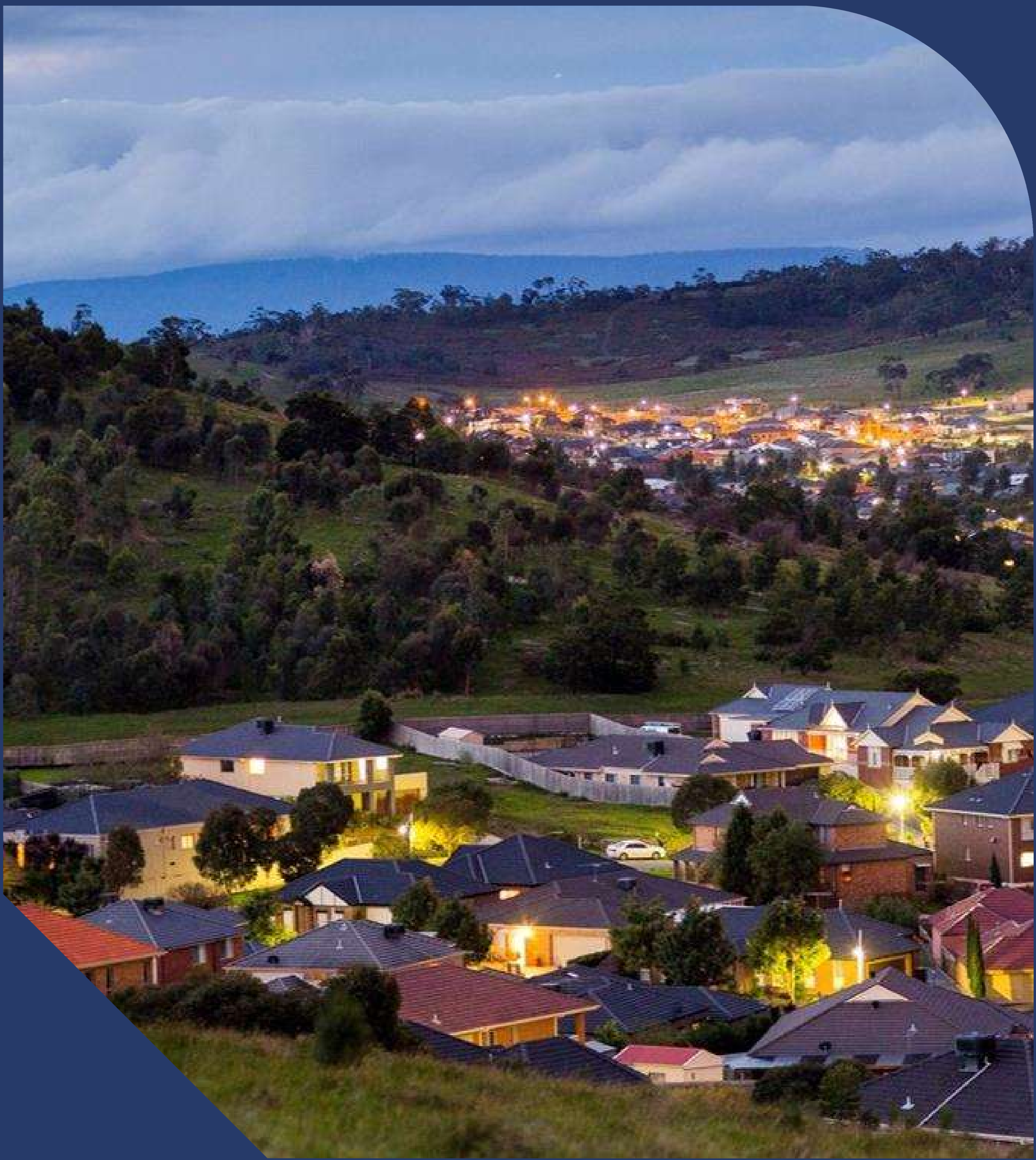
AusNet

Electricity Distribution Price Review (EDPR 2026-31)

Business case: Mobile Generation

Date: 31 January 2025



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1. Executive summary

The AusNet distribution network supplies electricity to ~809,000 customers across the east of Victoria. Across our network, extreme weather events and climate change is a significant risk and can impact both reliability and resilience of the distribution network; the most severe of these events causing multiple prolonged outages for our customers. As a part of enhancing the resilience of the distribution network against climate change, an investigation was conducted to assess the costs and benefits of various non-network programs in improving network resilience. This business case outlines our assessment and the preferred investment to proceed with.

This proposal outlines the identified need to replace and enhance mobile generation equipment within the AusNet generator fleet to improve resilience. A capital investment of "C-I-C" (direct, real 2023-24) over the 2026-31 regulatory period has been identified as the preferred solution to address resilience and reliability network issues, achieved by acquiring mobile generation equipment, comprised of four 1500kVA diesel generation units, one 2MVA portable station and one 1MW High-Voltage (**HV**) battery energy storage system (**BESS**). This fleet uplift is intended to enhance the mobile generation capabilities above current levels during events where restoration activities can be prolonged.

The existing fleet of large diesel generators is approaching the end of its operational lifespan, necessitating replacement to ensure continued service provisions. Additionally, the escalating risk of outages resulting from more frequent and severe storms and weather events has supported the expansion of the mobile generation fleet by acquiring a portable station and mobile BESS. This equipment is a strategic investment which can enhance flexibility, response times and resilience in power supply management during prolonged outages. The Net Present Value (**NPV**) (PV benefits minus PV costs) of the preferred option (relative to BAU) is "C-I-C".

This business case outlines how we have:

Analysed historical data: The process of investigating historical generator deployments on the network and evaluating the benefit that generator equipment delivers to customers.

Assessed various options: Options analysis involves comparing the costs and benefits of available options. We have evaluated three options:

- Business As Usual (**BAU**) scenario of acquiring four new diesel generators to replace our existing fleet that has reached end of life
- Option 1, involving acquiring four new diesel generators along with a portable station; and
- Option 2, acquiring four new diesel generators, a portable station, and a mobile BESS.

Benefits have been quantified by estimating the expected annual energy supplied by the generator equipment (based on historical deployment), then multiplying it by an appropriate Value of Network Resilience (**VNR**). Benefits for the battery have been estimated to be operational expenditure reductions through reduced fuel usage for generation jobs by using more sustainable operations.

Identified the preferred option: Acquiring four new diesel generators, a portable station and a mobile BESS is our preferred option as it maximises the NPV of all the options assessed.

Table 1: Economic Outcomes ($m, 2023-24 dollars)

	FY27 to FY31 (undiscounted)			Full assessment period (discounted)			Comments
	Capex	Opex	Total cost	Total cost	Total benefits	NPV	
BAU – Purchase four mobile generators	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	$176.5	"C-I-C"	Acquire four HV generators
Option 1 – Purchased Mobile Generators & portable station	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	$215.0	"C-I-C"	Acquire mobile generators & portable station
Option 2 – Purchase mobile diesel gens, portable station and battery	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	$215.0	"C-I-C"	Acquire mobile generators, portable station & battery

Source: AusNet analysis

2. Background

Extreme weather events on our distribution network

Over the past 5 years, we have experienced 4 major storms and 1 bushfire:

2019-2020 – Black summer bushfires

The black summer bushfires across the 2019-2020 summer resulted in widespread damage across the state and destroyed a significant proportion of our distribution network. Across our network, over 300 power poles were destroyed, over 1,000 kilometres of powerlines were affected, and approximately 60,000 customers experienced outages. Significant remediation works were required to restore supply to customers across the state, and temporary supply was required to enable operation of essential services across remote regions where power was not restored for a significant duration of time.

2021 – June & October storms

Victoria was impacted by severe storms during June and October of 2021, which again caused significant outages. The significant winds during this period caused trees and powerlines to fail, faulting powerlines and resulting in prolonged outages whilst infrastructure was repaired. These events resulted in outages to approximately 249,000 customers during the June 2021 storms and 217,000 customers during the October 2021 storms; some of which lasted multiple days.

2024 – February storm

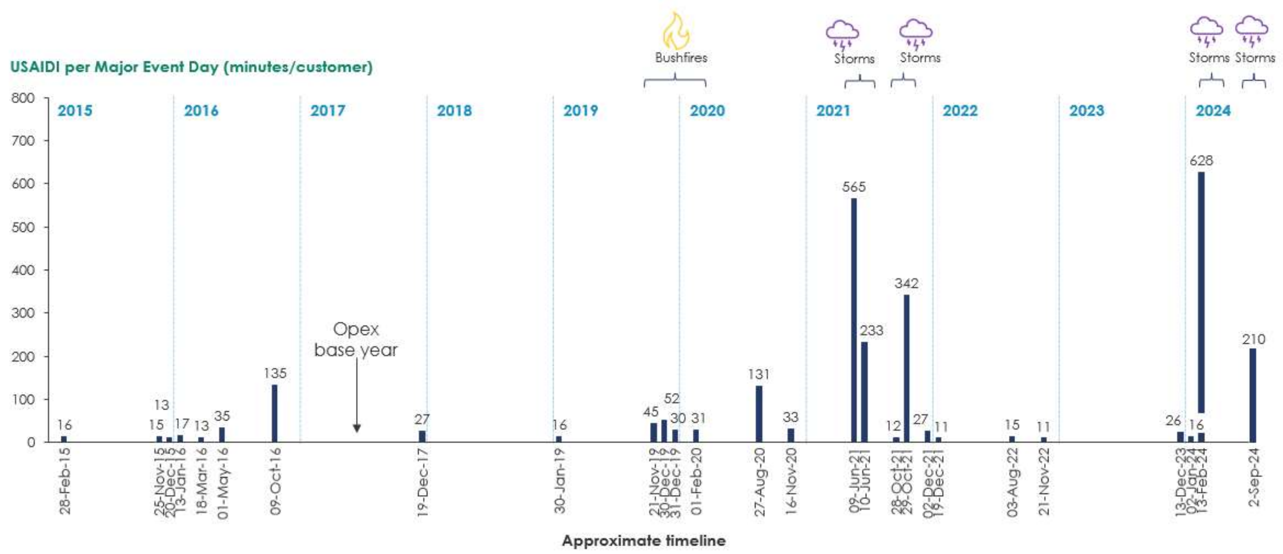
February 2024 storm impacted both transmission and distribution network infrastructure assets across the state. Much as the previous storm events, this resulted in powerline failures either through vegetation faulting or direct line failures. This storm impacted approximately 297,000[1] customers across the AusNet network, and the extent of damage left some customers disconnected for several days.

2024 – September storm

September 2024 storm impacted approximately 171,000 customers.

The impact of these events on the distribution network is depicted in the figure below.

Figure 1: USAIDI per Major Event Day from 2015 to 2024 (minutes/customer)



Source: AusNet.

[1] Other sources reference 255k customers which is the coincident peak customers off supply.

Weather event and forecasting climate change

The changing climate and its impact on our infrastructure, with flow on effects to our customers, is a key concern underpinning the need to invest in proactive solutions to mitigate the growing risk of weather hazards. To understand the impact of climate change, AusNet procured climate data from an independent and external consultant. We used the climate data to forecast our expected unnerved energy.

Climate data: Climate data (which was first procured to support our network hardening investment case) explored various scenarios that could affect key network infrastructure, such as power poles, overhead lines, and other distribution assets. The modelling focussed on two critical hazards: bushfire and windstorms. To forecast bushfire risk, the model used a Forest Fire Danger Index (**FFDI**) exceeding 100 as a threshold to quantify annual fire risk days. To forecast windstorms risk, the model assessed days with wind speeds exceeding 11.3 m/s and maximum windspeed. The selection of these high thresholds ensures that AusNet's modelling is conservative in assuming MED events will only be driven by the severe conditions and ensures the risk of over investment is reduced. The climate scenarios were based on the Representative Concentration Pathway (**RCP**) 4.5, a projection pathway reflecting moderate greenhouse gas emissions.

Risk Modelling: One of the outputs of the risk modelling (which was first developed to support our network hardening investment case) is the compound annual growth rate (**CAGR**) of risk in our network. The risk modelling projected a network wide CAGR of 0.63% (the sum of windstorm and bushfire risk). This network-wide risk rate can be disaggregated at the feeder level which are more granular and location specific.

See the CutlerMerz Climate Resilience Economic Modelling – Model Methodology – September 2024 report.

Resilience vs Reliability

Resilience and reliability are critical and interrelated concepts but address different aspects of the energy system's performance.

Reliability refers to the consistent and dependable performance of the energy system under normal operating conditions. Reliability emphasises consistent performance and aims to reduce outage time during regular operating conditions, including scheduled maintenance. It is commonly quantified by metrics such as the average number of outages per customer, or the average duration of outages per customer, both normalised to provide a standardised measurement. A reliable energy system delivers power continuously without frequent interruptions. Regulatory standards and performance metrics exist (e.g., **USAIDI** – Unplanned System Average Interruption Duration Index, **USAIFI** – Unplanned System Average Interruption Frequency Index) to quantify network reliability. Regular and preventive maintenance is crucial to maintaining reliability.

Resilience refers to the ability of the energy system to withstand and recover quickly from disruptive events. It pertains to a system's ability to cope with and recover from challenges such as natural disasters and climate change. Ultimately, resiliency is the ability of a network to respond rapidly to disruptions and restore normal operation quickly after unfavourable event.

To summate, whilst both reliability and resilience are essential for operations of a distributed energy service provider, reliability ensures the steady and predictable supply of energy under normal conditions, and resilience ensures the system can endure and recover from unexpected disruptions.

The role of non-network solutions in improving resilience

Non-network solutions are a vital tool in enhancing the resilience of the energy grid, particularly for DNSPs. For example, it can involve the use of battery equipment, solar energy, and local generation to replace capital intensive augmentation projects.

1. **Cost Savings:**

   Non-network solutions, such as solar power and energy storage systems, can be a more economical alternative to traditional capital-intensive augmentation projects. In regions with low customer densities, the cost of upgrading or replacing existing grid infrastructure can be particularly high. By implementing decentralised energy systems, AusNet can avoid significant capital and operational costs associated with grid maintenance.

2. **Enhanced Reliability and Resilience:**

Non-network solutions can significantly bolster the reliability of power supply, especially in areas prone to extreme weather or other disruptions. Local generation and storage systems can operate independent of the main grid, ensuring that communities have access to power even during outages.

3. **Improved Power Quality:**

Integrating non-network solutions can enhance power quality by mitigating issues such as voltage sags and frequency variations. Local energy sources can provide instantaneous power adjustments, helping to maintain stable voltage levels and reduce harmonics in the electrical supply. This results in fewer disruptions to sensitive equipment and appliances, improving overall satisfaction and productivity for consumers.

4. **Mobile and Deployable Solutions:**

Mobile energy solutions, such as portable generators or battery units, can be quickly deployed in response to outages, providing immediate relief to affected areas. These systems can be transported to where they are needed most, allowing for rapid restoration of power.

The role of mobile generation in resilience

Large mobile diesel generators are deployed across the network to address both planned and unplanned outages to meet customer power needs. These units offer a reliable and flexible solution for maintaining electricity supply during unforeseen disruptions or periods of heightened demand. By strategically stationing these generators at key locations within the network, AusNet can rapidly respond to generation needs, ensuring minimal downtime and uninterrupted service for customers. Their mobility and quick deployment capabilities make them uniquely suited and indispensable assets to restore power on the network.

Table 2: AusNet's current mobile generation fleet

Mobile Generators	Sizing	Number of Units
HV Diesel generators	1250 kVA	6
2 MVA containerised step-up transformers	2 MVA	3
MV Diesel Generators	500 kVA	2
LV & HV cables and connectors.	-	-
Fuel cell trailers	-	2
Cage trailer	-	1
Load Bank trailer	-	1
Load banks	3x100kw,1x400kw,1x600kw	5
100 kVA trailer mounted generator	100 kVA	1
LV BESS	45 KVA	1

Source: AusNet.

Renewing four mobile generators in the existing fleet is essential due to the growing age of the essential assets and the escalating challenges associated with deploying outdated equipment. Four of the current generator units are approximately eight years old and nearing the end of their expected lifespan (expected lifespan of 10 years). They are beginning to exhibit signs of wear and tear, resulting in decreased efficiency and increased risk of breaking down. As mobile generation assets near the end of their operational lifespan, they become prone to increased maintenance requirements, decreased reliability, diminished performance efficiency and possible failure. Hence, proactive renewal is imperative to ensure optimal functionality, reliability, and adaptability of mobile generation infrastructure in meeting evolving energy demands and operational needs. Our BAU option involves purchasing four mobile generators to replace the four existing generators that are nearing end of life.

Mobile generation is central to our network operations, serving as a swift and adaptable solution to mitigate some of the impacts of extreme weather events and natural disasters. With its ability to be rapidly deployed to provide backup power where needed, mobile HV generation equipment plays a pivotal role in restoring electricity supply to affected areas, minimising downtime, and safeguarding essential services. Its portability and versatility ensure rapid response capabilities, enabling efficient restoration efforts and bolstering overall resilience within the electricity distribution network. Key benefits delivered by mobile HV generation equipment in this proposal include:

- Rapid deployment to restore power during outages
- Flexibility to adapt to changing demand and emergency situations
- Increased restoration capabilities and supply potential
- Support for critical infrastructure and essential services
- Contribution to grid stability and resilience against unforeseen events

3. Identified need

AusNet has identified the need to update existing HV diesel generation equipment to maintain the critical response resources for outage events. As the current fleet of HV diesel generators approaches the end of its operational lifespan, concerns are increasing regarding their reliability, efficiency, and ability to continue to meet network demands. Four of the existing generators are approximately eight years old and nearing the end of their asset life. Given their pivotal role in restoring power during emergencies, it is essential to replace these generators to modern units. By investing in updated HV generators, AusNet can effectively maintain service requirements and deliver improved response to disruptions, reduce time off supply, and effectively manage demand scenarios, thereby safeguarding the reliability and resilience of the electricity distribution network.

In addition to updating existing generators, there is an opportunity to acquire both a portable station and HV BESS to further support the network's response capabilities. The portable station, equipped with a transformer, provides essential infrastructure support, enabling efficient power distribution and connectivity across various network locations. The HV BESS is a portable energy storage unit that stores electricity for use in remote locations, or as a backup power source during emergencies. The BESS serves as a new and innovative component for energy storage, offering flexibility and rapid deployment capabilities to manage dynamic demand fluctuations and unexpected outages more effectively. This approach enhances the network's resilience by diversifying its response toolkit and ensuring comprehensive coverage for emergency power needs. By investing in portable station infrastructure and HV battery technology, AusNet can improve the speed of outage response, reinforce its ability to maintain uninterrupted electricity supply, optimise grid stability, and enhance overall operational resilience to evolving network requirements, climate change and other external pressures. Ausnet is proposing the acquisition of the following equipment in the table below.

Table 3: Proposed generation equipment.

Equipment	Sizing	Number of Units
Diesel Generators	1400 kVA	4
Portable station	2 MVA	1
Mobile HV Battery	1250 KVA/ 1MWh	1

Source: AusNet.

Figure 2: Generation connection

Source: AusNet.

4. Methodology

The methodology for assessing the expansion of the mobile generation fleet evaluates the costs and benefits of three potential options for renewing and acquiring new equipment. These options include the Business as Usual (**BAU**) scenario, where four new diesel generators are acquired to replace aging, existing units, and two alternative options that introduce a portable station and a mobile BESS to the fleet.

Step 1: Deployment data analysis

Assess the annual generation requirements of the existing fleet. This incorporates historical deployment data for generators and uses the Compound Annual Growth Rate (**CAGR**) derived from climate modelling conducted for AusNet's resilience proposals by CutlerMerz to forecast the impact of extreme weather outage events on the network. The analysis considers the economic impact of unserved energy from typical deployments, while also accounting for the anticipated growth in climate-related risks.

Step 2: Load estimation

Equipment ratings were used to estimate the energy supplied during deployments. Generation equipment typically operates below its full capacity; to reflect this, a conservative figure has been assumed for the analysis.

Step 3: Value of Expected Unserved Energy (VoEUE)

The VNR rate, as outlined by the Australian Energy Regulator (**AER**), is used to quantify the economic impact of unserved energy across the network. This rate is derived from the outage duration tier system provided by the AER, which categorises rate values based on their outage duration.

By leveraging historical deployment data, load estimates and the VNR, the expected unserved energy can be estimated for each of the mobile generation units. This approach allows for a clear quantification of the benefits provided by each unit in terms of the energy they can deliver annually, reducing unserved energy. By comparing these benefits against the costs, including operational, maintenance, and capital expenditures, a comprehensive cost-benefit analysis can be performed.

Step 4: Operational cost analysis

The operational maintenance costs for the proposed solutions have been estimated based on the current practice of servicing every five years. This includes factoring in routine maintenance, inspections, and any necessary repairs required to keep units operational. By applying this servicing schedule, the long-term maintenance costs for each solution are projected, providing a clear understanding of the ongoing financial commitments associated with each option.

Step 5: OPEX reductions from BESS

The BESS delivers sustainability benefits by reducing diesel costs, as it recharges during off-peak periods and discharges during peak periods, optimising diesel generator operation and minimising fuel consumption.

Step 6: Benefit and cost projection

Benefits and costs are projected over a 10-year evaluation period, reflecting the useful life of the equipment. This analysis includes capital expenditures (**CAPEX**), operational expenditures (**OPEX**), and anticipated benefits to evaluate the NPVs of all options.

Step 7: Selection of preferred option

The optimal outcome from the available options is selected based on the highest NPV, ensuring the option with the highest long-term benefit is selected.

4.1. Assessment approach

Generation Approach:

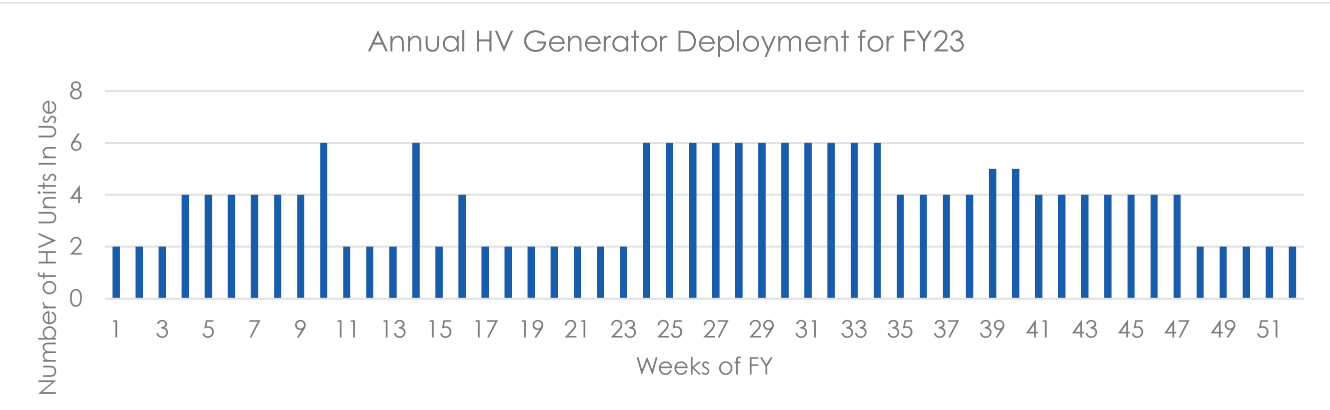
The assessment approach for evaluating mobile generation equipment involves quantifying the avoided expected unserved energy (**EUE**) resulting from deploying equipment to provide backup power during extended outages. The analysis considers typical deployment behaviours of the existing fleet to determine the annual utilisation and energy supplied by the equipment. By estimating the amount of unserved energy prevented by the mobile generation units, we can measure the benefits to customers from reducing downtime and minimising time off supply.

The methodology for evaluating the potential impact of this program involved:

- Evaluating current mobile generation deployment and energy supply
- Estimating the potential value of expected unserved energy avoided by maintaining critical generation equipment
- Comparing expected costs and quantifying benefits of improved resilience

The analysis of mobile generator deployment examines historical data on HV generation for the financial year ending in 2023, as illustrated in the figures below.

Figure 3: Historical weekly generator deployment



Source: AusNet.

The AER has developed a tiered multiple approach to calculate the Value of Network Resilience (**VNR**)[2], which considers the varying impacts of prolonged outages on residential and business customers. Specifically, outages are disaggregated into different outage bands, with multipliers for each band. The multipliers apply to the AER's standard VCRs. Residential customers are subjected to an additional upper bound limit of $3,500. The tiers and multipliers are set out in the table below.

We have adopted the VNR in our assessment of risk, applying the VNR multiples to the AER's standard 2023 VCRs.

[2] *Value of network resilience 2024*. Available at: https://www.aer.gov.au/system/files/2024-09/Final Decision - Value of Network Resilience 2024.pdf.

Table 4. VNR Tier multiples

Tier (Duration)	Residential	Business
<12 hours	1.0x	1.0x
12-24 hours	2.0x	1.5x
Greater than 24 hours up to $3,500 upper bound (residential customers only)	1.5x	0.5x
24-72 hours (business customers only)	-	1.0x
Greater than 72 hours (business customers only)	-	0.5x

Source: AusNet.

The generator benefits analysis uses the anticipated generator load (kW), the expected annual deployment of generators and the VNR rate to calculate the Value of Expected Unserved Energy (**VoEUE**). By integrating these factors, the benefits of deploying mobile generation units to prevent outages and reduce customer impact can be quantified. These calculations are presented in the equations below.

$$Unserved\ Energy\ (UE) = T \times L$$

- T is the expected annual duration off supply (measured in hours), and
- L is the average load not served during the outage (measured in kW).

$$Value\ of\ Expected\ Unserved\ Energy\ (VoEUE) = UE \times VNR$$

- VNR is the value of network resilience where we have applied the AER's tiered multiple approach to the 2023 VCRs ($/kWh).

The climate risk growth is accounted for through the CAGR discussed earlier. This rate was derived from the climate risk modelling by CutlerMerz.

$$\text{VoEUE (including climate risk growth)} = \text{VoEUE x } (1 + \text{CAGR})^{\text{investment year}}$$

- CAGR is the expected increase in risk across the network from climate change with a value of 0.63% increase per year.

Portable Station Approach:

A portable station is a mobile unit that consists of a transformer and switching equipment mounted on a trailer. This design allows generation equipment to be rapidly deployed and established to resupply power and support restoration efforts, especially in areas where infrastructure has been damaged. The ability to quickly transport and set up these stations is particularly valuable for mitigating the impact of outages or providing power during emergencies, especially in rural and remote areas.

Typical use cases for a portable station includes deployment in response to a natural disaster such as a storm, bushfire or flood. In these situations, the portable station can be quickly rolled out to connect generation equipment to restore power to the network, enabling power supply to resume in a matter of hours while restoration works are performed. This capability significantly reduces downtime and minimises disruptions to communities, providing a critical solution while permanent repairs are being made. The benefit calculations for the portable station are like those in the generator analysis, as this approach enables faster deployment of generation. By leveraging portable stations, AusNet can increase flexibility in responding to outages and enhance grid resilience, reduce service interruptions to customers impacted by extreme weather events, and accelerate restoration processes during challenging situations.

Battery Approach:

Acquiring a 1 MWh BESS is an innovative power supply tool that reduces fuel consumption and enhances sustainability in generation works. BESS equipment can provide more efficient load management, improved overall power quality for customers and increase sustainability practices during outage response. It offers flexible voltage and frequency management which diesel generators cannot deliver on their own by adjusting voltage levels to maintain stability to frequency changes, either by discharging or absorbing excess energy. While using the BESS unit in parallel with generators, fuel consumption can be run more efficiently, reducing fuel costs leading to opex savings.

This equipment can deliver a cost improvement for AusNet by offsetting diesel fuel costs during generation activities.

Table 5: Key assumptions

	Value	Comments
Weighted Average Cost of Capital (WACC)	5.56%	The average of 4.11% and AEMO's central discount rate (7.0%) in its latest 2023 Inputs Assumptions Scenario Report
2050 Risk Growth (CAGR)	0.63%	The climate risk growth rate derived from the climate risk modelling
Evaluation period	10 years	
Value of Network Resilience	The AER's 2023 VCRs and the AER's VNR multipliers were used to value expected unserved energy. The 2023 VCRs used are: • Residential: $25.13 • Farming/Agriculture: $44.4 • Commercial: $52.2 • Industrial: $74.79 The multipliers used for residential customers are: • 1.0 for outages less than 12 hours for prolonged outages • 2.0 for outages between 12-24 hours • 1.5 for outages greater than 24 hours, limited by an upper bound of ~$3,500 The multipliers for business customers are: • 1.0 for outages less than 12 hours for prolonged outages • 1.5 for outages between 12-24 hours • 1.0 for outages between 24-72 hours • 0.5 for outages greater than 72 hours	Adopted the AER's VNR tiered multiple approach for quantifying resilience published in 2024.
Generator/portable station and battery servicing costs	"C-I-C"	The estimate is based on the historical average annual operating expenses for generator equipment. Servicing is typically required around 5 years into asset life.
	Generator Assumptions	
Energy at risk value per year per generator	146,417 kWh	Assumed Annual Expected Unserved Energy per generator.
Assumed generator operating kW	700 kW	Assumed operating load below the prime operating mode rating.
Hours per day of generator operation	5	Historical daily average duration of generator operation.
Estimated annual days of generator deployment	125.50	Generator deployments use x2 generators.

Annual weeks of generator deployment (FY23)	198	The annual estimate quantifies deployment for multiple units. Therefore, the estimate is greater than the total weeks per year. (ie. 1 = 1 generator deployed for 1 week)
Weekly deployment costs for 1 Gen unit	"C-I-C"	Deployment costs for two HV generators is "C-I-C". Deployment estimates for a single generator is derived from this historic value.
Portable Station Assumptions		
Assumed transformer operation (kW)	1400	Assumed operating load below rating.
Annual number of portable station deployments	3	Number of expected portable station deployments per year.
Hours of daily operation (Portable station)	5	Same assumed value as diesel generator.
Days per deployment (Portable station)	5	Same assumed value as diesel generator.
Battery Assumptions		
BESS Capacity	1 MWh	Full discharge potential of the BESS.
Annual Battery Deployments	30	Expected annual deployment for the BESS.
Days of expected generator deployment	5	Expected number of days per generator deployment.
Dailey battery recharges & discharges	2	Daily discharges of full battery capacity. Aligned to morning and evening peaks.
Diesel Cost	$2 per litre	Cost of diesel consumption. Used in calculating avoided refuelling costs.
Diesel Consumption	0.25 litres per kWh	Estimated diesel consumption rate for generators.

Source: AusNet analysis

5. Options assessed

Business as Usual (BAU) - Purchase four Diesel Generators: This option is seen as a basic requirement to ensure current fleet is maintained. The option involves the acquisition of four diesel generators to renew our mobile generation capacity during outages. While providing a reliable source of backup power, this solution may lack the versatility and efficiency of a more comprehensive approach.

Option 1 - Purchase four Diesel Generators and a Portable Station: This option entails acquiring four diesel generators along with a portable station infrastructure. The addition of the portable station enhances power distribution capabilities, enabling more efficient response to outage events and improved grid connectivity.\

Option 2 - Purchase four Diesel Generators, Portable Station, and HV BESS: This is the preferred option as it delivers the greatest NPV outcome from investment. This option involves acquiring four diesel generators, a portable station, and a HV BESS system. In addition to backup power supply, the HV battery system enhances energy storage capabilities, providing greater flexibility, resilience, and efficiency in managing outage scenarios.

5.1. Business as usual

This BAU option involves acquiring four high-voltage (HV) diesel generators. These generators have an asset life of 10 years and are replacing four existing units which are approaching the end of their asset life.

Mobile generation plays a crucial role in supply during outages, providing temporary power to customers and essential services in affected areas. As existing units approach the end of their operational life, replacing them becomes vital to maintaining the reliability and effectiveness of outage management and response efforts. Aging units become less efficient or prone to breakdowns, hindering response times and the ability to restore power swiftly. By replacing these generators before they reach end-of-life, AusNet can ensure continued resilience and readiness to manage future outages.

Generators provide critical supply benefits but lack the added flexibility and versatility offered through the additional equipment listed in this proposal. This option is practical and generates a positive NPV, as benefits outweigh the cost, however, other options deliver a higher NPV and are preferable.

5.1.1. Summary

BAU requires the smallest capex investment among the three available options. The NPV of the proposal is positive with a value of "C-I-C" million over the life of the project.

Table 6: Economic Outcomes of BAU ($m, discounted, 2023-24 dollars)

	FY27	FY28	FY29	FY30	FY31	Total FY27-31	Full assessment period
Cost	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"
Benefits	$6.6	$12.6	$18.0	$22.9	$21.8	$81.8	$176.5
NPV	"C-I-C"						

Source: AusNet analysis

5.1.2. Cost

5.1.2.1. Capex

The capex forecast is uniformly distributed, assuming one generator is acquired for each of the first four years of the regulatory period. Assets will have a 10-year asset life and reach end of life in FY37-FY41. The total capital expenditure requirement is "C-I-C" a present value basis. The staggered approach for acquiring the generators assists with managing lead times, storage planning and decommissioning of the existing aging fleet.

Table 7: Capex Distribution of BAU ($m, discounted, 2023-24 dollars)

	FY27	FY28	FY29	FY30	FY31	Total FY27-31	Full assessment period
Capex	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"

Source: AusNet analysis

5.1.2.2. Opex

The acquisition of the four generators requires operational expenditure to maintain the equipment. The annual operational expenditure is around "C-I-C" per year for the generators and includes labour, refuelling and other running costs. There is an assumed weekly deployment cost of "C-I-C" per generator unit. The total PV opex costs come to "C-I-C" for the 2027-2031 regulatory period and "C-I-C" for the full assessment period. Maintenance also forms a small part of the opex breakdown, occurring in the 5th year of the generator life. Due to the low cost of servicing, this has a minimal impact on the total opex costs.

Table 8: Opex Distribution of BAU ($m, discounted, 2023-24 dollars)

	FY27	FY28	FY29	FY30	FY31	Total FY27-31	Full assessment period
Opex	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"

Source: AusNet analysis

5.1.3. Benefits

The primary benefit of acquiring the four generators in this option is the reduction in VoEUE, which translates to minimised time off supply during outage events. By effectively mitigating unserved energy through the deployment of generators, the network gains heightened resilience and reliability. This benefit comes out to $81.8 million for the next regulatory period and $176.5 million over the life of the project.

Table 9: Benefits Summary ($m, discounted, 2023-24 dollars)

	Total FY27-31 ($millions)	Total over full assessment period ($millions)
Total benefits	$81.8	$176.5

Source: AusNet analysis

5.2. Option 1

This option requires procuring four HV diesel generators (as in BAU) plus a portable station. The portable station allows for rapid generation connectivity across the network. The inclusion of a portable station alongside the acquisition of four new generators offers additional benefits, particularly in terms of enabling faster connectivity and reducing deployment times during outages and streamlining the process of restoring power to affected areas. While the four generators are still a key component of this option, the added flexibility and speed provided by the portable station enhances overall response capabilities.

5.2.1. Summary

Option 1 offers additional benefits compared to the BAU, despite requiring additional capital investment to acquire a portable station as well as four generators. The NPV of the proposal is positive with a value of "C-I-C" over the assessment period.

Table 10: Economic Outcomes of Option 1 ($m, discounted, 2023-24 dollars)

	FY27	FY28	FY29	FY30	FY31	Total FY27-31	Full assessment period
Cost	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"
Benefits	$11.3	$17.1	$22.3	$27.0	$25.7	$103.4	$215.0
NPV	"C-I-C"						

Source: AusNet analysis

5.2.2. Cost

5.2.2.1. Capex

The capex budget for this option is front-loaded, with higher initial costs to acquire the portable station and a generator. The total capex comes to $"C-I-C" million (discounted) across the regulatory period. The portable station will be acquired in the first year of the period. Assets will have a 10-year asset life and reach end of life in FY37-FY41.

Table 11: Capex Distribution of Option 1 ($m, discounted, 2023-24 dollars)

	FY27	FY28	FY29	FY30	FY31	Total FY27-31	Full assessment period
Capex	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"

Source: AusNet analysis

5.2.2.2. Opex

The acquisition of the four generators and portable station will require some additional operational expenditure compared to option 1. The increased opex in maintaining and deploying the portable station is a negligible increase compared to option 1. The annual operational expenditure is around "C-I-C" per year for the generators and includes labour, refuelling and other running costs.

Table 12: Opex Distribution of Option 1 ($m, discounted, 2023-24 dollars)

	FY27	FY28	FY29	FY30	FY31	Total FY27-31	Full assessment period
Opex	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"

Source: AusNet analysis

5.2.3. Benefits

The primary benefit of this option is the reduction of VoEUE, which translates to minimised time off supply during outage events. By effectively mitigating unserved energy through the deployment of generators and the faster deployment of generation using the portable station, the network gains heightened resilience and reliability. This benefit comes out to $103.4 million for the next regulatory period and $215.0 million over the life of the project.

Table 13: Benefits Summary ($m, discounted, 2023-24 dollars)

	Total FY27-31 ($millions)	Total over full assessment period ($millions)
Total benefits – Value of EUE Reduction Compared to BAU	$103.4	$215.0

Source: AusNet analysis

5.3. Option 2

This comprehensive option involves acquiring four generators, a portable station and a HV BESS (that is the same as option 1 plus the additional purchase of a HV BESS).. The inclusion of a mobile battery alongside the four generators and portable station in this option offers the greatest benefits among the available options, particularly in enhancing the efficiency of power generation during outages. When used in parallel with the generators, the mobile battery allows for more flexible and efficient management of energy supply, storing excess power during periods of lower demand and discharging it when demand spikes. This optimises fuel use and reduces the operational costs of the generators, leading to better overall performance during restoration efforts. While the four generators and portable station are integral components of this option, the added mobile battery improves the system's efficiency and response capability. The benefits of improved operational efficiency and power quality for customers justify the extra investment, resulting in a higher NPV than both BAU and Option 1, making Option 2 the preferred choice.

5.3.1. Summary

Option 2 offers the greatest NPV of all the options assessed. The benefits delivered, such as enhanced resilience, improved energy management, and reduced opex, outweigh the initial capital costs, making it the most v preferred option. The NPV of option 2 is positive at "C-I-C".

Table 14: Economic Outcomes of Option 2 ($m, discounted, 2023-24 dollars)

	FY27	FY28	FY29	FY30	FY31	Total FY27-31	Full assessment period
Cost	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"
Benefits	$11.3	$17.1	$22.3	$27.0	$25.7	$103.4	$215.0
NPV	"C-I-C"						

Source: AusNet analysis

5.3.2. Cost

5.3.2.1. Capex

The capex forecast for the selected option is front-loaded, with higher initial costs to acquire the HV BESS, portable station, and one generator. Investment flattens out over the following years, with a single generator acquired for the next three years. Total capex spend for this option is "C-I-C" (discounted). Assets will have a 10-year asset life and reach end of life in FY37-FY41.

Table 15: Capex Distribution of Option 2 ($m, discounted, 2023-24 dollars)

	FY27	FY28	FY29	FY30	FY31	Total FY27-31	Full assessment period
Capex	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"

Source: AusNet analysis

5.3.2.2. Opex

The operating expenses for the generators and portable station are identical to those listed in the Option 1 section.

The BESS will contribute to a reduction in opex due to reduced diesel consumption, this will come out to an annual saving of around $150k and $ 1.13 million over the life of the asset.

Table 16: Opex Distribution of Option 2 ($m, discounted, 2023-24 dollars)

	FY27	FY28	FY29	FY30	FY31	Total FY27-31	Full assessment period
Opex	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"

Source: AusNet analysis

Table 17: BESS Opex Savings for Option 2 ($m, discounted, 2023-24 dollars)

	FY27	FY28	FY29	FY30	FY31	Total FY27-31	Full assessment period
Opex	0.15	0.14	0.13	0.13	0.12	$0.67	$1.2

Source: AusNet analysis

5.3.3. Benefits

The primary benefit of acquiring this equipment lies in the reduction of EUE, which translates to minimised time off supply for customers. By mitigating unserved energy through the deployment of generators and the portable station, the network gains heightened resilience and reliability. This core benefit is identical to option 1.

The BESS offers opex savings by transitioning to more sustainable energy solutions.

This benefit comes out to $104.1 million for the next regulatory period and $216.2 million over the full assessment period.

Table 18: Benefits Summary ($m, discounted, 2023-24 dollars)

	Total FY27-31 ($millions)	Total over full assessment period ($millions)
Value of EUE Reduction Compared to BAU	$103.4	$215.0
BESS Opex Benefits	$0.7	$1.2
Total	$104.1	$216.2

Source: AusNet analysis

6. Preferred option and sensitivity testing

6.1.1. Sensitivity Analysis

Option 2 has the highest NPV of all options assessed even under sensitivity scenarios.

Table 19: Net Present Value ($m, 2023-24 dollars)

	Central Assumptions	Higher Discount Rate	Lower Discount Rate	Higher Costs	Lower Costs	Average	Comments
BAU – Purchase mobile generators only	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	Acquire four HV generators
Option 1 – Purchased Mobile Generator & portable station	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	Acquire mobile generators & portable station
Option 2 – Purchase mobile diesel gens, battery, and portable station	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	"C-I-C"	Acquire mobile generators, portable station & battery

Source: AusNet analysis

6.1.2. Recommendations

Considering the economic results and sensitivity testing results, Option 2 is the preferred option with a capital expenditure requirement of $3m (direct, real 2023-24). Option 2 involves the acquisition of four new mobile generators, a portable station & HV BESS.

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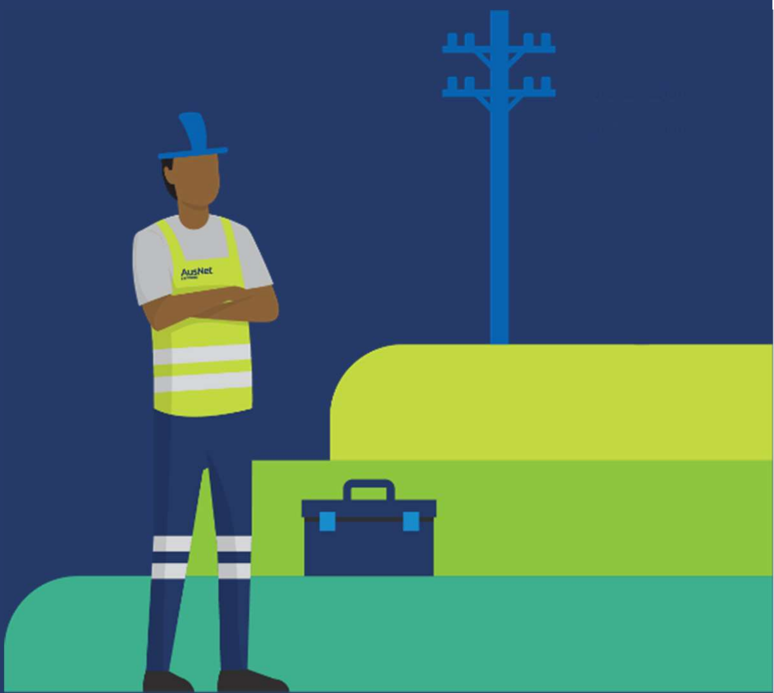

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