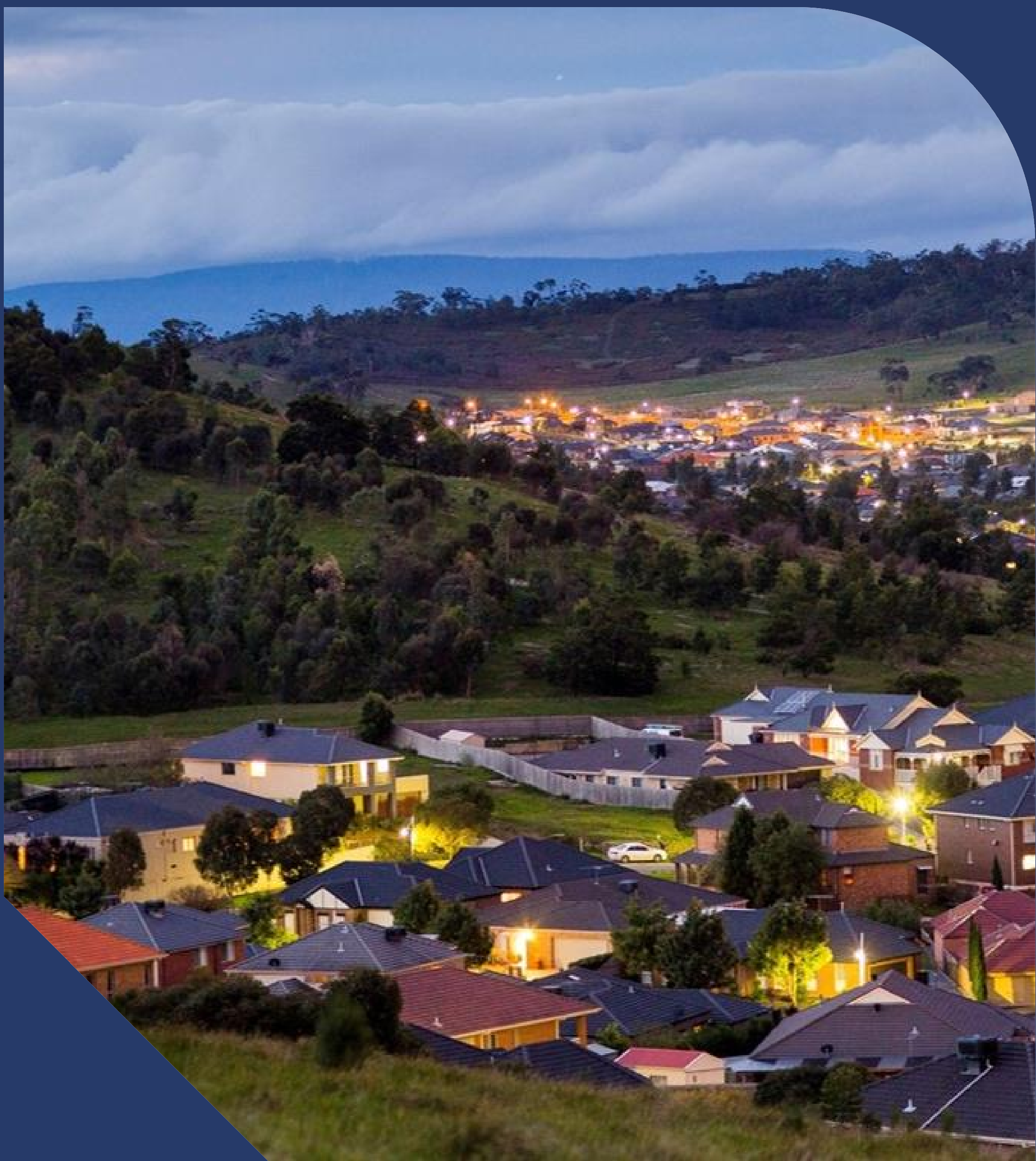
AusNet

Electricity Distribution Price Review (EDPR 2026-31)

Supply security of Wodonga

Date: 31 January 2025



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1. Executive summary

AusNet Services is a regulated Victorian Distribution Network Service Provider (DNSP) that supplies electrical distribution services to more than 800,000 customers. Our electricity distribution network covers eastern rural Victoria and the fringe of the northern and eastern Melbourne metropolitan area.

As expected by our customers and required by the various regulatory instruments that we operate under, AusNet Services aims to maintain service levels at the lowest possible cost to our customers. To achieve this, we assess the requirements, identify emerging constraints, evaluate options to mitigate constraints and develop plans that aim to maximise the present value of net economic benefit to all those who produce, consume and transport electricity in the National Electricity Market (NEM).

This Executive Summary provides an overview of the proposed investment in the electrical distribution network in Wodonga. It discusses the underlying need, the key drivers, the options considered to address the identified need, and the recommended solution. The body of the document covers these aspects in detail.

Identified need

Customers' energy requirements are changing due to the ongoing energy transition. Both individual customers and businesses are increasingly inclined to shift away from gas, embrace low-emission transportation and heating choices, and amplify the effectiveness of their household appliances and the presence of distributed energy resources (DERs) such as solar photovoltaic (PV) installations. Continued investments in DER to offset electricity from the grid, doesn't eliminate the need for network capacity augmentations, as the maximum generation or demand typically occurs at different times. The electricity demand growth over the next decade is predicted to occur at a faster pace. This growth is primarily attributed to three key factors:

- population growth,
- decarbonisation through the electrification of transport, and
- the gradual transition from using gas to using electricity in homes and industries.

Wodonga Council has identified approximately 19 km^2 of vacant land in Leneva Valley for development as residential land for medium to long-term population growth requirements in the Wodonga area. The Leneva Baranduda Precinct comprises 1062 hectares of land within the larger Leneva-Baranduda growth area. The precinct is expected to take 20 to 30 years to develop fully and will house up to 6,037 new dwellings accommodating a population of approximately 15,395[1] residents. Based on the connection inquiries AusNet have received, we anticipate the following developments, in addition to the development in Leneva Valley:

- Army consolidation and expansion to Bandiana South 5-10 years
- New commercial/industrial subdivision Kiewa Valley Highway, first lots being constructed now

When fully developed beyond 2053, it is expected that the development areas in Wodonga and surrounding areas will result in a new load in the order of 58 MVA being added to AusNet Services' electricity network in Wodonga.

The city of Wodonga and surrounding areas, including Tallangatta, are predominately serviced by 330/66/22kV Wodonga Terminal Station (WOTS). The Wodonga Terminal Station was first established in the 1980s. The existing built-up area of Wodonga and the township of Baranduda will be extended further into the Leneva Valley as per the development plans and will be supplied mainly by the WOTS25 feeder. This area has been subjected to several subdivisions in the last few years, and it is continuing, resulting in increasing demands on the WOTS ZS feeders, particularly on the WOTS25 feeder.

The basis for this business case is the combined growth in demand from existing (brownfield) and newly developed (greenfield) sites in the Wodonga Council, for initial stages of the Wodonga development area, for which AusNet Services have strong and credible forecast. The future stages, likely to be required after 2031 will be covered in a separate business case when the need or trigger arises.

AusNet Services has identified a need to increase the ability of the 22kV network to supply the forecast demand in Wodonga Council and manage the increasing risk of involuntary load shedding (National Electricity Rules (NER) 5.17.1(c)(4)(ii)) on WOTS25 22kV feeder supplied by WOTS station beyond 2028. In addition to the risk of unserved energy to existing customers, the lack of capacity of the 22kV network will prevent connecting new customers to AusNet Services' network in the area supplied by WOTS station. This would directly violate AusNet Services' obligation to provide connection services (Section 5.10 of the NER). There are also substantial reputational risks and stakeholder dissatisfaction if AusNet Services cannot meet supply requirements for this high-growth area. An investment into additional electrical capacity in this area is required to reduce these risks.

Options considered

[1] Source: Wodonga Council — Leneva Baranduda Growth Area

Based on gathered credible growth information, there is a need for a long-term increase in 22kV capacity in the abovementioned area. Increasing the 22kV capacity requires investment in infrastructure, which:

- enables new customer connections,
- finds the right balance between short-term and long-term needs, and
- provides the choices (network or non-network) for future growth of electricity infrastructure.

As a result, various network topologies based on the ultimate demand were tested, and the costs and benefits of these ultimate configurations were compared over a sensible time horizon (i.e., what is likely to be the demand within 10-15 years). Table 1 below summarises the options that were considered to address the identified need.

Based on the performed quantitative and qualitative analysis (Table 1), the preferred ultimate option is **Option 2 (Construct a new 22kV feeder by splitting the existing WOTS25 into two feeders)** as it has the most significant economic benefit being Net Present Value (NPV) positive **$740.6 Million**. This option provides the greatest benefit by providing the most significant reduction in unserved energy, allowing the 22kV feeders to be offloaded and the greatest number of customers to connect. As a result, Option 2 will provide more long-term benefits than all other options considered.

Table 1: Cost Benefit Analysis (CBA) of credible options

Option	Description	Solution Type	PV Benefits[2] ($M)	PV Cost[3] ($M)	NPV[4,5] ($M)	Rank	Assessment
0	No proactive intervention	Base case	-	-	-746.0	5	Non-preferred as will lead to unacceptable risk and higher customer costs if the opportunity is not captured.
1	WOTS25 22kV feeder upgrade to a higher rating	Network solution	684.9	7.4	677.6	3	Non-preferred as it will not deliver the most optimal long-term configuration of the 22kV network.
2	**Construct a new 22kV feeder by splitting the existing WOTS25 into two feeders (new WOTS21 feeder)**	**Network solution**	**745.9**	**5.2**	**740.6**	**1**	**Preferred long-term option as it will deliver the highest net economic benefits and most optimal configuration of the 22kV network.**
3	Construct 5MW/10MWh Battery Energy Storage System (BESS)	Non-network and new-technology solution	742.6	17.7	724.8	2	Not preferred as it will lead to high upfront investment costs, a much shorter operating life compared to the network solution and an inability to connect customers from the areas that do not have any Ausnet assets.
4	Contract external network support services to defer network investment	Non-network and new-technology solution	447.6	298.4	149.2	4	Not preferred as it results in high operating costs and an inability to connect customers from the areas that do not have any Ausnet assets.

[2,3,4,5] Notes:
2: PV of total costs, both capital expenditure (Capex) and operational expenditure (Opex).
3: PV of total quantified benefits, both risks mitigated, and any forecast decrease in Capex or Opex arising from undertaking the investment.
4: NPV represents the difference between PV Benefits and PV Investment Costs.
5: The breakdown of PV is based on the parameters specified for the base case (Section 5).

2. Identified Need

2.1. Strategic Context

Wodonga Council has identified approximately 19 km2 of vacant land in Leneva Valley for development as residential land for medium to long-term population growth requirements in the Wodonga area (Figure 1). The Leneva Baranduda Precinct comprises 1062 hectares of land within the larger Leneva-Baranduda growth area (Figure 2). The precinct is expected to take 20 to 30 years to develop fully and will house up to 6037 new dwellings, accommodating a population of approximately 15,395 residents. When fully developed beyond 2053, it is expected that the development areas in Wodonga and surrounding areas will result in a new load in the order of 58[2] MVA being added to AusNet Services' electricity network in Wodonga.

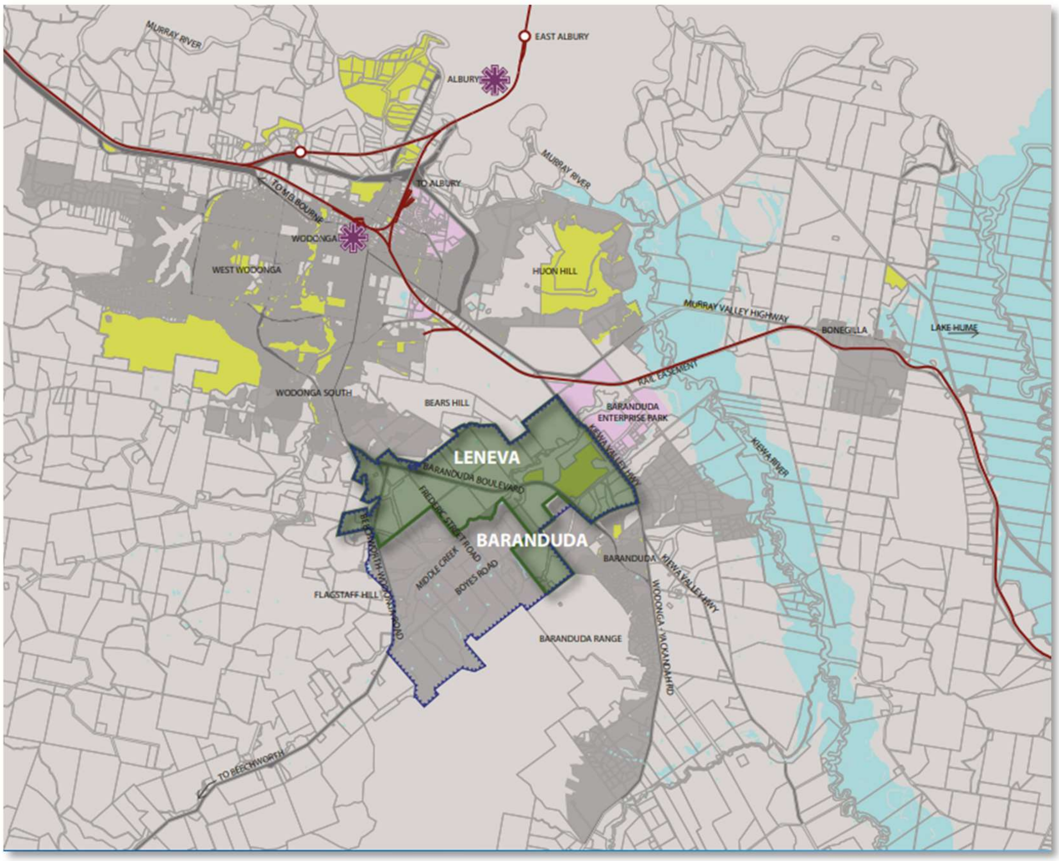

Figure 1: Wodonga – Geographic View[3]

Based on the connection inquiries AusNet have received, we anticipate the following developments, in addition to the development in Leneva Valley:

- Army consolidation and expansion to Bandiana South 5-10 years
- New commercial/industrial subdivision Kiewa Valley Highway, first lots being constructed now

As the population grows, so does the demand for electricity from the existing (brownfield) and new customer connections (greenfield). However, customer energy requirements are changing due to the ongoing energy transition. Both individual customers and businesses are increasingly inclined to shift away from gas, embrace low-emission transportation and heating choices, and amplify the effectiveness of their household appliances and the

[2] 5.4kVA per dwelling is adopted for dwellings. 6MVA per km² is adopted for industrial load and 12MVA per km² for commercial load. The employment lands are expected to have 67% of the industrial load and 33% of the commercial load. Supply of residential lots is 30 years.
[3] Source: Leneva-Baranduda_Precinct_Structure_Plan.pdf (wodonga.vic.gov.au)

presence of distributed energy resources. Continued investments in DER to offset electricity from the grid, doesn't eliminate the need for network capacity augmentations, as the maximum generation or demand typically occurs at different times. The electricity demand growth over the next decade is predicted to occur at a faster pace. This growth is primarily attributed to three key factors:

- population growth,
- decarbonisation through the electrification of transport, and
- the gradual transition from gas to electricity in households and industry.

All these factors combined will cause an increase in electricity demand, which will add extra load to the electricity network in Wodonga supplied by AusNet Services.

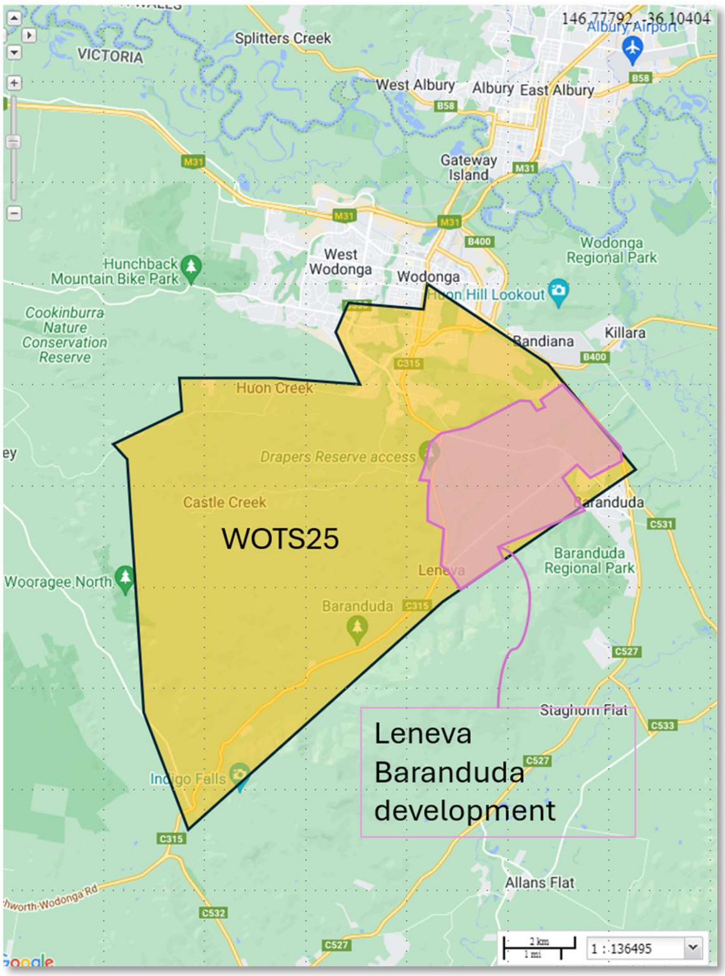

Figure 2: Wodonga - Key growth area

2.2. Existing supply arrangements

The city of Wodonga and surrounding areas, including Tallangatta, are predominately serviced by 330/66/22kV Wodonga Terminal Station (WOTS). The Wodonga Terminal Station and 22kV switchyard was established in 1987 and currently has 6 22kV feeders. The 22kV yard is indoor and has four remaining breakers for new feeders. The growth in the Wodonga area is expected to be very high over the next 30 years and consequently a number of new feeders will be required. It is expected that 3 new feeders will be required from WOTS over the next 30 years. The amount of load from the WOTS 22kV yard is limited by the two 330/66/22kV transformers which currently have an N –1 rating of 30 MVA. A new 3rd transformer is expected in the next 10 years so this will provide adequate capacity on the 22kV side.

WOTS25 feeder supplies to the west, east and north to the WOTS TS covering a large rural and suburban areas. The existing built-up area of Wodonga and the township of Baranduda will be extended further into the Leneva Valley as per the development plans and will be supplied mainly by the WOTS25 feeder (Figure 3).

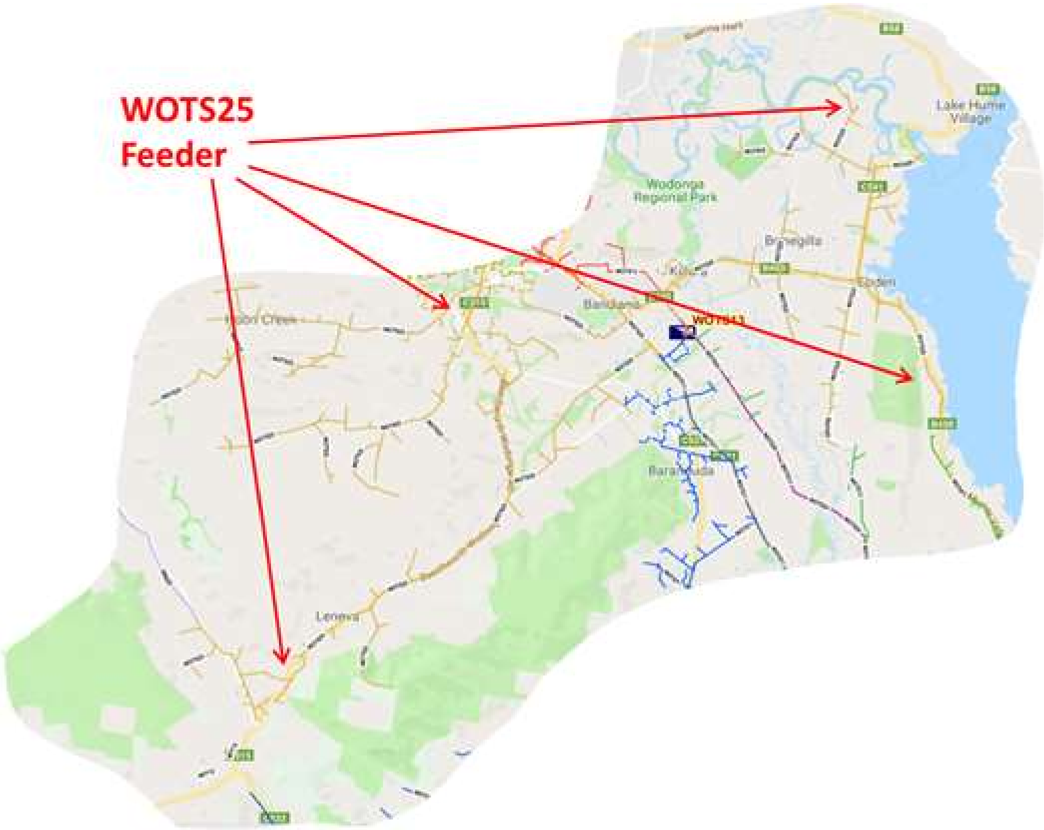

Figure 3: WOTS25 22kV feeder

Existing feeders in the area or neighbouring areas are being overloaded as per the latest forecast, and the nearby feeders in the area and neighbouring areas are also running close to the ratings and will be unable to take any new load.

Some of the new development areas do not have any Ausnet assets as these are greenfield developments.

Most of the feeders in the area and neighbouring areas have low transfer capacities. If a feeder fails during the peak hour, the options to transfer to nearby feeders become increasingly constrained.

The existing WOTS25 22kV distribution feeder and its details are presented in Table 2 below:

Table 2: Existing WOTS25 22kV distribution feeder

Feeder Name	Voltage (kV)	Length (km)	Winter Design Line Rating (MVA)	Summer Design Line Rating (MVA)
WOTS25	22	171.0	9.9	9.9

2.1. Demand forecast

Based on this load demand growth information of future economic trends in the area, including information from government agencies regarding identified growth areas and other factors, 50% probability of exceedance (POE) and 10% POE summer maximum demand forecasts for WOTS25 22kV distribution feeders supplying Wodonga are produced and shown in Table 3 and Table 4.

Table 3: 50% POE Maximum Demand Forecast (MVA) inc. available transfers - Summer

22kV feeder	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2053
WOTS25 – POE90 Demand (MVA)	7.8	8.1	8.4	8.8	9.1	9.8	10.1	10.5	10.8	11.2	11.6	12.0	12.4	12.7	12.7	12.7
WOTS25-POE50 Demand (MVA)	8.7	9.0	9.4	9.8	10.2	10.9	11.3	11.8	12.2	12.7	13.2	13.7	14.1	14.6	14.6	14.6

WOTS25–POE10 Demand (MVA)	9.6	10.0	10.4	10.8	11.3	12.1	12.6	13.1	13.6	14.2	14.7	15.3	15.8	16.3	16.3	16.3

Table 4: 10% POE Maximum Demand Forecast (MVA) inc. available transfers - Winter

22kV feeder	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2053
WOTS25 – POE90 Demand (MVA)	7.6	8.1	8.6	9.3	9.9	10.8	11.4	12.0	12.7	13.3	13.9	14.6	15.2	15.7	15.7	15.7
WOTS25-POE50 Demand (MVA)	8.3	8.8	9.4	10.1	10.7	11.6	12.2	12.9	13.5	14.2	14.8	15.5	16.1	16.7	16.7	16.7
WOTS25–POE10 Demand (MVA)	9.3	9.8	10.3	11.1	11.7	12.6	13.2	13.9	14.5	15.2	15.8	16.5	17.1	17.7	17.7	17.7

2.2. Limitations of existing infrastructure

To ensure that 22kV feeder capability is maintained, the forecasted maximum demand given in Table 3 and Table 4 should not exceed the 22kV feeder design ratings under N operating conditions. From this perspective, the most critical 22kV feeder in the area is WOTS25. The capacity of the existing WOTS25 22kV feeder at times of maximum demand will be entirely utilised by 2028, which will result in a load at risk from 2028 onwards (Table 5 and Figure 4).

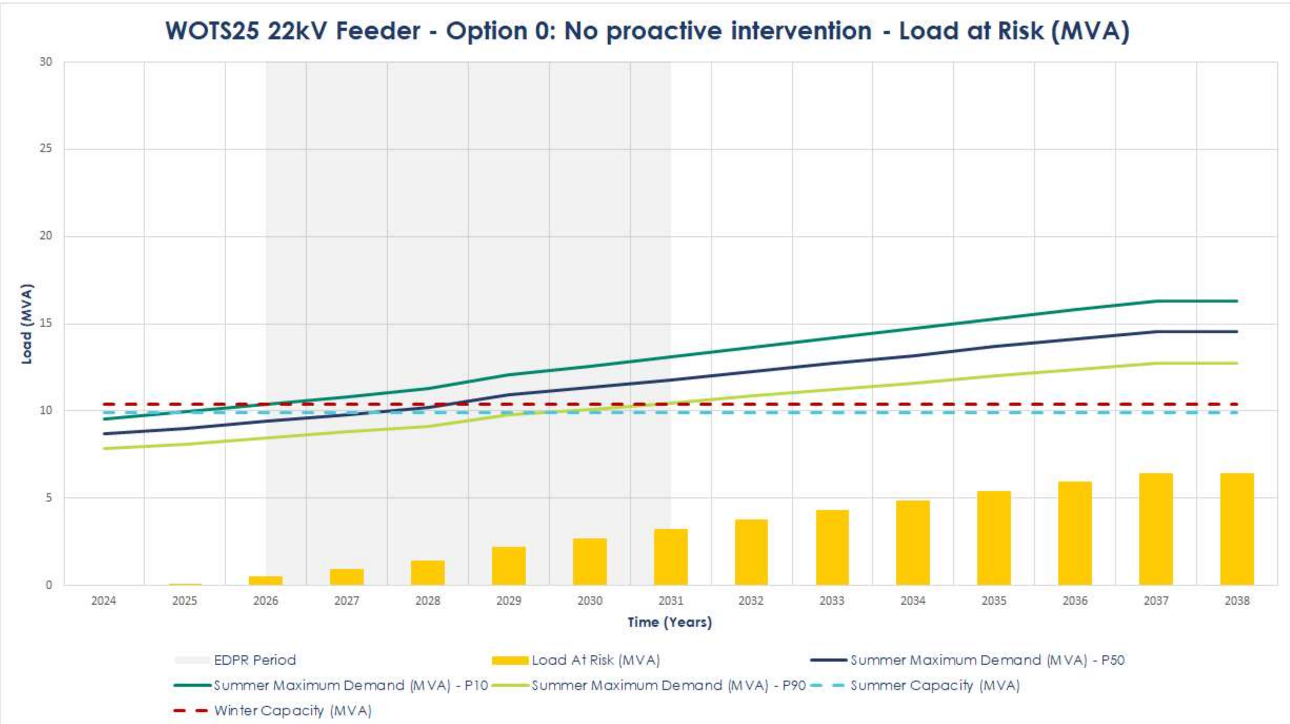

Figure 4: WOTS25 22kV Feeder - Load @ Risk (MVA) - Graphical view

From 2028, there will be a large amount of load at risk and ultimately sustained involuntary load shedding to maintain network loading within network capabilities to avoid damaging assets and risking personnel and public safety, resulting in considerable unserved energy and loss of supply. A long-term solution to address the load at risk at WOTS25 will be required from 2028. Extreme weather events and associated incidents, including periods of extreme heat or cold, may cause an exceedance of this capacity earlier than expected.

Table 5: WOTS25 - Load @ Risk (MVA) - Tabular view

Timeline	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2053
WOTS25 – POE90 Demand (MVA)	7.8	8.1	8.4	8.8	9.1	9.8	10.1	10.5	10.8	11.2	11.6	12.0	12.4	12.7	12.7	12.7
WOTS25- POE50 Demand (MVA)	8.7	9.0	9.4	9.8	10.2	10.9	11.3	11.8	12.2	12.7	13.2	13.7	14.1	14.6	14.6	14.6
WOTS25– POE10 Demand (MVA)	9.6	10.0	10.4	10.8	11.3	12.1	12.6	13.1	13.6	14.2	14.7	15.3	15.8	16.3	16.3	16.3
Winter Capacity (MVA)	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Summer Capacity (MVA)	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Load @ Risk (MVA)	0.0	0.0	0.5	0.9	1.4	2.2	2.7	3.2	3.7	4.3	4.8	5.4	5.9	6.4	6.4	6.4

2.3. Summary of identified need

AusNet Services has identified a need to increase the ability of the 22kV network to supply the forecast demand in Wodonga and manage the increasing risk of load shedding on the WOTS25 22kV feeder beyond 2028. Meeting this identified need is expected to result in an increase in producer and consumer surplus (a net economic benefit to all those who produce, consume and transport electricity in the NEM), primarily by reducing the cost of expected unserved energy by more than the proposed preferred solution's cost, including implementation, operating and maintenance costs. Consequently, the investment in increased capacity will deliver the market benefit by reducing the amount of involuntary load shedding in line with Section 5.17.1 of the NER. The Expected Unserved Energy (EUE) and community cost are described in Section 3.2.

3. Options considered

This section outlines the options that were considered in the long-term interests of consumers, including a "no proactive intervention" counterfactual option to assist overall comparison. These include all substantially differing commercially and technically credible options, including non-network and new technology solutions. Credible options (or a group of options) are those that meet the following criteria:

- addresses the identified need,
- is (or are) commercially and technically feasible, and
- can be implemented in sufficient time to meet the identified need.

The forecasted load requirements and limitations of existing infrastructure necessitate the investigation of additional supply options to address the loading of assets above their ratings in the West Gippsland area.

The options analysed to address distribution feeder exceeding planning design ratings are as follows:

- Option 0: No proactive intervention
- Option 1: WOTS25 22kV feeder upgrade to a higher rating
- Option 2: Construct a new 22kV feeder by splitting the existing WOTS25 into two feeders
- Option 3: Construct 5MW/10MWh Battery Energy Storage System (BESS)
- Option 4: Contract network support services to defer network investment

Each credible option is further elaborated in the subsequent chapter.

<u>Options considered but not progressed</u>

- Risk manage the feeder: beyond 2026, it is not possible as the 10%POE forecast exceeds 110% of the feeder rating.
- Feeder reconfiguration: WOTS25 is a radial feeder with limited transfer capability, and no reconfigurations are possible to address the identified need.
- Building additional feeder ties: other distribution feeders nearby are also experiencing constraints.
- Manage WOTS25 capacity with mobile generators: this option does not provide connection opportunities for customers from areas without Ausnet assets, such as the Leneva-Baranduda growth area.

3.1. Assessment approach

The NER states that quantifiable economic market benefits include changes in involuntary load shedding. The quantified costs and benefits described in this section included this benefit in determining the best option. AusNet Services Distribution Network Planning Standards and Guidelines were used to estimate the involuntary load shedding that can be prevented by proactive action. The estimated involuntary load shedding was utilised by the cost-benefit analysis (CBA) along with a Value of Customer Reliability (VCR) to calculate a market benefit. The VCR is an estimation of the value that customers place on a reliable electricity supply. This value is equivalent to the cost to consumers of having their electricity supply interrupted for a short time. No other identified risks were included in the CBA.

The key assumptions used in the CBA are:

- A study period of 30 years, with FY2024 being the first year of analysis and base year for dollar inputs.
- The commercial discount rate was set to 5.56% based on the average of 4.11% and AEMO's IASR central discount rate of 7%.
- A VCR of $41,522 per MWh was used in the analyses, comprising 59% residential, 13% commercial and 24% industrial and 4% agricultural loads. This estimation is based on a WOTS25 load profile.
- Asset life is assumed to be 45 years, and battery life 15 years.
- The benefits of options are based on the avoided expected unserved energy.
- NPV is based on the parameters specified for the base case.

3.2. Option 0: No proactive intervention

This chapter analyses the risks and benefits of taking no proactive interventions or maintaining the status quo. The option connects the proposed loads to the existing 22kV distribution feeders and analyses the impact on network capacity and unserved energy. The consequence of not proceeding with any investment in the area supplied by the 22kV WOTS25 feeder will result in significant unserved energy due to the existing feeders being constrained and incapable of supplying the forecast demand, as shown in Figure 5 and Table 6.

In terms of risk/cost assessment, the no proactive intervention option provides a base case where the risks are valued by applying a VCR to the forecast expected unserved energy.

Without proactive intervention, a risk of unserved energy will remain, as shown in Figure 5 and Table 6, resulting in AusNet Services being unable to provide supply security in the growth area of Wodonga. In addition to the risk of unserved energy to existing customers, the option of no proactive intervention will also prevent connecting new customers to AusNet Services' network. This would directly violate AusNet Services' obligation to connect customers as per the NER. There are also substantial reputational risks and stakeholder dissatisfaction if AusNet Services cannot meet supply requirements for this high-growth area.

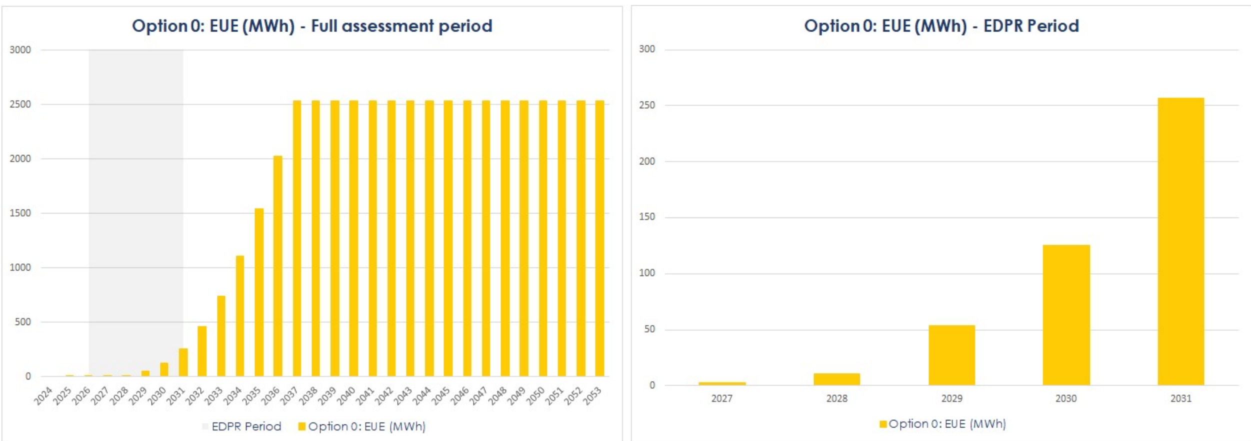

Figure 5: EUE as a result of no proactive intervention – Graphical view

Table 6: EUE as a result of no proactive intervention – Tabular view

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038		2053
EUE (MWh)	-	0.0	0.3	2.6	10.5	53.3	124.9	256.4	460.9	741.7	1106	1543	2022	2535	2535		2535
EUE Value ($M)	-	0.0	0.0	0.1	0.4	2.2	5.2	10.6	19.1	30.8	45.9	64.1	83.9	105.3	105.3		105.3

3.3. Option 1: WOTS25 22kV feeder upgrade to a higher rating

3.3.1. Scope

Option 1 proposes upgrading the existing WOTS25 22kV feeder exit cable to a higher rating, providing a 365A design rating. As a result of the connections from the greenfield development areas, the capacity of the upgraded feeder under this option is expected to be exhausted within two years of commissioning.

Figure 6 and Figure 7 present how this option will reduce the load at risk and expected unserved energy at the WOTS25 feeder compared to the base case (no proactive intervention). This option results in an additional capacity by 2029 and can meet the forecasted demand until 2037, resulting in no to minimal expected unserved energy for this period. Based on the current demand forecast, a 5MW/10MWh battery will provide seven years of the new feeder build deferral.

The EUE is expected to grow again after 2036, which will require further investment to meet long-term requirements.

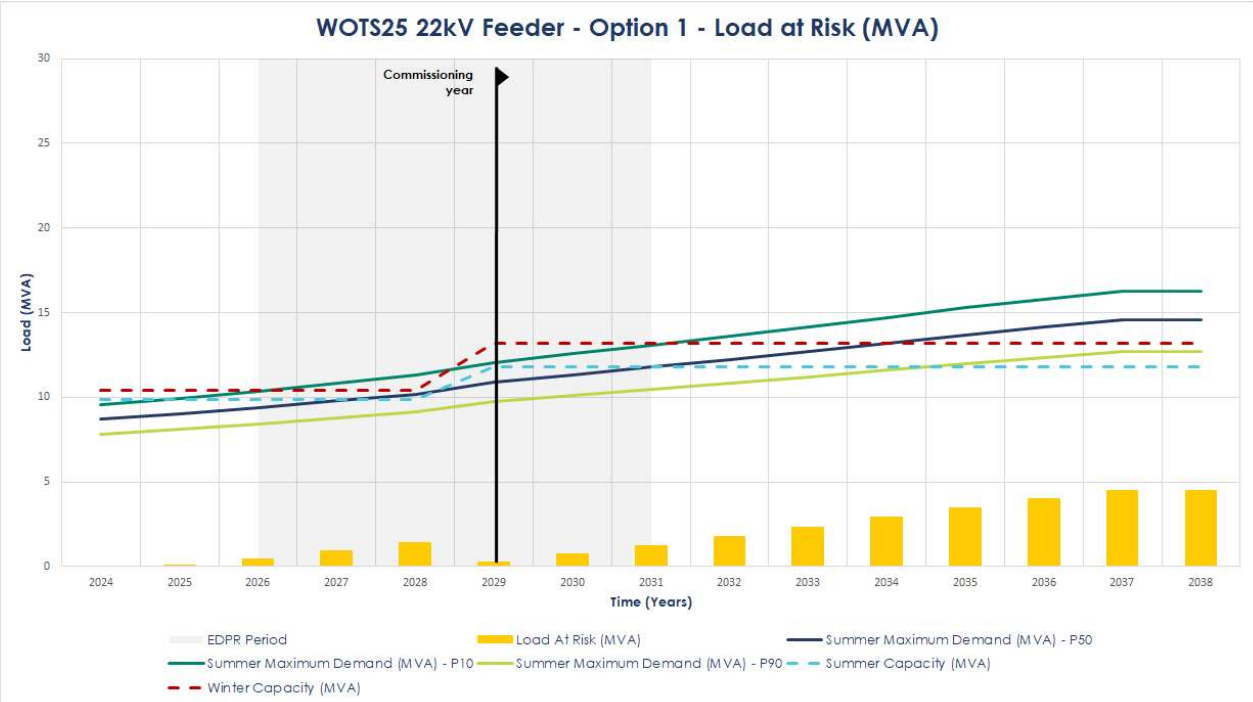

Figure 6: Option 1 – Load @ Risk (MVA) - Graphical view

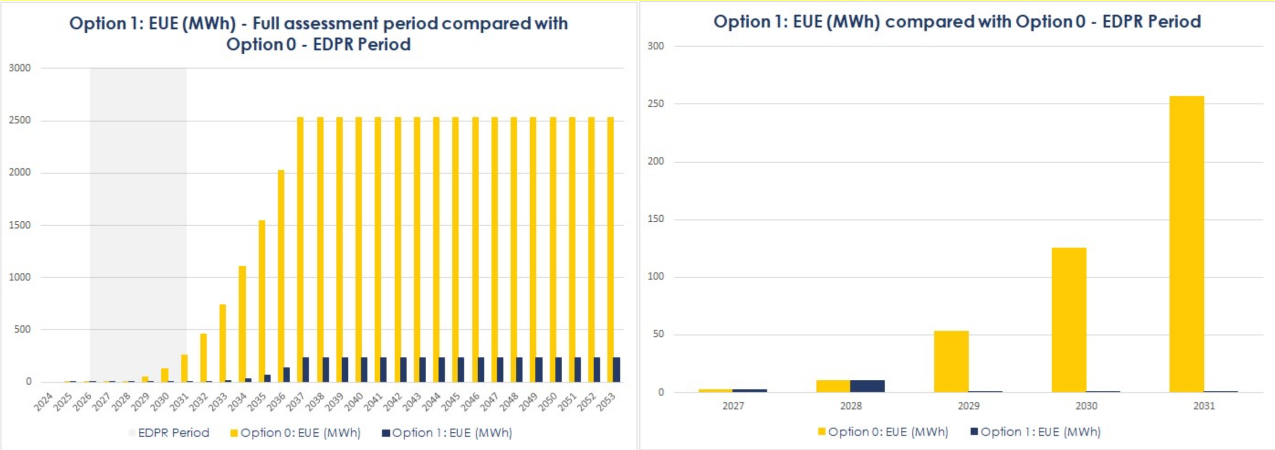

Figure 7: Option 1 - EUE results compared with no proactive intervention – Graphical view

Table 7: EUE as a result of Option 1 intervention – Tabular view

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038		2053
WOTS25 EUE (MWh)	0.0	0.0	0.3	2.6	10.5	0.0	0.2	1.2	4.2	12.	30.2	68.8	134.7	233.7	233.7		233.7
WOTS25 EUE Value ($M)	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.1	0.5	1.3	2.9	5.6	9.7	9.7		9.7

3.3.2. Cost

The total estimated value of capital cost of Option1 is **$9.4M**. The cost is spread over two years to align with construction timelines and is based on estimates provided by the estimating team. Commissioning of new equipment from Option 1 is planned for FY29. A summary of the capital cost can be found in Table 8.

Table 8: Capital cost summary

Year	FY27	FY28	FY29	FY30	FY31
Option 1	-	$4,688,891	$4,688,891	-	-

3.3.3. Benefits

The quantifiable economic market benefits include changes in involuntary load shedding. Unserved energy was used to estimate the involuntary load shedding that can be prevented because of the proactive action provided by this option.

The total present value of benefits for Option 1 is **$684.9M**.

3.3.4. Summary of CBA assessment

A summary of the cost-benefit assessment is provided in Table 9:

Table 9: CBA outputs

Option	PV Cost ($M)	PV Benefits ($M)	NPV ($M)
1	**7.4**	**684.9**	**677.6**

3.4. Option 2: Construct a new 22kV feeder by splitting the existing WOTS25 into two feeders

3.4.1. Scope

WOTS25 feeder supplies to the west, east and north to the WOTS station covering a large rural and suburban areas as shown in Figure 3. The option proposes to split the WOTS 25 Feeder into two feeders WOTS21 (New) and WOTS25 (Existing) with the open point north to the WOTS TS on WOTS25 feeder on pole number 5209509 as shown in Figure 8.

The scope of his option is to design, procure, install, and commission all necessary primary, civil/structural, line and secondary equipment for 22kV feeder augmentation works at WOTS A high-level scope includes:

- Install a 3-core 300mm2 Al XLPE feeder exit cable from the existing spare WOTS22 feeder along Baranduda Drive and then terminate on Pole 5205660—approximately 2km.
- Replace existing pole with new 17m/12kN pole and cable head,
- Install gas switch as this termination.
- Install a gas switch as an open point on pole 5209509.

It is estimated that the new feeder WOTS21 will carry approximately 60% of the existing WOTS25 load after reconfiguration. Further opportunities exist to transfer loads from WOTS11 and transfer loads to WOTS12 from the new feeder WOTS21. Depending on the long-term load growth of WOT13, further feeder re-configurations are possible to mitigate overloads on WOTS13.

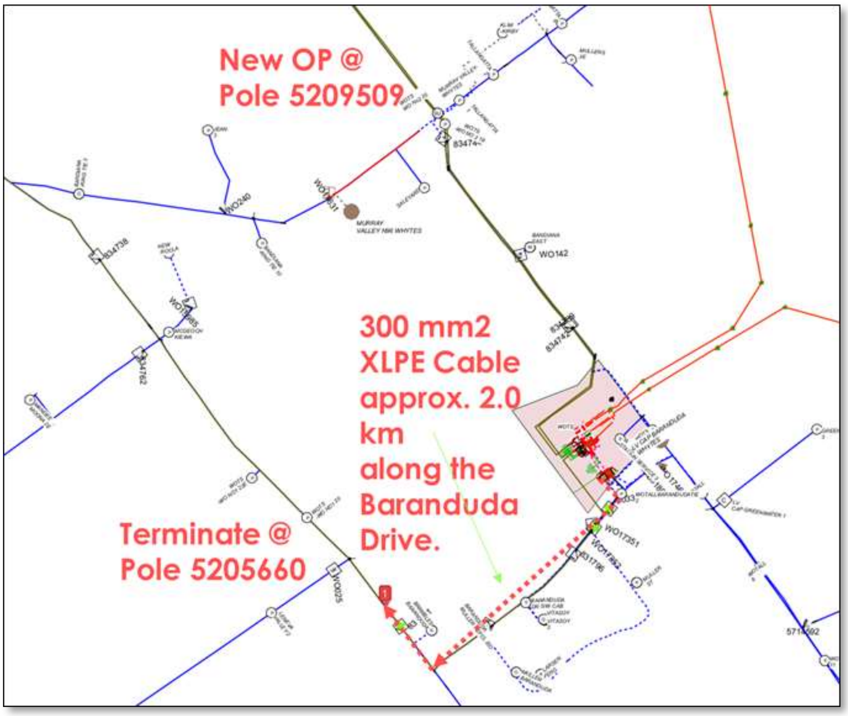

Figure 8: New WOTS21 22kV feeder route (dashed black line) and its proposed supply area (black)

This option provides the required network capacity in full and manages the unserved energy risk using a traditional augmentation solution. The option proposes the construction of a new feeder from WOTS ZS in 2028 as per optimal timing analysis. The load supplied by WOTS25 will be reduced as well as the expected unserved energy (Figure 9). From 2028 onwards, there will be no expected unserved energy on WOTS25.

In summary, Table 7 and Figure 10 present a cumulative impact of the investments proposed under this option on expected unserved energy compared to the base case ("no proactive intervention").

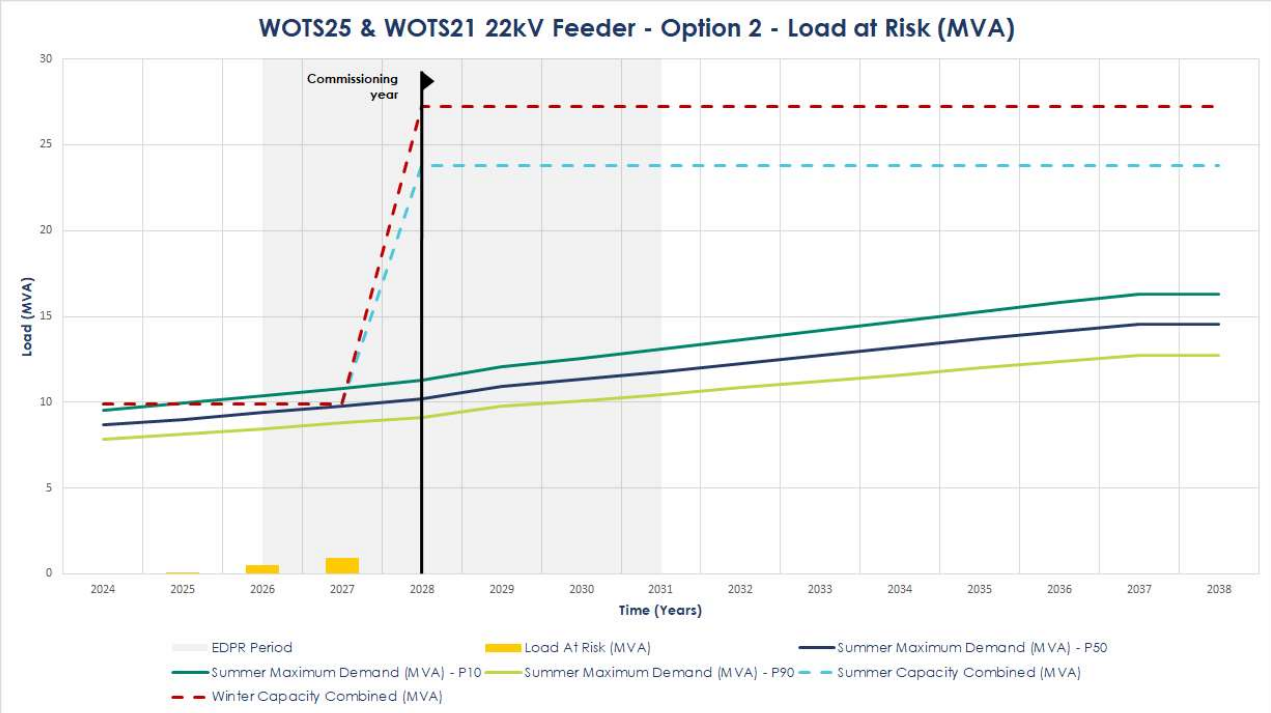

Figure 9: Option 2 - Load @ Risk (MVA) - Graphical view

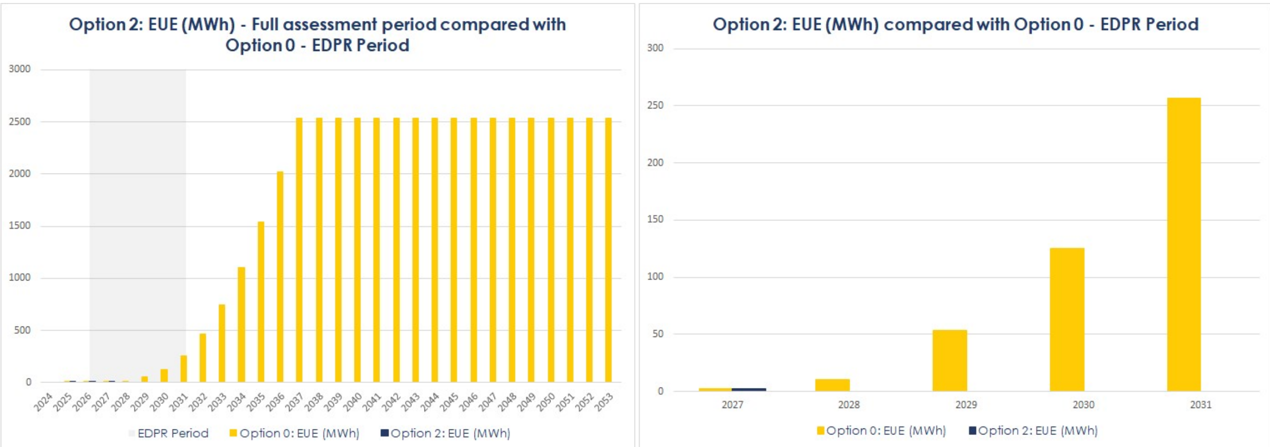

Figure 10: Option 2 - EUE results compared with no proactive intervention – Graphical view

Table 10: EUE as a result of Option 2 intervention – Tabular view

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038		2053
WOTS25 EUE (MWh)	-	0.0	0.3	2.6	-	-	-	-	-	-	-	-	-	-	-		-
WOTSL21 EUE (MWh)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
WOTS25 EUE Value ($M)	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-		-
WOTS21 EUE Value ($M)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-

3.4.2. Cost

The total estimated capital cost of Option 2 is **$6.3 M**. The cost is spread over 18 months to align with construction timelines and is based on estimates provided by the estimating team. Commissioning of new equipment from Option 2 is planned for FY28. A summary of the capital cost can be found in Table 8.

Table 11: Capital cost summary

Year	FY27	FY28	FY29	FY30	FY31
Option 2	$4,376,298	$1,875,556	-	-	-

3.4.3. Benefits

The quantifiable economic market benefits include changes in involuntary load shedding. Unserved energy was used to estimate the involuntary load shedding that can be prevented because of the proactive action provided by this option.

The total present value of benefits for Option 2 is **$745.9M**.

3.4.4. Summary of CBA assessment

A summary of the cost-benefit assessment is provided in Table 9:

Table 12: CBA outputs

Option	PV Cost ($M)	PV Benefits ($M)	NPV ($M)
2	**5.2**	**745.9**	**740.6**

3.5. Option 3: Construct 5MW/10MWh Battery Energy Storage System (BESS)

3.5.1. Scope

Option 3 proposes establishing a 5MW/10MWh Battery Energy Storage System (BESS) by 2030 to defer any investment in the network solution. This option is for AusNet Services to fully own, build and operate a grid-connected battery at the suitable site. Although more expensive than a traditional network solution per MVA basis, BESS has advantages over a conventional network solution, such as being modular and re-deployable.

Figure 11 and Figure 12 present how this option will reduce the load at risk and expected unserved energy at the WOTS25 feeder compared to the base case (no proactive intervention). This option results in an additional capacity of 5 MW by 2029 and can meet the forecasted demand until 2035, resulting in no to minimal expected unserved energy for this period. Based on the current demand forecast, a 5MW/10MWh battery will provide seven years of the new feeder build deferral.

After 2039, the EUE is expected to grow again, which will require further investment in the area to meet long-term requirements.

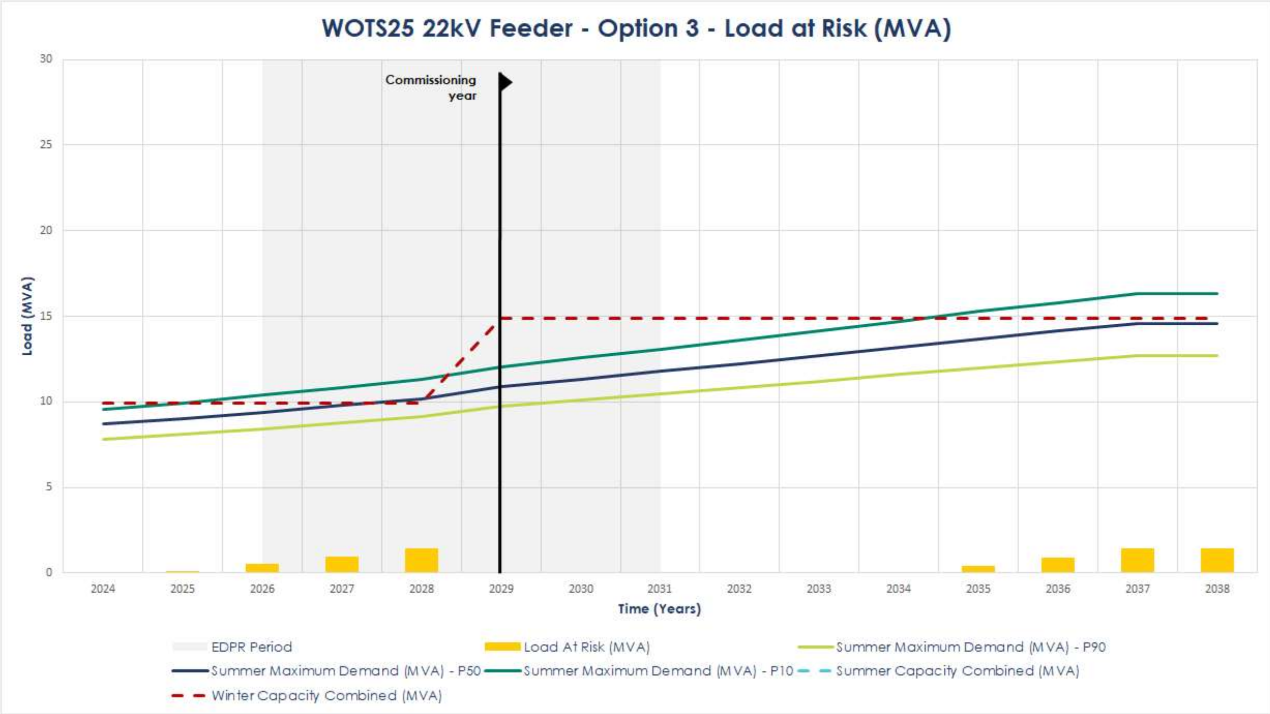

Figure 11: Option 3 - Load @ Risk (MVA) - Graphical view

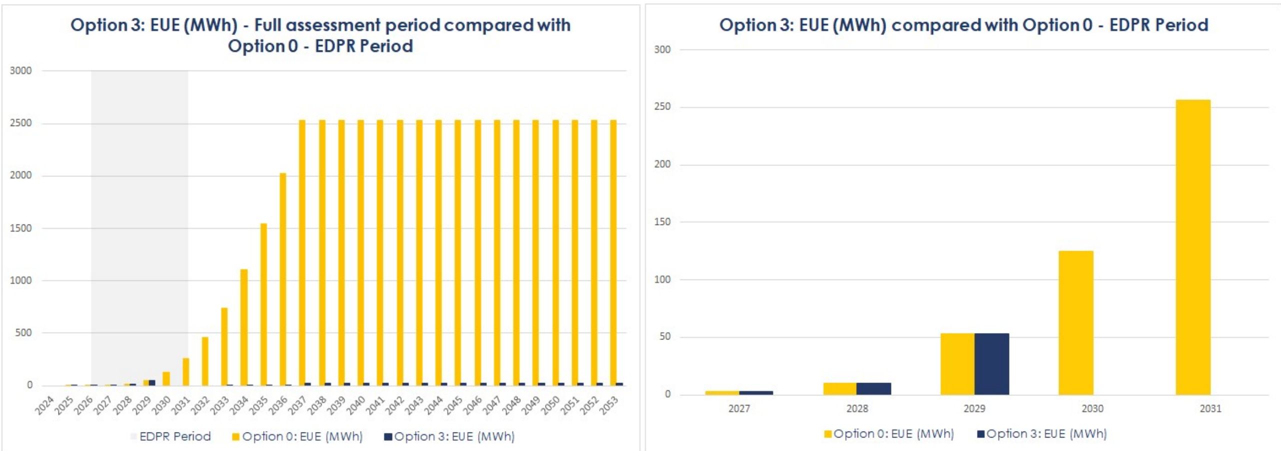

Figure 12: Option 3 -EUE results compared with no proactive intervention – Graphical view

Whilst the battery will be able to provide network support to mitigate load at risk in the short-term, existing regulations and ring-fencing guidelines prevent AusNet Services from accessing the same revenue stack as external unregulated businesses.

Although being modular and re-deployable, BESS can represent a more economic option in an environment of demand uncertainty or where demand is expected to increase for a short period and then decline. Deferring the network augmentation project provides an opportunity to reassess load growth forecasts over the coming financial years before committing to long-term network expenditures such as a new feeder. The Department of Transport and Planning's projections discussed in Section 2.1, and the number of enquiries received by AusNet Services indicate that the population and number of industrial customers in the Wodonga area will rapidly increase in the upcoming years. A significant portion of land has already been reserved for greenfield developments.

Figure 13: EUE as a result of Option 3 intervention – Tabular view

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038		2053
Option 3 EUE (MWh)	0	0	0.3	2.6	10.5	-	-	-	-	0.1	0.7	2.9	8.6	19.5	19.5		19.5
Option 3 EUE Value ($M)	0	0	0	0.1	0.4	-	-	-	-	0	0.03	0.1	0.4	0.8	0.8		0.8

3.5.2. Cost

The total estimated capital cost of Option 3 is **$22.0M**. The cost is spread over three years to align with construction timelines and is based on estimates provided by the estimating team. Commissioning of new equipment from Option 3 is planned for FY29. A summary of the capital cost can be found in Table 13.

Table 13: Capital cost summary

Year	FY27	FY28	FY29	FY30	FY31
Option 1	$7,333,333	$7,333,333	$7,333,333	-	-

3.5.3. Benefits

The quantifiable economic market benefits include changes in involuntary load shedding. Unserved energy was used to estimate the involuntary load shedding that can be prevented because of the proactive action provided by this option.

The total present value of benefits for Option 3 is **$742.6M**.

3.5.4. Summary of CBA assessment

A summary of the cost-benefit assessment is provided in Table 14:

Table 14: CBA outputs

Option	PV Cost ($M)	PV Benefits ($M)	NPV ($M)
3	**17.7**	**742.6**	**724.8**

3.6. Option 4: Contract network support services to defer network investment

3.6.1. Scope

The NER require DNSPs to investigate non-network and new-technology options by utilising a consultation process as part of planning for major network augmentations. A credible non-network and new-technology option are those that meet the following criteria:

- able to form a credible stand-alone option (i.e., without being combined with a network solution), or
- able to defer the network investment.

3.6.1.1. Requirements that a non-network option would need to satisfy

This section outlines the technical characteristics of the identified need that a non-network and new technology solution via network support services would be required to deliver, along with an indication of the maximum fee that AusNet Services could pay to a network support proponent to mitigate the identified risks. The specific network support requirements are presented in the Table, which outlines the following:

- Average expected network support response (MWh), which is the average volume of support that is expected to be required each year.
- Potential value of network support ($M), which is based on the probability-weighted annualised service level risk cost of each limitation and represents the maximum fee that AusNet Services could pay to a network support proponent, completely mitigating the associated service level risk.

Table 15: Network support requirements for WOTS25 thermal risk mitigation

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2053
Average expected network support (MWh)	-	0.0	0.3	2.6	10.5	53.3	124.9	256.4	460.9	741.7	1,106	1,543	2,022	2,535	2,535	2,535
Potential value of network support ($M)	0.0	0.0	0.0	0.0	0.2	0.9	2.1	4.3	7.7	12.3	18.4	25.6	33.6	42.1	42.1	42.1

3.6.1.2. Qualitative assessment of specific non-network and new technology options

Table 16 summarises non-network and new technology options for meeting the requirements of Section 3.6.1.1. The analysis outlined in the following sections found at least two credible non-network options (BESS, Commercial Direct Load Control, and Behavioural Demand Response). These options need to be further evaluated using the screening test in the RIT-D process. AusNet Services will issue a non-network options report before progressing with the Draft Project Assessment Report (DPAR) as part of the RIT-D process.

Table 16 - Non-network and new-technology solutions

Non-network and new-technology option	Potential outcomes	Qualitative assessment	Comments
Grid-Scale Storage (5 MW /10 MWh)	Potentially defers the network investment	✓	A feasible option and should be investigated further as it could defer the network investment into the next regulatory cycle. However, this option requires a large capacity augmentation to enable connection to the NEM and commercial operation. This augmentation would have a similar cost to the network options. The operating life of the BESS (15 years) is much shorter than the network asset life (45 years).
Virtual Power Plant (VPP)	Defers the network investment by one year	✗	Not feasible as the required capacity is large for this solution and requires a significant storage uptake by 2028.
Residential BESS aggregation	Defer the network investment by two years	✗	Not feasible as the required capacity is large for this solution and requires a significant uptake of residential BESS by 2028.
Commercial Direct Load Control	Defer the network investment by two years	✓	A feasible option and should be investigated further. There is 13% of commercial and 24% of industrial customers in the area. However, the deferred network investment may still fall within the FY27-31 regulatory cycle.
Behavioural Demand Response	Defer the network investment by one year	✓	Behavioural Demand Response could be a feasible option to defer network investment if there is sufficient participation from existing customers and should be investigated further. However, the deferred network investment may still fall within the FY27-31 regulatory cycle.

3.6.2. Benefits

The quantifiable economic market benefits include changes in involuntary load shedding. Unserved energy was used to estimate the involuntary load shedding that can be prevented because of the proactive action provided by this option.

The total present value of benefits for Option 4 is **$447.6M**.

3.6.3. Summary of CBA assessment

A summary of the cost-benefit assessment is provided in the following Table 17:

Table 17: CBA outputs

Option	PV Cost ($M)	PV Benefits ($M)	NPV ($M)
4	**298.4**	**447.6**	**149.2**

4. Recommended Option

Figure 14 below sets out the credible options considered together with the option Base Case - "no proactive intervention" to assist with the overall comparison. Option 2 represents the highest value (economic benefit), being NPV positive of **$740.6 Million** compared to other options, even with the sensitivity & scenarios considered in Section. This option allows AusNet Services to provide the most efficient, reliable, and safe supply services in the long-term interest of its customers. Hence, Option 2 is the preferred long-term network configuration for the project's overall scope.

Figure 14: CBA of credible options

Option	Description	Solution Type	PV Benefits[2] ($M)	PV Cost[3] ($M)	NPV[4,5] ($M)	Rank	Assessment
0	No proactive intervention	Base case	-	-	-746.0	5	Non-preferred as will lead to unacceptable risk and higher customer costs if the opportunity is not captured.
1	WOTS25 22kV feeder upgrade to a higher rating	Network solution	684.9	7.4	677.6	3	Non-preferred as it will not deliver the most optimal long-term configuration of the 22kV network.
2	**Construct a new 22kV feeder by splitting the existing WOTS25 into two feeders (new WOTS21 feeder)**	**Network solution**	**745.9**	**5.2**	**740.6**	**1**	**Preferred long-term option as it will deliver the highest net economic benefits and most optimal configuration of the 22kV network.**
3	Construct 5MW/10MWh Battery Energy Storage System (BESS)	Non-network and new-technology solution	742.6	17.7	724.8	2	Not preferred as it will lead to high upfront investment costs, a much shorter operating life compared to the network solution and an inability to connect customers from the areas that do not have any Ausnet assets.
4	Contract external network support services to defer network investment	Non-network and new-technology solution	447.6	298.4	149.2	4	Not preferred as it results in high operating costs and an inability to connect customers from the areas that do not have any Ausnet assets.

[2,3,4,5] **Notes:**
2: PV of total costs, both capital expenditure (Capex) and operational expenditure (Opex).
3: PV of total quantified benefits, both risks mitigated, and any forecast decrease in Capex or Opex arising from undertaking the investment.
4: NPV represents the difference between PV Benefits and PV Investment Costs.
5: The breakdown of PV is based on the parameters specified for the base case (Section 5).

5. Sensitivity analysis

5.1.1. Sensitivity analysis

Sensitivity testing was undertaken to ensure that the NPV calculations of the options were robust to changes in key input parameters. This provides confidence that identifying the preferred option is the most prudent option for the project under changes to key variables.

The key variables included in the sensitivity analysis and shown below were:

- Discount rate used for the discounted cash flow in the evaluation
- Capital cost estimates
- VCR
- Demand forecast

Sensitivity testing was conducted on each of the options assessed under the CBA. Three scenarios were tested around key cost and benefit values ranging from low, baseline, and high benefits cases. The cases differ from the baseline case by +/- percentage. The variables were selected to vary under the scenario due to some uncertainty around the forecast assumption and the importance of the parameter in the calculation.

A summary of sensitivity investigated is provided in Table 18. The sensitivity assessment in Table 19 shows that when each scenario is run, the ranking remains the same, indicating Option 2 is still preferred.

Table 18: Variables

Variable	Base case	Low case (low benefits)	High case (high benefits)
Capital cost	Estimated network capital costs	25% increase in the estimated network capital costs	25% decrease in the estimated network capital costs
VCR	$41,522/MWh	$44,613[4]/MWh	$58,125[4]/MWh
Discount rate	5.56% (WACC)	7.00%	4.11%
Demand Forecast	Demand forecast (Section 2.1)	10% decrease in the demand forecast	10% increase in the demand forecast

Table 19: Weighted NPV for credible options considered

Option	Base Case – NPV ($M)	Low Case – NPV ($M)	High Case - NPV ($M)	Option rank
1	677.6	264.4	2,016.4	3
2	**740.6**	**274.0**	**2,404.2**	**1**
3	724.8	260.5	2,326.3	2
4	149.2	-167.8	-1,445.6	4

5.1.2. Proposed Investment Timing

Optimal timing analysis is based on the 'crossover' method described by the Australian Energy Regulator (AER). The method identifies the optimal year as the first year when net operating benefits are more significant than the annualised cost of an option (i.e., the 'crossover'). The optimal timing where the value of unserved energy from the 'No Proactive Intervention' scenario exceeds investment costs for Option 2 is 2028, as per Table 20 and Figure 15. This timing aligns with the proposed commissioning date of Option 2.

[4] Based on the AusNet's Customer Willingness to Pay research.

Table 20: Annualised cost and optimal commissioning year for Option 2

Option	Annualised Cost	Optimal Year
2	$380,979	**2028**

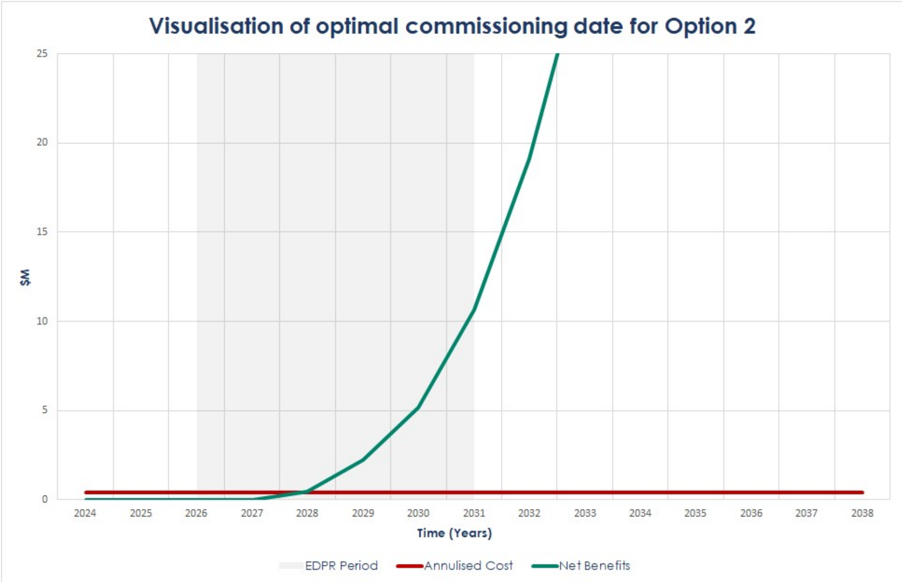

Figure 15: Visualisation of optimal commissioning year for Option 2

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