Prepared for
Jemena Asset Management Pty Ltd
ABN: 53086013461

AECOM

Network Resilience Study

Findings Report

13-Jun-2024

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Network Resilience Study

Findings Report

Client: Jemena Asset Management Pty Ltd

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13-Jun-2024

Job No.: 60730955

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

Document	Network Resilience Study
Ref	60730955
Date	13-Jun-2024
Originator	Upeshika Heenetigala
Checker/s	Allan Klindworth
Verifier/s	Adam Davis and Allan Klindworth

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
2	13-Jun-2024	Draft for Issue	Allan Klindworth Associate Director, Sustainability and Resilience	

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Table of Abbreviations

Abbreviation	Definition
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
DEECA	Department of Energy, Environment and Climate Action
EDB	Electricity Distribution Business
ENA	Energy Networks Australia
JEN	Jemena Electricity Networks
NER	National Electricity Rules
NRP	Network Resilience Plan
NSP	Network Service Provider
RHSEC	Risk, Health, Safety and Environment Committee
SOCI	Security of Critical Infrastructure
SES	State Emergency Services
TCFD	Task Force on Climate-related Financial Disclosures
WBCSD	World Business Council for Sustainable Development

Executive Summary

The growing impact of climate change coupled with increasing reliance on electricity and the need to upgrade the distribution network to support the energy transition is amplifying disruptions to the network, affecting critical infrastructure, customers and communities.

Key stakeholders including the Federal and State Government, customers, communities and investors are demanding a stronger response to ensure resilience of electricity networks. In 2022, the Victorian Government's Expert Panel recommended that electricity distribution businesses develop 5-yearly Network Resilience Plans, with funding requests requiring justification to the AER, including consideration of impacts of climate change.

In 2024, the Federal Government legislated the introduction of mandatory climate-related financial disclosures starting from 2024-2025 with a three-year phased rollout plan. Furthermore, Jemena's comprehensive customer engagement has indicated strong support for network resilience.

Network resilience is critical to enable Jemena to deliver energy safely, reliably, and affordably, and to the long-term sustainable growth of its business.

This network resilience study has been conducted to support Jemena Electricity Network (JEN) in gaining a high-level understanding of the current and emerging developments (including Federal and State legislative requirements), risks and opportunities associated with climate related-network resilience. This included gaining insights on JEN's current capabilities and key gaps in relation to network resilience governance, strategy and risk.

Recommendations and next steps identified in this study include short-term and medium to long-term actions to be undertaken in the next 12 months and one to five years respectively. Immediate, short-term actions are summarised below.

- **Develop a Network Resilience Plan (NRP):** Conduct a network-wide risk assessment, looking at extreme events (e.g., bushfire, wind, heat and flood), and longer-term changes in climate, framing the assessment using industry-recognised approaches (e.g., Task Force on Climate Related Financial Disclosures and AS5334). It is recommended that a wide group of stakeholders is engaged to allow oversight from a governance perspective and enhance preparedness for extreme events.
- **Enhance preparedness** by prioritising community resilience planning, working with communities to manage expectations and defining and implementing September preparation activities for extreme wind events and processes for managing hazardous trees outside of bushfire risk areas. Furthermore, stress-test the digital communication platform to give confidence in performance under high traffic volume scenarios.
- **Other resilience measures** include consideration of trade-offs with supporting quick recovery (i.e. balance pre- and post-event investment) in the development of the network hardening resilience program; defining targeted performance levels to enable modelling of resilience investment to strengthen submission to AER; and submitting a response to the AER issues paper on the Value of Network Resilience 2024.

1.0 Introduction

1.1 Background

The growing impact of climate change coupled with increasing reliance on electricity and the need to upgrade the distribution network to support the energy transition is amplifying disruptions to the network, affecting critical infrastructure, customers and communities. Jemena is committed to delivering energy safely, reliably, and affordably, and to the long-term sustainable growth of its business. Network resilience is critical to enable Jemena to meet this commitment. As the frequency and intensity of extreme weather events continues to grow, and shifts to a low carbon economy are made, Jemena faces increasing challenges, risks and opportunities to maintain the resilience of its electricity distribution network.

Key stakeholders including Government, customers, communities and investors are also demanding a stronger response to ensure resilience. In 2022, the Victorian Government's Expert Panel recommended that distribution businesses develop a Network Resilience Investment Strategy and 5-yearly Network Resilience Plan (DEECA, 2022). More recently, the Federal Government has legislated the introduction of mandatory climate-related financial disclosures and Jemena's comprehensive customer engagement has indicated strong support for network resilience.

1.2 Objective

The objective of this network resilience study is to support Jemena Electricity Network (JEN) in gaining a high-level understanding of the current and emerging developments, risks and opportunities associated with climate related-network resilience. This included gaining insights on JEN's current capabilities and key gaps related to network resilience governance, strategy and risk.

1.3 Scope and limitations

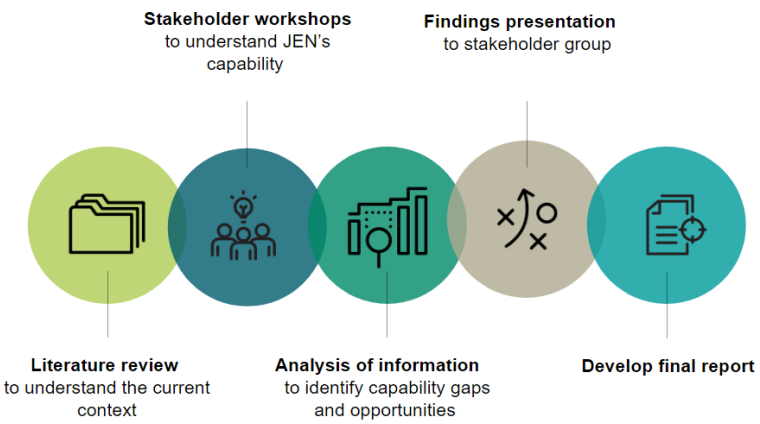
The scope of this study was limited to Jemena's electricity network in Victoria and did not include Jemena's wider electricity, or gas, assets in other states.

The findings and recommendations presented in this report reflect the information gathered from the documents that were reviewed and the views expressed by JEN staff through the activities described in Section 2. The scope of the study, and the content in this report does not reflect a comprehensive audit of JEN's resilience systems, practices and performance.

2.0 Methodology

The tasks undertaken in the study are summarised in Figure 1.

Figure 1: Summary of network resilience study methodology



A literature review was undertaken to develop an understanding of the current and emerging network resilience challenges faced by Jemena. This included reviewing recent assessments and policy documents including those published by Jemena, the Australian Energy Regulator (AER), the Victorian Government and Network Service Providers (NSP). A full list of documents reviewed is provided below:

- *Climate Change Study for Victorian Electricity Distribution Businesses - Phase 1* (AECOM, 2023)
- *Electricity networks: A guide to climate change and its likely effects* (Energy Networks Australia, 2022)
- AEMO Integrated Systems Plan (ISP), including the 2020 ISP Appendix 8. Resilience and Climate Change (AEMO, 2020)
- *Joint Distribution Business Customer Engagement Workshop Report: Resilient Network Investment Framework* (Nation Partners, 2024)
- Electricity Sector Climate Information (ESCI) Project (DISER, 2024)
- *Better Regulation, Expenditure Forecast Assessment Guideline* (AER, 2022)
- *Network resilience: A note on key issues* (AER, 2022a)
- *Electricity Distribution Network Resilience Review, Final Recommendations Report* (DECCA, 2022)
- *Victorian Government Response to the Expert Panel's Electricity Distribution Network Resilience Review* (DECCA, 2023)
- Documents related to business case and regulatory submissions for Ausgrid, Transgrid and Endeavour Energy (various, 2021-2014).

Two virtual workshops were held on the 13th and 15th of May, with participation from a group of multi-disciplinary stakeholders listed in Table 1. Following the analysis of information from the literature review and the workshops, key findings and recommendations were presented back to the stakeholders engaged in the workshops to obtain their initial feedback.

Table 1: Stakeholder workshop participants

Monday, 13 May 2024	Wednesday, 15 May 2024
Karl Edwards – General Manager, Assets and Operations	Sandra Centofanti – General Manager, Customer and Commercial
Mark Gardiner – Network Compliance and Accreditation Manager	Michael Ciavarella – Network Assets Manager
Sonia Madamba – Senior Analyst	Fiona Dunk – Group Manager, Resilience
Matthew Serpell – Electricity Regulation and Compliance Manager	Sonia Madamba – Senior Analyst
David Speairs – Network Delivery Manager	Matthew Serpell – Electricity Regulation and Compliance Manager

The Task Force on Climate-related Financial Disclosures[1] (TCFD) framework on climate-related financial disclosures are widely adoptable and applicable to organisations across sectors and jurisdictions. The TCFD framework was adopted in this study, guiding the workshop discussions and the framing of this report. The TCFD framework is structured around four thematic areas that represent core elements of how organisations operate: governance, strategy, risk management, and metrics and targets.

The definitions of the four thematic areas are summarised in Figure 2. Metrics and targets were not considered in the scope of this study, however they will need to be considered in the development of more detailed resilience assessments or planning that may follow this work.

[1] Globally the work of the TCFD is now being monitored by the International Sustainability Standards Board (ISSB) via their IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information and IFRS S2 Climate-related Disclosures.

Figure 2 Recommendations and supporting recommended disclosures (TCFD, 2017)

Governance	Strategy	Risk Management	Metrics and Targets
Disclose the organization's governance around climate-related risks and opportunities.	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.	Disclose how the organization identifies, assesses, and manages climate-related risks.	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.
Recommended Disclosures	**Recommended Disclosures**	**Recommended Disclosures**	**Recommended Disclosures**
a) Describe the board's oversight of climate-related risks and opportunities.	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	a) Describe the organization's processes for identifying and assessing climate-related risks.	a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.
b) Describe management's role in assessing and managing climate-related risks and opportunities.	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	b) Describe the organization's processes for managing climate-related risks.	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

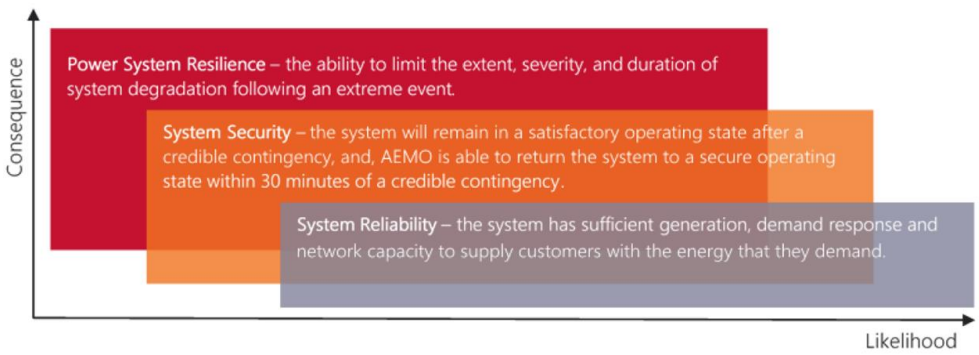
3.0 Network resilience

The AER defines network resilience as "…**a performance characteristic** of a network and its supporting systems (e.g. emergency response process, etc.). It is the network's **ability to continue to adequately provide network services** and recover those services when subjected to disruptive events" (AER, 2022a, p. 6).

The relationship between reliability and resilience is being discussed in various forums. Under the National Electricity Rules (NER), reliability is defined as "The probability of a system, device, plant or equipment performing its function adequately for the period of time intended, under the operating conditions encountered" (AER, 2022a, p. 6).

Figure 3 summarises the conceptual relationship between network resilience and reliability relative to consequence and likelihood i.e. magnitude of impact.

Figure 3 Conceptual relationships between definitions relative to impact magnitude (AEMO, 2020)



The close relationship between resilience and reliability was evident in the literature and the discussions held with JEN stakeholders. When asked in the workshops what network resilience meant, the following observations were made:

- Reliability and resilience are often confused: Resilience is about withstanding and recovery from disruption, reliability is a measure (e.g., CAIDI, SAIFI, SAIDI).
- Resilience is related to factors external to the network, whereas reliability is about factors within the network which impact performance.
- Solutions which improve resilience will make the network more reliable but not necessarily the reverse i.e. reliability does not always support resilience.
- There are multiple aspects to resilience. Recovery is a part of it. For example, making sure network can withstand event, and if impacted, how does it recover and respond to events.
- Customer expectations needs to be factored in, for example, how many hours or days will it take to restore power following an event. Certainty in response and recovery and setting acceptable levels of service need to be communicated.
- Managing investment trade-off for example, reactive versus proactive investments. Minimising an event occurring versus managing impacts during and after an event. Prioritisation of community needs must be considered.

4.0 Governance

4.1 Issues / challenges

This section summarises the findings from the literature review which relate to JEN's governance arrangements related to climate resilience. In the context of this study, governance relates to the oversight of climate-related risks and opportunities and the role of management in assessing and managing these risks and opportunities.

The AER provides capital and operating expenditure funding to regulated businesses and sets the direction on the value of customer reliability and value of network resilience (AER, 2022). The AER has expressed concerns about over-engineering in response to climate change. While the guidance is not clear, the AER expects NSPs to provide evidence that extreme weather events are expected to affect the network, detailing which parts of the network are most likely to be impacted and the quantification of the likelihood, consequences and costs to the network (AER, 2022a).

In addition to the AER's expectations, following storm events in 2022 and 2024, there are increasing expectations and requirements being placed on distributors by the Victorian Government, including upcoming requirements to develop Network Resilience Plans (NRPs) (DEECA, 2023). While the exact timing is not confirmed, five-yearly NRPs will be mandated in Victoria soon. These plans will need to be approved by Energy Safe Victoria, and funding will need to be approved by the AER.

The role of NSPs include managing a resilient and reliable network, identifying priorities for investment to maintain and enhance resilience, responding to outages following hazard events and supporting broader critical infrastructure resilience. This role will be expanded to include the development of NRPs and the need to justify funding requests to AER, including consideration of impacts of climate change. NSPs will also be required to respond to mandatory climate-related financial disclosure reporting aligned to the Australian Accounting Standards Board (AASB). There will be a staggered three-year roll out of the requirements starting from 2024-2025. Reporting is likely to occur at a corporate level at Jemena consistent with current sustainability reporting processes.

4.2 Current status / understanding

This section summarises the stakeholder views on JEN's current governance arrangements related to climate resilience.

Systems

- Climate change is recognised as a top five risk across Jemena corporate (of which JEN is a subset).
- Climate change is acknowledged as a Focus Area in the Jemena ESG Plan on a Page (Jemena, 2024). The Plan acknowledges readiness measures for climate disclosure obligations.
- Specific priorities in the ESG Plan on a Page include:
  - "Continue to mature ESG related risks and opportunities into risk and assurance programs
  - Further integrate ESG into Governance Framework & Management Systems and align to best practice
  - Ongoing delivery of Business Continuity and Resilience assurance programs including Organisational resilience maturity assessment."
- The 2022 Sustainability Report (SGSPAA Group, 2022) acknowledges the development of a pathway to Climate Related Financial Disclosures. This will start to be included in the 2023 Sustainability Hub.
- Organisational structures are in place to support many aspects of network resilience (e.g., Automation - SCADA team, Network Operations team, Future Networks team, and Asset Management team).

People

- The Risk, Health, Safety and Environment Committee (RHSEC) looks at group risk across Jemena.
- The crisis incident support management team sits across the business, which is escalated to Executive Management teams in the event of a crisis.
- Jemena corporate has market facing teams which have the same training across the business to enable movement across Jemena companies if more resources are needed during/post-event recovery.
- There is a dedicated Resilience team which looks after business continuity and resilience, with a particular focus on preparation and response to an event (e.g., training and exercises).
- It was identified that JEN's key strength is having the right people in the organisation who make it happen.

4.3 Gaps and opportunities

This section summarises the stakeholder views on gaps opportunities JEN has to enhance its governance arrangements related to climate resilience.

- Expand the remit of the Resilience team to capture broader aspects of resilience related to network resilience both upstream and downstream, including community resilience.
- Build the capability of the organisation to manage and respond to other hazards such as wind and flooding in the similar way that bushfire risk is managed.
- The growth of data centres in JEN's geographic footprint may increase the potential to be a greater target for malicious acts (e.g. non-climate related resilience risks).
- The Victorian Government requires the development of Network Resilience Plan.

4.4 Recommendations

To enhance JEN's climate resilience related governance, the following is recommended:

- Develop a Network Resilience Plan and underpin it with a risk assessment, ensuring that consideration is given to metrics and targets.
- When developing a NRP, engage a wide group of stakeholders including customer GM, asset management, delivery etc. to allow oversight from a governance perspective and enhance preparedness for extreme events.
- Capture lessons learned from past events and other Electricity Distribution Businesses (EDB) to enable continuous improvement, share knowledge, and celebrate wins.
- Expand capability of the organisation in addressing other hazards such as storms and flooding in a similar way to bushfire, using a risk assessment to inform the selection of hazards.
- Expand the remit of the Resilience team to capture broader aspects of resilience related to network resilience both upstream and downstream, including community resilience.

5.0 Strategy

5.1 Issues / challenges

This section summarises the findings from the literature review providing context for JEN's strategic arrangements related to climate resilience. In the context of this study, strategy relates to the understanding of physical and transition climate-related risks and opportunities facing the business.

It was found that actions taken by organisations to build resilience include physical, operational and community-based solutions. Most examples for the literature suggested there was a focus on specific asset related actions and less action on planning, design and collaboration. The viability of solutions is typically situation or location specific, recognising the local climate or hazard exposure, as well as local demands or vulnerabilities of customers. Prioritisation of actions was generally informed by cost benefit analysis, with a need to consider broader costs and benefits (e.g., financial, reliability, social and environmental benefits and costs). The application of climate projections as part of a cost benefit analysis is typically a 'black box' with limited transparency included in the reviewed literature. The AER has released an issues paper on the Value of Network Resilience (May 2024) which may inform cost benefit analysis. There was also limited discussion of transition risks and opportunities by EDBs. Examples of climate-related risks and opportunities are summarised in and Figure 4 and Figure 5.

Figure 4: Example transition and physical climate-related risks (WBCSD, 2017)

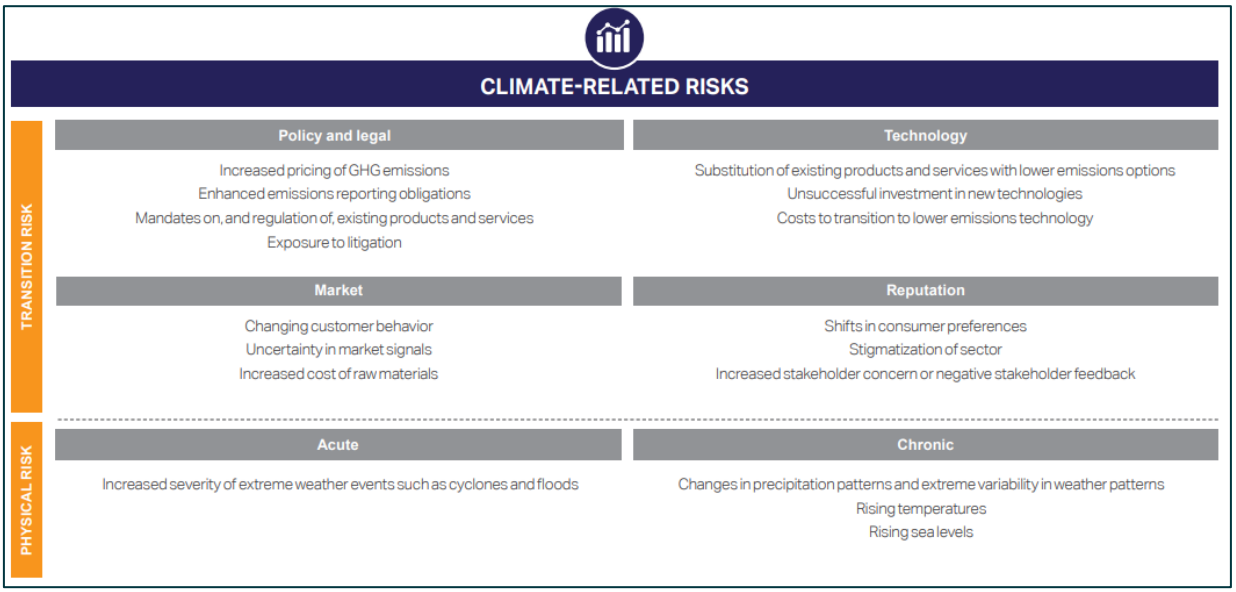
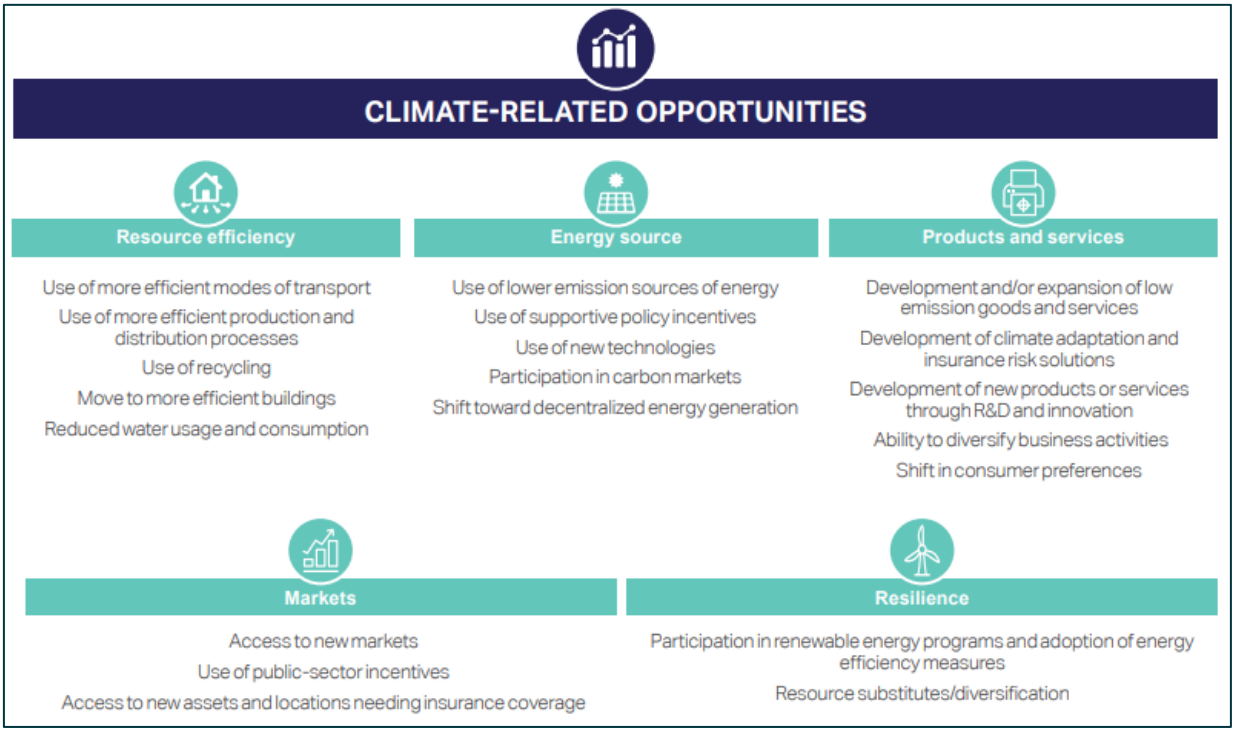


Figure 5: Example climate-related opportunities (WBCSD, 2017)



5.2 Current status / understanding

This section summarises the stakeholder views on JEN's current understanding of physical and transition climate-related risks and opportunities facing the business.

- Extreme wind is seen as the biggest issue from a resilience point of view.
- Fuses were called out as the assets at greatest risk during 3-4 consecutive days of 39-40^{o}C temperatures.
- Lightning across the top of the network area leads to need to replace smaller transformers.
- The 2022 Maribyrnong River flood event raised concerns about potential damage to substations.
- Larger scale hazard events may lead to supply chain issues, with access to equipment or personnel a potential risk.
- Being a smaller network provides opportunities to address risks that larger networks may struggle to do quickly (e.g. removing assets from bushfire risk). By being a smaller network, JEN has advantages in their ability to manage risks/respond.

5.3 Gaps and opportunities

This section summarises the stakeholder views on gaps and opportunities JEN has to enhance its understanding of physical and transition climate-related risks and opportunities facing the business.

- Coordination between federal and state agencies is lacking (e.g., conflicting requirements between state government vs AER). Flow of information from federal to state to EDBs is also questionable and unsure if JEN gets the information passed down to it via ENA.
- JEN's participation with the State control centre may need to be more coordinated and informed.
- The availability of human resources to respond is a risk to JEN with other networks also likely to compete for resources.

- Supply chain risks affecting JEN's repair and recovery capacity may be exacerbated by other networks also competing for materials, and associated cost implications.
- Transition risks and opportunities, including renewable energy generation (mostly rooftop and at the fringe of the network), community batteries and use of low carbon materials, present a new paradigm to EDBs. Questions on whether there will be more frequent events with more renewables coming on board upstream, and how these will be managed by JEN may be explored. There may be opportunities to tap into community batteries by isolating some areas to provide support to reliability, or response during or post-event. JEN needs to understand customer / community expectations of how batteries will support them during outages.
- Other threats including technological and human-caused threats need to be factored into network resilience plans (NRP), noting that significant work has been undertaken regarding cyber resilience. The NRP should be cause-agnostic (i.e. not just addressing climate hazards).
- JEN is in a unique position, dealing with different voltage levels across the network, plus legacy standards in some council areas leading to a variety of equipment and a 'mismatch' of standards across the network. Managing legacy issues across the network is challenging. Standardisation, or modularisation, of solutions will reduce the use of bespoke equipment and mean that solutions may be developed faster and more consistently aiding their response strategy. The potential increase in costs from standardisation will need to be factored into the business case.
- Lessons learned from the 2022 Maribyrnong River flood event presents an opportunity to revisit assets affected and look at different solutions (e.g., relocation, use different standards and criteria, or additional measures such as more flood barriers and stronger footings).
- JEN may be able to leverage lessons learned from other EDBs and the step changes that they are making (e.g., revisiting like for like replacement or step change in capacity resilience, and the question of affordability and funding. For example, is investment funded by productivity benefits).

5.4 Recommendations

To enhance JEN's understanding of physical and transition climate-related risks and opportunities facing the business, the following is recommended:

- Seek clarity from the Victorian Government on their expectations regarding the scope, timing and detail of the Network Resilience Plan (i.e. the framework for NRPs).
- Advocate for greater coordination between federal and state agencies.
- Continue to foster and enhance internal coordination across teams within JEN to support network resilience efforts.
- Assess potential supply chain risks and cost implications that may hamper repair and recovery (e.g. human resources, materials and equipment).
- Assess transition risks and opportunities, particularly renewables and batteries, and how they can hinder / assist network resilience.
- Consider non-climate threats including technological and human-caused threats in developing the network resilience plan, noting previous cyber resilience work undertaken.
- Look for opportunities to standardise / modularise solutions to manage legacy and supply chain risk. The benefits of standardisation include:
    - reducing the range of legacy or bespoke equipment across the network which may increase the likelihood of having equipment on hand to respond to outages.
    - standardisation across EDBs, may enable sharing of equipment and common expectation on performance levels of assets during extreme events. This may assist in managing expectations of the community as well as the AER.
- Ensure that lessons learned from past events and other EDBs are captured in feedback loop and considered in the development of the Network Resilience Plan.

- Consider submitting a response to the AER issues paper on the Value of Network Resilience 2024.

6.0 Risk management

6.1 Issues / challenges

This section summarises the findings from the literature review which relate to JEN's risk management arrangements related to climate resilience. In the context of this study, risk management relates to the organisation's processes for identifying, assessing and managing climate-related risks and opportunities.

It was found that the maturity in assessing and managing climate risks appears to be relatively low across the sector, with limited clear strategies or plans to manage climate resilience. The risk assessment processes adopted typically applied the *Australian Standard AS5334 Climate change adaptation for settlements and infrastructure — A risk based approach* and / or *ISO 31000, Risk management – Guidelines*, with considerations of risk, exposure and /or vulnerability. Physical risks identified include direct impacts to assets and the broader systems they operate in. Much of the focus in the reviewed literature was on extreme weather events including bushfire, wind, heat and extreme rainfall. A joint EDB study undertaken by AECOM in 2023 identified risks to EDB assets, climate projections that may be used to inform risk assessments, and a discussion of exposure of assets to climate hazards. JEN's exposure to extreme weather events are summarised in Table 2. The summary of exposure should be read in the context of the original study report's methodology and any stated limitations (AECOM, 2023).

Table 2: JEN's exposure to hazards (Source: AECOM, 2023)

Hazard		Exposure
	Extreme rainfall (flooding) (changes in heavy rainfall events, existing flood hazard area)	• Projected changes in heavy rainfall are greatest at Sunbury and Gisborne South. • In addition to parts of Sunbury, areas of asset exposure are spread across the southern half of the distribution area, example locations include West Footscray, Hadfield and Heidelberg West.
	Bushfires (existing bushfire management overlay)	• Areas of greatest asset exposure include Gisborne South, region surrounding Gisborne South and Woodlands Historic Park.
	Extreme heat (heatwaves) (Days over 35 °C and/ or days over 40 °C)	• Frequency and severity of extreme heat days are relatively uniform across the distribution area.
	Extreme wind (Tree extent, wind gust >100 km/h)	• Areas of higher exposure as indicated by the vegetation overlay and the concentration of assets include the region surrounding Gisborne South, and in proximity to Merri Creek and Darebin Creek.
	Sea level rise (Storm surge flooding)	• Areas of greater asset exposure include Williamstown.

6.2 Current status / understanding

This section summarises the stakeholder views on JEN's current processes to identify, assess and manage climate-related risks and opportunities.

Internal processes

- An enterprise climate risk assessment is conducted at a high level, with the business resilience framework feeding into it, and major/high risks feeding into the crisis incident support management team.
- A summer and bushfire management program, built off the back of the Black Summer bushfires, is managed up to the board level. Actions from this include a summer preparation program to stock up on equipment (e.g., transformers, fuses etc. The timeframe to respond due to exercising is also good, however larger events (1-4 days) need to be exercised.
- Hazard tree management in bushfire risk areas was stated to be good.
- Executive level forums for preparedness meet annually and include conducting risk assessments and tracking against action plans.
- There is a practise of enhancing redundancy through lessons learned from past events. This was stated to be good. For example, following the Metro/Optus outage in 2023, employees in critical roles now have dual-ability to access networks, building radio network redundancy. From a customer perspective, JEN uses one telecommunications carrier, and their call centre uses a different carrier, allowing JEN to switch carriers if needed to communicate with or remain accessible to customers if one network fails.
- Investment plans and business cases go up to the board for approval. The crisis incident support management team (including CEO and Executive management) have visibility of performance of network (day-to-day and in emergency) and reliability targets.

External drivers

- The Victorian Government recently introduced the requirement to submit an emergency management risk assessment to DEECA annually, under the Emergency Management Act. JEN submitted the first assessment in 2023 for audit.
- Federal Security of Critical Infrastructure (SOCI) legislation (cyber, physical and natural hazards, people vectors) requires a light-touch assessment.

Working with stakeholders

- JEN's connection with community stakeholders is strong. Significant effort has gone into building relationships with councils, retailers, community organisations. JEN was embedded in local response following the February 2024 storm event, basing personnel in community relief centres to give direct access to customers. JEN's ability to communicate well with customers was seen as strong.
- JEN is engaged with Victorian Government and other agencies such as the State Emergency Services (SES). JEN is currently in discussions to partner with the SES. JEN is involved in regional level community emergency management (e.g. northwest regional level). Significant resources would be required for JEN to do this comprehensively at the local government level (e.g. actively participate in municipal emergency management planning).

6.3 Gaps and opportunities

This section summarises the stakeholder views on gaps and opportunities JEN has to enhance its processes to identify, assess and manage climate-related risks and opportunities.

- Roll down enterprise risk assessment to the operational / business level and conduct a network-wide risk assessment which covers more extreme events (e.g., wind, flood) in line with how bushfire risk is managed over multiple timeframes and scenarios. Build on the 2023 joint EDB study, and lessons learned from other EDBs on hazards that JEN has not experienced yet. Identify high risk areas and weak spots in the network to develop redundancy pathways.
- Identify older substations with wooden poles. The location and placement of a substation, as opposed to the design of a substation, is critical for resilience.
- Consider enhancing or formalising September preparation to stock up on poles to get through windy season, in addition to summer preparation.
- Dead trees outside bushfire management areas that may impact lines if they fall, are not well managed. There are also hazard trees in the low bushfire risk areas that are not actively managed, and in the event of a windstorm, they may still cause an outage.
- Victorian Government legislation requires that a Network Resilience Plan be developed by mid-2025 to go to the regulator for funding approval. Key stakeholders to engage will include Customer GM, Asset Management, delivery partner Zinfra, and roll up to EGM of Network.
- There is an opportunity to enhance JEN's responses to SOCI legislation and how it is applied in JEN's context.
- JEN is likely to put together a resilience program to harden the network including programs to enhance customer communication. The question of the trade-off between hardening vs supporting quick recovery remains. It comes down to a balance of policy, community expectations and other drivers.
- JEN has received AER funding requested in the past. There is a risk of not putting a good enough ask for AER funding in the next pricing submission. There is an opportunity to develop and use a model for investing in resilience to achieve the desired performance levels/outcomes. The specific performance levels or outcomes also need to be identified.
- Lessons learned from the Ausnet call centre shut down, include enhancing digital communication platform resilience by testing high traffic scenarios across the whole network with all customers wanting to reach JEN.
- Customer needs and expectations need to be managed, acknowledging that it is difficult to service all customer needs at all levels. JEN is part of a community risk discussion at the northwest regional level, however, it is not present at all local council level meetings. There is an opportunity to work more closely with customers to enable community resilience planning, to understand who trusted community partners are and their capabilities to support, enable and deliver messaging on behalf on JEN. Community education/preparedness partnerships with the SES are a good example. JEN may develop a better resilience strategy with the Energy Charter, working towards one voice to customers on what to do or expect following an outage/event may a good strategy.
- Coordination with other stakeholders to work together to build resilience and minimise risk (e.g., councils planting trees under power lines).
- Understand how vendors are responding to resilience, and whether they can provide guidance and leadership in this area.
- Three of the five Victorian EDBs (i.e., CPPALUE) are moving towards one set of design standards. JEN should consider following suit.

6.4 Recommendations

To enhance JEN's organisation's processes for identifying, assessing and managing climate-related risks and opportunities, the following is recommended:

- Conduct a network-wide climate risk assessment, looking at extreme events (e.g., bushfire, wind heat and flood), and longer-term change in climate.
- Identify high risk areas and weak spots in the network to prioritise investment and develop redundancy pathways.
- Define targeted performance levels to then enable modelling of resilience investment to strengthen submissions to the AER. The Value of Network Resilience and other performance levels may be defined by legal and regulatory instruments.
- Network hardening resilience programs should consider trade-offs with supporting quick recovery (i.e. balance pre- and post-event investment). JEN should also engage with stakeholders to gain their views or expectations about pre- and post-event investment.
- To assist quicker recovery, consider streamlining asset standards to align with work being done by other EDBs.
- Prioritise community resilience planning to manage community expectations.
- Stress-test JEN's digital communication platform to give confidence in performance under high traffic volume scenarios.
- Enhance September/Spring preparation for extreme wind events similar to summer preparations for extreme heat and bushfire season.
- Strengthen hazard tree management outside of bushfire risk areas. Look to partner with council and other organisations to support management.
- Enhance JEN's response to SOCI legislation and how it is applied to JEN context.
- Work closely with community partners including the SES to enhance capabilities to support/enable/deliver consistent messaging to customers.

7.0 Recommendations and next steps

The recommendations made in the governance, risk management, and strategy sections of this report are summarised as key actions to enhance network resilience, categorised as:

- short-term actions to be undertaken in the next 12 months (Section 7.1)
- medium to long-term actions to be undertaken in the next 1 to 5 years (Section 7.2).

7.1 Short-term actions

Table 3: Short-term actions to undertaken over 12-month period

Action	Governance	Risk management	Strategy
Develop Network Resilience Plan			
1. Conduct a network-wide climate risk assessment, looking at extreme events (bushfire + wind and flood), and longer-term change in climate. To guide the development of the NRP, it is recommended that it is framed using industry-recognised approaches such as the Task Force on Climate-related Financial Disclosures framework and Australian Standard AS5334 Climate change adaptation for settlements and infrastructure — A risk based approach.	☑	☑	☑
2. Engage a wide group of stakeholders including customer GM, asset management, delivery etc. to allow oversight from a governance perspective and enhance preparedness for extreme events.	☑		☑
3. Expand capability of organisation in addressing other hazards such as storms and flooding in a similar way to fire. Use risk assessment process to inform basis of Network Resilience Plan.	☑	☑	
4. Identify high risk areas and weak spots in network to prioritise investment and develop redundancy pathways.		☑	

Action	Governance	Risk management	Strategy
5. Assess potential supply chain risks, transition risks and opportunities, and non-climate threats including technological and human-caused threats.			☑
Improve preparedness			
6. Prioritise community resilience planning to manage expectations.			☑
7. Define and implement September preparation activities for extreme wind events.			☑
8. Define and implement process for managing hazardous trees outside of bushfire risk areas.			☑
9. Stress-test digital communication platform to give confidence in performance under high traffic volume scenarios.			☑
Other resilience measures			
10. Continue to foster and enhance internal coordination across teams within JEN to support network resilience efforts.			☑
11. Network hardening resilience program should consider trade-offs with supporting quick recovery (i.e. balance pre- and post-event investment). JEN should also engage with stakeholders to gain their views or expectations about pre- and post-event investment.			☑
12. Define targeted performance levels to then enable modelling of resilience investment to strengthen submission to AER. Performance levels may be defined by legal instruments.			☑
13. Consider submitting a response to the AER issues paper on the Value of Network Resilience 2024.			☑

7.2 Medium to long-term actions

Table 4: Medium to long-term actions to undertaken over next 1 to 5 years

Action	Governance	Risk management	Strategy
14. Capture lessons learned from past events and other EDBs in feedback loop, share knowledge, and celebrate wins.	☑		
15. Expand the remit of Resilience team to capture broader aspects of resilience related to network resilience both upstream and downstream, including community resilience.	☑		
16. Enhance response to SOCI legislation and how it is applied to JEN context.		☑	
17. Work closely with community partners including SES to enhance capabilities to support/enable/deliver consistent messaging to customers.		☑	
18. To assist quicker recovery, consider streamlining variety of assets used across the network, as well as design standards to align with work being done by other EDBs.		☑	
19. Advocate for greater coordination between federal (e.g. AER) and state agencies (e.g. DEECA) on requirements related to network resilience.			☑
20. Look for opportunities to standardise / modularise solutions to manage legacy and supply chain risk.			☑

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