Attachment G Overhead Service Lines Ex post Review of Ergon Energy 2018-2023 Capital Expenditure

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ERGON ENERGY NETWORK
Part of Energy Queensland

Note

This attachment forms part of Ergon Energy's justification of the ex post review of its 2018-2023 capital expenditure for submission to the AER as part of it 2025-30 Regulatory Proposal.

It should be read in conjunction the main overview document and the following attachments:

Overview of Ergon Energy RDP 2025 Ex Post Review

Attachment A	Augmentation Capex
Attachment B	Replacement Capex
Attachment B1	Poles
Attachment B2	Services
Attachment B3	Pole Top Structure
Attachment B4	Switchgears
Attachment B5	Transformers
Attachment B6	Underground Cables
Attachment B7	Services
Attachment B8	SCADA
Attachment C	Connection Capex
Attachment D	Non Network Capex
Attachment D1	ICT
Attachment D2	Property
Attachment D3	Fleet
Attachment D4	Tools and Equipment
Attachment E	Indirect Cost

Note

This attachment forms part of Ergon Energy's justification of the ex post review of its 2018-2023 capital expenditure for submission to the AER as part of its 2025-30 Regulatory Proposal. It should be read in conjunction the main document.

The ex post review submission includes the following documents.

Ex-post Review of Ergon Energy 2018-2023 Capital Expenditure

Attachment A	Pole Replacements
Attachment B	Overhead Conductor Replacements
Attachment C	Pole Top Structure Replacements
Attachment D	Switchgear Replacements
Attachment E	Transformer Replacements
Attachment F	Underground Cable Replacements
Attachment G	Service Replacements
Attachment H	SCADA Replacements
Attachment I	Other Replacements
Attachment J	ICT Capex

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1 INTRODUCTION

Overhead service lines provide a connection for electricity between the Ergon's overhead low voltage (LV) mains and designated points of connection owned by individual customers. This asset class includes Low voltage Overhead Customer Services, Mains Overhead Service connection assets, and point of connection assets.

Our expenditure for overhead service line replacements of $122.6 million ($2024-25) over the review period was above the AER's forecast of $60.3 million ($2024-25). We have conducted a Post Implementation Review (PIR) on overhead service lines replacements to evaluate the outcomes and benefits of this expenditure. The PIR on overhead service lines replacements is set out in supporting document 5.3.17.

This paper provides the background and analysis of our expenditure on overhead service replacements to identify the causes and drivers behind the increase in expenditure.

2 ASSET MANAGEMENT PRACTICE

The asset management practice for Ergon is set out in the Asset Management Plan for Services and is consistent with ISO55000 asset management framework. In addition, a concise overview of these practices can be found in Section 8.3.5 of the Ergon Energy Distribution Annual Planning Report (DAPR) for 2022.

Ergon Energy owns and manages around 445,000[1] overhead service lines.

Overhead service lines pose the highest safety risk in terms of electrical shocks and tingles for residents and the public in houses and commercial venues within the electrical network. Failure of overhead services can result in electrical leakage, leading to shocks and tingles, and has caused serious injuries and even fatalities. Overhead service lines represent around 50% of all reported asset related shocks.

Ergon's strategy for the replacement of overhead service lines is a combination of proactive replacement through a targeted program and reactive replacement, either on electrical failure or poor condition as assessed through our asset inspections.

[1] 2021-22 CA RIN 5.2

3 OVERHEAD SERVICE LINES PERFORMANCE

As per 2021-22 CA RIN 5.2 information, around 38% of Ergon's overhead service lines' population are over 40 years old with 19% over the age of 55 years as shown in Figure 1.

Figure 1 - Age Profile

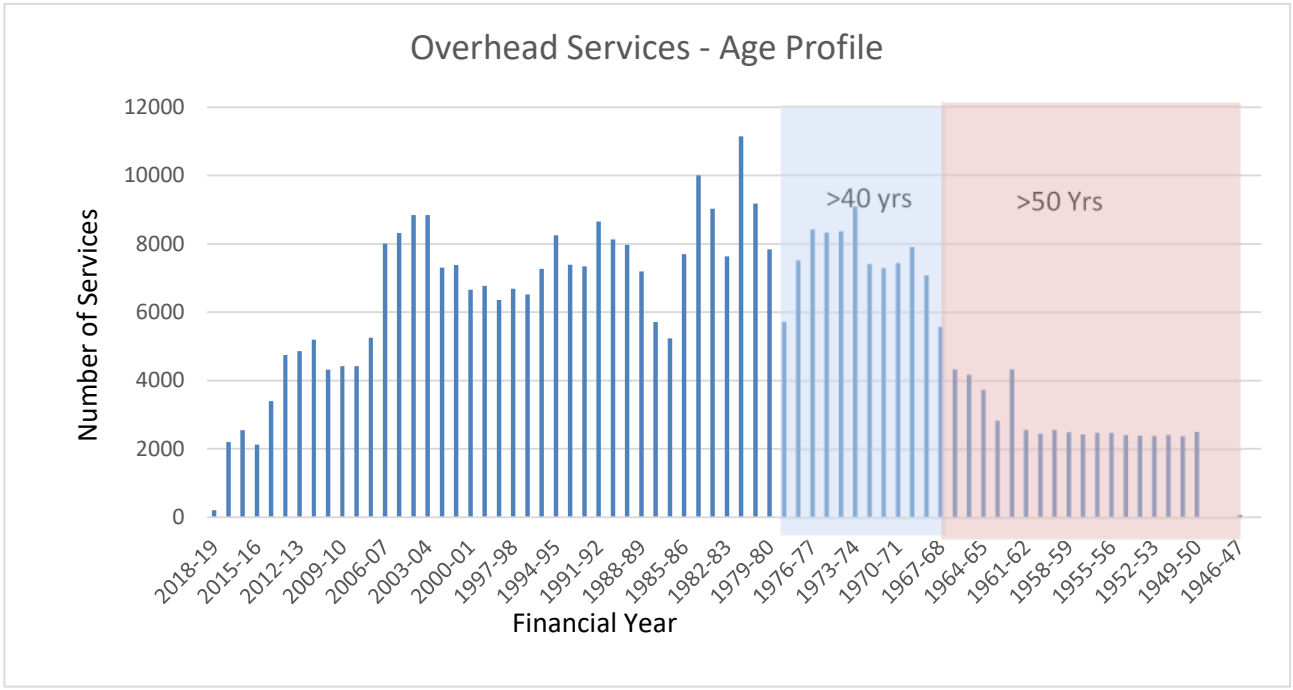


Table 1: Percentage of Services in different age categories

Age	Services	Proporton
Under 40 Years	277,654.00	62%
40-44 Years	42,753.00	10%
45-49 Years	40,731.00	9%
50-54 Years	33,723.00	8%
55-59 Years	18,834.00	4%
60-64 Years	12,339.00	3%
65-69 Years	11,709.00	3%
70 Years and Over	7,069.00	2%

Overhead service lines failures present the following significant risks:

- Failure of the neutral circuit leading to elevated risk of customer shock and fatality
- Failure of the active circuit leading to loss of customer supply
- Breakage of the service, falling to the ground and remaining energised, leading to elevated public risk of public shock.

4 2015-20 DISTRIBUTION DETERMINATION

Overhead service lines are a pre-defined asset group in the AER repex model that uses predictive modelling as a tool to estimate forecast replacement expenditure and volume.

Unless otherwise stated, all values in this section are in are $2014-15.

Table 2 is a summary of information on service lines replacements from the 2015-20 Regulatory Determination.

Table 2: 2015-20 Service Line Replacements

	SERVICE LINES 2015-2020 Determination					
$ 2014-2015 ($,000)	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	Total
Revised Regulatory Proposal	$ 11,422	$ 12,230	$ 11,668	$ 12,282	$ 12,821	$ 60,424
Repex Model Final Decision	$ 8,784	$ 8,930	$ 9,071	$ 9,216	$ 9,373	$ 45,373
AER Final Decision Allowance	$ 8,784	$ 8,930	$ 9,071	$ 9,216	$ 9,373	$ 45,374
Volume (units)	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**Total**
Revised Regulatory Proposal	7,323	7,152	8,374	7,544	8,375	38,768
Repex Model Final Decision	5,632	5,725	5,815	5,907	6,007	29,086
AER Final Decsion Allowance	5,632	5,725	5,815	5,907	6,007	29,086
Unit Cost ($)	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**Average**
Revised Regulatory Proposal	$ 1,560	$ 1,710	$ 1,393	$ 1,628	$ 1,531	$ 1,564
Repex Model Final Decision	$ 1,560	$ 1,560	$ 1,560	$ 1,560	$ 1,560	$ 1,560
AER Final Decsion Allowance	$ 1,560	$ 1,560	$ 1,560	$ 1,560	$ 1,560	$ 1,560

The key points in relation to services replacements are:

- We submitted our forecast expenditure of $62m for overhead service line replacement in the reset RIN based on a bottom-up assessment in our RP.
- In their review of our RP, EMCa noted an insufficient demonstration of a needs-based assessment regarding the forecast expenditure associated with Ergon's color-coded services.
- In our RRP, we re-submitted a repex forecast of $60 million.
- In its final decision, the AER adopted the unit costs and volumes from the calibrated repex model's outcome.

5 2020-25 DISTRIBUTION DETERMINATION

A comparison of the expenditure, volume and unit cost from the 2020-25 regulatory determination process is provided in Table 3 below.

Unless otherwise stated, all values in this section are in are $2019-20.

Table 3: Summary of 2020-25 Proposals and Decisions

	SERVICE LINES 2020-2025 Determination					
$ 2019-2020 ($,000)	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
Revised Regulatory Proposal	$ 10,335	$ 10,343	$ 10,425	$ 10,466	$ 10,434	$ 52,003
Repex Model Final Decision	$ 6,472	$ 6,462	$ 6,466	$ 6,487	$ 6,529	$ 32,416
AER Final Decision Forecast	$ 10,400	$ 10,400	$ 10,400	$ 10,400	$ 10,400	$ 52,000
Volume (units)	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
Revised Regulatory Proposal	15,288	15,287	15,274	15,268	15,273	76,390
Repex Model Final Decision	5,966	5,979	6,002	6,040	6,093	30,081
AER Final Decision Forecast	9,571	9,591	9,629	9,689	9,774	48,254
Unit Cost ($)	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Average**
Revised Regulatory Proposal	$ 676	$ 677	$ 683	$ 685	$ 683	$ 681
Repex Model Final Decision	$ 1,085	$ 1,081	$ 1,077	$ 1,074	$ 1,072	$ 1,078
AER Final Decision Forecast	$ 1,087	$ 1,084	$ 1,080	$ 1,073	$ 1,064	$ 1,078

The key points on service lines replacements from the 2020-25 regulatory determination are:

- In our RRP, we submitted a forecast expenditure of $52m. This forecast included a proactive replacement approach to address a growing number of network safety and reliability issues. This program involved proactively replacing approximately 8,500 services in poor condition annually, in addition to a forecast of 7,000 extra replacements each year to address defects and failures.
- Our proposal also included $44.0 million for a low-voltage (LV) safety program to install network monitoring devices (NMDs). The AER assessed that this program was linked with our service line replacement program and should be included in the repex model.
- The output from the repex model estimated an expenditure of $32m for the replacement of services.
- The AER's final decision did not provide any forecast for the low-voltage safety program but included an additional $20 million in service line replacements as an alternative to the LV safety program. This increased the AER's service line replacements forecast from $32 million (output from the repex model) to $52 million.

6 HISTORICAL EXPENDITURE AND VOLUMES

This section presents data from various sources including Ergon Energy Revised Regulatory Proposals, AER's repex models, AER's Final Decisions, Ergon Energy's CA RIN 2.2 Repex and CA RIN 5.2 Asset age profile as submitted to the AER.

Unless otherwise stated, all values have been converted to $2024-25 for comparison purposes.

6.1 2015-20 Actual Performance

A summary of the actual expenditure of services replacements over the 2015-20 regulatory control period is provided in Table 4 below.

Table 4 : Services Replacements 2015-2020

	SERVICE LINES					
$ 2024-2025 ($,000)	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	Total
Revised Regulatory Proposal	$ 15,071	$ 16,138	$ 15,396	$ 16,205	$ 16,917	$ 79,728
Repex Model Final Decision	$ 11,590	$ 11,783	$ 11,969	$ 12,160	$ 12,367	$ 59,869
AER Final Decision Forecast	$ 11,590	$ 11,783	$ 11,969	$ 12,160	$ 12,367	$ 59,870
Actual	$ 11,441	$ 12,186	$ 7,110	$ 12,798	$ 20,587	$ 64,121
Volume (units)	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**Total**
Revised Regulatory Proposal	7,323	7,152	8,374	7,544	8,375	38,768
Repex Model Final Decision	5,632	5,725	5,815	5,907	6,007	29,086
AER Final Decision Forecast	5,632	5,725	5,815	5,907	6,007	29,086
Actual	4,985	4,386	7,068	13,299	14,549	44,287
Unit Cost ($)	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**Average**
Revised Regulatory Proposal	$ 2,058	$ 2,256	$ 1,839	$ 2,148	$ 2,020	$ 2,064
Repex Model Final Decision	$ 2,058	$ 2,058	$ 2,058	$ 2,059	$ 2,059	$ 2,058
AER Final Decision Forecast	$ 2,058	$ 2,058	$ 2,058	$ 2,059	$ 2,059	$ 2,058
Actual	$ 2,295	$ 2,778	$ 1,006	$ 962	$ 1,415	$ 1,691

Key observations:

- Over the 2015-20 regulatory control period, we exceeded the AER's forecast by 7% for services.
- The AER's repex model forecast a total replacement of 29,086 LV services over the regulatory control period, in comparison to our RRP forecast of 38,768 LV services.
- The actual number of services replaced reported in the RIN over the five-year period was 44,287 overhead service lines.

6.2 2020-25 Actual and Estimated Performance

A summary of the actual expenditure of services replacements over the 2020-25 regulatory control period is provided in Table 5 below.

Table 5: Service Lines Replacements 2020-2025

	SERVICE LINES					
$ 2024-2025 ($,000)	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
Revised Regulatory Proposal	$ 12,510	$ 12,520	$ 12,620	$ 12,668	$ 12,630	$ 62,948
Repex Model Final Decision	$ 7,834	$ 7,822	$ 7,826	$ 7,853	$ 7,903	$ 39,238
AER Final Decision Forecast	$ 12,589	$ 12,589	$ 12,589	$ 12,589	$ 12,589	$ 62,944
Actual	$ 28,702	$ 28,129	$ 32,416	$ 24,423	$ 26,758	$ 140,428
Volume (units)	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
Revised Regulatory Proposal	15,288	15,287	15,274	15,268	15,273	76,390
Repex Model Final Decision	5,966	5,979	6,002	6,040	6,093	30,081
AER Final Decision Forecast	9,571	9,591	9,629	9,689	9,774	48,254
Actual	15,833	15,163	19,750	17,508	17,508	85,762
Unit Cost ($)	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Average**
Revised Regulatory Proposal	$ 818	$ 819	$ 826	$ 830	$ 827	$ 824
Repex Model Final Decision	$ 1,313	$ 1,308	$ 1,304	$ 1,300	$ 1,297	$ 1,304
AER Final Decision Forecast	$ 1,315	$ 1,313	$ 1,307	$ 1,299	$ 1,288	$ 1,305
Actual	$ 1,813	$ 1,855	$ 1,641	$ 1,395	$ 1,528	$ 1,647

Key observations:

- The actual expenditure of $89 million in the first three years of this regulatory control period has exceeded the AER's 5-year forecast t of $62 million.
- The annual expenditure over the regulatory control period averaged approximately $30 million.
- The average unit cost of $1,647 is 26% above the unit cost used in the AER's repex model.

6.3 Historical Trends and Performance

The charts in Figure 2 and Figure 3, below provide comparisons of the expenditure and volume of service lines replacements from the actual to the applicable RRPs, repex models and AER final decisions.

Figure 2: Services – Expenditure

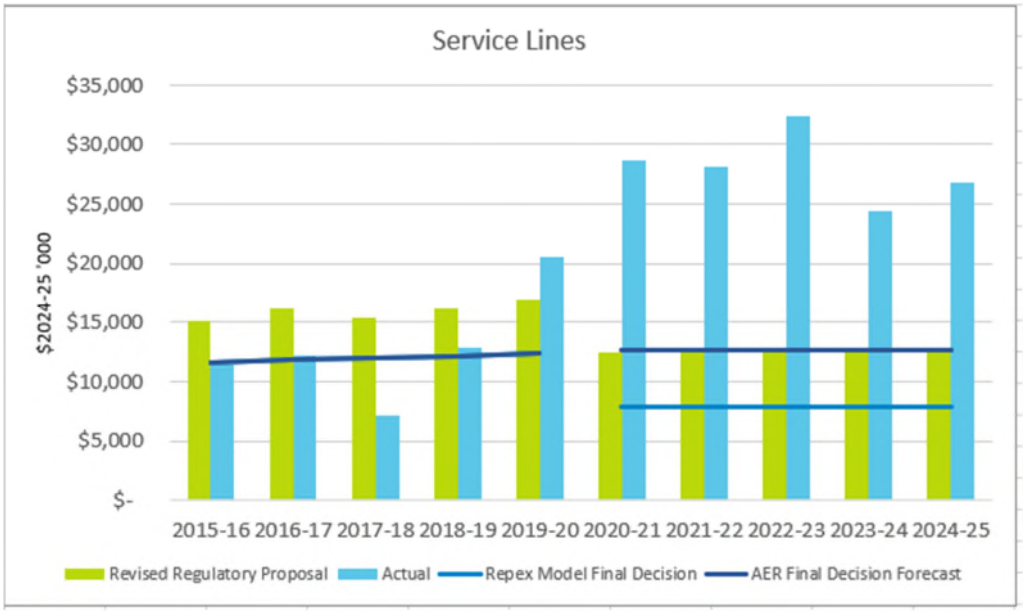
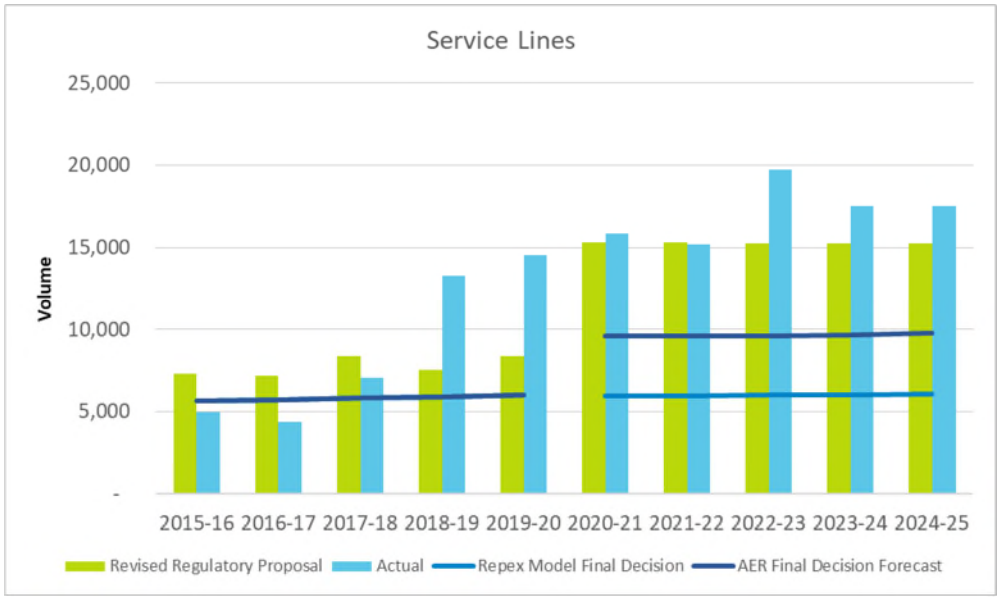


Figure 3: Services – Volume



Key observations:

- There has been an upward trend in expenditure and volume replacement from the 2018-19 onwards.
- Annual expenditure fluctuated between $7 million to $20 million in the 2015-2020 regulatory period. There was an increase in expenditure from 2018-19 onwards which was around 70% above the AER's forecast.
- Annual expenditure is relatively stable, between $28 million to $32 million in the 2020-2025 regulatory period. The expenditure has been around 160% above the AERs forecast.

7 ANALYSIS OF OVERHEAD SERVICE REPLACEMENTS

During the 2010-2018 period, we faced an increase in LV service failures. Additionally, a considerable number of Ergon's service lines were over 40 years old. This situation emphasized the need for a more proactive approach to managing ageing services, indicating that the volume of replacements would need to increase to maintain our current network performance.

In response, Ergon Energy initiated a shift toward a proactive asset management, beginning in the middle of 2015-2020 and extending into 2020-2025. This has led to an increase in our replacement volumes. Further demonstrating the need to alter our management of service line assets, during this period, our technical regulator the Electrical Safety Office issued us with:

- 10 improvements notices related to our service line assets.
- Notice to give information and produce documents to the regulator under Section 122C of the Electrical Safety Act 2022 regarding the management of Entity Neutrals, as well as a follow up notice.

8 POST IMPLEMENTATION REVIEW

We have undertaken a post implementation review (PIR) of our pole top structure replacement expenditure over the review period and compared with alternative options. This is provided in supporting document 5.3.17 Service line replacements.

The basis and assumptions used in the PIR are:

- A cost benefit analysis over a twenty-year time horizon as a period
- The options analysis is based on the different volume of replacements.
- The actual delivery or selected option expenditure and unit cost over the 5 years review period is used as the starting point.
- The base case or counterfactual is based on the implied volume using the AER forecast and the actual delivery unit cost.
- The actual unit cost is applied across all other options.
- Only cost associated with overhead service targeted and defects are included in the cost benefit analysis.
- Costs associated with replacements as a result of other projects or programs (e.g pole replacements, reconductoring, CTG/CTS) are excluded from this cost benefit analysis. They are included in the PIR of the respective asset classes.

Table 6 sets out the basis of the PIR for poles and reconciliation to the annual CA RIN 2.2

Table 6 : PIR / RIN Reconciliation

Services ($ millions nominal)	2018-19	2019-20	2020-21	2021-22	2022-23	Total
RIN total ($million)	$ 10.3	$ 16.9	$ 23.8	$ 23.8	$ 29.0	$ 103.8
Targeted	$ 3.1	$ 9.7	$ 13.7	$ 13.2	$ 13.5	$ 53.2
Defect	$ 4.7	$ 0.2	$ 3.3	$ 0.3	$ 6.6	$ 15.1
Non Defects / Added to other PIRs						
Poles	$ 1.9	$ 5.6	$ 4.4	$ 5.0	$ 6.4	$ 23.3
Conductors	$ 0.6	$ 1.3	$ 2.5	$ 5.3	$ 2.5	$ 12.2
Total PIR for Services	**$ 7.8**	**$ 9.9**	**$ 17.0**	**$ 13.5**	**$ 20.1**	**$ 68.3**

The cost benefits analysis from the post implementation review confirms that the pole top structure replacements undertaken over the review period delivered a net benefit of $27 million compared to the AER forecast.

9 REVIEW PERIOD PERFORMANCE (2018-19 TO 2022-23)

The *review period* for the ex post review spans across two regulatory control periods and two separate Distribution Determinations.

Actual and performance against the allowances set by the AER over the review period is provided in Table 7 below. Unless otherwise stated, all values have been converted to $2024-25 for comparison purposes.

Table 7 :Review Period Performance- Services Replacement

	SERVICE LINES					
$ 2024-2025 ($,000)	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Total
Revised Regulatory Proposal	$ 16,205	$ 16,917	$ 12,510	$ 12,520	$ 12,620	$ 70,772
Repex Model Final Decision	$ 12,160	$ 12,367	$ 7,834	$ 7,822	$ 7,826	$ 48,010
AER Final Decision Forecast	$ 12,160	$ 12,367	$ 12,589	$ 12,589	$ 12,589	$ 62,294
Actual	$ 12,798	$ 20,587	$ 28,702	$ 28,129	$ 32,416	$ 122,631
Volume (units)	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**Total**
Revised Regulatory Proposal	7,544	8,375	15,288	15,287	15,274	61,768
Repex Model Final Decision	5,907	6,007	5,966	5,979	6,002	29,862
AER Final Decision Forecast	5,907	6,007	9,571	9,591	9,629	40,705
Actual	13,299	14,549	15,833	15,163	19,750	78,594
Unit Cost ($)	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**Average**
Revised Regulatory Proposal	$ 2,148	$ 2,020	$ 818	$ 819	$ 826	$ 1,326
Repex Model Final Decision	$ 2,059	$ 2,059	$ 1,313	$ 1,308	$ 1,304	$ 1,609
AER Final Decision Forecast	$ 2,059	$ 2,059	$ 1,315	$ 1,313	$ 1,307	$ 1,611
Actual	$ 962	$ 1,415	$ 1,813	$ 1,855	$ 1,641	$ 1,537

Key observations:

- Our overhead service expenditure was above the AER's forecast over 2018-23 by 98% for service lines.
- We have exceeded the AER's overhead service line repex model forecast volume in every year of the review period.

9.1 Adjustments for CTG/CTS

As discussed in our overview paper, CTG/CTS programs are better reflected as an augex program. Hence, from 2021-22 onwards all clearance programs are categorised as augex. Going forward, Ergon Energy will be reporting costs associated with the clearance programs as augex instead of repex.

Table 8 present a summary of the AER allowance with and without the CTG/CTS where:

- The AER Final Decision Forecast includes the notional amount of CTG/CTS.
- Actual as reported in RIN with CTG/CTS in repex from 2018-19, 2019-20 and 2020-21
- Adjusted AER Decision Forecast is the allowance without the notional amount of CTG/CTS
- Adjusted Actual shows repex with expenditure for CTG/CTS in 2018-19, 2019-20 and 2020-21 removed from the pole replacement category.

Table 8: Review Period Performance – excluding CTG/CTS

	SERVICE LINES					
		.9-2020	2020-2021	2021-2022	2022-2023	Total
AER Final Decision Forecast	$ 12,160	$ 12,367	$ 12,589	$ 12,589	$ 12,589	$ 62,294
		20,587	$ 28,702	$ 28,129	$ 32,416	$ 122,631
Adjusted AER Forecast (without CTG/CTS)	$ 12,160	$ 12,367	$ 11,960	$ 12,589	$ 12,589	$ 61,665
Adjusted Actual (CTG/CTS removed in 18-19,19-20 and 20-21)	$ 11,223	$ 17,031	$ 24,024	$ 28,129	$ 32,416	$ 112,823

10 JUSTIFICATION STATEMENT

We submit that the expenditure for replacement of overhead services over the *review period* is prudent and efficient as demonstrated by

- The PIR shows that the replacement of targeted and defective overhead services was prudent and delivered a net benefit of $27 million compared to the AER's forecast option.
- The remaining units of overhead services were replaced as part of other works such as pole replacement and conductor replacement and they have been separately cost justified as part of those PIRs.

We therefore submit that all the repex on overhead service incurred over the review period are required and should be rolled into our RAB.