Cost Comparison of Energex RIN Unit Costs to the NEM

In support of the Energex Regulatory Proposal 2025-30

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Part of Energy Queensland

Contents

List of Tables

List of Figures

1 PURPOSE AND SCOPE

The purpose of this document is to compare our historic unit rate performance, as revealed in our Regulatory Information Notices (RIN) with other Distribution Network Service Providers (DNSPs) in the National Electricity Market (NEM). The scope of this document is limited to the comparison of the unit costs associated with our replacement expenditure in the Energex network.

2 RIN REPORTING

As part of RIN workbook 2.2, all DNSPs regulated by the Australia Energy Regulator (AER) are required to annually submit their replacement expenditure and units replaced. The majority of a DNSPs replacement expenditure tends to be the replacement of high volume, relatively low value assets such as pole, pole-top structures (cross-arms), pole-top and pad-mounted transformers, pole-top switches, and overhead conductor.

The RINs are reported at a granular level by asset category. That is, DNSPs are required to report on the cost associated with replacing an individual asset such as a pole, even if the pole was replaced with several other assets at the same time. Furthermore, each asset category broken down further by either voltage or function, providing a significant amount of data to assess the unit rates associated with replacement of individual assets.

As an example, Table 1 shows the 2.2 Repex workbook that Energex reported for poles for the financial year 2021-22[1].

Table 1 – 2.2 Repex Workbook for Pole Replacements 2021-22

Pole Type[2]	Expenditure ($m)	Asset Replacements	Asset Failures
Staking of a wooden pole	9,045,812	5,172	-
< = 1 kV; Wood	33,585,766	6,325	11
> 1 kV & < = 11 kV; Wood	21,888,782	3,703	17
> 11 kV & < = 22 kV; Wood	21,888,782	3,703	72
> 22 kV & < = 66 kV; Wood	7,534,581	780	14
> 66 kV & < = 132 kV; Wood	121,625	16	-
> 1 kV & < = 11 kV; Concrete	409,726	53	-
> 11 kV & < = 22 kV; Concrete	51,313	2	-
> 66 kV & < = 132 kV; Concrete	143,352	-	-
> 132 kV; Concrete	193,360	-	-

[1] Note that those asset categories without any expenditure or replacements have been excluded from Table 1 for simplicity.
[2] It should be noted that RIN expenditure is reported as incurred, while replacement volumes are reported on project completion. This means that there are circumstances where expenditure is reported without a corresponding replacement volume.

Generally, our asset replacement programs involve the replacement of multiple assets as a bundled work package. For example, where we have identified a defective pole that requires replacement based on its condition, we are likely to replace other assets that are attached to the pole at the same time such as the cross-arms attached to that pole. This allows the for the prudent replacement of assets that may also be likely to fail in the short to medium term which would have required us to return to the same site to replace these in the future. It also allows a more efficient delivery of the pole replacement where it may be difficult and more time consuming to re-establish the existing asset rather than a new one, as well as reducing planned outage on our network for future replacements, and unplanned outages for in-service failure of assets in poor condition.

Given our delivery of programs in a more bundled way, our method of reporting our RIN by asset categories is to apportion our replacement expenditure in a program on a pro-rated basis with the material cost of the assets being replaced. This is a consistent and repeatable process for us to report on expenditure in individual categories. Hence, in assessing the efficiency of our program delivery it is important that we consider the way our program is constructed.

This is particularly important when comparing costs against other DNSPs. All DNSPs bundle work together for delivery efficiency and the method of apportioning costs will vary slightly by each business. However, if we were to reconstruct a typical program delivery element, we are better able to assess and compare the efficiency of delivery.

Section 3.1 outlines our estimations of program delivery and the typical set of replacement items that we undertake as our major programs of work.

3 PROGRAM APPROACH

3.1 Basket of Goods

Energex's expenditure in both the ex-post review period and the forward 2025-2030 regulatory control period has a significant portion of expenditure related to the replacement of defective poles, and the replacement of overhead conductors. Both programs have significant portions of "consequential" replacements. That is, when we replace a defective pole, we replace assets that are attached to the pole where prudent and efficient to do so.

As discussed in our set of Business Case for Pole Replacements, replacing a pole involves re-establishing the existing equipment that exists on the pole. This means that the only incremental cost of also replacing a cross-arm or pole-top transformer with the pole is the material cost of the asset. We assess the condition of these assets, and where there is merit in establishing a new asset considering the risk of failure of the old asset, we install a new asset on the pole.

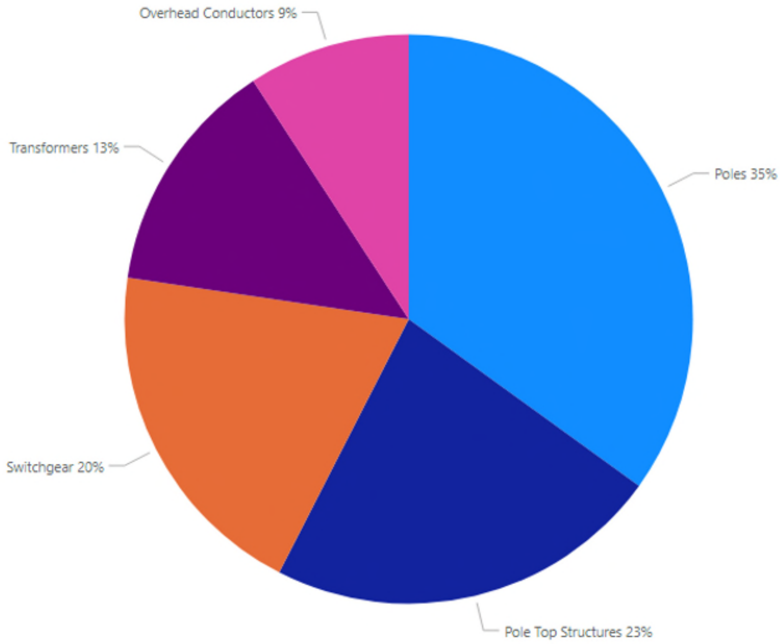
To test the efficiency of our costs for these key programs in our expenditure, we have assessed the average levels of consequential replacement for our three key programs and utilising the Repex RIN revealed unit rates for each DNSP to reconstruct a unit rate for the delivery of that basket of goods. In presenting these results we have de-identified individual DNSP data.

In undertaking this analysis, we have not been able to incorporate 2022/23 results as we didn't have access other DNSP RIN data at the time of writing. Furthermore, as a related party we have removed Ergon from this assessment so as not to influence the results.

3.1.1 Pole Replacement Costs

The cost build-up for an average pole replacement is shown in Figure 1.

Figure 1 – Pole Replacement Cost Build-up

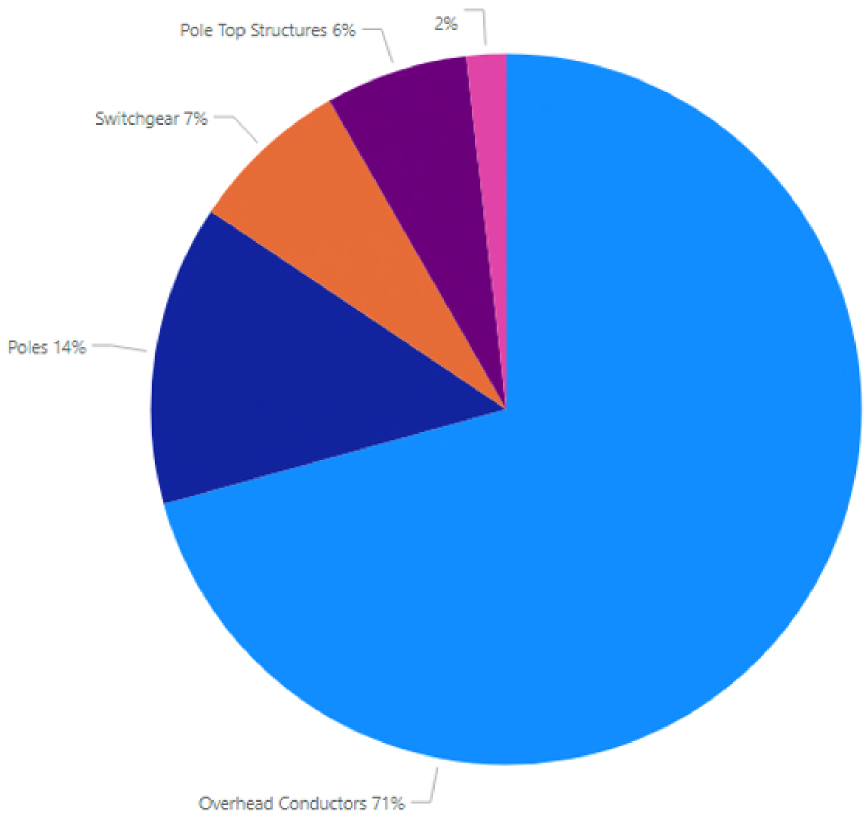


As Figure 1 shows, around 35% of the costs associated with pole replacements is for the pole itself, while significant portion of our costs are allocated to replacing the items of plant that are attached to the pole. Pole-top structures, mainly cross-arms, and switches such as fuses and air-break switches make up the largest portion of the other costs.

3.1.2 Reconductoring Programs Replacement Costs

We have two major reconductoring programs as part of our Program of Work – namely Low Voltage and High Voltage (11kV and 22kV) reconductoring programs. The cost build-up for an average LV reconductoring program is shown in Figure 2.

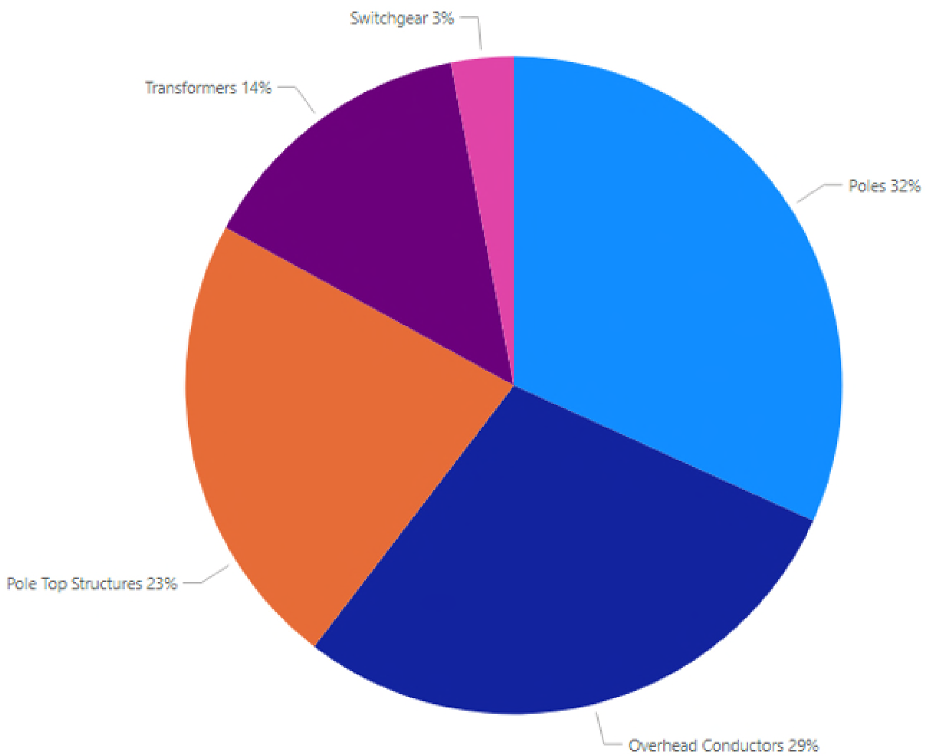
Figure 2 – LV Reconductoring Cost Build-up



As shown in Figure 2, for our LV reconductoring program, most of our costs are allocated to the replacement of the conductor itself. In renewing our conductor assets, expenditure on pole replacements is the next largest component, with switches and pole-top structures also making up a reasonable amount of the expenditure.

Figure 3 shows the cost build-up for our HV reconductoring program.

Figure 3 – HV Reconductoring Cost Build-up



For HV reconductoring, 29% of the cost is allocated to overhead conductor replacement itself, with the remainder of expenditure allocated to pole-top structures, poles, switchgear, transformers, and services. We average around 3 pole replacements per km as part of our typical delivery of this program.

3.2 Program Approach

Utilising the revealed Repex 2.2 RIN expenditure by asset category, pole replacements and HV and LV reconductoring make up around 30% of our total repex. This contrasts with the way our program of work is delivered, with our pole replacement, HV reconductoring and LV reconductoring programs being approximately 50% of our replacement expenditure. This means in assessing the efficiency of our program delivery, it is important to assess the way the work is bundled, particularly in the context of the complexity of the RIN allocation methods, and the different ways that each DNSP report their RINs.

For transparency and repeatability, our approach to comparing our costs utilises the reported RIN costs for each DNSP. Using these reported costs, we have constructed our typical delivery of the key programs outlined in section 3.1 using the unit rates of each element and proportionally incorporating these into a program cost. This ensures that there is a like-for-like comparison between our program delivery and the cost that other DNSPs would have delivered the same set of work for.

3.3 Results

3.3.1 Pole Replacements

We have constructed a DNSP Pole replacement overall delivery index to assess our relevant efficiency compared to other DNSPs. The basket of goods that these unit rates have been constructed on are outlined in Appendix A. Utilising these inputs, Table 2 outlines the basket of goods unit rates for each DNSP in the NEM. As discussed previously, Ergon Energy Network is not included in this analysis and does not appear in Table 2.

Table 2 – Pole Replacement DNSP Unit Rates ($2024-25)

DNSP	18/19	19/20	20/21	21/22
DNSP A	18,008	26,279	25,545	26,894
DNSP B	-	-	4,785	124,820
DNSP C	38,764	38,802	37,891	41,399
DNSP D	9,717	9,416	9,685	11,538
DNSP E	8,216	8,473	9,968	8,308
DNSP F	10,417	10,340	9,856	10,051
DNSP G	7,588	10,005	8,098	7,728
DNSP H	3,512	6,420	27,379	2,604
DNSP I	-	-	17,895	21,161
DNSP J	33,104	38,034	36,853	47,263
DNSP K	7,385	14,455	2,468	1,962
DNSP L	1,655	2,065	1,577	2,105

It should be noted that networks with limited overhead assets are unlikely to replace poles at a rate that would produce an accurate reflection of an efficient level of expenditure for that business. Because of this, we have provided the average cost with all DNSPs included, as well as with the highest and lowest excluded from the calculation.

As Table 2 shows, the constructed unit rates vary significantly, with the lowest rate at $1,577 / pole, with the highest rate at $124,820 / pole. Key metrics for pole replacement costs include:

- Energex average unit rate: $10,596 / pole
- Average median rate: $12,065 / pole
- Average rate: $21,873 / pole
- Average rate, excluding best and worst performers: $18,395 / pole. These were typically DNSP L as the lowest, and DNSP C as the highest.

Table 3 shows Energex's performance against the median and average cost metrics shown in Table 2.

Table 3 – Pole Replacement Comparison of Costs ($2024-25)

Cost Comparison	18/19	19/20	20/21	21/22
Energex	10,218	10,350	12,014	9,801
Median	11,152	12,426	11,947	12,734
Mean inclusive of outliers	18,072	20,069	19,285	30,065
Mean exclusive of outliers	15,227	18,846	18,385	21,122

As Table 3 outlines, we have been below the median unit cost for our pole replacements for all four years of the ex-post period. Our average performance across the four years is below the average and median cost throughout the NEM, part from 20/21 where we were above median by around $60 / pole. Furthermore, we have been consistently below the average unit cost for the NEM, as well as the average unit cost excluding the highest and lowest values. This analysis demonstrates that the delivery of pole replacements compares favourably with other DNSPs across the NEM, being below both the median and average unit costs across the NEM.

3.3.2 LV Conductor Replacement Results

We have constructed a DNSP LV Conductor program overall delivery index to assess our relevant efficiency compared to other DNSP. The basket of goods that these unit rates have been constructed on are outlined in Appendix A. Utilising these inputs, Table 4 outlines the unit rates for each DNSP in the NEM. As discussed previously, Ergon Energy Network is not included in this analysis and does not appear in Table 4.

Table 4 – LV Conductor Replacement DNSP Unit Rates ($2024-25)

DNSP	18/19	19/20	20/21	21/22
DNSP A	172,975	400,265	237,982	358,054
DNSP B	-	-	108,409	535,569
DNSP C	198,987	167,940	199,440	207,872
DNSP D	135,151	153,553	155,469	157,547
DNSP E	151,279	224,081	99,048	94,831
DNSP F	62,751	105,003	155,682	72,906
DNSP G	-	-	653,173	355,617
DNSP H	203,377	309,169	161,718	217,338
DNSP I	131,787	80,529	35,802	36,208
DNSP J	82,813	391,521	150,878	151,718
DNSP K	5,089,540	3,169,875	312,038	155,739
DNSP L	74,729	64,616	72,580	64,843

It should be noted that networks with limited overhead assets are unlikely to replace conductor at a rate that would produce an accurate reflection of an efficient level of expenditure for that business. Because of this, we have provided the average cost with all DNSPs included, as well as with the highest and lowest excluded from the calculation. As Table 4 shows, the constructed unit rates vary significantly, with the lowest rate at $35,802 / km, with the highest rate at $5.1 million / km. Key metrics for LV conductor replacement include:

- Energex average unit rate: $181,655 / km
- Average median unit rate: $162,861 / km
- Average unit rate: $383,216 / km
- Average unit rate, excluding best and worst performers: $180,092 / km. These were typically DNSP I & L as the lowest cost, and DNSP B, G and K as the highest.

Table 5 outlines Ergon performance against the median and average cost metrics shown in Table 4.

Table 5 – LV Reconductoring Comparison of Costs ($2024-25)

Cost Comparison	18/19	19/20	20/21	21/22
Energex	167,324	146,307	231,611	181,379
Median	143,215	196,011	155,575	156,643
Mean, inclusive of outliers	630,339	506,655	195,185	200,687
Mean, exclusive of outliers	142,390	229,008	165,324	183,647

As Table 5 outlines, we have been above the median unit cost for our LV reconductoring program for three of the four years of the ex-post period. On average, we have only been 12% above the median across the four years. However, our average performance across the four years is below the average unit rates for three of the four years of the period. This analysis demonstrates that our delivery of our LV reconductoring program is generally in line with other DNSPs across the NEM, being below both the median and average unit costs across the NEM for the first four years of the ex-post review period.

3.3.3 HV Conductor Replacement

We have constructed a DNSP HV Conductor program overall delivery index to assess our relevant efficiency compared to other DNSPs. The basket of goods that these unit rates have been constructed on are outlined in Appendix A. Utilising these inputs, Table 6 outlines the unit rates for each DNSP in the NEM. As discussed previously, Ergon Energy Network is not included in this analysis and does not appear in Table 6.

Table 6 – HV Conductor Replacement DNSP Unit Rates ($2024-25)

DNSP	18/19	19/20	20/21	21/22
DNSP A	142,163	180,068	166,839	227,640
DNSP B	-	-	88,404	616,384
DNSP C	269,102	117,261	240,750	244,647
DNSP D	137,345	132,838	134,511	163,896
DNSP E	149,498	230,036	96,161	95,374
DNSP F	58,491	116,154	138,948	25,236
DNSP G	-	-	168,785	73,269

DNSP	18/19	19/20	20/21	21/22
DNSP H	107,134	96,597	66,441	97,135
DNSP I	296,515	70,064	12,877	12,212
DNSP J	72,004	149,318	99,441	78,504
DNSP K	61,376	100,176	1,371,040	420,337
DNSP L	81,351	71,904	80,214	73,874

It should be noted that networks with limited overhead assets are unlikely to replace a section of conductor at a rate that would produce an accurate reflection of an efficient level of expenditure for that business. Because of this, we have provided the average cost with all DNSPs included, as well as with the highest and lowest excluded from the calculation. As Table 6 shows, the constructed unit rates vary significantly, with the lowest rate at $12,212 / km, with the highest rate at $1,371,040 / km. Key metrics for HV conductor replacement include:

- Average Energex unit rate: $182,064 / km
- Average NEM median unit rate: $176,016 / km
- Average unit rate: $237,538 / km
- Average rate, excluding best and worst performers: $205,331 / km. These were typically DNSP J as the lowest cost, and DNSP K as the highest.

Table 7 outlines Ergon performance against the median and average cost metrics shown in Table 6.

Table 7 – HV Reconductoring Comparison of Costs ($2024-25)

Cost Comparison	18/19	19/20	20/21	21/22
Energex	72,348	63,891	97,720	78,967
Median	122,240	116,708	116,976	96,255
Mean, inclusive of outliers	136,980	120,483	222,034	177,376
Mean, exclusive of outliers	130,923	120,539	128,049	149,991

As Table 7 outlines, we have been below the median unit cost for our HV reconductoring program for all four years of the period. Our average performance across these four years is also below the average median cost throughout the NEM and is below the overall average cost for the same collection of work. This analysis demonstrates that our delivery of our HV reconductoring program compares favourably to other DNSPs in the NEM, being around the median rate and below the average unit costs across the NEM for each year of the ex-post period for which we have data.

3.3.4 Transformer Replacement Results

We have constructed a DNSP Distribution transformer program overall delivery index to assess our relevant efficiency compared to other DNSPs. The unit rates that we have constructed are based on:

- The unit costs of one distribution transformer replacement, weighted by the level of replacement for each DNSP.
- 160% of the unit cost of fuse replacement: this represents the fuse holders and associated equipment, with 20% of the costs are associated with fuses themselves, which are expendable items and not generally associated with the replacement of the transformer itself. We have then assumed that two fuse sets will be required for a transformer replacement – HV and LV sides of the transformer.

Utilising these inputs, Table 8 outlines the unit rates for each DNSP in the NEM. As discussed previously, Ergon Energy Network is not included in this analysis and does not appear in Table 8.

Table 8 – Transformer Replacement DNSP Unit Rates ($2024-25)

DNSP	18/19	19/20	20/21	21/22
DNSP A	609,957	590,749	219,011	233,156
DNSP B	-	-	12,558	20,434
DNSP C	156,850	156,697	132,310	-
DNSP D	187,267	106,887	118,853	30,542
DNSP E	51,052	63,390	48,518	61,877
DNSP F	64,694	50,018	38,927	42,320
DNSP G	33,542	13,663	14,214	11,872
DNSP H	353,971	117,911	143,586	-
DNSP I	-	-	99,576	59,208
DNSP J	22,951	25,195	21,326	10,195
DNSP K	78,762	60,734	46,964	-
DNSP L	42,487	57,042	53,067	-

It should be noted that networks with limited overhead assets are unlikely to replace a section of conductor at a rate that would produce an accurate reflection of an efficient level of expenditure for that business. Because of this, we have provided the average cost with all DNSPs included, as well as with the highest and lowest excluded from the calculation. As Table 9 shows, the constructed unit rates vary significantly, with the lowest rate at $9k / transformer and fuse set, with the highest rate $490k / transformer and fuse set. Key metrics for LV conductor replacement include:

- Energex average unit rate: $56,209 / transformer
- Average median unit rate: $50,996 / transformer
- Average unit rate: $88,799 / transformer
- Average unit rate, excluding best and worst performers: $77,564 / transformer. These were typically DNSP G and J as the lowest, and DNSP H as the highest.

Table 9 outlines Ergon performance against the median and average cost metrics shown in Table 8.

Table 9 – Transformer Replacement Comparison of Costs ($2024-25)

Cost Comparison	18/19	19/20	20/21	21/22
Energex	51,052	63,390	48,517	61,877
Median	57,873	58,888	50,792	36,431
Mean, inclusive of outliers	133,461	103,524	79,076	39,134
Mean, exclusive of outliers	121,078	79,734	71,734	37,709

As Table 9 outlines, we have been below the median unit cost for our transformer replacements for two of the four years of the ex-post period. Our average performance across the four years is slightly higher than the average median cost throughout the NEM. One of the years where we were above the median was 21/22, which was an outlier year where five of the DNSPs in the NEM replaced no distribution transformers for the financial year. We are also significantly below the average unit rates for three of the four years of the period, and significantly below the average even excluding outliers from the analysis.

This analysis demonstrates that our delivery of our transformer replacement compares favourably to other DNSPs in the NEM, being below both the median and average unit costs across the NEM across the ex-post review period.

4 PROJECT COST REVIEW

To assess the efficiency of our costs on discrete projects in our program of work, we asked Turner and Townsend to assess our standard estimates for key pieces of work with industry benchmarks. Turner and Townsend undertook an assessment of the ratio of labour to non-labour ratios across these projects. Turner and Townsend found: *"that execution packages as a whole package is well within industry standard benchmarks".*

5 CONCLUSION

Through this analysis, we have assessed the major contributors to our program of work and how we compare against other DNSPs in the NEM. On all major programs of work, we are below the median and average unit rates across the NEM in delivering our bundles of work. The work selected in this analysis makes up a significant portion of our network and encompasses the replacement of all major distribution lines assets. This shows that we have been efficient in the delivery of our works program for across the ex-post review period for which data was available. We will update this work to incorporate the final year of the period when this becomes available.

Furthermore, our forecast work for 2025-2030 utilises our average unit rates delivered across this period. By ensuring that our forecast costs are in line with our historic efficient delivery of work, we have demonstrated that our regulatory proposal utilises efficient costs for the 2025-2030 regulatory control period. The unit rate review conducted by Turner and Townsend has also demonstrated that our costs for discrete project work is also within industry benchmarks, reflecting that our overall program costs compare favourably with industry benchmarks.

APPENDIX A – CONSTRUCTION OF UNIT RATES

The construction of unit rates for our LV conductor replacement program, HV conductor replacement program and our Pole replacement program is shown in Table 10 to Table 12.

Table 10 – Construction of Pole Replacement

Copperleaf Resource Code	Units
Pole: < = 1 kV; Wood	0.025
Pole: > 1 kV & < = 11 kV; Concrete	0.027
Pole: > 1 kV & < = 11 kV; Wood	0.754
Pole: > 22 kV & < = 66 kV; Wood	0.023
Pole: > 66 kV & < = 132 kV; Wood	0.012
Pole Top Structure: < = 1 kV	0.764
Pole Top Structure: > 1 kV & < = 11 kV	1.251
Pole Top Structure: > 22 kV & < = 66 kV	0.012
Overhead Conducter: < = 1 kV	0.002
Overhead Conducter: > 11 kV & < = 22 kV ; SWER	0.000
Overhead Conducter: > 1 kV & < = 11 kV	0.004
Overhead Conducter: > 22 kV & < = 66 kV	0.002
Service Lines: < = 11 kV ; Residential/ Commercial & Industrial; Simple Type	0.671
Transformers: Pole Mounted ; < = 22kV ; < = 60 kVA ; Multiple Phase	0.008
Transformers: Pole Mounted ; < = 22kV ; < = 60 kVA ; Single Phase	0.006
Transformers: Pole Mounted ; < = 22kV ; > 60 kVA and < = 600 kVA ; Multiple Phase	0.062
Switchgear: < = 11 kV ; Switch	0.559
Switchgear: < = 11 kV ; Circuit Breaker	0.002

Table 11 – Construction of LV Conductor Replacement

Copperleaf Resource Code	Units
Pole: < = 1 kV; Wood	1.129644006
Pole: > 1 kV & < = 11 kV; Concrete	0.000168211
Pole: > 1 kV & < = 11 kV; Wood	1.976325505
Pole: > 22 kV & < = 66 kV; Wood	0.19359563
Pole Top Structure: < = 1 kV	2.013432714
Pole Top Structure: > 1 kV & < = 11 kV	3.637268654
Overhead Conducter: < = 1 kV	1
Service Lines: < = 11 kV ; Residential/ Commercial & Industrial; Simple Type	9.251015801
Transformers: Pole Mounted ; < = 22kV ; < = 60 kVA ; Multiple Phase	0.040858703
Transformers: Pole Mounted ; < = 22kV ; > 60 kVA and < = 600 kVA ; Multiple Phase	0.055778181
Switchgear: < = 11 kV ; Switch	1.319231877
Switchgear: > 22 kV & < = 33 kV ; Switch	0.111524164

Table 12 – Construction of HV Conductor Replacement

RIN Asset Category	Units Included
Pole: < = 1 kV; Wood	0.124050992
Pole: > 1 kV & < = 11 kV; Concrete	0.00097174
Pole: > 1 kV & < = 11 kV; Wood	2.452569015
Pole: > 22 kV & < = 66 kV; Wood	0.176845681
Pole: > 66 kV & < = 132 kV; Wood	0.008446659
Pole Top Structure: < = 1 kV	1.665066815
Pole Top Structure: > 1 kV & < = 11 kV	6.967447568
Pole Top Structure: > 22 kV & < = 66 kV	0.027316459
Overhead Conductor: < = 1 kV	1
Service Lines: < = 11 kV ; Residential/ Commercial & Industrial; Simple Type	1.886298241
Transformers: Pole Mounted ; < = 22kV ; < = 60 kVA ; Multiple Phase	0.118922811
Transformers: Pole Mounted ; < = 22kV ; < = 60 kVA ; Single Phase	0.067335095
Transformers: Pole Mounted ; < = 22kV ; > 60 kVA and < = 600 kVA ; Multiple Phase	0.12727599
Switchgear: < = 11 kV ; Switch	0.322497746