Appendix 1.15

Demand Driven Augmentation Capital Expenditure Business Case

Regulatory proposal for the ACT electricity distribution network 2024–29

Contents

1 Scope and Purpose

This document provides the strategic context and justification for Evoenergy's proposed demand driven augmentation capital expenditure (augex) for the 2024-29 regulatory period.

It provides an outline of core projects and also sets out the overarching principles, processes, modelling approaches and assumptions that Evoenergy has applied across the project portfolio, to ensure a consistent and rigorous approach to business case development with respect to need, options, timing and costs.

Underpinning documentation, including detailed forecasting methodologies, cost benefit analysis and planning studies, are available on request.

2 Background and Context

2.1 AER feedback from 2019-24 proposal

In its determination of Evoenergy's revised 2019-24 regulatory proposal, the AER identified the following areas for improvement:

1. *"It was not apparent if Evoenergy's adjustment factors for block load applications had been accurately taken into account. Adjustment factors for new loads take into account when the connection is expected to proceed. This results in projects that are expected to be undertaken towards the end of the 2019–24 regulatory control period having a higher adjustment factor reflecting the greater uncertainty of the project.*

2. *It was not apparent that Evoenergy had taken into account load transfers in the modelling."*

Evoenergy has updated its probabilistic planning model and the approach to determining adjustment factors as part of improvements to overall methodology in developing the 2024-29 regulatory proposal. Further details are provided in section 5.

2.2 Summary of Outcomes from the 2019-24 proposal

A summary of the historical augmentation expenditure, including expenditure forecast for the remainder of the 2019-2024 period is summarised in Appendix 1.1: 2019-24 period capital expenditure.

Evoenergy estimates that its augex for the current period will be $58 million ($2023/24); $53 million of demand driven augex and $5 million of reliability and quality capex. This is 6 million or 10 per cent lower than our regulatory allowance for these two categories ($64 million).

This lower expenditure is primarily due to lower load growth in some areas than was forecast resulting in the deferred of several planned augmentation projects. Accounting for delays due to the pandemic and related issues, Evoenergy has also adjusted its probabilistic planning methodology to more accurately capture the uncertainty around such projects and the probability of them proceeding in the proposed timeframe. Further information on this methodology can be found in section 5.

3 Proposed 2024-29 Demand Driven Augex Portfolio

The proposed demand driven augex project program for the 2024-29 regulatory period is comprised primarily of zone substation projects and standalone feeder projects. Table 1 below lists each project and the associated augex proposed during the 2024-29 regulatory period, together with the year the project is required in order to meet the identified need. A summary of the key details from the business cases for each project is provided in Appendix A.

Table 1: Portfolio of proposed demand driven augex projects for 2024-29

Project Number	Description	Total Cost for EN24 ($m; FY23-24^)	Date needed
17519206	Molonglo Zone Substation Stages 2 & 3	11.16	2028/29
20001760	Strathnairn Zone Substation	19.04	2026/27
20009814	Curtin Zone Substation Stage 1	19.31	2030/31
20001010	Mitchell Zone Substation	2.20	2031/32
20003254	Gold Creek Zone Substation Third Tx	7.94	2025/26
20009994	Woden to Curtin 132kV UG Cable	8.52	2030/31
20010492	Zone Substation Reactive Plant	2.06	2028/29
20001374	Supply from Molonglo ZS	3.33	2028/29
20001961	Supply to Strathnairn from Latham ZS	2.12	2024/25
20004446	Supply to Belconnen Town Centre	0.41	2024/25
20007697	Supply to Donaldson St	3.41	2024/25
20008629	Gungahlin Feeder Ties	0.63	2024/25
20009664	Supply to Kingston	0.99	2025/26
20009665	Supply from Strathnairn ZS	1.71	2027/28
20009666	Supply to CBD S63	3.69	2024/25
20009667	Supply to Fyshwick Sec 38	0.68	2025/26
20009668	Supply to Lyneham- Canberra Racing Club	5.28	2027/28
20009669	Supply to Diplomatic Development – Curtin	5.30	2027/28
20009670	Supply to Woden Town Centre	4.14	2026/27
20009672	Supply to Fairbairn South	1.57	2028/29
20009673	Supply to Hume West	2.33	2026/27
20009677	Supply to Greenway / Tuggeranong	2.81	2026/27
20009678	Supply to Canberra CBD S3 & S37	4.98	2028/29
20009679	Supply to Gungahlin	5.22	2027/28
20009748	Supply to Braddon	3.87	2028/29
20009749	Supply to Watson	2.97	2029/30
20009750	Supply to Ainslie	4.77	2027/28
20009751	Supply to Campbell	5.04	2028/29
20009752	Supply to Franklin	4.98	2028/29
20009753	Supply to Garran and Red Hill	2.54	2029/30
20009754	Supply to Phillip	4.50	2028/29
20009755	Supply to Canberra CBD feeder 1	3.16	2027/28
20010802	Supply to Canberra CBD feeder 2	2.61	2028/29

20010803	Supply to Canberra CBD feeder 3	0.28	2030/31
20009869	Distribution Substation Upgrade Program	5.13	Ongoing
20009870	LV Circuits Upgrade Program	2.87	Ongoing
Total proposed demand driven capex (2024-29)		**161.55**	

^ Direct costs excluding corporate overheads

*** Refer to probabilistic determination framework in Section 5.1**

Evoenergy's proposed demand driven augex program for the 2024–29 regulatory period is $161.55 million. This is a substantial increase from our current period regulatory allowance. For the 2024-29 period, Evoenergy's proposed augex program for the 2024–29 contains a significant capex aimed at positioning our network for the transformational challenge of Net Zero while also addressing existing and emerging capacity constraints from the strong growth of the ACT region.

4 Strategic and Statutory Context

4.1 Statutory Context

4.1.1 National Electricity Law and National Electricity Rules

Evoenergy is subject to the National Electricity Law (NEL) and the National Electricity Rules (NER) which regulate the National Electricity Market (NEM). Evoenergy operates in the NEM as both a Transmission Network Service Provider (TNSP) and a Distribution Network Service Provider (DNSP).

The National Electricity Objective (NEO), as stated in the NEL is to:

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

a) price, quality, safety, reliability and security of supply of electricity; and
b) the reliability, safety and security of the national electricity system."

This objective requires Registered NEM participants to balance the costs and risks associated with electricity supply.

The planning and development process for distribution and transmission networks is carried out in accordance with the National Electricity Rules (NER) Chapter 5, Part B Network Planning and Expansion.

The primary objective of planning is to ensure that customers are able to receive a sufficient and reliable supply of electricity now and into the future.

4.1.2 Capital Expenditure Objectives and Criteria

The NER provides further guidance in terms of allowable capital expenditure via the capital expenditure objectives and criteria for standard control services. These capital expenditure objectives, specified in clause 6.5.6(a) and 6.5.7(a) of the NER describe the outcomes or outputs to be achieved by the expenditure. The objectives include:

1) *Meet or manage the expected demand for standard control services*
2) *Comply with all applicable regulatory obligations or requirements associated with the provision of standard control services*
3) *To the extent that there is no applicable regulatory obligation or requirement in relation to the quality, reliability or security of supply of standard control services; or the reliability or security of the distribution system through the supply of standard control services, to the relevant extent:*
    a) *Maintain the quality, reliability and security of supply of standard control services*
    b) *Maintain the reliability and security of the distribution system through the supply of standard control services*
4) *Maintain the safety of the distribution system through the supply of standard control services.*

The expenditure criteria, set out in Section 6.5.6(c) and Section 6.5.7(c) of the NER, further outline requirements for the way in which expenditure must be set to achieve the objectives above. These include:

1) *The efficient costs of achieving the expenditure objectives*
2) *The costs that a prudent operator would require to achieve the expenditure objectives; and*
3) *A realistic expectation of the demand forecast and cost inputs required to achieve the expenditure objectives.*

The above criteria therefore imply that the capital expenditure, determined in line with the expenditure objectives, must be met via prudent and efficient expenditure, is to be achieved at least cost.

4.1.3 Regulatory Investment Test

Section 5.16 of the NER describes the Regulatory Investment Test for Transmission (RIT-T) and Section 5.17 describes the Regulatory Investment Test for Distribution (RIT-D). These tests must be carried out for any proposed investment where the cost of the most expensive credible option exceeds $6 million (in the case of a RIT-D) or $7 million (in the case of a RIT-T).

The regulatory investment tests provide the opportunity for external parties to submit alternative proposals to the Network Service Provider, who is obliged to consider any credible proposal objectively.

4.1.4 Utilities Act 2000 (ACT)

Evoenergy has an obligation to comply with the *Utilities Act 2000* (ACT) which imposes specific technical, safety and reliability obligations via the Management of Electricity Network Assets Code and the Electricity Distribution Supply Standards Code.

The Electricity Distribution Supply Standards Code (August 2013) sets out performance standards for Evoenergy's distribution network. Evoenergy is required to take all reasonable steps to ensure that its Electricity Network will have sufficient capacity to make an agreed level of supply available.

This local jurisdictional code specifies reliability standards that Evoenergy must endeavour to meet when planning, operating and maintaining the distribution network. It also specifies power quality parameters that must be met including limits on voltage flicker, voltage dips, switching transients, earth potential rise voltage unbalance, harmonics and direct current content.

The Management of Electricity Network Assets Code requires electricity distributors to protect integrity and reliability of the electricity network and to ensure the safe management of the electricity network without injury to any person or damage to property and the environment.

4.1.5 Evoenergy's Distribution Network Augmentation Standards

Evoenergy's distribution network augmentation standards are set to ensure compliance with the relevant regulatory instruments described above. System planning studies are undertaken to assess the adequacy of the distribution network to meet current and forecast demands whilst meeting the quality of supply criteria stipulated in the NER. The key performance criteria that are addressed are:

- thermal overloading,
- voltage performance,
- supply security, and
- supply reliability.

Studies are conducted using Evoenergy's medium growth projections, 50% PoE demand forecast, plus known customer-initiated development in the area of interest.

As a **first step**, Evoenergy applies planning criteria to identify where existing or emerging constraints occur on the network based on known projects. In order to avoid a deterministic approach and uneconomic outcomes, further analysis is performed to confirm whether the investment proposal is justified economically.

Therefore, as a **second step**, Evoenergy applies probabilistic assessment of risk to determine whether network investment is justified. The value of avoided risk is estimated using probabilistic methodology. This methodology is explained in section 5.1.1.

Typically, unserved energy is the dominant risk component for augmentation projects. The probability of a credible contingency event occurring at a time when load exceeds firm capacity, is used to calculate unserved energy.

Unserved energy is associated with thermal overloading of existing feeders. Operating an 11 kV distribution feeder at or above its thermal rating is extremely risky from both an operational and public safety standpoint, as overheating can lead to conductor annealing and failure, or cause failure of jumpers, clamps, connectors, conductor joints, or other hardware. On overhead lines the conductors may sag below their statutory ground clearance (resulting from a combination of ambient and conductor temperature).

The value of unserved energy is used to determine whether a proposed investment is efficient from an economic perspective. However, since the requirement to provide safe and reliable supply is a regulatory compliance obligation, economic efficiency is not the primary driver for 11kV feeder projects.

In addition, non-network solutions and demand side management solutions are considered when evaluating project options. Modelling undertaken allows Evoenergy to consider whether a demand side solution is a viable option and should be explored further.

4.1.6 Cost compliance

Cost compliance is achieved by proactively pursuing the philosophy of compliance with the national electricity objective by fully exploring and evaluating all options technically and commercially so as to seek approval for a solution that provides sound grounds for an efficient investment while meeting the long term interests of the consumers.

The investment value has been determined using 2021-22 FY market prices. The methodology and estimated costs used for this project are developed through the application of industry knowledge and Good Engineering Operating Practices based on historical similar projects. This approach complies with paragraphs 6 & 7 of the National Electricity Law (NEL).

It is noted that the National Electricity Law, Rules, Objectives, Criteria, and the ACT Distribution Code, do not require an assessment of unserved energy to be included in the cost evaluation of major augmentation projects.

5 Methodology

This section sets out the overarching process and methodology for augex projects, covering key aspects of need, options, timing and costs. Figure 1 describes the key steps.

Figure 1: Process Overview

5.1 Establish Project Need

The need for the project shall be articulated in terms of the broader socio-economic drivers which are leading to the need for increased capacity citing relevant references which should include ACT Government planning documents and/or forecasts where possible.

Where the capacity increases are due to large spot loads and/or new residential or mixed use development, the project proponents/developers should be described including:

- the drivers for the development,
- the timing for development
- any uncertainties relating to the timing and/or size of the new load
- the extent to which any energy efficiency and/or embedded generation technologies will be incorporated in the development and reduce the otherwise expected demand.

5.1.1 Probabilistic Determination Framework

Evoenergy has established probability factors to represent the likelihood of a forecast load materialising in the current regulatory period. The probability factors are derived from measurable and objective project milestones that are representative of the level of commitment by a project developer and/or how certain it is that a load will connect during the regulatory period in question.

The probabilistic benchmarks are used as a proxy for the adjustment factors used in load forecasting. For example, if a load is associated with 50% probability, only 50% of the forecast load will be applied in forecasting. For loads considered >80%, the full load is applied in forecasting.

In instances where there are multiple loads or sources of loads in the regulatory period, the probabilities are averaged and rounded down to the nearest category.

Table 2: Probabilistic Determination criteria

Probability of Proceeding (during 2024-29)		Project Milestones					
		Initial Network Inquiry	Preliminary Network Advice	DA Approval	Application for network connection	Connection Agreement/ payment?	Commenced construction
Almost certain	~99%	✓	✓	✓	✓	✓	✓
Very high	>90%	✓	✓	✓	✓	✓	×
High	>75%	✓	✓	✓	×	×	×
Medium	>50%	✓	×	×	×	×	×
Low	>25%	×	×	×	×	×	×

Of course, it is not possible to obtain 100% certainty that a development will proceed or a load will connect during the regulatory period. Therefore we have set the highest probability category at ~99%.

5.2 Calculate 'Base Case' Energy at Risk

The Base Case involves connecting the new load(s) to the existing feeder network to minimise the amount of unserved energy through optimised load sharing to access as much remaining capacity as is practically feasible before it is exhausted. This includes consideration of load transfers between feeders. While no capex is required in the Base Case, opex is involved to reconfigure the feeders to supply the loads.

The residual amount of unserved energy is then calculated based on the value of the likely quantum of unserved energy over a 20 year period where no project occurs in this timeframe.

The calculation shall be dependent on the project need determined in the previous step. Energy at risk shall be defined as the energy that is unserved or at risk of being unserved, determined via a load duration curve as per Figure 2.

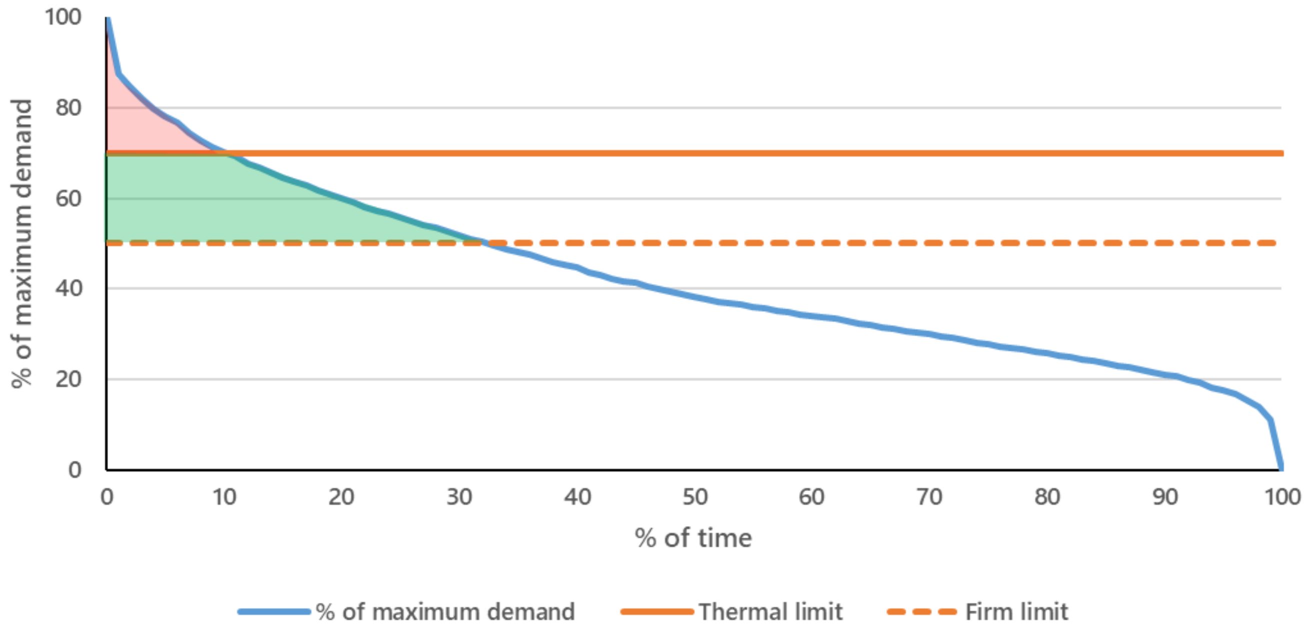

Figure 2: Load duration curve and load limit relationship

The load duration curve for the existing asset shall be based on the following inputs:

1) Historical hourly load data for the asset(s) being augmented (preferred) or a nearby asset with monitoring (e.g. nearby zone substation)
2) The most recent maximum demand for customers supplied by the relevant asset (estimated if monitoring is not available)
3) Forecast maximum demand forecast (most likely scenario) over a 20 year period.
4) The firm and thermal ratings of the relevant asset(s)

The load duration curve shall be determined based on the historical load data (see point 1 above) scaled by the actual demand at the asset (see point 2 above) and then projected for each year over the 20 year forecast period based on the forecast % change in maximum demand (see point 3 above).

For each year of the forecast period (20 years), the energy at risk is then calculated as:

$$EAR_{Base\ Case_i} = L_{>\ therm\ lim_i} - L_{transferred_i} + \sum_{j=1}^{n}\left(\left(L_{>\ firm\ lim_i} - L_{transferred_{i,j}}\right) \times P_j \times D_j\right)$$

Where:

$EAR_{Base\ Case_i}$ is the energy at risk where no investment occurs in year i

$L_{>\ therm\ lim_i}$ is the load represented by the area under the curve (total kWh) over the thermal limit of the asset (shaded pink in Figure 2) in year i

$L_{>\ firm\ -lim_i}$ is the load represented by the area under the curve (total kWh) that is over the firm limit but below the thermal limit of the asset (shaded green in Figure 2) in year i

$L_{\ transferred_{i,j}}$ is the load that is over the firm limit able to be supplied by load transfers in year i for contingency event j

$L_{transferred_i}$ is the load able to be supplied by load transfers in year i when there is no contingency event

P_j is the probability that contingency event j will occur in any given year

D_j is the duration of contingency event j (in years)

The load that is over the firm and/or thermal limit able to be supplied by load transfers in the event of each contingency ($L_{transferred}$) shall be based on estimated spare capacity of nearby assets during peak demand events. The probability of any relevant asset failing shall be based on observed rates of historical failure as per Table 3 below.

Table 3: Likelihood and duration of failure by asset type

Network Type	Likelihood of failure (% per year)	Duration of Contingency Event
Transmission line	0.1 % per km	8 hours
Zone substation (transformer)	0.217%	2.6 months
Distribution feeder	0.1% per km	8 hours

5.3 Identify Credible Options

For each business case, a minimum of one network option and a non-network option are considered. The following approach has been applied to developing the options

- Option 0 (Base Case)
- Option 1 – involves development of a grid-connected battery sized in direct proportion to the forecast capacity shortfall under the Base Case during the regulatory period
- Option 2 – involves development of a network-based solution at the nearest feasible location in context to the new load. For 11kV feeder projects, this involves the construction of a new 11kV feeder from the closest zone substation to the load or development. For zone substations, the nearest feasible location tends to be determined by the availability of suitable land and Evoenergy's capacity to procure the land.
- Option 3 – involves development of a network-based solution more distant from the new load than the nearest feasible option. For 11kV feeder projects this involves construction of a new 11kV feeder from the second nearest zone substation to the load or development

Not all projects will have a credible Option 3. Similarly, some projects may have more than 3 credible options, for example where there are a number of zone substations within reasonable proximity of the new loads.

5.4 Calculate NPV

For each credible network and non-network option the net present value shall then be determined as:

$$NPV_n = \sum_{i=1}^{i=c-1} \left(\left(EAR_{Base\ Case_i} \times VCR \right) \Big/ \left(1 + WACC^i\right) \right) - \sum_{i=c}^{i=20} \left(\left(Capex_{n_i} + Opex_{n_i} + EAR_{res_{n_i}} \times VCR \right) \Big/ \left(1 + WACC^i\right) \right)$$

Where

NPV_n is the net present value of option n

$EAR_{Base\ Case_i}$ is the energy at risk in year i (where $i < c$, the year of commissioning of the asset or DM project), and is equivalent to the Base Case energy at risk

EAR_{res_i} is the energy at risk with the option in place in year i (where $i < c$, the year of commissioning of the asset or DM project) and is determined by network modelling

VCR is the value of customer reliability, published by AEMO and based on the network customer load composition (% commercial, % residential)

WACC is the weighted average cost of capital set at 2.73%

$Capex_i$ is the capital expenditure on option n in year i which must be after the commissioning of the asset or DM project in year c

$Opex_i$ is the operational expenditure on option n in year i which must be after the commissioning of the asset or DM project in year c. This should include DM incentive payments

To calculate the NPV of the Base Case option the formula is simplified to:

$$NPV_{Base\ Case} = \sum_{i=1}^{i=20} \left(EAR_{Base\ Case_i} \times VCR\right) \Big/ \left(1 + WACC^i\right)$$

Where the variables have the same meaning as above.

5.5 Select Preferred Option

The preferred option is selected based on the highest NPV of the credible options, except under exceptional circumstances. An example of such circumstances would be where a non-network solution (such as a grid-battery) was identified as preferred to address a capacity shortfall emerging towards the end of a regulatory period, yet the load continued to grow steadily into the subsequent regulatory period. Under these circumstances an 11kV feeder is likely to represent the more prudent, medium-term solution despite a lower NPV.

Appendix A – Project Summaries

Zone Substation Projects

20001760 & 20009665 – Strathnairn Zone Substation & Feeders

The construction of one zone substation to primarily accommodate greenfield growth incorporating new feeders to connect the loads to the substation. Further detail and justification can be found in Appendix 1.19.

17519206 & 20001374 – Molonglo Zone Substation & Feeders

The completion of construction and installation of an additional transformer for a zone substation accommodating primarily greenfield growth as well as additional feeders connecting loads to the substation. Further detail and justification can be found in Appendix 1.18.

20009814 & 20009994– Curtin Zone Substation & Woden to Curtin 132kV UG Cable

The construction of a zone substation to accommodate load growth due to significant forecast electric vehicle load growth as well as urban infill and gas transition. This project includes subtransmission augmentation to connect the zone substation. Further detail and justification can be found in Appendix 1.17.

20001010 – Mitchell Zone Substation

The preliminary stages of a project to construct a zone substation to accommodate new developments, urban infill, gas transition and electric vehicle growth. This project will be largely delivered in the following regulatory period. Further detail and justification can be found in Appendix 1.17.

20003254 – Gold Creek Zone Substation Third 132/11 kV 55 MVA transformer

The final stages of delivery and commissioning for a third transformer at the Gold Creek Zone Substation. This project is currently progressing through a RIT-D. The non-network options report is available on the Evoenergy website[1].

20010492 – Zone Substation Reactive Plant

This project is to install reactive plant at zone substations identified as having poor quality of supply due to increased penetration of DER in the Evoenergy network. Further detail can be found in Appendix 1.17.

[1] https://www.evoenergy.com.au/-/media/evoenergy/documents/emerging-technology/evoenergy-nnor-gold-creek-capacity-rit-d.pdf?la=en&hash=C05CC076E8E328EA323AC436F87BFCFE459B842C

11kV Feeder Projects

The 11kV feeder projects are comprised of feeder projects driven primarily by standard projects and load growth (excluding the feeders from the Strathnairn and Molonglo Zone Substations described above) and a further 10 feeder projects driven largely by projected growth of electric vehicle uptake in the ACT due to the ACT Government's policies to meet net zero commitments by 2045.

An option evaluation summary is provided for each project. The cost of each option is in FY23/24 dollars, excluding corporate overheads, excluding contingency and excluding GST. NPV is calculated relative to the Base Case (more information on the methodology provided in Chapter 5).

Standard feeder projects

20007697 – Supply to Section 96, City East

The construction of two underground cable feeders from Civic Zone Substation to supply new demand associated with the high-density redevelopment of a car parking site situated on the corner of Donaldson Street and Cooyong Street, Canberra CBD. Load forecasting indicates 9.4MVA of new demand coming online between 2023 and 2026.

Although Civic Zone Substation is further away from the new load than City East Zone Substation, installing the feeder from Civic Zone Substation is a lower cost option due to the efficiencies obtained through sharing of civil works with project 20009666 (see ahead). Construction is scheduled to commence during the current regulatory period. Project completion and commissioning is targeted for winter 2025.

The evaluation summary is presented below:

Ref	Option	Cost (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as not technically feasible
1	Grid battery	$17.27	$432.40	Not selected due to lower NPV
2	New 11kV feeder from City East zone substation to Section 96, City East	$4.07	$442.18	Not selected due to lower NPV
3	New 11kV feeder from Civic zone substation to Section 96, City East	$3.41	$443.70	**Recommended** – Highest NPV technically feasible option

20009664 – Supply to Kingston

The construction of a new underground cable feeder from East Lake Zone Substation to supply new demand associated with the redevelopment of a number of sites in the Kingston foreshore area, including an existing 132kV switching station. The sites will be converted into a mix of residential and commercial uses, generating up to 15.9MVA of additional demand by 2029.

The project proposes to utilise an existing spare conduit to reduce costs. Construction is scheduled to commence in 2026/27 and be completed in 2027/28.

The evaluation summary is presented below:

Ref	Option	Cost (million)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as not technically feasible
1	Grid battery	$12.20	$158.55	Not selected due to high cost
2	New 11kV feeder from East Lake Zone Substation to Section 68 Kingston	$0.99	$167.33	**Recommended** - Highest NPV technically feasible option
3	New 11kV feeder from Telopea Park Zone Substation to Section 68 Kingston	$1.84	$166.66	Not selected due to high cost

20009666 – Supply to Canberra CBD West S63

The construction of a new underground cable feeder from Civic Zone Substation to Knowles Place, Canberra CBD to supply a cumulative incremental load increase of approximately 20.4MVA by 2027.

Installation from City East Zone Substation was also assessed but was not recommended, due to relatively lower substation capacity and higher cost compared to the Civic Zone Substation option.

Construction is scheduled to commence during the current regulatory period. Project completion and commissioning is targeted for 2024/25.

The evaluation summary is presented below:

Ref	Option	Cost (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as not technically feasible
1	Grid Battery	$17.74	$49.93	Not selected due to lower NPV
2	New 11kV feeder from Civic Zone Substation to Section 63, Canberra CBD	$3.69	$60.55	**Recommended** – Highest NPV technically feasible option
3	New 11kV feeder from City East Zone Substation to Section 63, Canberra CBD	$6.98	$57.96	Not selected due to lower NPV

20009667 – Supply to Fyshwick

The construction of a new underground cable feeder from East Lake Zone Substation to meet new load growth associated with the high-density redevelopment of the Section 38 site on Dairy Road, Fyshwick. Load growth from these developments is forecast to reach 13.3 MVA in 2026, rising to 16 MVA in 2028.

The preferred option takes advantage of a number of efficiencies, including having spare conduits to reduce the overall cost of the civil works, as well as sufficient capacity and spare breaker availability at East Lake Zone substation.

Construction is planned to commence in 2024/25. Completion and commissioning is planned for 2025/26.

The evaluation summary is presented below:

Ref	Option	Cost (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as does not meet minimum requirements
1	Grid battery only	$134.91	$1,202.71	Not selected due to lower NPV
2	New 11kV feeder from East Lake Zone Substation to Section 38	$0.68	$1,312.92	**Recommended** - Highest NPV technically feasible option

20009668 – Supply to Lyneham area

The construction of a new underground cable feeder from Civic Zone Substation to support load growth associated with planned high-density commercial and residential development along with the light rail project in Lyneham. Load growth of 11.5MVA is expected during the 2024-29 regulatory period with continuing growth through to 2036.

Civic Zone Substation is the closest substation to the development areas. Installation from the next closest substation, Belconnen Zone Substation was determined to be less economically efficient in the business case.

Construction is scheduled to commence in 2026/27. Completion and commissioning is planned for 2027/28.

The evaluation summary is presented below:

Ref	Option	Cost (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as not technically feasible
1	Grid battery	$32.60	$107.80	Not selected due to lower NPV
2	New 11kV feeder from Civic Zone Substation to Lyneham	$5.28	$128.42	**Recommended** – Highest NPV technically feasible option
3	New 11kV feeder from Belconnen Zone Substation to Lyneham	$8.89	$125.66	Not selected due to lower NPV

20009669 – Supply to Diplomatic Development Curtin

The construction of a new underground cable feeder from Woden Zone Substation to support load growth associated with the planned development on Block 4 & 5 in Curtin for 32 different embassies, combined with a range of nearby developments.

Installation from the next closest substation, Telopea Zone Substation was also explored in the business case and determined to be less economically efficient. Timing of project completion is scheduled for 2027/28.

The evaluation summary is presented below:

Ref	Option	Cost (millions)	NPV (millions)	Evaluation Summary
0	Utilise the existing network infrastructure	$0	$0	Not selected as not technically feasible
1	Grid battery only	$5.94	$187.94	Not selected due to lower NPV
2	New 11kV feeder from Woden Zone Substation	$5.30	$189.02	**Recommended** – Highest NPV technically feasible option
3	New 11kV feeder from Telopea Zone Substation	$8.13	$186.08	Not selected due to lower NPV

20009670 – Supply to Woden Town Centre

The extension of an existing feeder supplying Woden Bus Depot combined with construction of a new underground cable feeder from Wanniassa Zone Substation to support multiple planned residential and commercial developments along with Transport Canberra's new Woden bus depot.

While more distant from the new loads than Woden Zone Substation, installation from Wanniassa enables the utilisation of an existing feeder with a spare conduit, resulting in higher economic efficiency. Construction would commence in 2024/25. Project completion is targeted for 2026/27.

The evaluation summary is presented below:

Ref	Option	Cost (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as does not meet minimum requirements
1	Grid battery	$39.56	$1,357.67	Not selected due to lower NPV
2	New 11kV feeder from Woden Zone substation	Total – $5.10 Stage 1 – $3.06 Stage 2 – $2.04	$1,385.47	Not selected due to lower NPV
3	New 11kV feeder from Wanniassa Zone substation	Total - $4.14 Stage 1 - $2.48 Stage 2 – $1.66	$1,386.28	**Recommended** – highest NPV technically feasible option

20009672 – Supply to Fairbairn South

The construction of a new underground cable feeder from East Lake Zone Substation to support load growth associated with planned commercial development in Fairbairn South, for which the full load is expected to come online by 2029.

There are no other Zone Substations within reasonable proximity to the proposed development to provide feasible alternatives. Construction is scheduled to commence in 2027/28. Completion and commissioning is planned for 2028/29.

The evaluation summary is presented below:

Ref	Option	Cost (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as not technically feasible
1	Grid battery	$9.32	$18.48	Not selected due to lower NPV
2	New 11kV feeder from East Lake Zone Substation to Substation 11502	$1.57	$24.31	**Recommended** – Highest NPV technically feasible option

20009673 – Supply to Hume

The construction of a new underground cable feeder from Gilmore Zone Substation to provide supply to support load growth within and around New West Industrial Park, which is in the suburb of Hume.

There are no other zone substations within a reasonable proximity to the development. As such, no other network options have been considered. The project is due to commence construction in 2026/27 and be completed within the same year.

The evaluation summary is presented below:

Ref	Option	Cost (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as does not meet minimum requirements
1	Grid battery only	$10.40	$161.56	Not selected due to lower NPV
2	New 11kV feeder from Gilmore Zone Substation	$2.33	$168.00	**Recommended** - Highest NPV, technically feasible option

20009677 – Supply to Greenway

The construction of a new underground cable feeder from Wanniassa Zone Substation to provide sufficient capacity to supply anticipated load growth associated with the development of several mixed use residential and commercial buildings in the Greenway area, which is part of the Tuggeranong district.

There are no other zone substations that could feasibly supply the development. As such, no other network options have been considered. Construction is due to commence in 2023/24 and be completed in 2025/26. The works for 2023/24 will be funded under the existing 2019-24 capex allowance.

The evaluation summary is presented below:

Ref	Option	Cost^ (millions)	NPV^* (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as not technically feasible
1	Grid battery	$10.57	$60.72	Not selected due to lower NPV
2	New 11kV feeder from Wanniassa Zone Substation	$2.81	$66.97	**Recommended** – Highest NPV technically feasible option

20009678 – Supply to Canberra CBD S3 & S37

The construction of a new underground cable feeder from Civic Zone Substation to provide supply to support load growth in the proposed new University of New South Wales (UNSW) Canberra City Campus, an 8 hectare, 6000-student campus straddling Parkes, Reid and Canberra CBD.

Although Civic Zone Substation is further away from the new load than City East Zone Substation, installing the feeder from Civic Zone Substation is a lower cost option as there is a spare circuit breaker and existing conduits available to support the connection and placement of the new feeder, leading to lower civil costs. Construction is scheduled to commence in 2026/27. Project completion is scheduled for 2028/29.

The evaluation summary is presented below:

Ref	Option	Cost (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as not technically feasible
1	Grid battery	$5.65	$31.27	Not selected due to lower NPV
2	New 11kV feeder from City East Zone Substation to Sections 3 and 37	$5.24	$31.29	Not selected due to lower NPV
3	New 11kV feeder from Civic Zone Substation to Sections 3 and 37	$4.98	$31.49	**Recommended** – Highest NPV technically feasible option

20009679 – Supply to Gungahlin Mixed Development

The construction of a new underground cable feeder from Gold Creek Zone Substation to ensure sufficient supply to meet a forecast 24.4 MVA new load growth in the Gungahlin Town area between 2022 and 2029, associated with several mixed use commercial and residential developments.

Installation from the next closest substation, Belconnen Zone Substation was assessed to be less economically efficient in the business case. Construction is scheduled to commence in 2026/27. Project completion is scheduled for 2027/28.

The evaluation summary is presented below:

Ref	Option	Cost (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as does not meet minimum requirements
1	Grid battery	$19.07	$266.22	Not selected due to lower NPV
2	New 11kV feeder from Gold Creek Zone substation to Manning Clark Crescent Gungahlin	$5.22	$277.23	**Recommended** – Highest NPV technically feasible option
3	New 11kV feeder from Belconnen Zone Substation to Manning Clark Crescent, Gungahlin	$10.26	$272.87	Not selected due to lower NPV

20001961 – Supply to Strathnairn from Latham ZS

The construction of a new 5.2km 11kV underground cable extending the existing Weir feeder fed from the Latham Zone Substation. This project is to ensure sufficient supply to meet a forecast cumulative load increase of 12.4MVA by 2025 in the greenfield suburb of Strathnairn. This will provide sufficient capacity for the area until the Strathnairn Zone Substation is constructed. This project will begin construction in the 2019-2024 regulatory period with completion within the 2024-2029 regulatory period.

The evaluation summary is presented below:

Ref	Option	Cost* (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected as does not meet minimum requirements
1	Grid battery	$7.30	$943.90	Not selected due to lower NPV
2	Extend the Weir Feeder	$2.12	$948.23	**Recommended** – Highest NPV technically feasible option
3	New 11kV feeder from Latham Zone Substation to Strathnairn	$3.70	$946.91	Not selected due to lower NPV

*Only includes costs for the 2024-2029 regulatory period

20008629 – Gungahlin Feeder Ties

This project is for the augmentation of Hamer feeder by extending an existing radial leg into a ring and to reconfigure Nona feeder by disconnecting a faulted section of cable and create a tie with Anthony

Rolfe feeder. This project will improve network reliability in the Gungahlin area, reducing STIPS costs and risk cost of a prolonged outage.

These two works are proposed as a single project due to their geographical proximity. Combining the two feeder improvement works will reduce cost by allowing efficient use of internal resources and external (contractor) resources.

This project will be partially delivered in the 2019-2024 period.

The evaluation summary is presented below:

Ref	Option	Cost* (millions)	NPV (millions)	Evaluation Summary
0	Utilise existing network infrastructure	$0	$0	Not selected due to lower benefit
1	Connect Nona feeder to Anthony Rolfe feeder and extend radial section of Hamer feeder into a ring	$0.63	$0.21	**Recommended** as has highest benefit

*Only includes costs for the 2024-2029 regulatory period

20004446 – Supply to Belconnen Town Centre

As part of Evoenergy's 2019-2024 regulatory proposal there was a project for a new feeder to Belconnen Town Centre (Appendix 5.35 in the 2019-2024 submission). Due to delays in developer construction and related load growth, $0.41million of funding is required in the 2024-2029 regulatory period to finish this project.

Net-Zero driven feeder projects

The transition from internal combustion engine vehicles to electric vehicles will place additional demand on Evoenergy's distribution network, as a result of EV charging infrastructure. Further detail and justification are available in Appendix 1.17. The below table provides a summary of the proposed net zero driven 11kV feeder projects.

Project number	Project Name	Zone of origin	Length (km)	Cost* (million)
20009748	Supply to Braddon	City East	2.2	$3.87
20009749	Supply to Watson	City East	4.3	$2.97
20009750	Supply to Ainslie	City East	3.2	$4.77
20009751	Supply to Campbell	City East	4.0	$5.04
20009752	Supply to Franklin	Gold Creek	5.7	$4.98
20009753	Supply to Garran & Red Hill	Woden & Telopea Park	4.6	$2.54

20009754	Supply to Phillip	Woden	3.6	$4.50
20009755	Supply to Canberra CBD feeder 1	City East	3.0	$3.16
20010802	Supply to Canberra CBD feeder 2	Civic	3.8	$2.61
20010803	Supply to Canberra CBD feeder 3	Civic	3.0	$0.28

*Expenditure is in 2023/24 dollars, excluding corporate overheads, excluding contingency and excluding GST, only includes expenditure for the 2024-2029 regulatory period.

Other Projects

20009869 – Distribution Substation Upgrade Program

Involves targeted upgrades to distribution substations in areas correlated with higher EV uptake. The program is only proposed for the medium and high EV uptake scenarios and varies significantly in scope and scale (and therefore cost) between each scenario. Further detail and justification can be found in Appendix 1.17.

20009870 – LV Circuits Upgrade Program

Involves targeted upgrades to low voltage circuits in areas where EV uptake is expected to be highest. The program is only proposed for the medium and high EV uptake scenarios and varies significantly in scope and scale (and therefore cost) between each scenario. Further detail and justification can be found in Appendix 1.17.