evoenergy

Attachment 2: Replacement expenditure

Revised regulatory proposal for the Evoenergy electricity distribution determination 2024 to 2029

November 2023

Contents

List of tables

List of figures

List of appendices

Appendix	Document	Author	Confidential information
Appendix 2.1	Secondary Systems Business Case	Evoenergy	Y (partial)
Appendix 2.2	Poles Business Case	Evoenergy	N
Appendix 2.3	Independent Review – Repex Portfolio	Qubist	N

1. Overview

In its initial regulatory proposal, Evoenergy proposed a replacement capital expenditure (repex) program of $118 million ($2023/24). This was a small increase compared to the 2019–24 regulatory period allowance amount of $107 million ($2023/24). Evoenergy determined that a small increase was required under its Asset Investment Optimisation (AIO) framework. Under this framework, investment is driven by an assessment of risk, which is a function of:

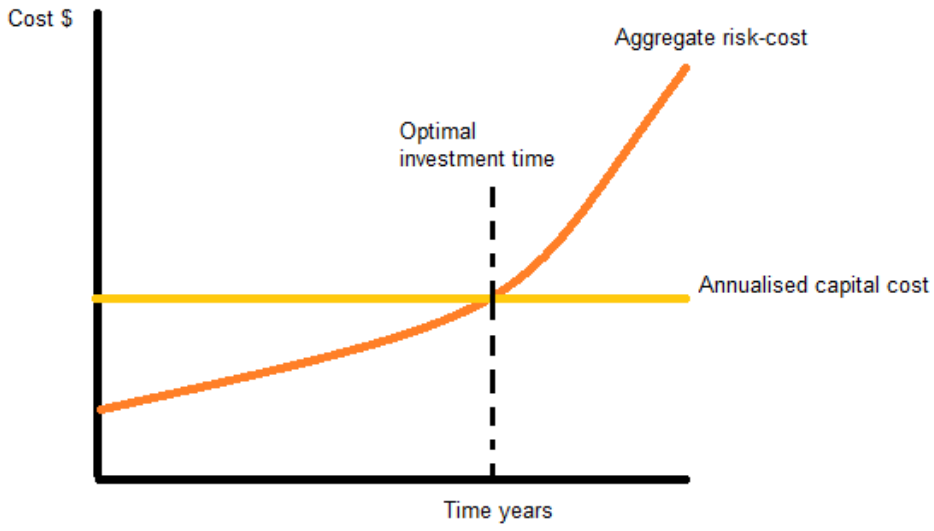
- **Asset condition (health):** where deterioration of the physical state of assets results in increasing probability of failure, maintenance costs or safety hazards.
- **Criticality:** the relative importance of reliable asset operation, as measured by the consequences of failure or insufficient functionality.

Under Evoenergy's asset management system, optimal investment timing is identified when the aggregate risk cost exceeds the annualised cost of the investment required to mitigate the risk (refer to Figure 1). Aggregate risk cost is a function of multiple components such as:

- **Environmental risk:** the risk to the environment caused by the failure of assets. E.g. due to fire, oil or sulfur hexafluoride (SF6) gas.
- **Financial risk:** this risk captures the direct financial consequence or impact to safely restore the network after an asset failure. This is usually the cost to replace the asset, but in some cases, it is a higher cost (compared to proactive replacement) due to collateral damage to adjacent assets.
- **Reliability risk:** the risk borne by consumers due to unserved energy due to asset failure (unplanned outages). This is typically the largest component of risk cost and is measured with the Australian Energy Regulator (AER)'s Value of Customer Reliability (VCR).
- **Safety risk:** the safety risk to individuals (both Evoenergy workers and the general public) caused by asset failures, such as the risk of electrocution or blunt force trauma.

In its regulatory proposal, Evoenergy visualised risk cost for each asset portfolio as part of the submitted asset portfolio strategies.

Figure 1 Evoenergy's risk-based approach to repex



Implicit in this approach to the replacement of assets is a cost benefit analysis (CBA). A CBA is an investment decision support tool that measures the benefits of an action against the costs of taking that action. Investment should be undertaken when the benefits exceed the costs, having due consideration to the time value of money.

Evoenergy acknowledges that formal CBAs for key repex programs were not provided for the initial repex proposal. This was part of the reason for the Australian Energy Regulator's (AER) cut to Evoenergy's proposed repex for the 2024–29 regulatory period. This will be part of a longer-term capability build within the business, combined with a shift towards condition rather than age-based asset health assessments.

1.1. AER draft decision

In its draft decision, the AER did not fully accept Evoenergy's proposed repex of $117.6 million for the 2024–29 regulatory period. The AER's draft decision substituted repex of $94.4 million,[1] representing a significant reduction of $23 million or 20% from Evoenergy's proposal.

Table 1 Evoenergy's proposed repex and AER draft decision

	2024/25	2025/26	2026/27	2027/28	2028/29	EN24
Evoenergy regulatory proposal	20.4	21.8	23.8	25.7	25.8	**117.6**
AER draft decision	16.4	17.5	19.1	20.7	20.7	**94.4**
Variance	-20%	-20%	-20%	-20%	-20%	**-20%**

The AER considered that Evoenergy had not sufficiently demonstrated the need for an uplift in repex above the historical trend. As a result, the AER applied a negative adjustment to bring down repex in line with Evoenergy's recent historical average levels.

The AER's assessment approach was a combination of a top-down and bottom-up approach. The AER noted issues with the application of its repex model (the top-down approach), which led to a more targeted review based on the materiality of the projected capital expenditures (the bottom-up approach). Key themes of the draft decision underlying the downward adjustment to Evoenergy's proposed repex are discussed below.

A lack of economic justification for key repex programs

The AER focused on the poles replacement program, as this was the largest sub-category of Evoenergy's proposed repex. The AER considered that the information provided by Evoenergy, in the initial proposal and subsequent information requests, did not provide substantive support for the poles program.

The AER noted that in terms of asset management and risk assessment, Evoenergy had not presented evidence of net present value (NPV) modelling or risk-based analysis because the programs are based on historical asset performance and recent inspections.

[1] AER 2023, *Draft decision for Evoenergy determination*, Attachment 5 Capital expenditure, Table 5.4, p.7. Note: the AER's decision amount reflects constant modelling assumptions to Evoenergy's proposal in terms of inflation and cost escalation factors.

The AER said:

"*In terms of asset management and risk assessment, and in response to our information request, Evoenergy stated that it had not undertaken net present value (NPV) modelling or risk based analysis on the five largest repex programs because the programs are based on historic asset performance and recent inspections".*[2]

Given this, the AER considered:

"*It is difficult to see that the forecast does reflect historic asset performance and recent inspections given the 24% increase in repex, and no clear explanation for this increase over the historical trends".*[3]

The AER reiterated that it expected Evoenergy to undertake a more comprehensive risk-based assessment linked to economic justification for key aspects of its proposed repex, such as poles, protection programs, overhead lines and high voltage cables.

The link between reliability performance and repex

The AER also provided an argument as to why Evoenergy's recent deterioration in reliability performance, as measured by System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI), was not a justification for the proposed higher repex. The AER indicated that asset failure is one reason out of many for supply outages and that vegetation management looked to be behind the worsening in reliability more so than asset failures (which could be related to a lack of repex).[4]

[2] AER 2023, *Draft decision for Evoenergy determination*, Attachment 5 Capital expenditure, pp. 28-29.
[3] Ibid, p.29
[4] Ibid, p.31

2. Evoenergy's revised regulatory proposal

2.1. Overview

Table 2 shows the Evoenergy Electricity Distribution Network Determination 2024–29 (EN24) Revised Regulatory Proposal contains a repex forecast of $107.3 million ($2023/24),[5] which is $23 million or 14 per cent higher than the AER's draft decision amount of $94.4 million. Evoenergy believes this is an appropriate quantum of repex to maintain the reliability, quality and security of electricity supply as required by the National Electricity Rules (the Rules), in addition to our customer's expectations. Evoenergy's revised proposal repex has been supported by independent consultant Qubist, who provided a review of Evoenergy's revised proposal.[6]

Table 2 Revised proposal repex and AER draft decision ($ million, 2023/24)

	2024/25	2025/26	2026/27	2027/28	2028/29	EN24
Evoenergy RRP	19.4	20.0	21.7	22.8	23.5	**107.3**
AER draft decision	16.4	17.5	19.1	20.7	20.7	**94.4**
Variance (%)	18%	14%	13%	10%	13%	**14%**

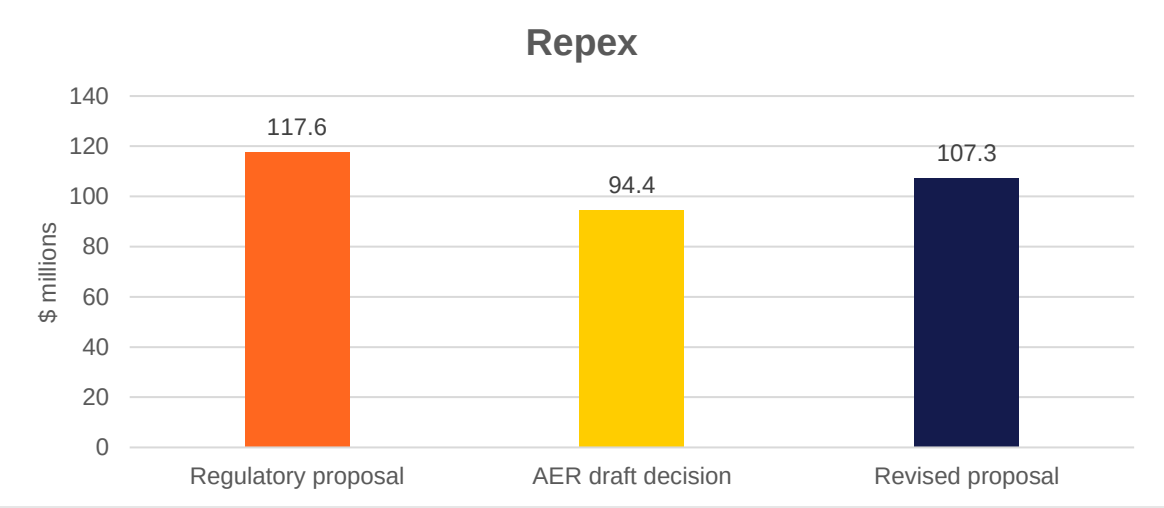
Evoenergy has accepted a partial cut to its proposed repex program from $117.6 million to $107.3 million. In doing so, Evoenergy has considered each component of its repex program and whether or not recent historical capex is appropriate or not for the 2024–29 regulatory period. In doing so, Evoenergy identified two categories of repex where it believes that some uplift from recent historical capex levels is required. These are the 'secondary systems' and the 'pole replacement' programs. The nature of the uplift and the reasons why Evoenergy believes an increase in repex over the current regulatory period is required for 2024–29 for these two components are discussed in sections 2.5 (Secondary systems) and 2.6 (Pole replacement).

For other categories of repex, such as ground assets and zone substations, Evoenergy's revised proposal remains equivalent to its initial regulatory proposal, but also involves no uplift on recent history. These categories of repex are discussed for completeness in section 2.7, but have not been subject to a business case as there has been no uplift in repex for these categories relative to the current 2019–24 regulatory period.

Figure 2 visualises the total repex program amount across Evoenergy's initial regulatory proposal, the AER's draft decision and Evoenergy's revised proposal.

[5] When updated escalation factors are applied, the amount is $109.0 million. For comparability with the AER's draft decision, this attachment refers to repex on a like-for-like basis with the AER's draft decision in terms of modelling assumptions, unless explicitly referenced otherwise.
[6] Appendix 2.3, Independent Review – Repex Portfolio.

Figure 2 Evoenergy's repex program ($ million, $2023/24)



Our consideration and response to the AER's concerns in its draft decision are discussed below.

As discussed in section 1, the AER's primary concern related to a lack of risk-based analysis for key repex programs, as reflected in cost-benefit analysis. Another concern was the link between reliability performance and the justification for repex. Evoenergy's consideration and response to these concerns are discussed separately below.

2.2. Evoenergy's economic justification for key repex programs

Evoenergy acknowledges the importance of economic justification for key repex projects. That is, only those investments where the present value of benefits exceeds the present value of costs should be undertaken; that is, investments with a positive NPV. It also acknowledges CBA was not explicitly provided for key repex programs, as the AER has noted.

That said, Evoenergy believes it is not accurate to say risk based analysis was not undertaken in the development of the repex program.[7] For instance, in each Asset Portfolio Strategy, there was a figure showing the 10 year forecast for asset portfolio risk value. E.g. for overhead assets:[8]

[7] The AER's focus on certain wording on an information request response should not supplant the other information provided in the regulatory proposal relating to risk based analysis in the context of the repex program.
[8] Evoenergy 2023, *Regulatory proposal for the ACT electricity distribution network 2024–29, Appendix 1.10: Evoenergy Asset Portfolio Strategy: Overhead Assets,* p.6

Figure 3 Ten year forecast for asset portfolio risk value

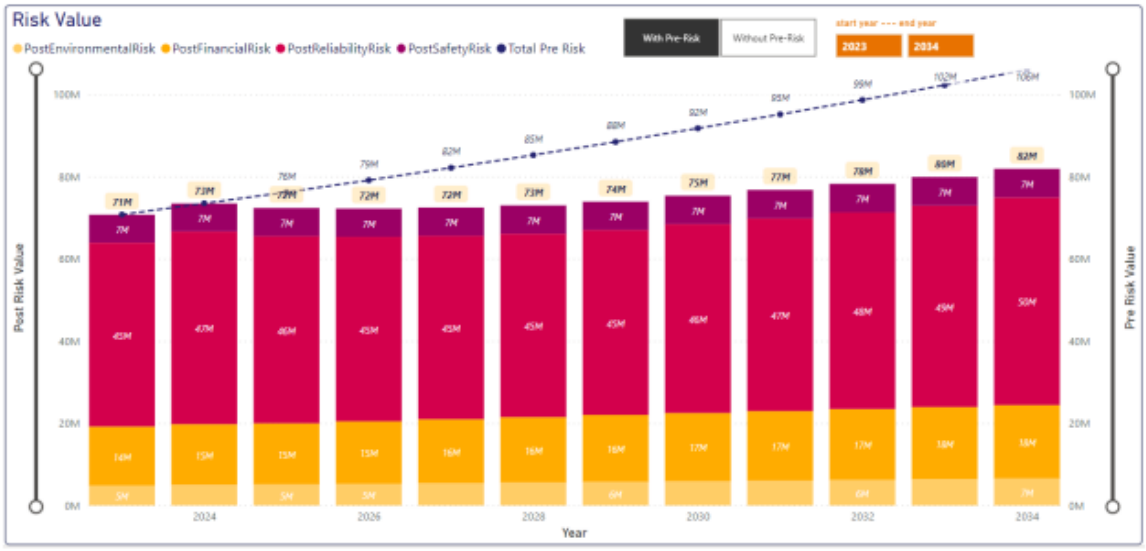
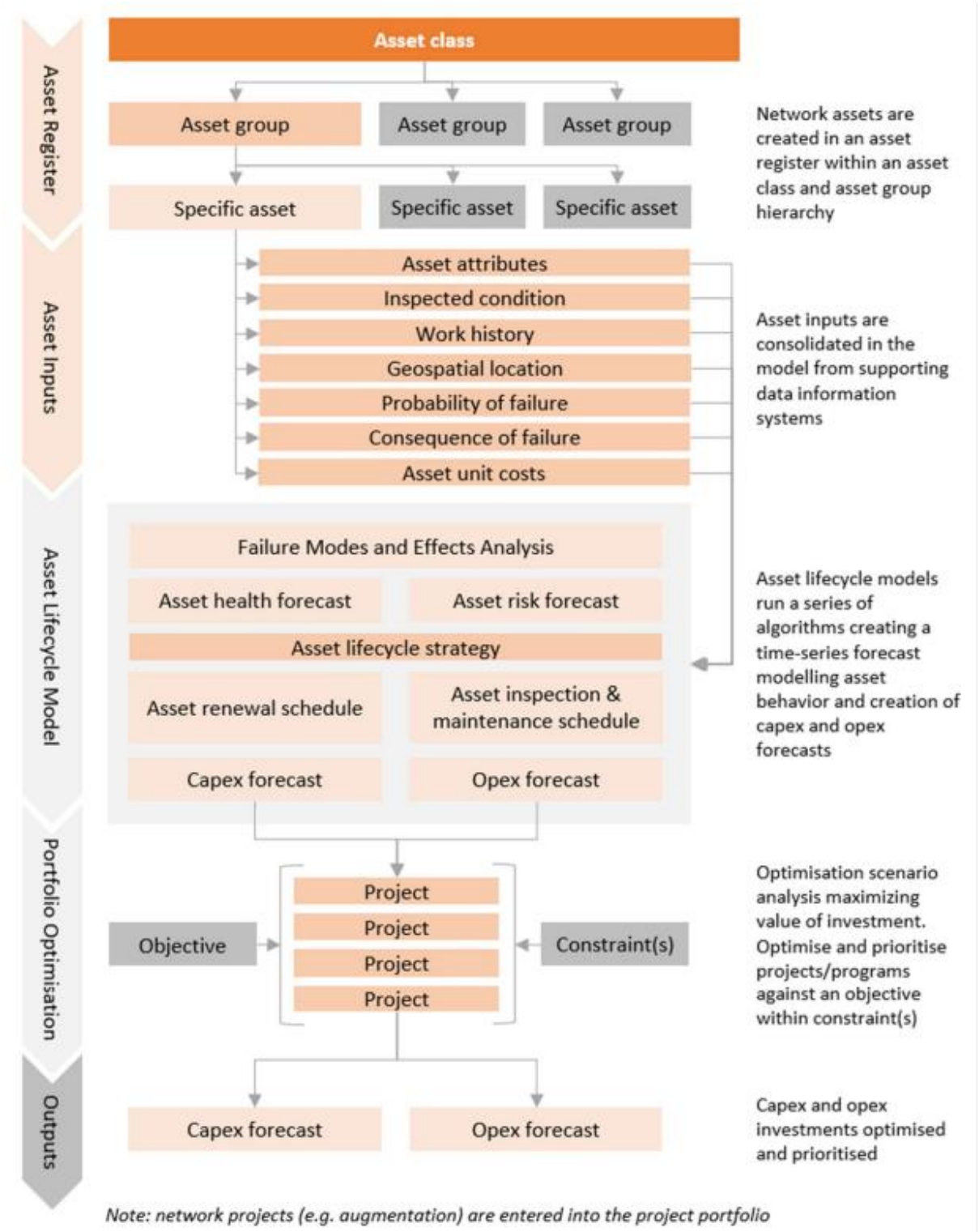


Figure 3 shows that the total pre-risk value (dotted line) is significantly higher than the post-risk value, in the stacked column chart. This represents the benefit in risk reduction from the proposed repex contained in the relevant Asset Portfolio Strategy. Under Evoenergy's AIO framework, risk value is an important consideration in determining the need for, and timing of, investment. More details on Evoenergy's AIO system are contained in Appendix 1.2 of the January 2023 regulatory proposal. Key elements of the AIO framework are reproduced in Figure 4.

Figure 4 Evoenergy's AIO framework



With that said, Evoenergy acknowledges this risk related information was not highly transparent in the discussion of its repex program, and business cases for key repex programs showing positive NPV investments, were not published as part of its regulatory proposal. To address the AER's draft decision, for the *EN24 revised proposal,* Evoenergy has evidenced the need for its proposed repex for key programs (secondary systems, poles) where there has been an uplift in the proposed repex. Sections 2.5 and 2.6 present why the proposed repex for these categories is economically efficient, with Evoenergy's proposed repex having a positive NPV.

2.3. The link between repex and reliability performance

Evoenergy acknowledges and accepts the AER's comments in respect of the link between reliability performance and the need for repex. Deterioration in metrics such as SAIDI and SAIFI is not necessarily reflective of a lack of repex, as reliability performance is reflective of a range of different factors. The AER correctly pointed to vegetation management as an increasing issue for Evoenergy and one that has contributed to worsening reliability performance.

In Evoenergy's January 2023 proposal, this discussion was included in the context of:

- the argument is that Evoenergy's historically strong reliability performance is not guaranteed to continue going forward; and
- the argument is that reliability takes on heightened importance as the electrification of the economy continues, as alternative energy sources to electricity diminish over time.

Evoenergy acknowledges that its recent deterioration in reliability performance is not in and of itself a basis for higher repex and that its initial proposal should have been phrased better in that respect. Importantly, the development of the initial repex proposal ($117.6 million) was determined under Evoenergy's established asset investment optimisation system,[9] with no increase to the proposed repex program due to recent reliability performance. As a result, Evoenergy can refute the AER's comment that:

"*Evoenergy states that the repex proposal is being driven by a deteriorating System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) performance trend and the aging of its network assets".*[10]

To the contrary, Evoenergy stated in the regulatory proposal the slight increase in repex:

"reflects the current state of our assets, necessitating an increase in repex to maintain the reliable electricity supply our customers require".[11]

At no point was it said that the repex program was being driven by a deterioration in reliability performance. The commentary in respect of SAIDI/SAIFI should have been phrased differently, but it had no bearing on the quantum of Evoenergy's proposed repex program.

2.4. Historical and future repex needs and benchmarking

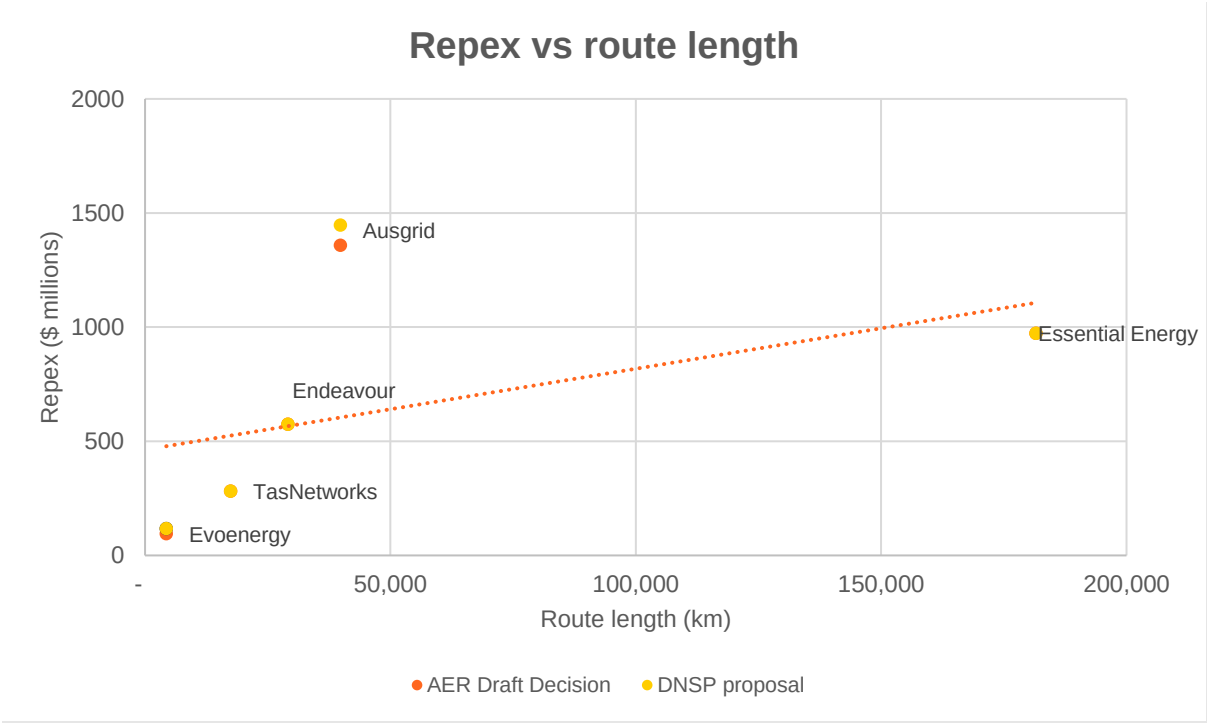
Given the lifecycle of Evoenergy's existing assets, repex will naturally vary over time. As a result, required repex may be relatively low in one (or more) regulatory periods and then relatively high in one (or more) regulatory periods. As a result, this is not a category of capex where historical expenditure may always be a reliable predictor of future capex requirements. This is an implicit basis for the AER's repex model.

[9] Which was discussed at length in Evoenergy's initial regulatory proposal and *Appendix 1.2: Asset management*.
[10] AER 2023, *Draft decision for Evoenergy determination*, Attachment 5 Capital expenditure, pp. 27-28.
[11] Evoenergy 2023, *Regulatory proposal for the ACT electricity distribution network 2024–29, Attachment 1 Capital expenditure,* p.32

It is also worth considering Evoenergy's historical repex compared to other networks. Whether a network's historical capex is an appropriate guide to future needs may also depend on how a network compares to other networks. For example, if a network has low repex relative to other networks, an increase in repex for that network may still be efficient. On the other hand, if a network benchmarks poorly, even if it proposes a constant repex program across periods, this may demonstrate continuing inefficiency.

For other networks on the same regulatory cycle, Evoenergy undertook a comparison of the AER's draft decision for repex, compared to their route length based on recent regulatory information notice (RIN) data. Figure 5 shows that Evoenergy's draft decision repex does not appear particularly high compared to other networks.

Figure 5 Repex (AER Draft Decision, $ million, 2023/24) vs route length (km)



Evoenergy also undertook a separate form of repex benchmarking across all distribution network service providers (DNSPs). Based on annual RIN information, Evoenergy calculated a ratio of repex (scaled to $2023/24[12]) to 1,000 customer numbers over five years from 2017/18 to 2021/22 inclusive. Evoenergy ranked the lowest amongst the 14 DNSPs analysed. Evoenergy had an average annual repex of $77,729 per 1,000 customers, against an average of $184,807 and a median of $153,391.

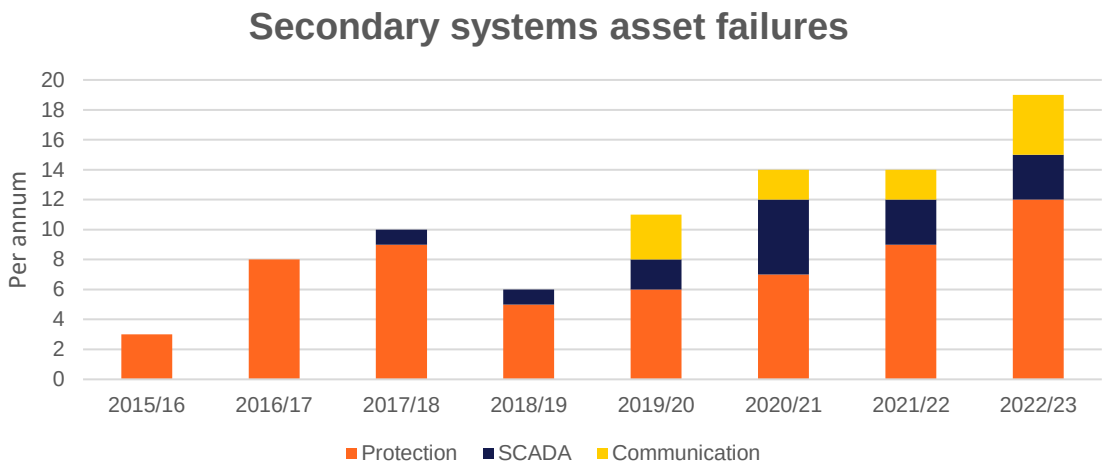
While different networks have different characteristics (e.g. geographies), which may affect the veracity of this comparison, it nonetheless indicates Evoenergy's proposed repex benchmarks relatively well compared to other networks. As a result, the proposed increase in repex from the AER's draft decision (from $94.4 million to $107.3 million) would still leave Evoenergy benchmarking strongly on this measure.

[12] The relevant inflation series was calculated using the December-on-December quarter Australian CPI approach used elsewhere in the revised regulatory proposal, such as in the AER standardised capex model.

2.5. Secondary systems

Evoenergy's secondary systems asset portfolio includes Supervisory Control and Data Acquisition (SCADA), communication systems, protection systems, DC auxiliary supply systems and National Electricity Market (NEM) metering. Collectively, the portfolio of assets allows Evoenergy to monitor, operate and safely use the electricity network. Despite the importance of these assets, Evoenergy has witnessed increasing asset failures (requiring immediate replacement[13]) in this asset class, as shown in Figure 6. This is important context to Evoenergy's proposed increased in repex for secondary systems over the 2024–29 regulatory period.

Figure 6 Secondary systems asset failures (per annum)



Evoenergy's revised proposal contains $22.8 million ($2023/24) for secondary systems repex, with constant modelling assumptions.[14] The breakdown of secondary systems repex across categories is shown below in Table 3.

Table 3 Evoenergy's revised proposal secondary systems repex ($ million, 2023/24)

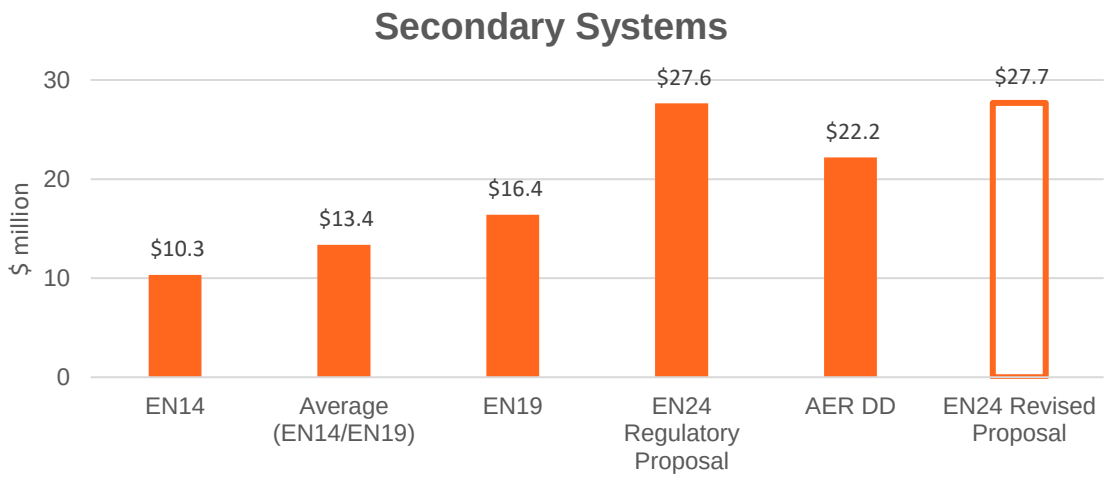
	EN24 total	Share of secondary program	Increase on current period spend?
Protection	13.8	60%	Yes
SCADA	4.7	21%	Yes
Communications	2.1	9%	Yes
DC auxiliary supply	2.2	10%	Yes
Total	**22.8**	**-**	**Yes**

[13] As opposed to defects which may be remediated.
[14] Or $23.2 million with updated modelling assumptions, as presented in *Appendix 2.1: Secondary Systems Business Case*.

Figure 6 shows the size of Evoenergy's secondary systems repex program (including corporate overheads)[15] across three regulatory periods; 2014–19, 2019–24 and 2024–29. It also shows an average of the 2014–19 and 2019–24 regulatory periods, as well as the AER's draft decision amount, which was 80 per cent of Evoenergy's proposed repex.

Figure 7 shows that the size of the secondary systems program has been increasing in recent history. The following sections discuss the components of the secondary systems program and factors warranting the size of the proposed program. However, the information in the Secondary Systems Portfolio Asset Strategy (Appendix 1.13) submitted as part of Evoenergy's regulatory proposal in January 2023 should still be referred to in the context of repex requirements for this asset class.

Figure 7 Secondary systems repex across regulatory periods ($ million, $2023/24, including corporate overheads)



The following sections discuss some of the key themes relevant to secondary systems assets. The full economic justification for the largest component, the protection program, is contained in the Secondary Systems business case in Appendix 2.1. The business case considered two options, as detailed below in Table 4. The business case focused on protection assets, the largest component of proposed secondary systems repex, as these were most readily quantifiable in a CBA.

[15] Explaining why the $27.7 million is different from the $22.8 million just mentioned.

Table 4 Secondary Systems (protection) business case investment options

Option	Option name	Description	Recommendation
1	Replacement volumes in accordance with historical rates.	Replace secondary systems in line with historical rates.	**Not recommended.** Historical replacement represents a largely 'replace on fail' strategy that has not addressed the emerging risks with the existing population. Without the planned management of obsolete, poor performing or poor condition assets off the network, there will be an increasing risk to public and worker safety, reliability and the environment.
2	Target the highest risk secondary system assets for replacement.	Target the highest risk secondary systems for replacement based on condition, technology, spares and skills.	**Recommended.** There is a growing population of poor performing or unsupported secondary systems assets (such as electromechanical relays) that can no longer be maintained due to a lack of skills, spares or suitable replacements. These populations pose an increasing risk to worker and public safety, as well as network reliability and are being managed off the network over time.

The resulting CBA yielded the results shown in Table 5. The recommended option is Option 2, which has the highest NPV and a benefit cost ratio (BCR) greater than one, indicating it is economically efficient for Evoenergy to undertake. This option will best manage the associated risk and ensure the continued safety and reliability of Evoenergy's network.

Table 5 Secondary systems (protection) CBA summary

Assessment Metrics	Option 1	Option 2
NPV ($ m, 2023/24)	$18.99	**$23.19**
BCR	2.85	**2.81**
Capex ($ m, 2023/24)	$16.18	**$23.17**
Meets customer expectations	◔	●
Aligns with Asset Objectives	●	●
Technical Feasibility	●	●
Deliverability	◔	●
Preferred	No	**Yes**

● Fully addresses the issue. ◔ Adequately addresses the issue. ◑ Partially addresses the issue. ○ Does not address the issue.

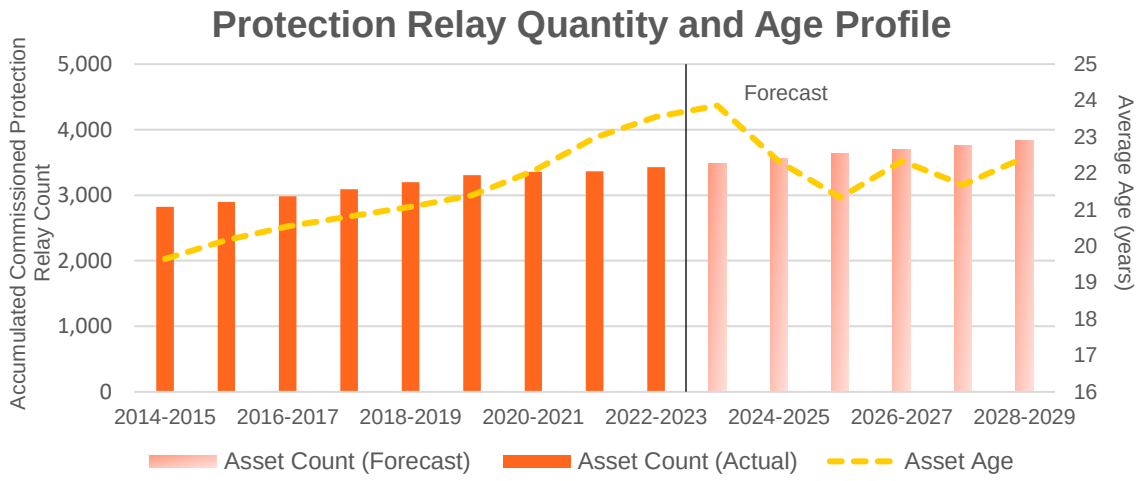
Protection assets

Protection assets serve an important function on Evoenergy's network, keeping our assets and customers safe. Protection relay assets are present at both zone and distribution substation assets.

Figure 8 shows that the average asset age for protection assets has increased from the 2019–24 regulatory period to the 2024–29 regulatory period. Specifically, the average asset age has increased from 20 years in 2014 to 23.5 years in 2023. The age of many assets exceeds their economic life and requires replacement, with 60 per cent of protection relays over 20 years old and 40 per cent over 30 years old. The current historical rate of asset replacement will not meet the replacement need and keep the reliability performance and population age at acceptable levels. Failure of protection devices such as transmission line, power transformer and distribution feeder protection relays can cause loss of electricity supply, damage to infrastructure and injury or fatalities. There is also a need to meet the Rules for N-1 redundancy in 132kV protection systems.[16]

The forecast component of this figure shows how average asset age will moderately lower over the 2024–29 regulatory period with Evoenergy's proposed repex.

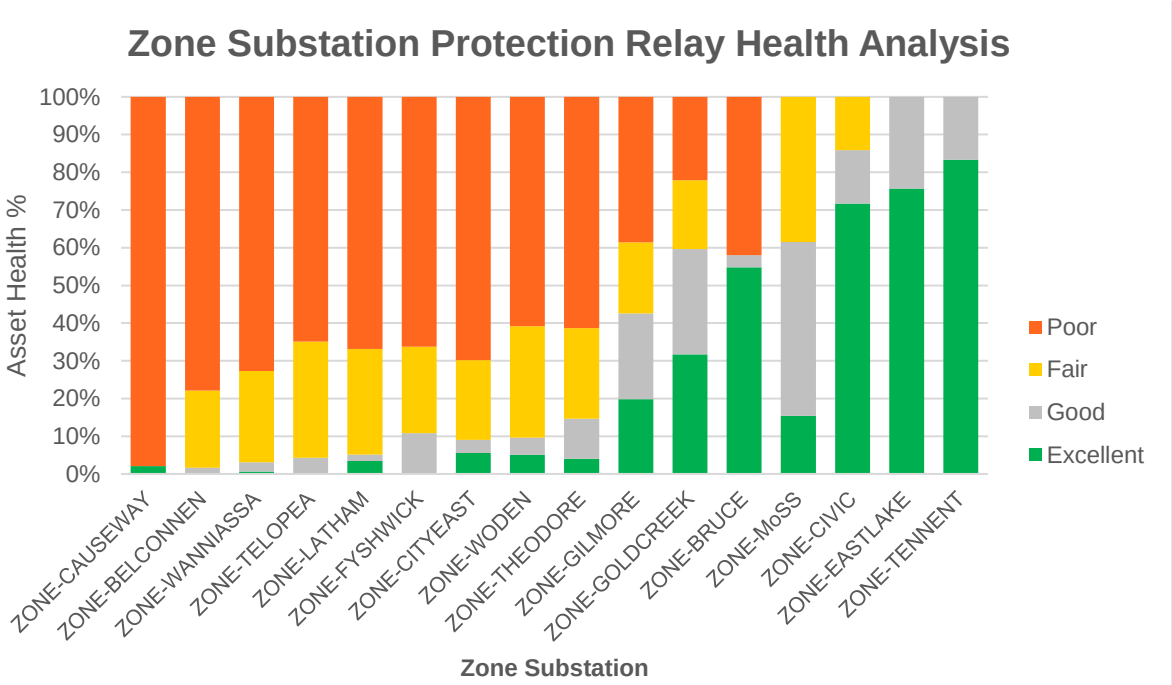
Figure 8 Protection relay quantity and age profile



In considering the proposed uplift in protection asset repex, it is also worth noting that there is first time asset replacement occurring for our oldest zone substation systems. Figure 9 shows a zone substation asset health analysis, with a significant number of zone substations currently rating 'poor' in terms of their current asset health. Poor health assets are those identified with type vulnerabilities affecting a make/model family, asset performance issue and/or history of failure.

[16] Rules, S5.1.9(d)

Figure 9 Zone substation protection asset health



As a result of these factors, Evoenergy believes an uplift on historical repex is required for protection assets. The full risk-based economic justification for the proposed repex is contained in the business case in Appendix 2.1.

Supervisory Control and Data Acquisition

SCADA assets play an important role in Evoenergy's network and will be important in facilitating the continued uplift in consumer energy resources (CER). Facilitating CER has been an important theme received from Evoenergy's consumers, with consumer engagement supporting related investment. In Evoenergy's Deep Dive Panel Report prepared by our customers after the AER's Draft Decision and before the EN24 revised proposal, it was noted:

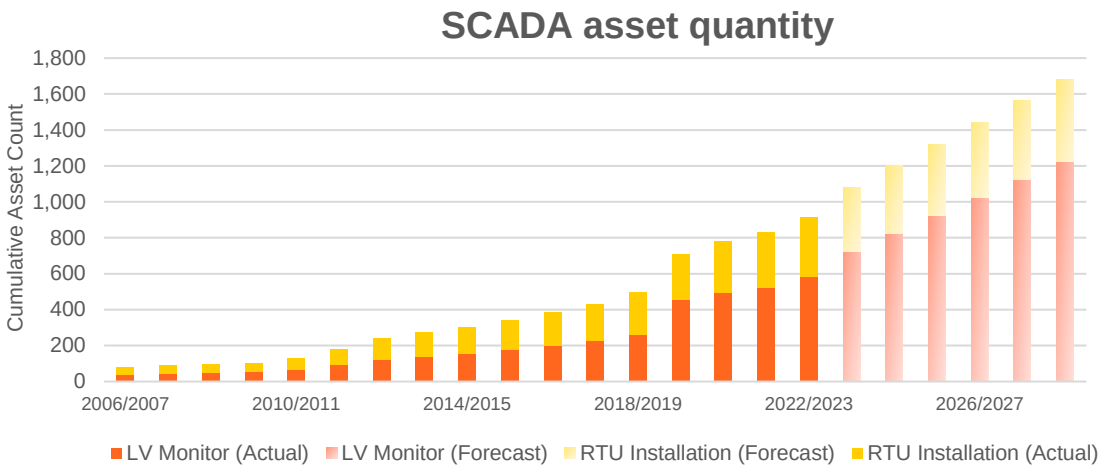
"*Investment must ensure the network is future-proofed to include two-way energy flows and increased electrification*"[17]

While the proposed SCADA program is not large in the overall repex program (refer to Table 5), it entails a significant increase in anticipated repex in the current regulatory period. Evoenergy views this increase in repex as necessary. An important reason for this is that the number of SCADA assets has been steadily increasing over time, as shown in Figure 10. As a result, even with a constant replacement rate, repex needs will increase simply due to the larger number of assets on the network.

As noted in Appendix 2.1, the focus for the 2024–29 regulatory period will be replacing obsolete SCADA assets and managing unsupported assets out of the network to maintain control capability and continue to manage known and emerging security vulnerabilities over time.

[17] Evoenergy and Communication Link 2023, *Evoenergy Deep Dive Panel, Panel report*, p.2, available at Appendix C to Evoenergy's revised regulatory proposal.

Figure 10 SCADA units (historical and forecast installation)



A substantial component of the SCADA program is the replacement of remote terminal units (RTU). The function of the RTU is to provide monitoring and control of electrical substations. Substation RTUs are connected to Evoenergy's Advanced Distribution Monitoring System (ADMS) system through the SCADA communications network, providing centralised monitoring and control across Evoenergy's network. Evoenergy has RTUs installed both within zone and distribution substations. All zone substations have RTUs, but the number of RTUs at distribution substations has been increasing in recent years. This trend is expected to continue at distribution substations, supporting key Evoenergy strategies such as the Reliability Strategy, Quality of Supply Strategy and Distribution System Operator Strategy.

As discussed in the Secondary Systems Portfolio Strategy, a number of RTUs are older than their design life (15 years) and require replacement. For these assets, vendor support is not available, and refurbishment is not considered a viable or cost-effective option. For zone substations, where it is practical and possible to do so, SCADA replacements are aligned with protection and communications systems upgrades in alignment with the secondary systems Digital Substation Strategy.

Complying with the Australian Energy Sector Cyber Security Framework (AESCSF) also requires the replacement and upgrade of some SCADA assets. This is to ensure that assets are kept up to date and to ensure that no known security vulnerabilities are exposed. This is driven by vendor releases and recommendations for software patches and updates, firmware updates and driver updates as required.

Similarly, Evoenergy's Security of Critical Infrastructure (SOCI) obligations[18] support the investment in SCADA. This is explored in the Secondary Systems business case in Appendix 2.1. It is also worth noting that the SOCI step-change discussed in relation to opex is separate from any repex. Therefore, there is no 'double counting' of related expenditure across opex and capex. In addition, Evoenergy's SOCI obligations are more supportive of the proposed repex than a direct causative driver. That is, Evoenergy's SOCI obligations support the replacement of dated secondary systems assets from a cyber security perspective,[19] but these replacements may well have occurred anyway under Evoenergy's approach to managing secondary system assets.

[18] Evoenergy's SOCI obligations are discussed more fully in *Attachment 3 Operating expenditure 2024–29* and the appended business case.
[19] Noting older secondary systems assets do not have the same built-in security as modern counterparts, leaving them more vulnerable to cybersecurity risk. In addition, older unsupported products present cyber risk as security concerns and updates are not announced by the vendor.

Communications

The primary purpose of the communication assets is to provide necessary communication capabilities that support the critical function of electricity network protection, monitoring and control. The core of the communications network is based on high-speed optical fibre and a multiservice Multi-Protocol Label Switching (MPLS) network, which provides the ability to utilise the network to include other functionality such as corporate Local Area Network (LAN) access, remote monitoring of CCTV and extending centralised access control to the zone substation sites.

Evoenergy's revised proposal includes $2.1 million for communication assets. This amount is significantly higher than repex in the current regulatory period.

A significant replacement program for communication assets will be Carrier (4G) modem replacements. Vendor support for the bulk of the 4G modem fleet is forecast to end during the 2024–29 regulatory period, so replacement with current cybersecurity-supported modems is required. For the Cisco 809 Industrial Integrated Services Router, the end of vulnerability/security support is at the end of February 2026, with the formal last date of support (product obsolescence) advised as the end of February 2028.[20] Moreover, the design life of modems is seven years, meaning large-scale modem replacement would likely be required regardless in the 2024–29 regulatory period.

As for SCADA assets, complying with AESCSF and SOCI also requires the replacement and upgrade of some communication assets.

Evoenergy believes its communications repex is required to ensure its assets are fit for purpose and to minimise risk to our customers.

Direct current auxiliary supply

Evoenergy's revised proposal includes $2.2 million for direct current (DC) auxiliary supply systems. DC systems are an important part of the protection and control systems. With no DC auxiliary supply, there is no operable protection system. We are required to meet the Rules clause S5.1.9(d) for sufficient redundancy in the protection system inclusive of the supporting DC systems, which includes investment in substation batteries and battery charger replacements.

Another factor for DC auxiliary supply systems is the additional capacity required as we replace protection assets at substations. The old electromechanical relays use much less DC auxiliary power as compared to the modern equivalent numerical relays being installed with the protection repex program. This triggers the need for a replacement and upgrade of DC auxiliary supply systems in conjunction with protection replacements.

2.6. Poles

Evoenergy's pole replacement program is a key component of its overall repex program. This asset class describes all the service, distribution, and transmission poles (spanning from 240V up to 132kV) that support the overhead network system that transports electricity throughout Evoenergy's network. As summarised in the Poles business case in Appendix 2.2, Evoenergy's distribution network has approximately 50,000 poles.[21]

Ensuring that poles are replaced when they are in poor health is crucial to ensuring that our customers receive a reliable electricity supply.

[20] CISCO 2022, *End-of-Sale and End-of-Life Announcement for the Cisco 809 Industrial Integrated Services Router,* available here
[21] *Appendix 2.2: Poles Business Case*, p.5

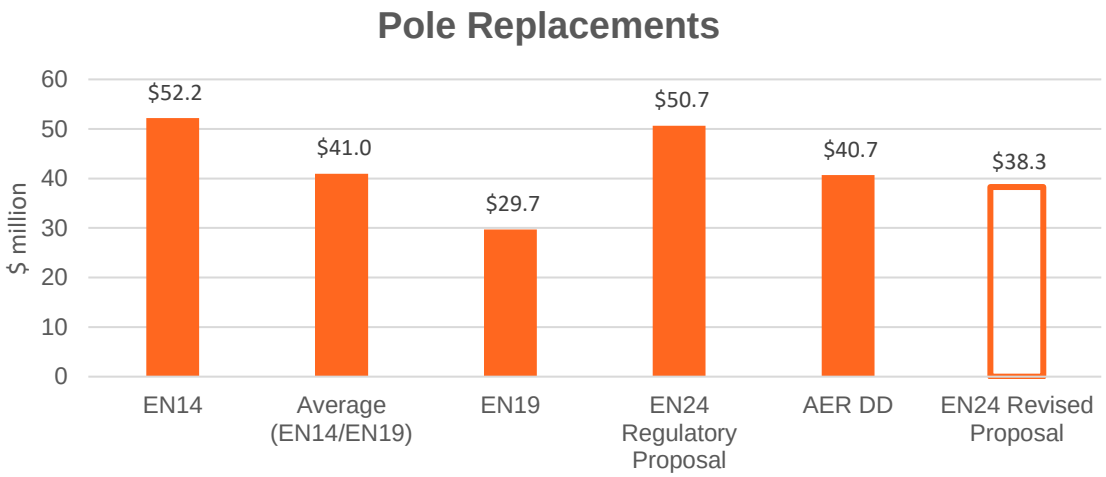
As noted the Poles business case (Appendix 2.2), "*the consequence of not replacing high-risk poles is a functional failure resulting in either pole collapse or excessive leaning comprising electrical clearances placing the public at risk".*[22]

Evoenergy's safety risks are exacerbated by the substantial number of distribution poles contained within residential backyards.

Evoenergy's revised proposal contains $31.5 million ($2023/24) for poles repex, with constant modelling assumptions.[23] When including corporate overheads, Evoenergy's revised proposal contains $38.3 million for poles repex ($2023/24), compared to $50.7 million in the regulatory proposal (Figure 11). Evoenergy has, therefore, accepted a significant reduction in the size of its pole replacement program from its initial regulatory proposal based on the AER's view of the size of Evoenergy's repex program as a whole.

Figure 11 shows that while Evoenergy's revised proposal poles program is approximately 20 per cent higher than its estimated capex in the 2019–24 regulatory period, it is significantly lower than its program in the 2014–19 regulatory period ($52.2 million).

Figure 11 Poles repex across regulatory periods ($ million, $2023/24, including corporate overheads)



[22] ibid

[23] In Evoenergy's submitted Standardised SCS Capex Model, this refers to the sum of the 'ENARDS Pole Replacement Standard Program', 'ENARDS Pole Reinforcement Program', 'ENARTS Structures Program' and 'ENARTS OH Lines and Pole Hardware Program'. Constant modelling assumptions means using the same cost escalation and inflation factors as utilised in the AER's draft decision. With updated modelling assumptions the amount is $32.0 million.

To support Evoenergy's pole investment, Evoenergy developed a business case (Appendix 2.2 Poles Business Case) for investment over the 2024–29 regulatory period. Three options were considered, as summarised in Table 6.

Table 6 Poles business case investment options

Option	Option name	Description	Recommendation
1	Historical Replacement Volumes	Proposed pole replacements in accordance with historical volumes.	**Not recommended.** Continuous use of degraded assets until functional failure does not mitigate increasing risk to public and worker safety, reliability and the environment. The historical replacement volumes are lower than is necessary to maintain risk levels on the network due to the increasing volume of older poles and significant volumes of condemned poles that need to be addressed.
2	Revised EN24 Repex Proposal	Implemented a targeted replacement strategy to maintain the current risk profile and evaluate the remainder of the higher risk poles for remedial action.	**Recommended.** This option is considered the most prudent and efficient. It allows for the volume of condemned poles to be managed through the EN24 period whilst responding to the AER's desire to reduce total repex in its draft determination. This represents a curtailed version of the original proposal, where Evoenergy has deferred some replacements and will manage the risk through maintenance and monitoring in favour of supporting price relief for its customers in the current inflationary environment.
3	Original EN24 Repex Proposal	Replacement of the highest high-risk poles based on condemnation forecasts.	**Not recommended.** Evoenergy's original program is strongly supported in the analysis as the option delivering the highest benefits. However, it has not been proposed in the revised proposal in order to implement strategic reduction of the program to reflect better the AER's draft decision outcome and other competing pressures (cost of living).

It was found that the recommended option was Option 2, which had the highest NPV and BCR and represented a prudent and efficient investment (see Table 7). Importantly, relative to the base case, the NPV was positive and the BCR greater than one, indicating the investment is economically efficient.

Table 7 Pole investment options ($ million, 2023/24)

Assessment Metrics	Option 1	Option 2	Option 3
NPV ($ m, 2023/24)	$14.8	**$21.9**	$27.5
BCR (ratio)	1.57	**1.72**	1.69
Capex ($ m, 2023/24)	$25.8	**$32.1**	$44.0
Meets customer expectations			
Aligns with asset objectives			
Technical feasibility			
Deliverability			
Preferred	No	**Yes**	No

 Fully addresses the issue.  Adequately addresses the issue.  Partially addresses the issue.  Does not address the issue.

This option involved investment for the following works:

- 1,550 distribution timber pole replacements ($27.45 million);
- 50 transmission pole replacements ($1.85 million)
- 200 timber pole reinforcements ($0.65 million); and
- 171 transmission hardware refurbishment and replacements ($2.1 million).

The recommended option is aligned with Evoenergy's current strategy and asset objectives but also includes a curtailment from our original proposal to respond to customers and the AER's price impact concerns in the current economic environment. Despite the additional benefits offered by the higher expenditure in Option 3, we have determined that associated risk can be managed adequately through Option 2.

This strategy looks to optimise costs and manage the risk presented through considered capex and opex trade-offs, with a view to lowering the total cost of ownership with minimal impact on risk. It also aligns with our customer expectations and Evoenergy's broader duty of care to maintain the safety, reliability and security of their network. Despite the additional benefits offered by Option 3, Evoenergy can manage the associated risk within acceptable parameters.

2.7. Other categories of repex

As discussed in section 2.1, for other categories of repex not contributing to the uplift rejected by the AER in its draft decision, Evoenergy has essentially maintained its proposed repex from the initial regulatory proposal to the revised regulatory proposal. Figure 12 and Figure 13 show Evoenergy's proposed repex for zone substations and ground assets.

Figure 12 Zone substation repex across regulatory periods ($ million, $2023/24, including corporate overheads)

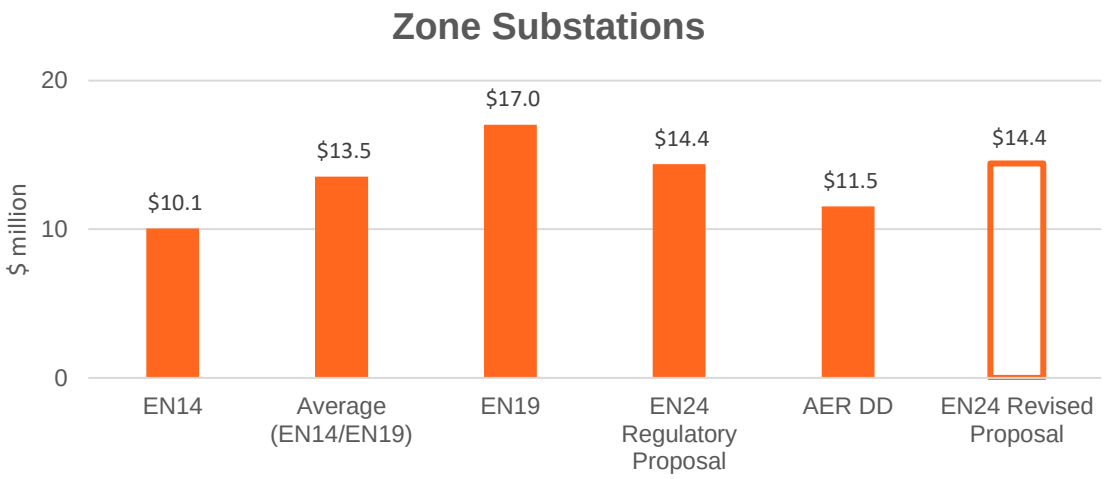
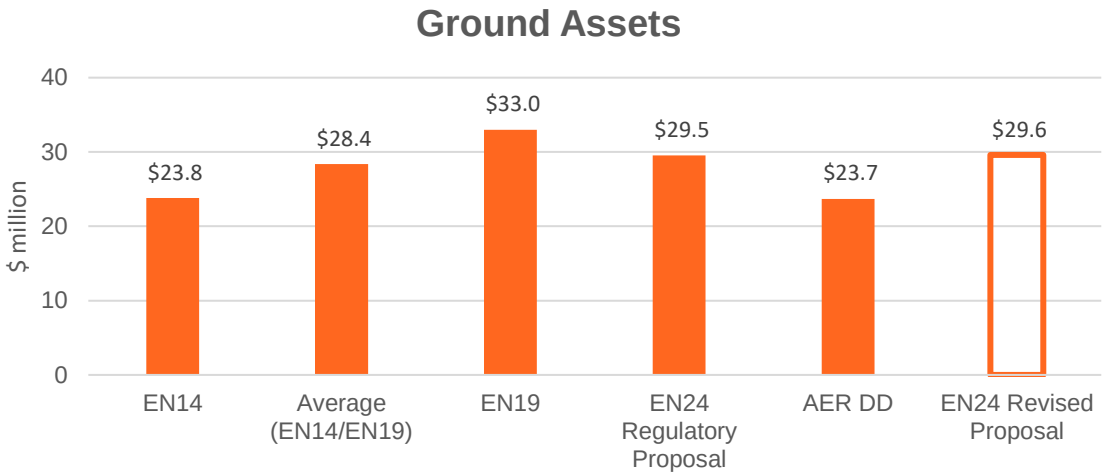


Figure 13 Ground assets repex across regulatory periods ($ million, $2023/24, including corporate overheads)



Abbreviations

Abbreviation	Meaning
AECSF	Australian Energy Sector Cyber Security Framework
AER	Australian Energy Regulator
AIO	Asset Investment Optimisation
BCR	Benefit Cost Ratio
DC	Direct Current
DNSP	Distribution Network Service Provider
EGWWS	Electricity, Gas, Water and Waste Services
FPSC	Fixed Price Servicing Charge
IoT	Internet of Things
LAN	Local Area Network
MPLS	Multi-Protocol Label Switching
NEM	National Electricity Market
NPV	Net Present Value
OTS	Operating Technology System
RIN	Regulatory Information Notice
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index

SCADA	Supervisory Control and Data Acquisition
SOCI	Security of Critical Infrastructure
VCR	Value of Customer Reliability