped working, taking out all land lines. Most of the mobile phone towers cut out after about 8 hours. The lack of ability to communicate within and to outside of the area was felt to be a real handicap.²²

16 Feedback provided by a community member in Park Orchards

17 Feedback provided by a community member in Park Orchards, referring to Yarra Valley Water initiative to replace old septic systems with new water treatment facilities on customer sites, which rely on power. https://media-2.yvw.com.au/inline-files/20220104_Extended%20power%20outages%20and%20generator.pdf

18 Feedback provided by a community member in Park Orchards

19 Feedback received from community member in Kalorama

20 Feedback provided by a community member in Yinnar South

21 Feedback received from community member in Traralgon

22 Feedback received from community member in Eltham

I'm at an age where I don't sit on social media and be on top of everything.²³

We had no telephone reception for most of the outage largely due to the loss of power to the Telstra Telephone Exchange at Ryanston and the Telstra mobile tower on Bass Hill. AusNet and the telecommunications businesses need to work together to ensure that communications are not lost during an outage. While this is primarily a telco responsibility, distribution businesses as good community members should take the lead in getting a better response from the telcos.²⁴

Even during normal times, mobile phone coverage is very poor in this area and calls frequently drop out. At such a critical time, good mobile phone reception is a critical means of communication.²⁵

Difficult to circulate information to the community with no phones or internet, most had to drive or walk to find information. People had to drive to other side of town, high points on hills to get any phone service or receive and send SMS messages and phone calls.²⁶

The lack of information provided by the distribution businesses meant that customers were not equipped to make alternative plans:

There was no communication from my electricity provider, until late in the week and I had no idea when the power was coming on.²⁷

AusNet uses texts to customers to provide targeted outage information. We did not receive any texts about the 9 June 2021 outage [on our property] which lasted 4 days 14 hours 59 minutes. We did receive infrequent general texts but these did not provide sufficient useful information that would allow us to make good decisions about how we managed the outage.²⁸

Like many customers, I have a lot of thoughts on the messaging around the AusNet expected timeframes to restore power. AusNet use SMS to provide outage information to customers who have provided a mobile number. But to register a mobile, customers are expected to contact their retailer. Outages can be a health and safety issue. Distribution businesses should allow customers to directly provide mobile numbers and email addresses so that they can receive outage messages. In addition, distribution businesses should allow customers to provide multiple mobile numbers so that all members of households can receive outage messages.²⁹

I believe there is scope for the distribution businesses to provide information in a more customer friendly manner.³⁰

Our power was out for around 8 days. We did not have any communication with AusNet apart from messages which kept changing the dates that the power would return³¹

The inability to provide the distribution businesses with valuable local knowledge of faults also delayed restoration and left customers frustrated:

In October, at least three residents in this street and probably more reported the tree down to AusNet. Both the police and CFA inspected the tree in ensuing days. The crew that finally turned up on Day nine did not know that there was a tree involved, forcing them to wait for lopping crew to turn up.³²

Distribution businesses need to consult customers about storm outages. I am not aware of any Distribution business holding a customer consultation about the storms in 2021. Distribution businesses should not underestimate the local knowledge held by customers. This knowledge that may allow distribution businesses to more efficiently solve problems.³³

The only option left available for some customers was to invest in their own back up power, but this was not without costs, limitations, delays and risks:

23 Feedback provided by a community member in Traralgon

24 Feedback provided by a community member in South Gippsland

25 Feedback received from community member in Kalorاما

26 Feedback provided by a community member in Pyalong

27 Feedback provided by a community member in Traralgon

28 Feedback provided by a community member in South Gippsland

29 Feedback provided by a community member in South Gippsland

30 Feedback provided by a community member in Traralgon

31 Feedback provided by a community member in Cockatoo

32 Feedback provided by a community member in Cockatoo

33 Feedback provided by a community member in South Gippsland

Resilience is a two way process. Both distribution businesses and customers have responsibilities. But it feels like the burden of resilience falls more heavily on customers³⁴.

After the October outage, I purchased a generator to avoid this problem going forward³⁵.

Due to poor electricity reliability, many rural residents have a portable generators for power outages. But generators can be problematic. A good generator can be expensive. Generators require fuel and during long periods can use a lot of fuel which may not always be available. There are potential safety issues. Distribution businesses could provide rural customers with advice and assistance to purchase and maintain generators³⁶.

Following the June storms, it took us four days to receive the back up generator and get it installed. By then the power was restored on the fifth day³⁷

Customers incurred significant costs as a result of the outages. These include loss of food, fuel for generators and alternative accommodation. For those working from home, prolonged power outages also led to significant losses of income:

Customers can face significant costs resulting from long outages. These include loss of food, fuel for generators and alternative accommodation. In many cases, customers are not adequately compensated for these costs.³⁸

After having lived through a number of power outages we have had to purchase a generator which is put on once a day for a few hours to keep fridge/freezers going and to minimise food waste, charge phones as we no longer have a landline and need at least one working phone for emergencies, and power any lights etc needed for the evening ahead. Unfortunately, our septic is hard wired into the house and the generator isn't big enough nor can we use it directly into our grid.³⁹

I think if you did a poll a high % of residents would say they have had to pay a considerable large amount of money for a generator which demonstrates how unreliable our power supply is.⁴⁰

On another note, two people in our house work from home. No power = no work = [no] income. There is no reimbursement for loss of income for any power outage. As these outages are becoming more common and now with covid so many people are working from home, it is important for government/power companies to address this asap.⁴¹

Small businesses also incurred significant losses:

I run a dairy farm with my wife and two children. We have around 160 cows. During the June storms we were without power for five days. Cows are not like a machine you can't just stop milking them and then restart, they start losing production after the first 24hrs. Our total lost production and income over the June month alone was 60% and bills piled up from there. To cover losses we reverted to personal loans and were unable to repay until January, Thankfully we had an amazing season and high prices to buffer, but with high inputs now it's not a healthy bank account⁴²

Local hotel was closed as they had no ability to cook or provide food and EFTPOS/tills were out of action. Hotel lost significant perishable food stock.⁴³

The storms of 21 had a severe impact on our income. We lost customers/trade, stock in freezers and fridges and had to pay staff. We had to travel to Castlemaine, Bendigo and Ballarat to hire generators, which cost \$25-30K to purchase. We use authentic bread making processes and want to be environmentally sustainable. Generators are the opposite image and create noise and fumes that are unacceptable to customers as well create safety issues. We tried to respond by just doing coffees, which

34 Feedback provided by a community member in South Gippsland

35 Feedback provided by a community member in Traralgon

36 Feedback provided by a community member in Traralgon

37 Feedback provided by a community member in Yarram

38 Feedback provided by a community member in Traralgon

39 Feedback provided by a community member in Park Orchards

40 Feedback provided by a community member in Park Orchards

41 Feedback provided by a community member in Park Orchards

42 Feedback provided by a community member in Yarram

43 Feedback provided by a community member in Pyalong

*was not viable. Husband also had ill health/cancer and tried to manage overnight baking - he has since passed away. This has been a devastating time.*⁴⁴

Some customers also suffered significant damage to their homes and private property:

*I live in Emerald in the Dandenong Ranges, on the south side of one of the higher hills. We were fortunate to not sustain any home damage during the June storms, but three homes close to us sustained significant damage and one remains unoccupied at this point. We counted ourselves lucky that power was only out for three days.*⁴⁵

*Some residents suffered significant damage to houses and outbuildings, not just power outage. Significant numbers of trees down on private land, fences destroyed.*⁴⁶

While the community appreciated the state government's prolonged power outage relief payments, the eligibility criteria for these payments meant that they were not accessible to all customers:

*Whilst well-meaning, the state government's \$1680 prolonged outage payment just simply divided our already battered community into haves and have nots. I saw this generate resentment between good friends – for example, one couple who were connected on Day six and didn't get any acknowledgement of what they have been through were pretty annoyed with friends who were past the seven day mark*⁴⁷.

Some customers had major concerns about their own safety:

*I believe the major fault in our area was due to a roadside tree that overhung the power lines falling on to the power lines. This resulted in two lines breaking and landing on the Dalyston-Glen Forbes Rd. These lines lay on the road for nearly four days with many people driving over the lines for the four days. I am not sure why it took AusNet so long to get a maintenance crew out to make the road safe and fix the power lines. How does AusNet prioritise restoration work?*⁴⁸

In particular, vulnerable customers including life support and power dependant customers, children, the elderly and people with disabilities were exposed to significant risks:

*Our experience with the continual power outages was our baby was born and in neonatal intensive care (NICU) in hospital for five months last year. We knew he was coming home on high flow breathing support which requires 24hr power to the machine. Knowing how unreliable our power is we filled in the life support notification paperwork with EnergyAustralia believing that in the event of the continual outages we have in Park Orchards we'd receive priority in getting power back on. Within a week of our baby finally being home we experienced a power outage and much to our disgust there was absolutely no priority given to our house to restore power, nor could the supplier advise an ETA to restore power. Fortunately we had spent a large amount of money on a generator but even having this caused a considerable stress to ensure we had sufficient petrol to run it 24/7, and as my husband is a firefighter who works nightshift I then had to not only care for a high needs baby on breathing support and with a feeding tube (and two other children) but also manage the extreme stress and concern wondering if the generator was going to cut out. The option of relocating elsewhere during power outages was not a viable option with us with our baby's equipment and medical needs, the only option was to take him back to hospital.*⁴⁹

*The network operator refused to provide the ICC with the list of power dependant customers or life support customers. This is a critical failure that was raised in one of the after action reviews that I haven't seen action taken on. It was eventually obtained after the police made the request however, that should be seriously investigated as a major breach of the NEL.*⁵⁰

*I did not have access to hot water for sterilizing by baby's bottle.*⁵¹

After the storms, I saw neighbours struggling to keep pets alive, elderly people in our street bewildered at having to try to start generators, distressed people with disabilities trying to manage without their normal

44 Feedback provided by a Trentham bakery owner

45 Feedback provided by a community member in Emerald in the Dandenong Ranges

46 Feedback provided by a community member in Pyalong

47 Feedback provided by a community member in Cockatoo

48 Feedback provided by a community member in South Gippsland

49 Feedback provided by a community member in Park Orchards

50 Feedback provided by a community member in Trentham

51 Feedback received from community member in Eltham

support systems. These experiences caused major trauma, on top of Covid, and it would not surprise me if there were deaths indirectly associated with it.⁵²

My mother-in-law was not able to use her [Continuous positive airway pressure (CPAP)] CPAP machine and could not get out of her property for several days, so was quite unwell as a result. As for my children not being able to do their school work, they were in year 11 and year 12 at the time so this had a large impact on them.⁵³

I personally know a few local pensioners who ate food that would be considered dangerous, as they could not afford to waste the food and didn't know what else to do.⁵⁴

The lines were laying on the ground for eight days near water where kids walk which I found to be rather dangerous.⁵⁵

A technical and further education (TAFE) Student was unable to complete online coursework or assessment, institution would not accept hand written work. Other local students were unable to complete any online work, during Covid and remote learning students and parents were reliant on online learning.⁵⁶

In some areas, scheduled maintenance took place shortly after a prolonged power outage, not allowing communities time to recover from their devastating consequences:

In the October storms, a large tree came down in our street, resulting in the power being off for nine days. It was tiring, and difficult, and frustrating. After only four full days of restored electricity, AusNet then turned our power off again for pre-storm planned maintenance, despite our protests to their call centre.⁵⁷

To address these concerns raised by communities, the Panel has developed a comprehensive package of recommendations including for reforms in the immediate, medium and long term. These are summarised in the section below.

52 Feedback provided by a community member in Emerald in the Dandenong Ranges

53 Feedback provided by a community member in Yinnar South

54. Feedback received from community member in Eltham

55 Feedback provided by a community member in Cockatoo

56 Feedback provided by a community member in Pyalong

57 Feedback provided by a community member in Emerald in the Dandenong Ranges

3. Summary of recommendations

The Panel's recommendations are summarised in this section. Each recommendation is further explored in the body of this Final Report, along with a discussion of considerations for implementing each of the recommendations.

The Panel has made eight recommendations in relation to the role of the distribution businesses in reducing both the likelihood and impact of prolonged power outages. Recommendations 1-3 seek to reduce both the likelihood and impact of prolonged outages through investments in resilience. Recommendations 5-8 seek to reduce the impact of prolonged power outages through actions undertaken in preparation for and during an outage event. These are outlined in sections 3.1 and 3.2 respectively.

The Panel has also considered the manner in which these recommendations will be implemented and has set out a series of principles to guide this process, which are explained in section 3.3.

3.1 The role of the distribution businesses in reducing both the likelihood and impact of prolonged power outages through resilience investments

Distribution businesses can reduce both the likelihood and impact of prolonged power outages by making investments in resilience. These investments can either be traditional investments in the network, or investments in non-network technology options such as microgrids and standalone power systems. However, distribution businesses are not proactively investing to mitigate the risk of prolonged power outages for a range of reasons including that the national regulatory framework, as it currently stands, does not embed resilience as an objective.

The Panel's view is that the national regulatory framework needs to be modified to support distribution businesses' investments in resilience, as set out in Section 4.3. The AER has engaged constructively with the Panel on the need for the national regulatory framework to support resilience, and has recently released a guidance note setting out how resilience can be supported under the current framework.⁵⁸ The Panel welcomes this guidance note and recommends that the national regulatory framework is formally amended to embed resilience as an objective. However, this will take time and there is an urgent need for reform. Victorian communities expect improvements in the immediate future in the context of the increased likelihood of prolonged power outages caused by extreme weather events. We have heard from customers and their representatives, including councils and other peak bodies, that it would not be acceptable to wait years for any changes to come through the national regulatory framework. We are now in the first year of the current 5-year regulatory period of the Victorian distribution businesses (2021 to 2026). It would not be appropriate to wait until after 2026 to see what, if any, changes might flow through the national regulatory framework in the next regulatory period (2026 to 2031), which may result in solutions on the ground in Victoria. There is an immediate need for action to build network and community resilience to prolonged power outages.

To meet the expectations of Victorian communities, the Panel has outlined a comprehensive package of recommendations for immediate, enduring and longer-term reform, in recommendations 1, 2 and 3, respectively. Further detail on Recommendations 1-3 is provided in **Table 1** below and a full discussion of these recommendations is provided in Section 4.

⁵⁸ Australian Energy Regulator. "Network Resilience - Note on Key Issues," April 2022. <https://www.aer.gov.au/system/files/Network%20resilience%20-%20note%20on%20key%20issues.pdf>.

Table 1 Recommendations to help reduce both the *likelihood* and *impact* of prolonged power outages, through resilience investments

Immediate, short-term reforms to drive investment in the current regulatory period (before 2025):	Recommendation 1: A Network Resilience Investment Strategy should be developed in the short term, with actions that can start immediately, to drive distributor investments in resilience solutions, informed by risk analysis and community needs. This should result in investments and solutions in the most high-risk locations by 2025.	
	1.1 Identify high-risk locations	The distribution businesses should be required to develop a Prolonged Power Outage Risk Assessment (PPORA) identifying areas of the network at highest risk to credible scenarios of climate risk events. This should be done by: • Developing credible scenarios of high risk weather events (including high winds, high rainfall, hail storms, lightning strikes, localised or widespread flooding, localised or widespread bushfires, and coastal surges) for the network, with a separate risk forecast for each type of event, drawing on climate risk information; and • Identifying the areas of the network at the highest risk of prolonged outages due to climate risk, geographic factors and the nature of the distribution assets (including asset age and asset type).
	1.2 Conduct geospatial analysis	DELWP should develop a geospatial analysis of climate risks, including PPORA data provided by the distribution businesses and other data provided by other agencies on critical infrastructure and community needs.
	1.3 Support local councils to identify the needs of community hubs	The distribution businesses and DELWP should be required to support local councils in high-risk areas to identify the needs of local community hubs in close consultation with the local community. In doing so: • the distribution businesses should engage with the local councils, providing them with the findings of their PPORA analysis from Recommendation 1.1; and • DELWP should assist the local councils by engaging with them with regard to the results from the geospatial analysis from Recommendation 1.2.
	1.4 Identify range of potential investments	The distribution businesses should be required to identify a range of potential investment solutions to address risk at the highest risk locations. This should be informed by: • the geospatial analysis developed by DELWP in Recommendation 1.2, which will provide insight into the essential services needs and critical infrastructure vulnerabilities at each high-risk location; and • feedback from the local community and the local councils in each of the high risk locations, which should be actively sought by the distribution businesses to inform the development of potential investment solutions.
	1.5 Identify preferred investment solution(s)	The distribution businesses should be required to submit one or more preferred investment (or operating) solution(s) to address risk in each high-risk location, to DELWP, based on their analysis from Recommendation 1.4. This proposal should include the requirements listed in Section 4.1.5.

	1.6 Conduct cost-benefit analysis (CBA) and identify investment sources	DELWP should conduct a cost-benefit analysis of the preferred investment solution(s) identified by the distribution businesses in Recommendation 1.5. The distribution businesses should be required to provide input into DELWP's cost-benefit analysis. This CBA should provide a holistic and contextual assessment of costs and benefits, including an assessment of external/non-network benefits. This should include an assessment of the costs and benefits to communities, networks and electricity consumers together. Based on this CBA, for each investment where benefits are outweighed by costs, DELWP should identify funding sources, setting out the investment contributions required from the range of co-investing parties. Funding for resilience may be drawn from a mixture of: • investment from the distribution businesses (to be recovered under the national regulatory framework); • funding contribution from communities (who will benefit directly from improvements in resilience and potential environmental benefits resulting from the investments); • funding from other private investors (such as retailers who might be interested in commercial opportunities with the assets), where private benefits that can be captured; and • funding contribution from the government (where the benefits of any solution are wider than those accruing to electricity consumers, such as in reducing the cost of the government's emergency response functions).
	1.7 Introduce new regulatory obligations to invest	The Victorian Government should impose regulatory obligations on the distribution businesses requiring them to invest in the preferred resilience solutions at the highest-risk locations, as identified in Recommendation 1.6, with penalties for non-compliance. This should take account of the community, private investor and government investment contributions identified from the cost benefit analyses in Recommendation 1.6.
Medium term, enduring reform to embed resilience investments in the Victorian framework (from 2025 onwards)	Recommendation 2: The distribution businesses should be required to take an all-hazards approach to risk mitigation for the purposes of safety, reliability, security and resilience of the electricity system. This should result in a regular assessment (at least every 5 years) of the need for investments and solutions in the-most high risk locations, from 2025 onwards.	
	2.1 Develop a 5-yearly Network Resilience Plan	The distribution businesses should be required to develop a Network Resilience Plan at least every 5 years. The object of the Plan will be to mitigate hazards to the distributor's network that could result in prolonged power outages under a range of scenarios. This Plan may incorporate relevant parts of a distributor's Bushfire Mitigation Plan (depending on the legislative or regulatory approach taken to implementation).
	2.2 Incorporate and refresh the PPORA	The Network Resilience Plan in Recommendation 2.1 should incorporate and refresh the distributor's PPORA in Recommendation 1.1.
	2.3 Submit plan, comply with regulatory requirements	The distribution businesses should be required to submit the Network Resilience Plan in Recommendation 2.1 to a regulator for approval, consistent with the framework for Bushfire Mitigation Plans. The distribution businesses should be required to comply with the regulatory requirements, with penalties for non-compliance.

Driving investments in resilience in the longer-term, from the next regulatory period (from 2026 onwards)	Recommendation 3: The national legislative framework should be amended to drive distributor investments in resilience in the longer-term. To implement these changes, the Panel proposes that the Victorian Government should seek to amend the AER's framework, through working with the AER and through a series of proposed Rule changes, to embed resilience in the national framework from the next regulatory period (from 2026 onwards) and avoid the need for Victorian Government intervention in the longer term.	
	3.1 Assess willingness to pay	DELWP should work with the AER to support the assessment of customer willingness to pay to avoid wide area, long duration outages (WALDO). This work should be led by the AER, with input from DELWP to incorporate data and learnings from the 2021 Victorian storms.
	3.2 Account for resilience as a capital expenditure objective	DELWP should propose a Rule change to the capital expenditure objectives under rule 6.5.7 to specifically account for resilience.
	3.3 Introduce a new regulatory mechanism to drive resilience	DELWP should propose a Rule change for the AER to incorporate a new regulatory mechanism to drive proactive investments in network resilience.

3.2 The role of distribution businesses in reducing the impact of prolonged power outages through actions undertaken in preparation for and during an outage event

The impact of prolonged power outages can be reduced by building community resilience.

Building community resilience to extreme weather events requires a collective effort from distribution businesses, government, regulators, critical infrastructure owners, local councils, relief agencies, small businesses, customers and communities.

Distribution businesses have an important role to play in reducing the impact of prolonged power outages and supporting community resilience. In the event of a power outage, the current obligations of distribution businesses are largely focussed on restoring supply in priority order and providing information to customers off supply. These are roles that the distribution businesses are best placed to lead, as they cannot be performed by other parties.

In addition to these roles that are best led by the distribution businesses, other parties (such as government, local councils and relief agencies) have an important role to play in building community resilience. The Panel's view is that the distribution businesses can also play an expanded and more proactive role in providing critical support to these other parties in their role in building community resilience, to improve outcomes for customers impacted by prolonged power outages.

The Panel has developed five overarching recommendations (see recommendations 4 to 8 below) to help reduce the impact of prolonged power outages, through actions undertaken in preparation for, during, and after an outage event.

The Panel's recommendations 4-8 will mean the distribution businesses have new, immediate obligations to ensure positive community outcomes, with penalties for non-compliance. These recommendations will also provide the Minister with additional powers to direct distribution businesses to take action to ensure the impact of future outages is reduced and communities are more resilient through better planning, and access to information and support.

Further detail on Recommendations 4-8 is provided in **Table 2** below and a full discussion of these recommendations is provided in Section 4.

Table 2: Recommendations to help reduce the *impact* of prolonged power outages, through actions undertaken in preparation for, during, and after an outage event

Recommendation 4: The distribution businesses should be required to partner with communities and local councils in emergency planning and response		
Partnering with communities		The distribution businesses should be required to provide structured input and periodic updates for municipal and regional emergency management plans (and associated relief and recovery plans, including by:
	4.1 Support municipal and regional emergency Planning	• providing their PPORA analysis from Recommendation 1.1, which identifies highest risk locations of the network, to the relevant Municipal Emergency Management Planning Committees (MEMPCs) and Regional Emergency Management Planning Committees (REMPCs); • seeking MEMPC and REMPC input into Recommendation 1.4, on how to best tailor potential investment solutions at each high risk location to help meet to the needs to local communities; and • providing input and support to the business continuity plans for relief centres and community hubs at each high risk location, including those identified in Recommendation 1.3, to ensure that they can continue to operate during a prolonged power outage.

Prioritisation of the restoration of power	4.2 Provide support to emergency response	The Regional Controller or Incident Controller should be given a new directions power to require the distribution businesses, if requested following a major energy emergency, to: • participate in a relevant meeting or shift briefing of any Incident Emergency Management Team (IEMT) or Regional Emergency Management Team (REMT), on a daily basis for the duration of an emergency response; • attend a relief centre or community hub, or a community meeting, to provide information to impacted community about the incident and response activities; and • take reasonable steps to ensure that relief centres and community hubs can continue to operate during a prolonged power outage. This may involve the prioritisation of relief centres and community hubs in restoration activities (at the expense of other customers).
	4.3 Backup generation	DELWP should divest the existing fleet of small generators, noting the lack of equitable access and effectiveness, risks and costs associated with the Victorian Government's small generator program. The distribution businesses should continue to explore the use of larger mobile back up generation to assist with restoration of essential services, community hubs, network sections. The distribution businesses should also explore the increased use of microgrids and standalone power systems to mitigate the likelihood of prolonged power outages at high-risk locations, as supported by Recommendations 1, 2 and 3.
	Recommendation 5: The distribution businesses should have new obligations to improve the prioritisation of the restoration of power following an outage	
	5.1 Improve the life support register	The life support register and registration process should be reviewed by the ESC, with support from DELWP and Department of Health (DH), with a view to improving the efficiency of relief activities during a prolonged power outage.
	5.2 Maintain a priority service register (PSR)	DELWP and the ESC should develop definitions of 'vulnerable persons', 'critical infrastructure', and 'community assets' for the purposes of establishing a Priority Service Register (PSR). DELWP and the ESC should consider how a PSR can be developed in practice, including whether parties would be required to self-register or if this information can be provided by other agencies. The distribution businesses should be required to work with DELWP and the ESC to establish the PSR, and then must maintain and update the PSR, to help inform restoration priorities.
	5.3 Prioritise the restoration of power having regard to the PSR and State Emergency Management Priorities	Distribution businesses should make best endeavours to prioritise restoration activities having regard to the PSR and the State Emergency Management Priorities, where feasible and practical. This should be achieved via a general obligation on the distribution businesses.
	5.4 Avoid non-urgent scheduled maintenance	The distribution businesses should avoid, to the extent possible, non-urgent scheduled maintenance for a period after prolonged power outages, to allow time for communities to recover from their devastating impacts.

Information provision	Recommendation 6: The distribution businesses should improve their communication with customers before and after prolonged power outages	
	6.1 Improve communication with customers	The distribution businesses should have a new general obligation to provide information to their customers who are off supply due to extreme weather events, including safety messaging, information on the severity of the outage, and information on the actions being taken to assess damage and restore power in the local area. This should include information on the phases and stages of restoration. The distribution businesses should have a new general obligation to receive information from the local councils on real-time community data and sentiment. The distribution businesses should have a new general obligation to assist local councils with pre-preparing customers at high risk of prolonged power outages (and frequent unplanned outages).
	6.2 Provide additional information if requested	The Secretary DELWP, or delegate, should be given a new directions power to require the distribution businesses, if requested following a major energy emergency, to provide additional information or support to assist communities with restoration activity
Relief support	Recommendation 7: Improve delivery of relief to customers affected by prolonged power outages	
	7.1 Victorian Government should review the co-ordination and availability of relief programs for prolonged power outages	The Victorian Government should review the coordination of relief programs during a prolonged power outage, with a view to improving outcomes and the experience of the community so that they are clear on what relief is available and how it can be accessed. The review of relief programs should also consider whether there are gaps in relief funding. In particular, the role of relief payments and rebates for small businesses should be assessed.
	7.2 Victorian Government should commit to funding PPOP	Victorian Government should commit to funding the Prolonged Power Outage Payment (PPOP). In formalising the PPOP, the Victorian Government should re-assess the threshold for the PPOP, including whether the seven-day eligibility criteria is appropriate, in the context of other relief payments that are also available, based on the review from Recommendation 7.1.
	7.3 Distribution businesses should administer payment	The distribution businesses should be required to administer the PPOP to their customers who are without power who meet the Victorian government's eligibility criteria.
	7.4 Distribution businesses should support relief programs	The Secretary DELWP, or delegate, should be given a new directions power to require the distribution businesses, if requested following a major energy emergency, to provide customer information and/or take reasonable steps to deliver or assist in the delivery of relief activities, where they are best placed to do so.
After action reviews	Recommendation 8: The distribution businesses should be required to conduct after action reviews (AARs) to improve outcomes for customers impacted by prolonged power outages	
	8. Conduct and publish after action reviews	The distribution businesses should be required to conduct an after-action review of any major energy emergency, and to publish a summary of that review including improvement actions (lessons), within six months of the event. This should include customer surveys and focus groups.

3.3 Principles for implementing the Panel's recommendations

While this report outlines a comprehensive plan of action to mitigate the risk of prolonged power outages and improve resilience, many details will need to be worked out in the implementation process. As such, this section outlines the Panel's view on key principles that should guide DELWP and related parties in the implementation of these recommendations in a manner that delivers enduring change. The Panel's proposed principles for implementation are the following:

- move quickly for demonstrable outcomes;
- take a whole of government, whole of sector approach;
- significantly enhance the focus on customer experience;
- actively engage the community in decision-making;
- build in flexibility to future-proof implementation; and
- support implementation with sound governance and resources.

3.3.1 Move quickly for demonstrable outcomes

There is a clear and reasonable expectation in the community that the outcomes of this Review will result in prompt and substantial change for the better in the management of extreme weather events.

The Government's response to the June and October 2021 wind storms is already underway. Following Phase 1 of the review – conducted from September to October 2021 – a report was delivered to the Government with short term recommendations to be implemented for summer 2021-22. These included improvements to communication with critical infrastructure operators, enhanced public messaging to support community preparedness, and faster and more streamlined support for power-dependent customers. All the recommendations were underway before the October storms.

The implementation of Phase 2 will necessarily be a longer-term project, aiming to fully embed better practices for mitigating the effects and likelihood of prolonged outages within five years. To address Recommendations 1-3, which will reduce both the likelihood and impact of prolonged outages through investments in the resilience, legislative and regulatory reform will be needed. The Panel expects that the first round of resilience investments arising from Recommendation 1 can be made by 2025 if the framework and preparatory work is developed promptly following the conclusion of the Review.

The Panel notes that the benefits of Recommendation 5-8, which will reduce the impact of prolonged power outages without the need for investment, will be realised sooner if implementation is pursued in a determined way. We cannot know for sure when the next major weather event will occur that will disrupt distribution networks. The sooner that the recommendations of the Review are put in place, the more likely the community is to benefit if, regrettably, more challenging conditions come about.

The key is to ensure that the urgency the Panel has heard in the community is matched by the government in responding to the community's needs. Waiting until the energy has dissipated would be a disappointing outcome, and one that might only lead to re-learning the same lessons.

3.3.2 Take a whole of government, whole of sector approach

Over the past 15 years there have been many instances of extreme weather and bushfire events that have significantly impacted electricity supplies in Victoria. These have been subject to post-event reviews and commissions of various kinds instituted by both the Victorian and Commonwealth governments and agencies. Examples include the Review of the Effectiveness of NEM Security and Reliability Arrangements in light of Extreme Weather Events (2009), The Black Saturday Royal Commission (2010) and the Inquiry into the 2019-20 Victorian fire season (2020-21).

In this context, the Panel heard from numerous Victorians their sincere hope that this report will underpin and advance a next generation of enhancements to the resilience of the state's power system. Delivering the outcomes that Victorians want, however, will require a robust, holistic and multi-stakeholder approach to implementing the recommendations. Further, ensuring that the benefits are enduring will require an implementation approach that simultaneously advances positive cultural change across all relevant organisations, including but not limited to the distribution businesses that serve the state. In this context, there is a need to take a whole of government, whole of sector approach. Coordination across key players in the provision of services will produce the best support outcomes for community.

3.3.3 Significantly enhance the focus on customer experience

Customer and community representatives reported great appreciation for the efforts of distribution business field staff during the 2021 extreme weather events and subsequent recovery. By contrast, however, a widespread sense of disempowerment was reported by many who sought to engage with their distribution business both during the extreme events and concerning more day-to-day service quality matters.

As noted earlier, during prolonged outages the Panel heard numerous examples of customers being provided with information that was self-evidently and repeatedly inaccurate. Outside of these extreme events, many regional customers reported having to 'get used to' repeated power outages, often without their distribution business providing clarity on why, how often and to what purpose. This included reports of inordinately long wait times for call centre staff, often compounded by dysfunctional fault identification and fault reporting systems being used by distribution businesses which only further frustrated customers.

In this context the Panel believes there is significant scope for the distribution businesses to expand their focus on customer experience both during and outside of extreme events. This is perhaps especially so for customers served by higher risk network segments. In all cases, the Panel is of the view that a concerted effort will be required by distribution business management and staff to implement the recommendations in a manner that gives organisational priority to significantly enhanced customer experience. Importantly, this must prioritise, drive and embed the cultural change that is foundational to ensuring the experience of Victorians in engaging with their distribution business is transparent, responsive and empowering.

3.3.4 Actively engage the community in decision-making

Supporting communities to take control and exercise greater autonomy in preventing, planning for, preparing for and recovering from emergencies, is a central feature of the approach of Victoria's emergency management framework.

Throughout our stakeholder consultation, the Panel has been impressed by the level of interest, knowledge and positive contributions made by agencies and the community more broadly in the interest of improving outcomes for other electricity consumers in potential future hazard events. This is particularly evident in smaller communities which are more dependent on each other in difficult times, such as responding to bushfires and other hazards. We note the distribution businesses have also outlined the progress being made in their engagement with consumers in relation to the development of their business cases in accordance with the AER's network pricing framework requirements. However, as resilience to future climate risks is a relatively new topic for regulators and distribution businesses alike, and the evidentiary base is still in development, much consultation with communities about their needs and wants is yet to be done. Where customers provide insights and information into problems and needs on the ground, these must be listened to and accounted for in both resilience planning and emergency response.

The Panel recommends that in implementing the recommendations that may be adopted following this report, that the distribution businesses consider the benefits that flow from broad, local and deep engagement with their customers in developing their implementation strategies and localised planning.

3.3.5 Build in flexibility to future-proof implementation

The Panel notes the need for flexibility to be built into the design of the new obligations that have been recommended. The distribution businesses have noted that the inherent unpredictability of extreme weather events means that operational flexibility should be preferred over prescriptive rules. It is necessary to ensure that the obligations are not too prescriptive as they may limit options at the critical response stages, which may not improve outcomes for customers (and may even lead to worse outcomes). Instead, there is a need to ensure that the distribution businesses can respond to obligations in a way that is flexible and accounts for the unique characteristics of the event, and be guided by regulatory obligations toward outcomes that support resilient communities. Furthermore, there is a need to build in sufficient flexibility to ensure that the design of the system is future proof, to ensure access to the energy options of today and tomorrow (such as standalone power systems, microgrids, solar, energy storage and electric vehicles). In particular, the environmental benefits and clean energy outcomes should be recognised when comparing the costs and benefits of alternative resilience solutions.

3.3.6 Support implementation with sound governance and resources

Legislative or regulatory changes will be required to implement the Panel's recommended obligations, including compliance and enforcement action. It is not necessarily the case that each recommendation will be implemented through the same instruments and frameworks.

There is, for instance, likely to be a need for the Government to:

- make amendments to some legislation, particularly in respect of implementing new powers of direction, and instigating an “all-hazards” approach to planning for major weather events.
- implement some measures in concert with relevant regulators, such as the Essential Services Commission (ESC), which currently addresses life support provision within the Electricity Distribution Code of Practice
- engage in advocacy to national energy institutions where the regulatory instruments concerned are not within its sole control, such as in amending national economic regulatory instruments.

Therefore, a robust project governance structure should be established by DELWP to coordinate implementation of the recommendations, determine the appropriate means of implementation, and ensure integration of regulators, distribution businesses and stakeholders in the process. The Panel does not recommend any specific governance structure, but considers it should be accountable, transparent and accessible to stakeholders and the public whose interests it is to serve.

4. Detailed discussion of the Panel's recommendations

The Panel's recommendations are discussed in detail in this section. As summarised in Section 3 above, the Panel has made eight recommendations in relation to the role of the distribution businesses in reducing both the likelihood and impact of prolonged power outages. Recommendations 1-3 seek to reduce both the likelihood and impact of prolonged outages through investments in resilience. Recommendations 5-8 seek to reduce the impact of prolonged power outages without the need for investment. These are discussed in turn below.

4.1 Immediate, short-term, reforms to drive investment in the current regulatory period (Recommendation 1)

Recommendation 1	A Network Resilience Investment Strategy should be developed in the short term, with actions that can start immediately, to drive distributor investments in resilience solutions, informed by risk analysis and community needs. This should result in investments and solutions in the most high-risk locations by 2025.
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Historic planning practices have delivered networks that can withstand the typical historical climate conditions.⁵⁹ However, climate change has increased the incidence, nature and severity of extreme weather events and natural hazards⁶⁰. We can expect climate change to make weather-driven events such as those experienced in the June and October 2021 storms more frequent, and more severe. Distribution businesses must ensure that their planning practices produce investment plans that will maintain a resilient and safe network for the decades to come, whilst also ensuring an affordable network for customers.

Victorian communities expect improvements in the immediate future to mitigate against future prolonged power outages. We have heard from customers and their representatives, including the councils and other peak bodies, that it would not be acceptable to wait years for any changes to come through the national regulatory framework. Financial year 2021-22 is the first year of the current regulatory period for the Victorian distribution businesses (2021 to 2026). It would not be appropriate to wait until after 2026 to see what, if any, changes might flow through the national regulatory framework in the next regulatory period (2026 to 2031), which may result in solutions on the ground in Victoria.

Considering the significant disruption and distress that prolonged power outages cause to people's lives and livelihoods, and the increased likelihood of such outages in the future, there is an immediate need for reform.

At the heart of this urgency is a need to acknowledge the increased likelihood of extreme weather events⁶¹. This is accepted by a broad range of stakeholders:

The incidence of major wind and storm events, such as those that occurred in June and October 2021, is expected to increase with climate change and therefore increase the likelihood of disruption to power/energy sources.⁶²

We agree that the frequency and severity of these events is expected to increase. Further, our collective dependency on our critical infrastructure has increased, with changes to how and where we work meaning we are more dependent on a safe and resilient power supply than ever before.⁶³

As set out in the distribution business joint consultation paper led by TasNetworks and reproduced in *Figure 1* below, the increased likelihood of extreme weather events creates a greater need for prudent proactive expenditure in network resilience⁶⁴.

59 Australian Energy Regulator. "Electricity Network Performance Report 2021," September 2021. <https://www.aer.gov.au/system/files/AER%20-%20Electricity%20network%20performance%20report%202021%20-%20September%202021%20-%20v1.1.pdf>

60 CSIRO. "Australia's Changing Climate." CSIRO, April 23, 2020. <https://www.csiro.au/en/research/environmental-impacts/climate-change/state-of-the-climate/previous/state-of-the-climate-2016/australias-changing-climate>

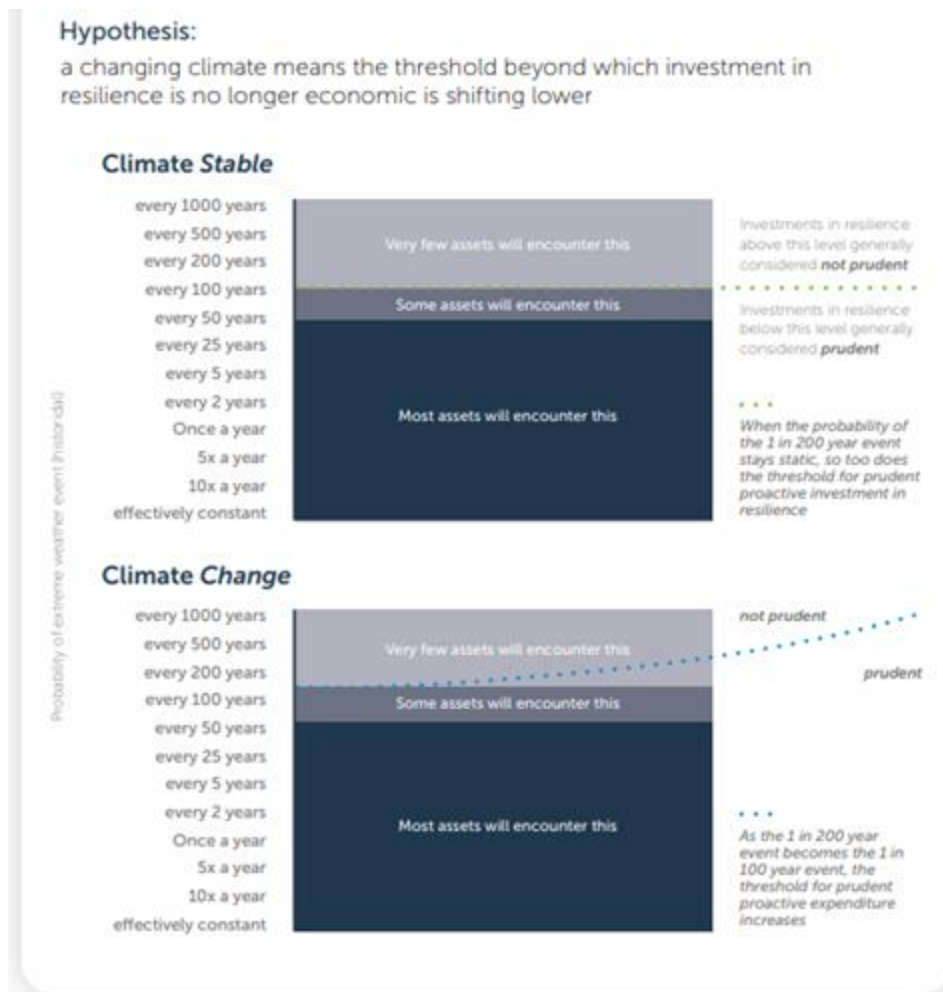
61 CSIRO, 2020

62 Written response from Yarra Ranges Council

63 Written response from CitiPower, Powercor and United Energy

64 TasNetworks, Endeavour Energy, Essential Energy, Ausgrid, EvoEnergy, and PowerWater. "Network Resilience: 2022 Collaboration Paper on Network Resilience," 2022. https://talkwith.tasnetworks.com.au/tasnetworks-r24/news_feed/network-resilience

Figure 1: A changing climate and its effect on network investment



Source: TasNetworks, et. al., 2022.

The Panel has established that the current regulatory framework under the National Electricity Rules (NER) does not adequately encourage proactive network resilience, and in fact arguably excludes the impact of events such as the June and October 2021 storms, owing to the following:

- Resilience to future climate risks is a relatively new topic for regulators and distribution businesses alike, and the evidentiary base is still in development, and much consultation with communities about their needs and wants is yet to be done. This is discussed further in Sections 4.1.1 and 4.2.
- The regulator primarily looks backward, to historical data to determine benchmarks for performance, and inputs to its incentive schemes and models. This means that forward looking threats – especially the predicted increase in the incidence of extreme weather – are often not recognised or considered to be legitimate determinants of distribution businesses' investment strategies, as discussed further in Section 4.3.2
- There is a gap in the understanding of customer willingness to pay to avoid widespread and long duration outages, as opposed to more frequent and shorter unplanned outages, as discussed further in Section 4.3.1
- The regulatory framework does not require distributors to actually implement specific investments even if they are approved for funding by the regulator, due to the ex-ante regulatory design, as discussed further in Section 4.3.3
- There may be economic externalities⁶⁵ associated with efforts to mitigate against prolonged outages – both positive and negative – which are not accounted for by the regulatory regime. Reductions in emissions associated with clean energy micro-grids would be one example. Improvements in community wellbeing due to reduced outages are another example.

⁶⁵ In economics, an externality or external cost is an indirect cost or benefit to an uninvolved third party that arises as an effect of another party's activity.

Because of this, there have been limited investments targeted specifically at network resilience in the past, and without reform, it will be unlikely that significant capital and operating investments in resilience would occur in the short or medium term.

Solving all of these issues at once is unlikely to be achievable. However, the Panel's view is that distributors and regulators – both state and national – need to seek to improve the integration of risk management, optimising for net benefits, over time, with the ideal in mind. The Panel's recommendations 2 and 3 in Sections 4.2 and 4.3 below seek to alter the landscape for both distributors and regulators in their considerations of future investment programs in the medium and longer term.

This section sets out how reform can be achieved in the short term.

The Panel recommends the development of a Victorian Network Resilience Investment Strategy, with actions that can start immediately and lead to investments and solutions in the most high risk locations by 2025. This involves the following steps.

- Identify high-risk locations (Recommendation 1.1)
- Conduct geospatial analysis (Recommendation 1.2)
- Identify locations for local community hubs (Recommendation 1.3)
- Identify range of potential investments (Recommendation 1.4)
- Identify preferred investment solution(s) (Recommendation 1.5)
- Conduct CBA and approve investments (Recommendation 1.6)
- Make approved investments (Recommendation 1.7)

These steps are discussed in turn below.

4.1.1 Identify high-risk locations (Recommendation 1.1)

Recommendation 1.1	The distribution businesses should be required to develop a PPORA identifying areas of the network at highest risk to credible scenarios of climate risk events. This should be done by: • Developing credible scenarios of high risk weather events (including high winds, high rainfall, hail storms, lightning strikes, localised or widespread flooding, localised or widespread bushfires, and coastal surges) for the network, with a separate risk forecast for each type of event, drawing on climate risk information; and • Identifying the areas of the network at the highest risk of prolonged outages due to climate risk, geographic factors and the nature of the distribution assets (including asset age and asset type).
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There are currently no explicit requirements under the national regulatory framework for the distribution businesses to analyse and mitigate climate risks. Indeed, distributors may benefit from not doing so by resorting to the cost pass-through framework to deal with the cost of damages. This creates the risk that consumers will see more frequent and prolonged outages in the absence of any action to mitigate their risks. However, the starting point for assessing efficient expenditure in risk mitigation is a need to assess the highest risk locations, assets and consumers in each distribution business' area.

The distribution businesses in their written submissions to the Panel have expressed their support for the prioritisation of efficient investment in locations that are either more susceptible or vulnerable to climatic extremes. The Panel's view is that the distribution businesses are best placed to identify such risks on their networks. The distribution businesses in their written feedback provided to the Panel's consultation paper agreed that it is their role to assist to identify high risk locations, based on their knowledge of the network and areas where it may be vulnerable to damage in particular extreme events.

We have a role in assisting to identify high risk locations, based on our knowledge of the network and areas where it may be vulnerable to damage in particular extreme events. More granular forecasting data to identify where extreme events are expected to occur under climate change would be a useful input into this process. Currently high-risk bushfire locations are well-understood, and there is an opportunity to systematically identify this for storm and flood zones⁶⁶.

66 Written response from AusNet Services

Building on the rationale set out above, the Panel recommends that distribution businesses should be required to develop a PPORA identifying areas of the network at highest risk to credible scenarios of extreme weather events.

The starting point for this should be to develop credible scenarios of high risk weather events (including high winds, high rainfall, hailstorms, lightning strikes, localised or widespread flooding, localised or widespread bushfires, and coastal surges) for the network, with a separate risk forecast for each type of event, drawing on climate risk information, including the following.

- Reviewing historic weather data by scale, impact, frequency, duration, and type, noting that there is quite a history of major events in the last 10 years in Victoria, and this data can be collected and analysed. An assessment should be made of data for different types of climate events including bushfire data.⁶⁷ This should also incorporate distribution businesses' learnings from previous extreme weather events.
- Using climate models, determining the likelihood of future climate events in the short-, medium- and long-term cycles. This should build on work completed by the Bureau of Meteorology (BOM) and The Commonwealth Scientific and Industrial Research Organisation (CSIRO), including by drawing on the Electricity Sector Climate Information project.

Following this, the distribution businesses should assess and identify the areas of their network at the highest risk of prolonged outages due to the climate risk events and the nature of the distribution assets (including asset age and asset type). This should be done by quantifying the consequences of potential future events in terms of network operations and asset survivability.

It would be desirable for distribution businesses to collaborate to develop a generally accepted approach to this task across the five distribution areas to aid comparison and clarity and share the workload.

Following this, the distribution businesses should assess and identify the areas of their network at the highest risk of prolonged outages due to the climate risk events and the nature of the distribution assets.

The assessment in recommendation 1.1 will result in the identification of locations, assets and consumers at the highest risk of prolonged power outages due to extreme weather in each distribution business' area.

4.1.2 Conduct geospatial analysis (Recommendation 1.2)

Recommendation 1.2	DELWP should develop a geospatial analysis of climate risks, including PPORA data provided by the distribution businesses and other data provided by other agencies on critical infrastructure and community needs.
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The distribution businesses' analysis of their own network vulnerabilities needs to be married with broader geospatial analysis to understand where these vulnerabilities would be most likely to occur, and have the largest impacts on the community. A number of factors may affect where improvements to resilience would have most benefit. Factors including climatic conditions, population density, population growth, the presence of critical facilities and socio-economic conditions are highly pertinent to determining this, and touch on areas of broad public interest. Ideally, locating geospatial 'hot spots' of network and population vulnerability would help to focus on areas of greatest priority. The Panel considers this to be a role best suited to the Victorian Government.

The analysis proposed in recommendation 1.2 will result in the identification of the highest risk locations, assets and consumers in each distribution business' area drawing on the distributors' PPORAs. This needs to be mapped against data from other agencies on essential services and critical infrastructure vulnerabilities, to arrive at a short-list of locations where investments can be targeted. The Panel's view is that this geospatial analysis is best led by DELWP, with input from the distribution businesses on the highest risk areas of the network, as well as other inputs from Emergency Management Victoria (EMV), Department of Jobs, Precincts and Regions (DJPR) and the Department of Families, Fairness and Housing (DFFH). The Panel understands that DELWP holds the skills and experience to carry out the role, drawing on its in-house geospatial specialists.

⁶⁷ It should be noted that bushfires are both a hazard in some circumstances created by electricity networks, and a hazard to those networks. DELWP should consider whether both or only the latter hazards should be included in this analysis, given the existing well developed bushfire mitigation approach under the *Electricity Safety Act 1998*.

DELWP’s geospatial review would aim to combine analysis of network-level vulnerabilities to fire, flood and storms, with analysis of climate and geographic risk factors, as well as analysis of community and essential infrastructure vulnerabilities, to inform:

- Government planning and response for outage events
- Distribution business planning and response
- Potential projects and investments to mitigate outages
- Community awareness and resilience

4.1.3 Support local councils with identifying the needs of community hubs (Recommendation 1.3)

Recommendation 1.3	The distribution businesses and DELWP should be required to support local councils in high-risk areas to identify the needs of local community hubs in close consultation with the local community. In doing so: • the distribution businesses should engage with the local councils, providing them with the findings of their PPORA analysis from Recommendation 1.1; and • DELWP should assist the local councils by engaging with them with regard to the results from the geospatial analysis from Recommendation 1.2.
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The next step would be for the distributors to work with local councils to support the resilience of community hubs at each high-risk location.

A community hub can include a broad range of solutions, depending on local community needs. Some community hubs may simply be places where the communities gather to exchange information following an outage, including information from the electricity distributor on work underway to restore power in the immediate area. This could be as simple as a designated community noticeboard which contains reliable information in the event that telecommunications and internet services are unavailable during a prolonged power outage.

However, some community hubs may be relief centres, providing places for community to seek to charge mobile phones and devices, access showers and cooking facilities, as well as receive information about power restoration activities and support available. In other cases, a community hub might consist of a strip of shops providing essential services such as food, fuel, ice and automatic teller machines. Some of these community hubs may benefit from investments in electricity assets such as microgrids, stand-alone power systems, and batteries, where there are limited other sites in the community with backup power supply options.

Under the State Emergency Management Plan (SEMP), it is the role of the local councils to establish and manage emergency relief centres to shelter members of the community displaced by an emergency⁶⁸. However, the Panel’s view is that the distribution businesses have an important role to play in supporting the local councils with pre-preparing community hubs at high-risk locations.

The local councils will have an important role to play in identifying potential locations and needs for emergency community hubs which communities can access in an outage. However, the distribution business do have a role to play in providing support to the hubs (for example, by identifying resilience opportunities for the hub in advance of an outage, and/or by supporting the restoration of power to hubs following an outage). The local councils will continue to be best placed to identify where hubs should be located, and what they should contain to best meet the needs of local communities. Multiple hub locations may need to be identified by councils as different locations may be suitable for use in a range of extreme events, including fires, storms and floods.

The identification of emergency community hubs should be led by local councils as they will be aware of the available options (the distributor will not) and which will be convenient for communities to access. The distributor can advise on suitability for installing generation quickly during a prolonged outage and ensure any required electrical works are carried out to prepare the site in advance of an event. We consider multiple hub locations should be identified by councils as different locations may be suitable for use in a range of extreme events – including fires, storms and floods⁶⁹.

68 Emergency Management Victoria. Victorian State Emergency Management Plan., 2021. <https://nla.gov.au/nla.obj-3006618556>

69 AusNet services written response.

We are also open to supporting councils in assessing resilience opportunities for community hubs, although local councils (or DELWP) are better placed to provide an initial list of these sites (recognising community centres are identified based on a range of factors beyond our expertise) ⁷⁰.

The Panel recommends that the distribution businesses and DELWP should be required to support the local councils in high-risk areas with identifying the needs of local community hubs, which should be done in close consultation with the local community. For example, the distribution businesses should engage with the local councils, providing them with the findings of their PPORA analysis from 1.1; and DELWP should assist the local councils by engaging with them with regard to the results from the geospatial analysis from 1.2.

This recommendation 1.3 is related to the Panel's recommendations in Section • on emergency planning, which discusses the role of local councils and community hubs in more detail. However, recommendation 1.3 below would specifically help with the identification of potential investment solutions, as local community hubs could be regarded as high-priority areas for investment.

4.1.4 Identify range of potential investments (Recommendation 1.4)

Recommendation 1.4	The distribution businesses should be required to identify a range of potential investment solutions to address risk at the highest risk locations. This should be informed by: • the geospatial analysis developed by DELWP in Recommendation 1.2, which will provide insight into the essential services needs and critical infrastructure vulnerabilities at each high-risk location; and • feedback from the local community and the local councils in each of the high risk locations, which should be actively sought by the distribution businesses to inform the development of potential investment solutions.
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Recommendations 1.1, 1.2, and 1.3 would result in an assessment of the highest-risk areas where investment could potentially be targeted. The next step would be for the distribution businesses to identify a range of potential investment solutions to address risk at the highest risk locations. This should be informed by the geospatial analysis developed by DELWP, and should have regard to essential services' needs and critical infrastructure vulnerabilities at each high-risk location. This includes working with telecommunications and water service providers to enable assets to be captured in resilience solution designs, so that wider benefits might be realised. Distribution businesses must engage with the local community in each of the high-risk locations to seek input on the potential investments to mitigate the risk and impact of prolonged power outages. This needs to cover both:

- operational practices;
- capital equipment investments, upgrades and replacements; and
- projects involving combinations of both.

The distribution businesses in their written feedback to the Panel's consultation paper have noted the need to be flexible and to tailor investments to meet a community's needs and preferences. The Panel supports this view.

There needs to be flexibility for distributors to tailor investments to meet a community's needs and preferences. Not all community centres may have the space suitable to locate infrastructure needed for a microgrid, for example.⁷¹

This work might be informed by precedent from Australian bushfire inquiries and "resiliency" projects conducted in the United States, where these kinds of investigations have already been initiated by various regulators. In the state of New York, for instance, the regulator has accepted resiliency upgrade plans covering the following areas:

- Enhanced vegetation management, improving utilities' ability to identify and remove tree branches and other hazards to overhead powerlines;
- Network hardening, adopting improved standards of construction for network assets; and

⁷⁰ CitiPower, Powercor and United Energy written response.

⁷¹ AusNet services written response.

- Network topology, utilising additional switching, circuit breaking and network automation to allow more segmentation of the network and restore power to undamaged sections more quickly.⁷²

Within these categories there are many common strategies. Not every solution must be site-specific and bespoke. There is potential that some solutions could be provided as standard drop-in solutions including both network and non-network options. Developing standard unit costs will be essential for suitability and business case development. The Panel has also noted that these types of solutions are in some cases, already being considered or developed by the distribution networks to improve reliability where a business case can be made for the investments; nevertheless, the Panel sees value in a clearer obligation and direction for distributors to undertake targeted investments to deliver resilience, and that resilience is more directly valued within the economic regulatory framework.

The local councils have highlighted the need to invest in innovation that drives resilience at all levels, in close collaboration with councils and communities to identify opportunities for innovation.

Yarra Ranges Council encourages the Victorian Government to invest in innovation that drives resilience at all levels, including engineering design resilience, operational resilience and community resilience. There is a need for Government to collaborate with councils and communities to identify opportunities for innovation, including the potential to integrate innovative engineering design with Council and community program⁷³.

The local councils have expressed support for working closely with the distribution businesses to identify resilience opportunities, which should be tailored to meet the needs of local communities.

The Panel's discussion paper highlighted an opportunity for the distribution businesses and councils to work together to develop better links, building on the existing emergency service assistance networks that operate for high-risk communities in fire, flood or storm events within metro, regional and/or remote areas. We see that local governments, such as Yarra Ranges Council, are best placed as a connector into communities and, as such, could provide a conduit for better information flow between the community and all parties involved in resilience planning, emergency management and system recovery. Based on our experience with recent storm events, we also see a need for localised solutions, in addition to incident-level solutions, in emergency management and system recovery.

We also see a need for investment in technological solutions to support the community and build resilience in the face of extreme weather events, extended power outages, fires and flood. For example, alternatively powered telecommunications and computer and battery charging stations at local hubs for supporting the community in the event of power outages for extended periods⁷⁴.

This need for a collaborative effort has also been recognised by the Victorian Council of Social Service (VCOSS).

There is clearly a need for those local areas with predictable high-risk of prolonged power outage to be better prepared, through additional planning and funded collaborative effort. More broadly, VCOSS understands that new frameworks for both Shared Responsibility [in emergency management] and People At-Risk in Emergencies are currently under development by the Victorian Government.

To scaffold the specific emphasis here on the importance of engaging and leveraging local community partners in coordinated planning, VCOSS recommends these broader frameworks also include an explicit recognition of the integral role that community organisations play in emergencies and disasters, and that the sector is fully funded to undertake this role.⁷⁵

The Panel's view is that the distribution businesses are best placed to identify solutions to avoid prolonged power outages, working with the community. The distribution businesses in their written submissions to the Panel have noted that they are also open to supporting DELWP and the councils in assessing resilience opportunities for community hubs, noting the importance of engaging with the local councils on this matter, as the councils will be aware of the available options and which will be convenient for communities to access. The most appropriate solutions are likely to vary with community and network features.

72 Beverly L Allen et al., "Direct Testimony of the Resiliency Plan Panel," § New York State Public Service Commission (2019), <https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B7EB126B1-C8BB-4BE3-89F2-57E1FE74F677%7D>.

73 Yarra Ranges Council written response.

74 Yarra Ranges Council written response.

75 VCOSS written response.

Recommendation 1.4 will result in the identification of a range of potential investment or operating solutions at each high-risk location identified following recommendation 1.2.

4.1.5 Identify preferred investment solution(s) (Recommendation 1.5)

Recommendation 1.5	The distribution businesses should be required to submit one or more preferred investment (or operating) solution(s) to address risk in each high-risk location, to DELWP, based on their analysis from Recommendation 1.4. This proposal should include the requirements listed in Section 4.1.5.
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Recommendation 1.4 will result in the identification of one or more preferred investment (or operating) solution(s) at each high-risk location.

When a range of potential investment (or operating) solutions at each high-risk location has been identified as a result of recommendation 1.3, the Panel recommends that the distribution businesses should be required to submit one or more preferred investment (or operating) solution(s) to address risk in each high risk location, to DELWP, drawing on the community input. The proposal should include:

- A synopsis of the key risks that are relevant to the particular location
- One or more credible solutions for: i) optimal resilience of supply; and, ii) reducing the impact of long duration outages
- Project outlines, and high level designs (where relevant)
- Project goals and timelines, in sufficient detail to allow later audit to assess success against these goals and milestones
- What extreme weather events will be addressed by the projects
- An assessment of the likely reductions in duration or frequency of interruptions resulting from projects in the event of such extreme weather
- Other benefits expected to arise from the projects, including reductions to unplanned outages more broadly
- Total forecast cost of each solution (capital and operating expenditure)
- Efficient level of distributor contribution to the cost, based on reliability benefits, operational expenditure reductions, and distribution business assessments of customer willingness to pay or customer value of avoiding prolonged outages
- To the extent that the costs are not covered by the distribution contribution above, board attestation that each proposed project would not occur within the distributor's existing regulatory allowance, without customer or government contribution.

The Panel notes that DELWP will be reliant on distribution business inputs to identify the most appropriate solutions to improved customer outcomes during/after an extreme weather event. The distribution business would also be required to carry the burden of proof that a proposed project would not occur (because it would not be cost/benefit positive) under the national regulatory framework and within their existing regulatory allowance. If there is a need for customer and government contribution to the project to recognise the wider community benefits that they may provide, this will need to be justified. It would not be acceptable to shift "business as usual" costs or initiatives onto community or government funding, and certification by the board would provide some assurance on this.

Recommendation 1.5 will result in the identification of one or more preferred investment (or operating) solution(s) at each high-risk location.

4.1.6 Conduct cost-benefit analysis (CBA) and approve investments (Recommendation 1.6)

Recommendation 1.6	DELWP should conduct a cost-benefit analysis of the preferred investment solution(s) identified by the distribution businesses in Recommendation 1.5. The distribution businesses should be required to provide input into DELWP's cost-benefit analysis. This CBA should provide a holistic and contextual assessment of costs and benefits, including an assessment of external/non-network benefits. This should include an assessment of the costs and benefits to communities, networks and electricity consumers together.
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Based on this CBA, for each investment where benefits are outweighed by costs, DELWP should identify funding sources, setting out the investment contributions required from the range of co-investing parties. Funding for resilience may be drawn from a mixture of:

- investment from the distribution businesses (to be recovered under the national regulatory framework);
- funding contribution from communities (who will benefit directly from improvements in resilience and potential environmental benefits resulting from the investments);
- funding from other private investors (such as retailers who might be interested in commercial opportunities with the assets), where private benefits that can be captured; and
- funding contribution from the government (where the benefits of any solution are wider than those accruing to electricity consumers, such as in reducing the cost of the government's emergency response functions).

Once the preferred investment (or operating) solution(s) at each high-risk location is identified as a result of recommendation 1.5, the next step would be to conduct an assessment of the costs and benefits.

As electricity is an essential service and a key economic input, the economic cost of power outages to the community and businesses is very high. However, completely eliminating the impacts of major natural hazard events on power systems is infeasible.

It would be prohibitively expensive to build network infrastructure in a manner that eliminates the risk of impacts of all major natural hazard events. It is important, therefore, to assess how investment programs can be optimised to strike an appropriate balance between proactive investment to avoid or mitigate the full impact of major natural hazard events and reactive asset replacement of damaged assets after a prolonged outage has occurred.

Costs should, of course, be outweighed by the benefits of any action that network businesses are required to undertake to ensure continuity of supply. This principle has long been recognised in the economic regulatory framework for electricity distributors. However, the Panel's view is that DELWP is best placed to conduct this analysis in relation resilience investments owing to the need for a more holistic and contextual assessment of costs and benefits, including an assessment of external/non-network benefits (which is currently not provided under the national regulatory framework). There is a need to assess the costs and benefits to communities, networks and electricity consumers together.

An appropriate methodology will need to be developed to conduct the cost benefit analyses, and this will be a major undertaking in its own right. Appropriate measures and weightings will need to be agreed to encompass costs to networks, consumers and the community, and benefits in terms of reduction of the likelihood and duration of outages, and externalities.

DELWP will need to begin work on this well in advance of the finalisation of proposals by distribution businesses, and the Panel considers it important that community organisations and relevant authorities be brought in at this stage to inform the approach. Community organisations and local councils that are potential contributors to the funding for solutions will need to be consulted carefully and thoroughly on the solution and the cost implications from an early stage, working with the distributors and DELWP. DELWP will also need to ensure compliance with the *Subordinate Legislation Act 1994* and any other relevant policies and guidelines of the Victorian Government.

The outputs of the cost benefit analyses will give rise to a number of flow-on actions:

- Following the completion of its cost benefit analysis, DELWP would approve the sub-set of investments proposed by the distribution businesses as a result of recommendation 1.6, where costs are outweighed by benefits. A wide variety of projects may be deemed CBA-positive, encompassing "traditional" poles and wires network strengthening, improvements in operational practices and capabilities, emerging technological solutions, and/or assistance to make communities more resilient to outages. The question of who should pay for the costs would need to be settled based on an assessment of where the benefits of each project may lie.
- For each approved investment, DELWP would set out the investment contributions required from the range of co-investing parties. Funding for resilience may be drawn from a mixture of:
 - investment from the distribution businesses (to be recovered under the national regulatory framework);

- funding contribution from communities (who will benefit directly from improvements in resilience and potential environmental benefits resulting from the investments); and
- funding from other private investors (such as retailers who might be interested in commercial opportunities with the assets), where private benefits that can be captured.
- funding contribution from the government (where the benefits of any solution are wider than those accruing to electricity consumers, such as in reducing the cost of the government's emergency response functions).
- These investments made by the distribution businesses would be recovered through additions to the regulatory asset base (RAB) of the distribution businesses. Government, community, and other contributions would be treated as capital contributions with assets netted off the RAB. The Panel understands that to the extent that community or government contributions are involved, complex tax issues may come into play. This is because capital contributions are excluded from the RAB but treated as income for tax purposes. This has led to tax being charged on contributions to distribution capital investments made through the Victorian Governments' Powerline Bushfire Safety Program. The Panel recommends that further consideration is needed on how to minimise any tax liability associated with capital contributions.

The Panel notes that where funding contributions are expected from parties other than distribution networks or the Victorian government, that a tripartite or multipart agreement on the funding for the project would be needed for it to proceed.

4.1.7 Introduce new regulatory obligations to invest (Recommendation 1.7)

Recommendation 1.7	The Victorian Government should impose regulatory obligations on the distribution businesses requiring them to invest in the preferred resilience solutions at the highest-risk locations, as identified in Recommendation 1.6, with penalties for non-compliance. This should take account of the community, private investor and government investment contributions identified from the cost benefit analyses in Recommendation 1.6.
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Once DELWP has approved a sub-set of preferred investment (or operating) solution(s), this would end in an obligation for the distribution businesses to implement the approved solution, with penalties attached for non-compliance.

The Panel's view is that it is necessary first to ensure that there is a positive obligation to implement projects identified as having a positive benefit-cost ratio through the analytical work. Obligations need to be clearly specified and allow for auditing of outcomes, to ensure that funded projects are delivered.

Secondly, it is necessary that such projects be formalised as regulatory obligations and not merely agreements, to ensure that the portion of the costs funded through Distributed Network Service Providers (DNSPs) themselves are accounted for in their revenue allowance. This direction to invest will allow the AER to take account of the obligations.

Finally, it may be that government decides that a greater proportion of costs should be borne by distribution businesses and their customers, depending on the balance of risks and costs determined in the CBA, in which case a regulatory change, such as a new licence condition, triggering a cost pass through would be needed.

The Panel's short-term recommendations will result in new, immediate obligations for the distribution businesses under the Victorian framework, with penalties for non-compliance. This would require amendments to Victorian regulation or legislation. These obligations would result in investments, by 2025, in highest-risk locations to reduce the likelihood of prolonged power outages.

4.2 Medium term, enduring reform to embed resilience investments in Victorian framework (Recommendation 2)

Recommendation 2	The distribution businesses should be required to take an all-hazards approach to risk mitigation for the purposes of safety, reliability, security and resilience of the electricity system. This should result in a regular assessment (at least every 5 years) of the need for investments and solutions in the most high risk locations, from 2025 onwards.
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2.1 Develop a 5-yearly Network Resilience Plan	The distribution businesses should be required to develop a Network Resilience Plan at least every 5 years. The object of the Plan will be to mitigate hazards to the distributor's network that could result in prolonged power outages under a range of scenarios. This Plan may incorporate relevant parts of a distributor's Bushfire Mitigation Plan (depending on the legislative or regulatory approach taken to implementation).
2.2 Incorporate and refresh the PPORA	The Network Resilience Plan in Recommendation 2.1 should incorporate and refresh the distributor's PPORA in Recommendation 1.1.
2.3 Submit plan, comply with regulatory requirements	The distribution businesses should be required to submit the Network Resilience Plan in Recommendation 2.1 to a regulator for approval, consistent with the framework for Bushfire Mitigation Plans. The distribution businesses should be required to comply with the regulatory requirements, with penalties for non-compliance.

While the short-term recommendations of this report set out a comprehensive process of risk assessment, opportunity identification and cost-benefit analysis, led by the Victorian Government in partnership with the distribution businesses, local councils and communities, it will be desirable to renew and refresh this work in future as climate and extreme weather risks become more apparent. It would be most appropriate for the distribution businesses to embed this within their own reporting and risk analysis processes. This is because optimising their planning, investments and responses to extreme weather involves both:

- a) Trade-offs, in terms of actions that mitigate one risk may exacerbate another. For example, undergrounding of power lines may improve resilience against wind and bushfire related threats, but increase vulnerability to flooding threats; or management of power lines during bushfires may reduce ignition threats, but increase community vulnerability to outages.
- b) Co-benefits, where the benefits of investments in resilience may stack up only in relation to a range of threats, but not in relation to any one threat. This may particularly affect the timing of investment in new-technology options like micro-grids, where these are progressing down the cost curve.

Distribution businesses are best able to make these assessments in an integrated way.

Responding to risks to the continuity of supply to Victorians will ultimately require distribution businesses to internalise and operationalise business-specific practices of risk mitigation. These practices need to be developed from distribution businesses' existing risk mitigation and emergency planning practices, extended as needs be to encompass the broader set of hazards that are now apparent.

Currently, distribution businesses are required to plan, invest for and respond to these threats through requirements across various regulatory frameworks. They are required to develop emergency response plans through Clause 8.1 of the Electricity Distribution Code of Practice, respond to the network planning and investment frameworks in Chapters 5 and 6 of the NER, and comply with the provisions of the *Electricity Safety Act 1998* which includes bushfire mitigation plans and provisions concerning electric line clearances. There also is potential that distribution businesses will need to respond to the critical infrastructure resilience planning provisions of Part 7A of the *Emergency Management Act 2013* in future, and have obligations under the Commonwealth's *Security of Critical Infrastructure Act 2018* in relation to cyber security and ownership.

This is an extremely diverse range of instruments and the Panel is conscious that ensuring compliance across the spectrum is a challenging task for distribution businesses. It is not the Panel's intention to suggest a significant re-ordering or rationalising of this framework, but rather to ensure that businesses do bring together their related activities in an "all hazards"⁷⁶ approach to planning in an appropriate place and time.⁷⁷

⁷⁶ "The 'all hazards' approach to emergency management involves a recognition that all emergencies cause similar problems and that many of the measures required to deal with emergencies are generic. There is also a recognition that one emergency may cause others. At the same time, the approach recognises that many risks require specific prevention, response and recovery measures." Esplin, B. cited: Teague, Bernard, Ronald McLeod, and Susan Pascoe. "Interim Report: 2009 Victorian Bushfires Royal Commission," 2009. p. 262.

⁷⁷ The Panel notes the implications of cyber security regulation at the national level as responding to an additional "hazard" that is outside the scope of the Panel's review, as are some other hazards such as health emergencies. The Victorian Government should consider whether these should also be weighted and included in Victorian distribution businesses' local responsibilities but considers that at minimum, "all hazards" should pertain to weather related events and bushfires.

For the reasons set out above, the Panel recommends that the distribution businesses should be required to develop an all-hazards approach to risk mitigation for the purposes of safety, reliability, security and resilience of the electricity system. This should encompass, at a minimum:

- a. That distribution businesses should be required to develop a Network Resilience Plan no less often than every 5 years. The object of the Plan will be to mitigate hazards to the distributor's network that could result in prolonged power outages under a range of scenarios. This Plan may incorporate relevant parts of a distributor's Bushfire Mitigation Plan (depending on the legislative or regulatory approach taken to implementation).
- b. That this plan should incorporate and refresh the distributor's PPORA.
- c. Consistent with the framework for Bushfire Mitigation Plans, that distribution businesses should submit the plan, that the plan be validated by a regulator, and that distribution businesses be required to comply with its actions, or be subject to penalties.

These obligations would result in ongoing investments, at least every 5 years, from 2025 onwards, in highest-risk locations to reduce the likelihood of prolonged power outages.

In implementing Recommendation 2, the regulatory requirements outlined above will need to be formalised and codified in a regulatory instrument. This could take a number of forms. It may not necessarily involve the expansion of the existing regulations in the Electricity Safety Act around Bushfire Mitigation Plans, but rather a separate requirement having this effect. The Panel expects that the Victorian Government will assess the most appropriate framework and regulator to take on supervision of these activities.

4.3 Longer term reforms to embed resilience investments in the national regulatory framework (Recommendation 3)

Recommendation 3	The national legislative framework should be amended to drive distributor investments in resilience in the longer-term. To implement these changes, the Panel proposes that the Victorian Government should seek to amend the AER's framework, through working with the AER and through a series of proposed Rule changes, to embed resilience in the national framework from the next regulatory period (from 2026 onwards) and avoid the need for Victorian Government intervention in the longer term.
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The Panel's proposed longer-term recommendations in this section seek to facilitate that the national regulatory framework supports investments in resilience from the next regulatory period (from 2026 onwards).

The AER regulates the electricity distribution businesses by setting the maximum amount of revenue they can earn over a five year period. The framework under which the AER does so is set out in Chapter 6 of the NER. This provides for the AER to apply a "building block" methodology to set tariffs that recover the costs that an efficient and prudent service provider would incur in running the business.

The economic regulatory framework, as it currently stands, does not sufficiently require distribution businesses to proactively invest in resilience. Distribution businesses are required to improve reliability of supply through the use of the Service Target Performance Incentive Scheme (STPIS). However, the distinction between reliability and resilience is an important one. Reliability is focused on the average network performance and seeks to minimise outage duration and frequency during normal conditions. On the other hand, the capacity of electricity networks to prepare for and recover from natural hazard events (such as those experienced in Victoria on 9 June and 29 October) is generally referred to as resilience.

The AER has engaged constructively with the Panel on the need for the national regulatory framework to support resilience, and has recently released a guidance note⁷⁸ setting out how resilience can be supported under the current framework. The Panel welcomes this guidance note, which offers further clarity on what might be achieved under the current national regulatory framework. However, the Panel's view remains that the national regulatory framework needs to be modified to support distribution business investments in resilience. To implement the recommended changes, the Panel proposes that the Victorian Government should seek to shift the dial on the AER's framework, through a series of Rule changes, which would seek to embed resilience in the framework and avoid the need for Government intervention in the long term.

Specifically, the Panel recommends that:

⁷⁸ Australian Energy Regulator. "Network Resilience - Note on Key Issues," April 2022. <https://www.aer.gov.au/system/files/Network%20resilience%20-%20note%20on%20key%20issues.pdf>.

- DELWP should work with the AER to support the assessment of customer willingness to pay for wide area, long duration outages (WALDOs) (recommendation 3.1)
- DELWP should propose a Rule change to the capital expenditure objectives under rule 6.5.7 to specifically account for resilience (recommendation 3.2)
- DELWP should propose a Rule change to incorporate a new regulatory mechanism for proactive investments in network resilience (recommendation 3.3).

These recommendations are discussed in turn below.

4.3.1 DELWP should work with the AER to support the assessment of customer willingness to pay for WALDOs (Recommendation 3.1)

Recommendation 3.1	DELWP should work with the AER to support the assessment of customer willingness to pay to avoid wide area, long duration outages (WALDO). This work should be led by the AER, with input from DELWP to incorporate data and learnings from the 2021 Victorian storms.
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Investments in network resilience must be balanced against the affordability impacts on customers. The regulatory incentives for distribution businesses need to strike an appropriate balance between encouraging enough investment and avoiding overinvestment. This balance can be informed by assessing the value of customer reliability (VCR).

However, there is currently a limited understanding of customer willingness to pay for the range of resilience options. The AER in 2019⁷⁹ (and previously AEMO in 2014⁸⁰) has estimated separate VCRs for localised outages that last up to 12 hours, using an extensive survey of residential and business customers. These customer surveys did not seek information on the value that customers place on reliable supply during prolonged power outages (lasting more than 12 hours) such as those experienced in Victoria in June and October 2021. As set out in Section 2 above, the outages caused by both events lasted far longer than 12 hours, with significant numbers of customers off supply after 72 hours and even seven days after the event. The AER's previous assessment of the VCR does not capture how much customers would be willing to pay for proactive investments to avoid or mitigate the full impact of major natural hazard events.

The AER agrees with the Panel's view that the AER's VCRs published in 2019 may not be appropriate to estimate the value which customers would place on avoiding or reducing the severity of larger unplanned outage events that have specific localised impacts.

We consider that the VCRs we published in our review in 2019 may not be appropriate to estimate the value which customers would place on avoiding or reducing the severity of larger unplanned outage events.

The 2019 values were based on customer survey responses that tested the value customers placed on unplanned outages of up to 12 hours duration and had a limited geographic impact (a few blocks for a CBD/suburban customer and an entire town for rural and more remote areas)⁸¹.

From March to June 2020, the AER consulted on a draft model for estimating the VCR for WALDOs⁸², using a macroeconomic approach to estimating the residential, commercial and industrial, and social costs of severe outages. Although stakeholders provided in-principle support for a macroeconomic approach for estimating the costs of WALDOs and deriving a WALDO VCR, they did not support the draft WALDO model which was produced by the AER.

The AER in its recently published guidance note has provided its view that the VCRs for WALDOs which the AER estimated and published in September 2020, have limited application at this stage, noting the stakeholder response to the methodology applied. However, the AER has noted that it is considering ways of revisiting VCRs for WALDO to accommodate longer unplanned outages with localised impacts. The Panel is supportive of this additional work from the AER.

79 Australian Energy Regulator. "Values of Customer Reliability Review - Final Report," December 2019. <https://www.aer.gov.au/system/files/AER%20-%20Values%20of%20Customer%20Reliability%20Review%20-%20Final%20Report%20-%20December%202019.pdf>.

80 Australian Energy Market Operator. "Value of Customer Reliability Review: Final Report." Melbourne, September 2014. <https://www.aemo.com.au/-/media/Files/PDF/VCR-final-report--PDF-update-27-Nov-14.pdf>.

81. AER, 2022. p. 10.

82 Australian Energy Regulator. "Values of Customer Reliability Review - Widespread and Long Duration Outages Consultation Paper," April 21, 2020. <https://www.aer.gov.au/system/files/AER%20-%20Values%20of%20Customer%20Reliability%20Review%20-%20Widespread%20and%20Long%20Duration%20Outages%20Consultation%20Paper%20-%20Updated%2021%20April%202020.pdf>.

The WALDO model was not supported by stakeholders in its draft form, mainly due to concerns about how certain costs like the social costs were estimated in the model. We are considering ways of revisiting VCRs for WALDO to accommodate longer unplanned outages with localised impacts.⁸³

The distribution businesses also support the development of further work in this area.

AusNet Services notes:

There is an opportunity to develop a framework (with input from the AER) to value the benefits or investments that can reduce the impact on communities of prolonged power outages or ‘harden’ network assets to mitigate the damage associated with extreme events (noting there may not be feasible options available in all cases).⁸⁴

CitiPower, Powercor and United Energy note:

Our view is that the existing regulatory framework can support proactive resilience investments, but a more pragmatic approach will likely result in better customer outcomes. This may include the following:

greater acceptance of customer values—we have recently completed a significant body of work with our customers to develop an indicative estimate of the value our customers place on resilience (and other services). These values have been developed to be additive to other value measures, such as the AER’s VCR. We note however, that recent AER positions set out in their [Distributed Energy Resources (DER)] DER integration expenditure guideline, and their work on developing a [Customer Export Curtailment Value (CECV)] CECV, have been to reject explicit recognition of many customer benefit streams

re-opening of the WALDO process—similar to our customer values initiative outlined above, a WALDO would provide a quantitative value that could be used in economic analysis of proposed investments. It is not clear what mechanism could be used by DELWP to direct the AER into re-opening its analysis, but for either alternative, it is important that ‘perfection is not the enemy of the good’ (i.e. the key is to recognise there is an economic value of resilience and other customer expectations).⁸⁵

Reflecting on the customer experience of the June and October 2021 storms in Victoria, the Panel recommends that there is value in reconsidering the development of a new VCR for WALDOs. This would also facilitate a better understanding of the balance of proactive and reactive investment options valued by customers.

To ensure that customer values of resilience are able to be taken into account by distributors and the AER in assessing the costs and benefits of investments over the longer term, the Panel recommends that DELWP should work with the AER to support the assessment of customer willingness to pay for WALDO. This work should be led by the AER, with input from DELWP in relation to how this work can incorporate data and learnings from the 2021 Victorian storms in determining willingness to pay and social costs of prolonged power outages. For example, as discussed in Section 4.4.3, the significant amounts that many Victorian customers are willing to pay for small back-up generators should be reflected in the VCR for WALDOs. This should be accounted for in network investment decisions.

4.3.2 Amend capital expenditure objectives to specifically account for resilience (Recommendation 3.2)

Recommendation 3.2	DELWP should propose a Rule change to the capital expenditure objectives under rule 6.5.7 to specifically account for resilience.
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In the long term, there are many interlinked decisions that must be made by distributors about network augmentation, replacement, and operations to balance the capabilities of their networks and deliver a range of services. Resilience must be factored into decisions that may be more about reliability, capability or flexibility. Factoring in reliability to these decisions could include marginal cost increases for planned investments such as higher design standards, alternate construction types, vegetation clearance programs, and early replacement of aging assets with different asset types.

Under the National Electricity Law (NEL) framework, the distribution businesses are regulated to advance the National Electricity Objective (NEO). This requires the distribution businesses to

⁸³ AER, 2022. p. 10.

⁸⁴ Written response from Ausnet Services.

⁸⁵ Written response from CitiPower, Powercor and United Energy.

“promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

- price, quality, safety and reliability and security of supply of electricity*
- the reliability, safety and security of the national electricity system”⁸⁶*

This requires the distribution businesses, amongst other things, to develop investment plans in accordance with expenditure objectives that the AER assess against the NER. The expenditure objectives involve meeting or managing the expected demand for network services, while maintaining the quality, reliability and security of supply and the distribution system. The NEO variables of price, quality, safety, security, and reliability do not explicitly include resilience. Instead, it is the impacts of managing resilience on these variables that makes it relevant to advancing the NEO in the interests of customers.

Nevertheless, the AER considers that resilience-related funding is accommodated by the NER, even though it is not explicitly mentioned in the NER.

We recognise that climatic conditions are changing and there is uncertainty of the impact this will have on electricity networks. We consider that our assessment framework is sufficiently flexible to have regard to an uncertain future environment. In particular, there is scope for our framework to respond and evolve as more information is revealed overtime about the impact of climate change and its effect on networks and communities.

To support broader discussions around network resilience, our guidance note sets out the supporting evidence required to demonstrate that resilience-related funding is a prudent and efficient response given that uncertainty and therefore in the long term interests of consumers. We are also mindful that in an environment of significant uncertainty, we need to be flexible and realistic in our requirements on the burden of proof.⁸⁷

However, the distribution businesses have noted that the benefit of investments that improve resilience to prolonged power outages (either reducing the impact or likelihood they will occur) have not been historically explicitly recognised under the currently regulatory framework.

The AER’s standard assessment approach for large capital investment projects is to apply a risk-based determination. This typically includes consideration of the probability of a given event occurring, the likelihood of that event resulting in a particular consequence, and the cost of that consequence.

We support the above assessment approach for the majority of proposed capital investments, noting it is consistent with good asset management practices (and our own internal approach). However:

- the AER’s starting point for assumptions regarding the forecast probability and consequence of events is historical observed performance. This creates a high evidence threshold for resilience investments, where history is not the best predictor of future outcomes (i.e. although the widely accepted scientific evidence supports the high likelihood that extreme events will increase in both frequency and severity, linking this to increased investment needs is more subjective)*
- the AER’s starting point for overall category level forecasts (e.g. augmentation and replacement expenditure) is also historical spend. As the AER has a high level of discretion to accept or reject investment proposals, top-down category level assessments mean that proactive resilience initiatives can be ‘collateral damage’ (noting that these projects are typically more readily rejected than ‘standard’ augmentation or replacement projects that are more directly supported by historical evidence)*
- in the absence of explicit funding ‘approval’ in the AER’s regulatory determinations, it is difficult to justify internal business cases on resilience initiatives (again, particularly relative to other projects).⁸⁸*

The Panel agrees that the current rules can, in theory, support investments in resilience. However, explicitly accounting for resilience in the rules would assist in future projects being favourably assessed by the AER. To support efficient investments in resilience in the long-term interests of customer, the Panel recommends that DELWP propose a Rule change to the capital expenditure objectives under Rule 6.5.7 to specifically account for resilience.

⁸⁶ Section 7, National Electricity Law.

⁸⁷ Written response from the AER.

⁸⁸ Written response from CitiPower, Powercor and United Energy

4.3.3 Introduce a new incentive mechanism to drive resilience (Recommendation 3.3)

Recommendation 3.3	DELWP should propose a Rule change for the AER to incorporate a new regulatory mechanism to drive proactive investments in network resilience.
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The AER's current regulatory mechanisms have resulted in the distribution businesses being more reactive than proactive with regard to the costs of responding to extreme weather. To date, cost pass-through has been the primary means by which the distribution businesses have managed the financial impacts of natural hazard events.

The cost pass-through framework is based on the principle that customers should not pay for investments that may not be required. Instead, the AER can decide on the revenue required to fund these costs only after a certain trigger event occurs. One alternative is for the distribution businesses to invest more upfront to reduce the impact of any natural hazards that might occur, which in many cases would be more cost efficient.

There are advantages and disadvantages to the proactive and reactive options available to distribution businesses. A reactive approach only recovers costs from customers where they are incurred. However, if the frequency and severity of natural hazards continues to increase, this could result in large and unexpected increases to network revenues and bill shocks due to cost pass throughs. Investment programs need to strike a more appropriate balance between proactive and reactive investment.

The economic regulatory framework, as it currently stands, does not sufficiently require distribution businesses to proactively invest in resilience. Distribution businesses are required to improve reliability of supply through the use of the STPIS.

The STPIS' main reliability mechanism is the service component, which applies a bonus or penalty to distributors' regulated maximum allowed revenues each year, depending on whether they have over- or under-performed a benchmark level of reliability, which is derived from historic performance levels. This can lead to a bonus or penalty of up to 5% of their revenue.

The bonus/penalty levels are based on the VCR which is estimated by the AER. The VCR is a proxy figure representing what customers are understood to be willing to pay to avoid outages. It is derived from surveys of electricity customers undertaken by the AER.

However, the distinction between reliability and resilience is an important one. Reliability is focused on the average network performance and seeks to minimise outage duration and frequency during normal conditions. On the other hand, the capacity of electricity networks to prepare for and recover from natural hazard events (such as those experienced in Victoria on 9 June and 29 October) is generally referred to as resilience.

Major event days⁸⁹ (MEDs) (such as those experienced in Victoria in June and October) are currently excluded from the STPIS. This is done principally for cost reasons, as including them would result in significant penalties for events which are principally outside of a distributor's control, and would therefore increase their financial risk.

However, without the economic regulatory framework specifically addressing resilience, a network may meet or exceed the reliability standards, while still not being adequately resilient to prolonged power outages.

There is a need for a new incentive mechanism in the AER's building block framework to drive more proactive investment in network resilience.

The Panel recommends that DELWP should propose a Rule change to incorporate a new regulatory mechanism for proactive investments in network resilience. Further work is needed on how best to approach this given methodological difficulties. Options include:

⁸⁹ A major event day is defined in the Institute of Electrical and Electronics Engineers (IEEE) standard 1366-2003, IEEE Guide for Electric Power Distribution Reliability Indices. This standard was published in May 2004. The IEEE standard excludes natural events which are more than 2.5 standard deviations greater than the mean of the log normal distribution of five regulatory years' SAIDI data (the '2.5 beta method'). SAIDI is the average duration of outages for each customer served by that network. The 2.5 beta method is the AER's minimum or 'safe harbour' approach to setting the major event day boundary that a DNSP may propose. However, in accordance with clause 2.2 of this scheme, a DNSP can propose a major event day boundary that is greater than 2.5 standard deviations from the mean. See: <https://www.aer.gov.au/system/files/AER%20-%20Service%20Target%20Performance%20Incentive%20Scheme%20v%202.0%20-%202014%20November%202018%20%28updated%2013%20December%202018%29.pdf>

- i. Design a new incentive mechanism for proactive investments in network resilience, separate from the STPIS. For example, the distribution businesses have proposed the introduction of a new 'Network Resilience Investment Allowance':

We also recommend the establishment of a new 'Network Resilience Investment Allowance' to support investment and build an evidence base for new or emerging technologies (that may otherwise be challenging to demonstrate a strong economic justification for). Such a fund could have strict controls and reporting requirements as a jurisdictional scheme, and be based on a use-it or lose-it approach.

This Network Resilience Innovation Allowance—similar in nature to the [Demand Management Innovation Allowance (DMIA)] DMIA funding mechanism approved by the AER—could finance proactive resilience investments (across the industry) that may otherwise be too risky or uncertain to attract 'standard' regulatory funding approval. Such a mechanism would support building of an evidence base, especially in new or emerging technologies. Such a fund could have strict controls and reporting requirements as a jurisdictional scheme, be on a 'use-it-or-lose-it' basis, and have the magnitude of the total investment determined in advance.⁹⁰

- ii. Amend the STPIS to incentivise resilience investments (for example by eliminating the MED exclusion, but capping revenue at risk on these days).

The Panel recommends that the AER should consult closely with the distribution businesses on the preferred incentive mechanism design. Written feedback provided to the Panel suggests a preference for the first option (designing a new incentive) over the second option (amending the STPIS) above.

Performance incentive schemes should also not be used. It is appropriate that Major Event Days are excluded from the STPIS, as these are events outside of our control. Full solutions to ensure the networks can withstand MED events are prohibitively expensive (as the consultation paper notes). The impact of including MED events in the STPIS will make penalties and rewards – and therefore customer prices – far more volatile. This would create excessive noise in STPIS performance, swamping outcomes, therefore blunting the incentive for networks to improve underlying reliability, to the detriment of consumers.⁹¹

4.4 Partnering with communities and local councils in emergency planning and response (Recommendation 4)

Recommendation 4	The distribution businesses should be required to partner with communities and local councils in emergency planning and response.
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There is an opportunity for distribution businesses to partner with consumers and local communities to help build community resilience in the longer-term. The separation of electricity distribution and retail functions in the early 2000s has resulted in retail businesses having a much closer relationship with customers than distribution businesses. Retailers are set up to be interactive with customers, including communication tools, training of staff and availability for direct phone service, through their investment in large customer service centres and customer resource management systems. Central to their role is the customer billing function which includes the pass through of distribution network costs. As a result, customers do not generally have awareness or interaction with their distribution business.

There is scope for distribution businesses to take on additional roles in building relationships with customers, indigenous groups, local businesses, and the wider community. Opportunity also exists for the distribution businesses and councils to work together to develop better links, building on the existing emergency service assistance networks that operate for high-risk communities in fire, flood or storm events within metro, regional and remote areas. Customers impacted by prolonged emergencies such as fire, flood or storm damage need a complex range of support, including in relation to food and financial relief, accommodation, financial counselling, communication tools and transport:

There was no communication from my electricity provider, until late in the week and I had no idea when the power was coming on.⁹²

⁹⁰ Written response from CitiPower, Powercor and United Energy

⁹¹ Written response from AusNet Services

⁹² Feedback provided by a community member in Traralgon

*I believe there is scope for the distribution businesses to provide information in a more customer friendly manner.*⁹³

State level emergency management frameworks are currently well-established under the *Emergency Management Act 2013* (EMA). The EMA is Victoria's principal legislation addressing emergency response and relief. The EMA establishes frameworks within the public sector for emergency management, establishing various public sector bodies, and planning for the resilience of critical infrastructure.

The SEMP is developed under the EMA. The SEMP, and incorporated sub-plans, outline the arrangements for the mitigation of, response to and recovery from emergencies (before, during and after), and to specify the roles and responsibilities of agencies in relation to emergency management.

The recently published SEMP Energy Sub-Plan describes the actions distribution business take as the owners and operators of private assets to support state emergency management efforts. As private owners and operators of the distribution networks, the distribution businesses have a general commercial responsibility to plan for emergencies, respond to and resolve outages, and communicate with customers appropriately. However, the distribution businesses do not have a formal emergency response or relief role specified under the EMA.

The Panel's view is that specific obligations are needed to formalise the role of distribution business in municipal and regional emergency management, and regional and municipal relief and recovery planning and delivery. This includes:

- Emergency planning (Recommendation 4.1)
- Emergency response (Recommendation 4.2)
- Backup generation (Recommendation 4.3).

These are discussed in turn below.

4.4.1 Support municipal and regional emergency planning (Recommendation 4.1)

Recommendation 4.1	The distribution businesses should be required to provide structured input and periodic updates for municipal and regional emergency management plans (and associated relief and recovery plans, including by: • providing their PPORA analysis from Recommendation 1.1, which identifies highest risk locations of the network, to the relevant Municipal Emergency Management Planning Committees (MEMPCs) and Regional Emergency Management Planning Committees (REMPs); • seeking MEMPC and REMPC input into Recommendation 1.4, on how to best tailor potential investment solutions at each high risk location to help meet to the needs to local communities; and • providing input and support to the business continuity plans for relief centres and community hubs at each high risk location, including those identified in Recommendation 1.3, to ensure that they can continue to operate during a prolonged power outage.
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The EMA establishes frameworks within the public sector for emergency management, establishing various public sector bodies, and planning for the resilience of critical infrastructure.

The EMA includes the requirement for the preparation of the following:

- **State emergency management plan** – The Emergency Management Commissioner must arrange for the preparation of the SEMP to provide for an integrated, coordinated and comprehensive approach to emergency management at a State level.
- **Regional emergency management plans** – The Regional Emergency Management Planning Committee (REMP) for a region must arrange for the preparation of a regional emergency management plan (REMP) for that region to provide for an integrated, coordinated and comprehensive approach to emergency management in relation to that region.
- **Municipal emergency management plans** – The Municipal Emergency Management Planning Committee (MEMPC) for a municipal district must arrange for the preparation of a municipal emergency

93 Feedback provided by a community member in Traralgon

management plan (MEMP) to provide for an integrated, coordinated and comprehensive approach to emergency management in relation to that municipal district.

At the local level, a MEMP contextualises its REMP and is informed by local and municipal risks. It also considers any community emergency management plans that may be in place. Likewise, a REMP contextualises the SEMP for its region. It also considers MEMPs within its region and any region-specific issues and opportunities. The SEMP is not an aggregation of the REMPs: rather, it sets out the state-level arrangements for emergency management in Victoria including the roles and responsibilities of agencies. In this way, the SEMP, REMPs and MEMPs, in conjunction with any community emergency management plans, form a holistic planning landscape to mitigate, plan and prepare for, respond to and recover from emergencies. Plans at each tier reflect the appropriate level of emergency management for that tier.

The SEMP, and incorporated sub-plans, outline the arrangements for the mitigation of, response to and recovery from emergencies (before, during and after), and to specify the roles and responsibilities of agencies in relation to emergency management.

As noted above, the recently published SEMP Energy Sub-Plan describes the actions distribution business take as the owners and operators of private assets to support state emergency management efforts. The distribution businesses have a general commercial responsibility to plan for emergencies, respond to and resolve outages, and communicate with customers appropriately, and some specific emergency mitigation and information provision obligations under the *Electricity Safety Act 1998*, *Electricity Industry Act 2000* and Electricity Distribution Code of Practice. However, the distribution businesses do not have a formal emergency response or relief role specified under the EMA.

There is broad agreement across stakeholder groups that distribution businesses need to provide input into municipal and regional emergency planning. However, distribution businesses' involvement in the REMPC and MEMPs is forums to date is voluntary, and inconsistent. The Panel has received feedback from the local councils that in cases where distribution businesses do participate in state, regional and municipal planning, this has been very valuable and well-received by the community. The following were provided as examples of good precedent in discussions at the Panel's stakeholder roundtables held in May:

AusNet Services sit on the South Gippsland MEMPC as a non-voting member, and they regularly attend.

Powercor attended Moorabool Council's line recovery sessions months after the event and talked about the after actions review (AAR) they had undertaken and improvements after the response to the storms. This was appreciated by the community.⁹⁴

The local councils have provided feedback to the Panel noting the need for including Distribution Businesses in MEMPCs:

Yarra Ranges Council would encourage the Victorian Government to consider including Distribution Businesses in Municipal Emergency Management Planning Committees (MEMPCs).⁹⁵

The Panel's view is that specific obligations are needed to formalise the role of distribution business participation in these forums. The Panel recommends that the distribution businesses should be required to participate in MEMPCs and REMPCs planning processes if requested by the relevant committee. This should include a requirement to provide any PPORAs (see Recommendation 1 in section 4.1.1 to assist the local councils with identifying most high risk locations to relevant MEMPCs and REMPCs).

As outlined in recommendation 1, the Panel considers that distribution businesses must also engage with the local councils in high risk locations to seek input on the potential investments that may help mitigate the risk of prolonged power outages (see section 4.1.1). The distribution businesses in their written feedback to the Panel's consultation paper have noted the need to be flexible and to tailor investments to meet a community's needs and preferences. The Panel agrees with this view, and considers that this need for tailoring investment to community needs can be supported by distribution businesses participation in the MEMPCs and REMPCs.

There needs to be flexibility for distributors to tailor investments to meet a community's needs and preferences. Not all community centres may have the space suitable to locate infrastructure needed for a microgrid, for example.⁹⁶

94 Feedback provided at the Panel's stakeholder roundtables held in March

95 Written feedback provided by Yarra Ranges Council

96 Written response from AusNet Services.

The local councils also noted in the stakeholder roundtables conducted by the Panel that there is a need for two-way information flow between the distribution businesses and communities. Communities are very engaged and want to participate in identifying solutions, building on their experiences and learnings through recent prolonged power outages.

Participation in the MEMPCs and REMPCs would have benefits both for the local councils and the distribution businesses. It would assist with local and regional planning for emergencies (as well as planned outages) and identification of the most suitable locations for community hubs in high-risk locations, by ensuring that MEMPCs and REMPCs are provided with necessary information on the customers, assets and locations most vulnerable to prolonged power outages. It would also help communities prepare for frequent planned outages, which can be as often as once a week in some local communities. Finally, it would also assist the distribution businesses with tailoring potential investment solutions to the needs to local communities, through input from the MEMPCs and REMPCs.

For the reasons above, the Panel recommends that the distribution businesses should be required to provide structured input and periodic updates for municipal and regional emergency management plans (MEMPC/REMP) and associated relief and recovery plans, including:

- providing any PPORAs to identify the highest risk locations to relevant MEMPCs and REMPCs (Recommendation 4.1.1)
- seeking MEMPC and REMPC feedback on how to best tailor potential investment solutions each high risk location to help meet to the needs to local communities, having regard to new technologies and opportunities to reduce emissions (Recommendation 4.1.2)
- providing input and support to the business continuity plans for relief centres and community hubs at each high risk location to ensure that they can continue to operate during a prolonged power outage. This may involve the use of microgrids, batteries or simply pre-wiring community hubs for back up generation in the event of a power outage (Recommendation 4.1.3).

4.4.2 Provide support to emergency response (Recommendation 4.2)

Recommendation 4.2	The Regional Controller or Incident Controller should be given a new directions power to require the distribution businesses, if requested following a major energy emergency, to: • participate in a relevant meeting or shift briefing of any Incident Emergency Management Team (IEMT) or Regional Emergency Management Team (REMT), on a daily basis for the duration of an emergency response; • attend a relief centre or community hub, or a community meeting, to provide information to the impacted community about the incident and response activities; and • take reasonable steps to ensure that relief centres and community hubs can continue to operate during a prolonged power outage. This may involve the prioritisation of relief centres and community hubs in restoration activities (at the expense of other customers).
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The EMA defines emergency response as follows.

“[T]he action taken immediately before, during and in the first period after an emergency to reduce the effects and consequences of the emergency on people, their livelihoods, wellbeing and property; on the environment; and to meet basic human needs.”

Distribution businesses have an important role to play in emergency response under the SEMP Energy Sub-plan

“As the owners and operators of energy infrastructure and supply chains, the energy industry has the primary responsibility to respond to energy supply disruption and deliver repairs, restoration and reconnection. Industry also provides expert advice and support during energy emergencies through Energy – Emergency Management Liaison Officers.”⁹⁷

Under the SEMP, DELWP is the control agency for major energy emergencies in Victoria, as defined in the EMA.

97 Emergency Management Victoria. “State Emergency Management Plan - Energy Sub-Plan,” 2022. <https://files.emv.vic.gov.au/2022-03/State%20Emergency%20Management%20Plan%20Energy%20Sub-Plan.pdf>. p. 17.

To ensure that emergency management arrangements are scalable, Victoria has three operational tiers (incident, region and state). Most emergencies in Victoria (such as house fires and traffic accidents) are routinely controlled at the incident tier, with local resources and without broader consequences or communications needs. However, some emergencies have implications beyond the incident tier that require specific actions: they need more resources, have greater consequences and recovery needs or need messages sent to broader groups of people. In these cases, regional or state arrangements may be enacted to support the incident. The state tier is generally used only when whole-of-state emergency management arrangements are needed (such as for a human health pandemic).

Depending in the nature of the emergency, it may be controlled from the State Control Centre (SCC), a Regional Control Centre (RCC), an Incident Control Centre (ICC), a Police Operations Centre (POC) or another location.

The Panel' view is that the distribution businesses can play a critical role in assisting the Incident Emergency Management Team (IEMT)⁹⁸ or Regional Emergency Management Team (REMT)⁹⁹ in their emergency response role. Specifically, the Panel recommends that following an emergency, if invited by the Regional Controller or Incident Controller, distribution businesses should be required to:

- provide a briefing to or participate in a relevant meeting or shift briefing of any REMT or IEMT established during a major energy emergency, on a daily basis for the duration of an emergency response (recommendation 4.2.1)
- attend a relief centre or community hub, or a community meeting, to provide information to impacted community about the incident and response activities (recommendation 4.2.2)
- take reasonable steps to ensure that relief centres and community hubs can continue to operate during a prolonged power outage (recommendation 4.2.3).

4.4.3 Backup generation (Recommendation 4.3)

Recommendation 4.3	DELWP should divest the existing fleet of small generators, noting the lack of equitable access and effectiveness, risks and costs associated with the Victorian Government's small generator program. The distribution businesses should continue to explore the use of larger mobile back up generation to assist with restoration of essential services, community hubs, network sections. The distribution businesses should also explore the increased use of microgrids and standalone power systems to mitigate the likelihood of prolonged power outages at high-risk locations, as supported by Recommendations 1, 2 and 3.
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As discussed in Section 5.3 of this report, Advisian in Phase 1 of this Review recommended that a broad review of the use of generation / backup power (including other technologies or solutions) by the distribution businesses, government, and businesses (small, medium, large) during restoration of power should be completed in Phase 2. Critical infrastructure owners identified in Phase 1 that some of their backup power arrangements for critical sites (including both fixed and mobile generation, batteries, and solar/battery systems) were not adequate for an extended outage duration such as the June 2021 event.

Related to this, as discussed in Section 5.5, Advisian in Phase 1 of this Review recommended that the Panel should provide a more detailed review of the fleet of 300 small generators used during the June and October events, including an assessment of whether the small generators should remain as a permanent solution for single vulnerable consumers or if other alternatives exist.

The Panel has considered the role of back up generation in providing resilience, which is discussed in detail in this section. This includes a consideration of the role of:

- the Victorian Government's small generator program (Recommendation 4.3.1)
- larger mobile backup generators owned by the distribution businesses (Recommendation 4.3.2)
- other forms of investments in providing resilience during network disruptions (Recommendation 4.3.3)
- customers investing in their own back up generation.

98. Those at the incident tier responsible for performing control, coordination, consequence management, recovery and communication functions anticipated or occurring

99. Those at the region tier responsible for performing control, coordination, consequence management, recovery and communication functions anticipated or occurring

These are discussed in turn below.

Role of the Victorian Government's small generator program (Recommendation 4.3.1)

Following the June 2021 storm, the Victorian Government established a small generator loan program to assist vulnerable customers who had been off supply for an extended period of time. The Victorian Government purchased 200 8.9kVA generators and Bunnings donated an additional 100 generators. Generators were made available to customers expected to be affected by prolonged outages during the June and October storms (defined as more than seven days in the October event; and more than three weeks in the June event). The generators are sized to supply essential household appliances (e.g. some lighting, kettles, small plug-in heaters, phone chargers) but not large equipment such as hot water boilers or space heating. As part of the program, some customers received one generator and two cans of petrol. Generators were collected from customers once their power was restored. During the June storm, 186 small generators were deployed. In October, 27 generators were deployed.

Stakeholder feedback has identified that, while it was helpful for some customers experiencing prolonged outages, there are some significant risks and drawbacks to the small generator program, based on the experience in June and October 2021:

- Safety Risks – safety issues arising from installation, refuelling and electrocution risks together with exhaust fumes and load balancing to ensure customer appliances are not damaged.
- Customer expectations – the nature of the emergency will impact the availability of resources for deployment of small generators, for example, resources during a bushfire event are likely to be very limited.
- Financial – significant costs involved in storing and maintaining such assets, and further costs in deploying them in the event of an emergency such as delivery and pick-up costs – estimated at \$721,000 per year.
- Equity – decision making about which of the many customers that have lost supply should be provided with a small generator is problematic.
- Moral hazard – an ongoing commitment by government to provide generators may disincentivise customers and communities from taking appropriate responsibility for enhancing their own resilience to power outages.

During the Panel's community consultations, several examples of elderly residents struggling with transporting heavy petrol containers to refuel the generators that were provided. The Panel is aware of several accidents that occurred with private generators following the June 2021 storms, including one community member who reported a house fire caused by an overheated generator. Community members also reported difficulties in operating generators, some noting that while instructions were provided when generators were installed, the stressful nature of the event meant that it was difficult for some to take on board detailed instructions at that time.

While distribution businesses have previously deployed small diesel generators during bushfire events, they chose not to establish a similar program during the 2021 storms owing to issues associated with accessibility, costs and risks. In particular, in discussions with DELWP, distributors highlighted the following lessons learnt:

- Accessibility: access issues mean that distribution businesses cannot always deliver generators where needed, which reduces the benefits of the fleet (for example, during the June storm, the distributor could not access locations in the Dandenong Ranges for up to a week).
- Clear messaging to vulnerable consumers: vulnerable customers may consider diesel generators as an appropriate solution to prolonged outages rather than enacting their own emergency response plan, such as relocating to a hospital or other temporary accommodation. Diesel generators will not provide the reliable power required by such vulnerable customers. This risk would need to be managed through clear communications on the intended use of the generators.
- Safety risks: safety is also a concern where a customer attempts to interfere with the generator (e.g. in the event that fuel runs out).
- Significant costs: there are high costs associated with such a program, and a risk that it could be undersubscribed because customers prefer to access other forms of assistance. It was suggested that funding could be better directed towards other options that may have greater take-up rates (such as financial assistance for alternative accommodation).

Noting the costs and risks associated with the Victorian Government's small generator program, the Panel recommends that the existing fleet of small generators should be divested. The Panel's view is that the distribution businesses should not have obligations to provide such small back-up generators to customer premises during prolonged outages. This view is supported by the distribution businesses.

*Distributors should not have obligations to provide small back-up generators to individual customer premises during prolonged outages.*¹⁰⁰

*We have previously provided DELWP with analysis on costing and our ability to deploy a fleet of 6.3kW residential generators across our networks. There are numerous regulatory and social challenges associated with these initiatives (e.g. licence condition limitations, and our ability to recover costs associated with the program is restricted under the Rules unless funded by DELWP), and such schemes would diminish the need for customers and communities to have their own resilience plans.*¹⁰¹

*Additionally assigning accountability for this is a fundamental change in the services we are obligated to provide our customers. This would change our risk profile and may also require additional insurance to be obtained. The higher premiums, as well as the cost of the generators themselves, would ultimately push up energy prices faced by all customers, for little benefit.*¹⁰²

Requiring distribution businesses to deploy small generators to individual customer premises during an emergency may also act as a drain on distribution business emergency resources. Some Victorian distributors have explored the potential for a distribution business-led residential small generator program. However, it was identified that the variable costs of such a program, including installation labour, storage, maintenance and re-fuelling, significantly outweigh benefits.

An ongoing commitment by government to provide generators may also discourage individuals and communities from taking appropriate responsibility for enhancing their own resilience to storms and prolonged power outages. Supporting communities to take control and exercise greater autonomy in preventing, planning for, preparing for and recovering from emergencies, is a central feature of the approach of Victoria's emergency management framework.

However, the Panel's view is that the distribution businesses should continue to explore the use of larger mobile back-up generation to assist with restoration of essential services, community hubs, and network sections. Furthermore, the distribution businesses should also explore the greater use of microgrids and standalone power systems to mitigate the likelihood of prolonged power outages at high-risk locations.

Role of larger mobile backup generators owned by the distribution businesses (Recommendation 4.3.2)

The distribution businesses also use their own mobile generation plant to restore supply. Generator sizes may be up to 1 MVA connected at low voltage (LV) to pole mounted or ground mounted substations. The installation of generator connection points in pad mount transformers is common practice. Generators are used for both planned outages and unplanned outages during major events.

Larger mobile generators with step up transformers can also be used to connect to high voltage (HV) feeders. Applications vary and their suitability for use depends on the event and the network damage. The aim of these larger generators is to supply groups of customers or large customers and not individual residents.

Mobile generators have the advantage that they may be installed at a site with limited costs, and could be the solution for a number of sites, where the business case benefits of network augmentation at individual sites might be small, such as for small towns on radial lines. However, larger mobile generators also have some of the disadvantages associated with small generators discussed above, which is that they can be constrained by safety and accessibility, they do require experienced generator crews and fuel supply becomes an issue. Furthermore, the large generators also do not suit situations where there are lots of individual customers off supply at different locations on a feeder. However, the Panel understands that distribution business owned larger generators were an extremely valuable resource in regional Queensland during recent cyclones.

100 Written response from AusNet Services

101 Written response from Powercor

102 Written response from AusNet Services

The Panel's view is that these larger generators should continue to be deployed by the distribution businesses, where safety and accessibility issues permit, to restore power to community hubs, relief centres, and essential services which may benefit large groups of customers. The approach needs to continue to allow for flexibility for the response to be tailored depending on the unique characteristics of the event. The Panel has not recommended specific obligations to allow for this flexibility. Instead, the Panel recommends that the distribution businesses should make best endeavours to deploy their currently owned larger generator fleet to support the restoration of power to the benefit of larger groups of customers or priority service register customers, where safety and accessibility permits. The Panel's other recommendations on the development of a PSR which includes information about backup generation capacity at critical sites, and the distribution businesses' active involvement in the MEMPC and REMPC, will facilitate more coordinated use of the distributors' fleet of larger backup generators.

The flexible use of these larger generators, depending on the unique characteristics of the event, is supported by the distribution businesses:

During events network generation may be deployed where discrete areas of the network can be identified that are in sufficiently good condition to restore sensitive customers, farms, or where it would benefit many customers. As above we also support establishing community hubs (for which we could supply generation) or microgrids to ensure the most critical community infrastructure can remain on supply during the prolonged power outage.

The approach is necessarily flexible depending on the unique characteristics of the event and the response and enables us to make the most efficient use of resources to achieve the best outcome for customers as assessed during the event. Putting in place obligations will constrain this flexibility, likely leading to poorer customer outcomes, and will change customer expectations such that they may be less likely to make their own contingency plans as they rely on back up generation, which may not be able to physically be provided in some events (e.g., due to access issues).¹⁰³

Role of other forms of investments in providing resilience during network disruptions (Recommendation 4.3.3)

Finally, the Panel notes that the distribution businesses should also explore the greater use of microgrids and standalone power systems to mitigate the likelihood of prolonged power outages at high risk locations. By identifying high-risk locations that are most susceptible to extreme weather events, and seeking to mitigate their risks through potential investment solutions such as microgrids and stand alone power systems, these investments would provide a form of 'back-up' in the event of a prolonged power outage to the distribution network. This can be achieved through the Panel's recommendations 1 – 3 set out in Sections 4.1, 4.2 and 4.3.

Role of customers investing in their own back up generation

Rather than rely entirely on distribution networks for the reliability of supply, customers with critical power quality requirements and/or those located in higher risk locations may choose to invest in their own back-up generation and/or storage.

For example, hospitals, high-rise office buildings and others have invested in back up generation for many years given the criticality of their electricity supply, with some having full-service backup power facilities installed. But there are many options that, while falling short of providing for full service needs, can ameliorate the effects of prolonged outages. For instance:

- Some customers may benefit from investing in solar and energy storage installations that are fitted with an approved automatic transfer mechanism that allows customers to safely use their self-generated energy during a network outage.
- Some businesses and homes may benefit from investing in a petrol or diesel generator where they are likely to face a critical need for ongoing power and where a solar and energy storage solution is not possible or sufficient (this is fairly common among rural customers).
- Some solar inverters come with a built-in protected circuit from which some power can be drawn during daylight hours even without a battery, providing a means of recharging phones and other crucial but sporadic power needs during outages.
- Uninterruptible Power Supply (UPS) units and spare portable batteries can provide a longer life for crucial powered appliances like mobile phones and computers for a moderate price

¹⁰³ Written response from AusNet Services

- Portable gas cooking and heating equipment and gas-powered refrigerators can be used during a power outage, and the Panel heard many stories of community members using this equipment during the outages in 2021.

Such customer investments are likely to become more prevalent as distributed energy and storage technologies continue to become more affordable. They are likely to be of particular benefit to customers that are most impacted by outages such as pharmacies, shops and special needs customers. In all cases, generation and storage technologies must be correctly installed by a licensed electrician, including any necessary upgrades to the customer switchboard and internal wiring, and operated strictly in accordance with the manufacturer's instructions. Overall, these consumer technology trends should be also recognised and reflected in network investment decisions.

The use of generators to reduce the impact of power outages has been supported by government previously. In 2016, the Victorian Government established the Local Infrastructure Assistance Fund, which was a \$40 million fund to reduce the impact of power outages on vulnerable Victorians. The Fund was used to pay for back up diesel generators in 343 residential care facilities in peri-urban, regional and rural Victoria, including aged care, supported residential services, disability, mental health and drug and alcohol rehabilitation facilities.¹⁰⁴

Anecdotal accounts from the Panel's community consultations suggest that 20%-30% of people who live in the high-risk areas have purchased their own small generator. Where installed correctly, this may provide a workable back-up solution for those who can afford it. However, the Panel also heard of several instances where serious health and safety risks had occurred with generator fires, fuel spillages and elevated electrocution risks.

In addition, the Panel also noted that many vulnerable customers simply do not have the means to purchase or operate such generators as purchase and installation costs typically exceed \$6,000. The Panel also notes the significant limitations, delays and risks of the small generators that were provided to customers following the June and October storms, as noted in Section 2:

Resilience is a two way process. Both distribution businesses and customers have responsibilities. But it feels like the burden of resilience falls more heavily on customers¹⁰⁵.

After the October outage, I purchased a generator to avoid this problem going forward¹⁰⁶

Due to poor electricity reliability, many rural residents have portable generators for power outages. But generators can be problematic. A good generator can be expensive. Generators require fuel and during long periods can use a lot of fuel which may not always be available. There are potential safety issues. Distribution Businesses could provide rural customers with advice and assistance to purchase and maintain generators.¹⁰⁷

Following the June storms, it took us four days to receive the back up generator and get it installed. By then the power was restored on the fifth day.¹⁰⁸

Overall, the Panel's view is that the propagation of small petrol and diesel generators across customer properties is not ideal and is a poor substitute to a reliable and resilient power system. Of particular concern to the Panel are the significant and expanding health and safety risks to customers, the community and distribution field staff should this trend continue. While these small generators offer only limited back-up power and do not have the capacity to meet many normal customer loads, increased adoption will increase both air and noise pollution and may exacerbate social inequity.

As an alternative, the Panel notes the need for continued innovation in other forms of back-up power at customer premises, including solar and energy storage installations fitted with an approved automatic transfer mechanism and/or UPS units as discussed above. These provide safer, longer-term and more sustainable alternatives. However, they may not be a feasible or affordable option for many customers, including those who are vulnerable or in rental properties. Therefore, the Panel also recognises the need for

104 Department of Environment, Land, Water and Planning. "Local Infrastructure Assistance Fund." Text. Energy, August 3, 2020. Victoria. <https://www.energy.vic.gov.au/safety-and-emergencies/powerline-bushfire-safety-program/local-infrastructure-assistance-fund>

105 Feedback provided by a community member in South Gippsland

106 Feedback provided by a community member in Traralgon

107 Feedback provided by a community member in Traralgon

108 Feedback provided by a community member in Yarram

additional options such as the use of larger mobile generators (see 4.3.2) and other investments in resilience such as microgrids and stand alone power systems (see 4.3.3).

Importantly, however, the Panel proposes that the significant amounts that many customers are willing to pay for small back-up generators should be reflected in the VCR for WALDOs. This should be accounted for in network investment decisions.

4.5 Prioritising the restoration of power following an outage (Recommendation 5)

Recommendation 5	The distribution businesses should have new obligations to improve the prioritisation of the restoration of power following an outage
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Following an outage event, the distribution businesses need to restore supply quickly and in priority order. To a large extent, the order of restoration will be dictated by the nature and location of the faults that have resulted from the extreme weather event. Repairing damage to high voltage lines and long feeders will tend to be prioritised as it is necessary to enable restoration of supply at locations served by those lines. Following this, more localised faults in particular streets will be targeted. While the topology of the networks constrains the ability of distributors to restore supply at particular locations based on need, there will always be a degree of discretion, particularly once major upstream faults are rectified and distributors move to focus on numerous near-to-customer faults caused by falling trees and similar issues.

It is also important for distribution businesses, and emergency and community services, to have situational awareness of where prolonged outages are having a disproportionate impact on customers and other essential services. Even if restoration of supply cannot be prioritised to some customers, awareness of their needs can feed through to other arrangements being made, such as community hubs, and also inform state government and local council relief efforts.

As set out in Section 2 above, the outages caused by both the June and October 2021 events were prolonged, with significant numbers of customers off supply after 72 hours and even seven days after the event. The supply restoration task was lengthy and the Panel has heard that there were customers whose needs were not met in the process, and many instances where these needs were not even understood.

Losing electricity supply for long periods can cause huge disruption to people's lives and livelihoods and considerable distress. Following the storms of June and October 2021, the disruption impacted many aspects of people's daily lives. As well as finding themselves without power and the ability to heat their homes, in some cases customers were also without water, sewerage, communications and other services that are dependent on the power supply:

At my house no power meant no light, lost food storage, no water, no septic (and untreated sewage leakage!!), no internet, mobile phone was also out, so no communication.

*We did thankfully have heating as we use wood fire for warmth but I knew many who struggled with the cold, especially the elderly who had moved away from wood heating as they couldn't manage the lifting.*¹⁰⁹

*It's important too to appreciate that for many of us, no power means no water as the pumps stop. My house is not on mains water or sewer & has black water treatment on site, so no power also means the septic system does not work.. the tank has capacity for about three days before... well.. you can imagine!!!!*¹¹⁰

*And the other nightmare was not having any cash!!!! No power meant no eftpos & no atm & no power to charge phone to use applepay or bank transfer & the Telstra network was also out, so most mobiles were useless. So, cash economy, but who carries cash these days??!!!*¹¹¹

*Our property was without power for 17 days. In our case we were fortunate to have gas as well as electric hot water and backup gas cooking. However, we were unable to heat the house which has gas ducted heating powered by an electric fan. It was particularly cold.*¹¹²

*Many residents were paying to go "swimming" at Eltham Leisure Centre to just use their showers*¹¹³.

109 Feedback received from community member in Warburton/ Yarra Junction

110 Feedback received from community member in Warburton/ Yarra Junction

111 Feedback received from community member in Warburton/ Yarra Junction

112 Feedback received from community member in Kalorama

113 Feedback received from community member in Eltham

The lived experience of the June and October storms demonstrates that there is a clear gap in distribution business situational awareness, with flow on implications for actions by relief agencies and the businesses themselves. The Panel has identified gaps around:

- information on critical infrastructure locations, backup power capacity and restoration criticality
- information on life support and vulnerable customers, with gaps in coverage but also potentially issues with out of date information, leading to over-subscription to the current life support register
- information on critical infrastructure locations, backup power capacity and restoration criticality
- communications between distribution businesses and critical infrastructure providers
- communications between distribution businesses and government and councils
- a clearly expressed set of priorities to apply where there is discretion for the businesses in targeting supply restoration.

The coordination and management of a major energy emergency would be significantly improved by the development of information architecture and technology to enable a clearer understanding of where outages are and what action is being undertaken to address faults, in real time. While the Panel understands that there are information systems in place today that are used to inform decision makers managing an energy emergency, that there are limitations associated with these systems, and that technology exists to improve the information accessibility. While the Panel is not specifically recommending a significant overhaul of the emergency management information systems, noting that this would be beyond the scope of the Review, it considers that improvement of these systems and processes must be a continuous focus for the government, and that where technology is able to be engaged to better inform the management of an energy emergency, that it should be seriously considered, and barriers to improvements should be examined and overcome over time.

- The Panel's view is that the restoration of power can be better prioritised by:
- improving the life support register (Recommendation 5.1)
- DELWP, the ESC and the distribution businesses each having a role in developing, maintaining and annually updating a PSR (Recommendation 5.2)
- distributors having formal regard to State Emergency Management Priorities (Recommendation 5.3)
- distributors avoiding non-urgent scheduled maintenance for a period after prolonged power outages (recommendation 5.4).

These recommendations are discussed in turn below.

4.5.1 Improve the life support register (Recommendation 5.1)

Recommendation 5.1	The life support register and registration process should be reviewed by the ESC, with support from DELWP and Department of Health (DH), with a view to improving the efficiency of relief activities during a prolonged power outage.
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A key issue identified in Phase 1 of this review was that there is scope to improve the life support register (see Section 5.7). Timely provision of information on where life support customers are experiencing outages is crucial to ensuring their wellbeing during widespread outage events. Phase 1 of the review identified shortcomings in data handling during the June event, which are being addressed in the response to the Phase 1 report. Phase 1 identified the need for further work to be done in this area in Phase 2. The Panel's stakeholder consultation in Phase 2 has reiterated the need to improve the life support register.

Our experience with the continual power outages was our baby was born and in neonatal intensive care (NICU) in hospital for 5 months last year. We knew he was coming home on high flow breathing support which requires 24hr power to the machine. Knowing how unreliable our power is we filled in the life support notification paperwork with Energy Australia believing that in the event of the continual outages we have in Park Orchards we'd receive priority in getting power back on. Within a week of our baby finally being home we experienced a power outage and much to our disgust there was absolutely no priority given to our house to restore power, nor could the supplier advise an ETA to restore power. Fortunately we had spent a large amount of money on a generator but even having this caused a considerable stress ensure we had sufficient petrol to run it 24/7, and as my husband is a firefighter who works nightshift I then had to not only care for a high needs baby on breathing support and with a feeding tube (& 2 other children) but also manage the extreme stress and concern wondering if the generator was going to cut

out. The option of relocating elsewhere during power outages was not a viable option with us with our baby's equipment and medical needs, the only option was to take him back to hospital.¹¹⁴

The life support customer provisions in the Electricity Distribution Code of Practice are intended to support the most vulnerable members of society with managing the physical loss of electricity to their medical equipment.

The distribution businesses have many responsibilities with respect to life support customers, including the requirement to maintain a register of those customers. During an escalation event, distribution businesses supply these details to the DH, which can provide individualised support and welfare checks if required. In addition, distribution businesses also notify life support customers (and their carers if registered) of the unplanned outage via SMS.

Life support customers are defined in the Electricity Distribution Code of Practice, involving certification from a registered medical practitioner. Distribution businesses have clear visibility of these customers at the time of registration, as the B2B process¹¹⁵ with retailers contains a life support notification transaction.

There are a large number of customers registered as having life support equipment. Ensuring that life support registers are accurate, up to date, and accessible is crucial to effective prioritisation of supply restoration. Inaccurate data can put lives at risk – omissions can result in life support customers not receiving critical help, and registrations of premises that do not, or no longer have life support customers present can misdirect scarce and vulnerable relief efforts. Ensuring that life support customer registrations in particular remain unambiguous, up to date and accessible in the transition to a PSR is an absolute priority for the Panel.

There is broad agreement from stakeholders that the life support registration (and de-registration) framework needs to be urgently reviewed. We heard at the stakeholder roundtable that during the recent storm events welfare checks were made on registered life support customers who had passed away many years ago. There is also no obligation for retailers to de-register previous premises for life support customers who have moved house. This suggests there are opportunities to refine the list of registered life support customer by removing customers for whom information is confirmed to be out-of-date. This will benefit the remaining life support customers during an event as we will be able to contact them sooner. This assessment is most appropriately carried out by retailers as the party that registered the life support information in the majority of cases.

There is scope to improve the overall management of vulnerable customers during an outage through:

- increased clarity around eligibility for life support customers, noting this list has more than doubled since 2016, and now includes over 25,000 registered life support customers across our networks
- increased efforts to keep the register up to date
- greater clarity around contact requirements, noting that many life support customers were repeatedly contacted by multiple organisations (often to the frustration of these customers).

Distribution businesses have also noted the need to identify the most critical customers on the life support register, who should be prioritised over others.

We know that within [our register of life support customers] there are a 'critical few' who have a complex, severe or critical need, whilst the vast majority, whilst dependant on power, have other options and less immediate impacts.

It would help if we could identify the most critical customers that need the fastest and most urgent response so we could provide a level of additional care and support before and during an event – for example, ensuring they are top of our list when attempting to contact life support customers off supply, rather than towards the bottom of a long list of registered life support customers. At present, the Department of Health and Human Services (DHHS) is privy to this information and acts on it, cross referencing this list against the longer list of life support customers off supply that we provide to DHHS.¹¹⁶

The Panel recommends that the life support register and registration process must be reviewed with a view to improving the efficiency of relief activities during a prolonged power outage, noting that improving the register will go beyond the role of distributors during a prolonged outage and is therefore beyond the scope

¹¹⁴ Feedback provided by a community member in Park Orchards

¹¹⁵ B2B or "business to business" procedures are a set of commercial arrangements put in place between distributors and retailers to exchange information and payments for services.

¹¹⁶ Written response from AusNet Services

of this Review. The ESC, with support from DELWP and DH and DFFH, should carry out a review of the life support register arrangements in the Electricity Distribution Code of Practice as part of the transition to a PSR (see section below), aiming to:

- streamline the customer registration process to avoid circumstances where customers are registered, without having provided medical confirmation of their life support needs, for extended periods;
- require that the register must identify the ‘critical few’ who have a complex, severe or critical need;
- embed regular reviews of the register to ensure it remains relevant (this could require customers to confirm their registration every 2 years, for example);
- improve business to business arrangements to ensure retailers are required to provide up to date information to Distribution businesses for use in emergencies; and
- drive regular audits of the life support registration and register maintenance processes of Distribution businesses and retailers.

4.5.2 Maintain a priority service register (PSR) (Recommendation 5.2)

Recommendation 5.2	DELWP and the ESC should develop definitions of ‘vulnerable persons’, ‘critical infrastructure’, and ‘community assets’ for the purposes of establishing a Priority Service Register (PSR). DELWP and the ESC should consider how a PSR can be developed in practice, including whether parties would be required to self-register or if this information can be provided by other agencies. The distribution businesses should be required to work with DELWP and the ESC to establish the PSR, and then maintain and update the PSR, to help inform restoration priorities.
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Stakeholder feedback provided to the Panel suggests that distribution businesses need to have a better understanding of essential services’ electricity needs during a prolonged outage, to help inform their restoration priorities and other relief efforts.

In particular, communities have reported that the telecommunications network failures (that occurred as result of the power outages) were one of the most distressing aspects of their experience in the June and October storms, with many residents cut off for several days, unable to contact loved ones or call 000. Customers are reliant on the internet to access emergency information during bushfires and other disasters. Faster restoration of telecommunications assets, or longer lasting back up power (or both) would have reduced risks and improved the community’s experience of the outage:

When the mains power cut out during the June 2021 storm, batteries at local mobile towers lasted mere hours before depleting, leaving residents and services completely cut off – in some instances, for several days – unable to call 000 or connect with their workforces.¹¹⁷

Lack of phone service became a real issue. The Hurstbridge telephone exchange stopped working, taking out all land lines. Most of the mobile phone towers cut out after about 8 hours. The lack of ability to communicate within and to outside of the area was felt to be a real handicap.¹¹⁸

We had no telephone reception for most of the outage largely due to the loss of power to the Telstra Telephone Exchange at Ryanston and the Telstra Mobile Tower on Bass Hill. AusNet and the Telecommunications businesses need to work together to ensure that communications are not lost during an outage. While this is primarily a Telco responsibility, Distribution Businesses as good community members should take the lead in getting a better response from the Telcos.¹¹⁹

Even during normal times, mobile phone coverage is very poor in this area and calls frequently drop out. At such a critical time, good mobile phone reception is a critical means of communication.¹²⁰

117 Feedback received from community member in Eltham

118 Feedback received from community member in Eltham

119 Feedback provided by a community member in South Gippsland

120 Feedback received from community member in Kalorama

Difficult to circulate information to the community with no phones or internet, most had to drive or walk to find information. People had to drive to other side of town, high points on hills to get any phone service or receive and send SMS messages and phone calls. ¹²¹

This was a key issue identified in Phase 1 of this review, as discussed in Section 5.4 of this report, which identified the need for further work to be done in Phase 2.

Phase 1 of the review also identified that the planning for significant events would benefit from direct and regular communication between the electricity and other infrastructure owners (see Section 5.2). Some infrastructure owners indicated they do not supply information (or changes) about their critical assets (such as location, backup power capacity and restoration criticality) and that the distribution businesses may not have requested this information as an aid to understanding their critical loads. Advisian recommended that infrastructure owners should concisely document both the criticality and vulnerability of assets for distribution businesses. For example, this may allow the distribution businesses to plan restoration for a site differently if sufficient backup power is available, providing visibility over the critical sites that urgently need power restored. Advisian noted that this data should be reviewed annually to keep up to date with the changes that occur with asset development. In response to this recommendation, DELWP has consulted extensively with critical infrastructure sector leads from water, health, telecommunications, government, banking and finance, food and grocery supply and transport to seek feedback on how these critical infrastructure owners/operators consider and plan for extended power outages as part of their risk management planning.

The Panel identified in its consultation paper that vulnerable customers are not only those on life support. Other vulnerable customers including children, the elderly and people with disabilities were exposed to significant risks in the June and October storms:

After the storms, I saw neighbours struggling to keep pets alive, elderly people in our street bewildered at having to try to start generators, distressed people with disabilities trying to manage without their normal support systems. These experiences caused major trauma, on top of Covid, and it would not surprise me if there were deaths indirectly associated with it. ¹²²

My mother-in-law was not able to use her [Continuous positive airway pressure (CPAP)] CPAP machine and could not get out of her property for several days, so was quite unwell as a result. ¹²³

I personally know a few local pensioners who ate food that would be considered dangerous, as they could not afford to waste the food and didn't know what else to do. ¹²⁴

The lines were laying on the ground for 8 days near water where kids walk which I found to be rather dangerous. ¹²⁵

In phase 2, the Panel has consulted extensively with the local communities most significantly impacted by the June and October storms. The Panel recognises that the prioritisation decisions of the distribution businesses are highly complex and dynamic, and there is of course a strong need for operational flexibility and decisions made on the ground. These decisions are impacted by the disaster itself, communication, road access, network data, customer information back to the distribution business. Nevertheless, the Panel's view is that there is a clear gap in distribution businesses' situational awareness, with flow on implications for actions by relief agencies and the businesses themselves.

The distribution businesses currently have obligations to maintain a register of life support customers under the Electricity Distribution Code. In the United Kingdom, a more expansive set of vulnerable customers are required to be recorded by distribution businesses through a PSR.¹²⁶ The Panel's view is that a similar (but even broader) approach can be adopted to identify broader range of priorities and improve distributors' awareness of where major impacts from outages are being felt. This could potentially include the following:

- vulnerable persons;

¹²¹ Feedback provided by a community member in Pyalong

¹²² Feedback provided by a community member in Emerald in the Dandenong Ranges

¹²³ Feedback provided by a community member in Yinnar South

¹²⁴ Feedback received from community member in Eltham

¹²⁵ Feedback provided by a community member in Cockatoo

¹²⁶ Ofgem, 2016. Priority Services Register Review - Final Proposals. <https://www.ofgem.gov.uk/publications/priority-services-register-review-final-proposals>

- critical infrastructure, including facilities and services in any of the eight critical infrastructure sectors that support our basic needs¹²⁷; and
- community assets, which are facilities and services that support a community's resilience to shocks and emergencies.¹²⁸

However, the Panel has received written responses from the distribution businesses cautioning against expanding the life support register to include other vulnerable persons.

Our view is that distribution business are not well placed to manage any broadening of the definition of life support customers to include power dependent customers. There is no description of a power dependent customer under the current regulatory framework, and accordingly, distribution business do not have any customer details to support an expanded function. An expanded definition of power dependent customer will mean that restoration resources will be diverted from restoring power supply to as many as possible, creating worse outcomes for most. It is also unlikely that further increasing the surge resource capacity of distribution business contact centres to manage an expanded definition could be accommodated efficiently (i.e. as much of this capacity would be idle for long periods of time).

...

What constitutes a vulnerable customer is also subjective, and may vary through time due to specific customer circumstances. Vulnerability is broader than financial hardship, and includes culturally and linguistically diverse (CALD), the elderly, the under-educated, those with impairments or otherwise unable to access energy literacy, victims of domestic violence, life support customers or any other customer with a specific need.¹²⁹

VCOSS has also provided the view that the Panel should be cautious about expanding the life-support register for other vulnerabilities

Individuals, families and communities with pre-existing vulnerabilities or disadvantages are hardest hit by the effects of disasters, and are most likely to continue to be affected in the longer term. VCOSS welcomes this recognition in the consultation paper.

While there is some initial appeal to the suggestion of modifying (i.e. expanding) current Electricity Distribution Code of Practice life-support register obligations to include other households, at this stage VCOSS is mindful of the need for current information flows in emergencies to work better first. This is particularly the case given that the ESC has (relatively recently) reviewed the current life-support register requirements.¹³⁰

Energy Consumers Australia (ECA) has also stated the view that while the distribution businesses need to make "best endeavours" work with others to find good data, a new obligation is not necessary.

ECA's view is that distribution businesses need to work with community organisations to improve the data. Not necessarily an obligation but maybe "best endeavours" work with others to find good data.¹³¹

However, the distribution businesses have also expressed support for preparing a list of critical infrastructure sites and their corresponding back-up capabilities to help them prioritise restoration.

The availability of a list of critical infrastructure sites and their corresponding back-up capabilities, as well as the locations of existing community refuge centres, will improve our planning practices and ability to support restoration during an extreme event. We have noted that this information should be provided by DELWP.¹³²

127 These are defined by EMV as safe drinking water; food; reliable transport; accessible public health services; energy for homes and industry; access to banking, finance and government services; and global communications networks. See: <https://www.emv.vic.gov.au/our-work/critical-infrastructure-resilience>

128 High priority facilities to consider are where vulnerable people are likely to be situated such as aged care facilities, schools and childcare centres. This also includes emergency services. Other community assets may include facilities that may be planned for community use during emergencies such as community / emergency relief centres and hubs. Others may be occasional or created for a specific emergency event to support community relief and recovery. Other facilities include facilities and services that support resilience and 'return to normal' - like garbage collection and waste treatment facilities. The type and location for many of these community facilities and services will be known and detailed in each Local Government Area's Municipal Emergency Management Plan.

129 Written response from AusNet Services

130 Written response from VCOSS

131 Written response from ECA

132 See written response provided by CitiPower, Powercor and United Energy

Notwithstanding the notes of caution sounded by these stakeholders, the Panel believes a more expansive prioritisation register is the best and most logical way to ensure that distribution businesses have high quality, detailed information on hand to aid in understanding where critical infrastructure and vulnerable customers are being affected by outages. This should include information on the availability of back-up generation at each of these critical sites, to help the distribution businesses prioritise critical loads. It is noted that while this results in distribution businesses having an expanded list of priority connections to restore during an outage, obligations in the Electricity Distribution Code of Practice around life support customers and the additional information requirements and notice periods for them should not also apply to the PSR, but should remain specific to life support customers. The intention of the PSR is to provide the distributors with significantly more information on the nature of critical connections that can result in a better-informed prioritisation of reconnection process, and in doing so a better experience for customers during prolonged outages.

It should be the role of DELWP and the ESC to develop definitions of ‘vulnerable persons’, ‘critical infrastructure’ and ‘community assets’ for the purposes of the PSR.

In order for the PSR to be implemented, data on the relevant categories of premises and customers will need to be collected. In the case of life support customers, there are existing processes to allow registration and deregistration of premises for these customers. Other procedures may be necessary to collect the other types of information. The Panel presumes that information on critical infrastructure will need to be collected from infrastructure providers themselves. Information on vulnerable persons may come through a registration process similar to life support customers, or it may be appropriate for government to provide its own vulnerable persons data for incorporation into the PSR. These issues will need to be addressed in implementation by DELWP and the ESC. The initial establishment of the PSR is a significant undertaking that will require considerable resources given the breadth of community assets that might be included, and in the implementation process, DELWP may consider whether the PSR should be initially limited to high risk locations for prolonged power outages.

Finally, the distribution businesses should then be required to maintain and update the PSR, to help inform restoration priorities. Distribution businesses are the best parties to compile and maintain this information as they are best able to reconcile it with connection and metering point data, and Supervisory Control and Data Acquisition (SCADA) and smart meter data indicating outages during an event. Moreover, existing requirements to maintain a life support register have familiarised distribution businesses with this kind of task, which can now be expanded.

The Panel notes the need for flexibility to be built into the design of this new obligation. The distribution businesses should be empowered to respond flexibly by making the most efficient use of resources to achieve the best outcome for customers as assessed during the event, in a way that is tailored to its unique characteristics. However, the Panel's view is that there would be significant benefits in maintaining a PSR. An obligation on the distribution businesses to maintain a PSR would ensure that when it comes to an outage, distribution businesses can better prioritise the restoration of power, having the information to hand on where critical and community infrastructure is located and the capability and capacity of their corresponding back up facilities.

4.5.3 Prioritise restoration of power having regard to the PSR and the State Emergency Management Priorities (Recommendation 5.3)

Recommendation 5.3	Distribution businesses should make best endeavours to prioritise restoration activities having regard to the PSR and the State Emergency Management Priorities, where feasible and practical. This should be achieved via a general obligation on the distribution businesses.
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The State Emergency Management Priorities provide clear direction on the factors that are required to be considered and actioned during response to any emergency. The intent is to minimise the impacts of emergencies and enable affected communities to focus on their recovery as early as practicable. These priorities underpin and guide all decisions under the EMA during a response to any emergency.

The State Emergency Management Priorities are listed as the following:

- Protection and preservation of life and relief of suffering is paramount. This includes:
 - Safety of emergency services personnel; and
 - Safety of community members including vulnerable community members and visitors/tourists

- Issuing of community information and community warnings detailing incident information that is timely, relevant and tailored to assist community members make informed decisions about their safety.
- Protection of critical infrastructure and community assets that support community resilience.
- Protection of residential property as a place of primary residence.
- Protection of assets supporting individual livelihoods and economic production that supports individual and community financial sustainability.
- Protection of environmental and conservation assets that considers the cultural, biodiversity and social values of the environment.¹³³

The Panel recommends that the distribution businesses should make best endeavours to prioritise restoration activities having regard to the State Emergency Management Priorities, where feasible and practical. This should be achieved via a general obligation on the distribution businesses. This would ensure that the restoration priorities of the distribution businesses are aligned, where possible, with the broader State Emergency Management Priorities which currently underpin and guide all decisions under the EMA. The PSR will help the distribution businesses to identify the critical infrastructure and community assets that support community resilience.

The Panel notes the need for flexibility to be built into the design of this new obligation. The distribution businesses should be empowered to respond flexibly by making the most efficient use of resources to achieve the best outcome for customers as assessed during the event, in a way that is tailored to its unique characteristics. However, the Panel's view is that where discretion can be exercised by the distribution businesses, this guidance will be valuable.

4.5.4 Avoid non-urgent scheduled maintenance, if possible, for a period after prolonged power outages (recommendation 5.4)

Recommendation 5.4	The distribution businesses should avoid, to the extent possible, non-urgent scheduled maintenance for a period after prolonged power outages, to allow time for communities to recover from their devastating impacts.
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While not specifically related to prioritising the restoration of power following an outage, the Panel has received written feedback from the local councils that routine maintenance has become more frequent since the June and October 2021 storms.

There is also a concern that routine maintenance has become more frequent since the storms, and while this is understood to be a critical element of ensuring a reliable service, this can cause disruptions to entire townships and activity centres, with most businesses having to close for the day¹³⁴.

The Panel has received feedback from the communities that planned outages can be very frequent, sometimes once a week, with a lack of specific information about the program.

We receive a one liner from the distribution businesses noting that “we are carrying out critical repairs”. Customers want to know what works are being carried out and what they will achieve.¹³⁵

The Panel has received feedback that these planned outages can have significant financial consequences for small businesses and communities. This reiterates the importance of better outage planning (not only for emergencies and for also planned outages), including the need for community hubs to be pre-planned (Panel's recommendation 4.1 in Section 4.4.1), and need for customers to be pre-prepared for outages through better information provision (Panel's recommendation 6.1.3 in Section 4.6.1).

While the Panel understands that routine maintenance is an essential component of maintaining reliability of supply, the Panel recommends that the distribution businesses should avoid, to the extent possible, non-urgent scheduled maintenance for a period after prolonged power outages, to allow time for communities to recover from the devastating impacts that prolonged power outages, such as those experienced in June and October.

133 Emergency Management Victoria. “State Emergency Management Priorities.” General. Emergency Management Victoria, State Government of Victoria. Accessed May 5, 2022. <https://www.emv.vic.gov.au/responsibilities/state-emergency-management-priorities>.

134 Written feedback provided by Yarra Ranges Council

135 Feedback provided by a community member in Traralgon

4.6 Communication with customers before and during prolonged power outages (Recommendation 6)

Recommendation 6	The distribution businesses should improve their communication with customers before and after prolonged power outages.
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The Australian Institute of Disaster Resilience's Public Information and Warning's Handbook notes:

*The effective communication of public information and warnings is a critical element of emergency management, with the power to save lives. Timely, targeted and tailored information and warnings empower people to make informed decisions, to take protective action, and to reduce the potential impacts and consequences of a hazard.*¹³⁶

Timely and accurate information on restoration time is critical for community resilience. Consumers are reliant on information to make plans about how to remain in their home or whether to find alternative temporary accommodation. Owners and operators of hospitals, telecommunications assets and water treatment facilities also rely on timely and reliable information about the extent and expected duration of energy disruption to inform implementation of their continuity and contingency plans.

Following the June and October storms, the inadequacies in information provided by the distribution businesses meant that customers were not equipped to make alternative plans.

*There was no communication from my electricity provider, until late in the week and I had no idea when the power was coming on.*¹³⁷

*AusNet uses texts to customers to provide targeted outage information. We did not receive any texts about the 9 June 2021 outage on our property which lasted 4 days 14 hours 59 minutes. We did receive infrequent general texts but these did not provide sufficient useful information that would allow us to make good decisions about how we managed the outage.*¹³⁸

*Like many customers, I have a lot of thoughts on the messaging around the AusNet expected timeframes to restore power. AusNet use SMS to provide outage information to customers who have provided a mobile number. But to register a mobile, customers are expected to contact their retailer. Outages can be a health and safety issue. Distribution businesses should allow customers to directly provide mobile numbers and email addresses so that they can receive outage messages. In addition, distribution businesses should allow customers to provide multiple mobile numbers so that all members of households can receive outage messages.*¹³⁹

*I believe there is scope for the distribution businesses to provide information in a more customer friendly manner.*¹⁴⁰

*our power was out for around 8 days. We did not have any communication with AusNet apart from messages which kept changing the dates that the power would return.*¹⁴¹

To address these concerns, the Panel sees the need for both:

- a new general obligation on the distribution businesses in relation to how they communicate with customers following an extreme weather event (Recommendation 6.1)
- a new power of direction for Secretary DELWP, or delegate, to direct the distribution businesses to provide information both to customers, and to the State Controller in charge of an emergency, in the time and format that is best required (Recommendation 6.2).

These recommendations are discussed in turn below.

¹³⁶ National Recovery and Resilience Agency and Australian Institute for Disaster Resilience. Public Information and Warnings Handbook. Australian Disaster Resilience Handbook Collection. Australian Government, 2021. <https://knowledge.aidr.org.au/resources/public-information-and-warnings-handbook/>. p. vii.

¹³⁷ Feedback provided by a community member in Traralgon

¹³⁸ Feedback provided by a community member in South Gippsland

¹³⁹ Feedback provided by a community member in South Gippsland

¹⁴⁰ Feedback provided by a community member in Traralgon

¹⁴¹ Feedback provided by a community member in Cockatoo

4.6.1 General obligation to improve communication with customers (Recommendation 6.1)

The Panel's view is that distribution businesses should improve how they engage with communities following extreme weather events. This includes the need to:

- improve how they provide information to communities (Recommendation 6.1.1)
- improve how they receive information back from communities (Recommendation 6.1.2).

There is also a need to better prepare communities in advance of extreme weather outages, by assisting local councils with pre-preparing customers at high risk of prolonged power outages (Recommendation 6.1.3).

These matters are discussed in turn below.

Providing information to customers following an outage (Recommendation 6.1.1)

Recommendation 6.1.1	The distribution businesses should have a new general obligation to provide information to their customers who are off supply due to extreme weather events, including safety messaging, information on the severity of the outage, and information on the actions being taken to assess damage and restore power in the local area. This should include information on the phases and stages of restoration
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Distribution businesses are obliged to provide information relating to customer impacts in the event of an outage under the Electricity Distribution Code of Practice, established under the *Electricity Industry Act*, which applies to electricity distributors as a condition of their licence. In an emergency, distribution businesses must, as soon as practicable, provide information on the nature of an interruption and an estimated time of restoration of supply (ETR) or when reliable information will be available - via a 24 hour phone service and frequently updated entries on its website. Customers must also be provided with options to connect to a telephone operator, if required. The businesses are also required to provide information to customers in their preferred communication method. The focus on information provision has until now been on supply restoration in unplanned events (commonly up to 12 hours) and bushfires.¹⁴² The Electricity Distribution Code of Practice also requires distributors, prior to December each year, to notify each of its customers in writing about its role in emergencies and restorations and its contact details and website.

Stakeholders have reported that, particularly during the June event, the distribution businesses were unable to share timely, accurate and fit-for-purpose information with the State Controller, which had multiple impacts on the planning of relief programs.¹⁴³ In particular, the ETR information provided by the distribution businesses varied several times during the response as more information on the state of assets became available. Yarra Ranges Council has noted these information inaccuracies in its written feedback to the Panel.

In June and July 2021, distribution businesses worked quickly to rebuild the network, which had suffered extensive damage. However, delays and provision of inaccurate information –including estimated restoration times – caused a high degree of distress within the community.¹⁴⁴

The Panel raised this concern with stakeholders, including the distribution businesses and local councils who attended the Panel's stakeholder roundtables in March. The Panel has sought stakeholder feedback on how the information obligations of the distribution businesses can be improved. The distribution businesses have noted the practical challenges associated with meeting their current obligations to provide information on ETRs. Distribution businesses provide their customers with ETRs, and during normal, business-as-usual outages, these estimates are usually reliable. During extreme events, however, difficulty obtaining safe access (e.g. tree hazards, ongoing unsafe conditions, road access) to assess network damage, and the widespread and dynamic nature of the outages make providing accurate ETRs inherently more challenging. For example, as new information continually arises, the front and end of the 'queue' are constantly shifting. Distribution businesses also need to strike an appropriate balance between using finite resources to improve the robustness of ETRs versus focusing their workforce on restoring supply. AusNet Services' response here is instructive:

During a major storm event, there are logistical barriers to providing customers with accurate response times. These include:

143 Advisian Phase 1 report, Finding 7.

144 Written response received from Yarra Ranges Council

- *Difficulty obtaining safe access (eg. tree hazards, ongoing unsafe conditions, road access) to assess network damage;*
- *When the extent of the damage is very severe and widespread, it takes time for these damage assessments to be completed and prioritised;*
- *Re-prioritisation of repair works impacting ETRs with more recent higher impact faults being prioritised for repair and supply restoration. Also, our fault response crews prioritise repairs based on customer density and whether the unplanned outage impacts priority customers (eg. life support customers or critical infrastructure); and*
- *Lines supplying many customers may have several faults that need to be repaired, which may not be identified until the first fault is resolved.*

This may increase the length of time to restore all customers and makes it more challenging to provide an accurate ETR at the first attempt. For these reasons, the ETRs provided to customers during extreme events can be dynamic. While we recognise this is a source of frustration to customers, an alternative approach whereby we provide certainty to customers about when their power will be restored would require a high level of conservatism to be provided in these timeframes. This may lead to faults with lower customer numbers being restored earlier to meet original ETR's versus customer density prioritisation, slowing the restoration time overall or customers making alternative arrangements only to have their supply back on earlier. Therefore, this alternative approach would likely be a worse outcome for our customers.¹⁴⁵

The distribution businesses have noted that more onerous obligations to provide information on ETRs is unlikely to result in better outcomes, owing to the practical challenges associated with providing this information during extreme events.

The Panel understands from the distribution businesses that following an extreme weather event, difficulty obtaining safe access (for example, owing to tree hazards, ongoing unsafe conditions, and road access) to assess network damage can cause significant delays in locating the fault, identifying the cause of the fault, and making a restoration plan. The Panel accepts that this makes it inherently challenging to provide accurate information on ETRs immediately after an outage caused by an extreme weather event.

Recognising this practical challenge, the Panel recommends that the information provision requirements of the distribution businesses need to be different in outages caused by extreme events, when compared to during normal, business-as-usual outages. In outages caused by extreme weather events, customers need a broad range of information to assist them in making well-informed decisions about how to safely cope in the event of a prolonged period without power. This needs to be broader than an ETR. In addition to the best-available information on ETRs, the distribution businesses should be required to provide safety messaging, information on the severity of the outage, and information on the actions being taken by the distribution businesses to restore power in the local area, such as information on the phases and stages of restoration which may include:

- locating the fault (which may take time in areas of the network which have accessibility issues);
- identifying the cause of the fault;
- making a restoration plan;
- bringing in a restoration crew; and
- restoring the fault.

The accuracy of ETRs is likely to improve as the distribution businesses progress through the phases and stages described above. In the period following an extreme weather event where safety and accessibility constraints inhibit the distribution businesses from locating the fault, identifying its cause, and making a restoration plan, ETRs are unlikely to be accurate. However, during this period, in addition to the best-available information on ETR, the distribution businesses should have an obligation to provide a broad range of information to assist customers with making alternative plans. This should include:

- Information on the severity of the outage, with the possible creation of a new traffic lighting system which describes to customers whether the outage is mild, moderate or severe.
- Safety messaging, including:

¹⁴⁵ Written response received from Ausnet Services

- information on the safety and accessibility constraints that inhibit the distribution businesses from locating the fault; and
- information on how customers can remain safe during this period, including:
 - > whether they should remain in their homes or arrange alternative temporary accommodation until a further update is provided by the distribution businesses;
 - > the local of their local community hub, where they can find further information and support;
 - > safety considerations for customers who own small back-up generators;
 - > who the customers should contact if they are concerned about their safety.
- Messaging about the range of mediums through which periodic updates will be provided by the distribution businesses (which should include text messages, the distribution business website, social media, and information provided to the local community hubs).
- More detailed information on where the distribution business is in the phases and stages of restoration.

Once the distribution business has safely located the fault and made a plan for its restoration, it should provide accurate information on ETRs.

While the Electricity Distribution Code of Practice has recently been reviewed to assess the adequacy of the distribution business information requirements under normal, business-as-usual outages, these information provision requirements are not fit-for-purpose to assist customer during prolonged outages caused by extreme weather events. The Panel recommends that new, enhanced, information provision requirements, as described above, be introduced as a general obligation, for outages caused by extreme weather events. Further work is required to determine the threshold beyond which these enhanced information requirements would be triggered. For example, it may be necessary to define an 'extreme weather event' or a 'major energy emergency' which triggers these new, enhanced information requirements to ensure that customers receive more detailed incident information that is timely, relevant and tailored to assist them in making informed decisions about their safety during a prolonged power outage.

Receiving information from customers following an outage (Recommendation 6.1.2)

Recommendation 6.1.2	The distribution businesses should have a new general obligation to receive information from the local councils on real-time community data and sentiment.
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In addition to the need to improve how the distribution businesses provide information to customers, there is also an opportunity to allow customers to provide critical information to the distributor, where appropriate.

Feedback from the stakeholder roundtables conducted by the Panel in March 2022 has highlighted the importance of getting information back from communities. The local councils have noted that there needs to be a two-way conversation. Communities are very engaged and want to participate.

This feedback was further reiterated in the written feedback received by the Panel from local councils. In many cases, distribution businesses were reporting that service had been restored in areas where customers were experiencing ongoing outages

In June and July 2021, distribution businesses worked quickly to rebuild the network, which had suffered extensive damage. However, delays and provision of inaccurate information –including estimated restoration times – caused a high degree of distress within the community.

While council worked with agencies through emergency management structures, at incident and regional level, to respond to the event and coordinate a response, there appeared to be a disconnect between the response agencies and the distribution businesses.

In many cases, distribution businesses were reporting that service had been restored in areas where customers were experiencing ongoing outages, and alerting response agencies accordingly.

There was a missed opportunity for information to flow both ways between distributors, response agencies and communities, that would have ensured distributors were aware of outages that hadn't been detected by their systems, and agencies could support distributors to deliver a coordinated and efficient response.¹⁴⁶

146 Written feedback provided by Yarra Ranges Council

The feedback received at the Panel's community consultation emphasised this need once again. In particular, customers noted that they had access to valuable local information about faults (for example, faults resulting from fallen trees which the distribution businesses are unaware of). There were a number of instances where the distribution businesses considered the fault to be restored, where in fact there were a number of secondary faults owing the fallen trees further down the line, which local communities were aware of, but had no way of communicating this information back to the distribution businesses.

One customer from the Cockatoo region informed the Panel that following the October storms, it took their distribution businesses nine days to send a fault restoration crew to restore a fault, despite multiple customers reporting a fallen tree in the area in the ensuing days. The restoration crew on the ground did not have knowledge of the fallen tree involved despite the multiple customer reports:

In October, at least three residents in this street and probably more reported the tree down to Ausnet. Both the police and CFA inspected the tree in ensuing days. The crew that finally turned up on Day nine did not know that there was a tree involved, forcing them to wait for a crew lopping crew to turn up. This, to me, is a demonstration of both inefficiency, and a lack of communication between agencies.¹⁴⁷

Another community member from South Gippsland noted that distribution businesses are yet to conduct a customer consultation about the storms in 2021:

Distribution businesses need to consult customers about storm outages. I am not aware of any distribution business holding a customer consultation about the storms in 2021. Distribution businesses should not underestimate the local knowledge held by customers. This is knowledge that may allow distribution businesses to more efficiently solve problems.¹⁴⁸

Based on this experience from the June and October 2021 storms, the Panel considers that there is an opportunity for real-time accurate information flow from the community to the distribution businesses. The local councils are well-placed to be the point of connection and communication between the distribution businesses and community. The written feedback provided to the Panel from the local councils supports this view.

We see a real benefit in recognising and strengthening the role of local government in connecting and communicating between distribution businesses and community, through existing networks and trusted relationships, during outages to provide real-time community data and sentiment. Local government can also play a role in providing ongoing visibility of the weaker and more vulnerable parts of the power network so that greater preparedness planning can be undertaken with associated communities.¹⁴⁹

Preparing customers prior to an outage (Recommendation 6.1.3)

Recommendation 6.1.3	The distribution businesses should have a new general obligation to assist local councils with pre-preparing customers at high risk of prolonged power outages (and frequent unplanned outages).
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In addition to the recommended new requirements under 6.1.1 and 6.1.2 above in the event of an outage, the Panel's view is that there is a need for additional education campaigns to pre-prepare customers at high-risk locations for prolonged power outages. This was also recommended by Advisian in Phase 1, as set out in Section 5.8.

Experience from the June and October 2021 storms has taught us that while customers need information following prolonged power outages, the provision of this information is heavily reliant on power. Once batteries on mobile phones run out and if communication systems such as the National Broadband Network (NBN) go down, there are few options for reliable communication with communities. The Panel has noted that there are increasing public Wi-Fi facilities, such as NBN satellite services which have been rolled out in 309 natural disaster-prone areas across Victoria under the Commonwealth Government's Strengthening Telecommunications Against Natural Disasters (STAND) Program, which can provide connectivity when connected to a portable generator.

A lack of communication access during an outage can be partly addressed by preparing customers at high-risk locations, including through warning messages and by informing them of the location of their local community hub. The need to prepare customers prior to a prolonged power outages is particularly important

¹⁴⁷ Feedback provided from community member in Cockatoo

¹⁴⁸ Feedback provided by a community member in South Gippsland

¹⁴⁹ Written feedback provided by Yarra Ranges Council

in rural communities, where door-to-door knocking is not feasible owing to the sparsely distributed customer population. The Panel has noted the Commonwealth Government's STAND program includes a \$2.1 million public communication program which is being delivered to provide practical information and advice for communities and businesses about how to keep connected during emergencies.

The Panel's view is that the local councils are best-placed to lead community education campaigns, with input from the distribution businesses. Community education focused on preparing customers for a power outage should be carried out via a range of mediums including mailings, radio and TV ads, and should include information on what to expect in the event of a prolonged power outage including:

- the location of the local community hub
- what facilities can be expected at the hub (e.g., information, mobile phone charging, showers)
- what information will be made available from the distribution businesses to the customers
- why information on ETR is likely to change as more information becomes available to the distribution businesses about the nature of the outage
- how information can be accessed from different mediums (including text, radio, social media, and community hub information centre)
- useful information about personal generators, including their value in providing back up power for basic needs such as refrigeration, as well as their safety risks
- information about other valuable personal investments including eskies
- information on the need for back-up power on their NBN modem (which customers are often unaware is necessary), to access their landlines and the internet in the event of an outage, if the local NBN hub has power
- what relief support can be expected.

The local councils have noted in their feedback to the Panel that following the June and October storms, that restricted information flow from the distribution businesses down to the local level was an issue. The local councils need additional input from the distribution businesses to help pre-prepare their customers.

Following the June and October storms, restricted information flow down to the local level was an issue. The councils were overlooked, and the focus was on providing information to response agencies. The relief role of the councils following emergencies is poorly understood. Councils need more specific information to help set up community hubs where communities can congregate.¹⁵⁰

The need to pre-prepare customers is also relevant to planned outages. As noted above, the Panel has received feedback from some communities that planned outages can be very frequent, sometimes once a week, with a lack of specific information about the program. These unplanned outages can have significant financial consequences for small businesses and communities.¹⁵¹

We receive a one liner from the distribution businesses noting that "we are carrying out critical repairs". Customers want to know what works are being carried out and what they will achieve.¹⁵²

To address this issue, the Panel recommends that the distribution businesses should have a new general obligation to assist local councils with pre-preparing customers at high risk of prolonged power outages (as well as frequent planned outages).

The Panel noted that while recommendation 6.1.3 is specifically related to information provision and preparing communities, it is also related to the new requirements set out in the Panel's recommendation 4, which is that the distribution businesses should be required to actively participate in municipal and regional emergency planning and response. This is discussed in detail in Section 4.4. Any remaining gaps in the need for further information provision requirements are addressed through the Panel's recommendation 6.2 below which would create a requirement for the distribution businesses to provide additional information to local communities during an emergency where directed by the Secretary of DELWP, or a delegate.

Finally, while outside the scope of the Panel's ToR, the Panel considers that are opportunities for review and changes related to public information and weather warnings. The Panel heard from impacted communities that the public information and weather warnings they received in June and October 2021 prior to the wind

¹⁵⁰ Feedback provided at the Panel's stakeholder roundtables held in March.

¹⁵¹ Feedback provided by a community member in South Gippsland

¹⁵² Feedback provided by a community member in South Gippsland

storms did not adequately prepare them for the significant damage and prolonged impact on power supplies. The Panel notes that Emergency Management Victoria's June 2021 Extreme Weather Event Learning Review – Community Report is specifically addressing these opportunities. The report comprises a series of lessons regarding weather intelligence, predictive services and public information and is intended to ensure the key lessons that were identified from the extreme weather event that are relevant to the community are implemented and shared across the emergency management sector and with impacted communities.

The Panel has noted that since the June and October 2021 events, emergency services have taken further steps to shift towards action-based warning titles, consistent with the Australian Warnings System implementation, and progress ongoing work to build impact-based data that can inform forecasts and warnings. Emergency services are seeking to increase collaboration with organisations that can contribute to available impact data, and continue to build the capacity of community engagement staff and volunteers to support communities prepare for emergencies.

4.6.2 Requirement to provide additional information, upon request (Recommendation 6.2)

Recommendation 6.2	The Secretary DELWP, or delegate, should be given a new directions power to require the distribution businesses, if requested following a major energy emergency, to provide additional information or support to assist communities with restoration activity.
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In addition to the new general obligations recommended in 6.1, the Panel recommends that the distribution businesses be required to provide additional support at the direction of the Secretary DELWP, or delegate, to assist communities with restoration activity. The Panel recommends that in the event of a major energy emergency, Secretary DELWP, or delegate, should be empowered to direct a distribution business to:

- provide a standard set of data about power outage location, expected duration and restoration activity, including identified customer-level data to support response and relief activities;
- provide confirmation of how it has applied the State Emergency Management Priorities; and/or
- publish community information detailing incident information that is timely, relevant and tailored to assist community members make informed decisions about their safety*. This may include information about power outage location, expected duration and restoration activity. This direction could specify what information should be communicated, the timing for issuing this public information, the format and medium/channel.

The Panel recommends that this should be a power for the Secretary as the 'Control Agency Officer in Charge' as it is an 'in the moment' decision as part of emergency response. This could also be delegated to the State Controller – Energy, where appropriate.

The Panel's view is that it should be DELWP's role to collect and collate this information from the distribution businesses. It should also be DELWP's role to analyse and disseminate this information to the relevant response and relief lead and support agencies as well as local councils, utilising existing emergency management networks and systems already in place. This would assist the distribution businesses by providing them with DELWP as the central point of contact for information collection and dissemination. Utilising existing emergency management networks would also ensure that information is flowing through to the right people.

Finally, as recommended by Advisian in Phase 1 and set out in Section 5.6, the Panel agrees that it should also be DELWP's role to standardise the templates for these information requests, to the extent possible, to assist the distribution businesses efficiently respond to the large volume of information that they are requested to provide in the event of an outage. As discussed in Section 5.6.2 above, measures to improve the standardisation of information requests are already underway.

The Panel's rationale behind 6.2 for recommending directions powers for over specific obligations for the distribution businesses is to limit additional information requests from the distribution to only what is necessary to assist communities with restoration activity, as deemed appropriate by the Secretary DELWP, or delegate.

4.7 Delivery of relief to customers affected by prolonged power outages (Recommendation 7)

Recommendation 7	Improve the delivery of relief to customers affected by prolonged power outages.
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The EMA defines relief as:

[T]he provision of assistance to meet the essential needs of individuals, families and communities during and in the immediate aftermath of an emergency.

The Victorian SEMP clearly sets out the responsibilities for relief activation and the principles for the coordination and delivery of relief. Distribution businesses currently do not have a relief role specified under the SEMP.

The Panel's view is that it is the role of government to fund relief payments.

During and following the storms in June and October 2021, impacted communities suffered many losses, including damage to homes, vehicles, and other equipment. The impact of a prolonged power outage during and following such an event is a separate cost which has major consequences that have been outlined in this report, and therefore it is appropriate that loss of power stands alone as a very costly and devastating disaster.

The purpose of relief payments for prolonged power outages is help families buy the basics to cope, and/or to pay for alternative accommodation. This is essentially a social welfare payment and is appropriately funded through taxation revenue. If distribution businesses were required to fund relief programs, the impacts of any payments would be unequal across the community. This is because a distributor funded relief program would drive up costs for all our electricity customers, including businesses and low-income customers who have not received the relief payment. For these reasons, the Panel's view is that relief payments should continue to be funded by the government.

However, the Panel also considers that distributors do need to have a role in supporting relief, because they hold critical information that supports its delivery, being data on which customers are without power and for how long they are likely to remain off supply. To date, distributors have supported government relief programs on a good-will basis, and while in many cases this has been effective, the Panel sees value in a formal obligation for distributors in supporting relief programs, to provide certainty for distributors, government and the community about how relief will be delivered. The Panel considers that distribution businesses should have a clear obligation to assist with the delivery of relief activities to customers affected by prolonged power outages, when they are best-placed to do so.

Based on its assessment in Phase 2, the Panel recommends the following.

- The Victorian Government should review the coordination of relief programs during a prolonged power outage, with a view to improving outcomes and experience of the community so that they are clear on what relief is available and how it can be accessed. The review should also consider whether there are gaps in relief funding.
- The Victorian Government should commit to providing the Prolonged Power Outage Payment.
- The distribution businesses should be required to administer the PPOP.
- At the direction of the Secretary DELWP, or delegate, in the event of a major energy emergency, distribution business should be required to provide customer information and/or take reasonable steps to deliver or assist in the delivery of relief activities, where they are best placed to do so.

These recommendations are discussed in turn below.

4.7.1 The Victorian Government should co-ordinate relief programs and assess gaps in relief funding (Recommendation 7.1)

Recommendation 7.1	The Victorian Government should review the coordination of relief programs during a prolonged power outage, with a view to improving outcomes and the experience of the community so that they are clear on what relief is available and how it can be accessed. The review of relief programs should also consider whether there are gaps in relief funding. In particular, the role of relief payments and rebates for small businesses should be assessed.
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The Panel has received consistent feedback from the councils and customers that coordination of relief payments needs improvement. There is currently a lack of clarity around which relief program and payments are available, and what the eligibility criteria are.

Following the June and October storms, customers incurred significant costs as a result of the power outages:

Customers can face significant costs resulting from long outages. These include loss of food, fuel for generators and alternative accommodation. In many cases, customers are not adequately compensated for these costs¹⁵³.

Small businesses also incurred significant losses:

I run a dairy farm with my wife and two children. We have around 160 cows. During the June storms we were without power for 5 days. Cows are not like a machine you can't just stop milking them and then restart, they start losing production after the first 24hrs.¹⁵⁴

Local hotel was closed as they had no ability to cook or provide food and EFTPOS/Tills were out of action. Hotel lost significant perishable food stock.¹⁵⁵

The outages in simple terms means like all businesses here we had to close and lose trade throughout the duration....5 days here...2 days there and outages on weekends is very disruptive & costly for Meeniyah. it's getting to the stage with the amount of outages ... businesses have to have generators at their disposal to get by... businesses should be entitled to a federal /state rebate for having to buy generators in the first place.¹⁵⁶

Some customers also suffered significant damage to their homes and private property

I live in Emerald in the Dandenong Ranges, on the south side of one of the higher hills. We were fortunate to not sustain any home damage during the June storms, but three homes close to us sustained significant damage and one remains unoccupied at this point. We counted ourselves lucky that power was only out for 3 days.¹⁵⁷

Some residents suffered significant damage to houses and outbuildings, not just power outage. Significant numbers of trees down on private land, fences destroyed.¹⁵⁸

The Panel recommends that the Victorian Government should review the coordination of relief programs during a prolonged power outage, with a view to improving outcomes and experience of the community so that they are clear on what relief is available and how it can be accessed. The review should also consider whether there are gaps in relief funding. In particular, the role of relief payments and rebates for small businesses should be assessed, considering the extent of losses faced by small businesses in the June and October storms, and the corresponding impact this has on local communities.

4.7.2 The Victorian Government should commit to funding the PPOP and re-assessing its seven-day eligibility criteria in the context of other relief payments available (Recommendation 7.2)

Recommendation 7.2	Victorian Government should commit to funding the Prolonged Power Outage Payment (PPOP). In formalising the PPOP, the Victorian Government should re-assess the threshold for the PPOP, including whether the seven-day eligibility criteria is appropriate, in the context of other relief payments that are also available, based on the review from Recommendation 7.1.
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Notwithstanding this need to review the coordination of relief programs more broadly, the Panel considers that there is a clear need for specific relief funding during prolonged power outages.

Noting the separate but important impact that an extended power outage has on communities that have also experienced a natural disaster, in response to the June 2021 storm, the Victorian Government announced the Prolonged Power Outage Payment (PPOP) program. The PPOP program comprised weekly payments of \$1,680 to residential customers and \$2,500 to business customers remaining without power seven days after the event, for a maximum of three weeks. To support funding of the PPOP program, the Victorian Government activated the Australian Government-State Disaster Recovery Funding Arrangements. A 50:50 cost share was agreed.

Seven days without power was chosen as the appropriate threshold for eligibility, because a separate relief program was available for the first seven days following the June storm, which was the Commonwealth-State Personal Hardship Assistance Program (PHAP).

¹⁵³ Feedback provided by a community member in Traralgon

¹⁵⁴ Feedback provided by a community member in Yarram

¹⁵⁵ Feedback provided by a community member in Pyalong

¹⁵⁶ Feedback provided by a community member in Meeniyah

¹⁵⁷ Feedback provided by a community member in Emerald in the Dandenong Ranges

¹⁵⁸ Feedback provided by a community member in Pyalong

The PHAP provides a one-off, seven-day payment of \$560 per adult and \$280 per child – or \$1,680 for a family of four, to Victorians whose homes are uninhabitable as a result of a disaster having suffered physical damage to their property. This emergency relief assistance payment is subject to the Commonwealth Government's Disaster Recovery Funding Arrangements (DRFA), and therefore requires activation based on a threshold of eligible state expenditure. If activated, the PHAP is available for seven days after an emergency event.¹⁵⁹ Once this expired in June 2021, the Victorian Government's PPOP was applied for customers who remained off power. In October, the DRFA was not activated, however the Victorian Government re-established the PPOP for customers without power after seven days. The June PPOP program provided over \$11.9 million in payments to Victorians affected by the storm, made up of 6,497 residential payments and 396 business payments. The October PPOP program provided over \$3.8 million in payments to Victorians affected by the storm, made up of 2,159 residential payments and 66 business payments.

The Panel has consulted with stakeholders and communities on whether the PPOP should be formalised as a response to a prolonged power outages in the longer-term. The stakeholder feedback that the Panel received on the PPOP as it applied in June and October 2021 was broadly positive:

- The payment was considered to be adequate, and reflective of the costs involved in securing emergency relief for prolonged outages.
- Payments were made rapidly and efficiently, with funds being deposited into customer bank accounts by the distributors, within a few days of eligibility being established.

However, there were some criticisms:

- Eligibility was applied strictly – customers off power for just under seven days were not eligible for the PPOP, despite having suffered considerable costs due to the prolonged outage, and many not being eligible for, or being unaware of, the PHAP funding available for the first seven days of the event in June.
- Accessibility – some customers noted that the process for applying for PPOP was largely computer based, and customers without power or access to a computer found it difficult to apply. Paper forms were made available at some community relief hubs in June, however this was limited.

In particular, the Panel has received feedback from its community consultations noting that customers who were connected on Day 6 of the outage and did not receive the PPOP payment felt an inequity with their neighbours who were connected on Day 7 and received the full \$1860, despite these customers experiencing similarly adverse outcomes:

While well-meaning, the State Government's \$1680 prolonged outage payment just simply divided our already battered community into haves and have nots. I saw this generate resentment between good friends – for example, one couple who were connected on Day 6 and didn't get any acknowledgement of what they have been through were pretty pissed off with friends who were past the 7 day mark.¹⁶⁰

The Panel considers that there is a clear need for specific relief funding during prolonged power outages, and given the success of the program in June and October, recommends that PPOP should be formalised and activated again during prolonged power outages, for both residential and small business customers.

In formalising the PPOP, the Victorian Government should re-assess the threshold for the PPOP, including whether the seven-day eligibility criteria is appropriate, in the context of other relief payments that are also available. For example, if the PHAP is not available for the first seven days of an outage, consideration should be given to phasing in the PPOP earlier than seven days. The Panel considers that day four could be a reasonable trigger for the PPOP to commence, noting that the community feedback has supported the view that challenges intensify after the first three days without power. The threshold and approach to triggering the establishment of PPOP should also be clarified, it is not intended to apply in every circumstance where there is an unplanned outage beyond four or seven days for each customer, but instead should apply where there are major energy emergencies following extreme weather events, and therefore the resilience of the community is tested and the options for customers to seek support within their community are limited by the extent of the outage.

The Victorian Government should also ensure that where the PPOP has been activated, that paper based forms are made widely available at community hubs and relief centres, noting the limitations of online forms

159 Department of Home Affairs. Disaster Recovery Funding Arrangements 2018 - Fact Sheet. Australian Government, 2018. <https://www.disasterassist.gov.au/Documents/Natural-Disaster-Relief-and-Recovery-Arrangements/drfa-factsheet.PDF>.

160 Feedback provided by a community member in Trentham

where people don't have access to power to charge phones and laptops, and those vulnerable customers that may also otherwise be unable to access online forms.

The Panel also considers that there is also need for the Victorian Government to more fully assess the interaction between the PPOP and other relief measures in the process of re-evaluating the trigger thresholds.

4.7.3 The distribution businesses should be required to administer the PPOP (Recommendation 7.3)

Recommendation 7.3	The distribution businesses should be required to administer the PPOP to their customers who are without power who meet the Victorian government's eligibility criteria.
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The current obligations on distribution businesses do not include a requirement to make relief payments. However, following the June and October 2021 storms, the distribution businesses have, at the request of government, administered relief payments on behalf of government as part of the PPOP program.

The Panel considers that the distribution businesses are best placed to administer the PPOP as these businesses hold critical information about affected customers during an outage, and have the capability to make payments quickly.

The Panel's view is that the distribution businesses should have a formal obligation to administer the PPOP to their customers who are without power and meet the Victorian government's eligibility criteria.

The Panel has also considered the role of the Guaranteed Service Level (GSL) payments, including their relationship to relief payments.

While not an emergency relief payment itself, the distribution businesses do have GSL payment obligations set out in the EDC, which form part of the Victorian distributors' licence obligations.¹⁶¹ GSL payments are provided by electricity distributors to those customers who experience frequent or prolonged power disruptions. These are typically experienced by a small number of customers who live toward the end of long feeders.

Customers receive GSL payments in the form of a rebate on their electricity bill; consequently payment typically occurs one quarter later than the actual disruption. Payments range from \$130 to \$380 for customers experiencing more than 18 hours of supply disruption or more than eight unplanned, sustained outages per year, but these do not apply on major event days. Following an ESC review of the scheme in 2019-20¹⁶², from July 2021 distribution business have been required to pay customers \$90 each if they experience more than 12 hours' disruption on a major event day (though not if an individual suffers from disruptions on subsequent days which are not major event days). While the GSL scheme targets "worst served customers" recognising the poor service they experience, the payment is not designed to support households manage throughout continuous prolonged power outages such as those experienced in June and October.

Therefore, while the Panel considers that the GSL framework is not the appropriate vehicle for relief funding, the Panel notes that the ESC may wish to reassess whether there is a case for modifying the GSL payment in the context of international precedent. Specifically, precedent from Great Britain and Scandinavia may be of particular relevance to the ESC:

- In Great Britain, if the distribution businesses do not restore power to a consumer within 48 hours, they must pay £70 (AUD 125) in compensation; and this increases to £140 (AUD 250) per day for each successive day. There is a cap of £700 (AUD 1250) on such compensation, but in response to the recently experienced storm Arwen in Scotland, the distribution businesses agreed to lift the cap so that customers are fully compensated for the outages they have endured.¹⁶³
- Sweden has introduced a model where networks are required to compensate their customers if the period of outage exceeds twelve hours. Importantly, severe weather events are not regarded as a reason for avoiding compensation. The compensation is 12.5% of the calculated annual network charge, but a minimum of 1000 Swedish Crowns (140 AUD). The size of the compensation increases in

161 Note that in other NEM jurisdictions, GSL schemes apply as part of the AER's STPIS, however in Victoria, the arrangements are separate as set out in the Electricity Distribution Code of Practice.

162 Essential Services Commission. "Customer Protections in the Electricity Distribution Code (2019 Review)," December 2020. <https://www.esc.vic.gov.au/electricity-and-gas/codes-guidelines-and-policies/electricity-distribution-code/electricity-distribution-code-review-2019/customer-protections-electricity-distribution-code-2019-review>.

163 Ofgem. "Interim Report on the Review into the Networks' Response to Storm Arwen," February 2022. https://www.ofgem.gov.uk/sites/default/files/2022-02/Interim%20report%20on%20the%20review%20into%20the%20networks%27%20response%20to%20Storm%20Arwen_0.pdf.

a step model with 25% increases, or at least 1000kr, for every 24-hour period or part thereof. An outage is considered to have ended if power has been restored uninterrupted for at least two hours.¹⁶⁴

4.7.4 The distribution businesses should be required to support relief programs (Recommendation 7.4)

Recommendation 7.4	The Secretary DELWP, or delegate, should be given a new directions power to require the distribution businesses, if requested following a major energy emergency, to provide customer information and/or take reasonable steps to deliver or assist in the delivery of relief activities, where they are best placed to do so.
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The delivery of relief by government and other agencies may be dependent on action or support from the distribution businesses. However, stakeholder feedback based on experience from the June and October storms suggests that the distribution businesses were, in some instances, not sufficiently willing to offer support to the emergency response and relief efforts, because they were focused on restoration and did not have resources to apply to the Government's relief effort. This was a particular issue around information provision and their willingness to support customers with small generators following the June storms.

The Panel considers that, while the distributors' primary role in responding to an outage should remain the restoration of power, during a prolonged outage of the scale experienced in June and October 2021, distributors should also be required to support the delivery of relief, because they hold critical information on the nature of the outage. Information on the location of customers without power, and the process for reconnecting power, is critical for government and agencies seeking to support vulnerable customers during a prolonged power outage. The Panel has heard accounts of significant wasted effort in the delivery of relief that could have been avoided by the timely provision of information by distributors.

The Panel has identified a gap in the regulatory regime that impedes such requirements being imposed. Existing emergency powers under the *Electricity Industry Act 2000* are limited to matters of reconnection and supply and are generally not adequate to direct the distribution business to support broader response and relief efforts. Part 6, Division 1 deals with emergencies, which are defined under section 95(1) as being where:

- (a) an event has occurred, or is about to occur, which may endanger an undertaking of a distribution company, a transmission company or a generation company or a person who supplies electricity to another person or materially affect the safe, economical or effective supply of electricity; or
- (b) the available supply of electricity is, or is likely to become, less than is sufficient for the reasonable requirements of the community

Declaration of an emergency by the Governor in Council under this Division grants the Minister power to give directions to bodies and persons as needs be to protect the electricity system, ensure its safety and operation, ration/distribute it, increase supply or regulate available electricity.

The use of these provisions is extremely rare, and generally not invoked during even fairly widespread outages across distribution networks. Jurisprudential constraints are understood to exist on the interpretation of section 95(1) and what kind of events may fall within its parameters. These provisions were most recently invoked in respect of the LaTrobe Valley flooding event which followed the June 2021 storms, to ensure the operation of the Yallourn Power Station could be safeguarded, but no orders needed to be made subsequently as the flooding was dealt with.

The Ministerial licence condition powers under the EIA may be helpful to place obligations on distribution business in advance of emergencies. Section 33AB provides that the Minister may impose licence conditions by Ministerial Order. This provision is of unlimited generality, but places significant process constraints on the Minister through the requirements of section 33AB(2), which requires consultation and an assessment of the costs and benefits of the proposed conditions. It should be noted that these Ministerial licence condition powers were not introduced with a view to their exercise in the event of an emergency, and given the time needed for these to be implemented this would not be feasible.

To fill these gaps, the Panel recommends that at the direction of the Secretary of DELWP (or a delegate) in the event of a major energy emergency, distribution businesses be required to provide customer information and/or take reasonable steps to deliver or assist in the delivery of relief activities, where they are best placed to do so.

164 Enegimarknadsinspektionen. "Leveranssäkerhet i Sveriges elnät 2015: Statistik och analys av elavbrott," 2015.

https://ei.se/download/18_d4c49f01764cbd606218b37/1608307256934/Leverans%C3%A4kerhet-i-Sveriges-eln%C3%A4t-2015-Ei-R2016-17.pdf

This will ensure that the distribution businesses act on any other reasonable requests to support the delivery of relief for impacted customers, with associated penalties for not doing so. Importantly, however, the Panel notes that the purpose of this directions power should be limited to requesting support from the distribution businesses, only where they are best placed to provide this support, and where this support cannot be provided by other parties, to assist the delivery of relief operations. An example of an instance where such a directions power may be used could include where the PPOP application forms need to be distributed to community hubs, and road closures or other access issues mean that distributors are best placed to deliver PPOP application forms to the hubs to ensure that customers without internet access can access relief.

4.8 After action reviews to improve outcomes for customers impacted by prolonged power outages (Recommendation 8)

Recommendation 8	The distribution businesses should be required to conduct an after-action review of any major energy emergency, and to publish a summary of that review including improvement actions (lessons), within six months of the event. This should include customer surveys and focus groups.
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A key part of the institutional learning process in responding to emergencies is to look back and review the response to emergencies past; to learn lessons and develop better approaches to incidents in future. This role is central to the Victorian Government's own emergency management framework, with the Inspector-General for Emergency Management (IGEM) having this role.

Undertaking objective and system-wide reviews, evaluations and assessments of Victoria's emergency management arrangements and sector-wide performance, allows the IGEM to:

- identify emerging issues for the emergency management sector
- provide reliable, evidence-based information on what is working well and where improvements can be made
- identify ways for Victoria's emergency management sector to continue to learn and improve
- provide the government and the community with confidence that the emergency management arrangements are fit for purpose.

IGEM undertakes system-wide reviews, including reviews of the emergency management functions of responder agencies and government departments as prescribed in section 66 of the *Emergency Management Act 2013*.¹⁶⁵

A similar role is given to the AER in respect of wholesale market events that result in very high prices, generally as a result of tight supply-demand conditions in the NEM. The AER is required to publish a report whenever the 30-minute price for electricity exceeds \$5,000/MWh. It also has an obligation to publish a report when the ancillary service price exceeds \$5,000/MW for a sustained period. These reports identify and describe the factors contributing to the high prices, including rebidding, network issues or changes to demand and generator availability.¹⁶⁶

Distribution businesses are understood to undertake their own reviews of major events that have occurred within their networks, though these are undertaken at the discretion of the businesses and are generally internal documents only. There is limited transparency and the ability of emergency management authorities and the public to learn from these reviews is not facilitated.

The Panel's view is that to drive continuous improvement and deliver accountability to local communities, there would be value in requiring the distribution businesses to publicly release their after action reviews, while ensuring (through a new power for the Minister) that actions are taken on any improvement opportunities that are identified.

To give effect to the Panel's intentions, the Government should impose a requirement upon distribution businesses to conduct after action reviews after major energy emergencies, and to publish a summary (noting that there may be sensitive contents to any such review). This should include a review of customer sentiment through customer surveys and focus groups. The summary should identify the actions and key learnings from the event. An appropriate threshold will need to be determined in the process, to delimit which

¹⁶⁵ Inspector-General for Emergency Management Victoria. "Evaluation and Review." General. Inspector-General for Emergency Management Victoria, State Government of Victoria. Accessed May 5, 2022. <https://www.igem.vic.gov.au/our-work/evaluation-and-review>.

¹⁶⁶ Australian Energy Regulator. "Prices above \$5,000/MWh - 31 January and 1 February 2022 (Queensland)." Australian Energy Regulator, March 29, 2022. <https://www.aer.gov.au/wholesale-markets/performance-reporting/prices-above-5000-mwh-31-january-and-1-february-2022-queensland>.

events are major enough to warrant an after action review. The Panel suggests that such reviews should be undertaken while memory of the event is fresh in the minds of those involved, so a time limit of six months for publication would be appropriate.

Furthermore, the distribution businesses should also be required to actively participate in other after action reviews carried out by Government agencies, including EMV and DELWP.

5. Appendix A: Phase 1 recommendations and measures underway

Phase 1 comprised of two stages. Stage 1 of phase 1 was conducted from September to October 2021 and resulted in a report by consultants Advisian, which made recommendations to be implemented for summer 2021-22. Eight recommendations were made, and responses to all of these were underway prior to the 29 October 2021 storm. These included improvements to communication with critical infrastructure operators, enhanced public messaging to support community preparedness, and faster and more streamlined support for power-dependent customers. Stage 2 of Phase 1 was conducted from November to December 2021, identifying opportunities for longer-term regulatory reforms (beyond the summer of 2021-22) to be investigated in Phase 2.

Sections 5.1 to 5.8 below provide a summary of the eight recommendations from Phase 1 and a discussion of the measures that are already underway to action these recommendations. Areas where the Phase 1 report had noted a need for further assessment from the Panel in Phase 2 are identified and cross-referenced to the relevant section of this report where this further assessment has been provided.

Furthermore, in addition to the Phase 1 recommendations identified by Advisian, a number of other post-event reviews and actions stemming from the June and October 2021 storms have identified and implemented various improvements. These are described in section 5.9.

5.1 Recommendation 1: Distribution Businesses should review surge capacity for major storm events for summer 2021/22 based on learnings from the June 2021 event.

5.1.1 Findings from Phase 1

Phase 1 identified that the extended duration and scale of the response placed significant pressure on distribution business resources across all functional areas. Similar pressures impacted emergency response agencies, including in the delivery of relief. Areas where the distribution businesses had additional resources (referred to as 'surge capacity' in the Phase 1 report) included contact centres, community engagement, damage assessors (scouts), and field construction and maintenance staff. However, when surge capacity was unavailable during the June 2021 event, the distribution businesses used mutual aid from Victoria and NSW. Stakeholders indicated that the use of mutual aid staff required processes for staff induction and for finding accommodation of the staff.¹⁶⁷

To address this issue in planning for summer 2021-22, Advisian recommended that the distribution businesses should plan for additional surge capacity in areas identified in post incident reviews, and review mutual aid sources, processes, inductions, and accommodation requirements based on learnings from the storm events last year.

5.1.2 Measures underway

In response to this recommendation, the distribution businesses have reviewed their surge capacity as part of their post event reviews; and again prior to winter 2022.

DELWP met with the distribution businesses on 22 November 2021 to discuss their summer preparedness including surge resourcing arrangements. This included a discussion of learnings from the June and October 2021 events regarding mutual aid arrangements and staffing for potential summer 2021-22 emergencies. The distribution businesses confirmed that activities such as line maintenance, REFCL operations, fuse replacements and upgrades, transformer substation augmentations, other network resilience projects and emergency management resourcing arrangements were either complete or on track for completion by the summer 2021-22 peak. Distribution businesses noted that vegetation management programs were underway but experiencing delays due to access issues associated with heavy rain or the aftereffects of the October 2021 storms. This included resource constraints which were common across the industry due to the diversion of staff towards storm response activities.

¹⁶⁷ The Victorian Mutual Aid Agreement for Distribution Businesses of the Victorian Electricity Supply System (2017) is an agreed process between Victorian electricity distribution businesses to obtain, where possible, short-term assistance in the form of personnel, equipment, materials, and other related services outside the area that a distribution business operates in. The Victorian regulatory safety framework also allows mutual aid agreements to be made between Victorian and interstate distribution businesses during an emergency.

In its written submission, AusNet advised that, in response to customer feedback regarding long call centre wait times during the June storms, it is providing customers with access to other channels for faults and emergency information. Powercor's written submission notes that, as a result of its review of processes for providing estimated time to restore information, Powercor has dedicated additional resources to manage the provision of this information to customers.

DELWP will meet with the distribution businesses again in May 2022 to discuss preparedness for potential winter 2022 emergencies. Discussions will include communications for winter, emergency management resourcing, line works, vegetation management and other resilience projects.

5.1.3 Further consideration in Phase 2

A further consideration of specific bottom-up requirements for surge capacity was outside the scope of the Panel's work in Phase 2. However, the Panel's recommendations, summarised in Sections 3 of this report, to help reduce both the likelihood and impact of prolonged power outages, include obligations for distribution businesses to undertake actions to mitigate the risk and impact of prolonged outages in high-risk locations, which would include ensuring that they are adequately resourced to respond to power outages in the future. In particular, the Panel's recommendations in relation to identifying high-risk locations in Section 4.4.1 will assist with surge resource planning.

5.2 Recommendation 2: Distribution Businesses should regularly request information on the criticality and vulnerability of key sites and backup generation from critical infrastructure owners.

5.2.1 Findings from Phase 1

The Phase 1 review identified that the distribution businesses need to better understand essential services' needs during a prolonged outage, to help inform their restoration priorities. Findings from Phase 1 highlighted that the relationships between the distribution businesses and critical infrastructure owners (such as telecommunications and water service providers) could be improved.

Some critical infrastructure owners commented that they do not interact regularly with the distribution businesses and communication is at times via the retailer. Planning for significant events would benefit by direct and regular communication between the electricity and other infrastructure owners. Often communication is between staff that have had prior relationships. Some infrastructure owners indicated they do not supply information (or changes) about their critical assets (such as location, backup power capacity and restoration criticality) and that the distribution businesses may not have requested this information as an aid to understanding their critical loads.

Advisian recommended that infrastructure owners should concisely document both the criticality and vulnerability of assets for distribution businesses. For example, this may allow the distribution businesses to plan restoration for a site differently if sufficient backup power is available, providing visibility over the critical sites that urgently need power restored. Advisian noted that this data should be reviewed annually to keep up to date with the changes that occur with asset development.

5.2.2 Measures underway

In response to this recommendation, DELWP has worked with emergency services, critical infrastructure hazard leads, and distribution businesses to develop standard operating procedures to identify critical infrastructure and community asset impacts to inform restoration priority.

Improved processes were trialled during the October 2021 storm event. These processes and templates have been further refined through co-design workshops in February and March 2022. The workshops have also helped build relationships between the distribution businesses and critical infrastructure hazard leads. Critical infrastructure leads have a better understanding of how distribution businesses respond to power outages; and distribution businesses have a better understanding of the contingency planning and risks for critical infrastructure sectors.

The final draft of the new standard operating procedures and information collection template is with distribution businesses for confirmation as at April 2022. DELWP will follow these new standard operating procedures in the event of a major emergency. Reviews of these processes are scheduled in September 2022 and March 2023.

5.2.3 Further consideration in Phase 2

The Panel has given further consideration to how critical infrastructure can be better prioritised in the restoration of power, including how a register of critical infrastructure owners and other priority customers can be maintained and updated annually, in Section 4.5 of this report.

5.3 Recommendation 3: Critical infrastructure owners should review their backup power arrangements for extended outages for summer 2021/22.

5.3.1 Findings from Phase 1

Critical infrastructure owners identified that some of their backup power arrangements for critical sites were not adequate for an extended outage duration such as the June 2021 event. Backup power includes both fixed and mobile generation, batteries, and solar/battery systems.

The use of backup power at these sites is based on a risk assessment. One water utility suggested that common risk assessment criteria for installing permanent generation (or alternatives) would be of benefit for infrequent events such as June 2021 and outage durations up to 5 to 10 days may need to be considered. In addition, disruptions to road access and refuelling requirements should now be considered as part of this risk assessment.

The distribution businesses have trials underway for new technology for backup power, and investment business cases will be developed if successful. However, there are many different scenarios in the power network that require different solutions.

Advisian recommended that a broad review of the use of generation / backup power (including other technologies or solutions) by the distribution businesses, government, and businesses (small, medium, large) during restoration of power should be completed in Phase 2 of the review. There is now an awareness amongst stakeholders that existing backup power arrangements may be insufficient for some utilities and agencies.

5.3.2 Measures underway

In response to this recommendation, DELWP has consulted extensively with critical infrastructure sector leads from water, health, telecommunications, government, banking and finance, food and grocery supply and transport to seek feedback on how these critical infrastructure owners/operators consider and plan for extended power outages as part of their risk management planning.

Sector Resilience Plans, required under the Emergency Management Act, for critical infrastructure sectors (water, food and grocery supply logistics, health, transport, communications, banking and finance, and government) consistently identify energy disruption as a key risk requiring preparedness and mitigation strategies at the sector-wide and individual operator level. Since the June event, DELWP has worked with critical infrastructure Sector Resilience Networks to further cross-sector understanding of interdependency, and improve preparedness.

DELWP briefed all critical infrastructure sector leads on 18 January 2022 on high level principles of contingency planning for prolonged power outages. Co-design workshops in early 2022 to develop standard operating procedures to identify and respond to critical infrastructure impacts have provided an opportunity to support risk and contingency planning. When the revised approach is adopted throughout 2022, it is intended to provide critical infrastructure owners and operators with standardised processes for how they report site-specific impact data to distribution businesses and government. This approach is designed to enable distribution businesses to have a clearer understanding of the critical sites to prioritise for restoration during a prolonged outage.

5.3.3 Further consideration in Phase 2

The Panel has provided further consideration to the role of back up generation in Section 4.4.3 of this report.

5.4 Recommendation 4: Review the vulnerability of telecommunication assets and improve the resilience of telecommunication systems during extended outages. Utilities should develop contingency plans to communicate with consumers

5.4.1 Findings from Phase 1

The loss of telecommunications was a significant issue after the June and October 2021 storms, limiting the ability of the distribution businesses, other utilities and emergency services to communicate directly with customers, and customers to communicate with their families and each other. Utilities rely on mobile phone, fixed line and/or data for inbound and outbound communication with consumers, staff, and system monitoring and control. The loss of telecommunications resulted in utilities being unable to communicate with their customers. The 000 service was not contactable in some locations.

Utilities indicated that they would need to review how communication with consumers can occur when normal communication channels are lost. The importance of places where consumers could visit to charge mobile phones was also highlighted by several stakeholder groups. NBN provided Sky Muster trucks (also called Communications on Wheels “COWS”), which were helpful to customers. Some councils have been successful in gaining Federal grants to purchase Sky Muster equipment at relief centres.

Many stakeholders suggested that the improved resilience of sites during power outages should be a focus for the telecommunication utilities.

5.4.2 Measures underway

Telecommunications services in Victoria are privately owned and regulated by the Commonwealth. The Commonwealth Government has constitutional responsibility for the regulation of the telecommunications sector and the adequacy of telecommunications services across Australia. However, the Victorian Government plays supporting roles through advocacy, by partnering with Commonwealth Government programs and by delivering targeted investments that improve Victorians’ access to high quality and reliable telecommunications.

The DJPR has supported a range of activities in response to the impact of emergency events on telecommunications to better understand network vulnerabilities and help mitigate the impact of future disasters. This includes:

- **Strengthening Telecommunications Against Natural Disasters (STAND)** – DJPR facilitated implementation of the Commonwealth Government’s STAND program in Victoria. This program is delivering 309 NBN Co satellite services across Victoria to provide alternative emergency connectivity to communities in natural disaster-prone areas.
- **Partnering with the Commonwealth Government’s Mobile Network Hardening Program (MNHP)** – The Victorian Government has co-invested alongside industry in the Commonwealth Government’s MNHP. This program is improving the resiliency of mobile base station infrastructure by extending battery backup power and undertaking site hardening works. The program is extending battery backup at mobile base stations funded by government through previous rounds of the Mobile Black Spot Program.
- **Connecting Victoria program and historical telecommunications investments** – The Victorian Government is delivering \$550 million to improve connectivity across Victoria for both fixed-broadband and mobile networks through the Connecting Victoria program. The program seeks to partner with telecommunications providers to improve the quality and consistency of their networks. This program builds off the \$58 million that the Victorian Government already invested to fund 253 new mobile base stations across the state, particularly in disaster-prone areas.
- **Liaising with industry on communications sector resilience planning** – DJPR has an emergency management liaison function to engage with the communications sector on network outages during emergencies. DJPR engages regularly with industry before, during and after emergency events and during periods of heightened risk. Additionally, under Victoria’s Critical Infrastructure Resilience Strategy (2015), DJPR and the sector collaborate on an annual Sector Resilience Plan for the telecommunications sector. After the 2019-20 fire season, key preparedness activities were reviewed, including procedures for site maintenance, standards for resilient future site construction, ensuring sufficient stock levels of temporary telecommunications facilities and processes for better provision of information to customers.
- **Report into telecommunications to network vulnerabilities during natural disasters** – Following the 2019-20 fire season, DJPR commissioned a report into telecommunications to network vulnerabilities during natural disasters. The report identified a range of vulnerabilities including the

loss of mains power, the lack of power backup, capacity constraints, and the lack of emergency roaming beyond triple zero calls. This report informed DJPR input to the 2020 Inspector General of Emergency Management (IGEM) and Royal Commission enquiries.

DELWP and DJPR continue to work closely together to support the telecommunication sector's business continuity and contingency planning.

5.4.3 Further consideration in Phase 2

In Phase 2, the Panel has consulted extensively with the local communities most significantly impacted by the June and October storms. As summarised in Section 2, the loss of telecommunications in the days immediately following the storms had a devastating impact on the community, and it was the most significant and consistent issue of concern raised during the Panel's community consultation and during Advisian's stakeholder interviews in November and December 2021. In response to this feedback, the Panel has given consideration to how telecommunications and other critical infrastructure can be prioritised in the restoration of power in Section 4.5 of this report. The Panel has also considered how the distribution businesses can develop alternative ways to communicate with their customers during an outage (such as by pre-identifying community hubs where mobile phones can be charged and by supporting the development of community education campaigns), in Section 4.6 of this report. Finally, the Panel has also made a further assessment of the importance of critical infrastructure owners investing in their own resilience and business continuity plans, as discussed in Section 4.4.3.

5.5 Recommendation 5: The Victorian Government should decide if the existing fleet of generators would be used during summer 2021/22, allocate interim ownership and responsibilities and review the processes for installation.

5.5.1 Findings from Phase 1

Following the June 2021 storm, the Victorian Government established a small generator loan program to assist vulnerable customers who had been off supply for an extended period of time. The Victorian Government purchased 200 8.9kVA generators and Bunnings donated an additional 100 generators.

The fleet of 300 small generators used during the June event is now in storage. Advisian suggested that if these generators were to be considered for use during an emergency in summer 2021/22, they should be maintained and be ready to deploy. Advisian recommended that the responsibility for summer 2021/22 should be resolved.

Stakeholder feedback identified that, while the small generator program was helpful for some customers experiencing prolonged outages, there are drawbacks to this program, including the significant financial costs involved in storing, maintaining and deploying such assets, and safety risks regarding installation and refuelling.

Advisian recommended that a more detailed review of backup generation in Phase 2 should include whether the small generators should remain as a permanent solution for single vulnerable consumers or if other alternatives exist.

5.5.2 Measures underway

As an interim measure while Phase 2 of the Review was underway, DELWP maintained the fleet of generators to enable them to be deployed in the event of prolonged outages, in the same manner and on the same terms as in June and October 2021.

DELWP adopted interim standard operating procedures, which supported the program to be rolled out in response to the October 2022 storm event. While the program was opened and generators were placed more quickly than in the June event, demand for small generators in October was significantly lower than in June.

DELWP continues to refine the interim standard operating procedures to enable timely and effective use of the small generators.

5.5.3 Further consideration in Phase 2

The Panel has given further consideration to the role of back up generation in Section 4.4.3 of this report.

5.6 Recommendation 6: Develop common templates and formatting for reporting of information during an emergency

5.6.1 Findings from Phase 1

Following a power outage, customers are reliant on outage information provided by the distribution businesses, to assist them to make more informed decisions about how to cope during a prolonged power outage. Agencies and asset owner/operators involved in emergency response received frequent requests each day for essentially the same event information, from many sources but required in different data formats. For distribution businesses, the preparation of outage information in different reports consumed significant time and resources and resulted in delays.

Many stakeholders suggested that common templates should be developed for many of the requested formats. These could be agreed during pre-planning and system-generated reports could be created. This would reduce the effort producing requests for data during the emergency response.

5.6.2 Measures underway

DELWP has developed a set of processes and templates to improve the collection, analysis, dissemination and use of key information about prolonged power outages. This complements the standard operating procedures to identify critical infrastructure impacts to inform restoration priority outlined under the recommendation 2 'measures underway' section.

This approach has been co-designed with emergency services, relief agencies, critical infrastructure hazard leads and distribution businesses. New standard operating procedures include:

- templates that standardise reporting including outage geography, priority site identification, estimated time to restore and power dependent customers
- processes that require and support coordination across emergency services, relief agencies and state, regional and incident tiers of emergency response
- standardised and adaptable text for situation reporting explaining how outage numbers, estimated time to restoration, critical infrastructure and essential services impact and restoration prioritisation is determined.

5.6.3 Further consideration in Phase 2

The Panel has given consideration to how the information provision requirements for distribution businesses can be improved, as outlined in Section 4.6 of this report.

5.7 Recommendation 7: The Distribution Businesses should decide which agencies should have access to power-dependent consumer registers during emergencies for summer 2021/22.

5.7.1 Findings from Phase 1

During the June and October 2021 events, distribution businesses provided lists of life support customers to agencies as required under the Electricity Distribution Code. However, findings from Phase 1 highlighted deficiencies in the processes for collection and sharing of power-dependent customer data which are being addressed in the response to Phase 1.

5.7.2 Measures underway

Since June 2021, distribution businesses, DELWP, DH and DFFH have reviewed and improved processes and practices to share and act on power dependent customer data. This information was shared with relevant agencies during more recent major energy emergencies, including the October storm event.

The processes and templates to improve the collection, analysis, dissemination and use of key information referenced above in relation to Recommendation 6 include streamlining and standardising the sharing of power dependent customer data.

DELWP has provided support to DH and DFFH to review the protocol for how distribution businesses share information about life support customers during outages.

The new State Emergency Management Energy Sub-Plan (February 2022) includes clear expectations that life support customer details will be provided by distribution business to DH, DFFH and DELWP simultaneously.

In addition, since 2019 the ESC has consulted widely with electricity retailers and distributors as part of an overhaul of energy industry customer obligations. This resulted in new life support equipment-obligations introduced in July 2021. Changes to the code improved and strengthened registration processes and clarified the obligations of small-scale distributors.

5.7.3 Further consideration in Phase 2

The Panel has given consideration to how the life support register processes can be improved in Section 4.5.1 of this report.

5.8 Recommendation 8: Improve community preparedness and resilience during major storm events through public messaging.

5.8.1 Findings from Phase 1

Stakeholder feedback from Phase 1 identified the importance of building community resilience for prolonged or severe outages through pre-preparedness education – building on bushfire reviews, learning and campaigns. Pre-preparedness information is particularly important in safety messaging regarding the use of solar/batteries and the safe use of small generators, which are now being heavily marketed to residential customers and are being purchased by many customers in areas prone to outages.

Stakeholders suggested that, in addition to information about fires, public messaging and education should be developed for storm outages to enable community preparedness and resilience (this is also in the scope of the Learning Review). It was suggested that this should be done without delay due to heightened community awareness about the 2021/22 summer.

5.8.2 Measures underway

In response to this recommendation, DELWP has reviewed and updated standard public information to support the community to prepare for and manage during prolonged power outages. This communication protocol was shared with distribution businesses. Prior to summer 2021-22, DELWP also updated its 'Prepare for Power Outages' webpage to include advice for customers about what to do during power outages that occur as a result of storms or bushfires. This includes advice on keeping clear of fallen powerlines, being careful with temporary generators, and making sure that a licensed electrician checks that it is safe to turn power back on if there has been significant damage to property.

5.8.3 Further consideration in Phase 2

The Panel has given consideration to how the information provision requirements for distribution businesses can be improved, including through supporting pre-preparedness education, in Section 4.6 of this report.

5.9 Learning from other post event reviews

In addition to the Phase 1 recommendations identified by Advisian, a number of other post-event reviews from the June and October 2021 storms have identified and implemented various improvements. These are set out in the sections below.

5.9.1 Post event reviews

Government agencies, local councils and distribution businesses conducted post event reviews following the 2021 storms. Relevant improvements are outlined below.

- **DELWP Energy Emergency Management improvements.** Following an internal post event review, DELWP has undertaken capability and capacity uplift activities to support emergency response including to ensure that there is sufficient trained energy emergency personnel to support a long duration (2-3 weeks) emergency, and made improvements to role clarity of energy emergency personnel.
- **EMV's Learning Review.** EMV Learning Review was established to ensure that the lessons of state-wide multi-agency significance are implemented and shared across the emergency management sector and with impacted communities. Learnings are being used to continuously improve EMV's emergency response and recovery efforts. A report will be published in 2022.

- **Distribution businesses' reviews.** Distribution businesses affected by the June and October 2021 storms conducted internal reviews that have informed their preparedness for future events. The Panel understands that, as a result of these reviews, distribution businesses have reviewed their processes for providing estimated time to restore information to customers and undertook community engagement and information campaigns for customers on how to prepare for power outages.

5.9.2 Asset and vegetation management programs

Distribution businesses undertake routine asset and vegetation management programs to mitigate the electrical safety risks of bushfires, electrocution, and to maintain a reliable electricity supply.

Energy Safe Victoria (ESV) oversees a statutory safety regime that requires distribution businesses to develop, submit and comply with an Electricity Safety Management Scheme, bushfire mitigation plan, and an electric line clearance management plan, to the satisfaction of ESV. Distribution businesses must also participate in ESV audits to test the compliance of their safety systems.

ESV also conducts technical reviews into specific bushfire and other safety events. Notably, learnings from the 2018 St Patrick's Day fires have informed investigations into distribution businesses' power pole practices and led to an expanded pole replacement program in the Powercor network as well as other improvement initiatives.

6. Appendix B: The Panel's work program for Phase 2

In Phase 2, the Panel has designed a package of reform measures, policies and regulatory changes needed to enable distribution businesses to mitigate the risk of, and better respond to, prolonged power outages in the future. The Panel's findings and recommendations were informed by the following evidence and inputs.

6.1.1 Consultation completed by Advisian

The Panel has considered the work completed by Advisian in consulting broadly with stakeholders in Phase 1 of this review (between September and December 2021). This included discussions with the distribution businesses, regulators, emergency management agencies, water utilities, local government, consumer groups and relief agencies in Stage 1 of Phase 1 (in September and October), and a deeper dive with the distribution businesses and other stakeholders such as Energy Networks Australia (ENA) in Stage 2 of Phase 1 (in November and December 2021) prior to the Panel's appointment on 20 January 2022.

6.1.2 Desktop research on policy issues and opportunities

The DELWP Secretariat conducted desktop research on a broad range of resilience policy issues arising from the June and October storms, to inform the Panel's deliberations. This includes research on policy issues and opportunities arising from the provision of the prolonged power outage payment (PPOP), Guaranteed Service Level Payments (GSL), and the rollout of the small generator program following the June and October storms. Analysis was also undertaken by DELWP on existing Victorian regulatory frameworks and international exemplars in regulatory policy.

6.1.3 Community survey

DELWP commissioned a survey of community members affected by the June and October storms, in order to gauge the range of experiences that people had in those events, and what actions they took to manage the consequences. The survey was undertaken by Quantum Market Research, drawing on online resources to survey over 800 customers statewide.

Respondents to the survey were asked about topics including:

- The length of outages experienced
- The impact of loss of communications
- Contact with, and information provided by distributors
- Impacts on work and study
- Support and payments
- Consumer perceptions and expectations with respect to outages

A range of quantitative and qualitative questions were asked which assisted the Panel to focus on key major impacts on customers. A report was delivered to Panel in March 2022.

6.1.4 Consultation Paper

In March 2022, the Panel prepared a consultation paper setting out the issues and opportunities for distribution network resilience, in the context of, but not limited to, the prolonged and widespread outages experienced in June and October 2021. This paper discussed the role of distribution businesses in reducing the likelihood and impact of prolonged power outages, to help build community resilience. The consultation paper was shared with key stakeholders in advance of roundtable discussions. Written feedback received in response to this consultation paper is summarised in the relevant sections of this report.

6.1.5 Stakeholder roundtables

The Expert Panel led three half-day stakeholder roundtable workshops in March 2022. These were attended by the Victorian Distribution Businesses (including CitiPower, Powercor, United Energy, AusNet Services, Jemena, the AER, the Australian Energy Market Commission (AEMC), the Department of Families Fairness and Housing, local councils affected by the June and October storms (including Cardinia Shire, Moorabool, Mornington Peninsula, Murrindindi, South Gippsland, Windermere and Yarra Ranges Council), government bodies (including the ESC, ESV, State Emergency Service, Energy and Water Ombudsman and Emergency

Management Victoria (EWOV)) and peak bodies (including the Clean Energy Council, ENA, ECA, Electric Vehicle Council and VCOS), and specialist businesses Amokabel. The issues and opportunities identified in the Panel's Consultation Paper were discussed at these roundtables. Feedback was sought on the role of distribution businesses in reducing the likelihood and impact of prolonged power outages, including the need for enhanced obligations going forward. Feedback received at these stakeholder roundtables is summarised in the relevant sections of this report.

6.1.6 Additional consultation with individual stakeholders

Following the stakeholder roundtables in March 2022, the Panel and DELWP Secretariat conducted additional one-one-one consultation with individual stakeholders who sought to meet with the Panel to discuss particular matters in more detail. This included consultation with the Victorian distribution businesses, the AER, AEMC, ESC, ECA, and EWOV. Panel members and the Secretariat also met with the Victorian Small Business Commissioner, the Victorian Energy Policy Institute, TasNetworks, the Total Environment Centre, the Grattan Institute to seek additional input.

6.1.7 Community consultation

In April 2022, the Panel undertook to meet with members of the community face-to-face to better understand their lived experiences of network outages as a result of the storms in June and October 2021.

In order to hear from a wide variety of impacted customers, the Panel visited seven locations across Victoria which had experienced prolonged power outages, hearing in person from 67 members of the public. Two additional community members were contacted individually after the roundtables by the Panel Chair.

The seven roundtables, which were held on April 19, 20, and 21, were kept to around ten people each in order to hear fully from participants, and to enable full discussion. Each ran for one and a half hours as a facilitated conversation.

The locations included a range of geographies (rural/ regional and peri urban), included locations affected by the most prolonged outages (some participants were without power for many weeks), and included participants from a range of socio-economic backgrounds, as well as domestic and small business customers. Areas visited were serviced by AusNet Services or Powercor.

In addition, the Panel received ten written submissions from community members unable to attend the roundtables in person.

Participants were found through a variety of methods including contacting neighbourhood houses, community centres and organisations, and councils, and then through word of mouth. Some small communities and community organisations publicised the meetings through their Facebook pages, while one council sent details to community members they had contact with post the storms.

Traditional Owner Corporations were approached to partake in Gippsland, however the Review time frames made engagement with indigenous community members very difficult. The experiences of customers on life support/ power dependent lists were told through health and community representatives, including a representative from a general practice and several from community houses.

The Panel heard a variety of experiences which are reflected in this report.

Further detail on the locations of the Panel's community consultations is provided in Appendix C.

6.1.8 Review of international precedent

The Panel commissioned consultants, Strategen, to provide research and analysis of the current regulatory environment and state-specific approaches to increasing distribution network resilience. This research confirmed for the Panel that there has been an uptick of extreme weather events causing prolonged outages for significant proportions of distribution business customers in the USA in recent years. California has had outages caused by widespread wildfires, while New Jersey has been significantly impacted by various hurricanes and snowstorms. Experience from the states of California and New Jersey provides precedent on a diverse range of weather events to which the networks were vulnerable. Precedent from these international jurisdictions, where relevant to the Panel's considerations, is summarised in the relevant sections of this report.

All of the inputs above have informed the recommendations that we have made in the remainder of this final report.

7. Appendix C: Biographies of the Expert Panel Members

7.1 Jo Benvenuti

Director at Gippsland Water Board and Chair of Network Resilience Review Expert Panel

Ms Jo Benvenuti is an experienced consultant across a range of consumer matters, specialising in consumer engagement, energy and water policy. She is currently a sole trader consultant, as well as a Director at Gippsland Water and a member of the Independent Energy Selection Panel.

As part of her consulting work, Ms Benvenuti produced a 2016 research report on embedded networks for the Energy and Water Ombudsmen of SA, NSW and Victoria. Ms Benvenuti has also provided consultancy services to Consumer Policy and Research Centre in 2016-17 and DELWP in 2020 on embedded networks. Previously, she was the Chair of the Consumers' Federation of Australia from 2013 to 2015 and Executive Officer of the Consumer Utilities Advocacy Centre from 2008 to 2015. Ms Benvenuti has previously held executive positions for EWOV and for RSPCA Victoria.

Ms Benvenuti holds a Higher Diploma of Teaching (Secondary) from the Melbourne College of Education and a Graduate Diploma in Public Policy from the University of Melbourne.

7.2 Dr Claire Noone

Principal at NOUS Group

Ms Noone has wide ranging experience in regulatory design and practice. Claire was the deputy secretary, regulation in the Victorian Department of Justice and Regulation; prior to which she was the acting secretary of the department. As the director of Consumer Affairs Victoria she played a significant role in a number of reforms and national initiatives including the development and implementation of the Australian Consumer Law. She has held leadership roles at the Australian Competition and Consumer Commission, WorkSafe and the Australian Manufacturing Council.

Ms Noone holds a PhD and a Master of Business Administration, a Diploma of Education, and Bachelors of Laws and of Arts. She was admitted as a lawyer in the High Court of Australia and the Supreme Court of Victoria.

7.3 Mark Paterson

Chief Strategy Officer & Lead Systems Architect

Mr Paterson led CSIRO's Grids and Renewables Integration research team and Project Directed the influential Electricity Network Transformation Roadmap project. He has a strong skillset in energy systems, demand-side technologies and applied science. Mark served as General Manager of the Consumer Energy division at Western Australian utility Horizon Power which focused on new technology innovations for remote and regional electricity supply. His international work at Strategen focuses on the whole-of-system transition to decarbonised electric power systems that deliver reliable, resilient, cost-efficient and human-centred outcomes.

Mr Paterson holds a Master of Enterprise from the University of Melbourne and Business and Engineering undergrad qualifications. He is a Fellow of the Pacific Energy Institute and Associate Member of the US Department of Energy's GridWise Architecture Council. He is the former chair the Clean Energy Council's Distributed Energy Leadership Forum the AS/NZS4755 suite of demand response standards.

8. Appendix D: Glossary of terms

Term	Description
Australian Energy Market Commission (AEMC)	The Australian Energy Market Commission (AEMC) undertakes rule making and energy market development.
Australian Energy Market Operator (AEMO)	AEMO was established in 2009 and is responsible for the operation of the National Electricity Market which includes the eastern and south-eastern regions of Australia (Queensland, New South Wales, Victoria, Tasmania and South Australia).
Australian Energy Regulator (AER)	The AER is the national economic regulator of wholesale and retail energy markets and the body responsible for monitoring and enforcing national energy legislation.
Control	In the context of emergency management, the State Emergency Management Plan (SEMP) defines 'control' as follows: Control is the direction of response activities across agencies, horizontally, including the coordination and tasking of other agencies. Depending in the nature of the emergency, it may be controlled from the State Control Centre (SCC), a Regional Control Centre (RCC), an Incident Control Centre (ICC), a Police Operations Centre (POC) or another location. Under the State Emergency Management Plan (SEMP), DELWP is the control agency for all energy emergencies in Victoria.
The Department of Environment, Land, Water and Planning (DELWP)	The Department of Environment, Land, Water and Planning (DELWP) is a government department in Victoria, Australia. DELWP brings together Victoria's planning, local government, environment, energy, suburban development, forests, emergency management, climate change and water functions into a single department to strengthen connections between the environment, community, industry and economy.
Distribution businesses	Electricity and natural gas distribution businesses own and maintain the distribution networks, including electricity powerlines and power poles, and natural gas pipelines that carry electricity and natural gas to houses and businesses. The focus of this Review is on the Victorian electricity distribution businesses. There are five electricity distribution businesses in Victoria. Each is responsible for a separate geographic region of Victoria. • CitiPower • Jemena • Powercor Australia • AusNet Services • United Energy Distribution
Energy Consumers Australia (ECA)	Energy Consumers Australia was established in 2015 to advocate on energy market matters of strategic importance and material consequence for energy consumers.
Electricity Distribution Code of Practice	The Code is a regulatory document issued by the Essential Services Commission, which requires distributors to adhere to a wide range of provisions related to their conduct in providing services to consumers.

Term	Description
Electricity Industry Act 2000 (EIA)	This Act regulates the Victorian electricity supply industry. It prohibits persons from generating, transmitting, distributing, supplying or selling electricity without either holding a licence from the Essential Services Commission of Victoria, or being exempted from the requirement to obtain a licence.
Emergency Management (EM)	Emergency management in Victoria uses common management arrangements to respond to all forms of emergency. Victoria's state level emergency management frameworks are established under the Emergency Management Act 2013 (EMA).
Emergency Management Act 2013	The Emergency Management Act 2013 (EMA) is Victoria's principal legislation addressing emergency response and relief. The EMA establishes frameworks within the public sector for emergency management, establishing various public sector bodies, and planning for the resilience of critical infrastructure.
Emergency management tiers	To ensure that emergency management arrangements are scalable, Victoria has three operational tiers (incident, region and state). Most emergencies in Victoria (such as house fires and traffic accidents) are routinely controlled at the incident tier, with local resources and without broader consequences or communications needs. However, some emergencies have implications beyond the incident tier that require specific actions: they need more resources, have greater consequences and recovery needs or need messages sent to broader groups of people. In these cases, regional or state arrangements may be enacted to support the incident. Extreme weather events such as the storms experienced in June and October last year are generally managed at the regional and incident level. The state tier is generally used only when whole of state emergency management arrangements are needed (such as for a human health pandemic).
Emergency Management Victoria (EMV)	Emergency Management Victoria is a state government statutory authority responsible for leading emergency management in Victoria, Australia by working with communities, government, agencies and business to strengthen their capacity to withstand, plan for, respond to and recover from emergencies.
Electricity Safety Act 1998 (ESA)	This Act provides for the regulation of the safety of electricity supply and use, the reliability and security of electricity supply and the efficiency of electrical equipment. It has a prominent role in managing the risk of bushfires for and by energy networks.
Energy Safe Victoria (ESV)	Victoria's energy safety regulator, with responsibility for enforcing the ESA.
Energy and Water Ombudsman (Victoria) (EWOV)	A free and independent dispute resolution service for Victorian energy and water customers.
Essential Services Commission (ESC)	Victoria's economic regulator of essential utility services.
Guaranteed Service Levels (GSL)	A set of benchmark levels of service provided by electricity networks, and associated payments required to be made to customers who do not obtain those service levels. GSLs in Victoria are set by the ESC in the Electricity Distribution Code of Practice.

Term	Description
Microgrid	A small energy system that efficiently manages the supply and demand of electricity from local sources of generation and storage for end-user consumption. Often microgrids will be able to operate in an “islanded” mode, where they can operate independently of the grid. Commonly, this back-up function is enabled via fossil fuel generation (gas or diesel).
Mitigation	In the context of emergency management, the State Emergency Management Plan (SEMP) defines ‘mitigation’ as follows: mitigation means the elimination or reduction of the incidence or severity of emergencies and the minimisation of their effects.
National Electricity Law	The National Electricity Law, a Schedule to the National Electricity (South Australia) Act 1996, establishes obligations in the National Electricity Market (NEM) and for electricity networks. The Law is supported by the National Electricity Rules (NER) and National Electricity (South Australia) Regulations.
National electricity market (NEM)	NEM is both a wholesale electricity market and the physical power system. The NEM commenced operation as wholesale spot market in December 1998. It interconnects five regional market jurisdictions – Queensland, New South Wales (including the Australian Capital Territory), Victoria, South Australia, and Tasmania. Western Australia and the Northern Territory are not connected to the NEM. The NEM involves wholesale generation that is transported via high voltage transmission lines from generators to large industrial energy users and to local electricity distributors in each region, which deliver it to homes and businesses. The transport of electricity from generators to consumers is facilitated through a ‘pool’, or spot market, where the output from all generators is aggregated and scheduled at five-minute intervals to meet demand. The day-to-day management of the NEM spot market is performed by the Australian Energy Market Operator (AEMO), in line with the National Electricity Law (NEL) and National Electricity Rules (NER).
National Electricity Rules	The National Electricity Rules govern the operation of the national electricity market (NEM). Changes to the National Electricity Rules are made by the AEMC.
Network Resilience Investment Strategy	The collection of actions set out in recommendations 1.1-1.7 of this report aiming to deliver improvements to network resilience in the shorter term.
Network Resilience Plan	A plan of action developed by a distribution business, aimed at further improvement of the resilience of their networks, as proposed by recommendations 2.1-2.3 of this report.
Preparedness	In the context of emergency management, the State Emergency Management Plan (SEMP) defines ‘preparedness’ as follows: preparedness includes the activities of emergency management sector agencies to prepare for and reduce the effects of emergencies by having plans, capability and capacity for response and recovery.
Prolonged Power Outage Risk Assessment (PPORA)	A detailed assessment of the risks to electricity network from extreme weather events, developed by distribution businesses, as proposed by recommendation 1.1 of this report.
Relief	In the context of emergency management, the State Emergency Management Plan (SEMP) defines ‘relief’ as follows: Relief is the provision of assistance to meet the essential needs of individuals, families and communities during and in the immediate aftermath of an emergency

Term	Description
Renewable or clean energy	For the purposes of the Review and recommendations, these terms are used to describe renewable or clean energy options or technologies that help with carbon emission reduction in line with Victorian Government policy. Examples include, but are not limited to, renewable energy generation options (such as solar photovoltaics), energy storage and batteries, energy efficiency, demand management and smart systems, and/or enabling purchase of energy using renewable sources from the market. These terms are technology neutral.
Response	In the context of emergency management, the State Emergency Management Plan (SEMP) defines 'response' as follows: Response is the action taken immediately before, during and in the first period after an emergency to reduce the effects and consequences of the emergency on people, their livelihoods, wellbeing and property; on the environment; and to meet basic human needs.
Service Target Performance Incentive Scheme (STPIS)	An incentive scheme developed by the AER, applicable to distribution networks, which aims to ensure that networks deliver an economically efficient level of reliable service having regard to historical performance and customer willingness to pay.
Stand-Alone Power System (SAPS)	A Stand-Alone Power System (SAPS) is an electricity supply arrangement that either has no physical connection to, or may operate for a period isolated from, the wider power system. The term encompasses both microgrids (which supply electricity to multiple customers) and individual power systems (which supply electricity to a single customer or business). The term encompasses both microgrids (which supply electricity to multiple customers) and individual power systems (which supply electricity to a single customer or business).
State Emergency Management Plan (SEMP).	The State Emergency Management Plan (SEMP) is developed under the EMA. The SEMP, and incorporated sub-plans, outline the arrangements for the mitigation of, response to and recovery from emergencies (before, during and after), and to specify the roles and responsibilities of agencies in relation to emergency management.
Value of Customer Reliability (VCR)	The value that customers collectively are willing to pay to avoid electricity outages, as assessed by the AER.
Victorian Council of Social Service (VCOSS)	VCOSS is the peak representative body for Victoria's social and community sector, and the state's leading social advocacy organisation.
Widespread and Long Duration Outages (WALDOs)	Electricity outage events thought to exceed the normal range of scenarios planned for and addressed by distribution businesses in ensuring reliable service, usually caused by natural disasters. The values customers place on avoiding these events has been the subject of research by the AER.

9. Appendix E: Community consultation locations

Location	Council area	No of participants at roundtable	No of additional written submissions	Others (post meeting phone calls)
Kalorama, Dandenongs	Yarra Ranges Shire	11	1	1
Olinda, Dandenongs	Yarra Ranges Shire	9		1
Cockatoo, South East of Melbourne	Cardinia Shire	11	2	
Traralgon, Gippsland	LaTrobe City, participants also from Baw Baw, South Gippsland and Wellington Shires	11	4	
Warburton	Yarra Ranges Shire	9	1	
Eltham, northern fringe of Melbourne	Nillumbik, participants also from Manningham	9		
Trentham	Hepburn Shire, participants also from Moorabool and Macedon Ranges	7 (includes individual meeting with business owner)	2	