Category benchmarking metrics for DNSPs

The benchmarking metrics set out below are derived from recently collected RIN data over which there have been no confidentiality claims.

AER staff have made observations about the information, and seek input from DNSPs to assist in contextualising them and identifying caveats in the data used. These cover a number of areas of interest for our analysis, but are by no means exhaustive, and DNSPs are welcome to provide comment on any of the metrics included in the document. DNSPs should pay particular attention to those metrics where observations for their network appear materially differ from the average or the best performer.

In many cases, when considering each metric we have looked at both the metric on its own and compared against customer density. This is because some metrics may favour urban DNSPs and others may favour rural DNSPs. Normalising by customer density provides a visualisation of which DNSPs are rural and which are urban. This makes it easier take this into account when making observations.

These metrics may be affected by DNSPs' estimation methodologies. That is the metrics may be affected by:

- Allocation of costs to services (for example alternative control and standard control);
- The method used to split direct and indirect costs; and
- Allocation of costs to cost categories.

Despite these differences, we consider these metrics a useful tool when used in conjunction with other information. For example:

- When the split between services appears to affect metrics standard control and alternative control metrics will both be used;
- In instances where the split between direct and indirect costs, or cost categories, appear to affect metrics, costs can be compared at the aggregate category level or at total expenditure level.

1. Opex analysis

Figure 1.1 Comparison of opex by opex category: averages 2009-13 ($000, 2014)

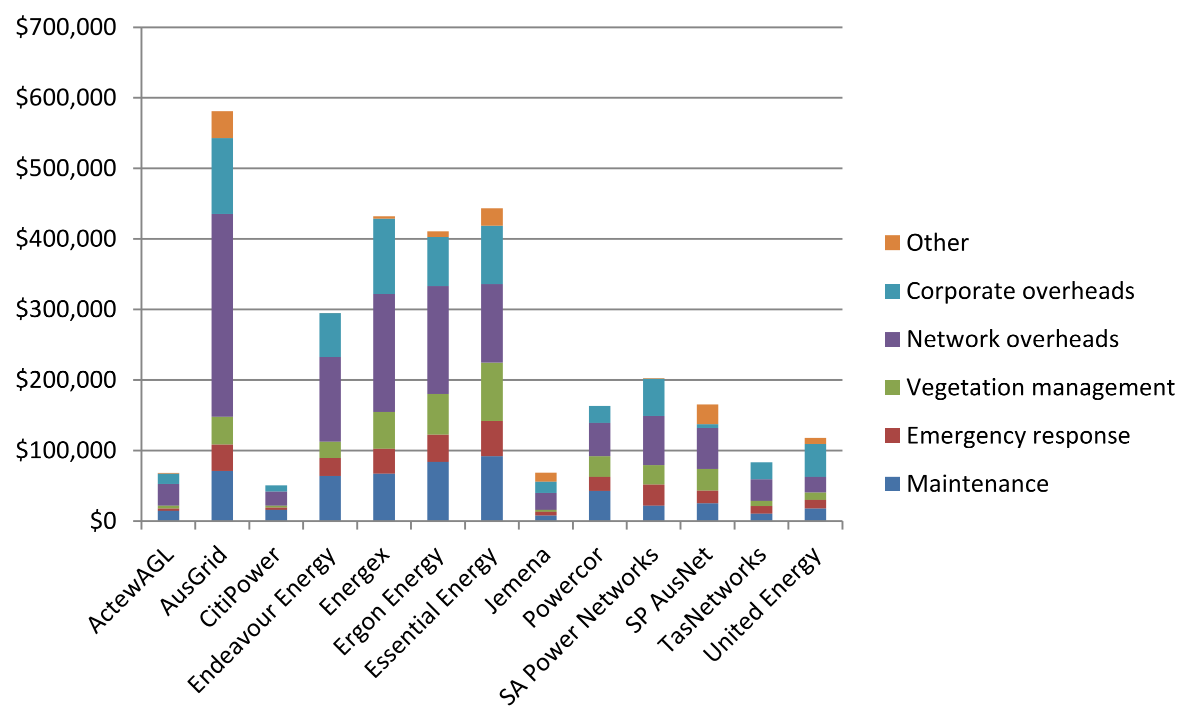
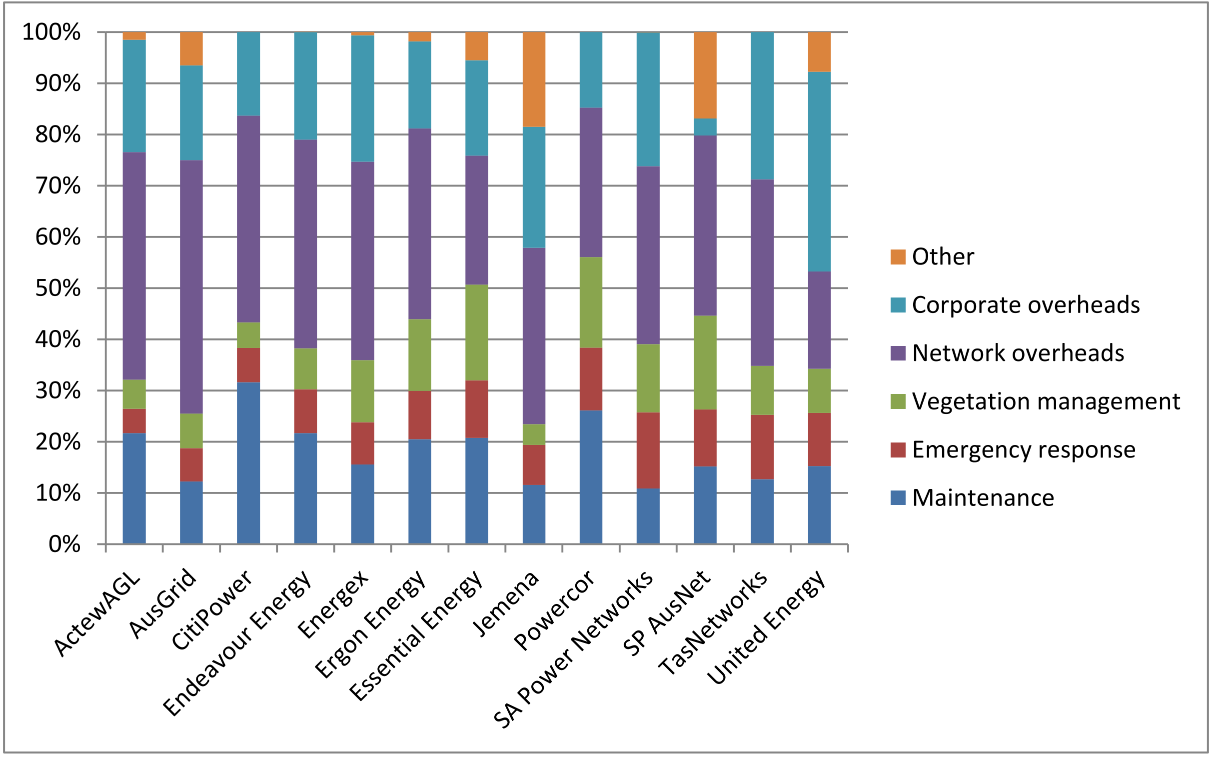


Figure 1.2 Comparison of opex by opex category: averages 2009-13



- Ausgrid and JEN appear to have a high proportion of overheads relative to total opex. Conversely Powercor seems to have a low proportion of overheads.
- Other costs are the difference between total opex and the opex categories in the graph. As a result these are mostly non-network costs, most DNSPs have classified these as corporate overheads.

Figure 1.3 Maintenance per customer ($2014)

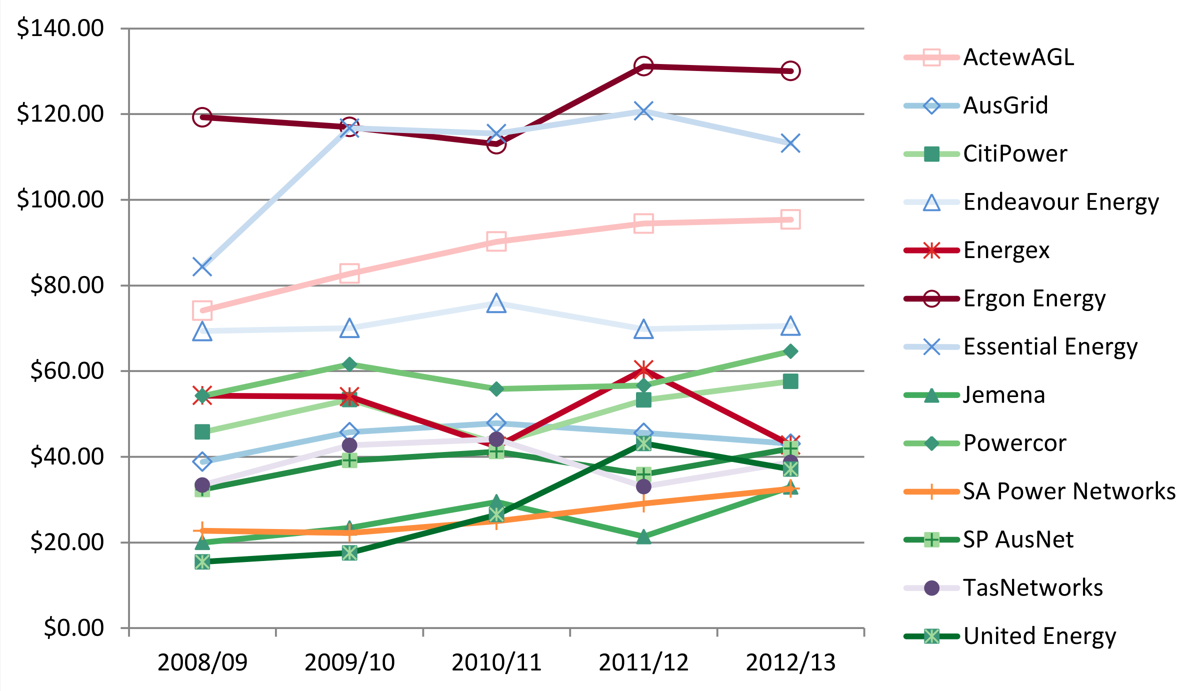
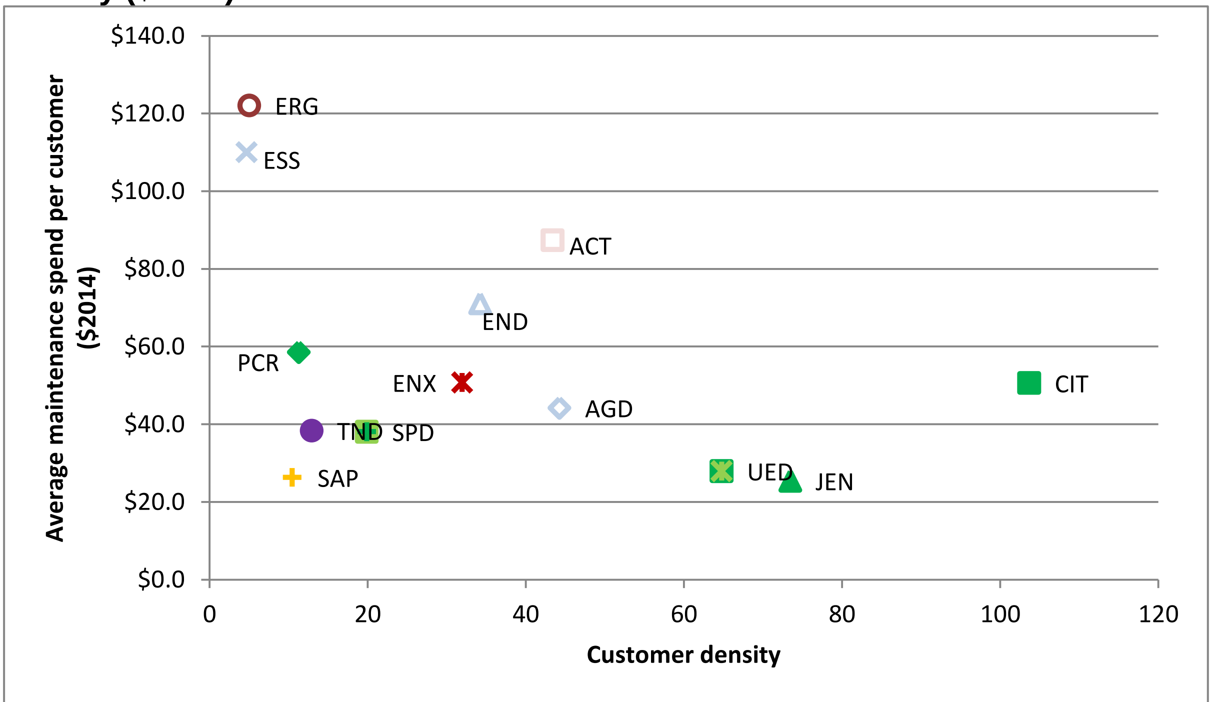


Figure 1.4 Average maintenance per customer for 2009-2013 against customer density ($2014)



- ActewAGL, Endeavour, Ergon, and Essential appear to be above their peers on this metric.
- Because this is a per customer metric DNSPs should be compared to others with similar densities.
- When this is done ActewAGL, Citipower, Endeavour, Energex, Ergon, Essential, and Powercor appear to be above their peers.

Figure 1.5 Maintenance per km of circuit ($2014)

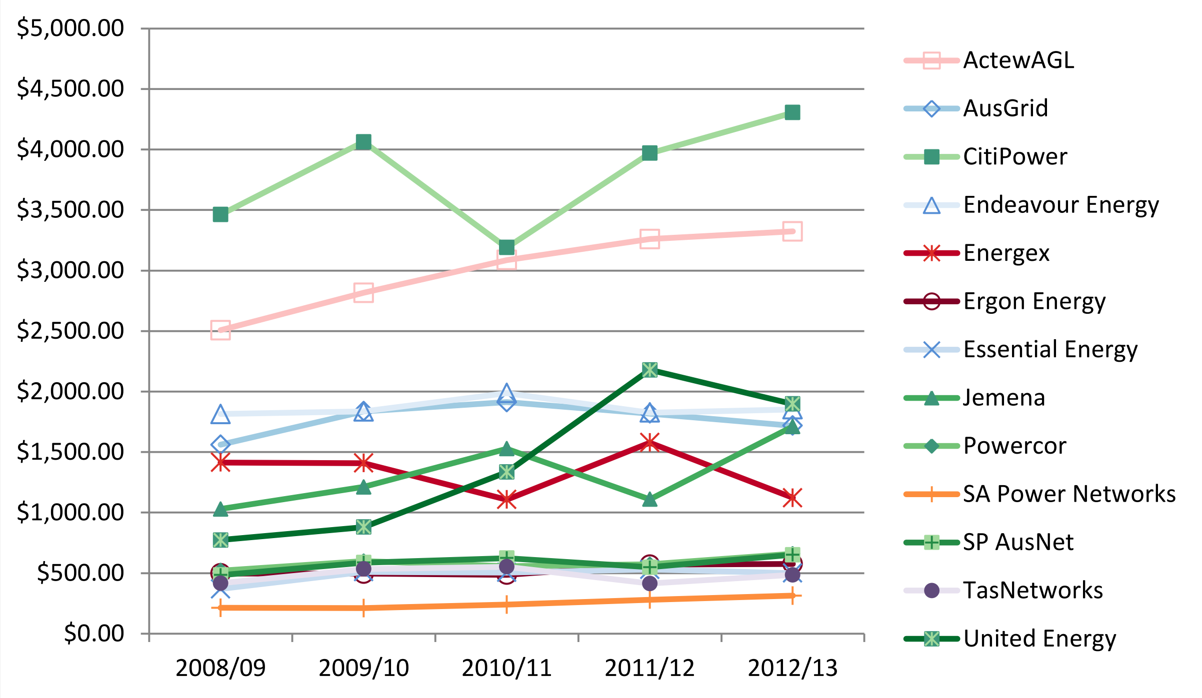
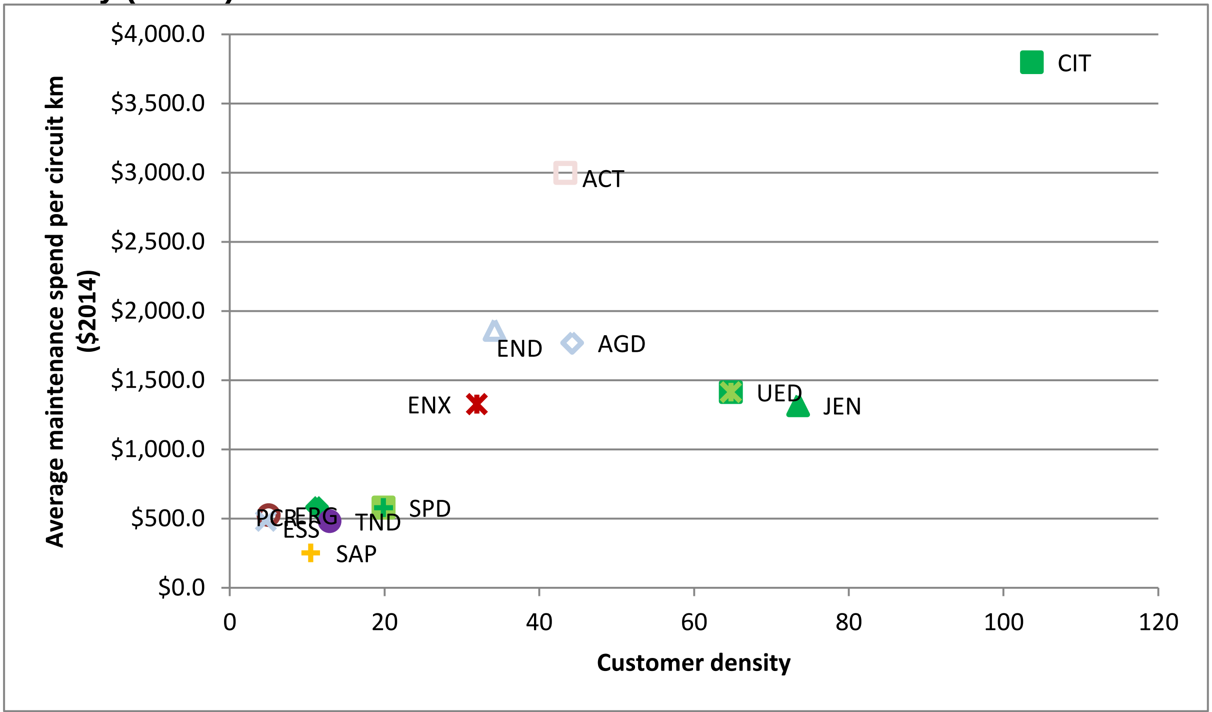


Figure 1.6 Average maintenance per km of circuit for 2009-13 against customer density ($2014)



- ActewAGL, Ausgrid, Citipower, Endeavour, and United Energy appear to be above their peers on this metric.
- Because this is a per km of circuit metric DNSPs should be compared to others with similar densities.
- This taken into consideration ActewAGL, Ausgrid, Citipower, and Endeavour appear to be above their peers on this metric.

Figure 1.7 Maintenance per installed MVA of distribution transformer capacity ($2014)

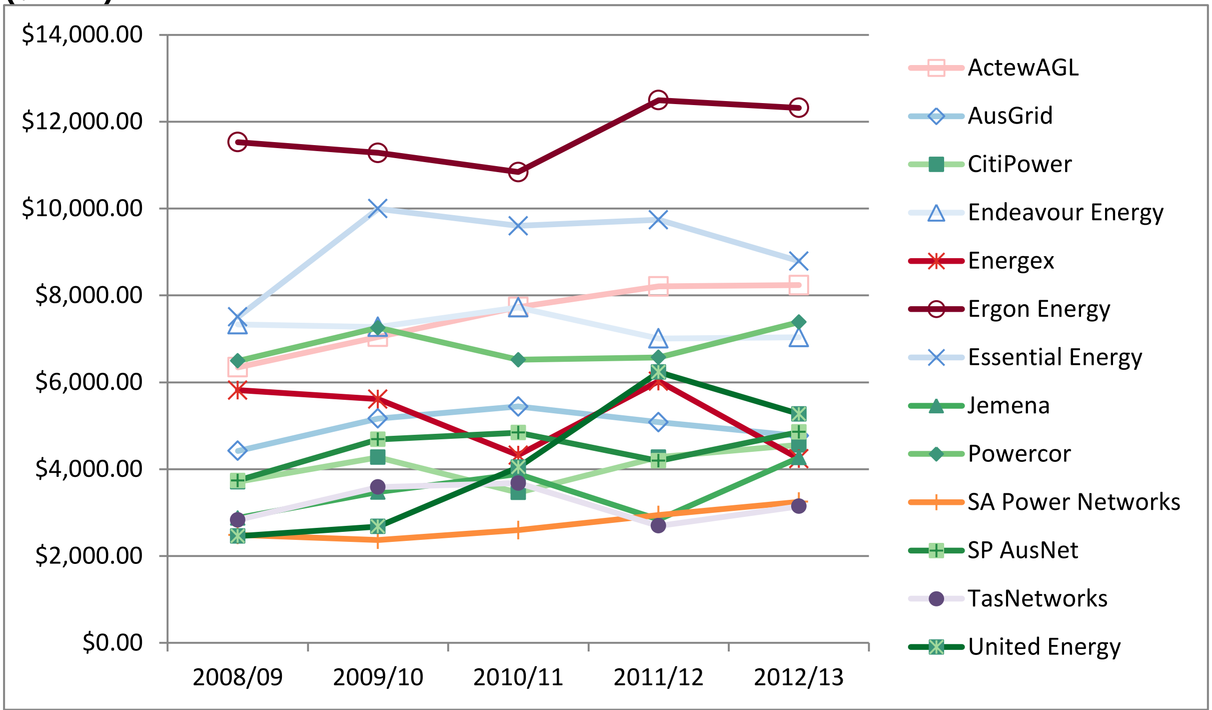
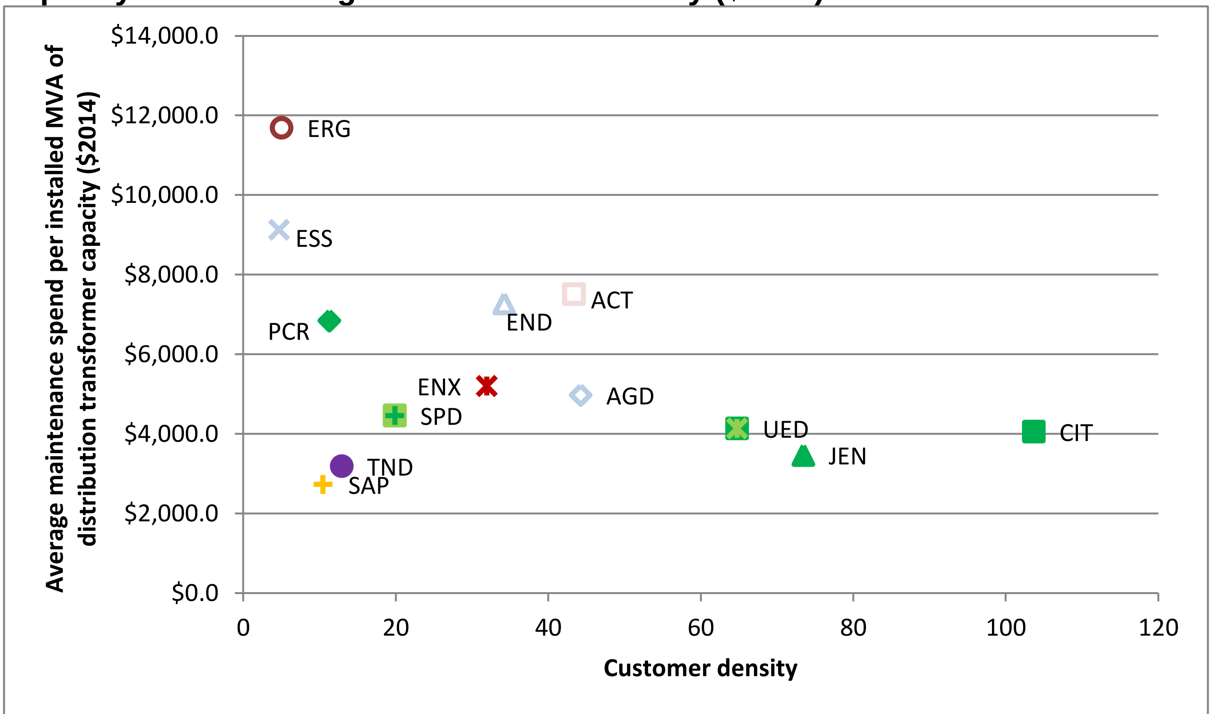


Figure 1.8 Average maintenance per installed MVA of distribution transformer capacity for 2009-13 against customer density ($2014)



- ActewAGL, Endeavour, Ergon, Essential, and Powercor appear to be above their peers on this metric.
- Given that distribution transformer capacity is correlated with customer numbers, DNSPs should be compared to others with similar densities.
- This considered ActewAGL, Endeavour, Ergon, Essential, and Powercor still appear to be above their peers on this metric.

Figure 1.9 Emergency response opex per customer excluding MEDs and MEs[1] ($2014)

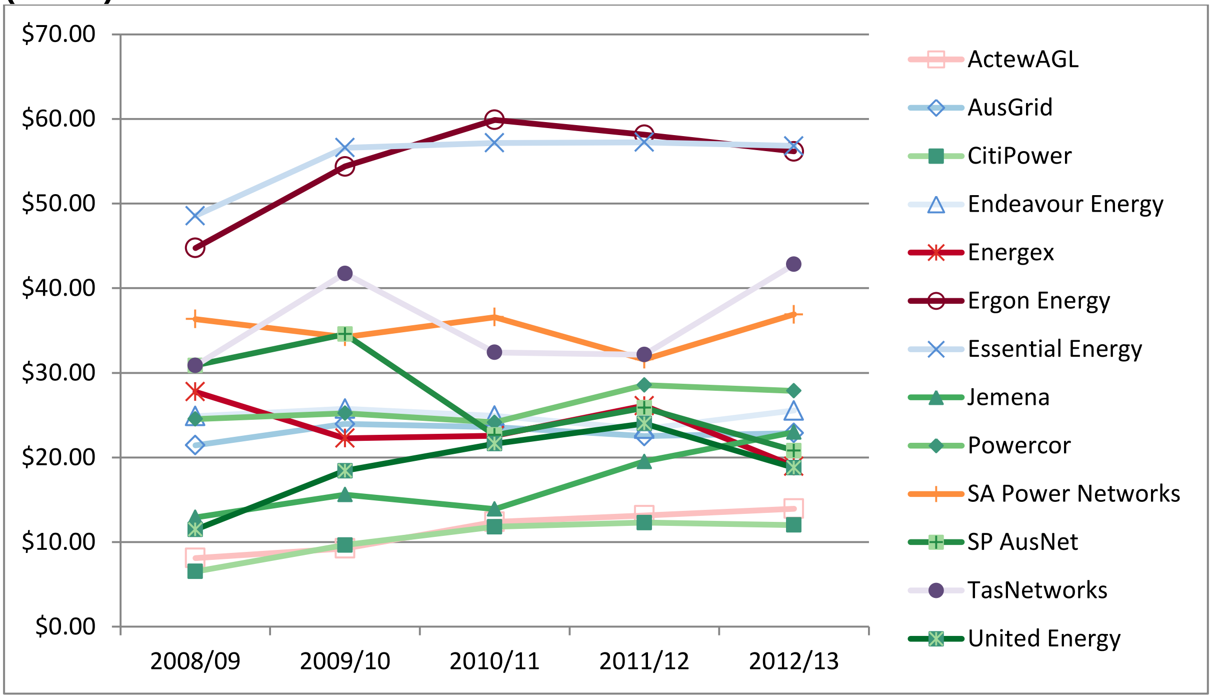
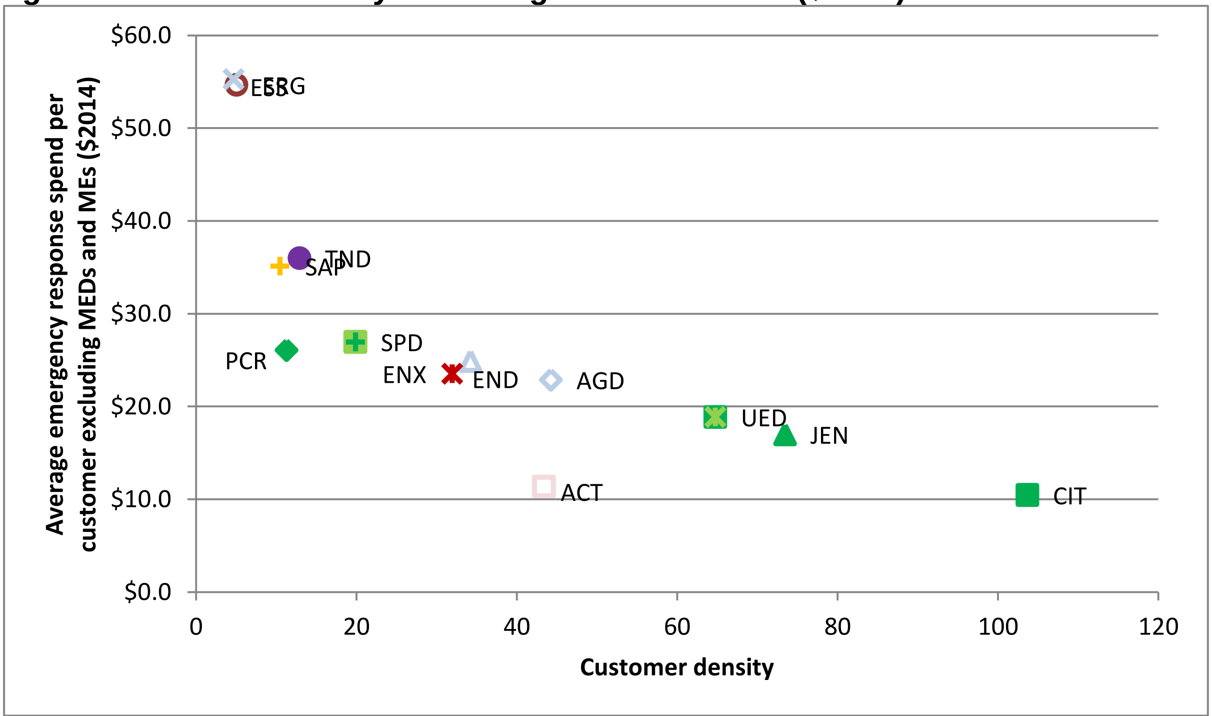


Figure 1.10 Average emergency response opex per customer for 2009-13 against customer density excluding MEDs and MEs ($2014)



- Ergon, Essential, SA Power, and Tas Networks, appear above their peers on this metric.
- DNSPs should be compared to others with similar densities as denser DNSPs may be better able to mesh their networks than less dense networks.
- This considered Ergon, Essential, SA Power, and Tas Networks, still appear above their peers on this metric.

[1] MEs are Major Events.

Figure 1.11 Emergency response opex per interruption excluding MEDs and MEs ($2014)

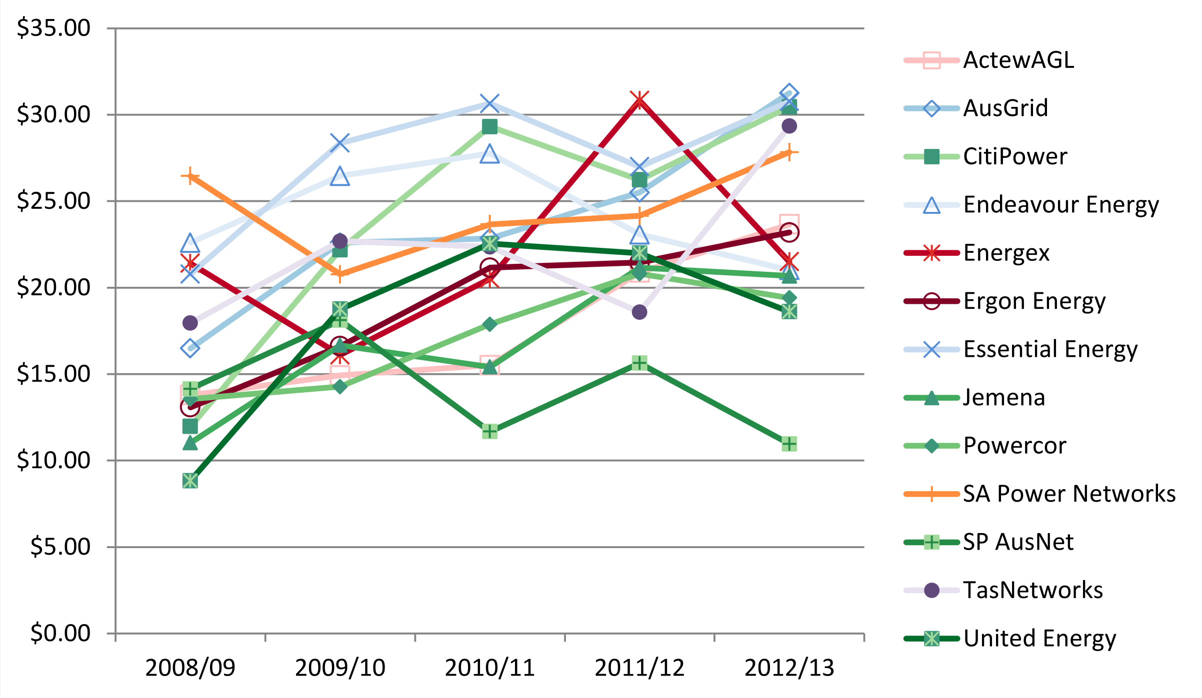


Figure 1.12 Average emergency response opex per interruption for 2009-13 against customer density excluding MEDs and MEs ($2014)

- Ausgrid, Citipower, Endeavour, Energex, Essential, SA Power, and Tas Networks appear to be above their peers on this metric.
- Because this metric normalises by number of interruptions we consider that no DNSP should be inherently advantaged or disadvantaged when making comparisons on this metric.

Figure 1.13 Corporate overheads opex ($1,000s 2014)

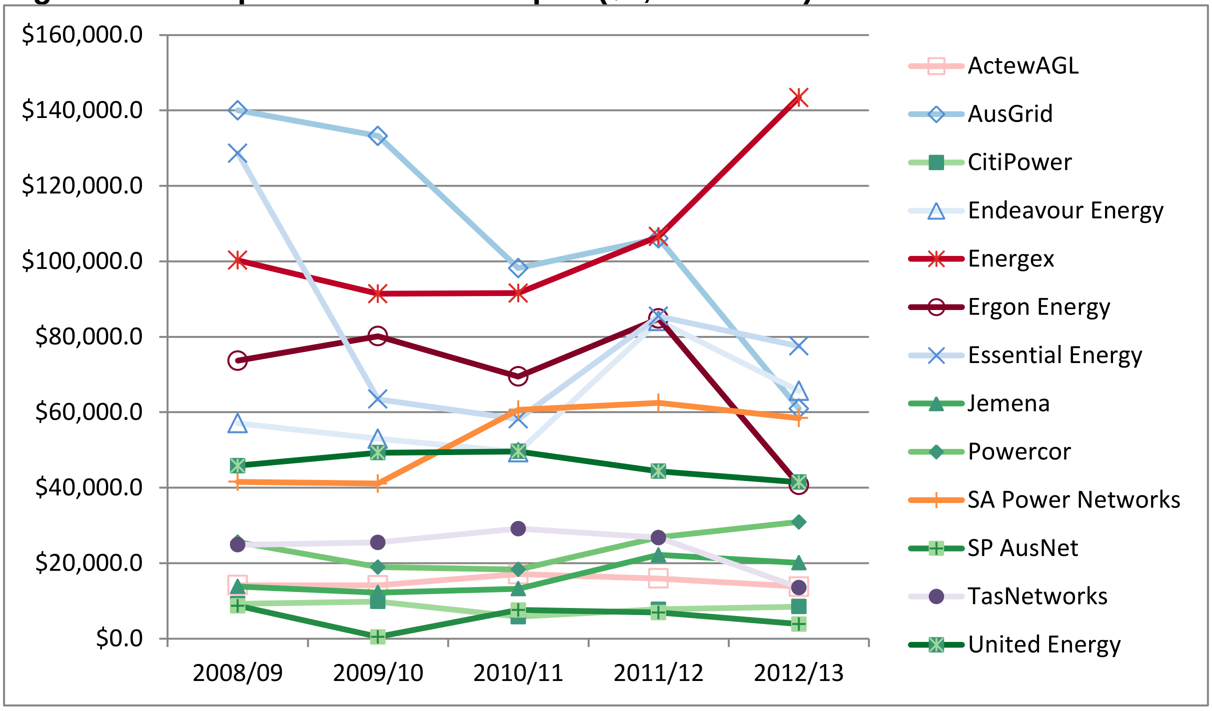
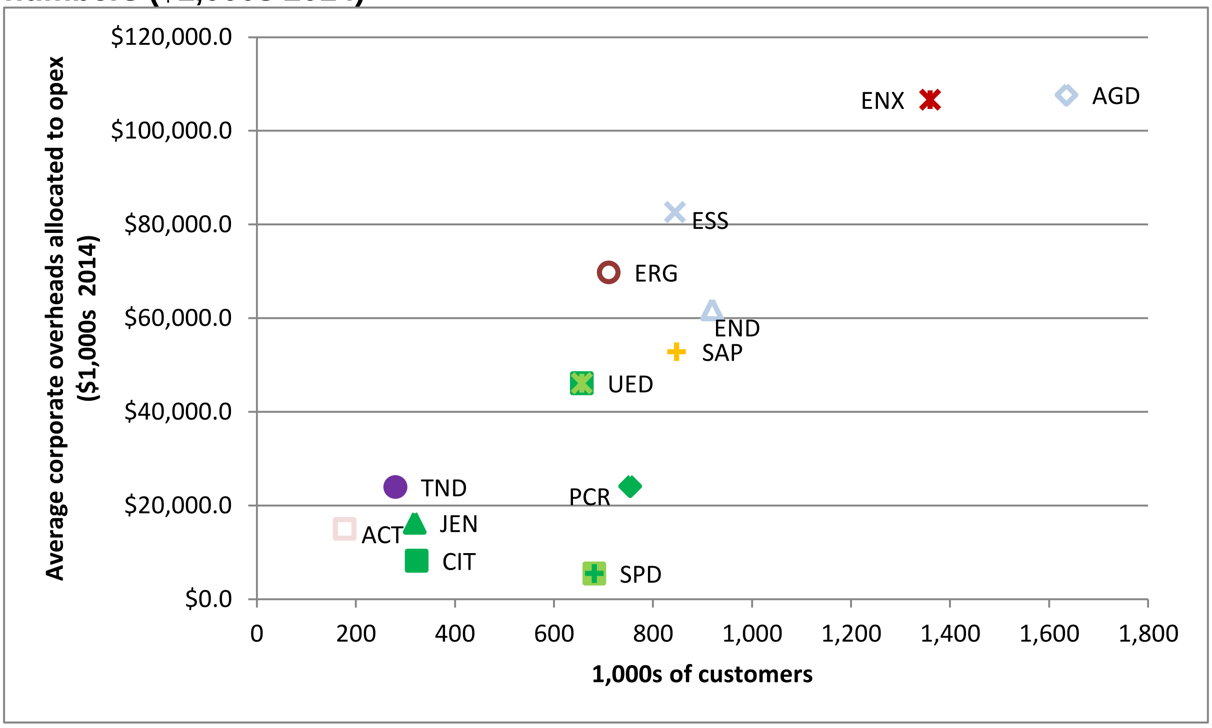


Figure 1.14 Average corporate overheads opex for 2009-13 against customer numbers ($1,000s 2014)



- Ausgrid, Endeavour, Energex, Ergon, Essential, Powercor, SA Power networks, Tas Networks, and United Energy appear to be above their peers on this metric.
- Ausgrid, Endeavour, Energex, Ergon, Essential, SA Power networks, TasNetworks, and United Energy appear to be above their peers on the scatter graph of total corporate overheads against customer numbers.

Figure 1.15 Corporate overheads opex per customer ($2014)

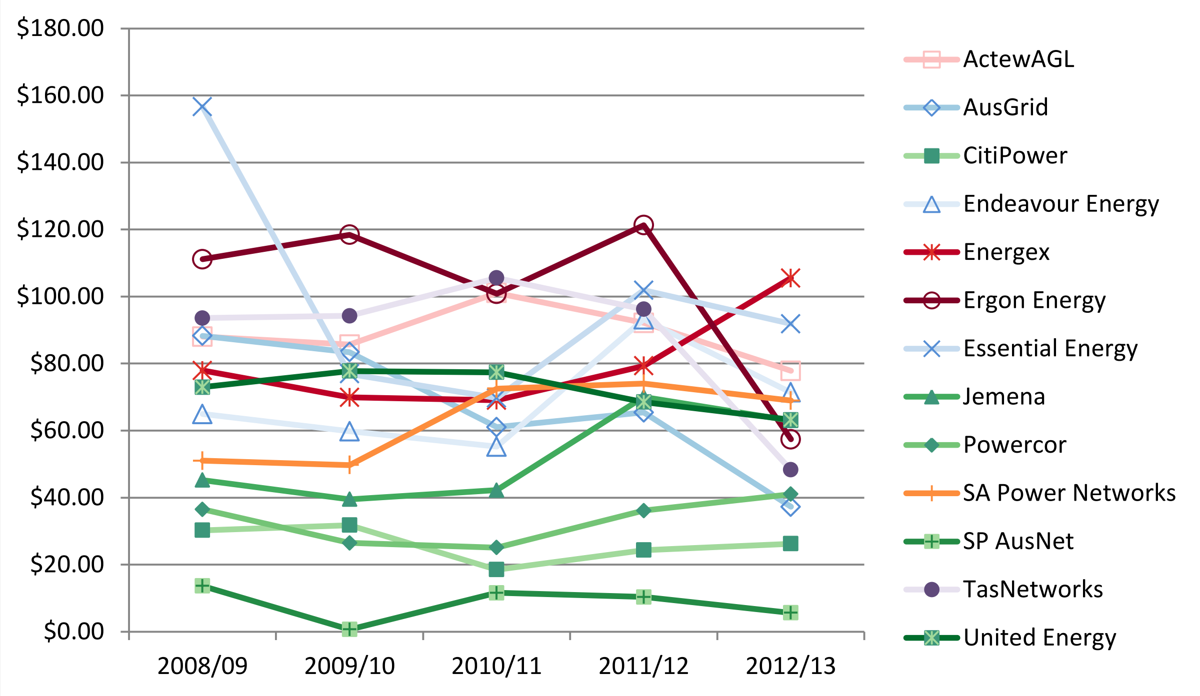
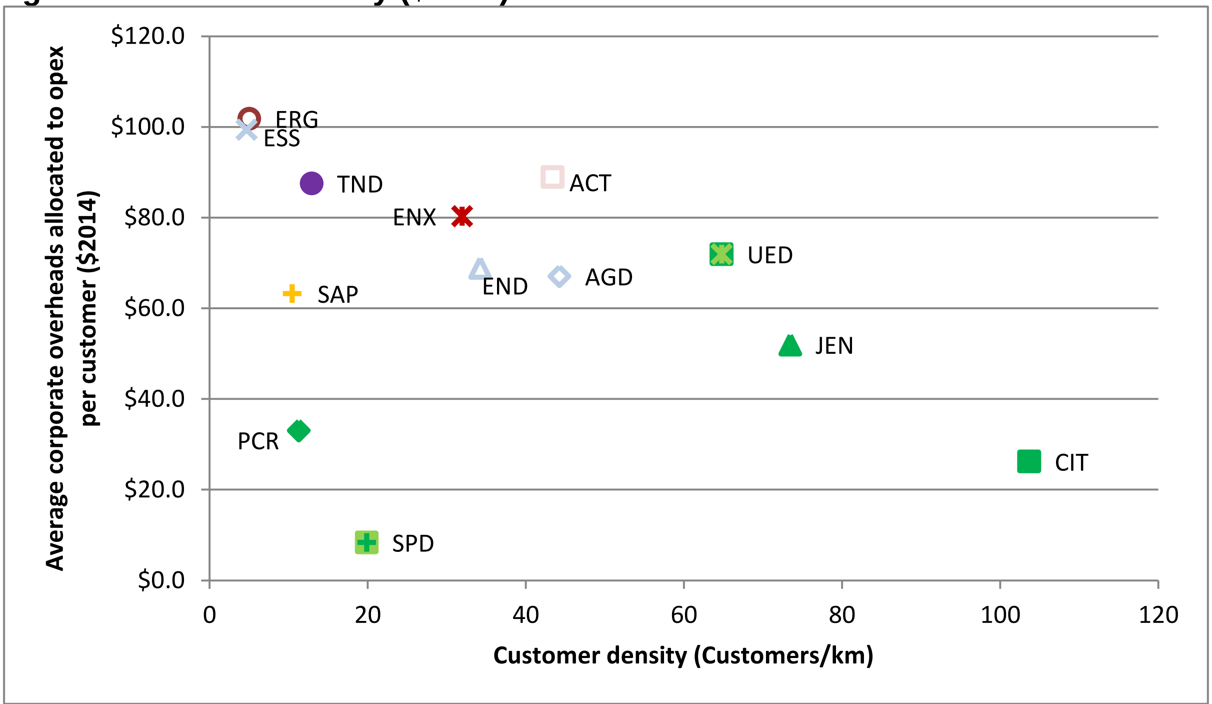


Figure 1.16 Average corporate overheads opex per customer for 2009-13 against customer density ($2014)



- Citipower, Powercor, and SP AusNet appear to be below their peers on this metric.
- Corporate overheads opex per customer against customer density shows there is not a strong relationship between customer density and corporate overhead costs.

Figure 1.17 Corporate overheads opex per km of line ($2014)

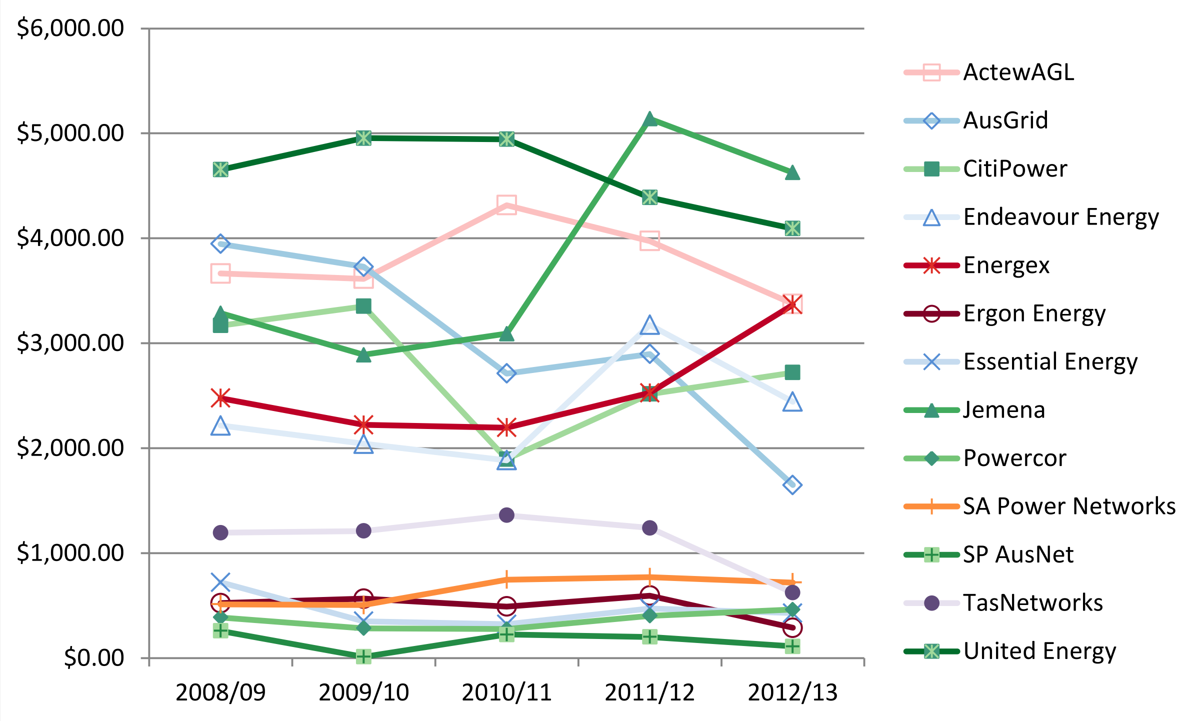
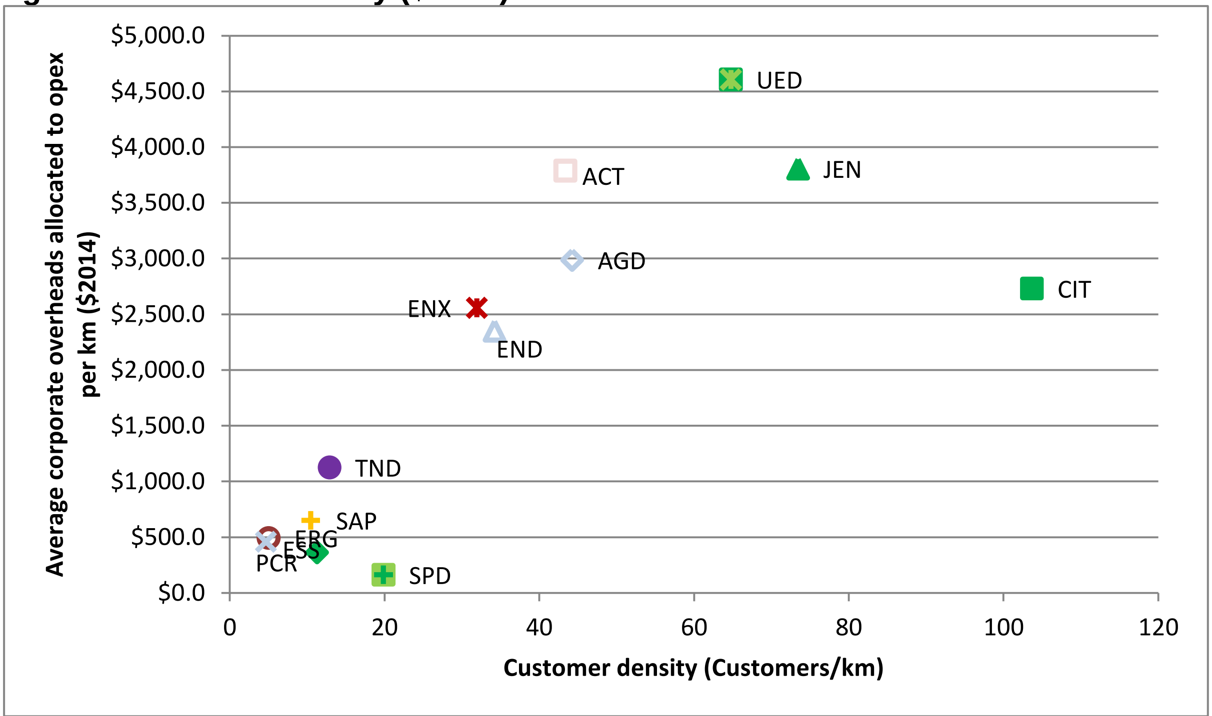


Figure 1.18 Average corporate overheads opex per km of line for 2009-13 against customer density ($2014)



- On this measure all urban DNSPs appear to be above rural DNSPs.
- Because this is a per km metric, DNSPs should be compared to others with similar densities.
- On the graph of corporate overheads opex per km against customer density ActewAGL, Ausgrid, Endeavour, Energex, JEN, Tas Networks, and UE appear above their peers.

Figure 1.19 Network overheads opex per customer ($2014)

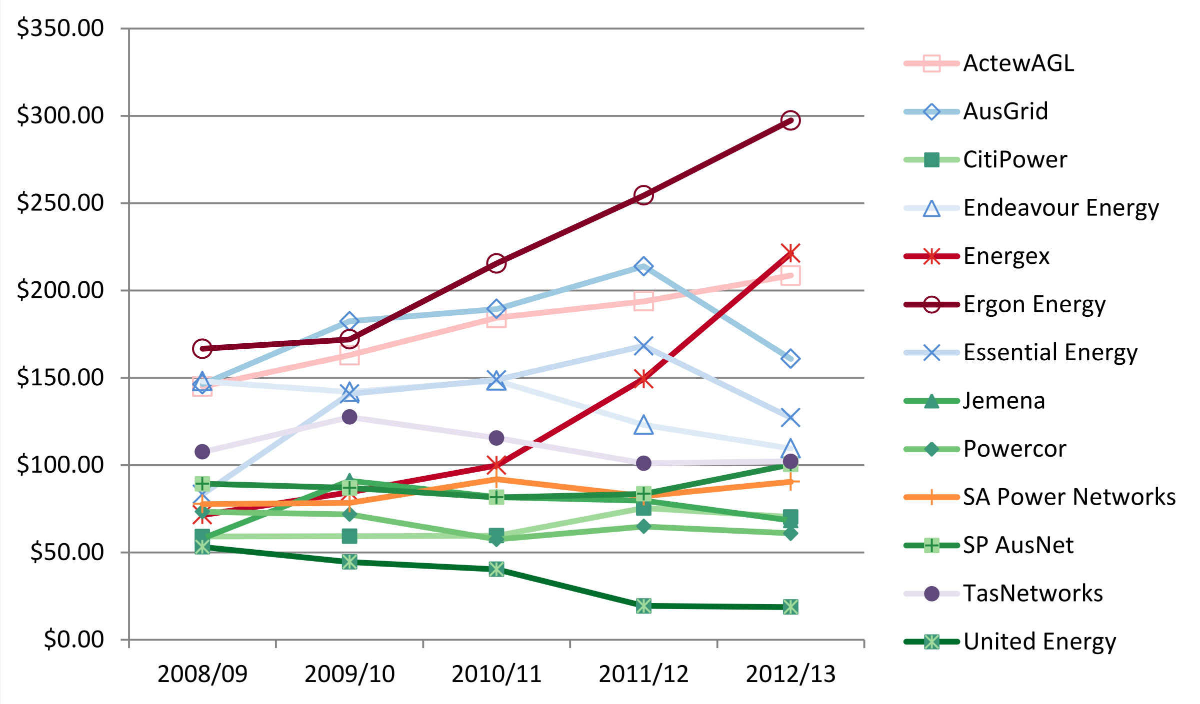


Figure 1.20 Average Network overheads opex per customer 2009-13 against customer density ($2014)

- The ACT, NSW, Queensland, and TAS DNSPs, appear to be above their peers on this metric.
- Because this is a per customer metric DNSPs should be compared to others with similar densities.
- When taking customer density into account The ACT, NSW, Queensland and TAS, DNSPs still appear to be above their peers on this metric.

Figure 1.21 Network overheads opex per km of line ($2014)

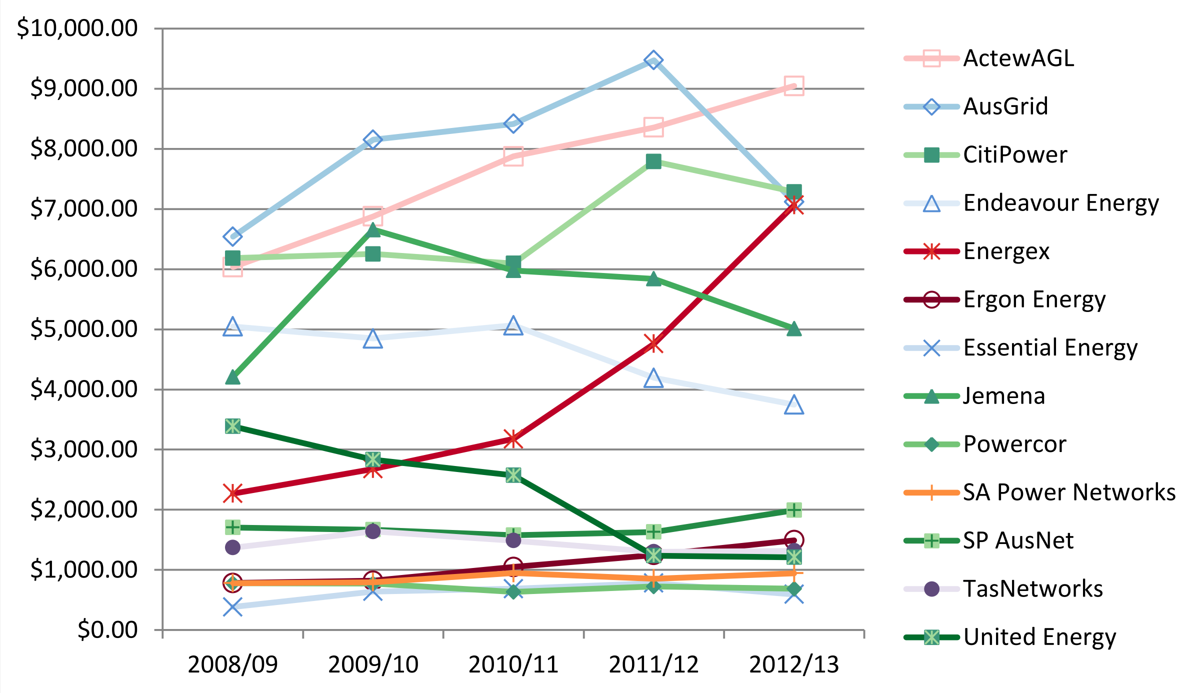
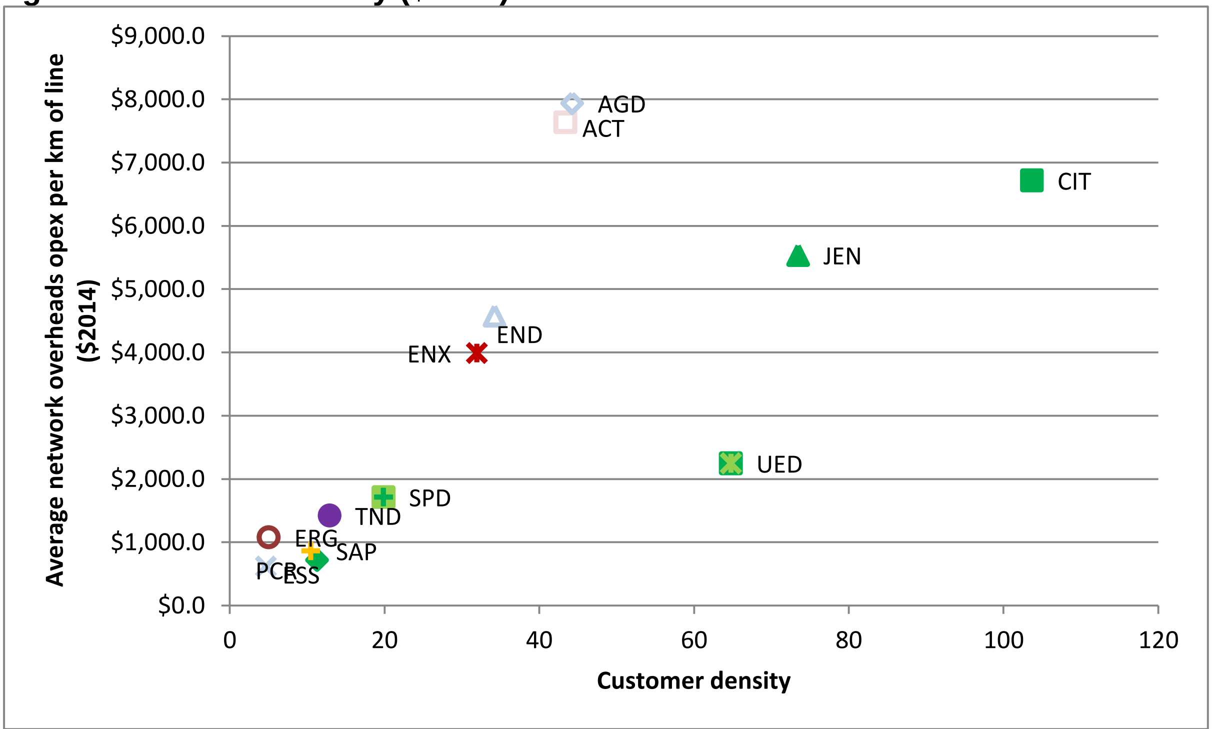


Figure 1.22 Average network overheads opex per km of line for 2009-13 against customer density ($2014)



- On this measure all urban DNSPs appear higher than rural DNSPs.
- Because this is a per km metric, DNSPs should be compared to others with similar densities.
- On the graph of network overheads opex per km against customer density ActewAGL, Ausgrid, Citipower, Endeavour, JEN, SP AusNet, and Tas Networks appear to be above their peers.

Figure 1.23 Total overheads allocated to opex per customer ($2014)

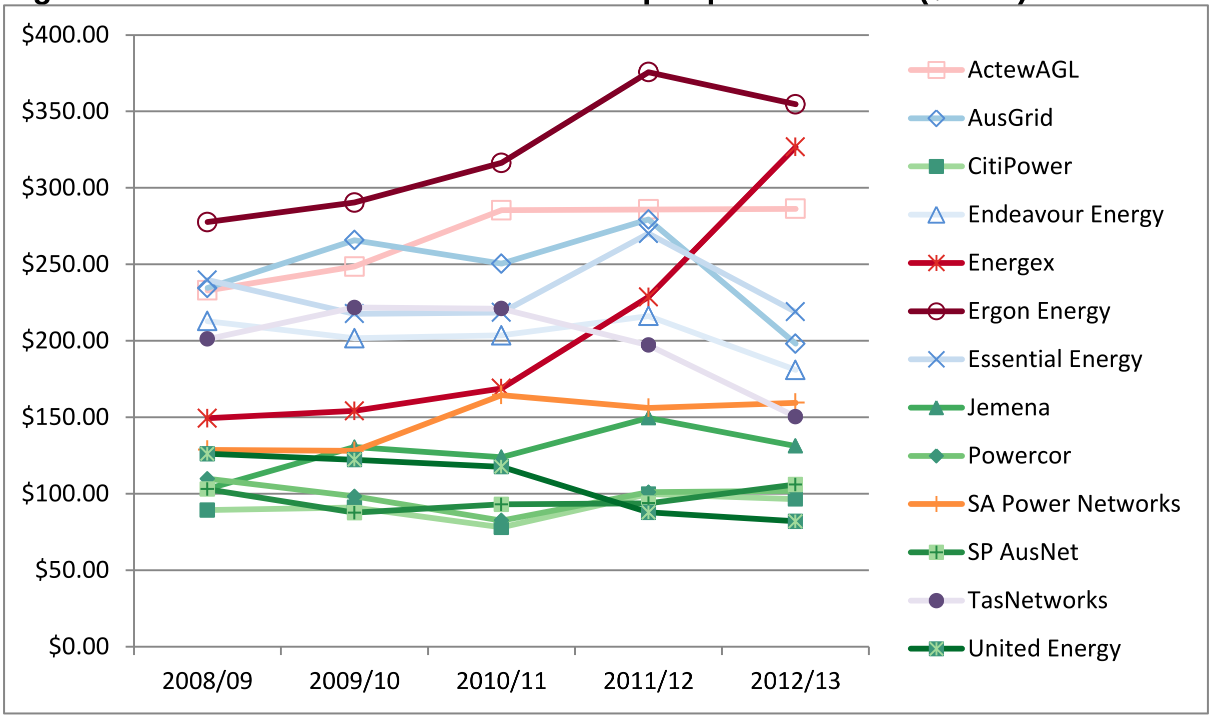
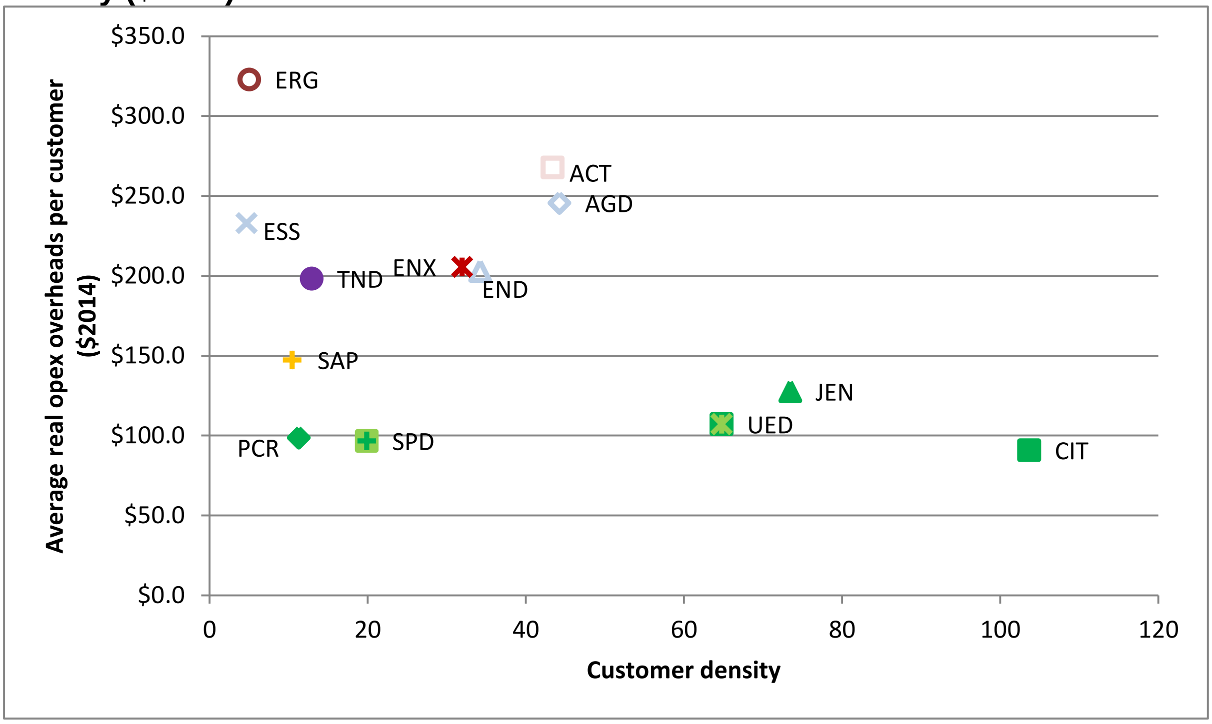


Figure 1.24 Total overheads allocated to opex per customer against customer density ($2014)



- The Victorian DNSPs appear to be below their peers on this metric.
- Because this is a per customer metric that DNSPs should be compared to others with similar densities.
- When taking customer density into account the Victorian DNSPs still appear to be below their peers on this metric.

Figure 1.25 Total opex overheads per km of line ($2014)

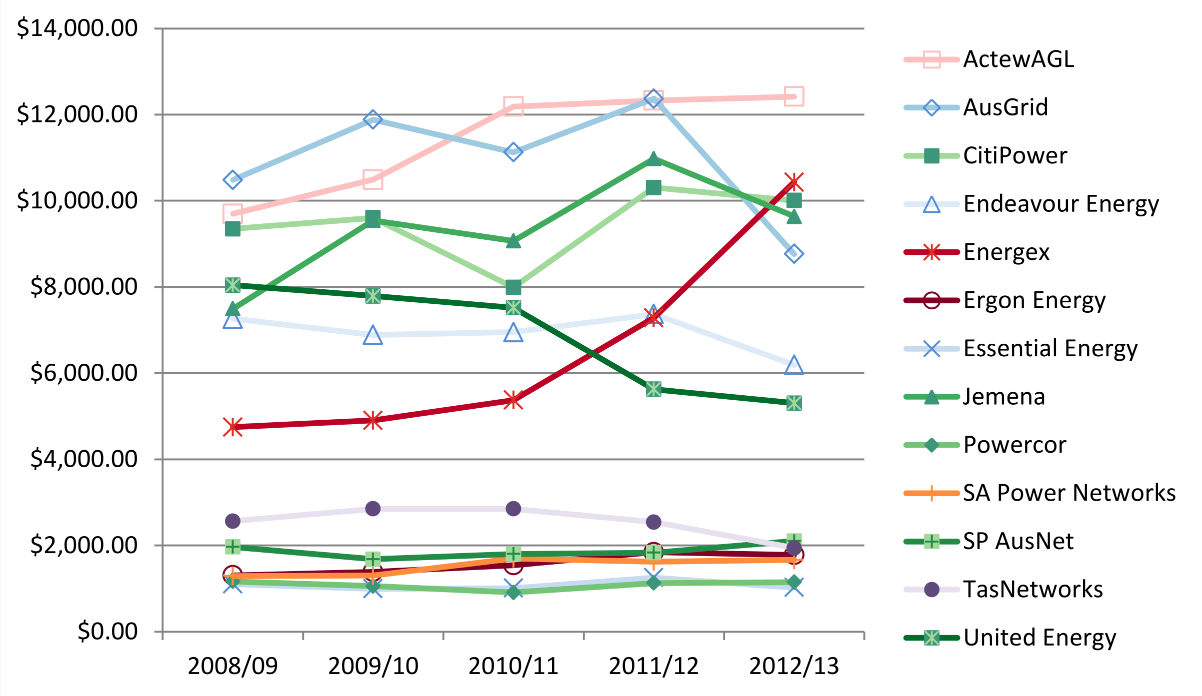
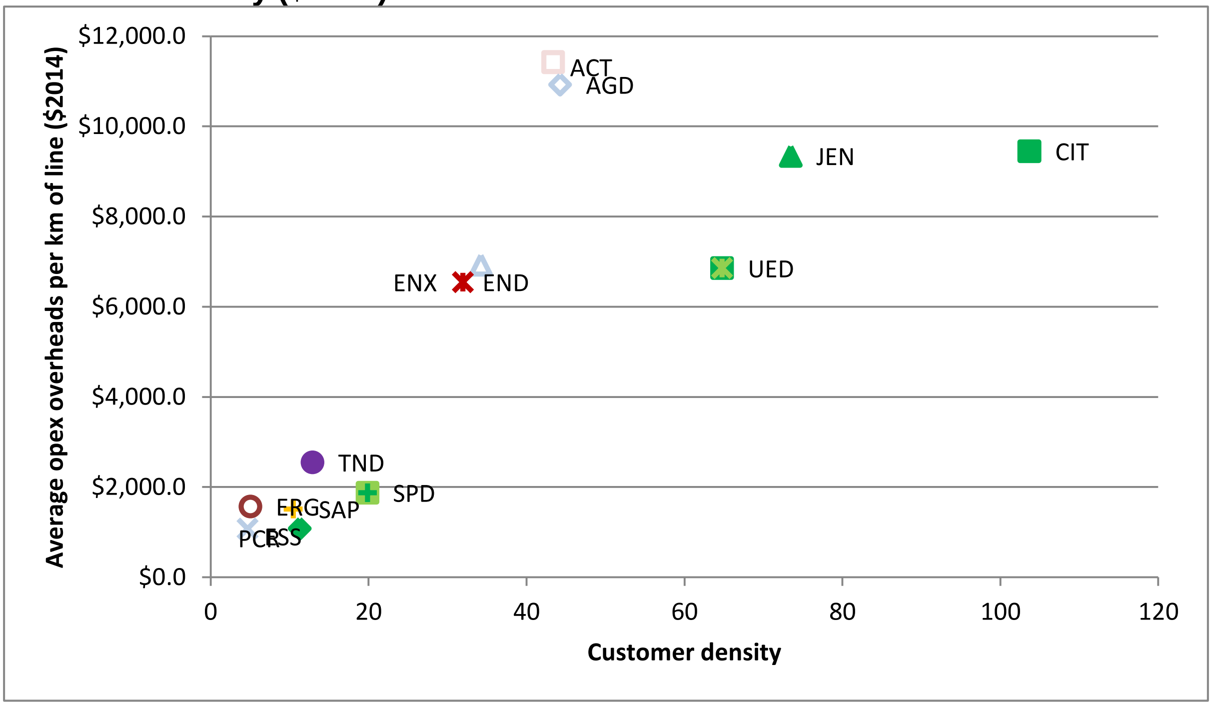


Figure 1.26 Average opex overheads per km of line for 2009-13 against customer density ($2014)



- On this measure all urban DNSPs appear to be higher than rural DNSPs.
- Because this is a per km metric that DNSPs should be compared to others with similar densities.
- On the graph of network overheads opex per km against customer density ActewAGL, Ausgrid, Endeavour, JEN and Tas Networks appear to be above their peers.

Figure 1.27 ASLs per 100,000 customers

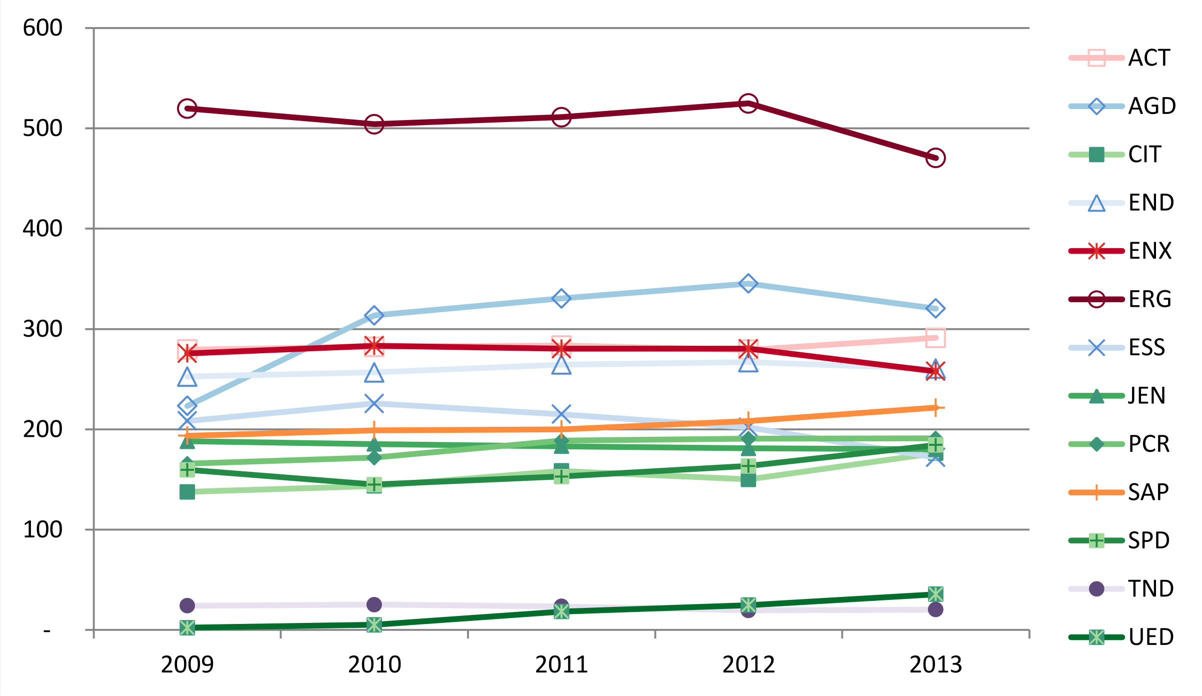
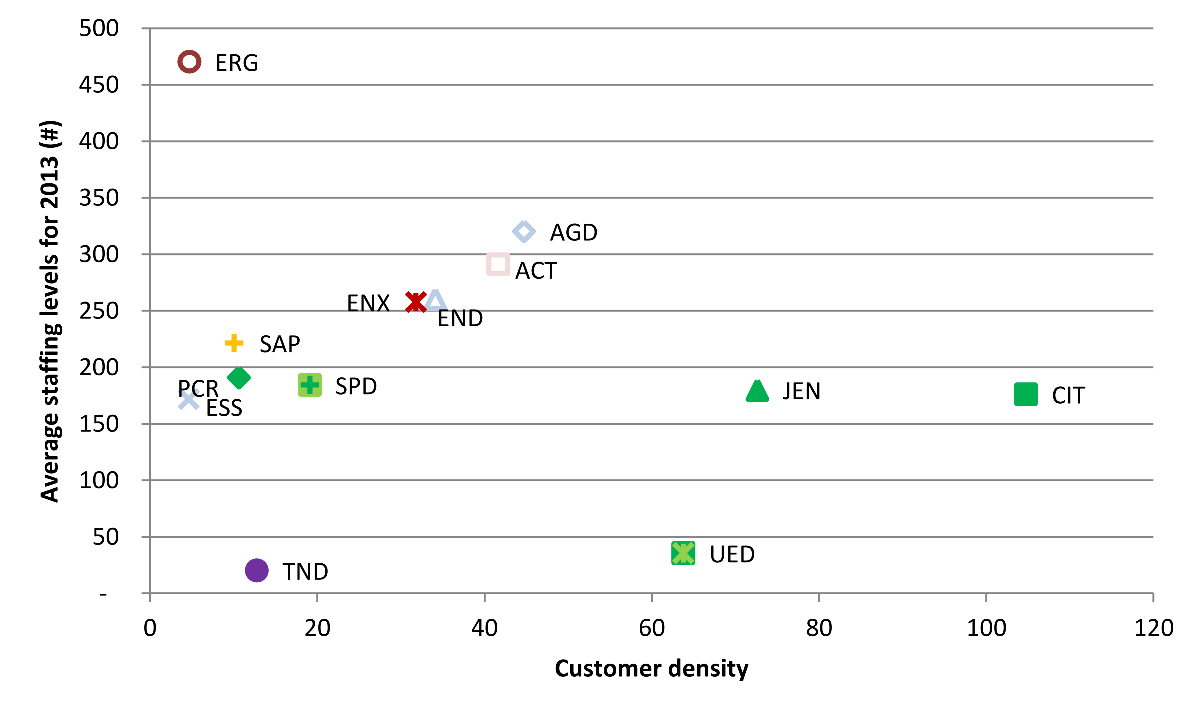


Figure 1.28 ASLs per 100,000 customers in 2013 against customer density



- The ACT, NSW, and Queensland DNSPs, except Essential, appear above their peers on this metric.
- Because this is normalised by customer numbers DNSPs should be compared to others with similar densities.
- When customer density is taken into account the ACT, NSW, Queensland and SA DNSPs, except Essential, appear above their peers on this metric.
- The proportion of outsourcing may affect apparent performance on this metric.
- Ergon reported its ASLs in 10s rather than units, so we adjusted their data to make it comparable with the other DNSPs.

Figure 1.29 Labour expenditure per customer ($2014)

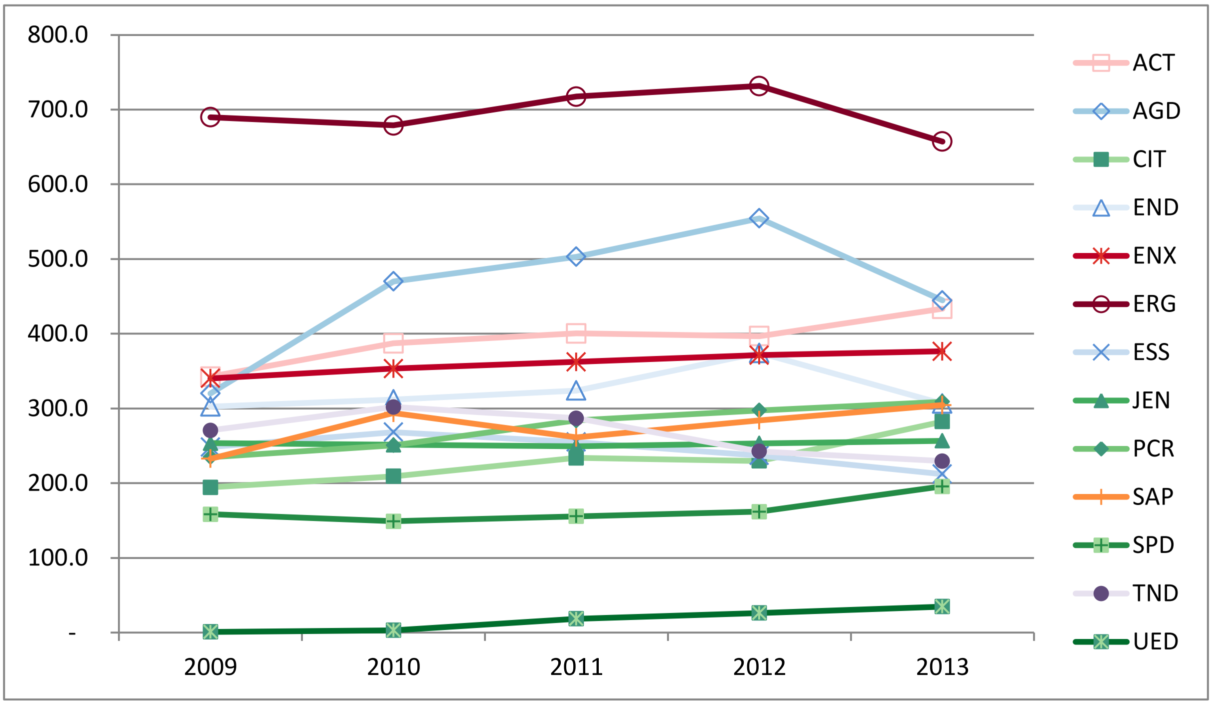
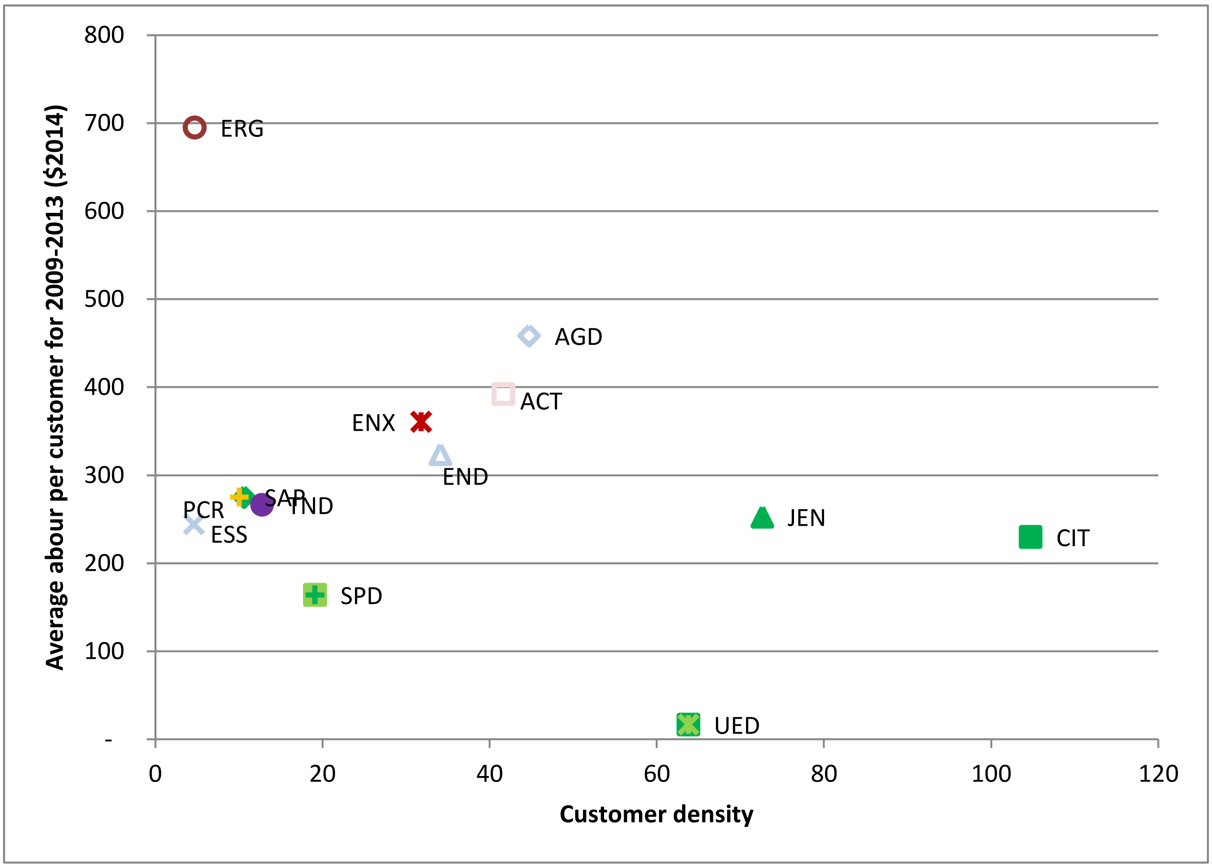


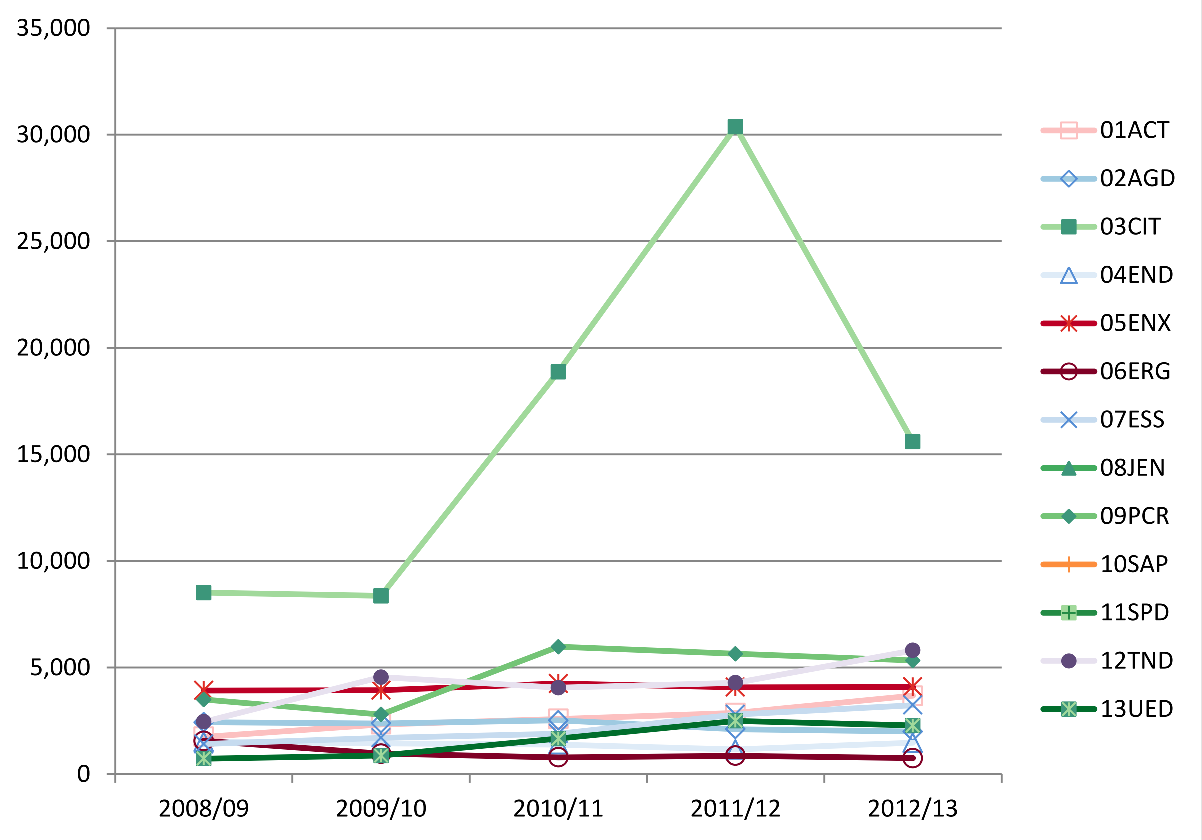
Figure 1.30 Labour expenditure per customer against customer density ($2014)



- The ACT, NSW, and Queensland DNSPs, except Essential, appear to be above their peers on this metric.
- Because this is normalised by customer numbers rural DNSPs should be compared to DNSPs with similar densities.

- When customer density is taken into account the ACT, NSW, and Queensland DNSPs, except Essential, still appear to be above their peers on this metric.
- The proportion of outsourcing may affect apparent performance on this metric.

Figure 1.31 Vegetation management opex per maintenance span ($000, 2014)



- Citipower, and to a lesser extent, Powercor, Energex and TasNetworks appear to be above their peers on this metric.
- Ausgrid and Endeavour included vegetation management spans where there is one tree on the span.
- SA Power Networks, SP AusNet and JEN claimed confidentiality over their vegetation management data.

Figure 1.32 Total vegetation management opex ($000, 2014)

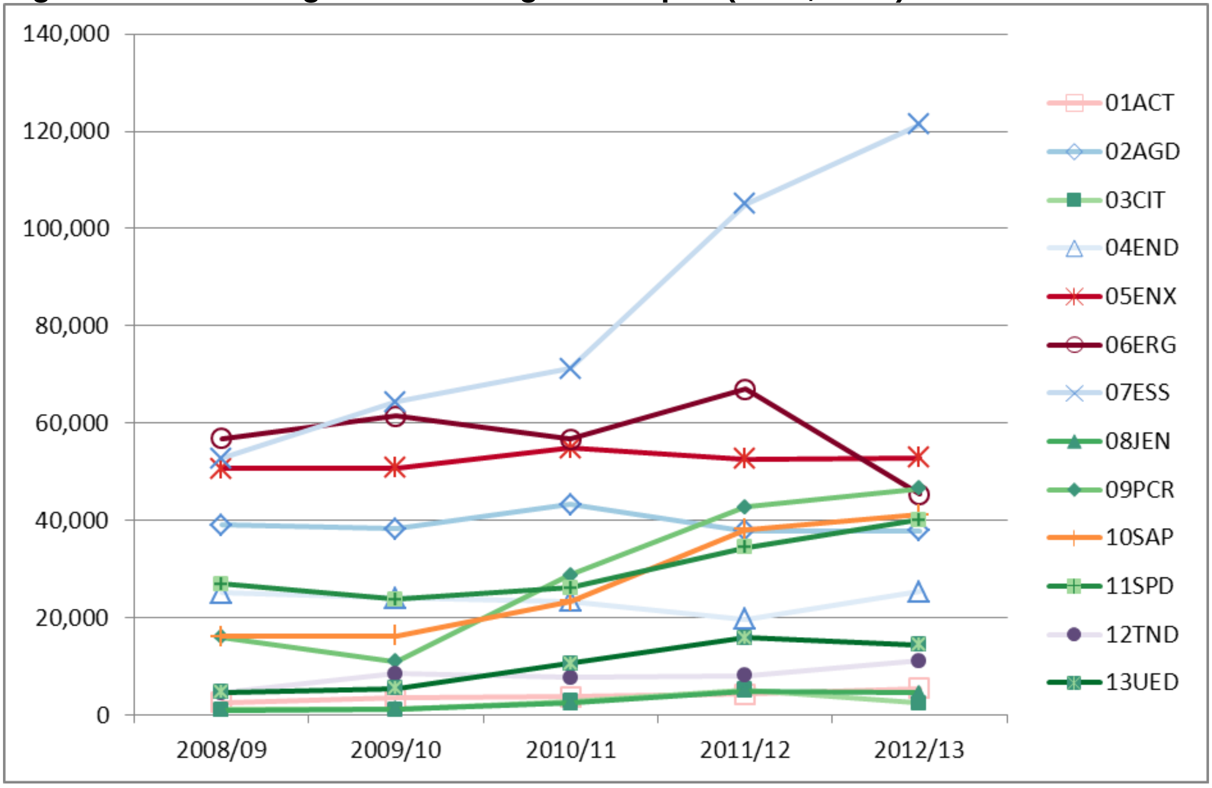
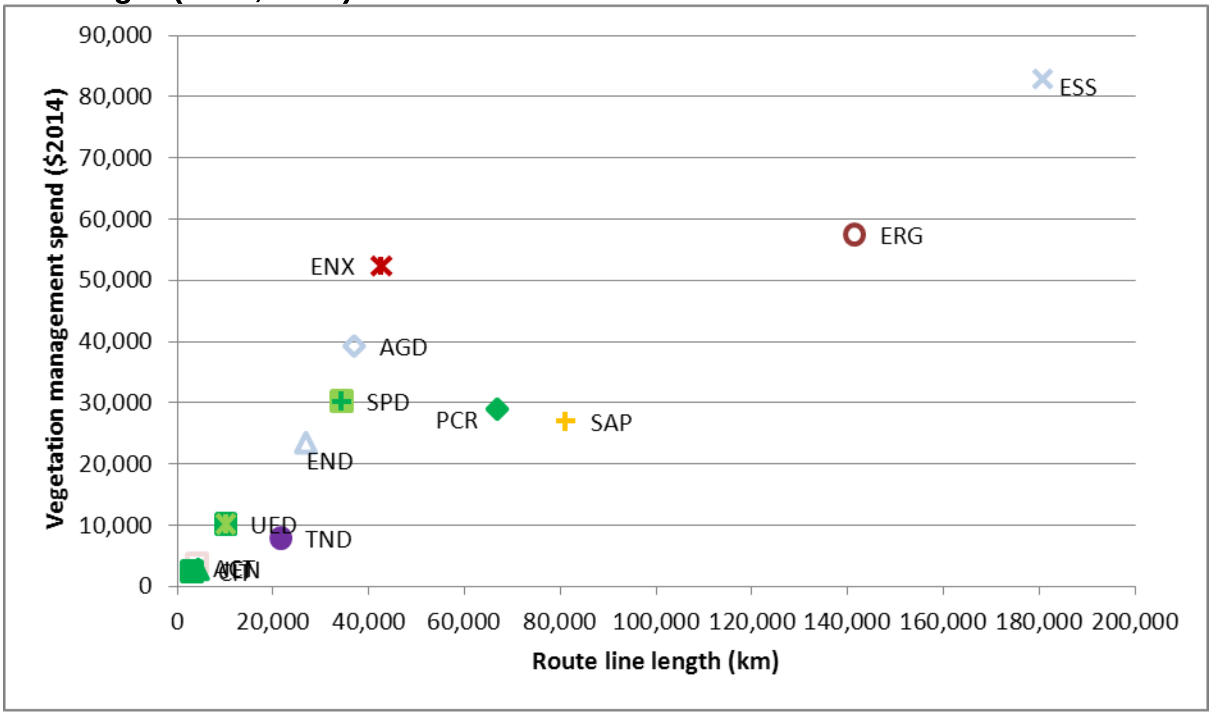


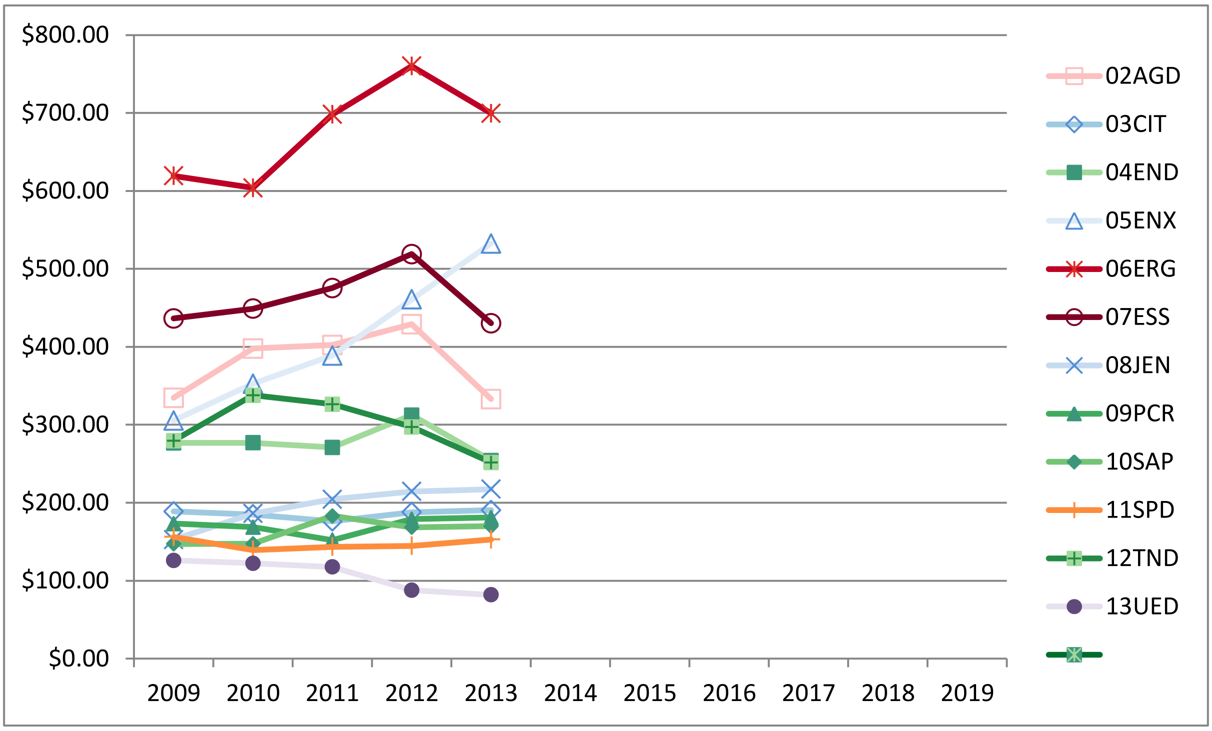
Figure 1.33 Average vegetation management opex for 2009-13 against route line length ($000, 2014)



- Ausgrid, Energex, Ergon, Essential, Powercor, SA Power, and SP AusNet appear to be above their peers on this metric.
- As NSPs with larger network areas are likely to have more vegetation management, DNSPs should be compared to others with similar network lengths.
- This taken into consideration Ausgrid, Endeavour, Energex, Powercor, SP AusNet and UE appear to be above their peers on this metric.

2. Total expenditure (totex) analysis

Figure 2.1 Totex network overheads - standard control ($000, 2014)



- On this metric the NSW and Queensland DNSPs appear to be above their peers.
- One would expect larger networks to have a higher level of expenditure on network overheads than smaller networks.

Figure 2.2 Totex corporate overheads per customer ($2014)

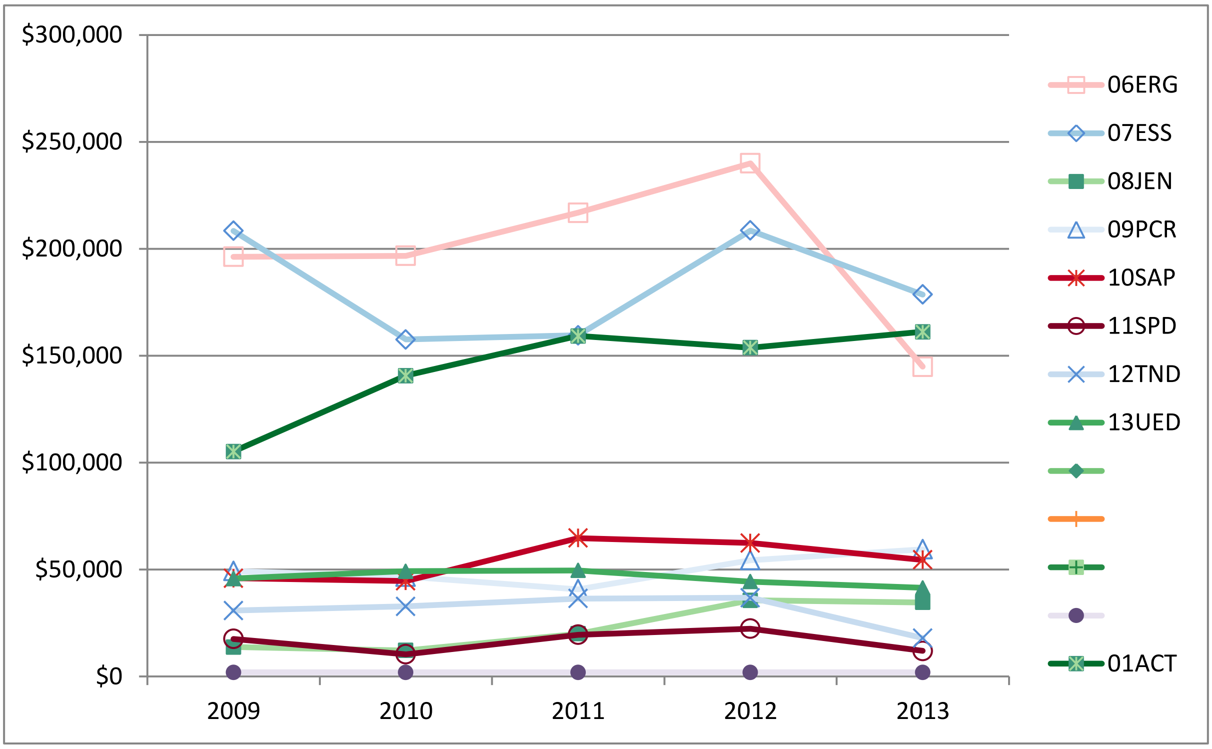
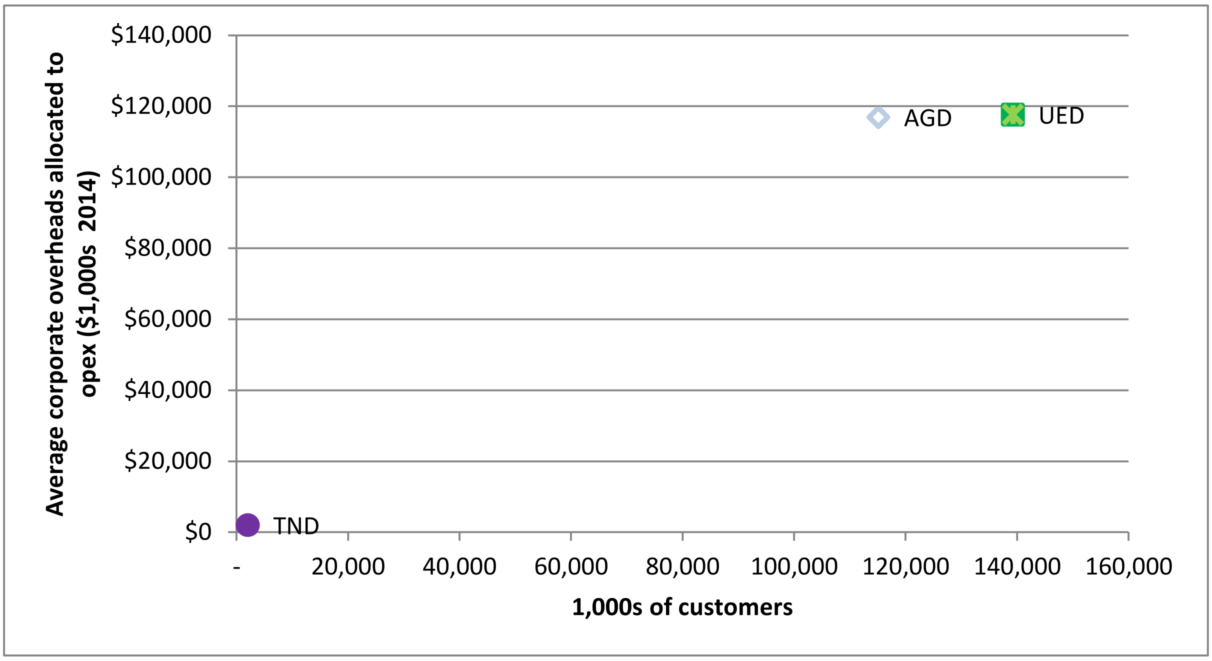
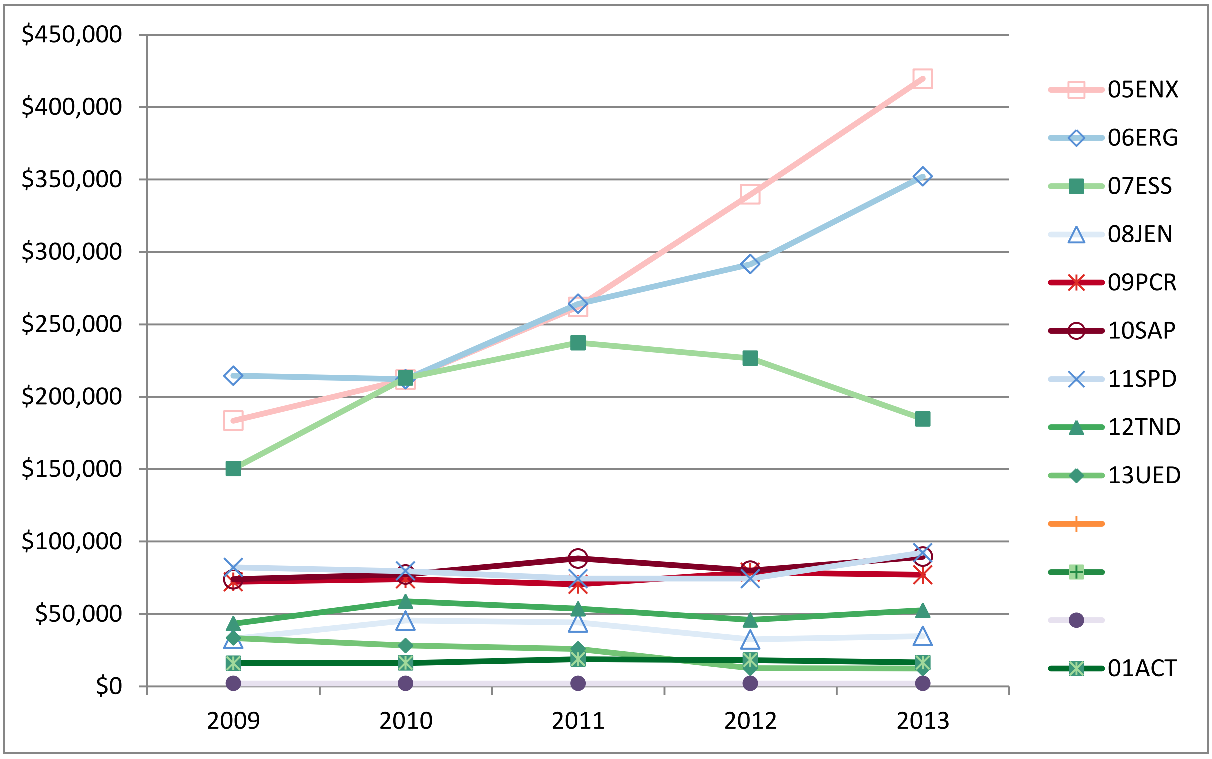


Figure 2.3 Corporate overheads against customer numbers ($2014)



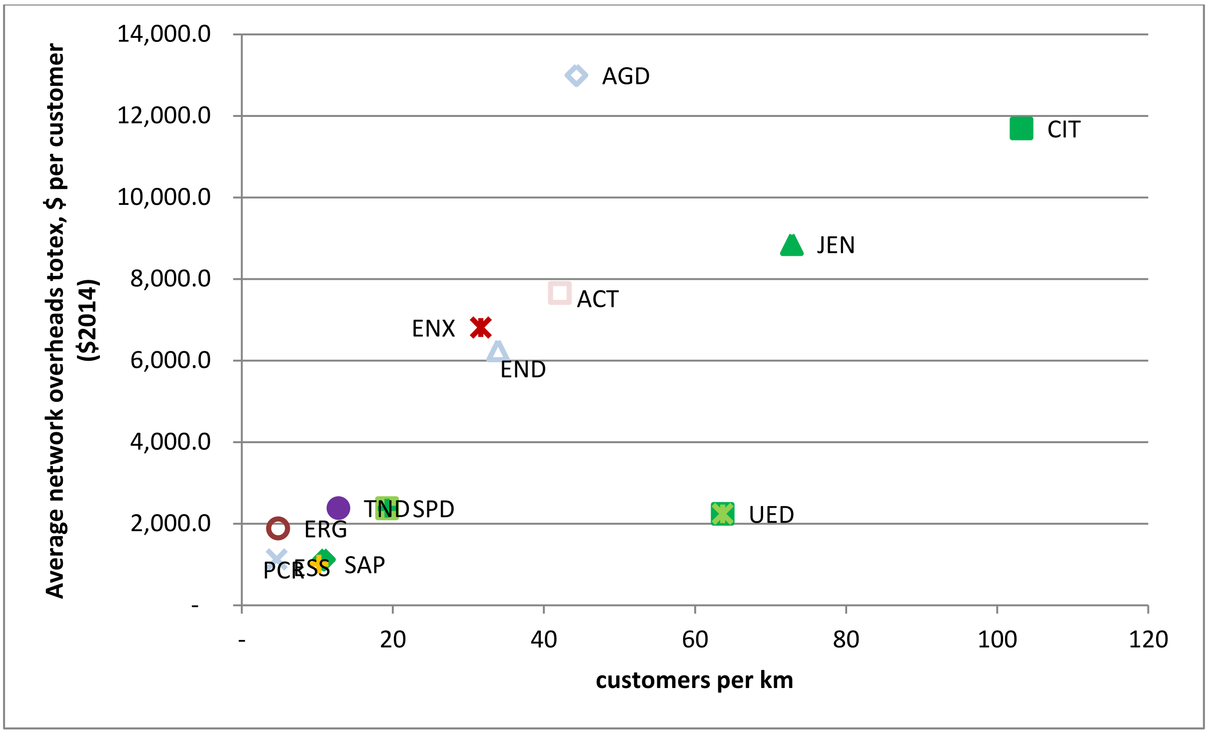
- On this metric Energex, Ergon, and Essential appear to be above their peers.
- As a large proportion of corporate costs are fixed, one would not expect the size of the network to have a great impact on them.
- The graph of corporate overheads costs against customer numbers demonstrates this to be the case for most DNSPs.
- When total customer numbers are also considered Endeavour, Energex, Ergon, and Essential appear to be above their peers.

Figure 2.4 Totex network overheads per customer - standard control ($2014)



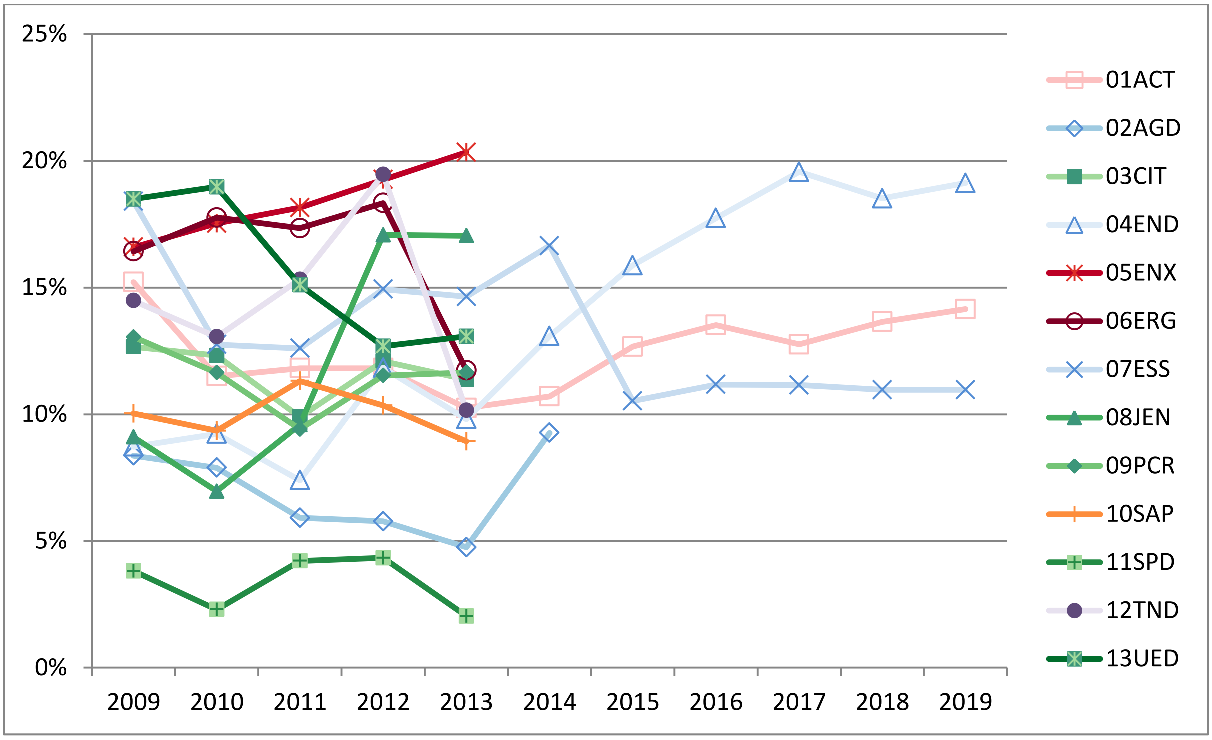
- On this metric the ACT, NSW, and Queensland DNSPs appear above their peers.

Figure 2.5 Totex network overheads per km ($2014)



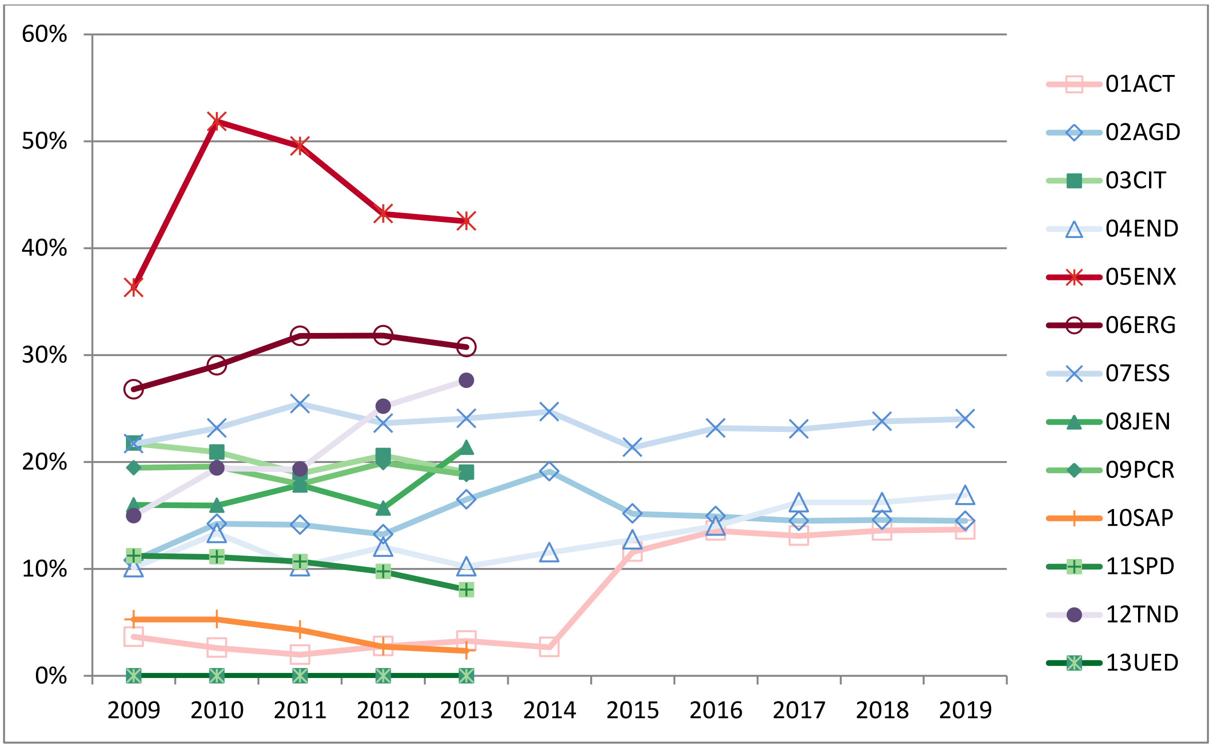
- On this metric, Ausgrid, Energex, Ergon, and TasNetworks appear above their peers.

Figure 2.6 Totex corporate overheads percentage of totex



- As a proportion of totex, SP AusNet appears to have a low amount of corporate overheads.

Figure 2.7 capitalised network and corporate overheads - percentage of capex



- On this metric Energex, Ergon, and Essential, appear to capitalise more overheads than their peers.

Figure 2.8 IT capex

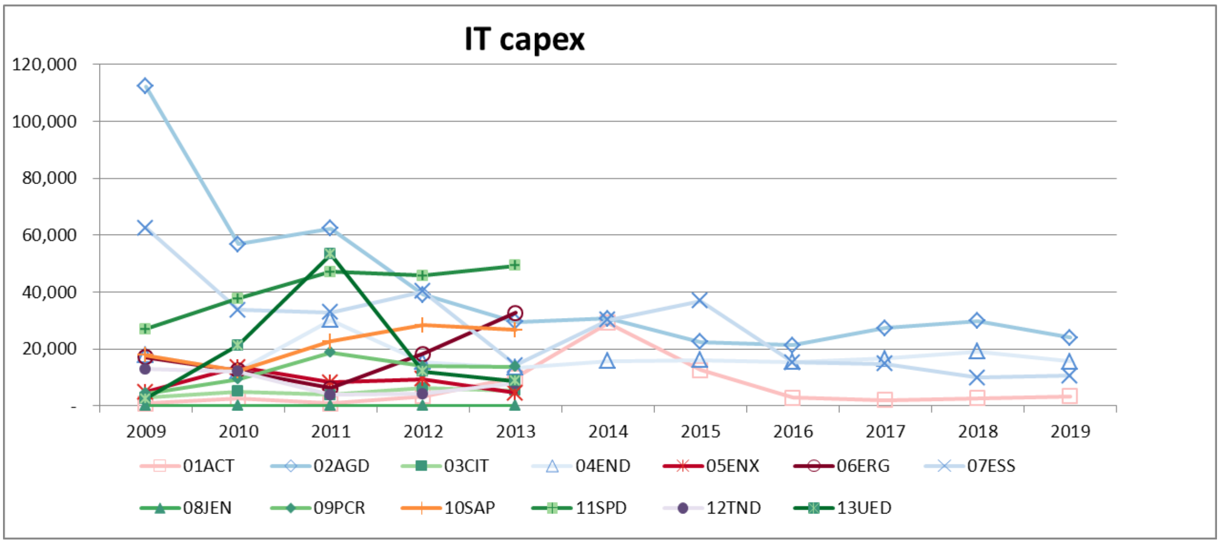
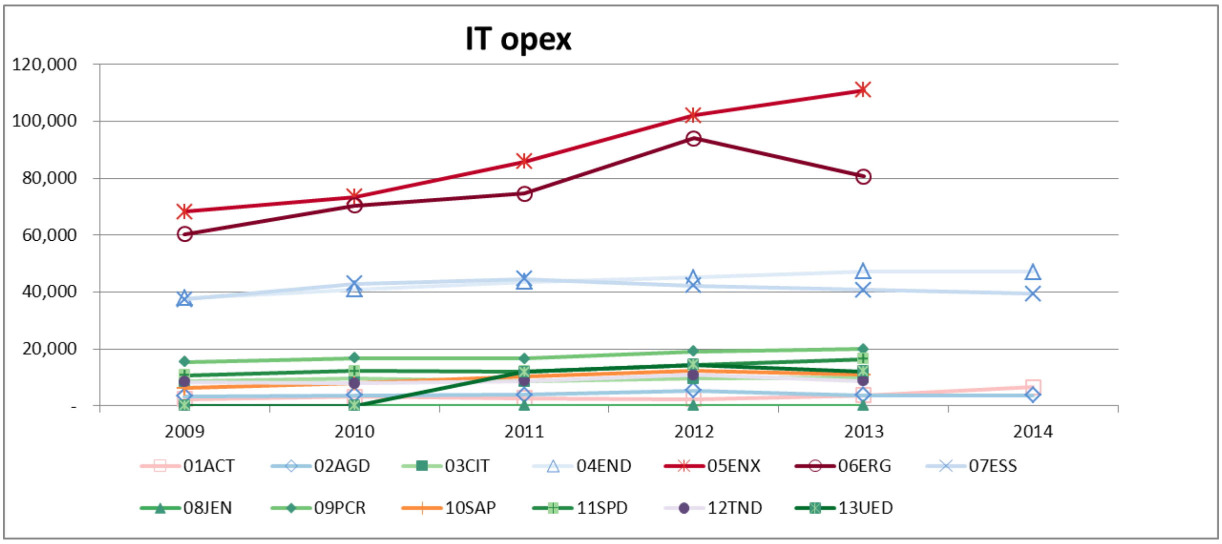
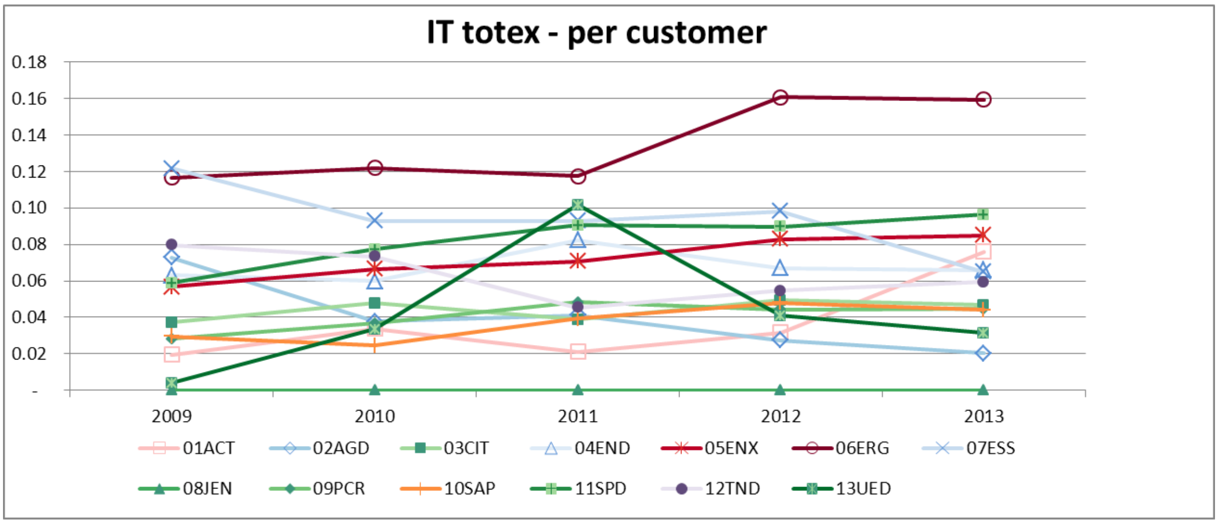


Figure 2.9 IT opex



- QLD DNSPs show a clear difference in approach to IT service arrangements
- Scale of the DNSP is likely to be a driver of IT costs generally

Figure 2.10 IT totex per customer



- Using customer numbers as a scale variable, and in grouping capital and operating IT expenditure, Ergon still appears to be spending significant amounts on IT (and increasing), SP AusNet, Essential Energy and Energex are also above average.

Figure 2.11 IT opex per customer

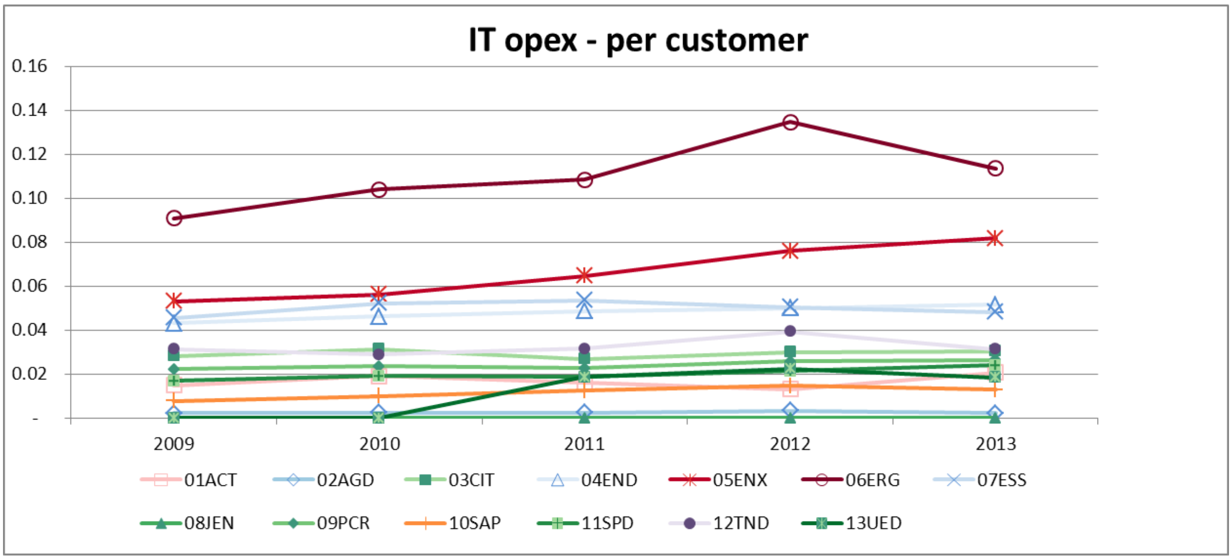


Figure 2.12 IT capex per customer

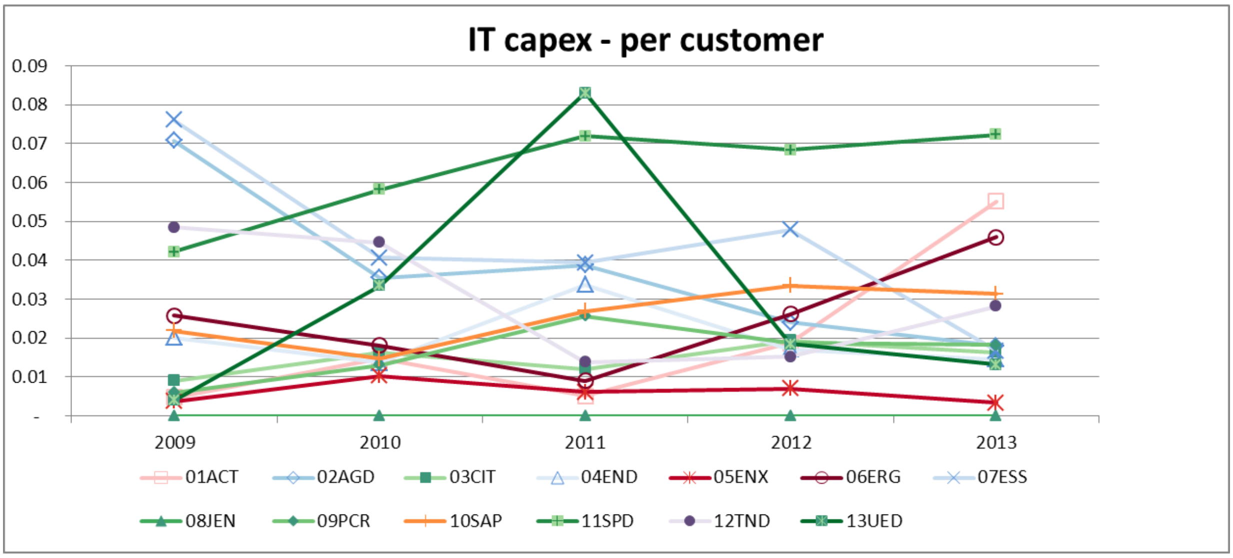
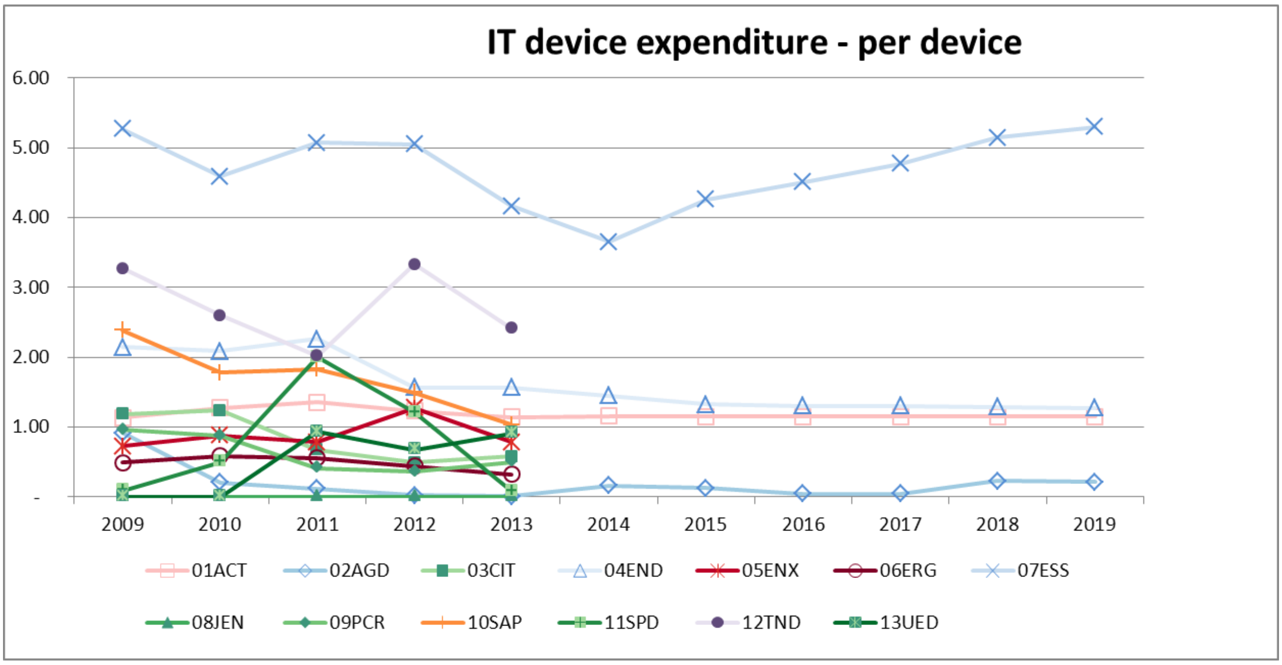
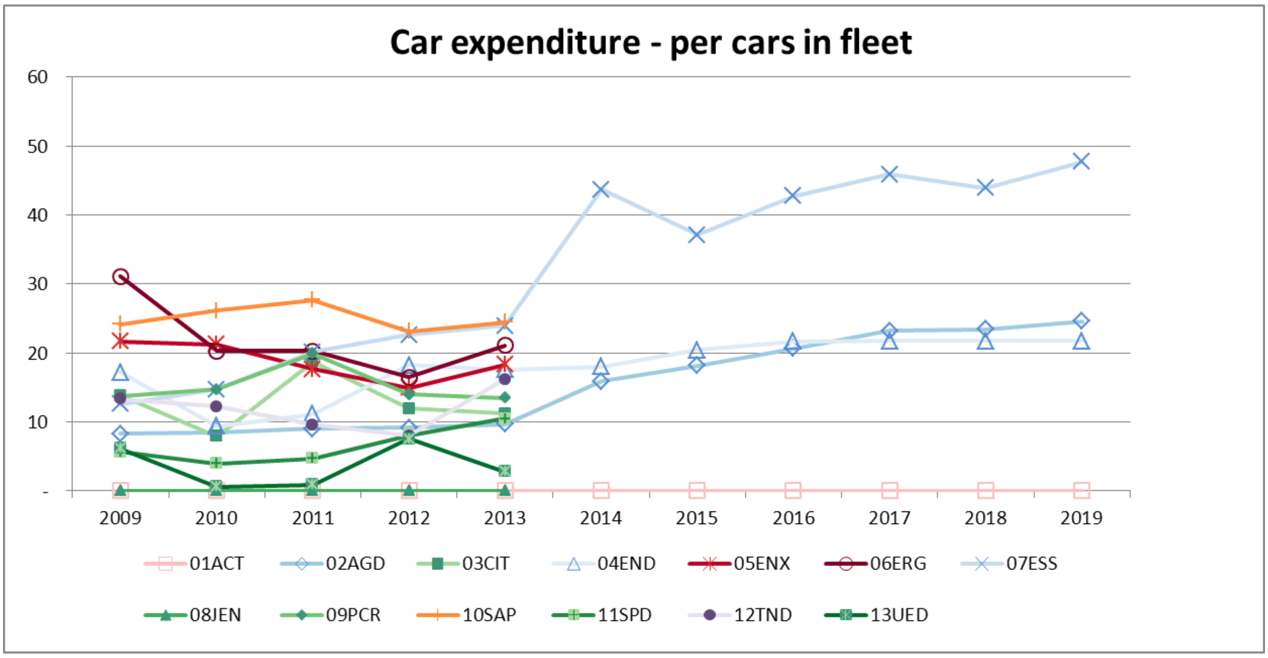


Figure 2.13 IT device expenditure per device



- Essential Energy has the highest cost per IT device by a significant margin, TasNetworks is also high by comparison

Figure 2.14 Car expenditure (totex) per 'cars in fleet'

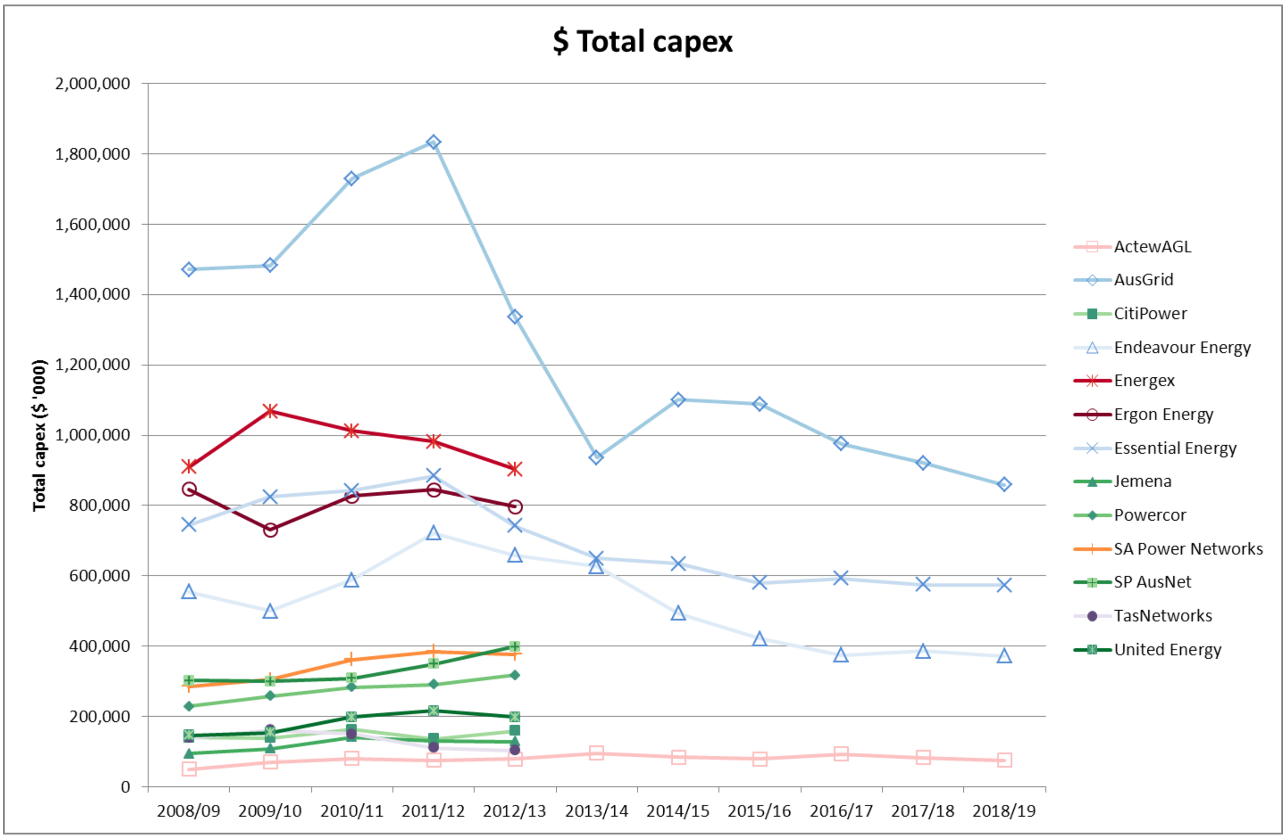


- Essential has the highest average cost per car in fleet
- All three NSW DNSPs show increasing average costs as part of their regulatory proposals
- Total expenditure on all vehicles, when accounting for the scale of the network (approximated by customer numbers) is high for Essential and Ergon

3. Capital expenditure analysis

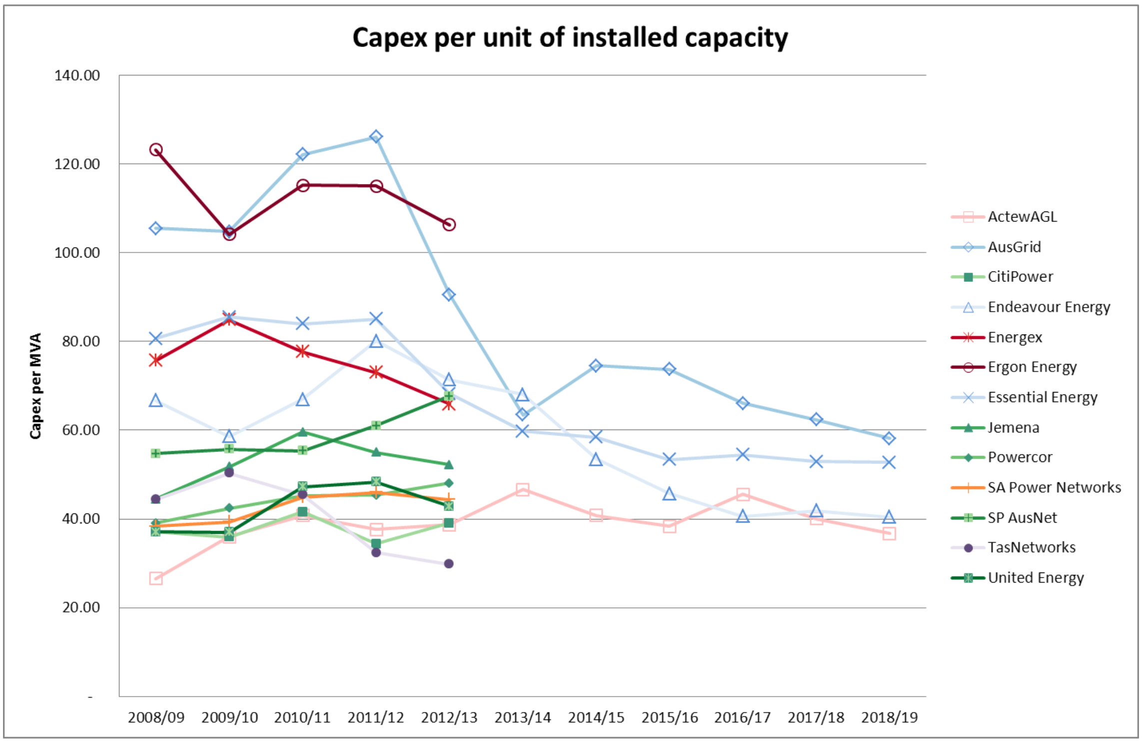
Total Capex

Figure 3.1



- Whilst there is no normalisation applied here, do NSPs have any comments on their level of overall capex compared to other NSPs?

Figure 3.2



Note: 'Installed capacity' refers to the aggregated installed distribution transformer capacity owned by the DNSP.

Figure 3.3

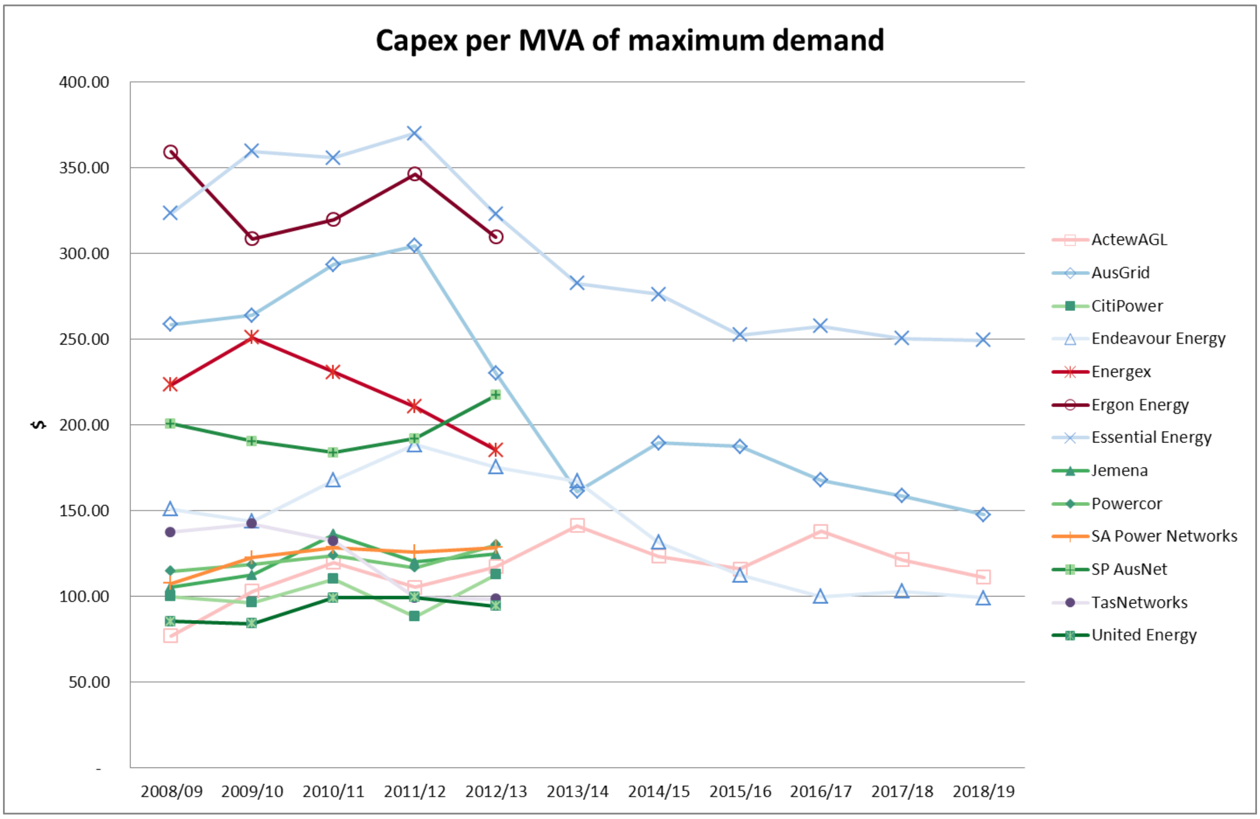


Figure 3.4

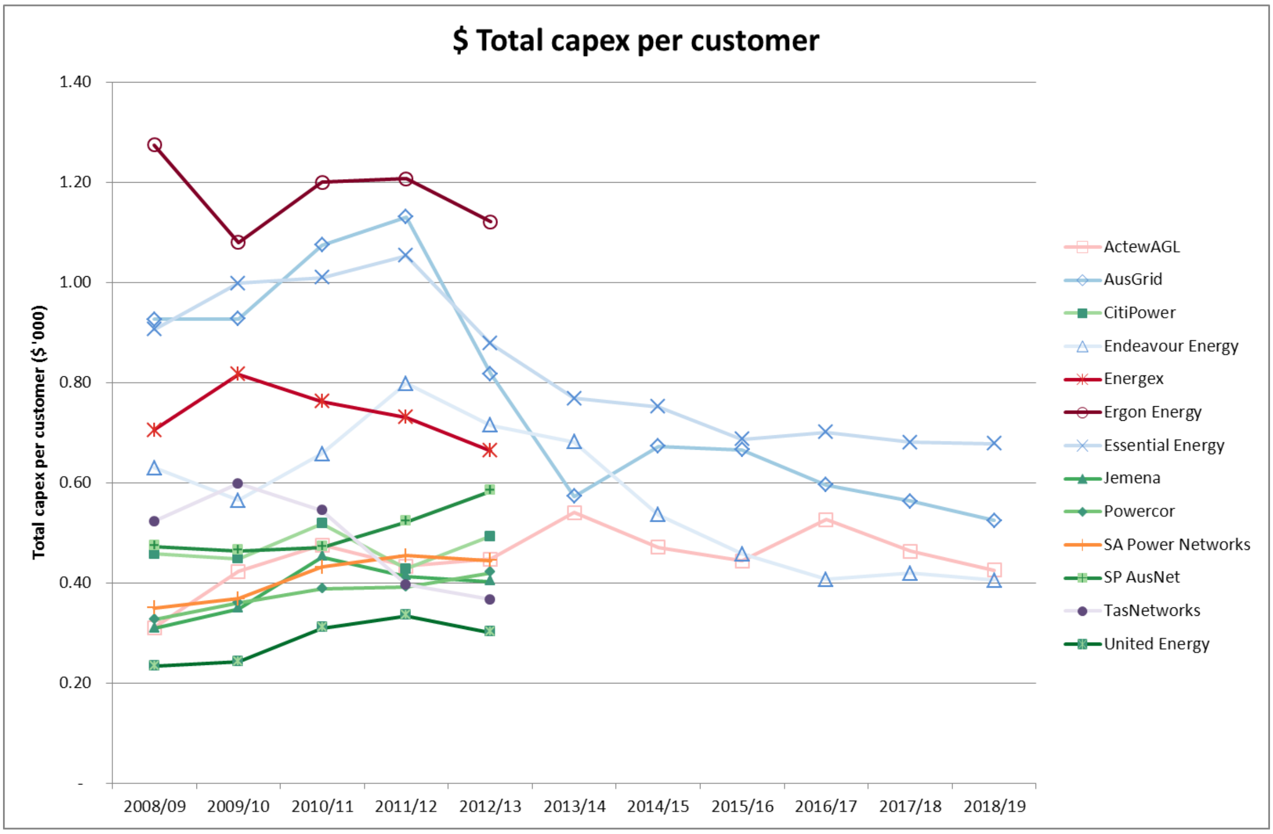
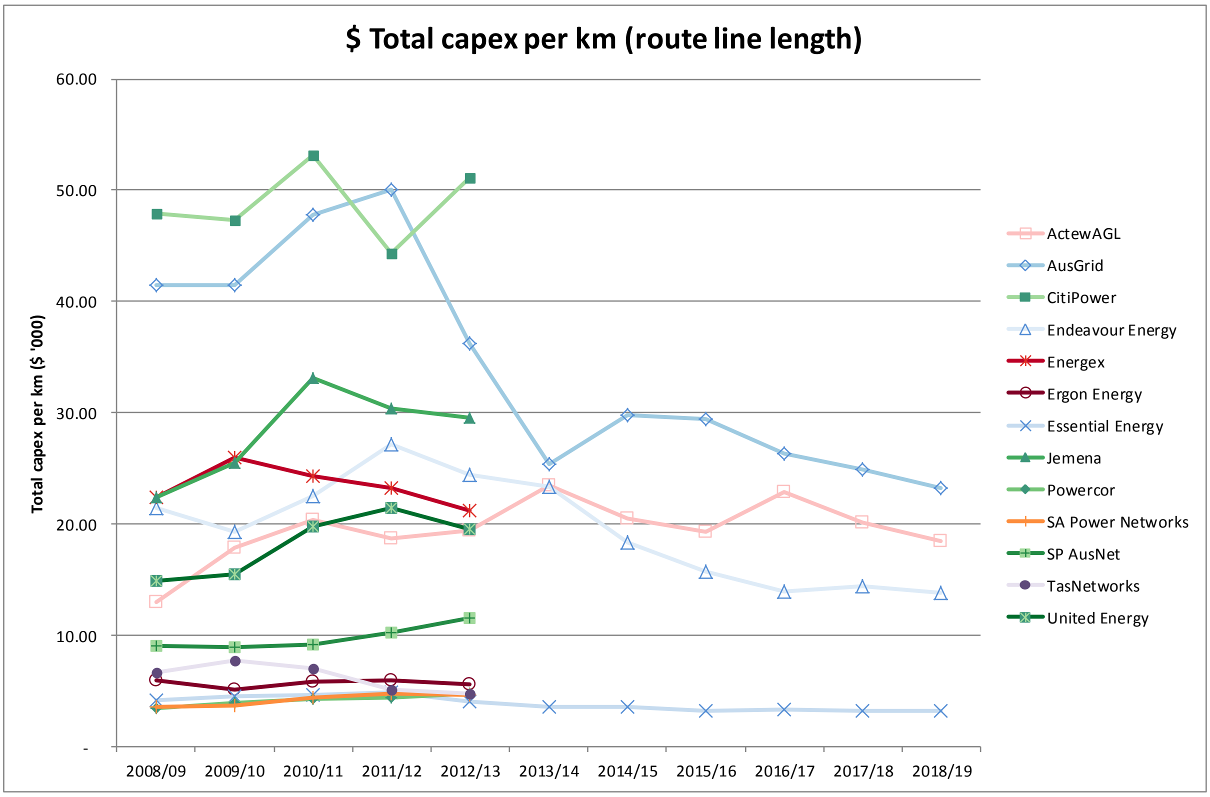


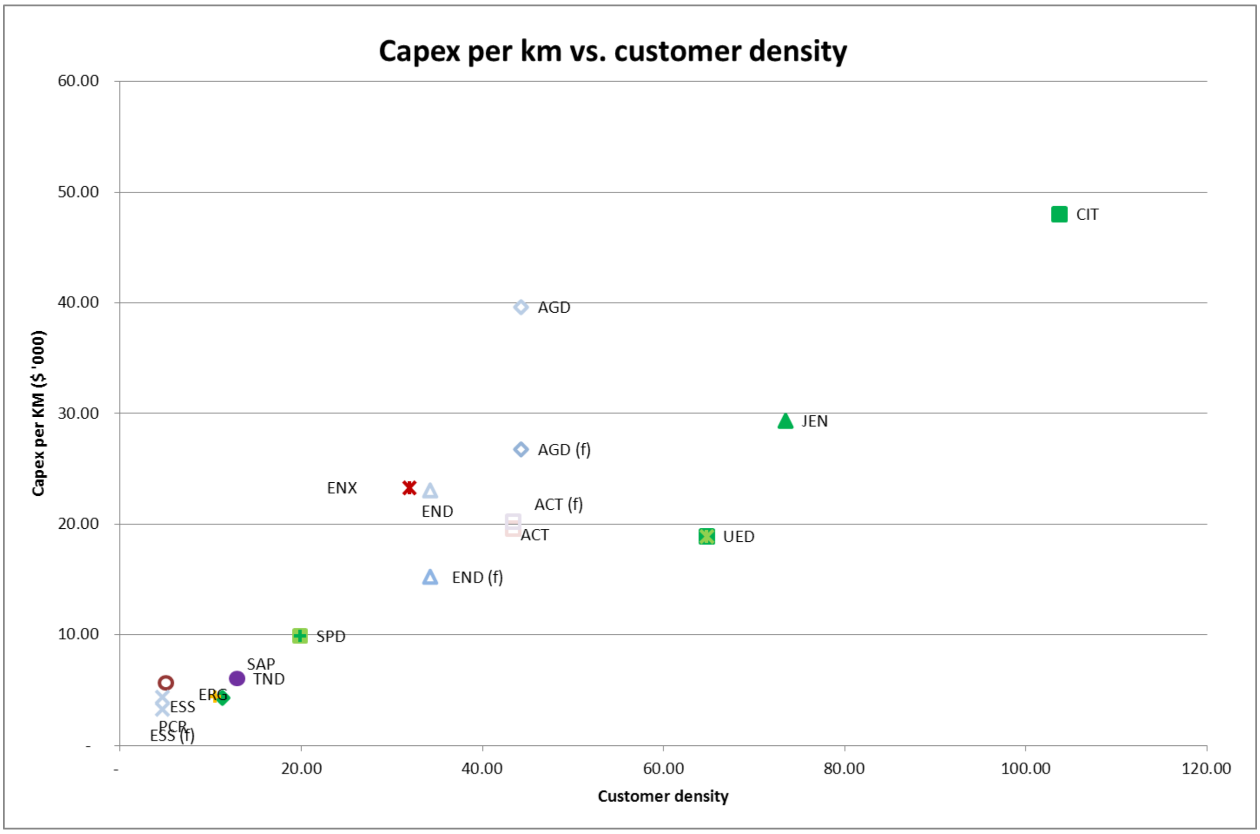
Figure 3.5



- Ausgrid appears to have had comparatively high expenditure on all metrics that are normalised for network scale.
- Ergon and Essential appear high on many metrics, but are low on the per km measure. This could be explained by the network density.
- Citipower appears to have relatively high expenditure compared the length of its line, but this is probably explained by the relatively high network density.
- NSW and ACT NSPs appear to be improving on these metrics in the forthcoming regulatory control period.

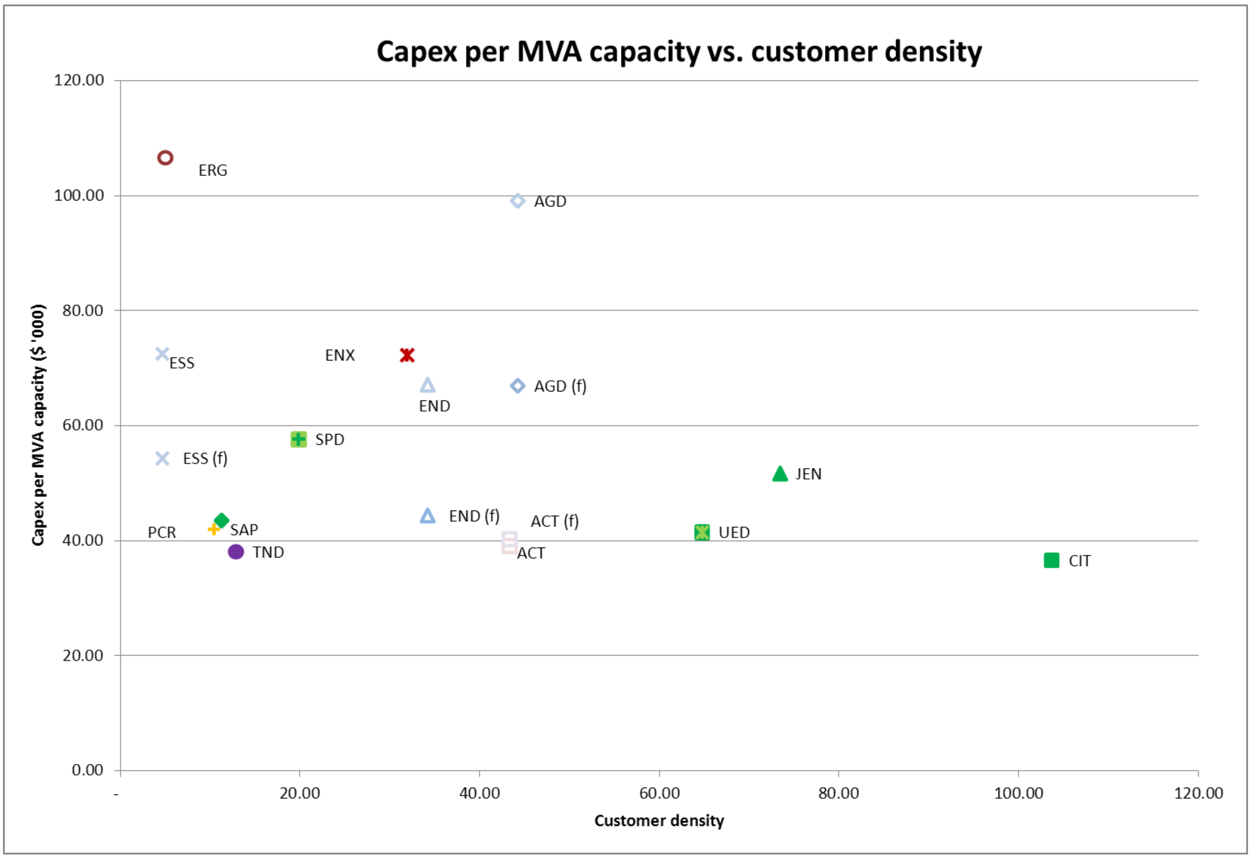
Total Capex – Normalised for customer density

Figure 3.6



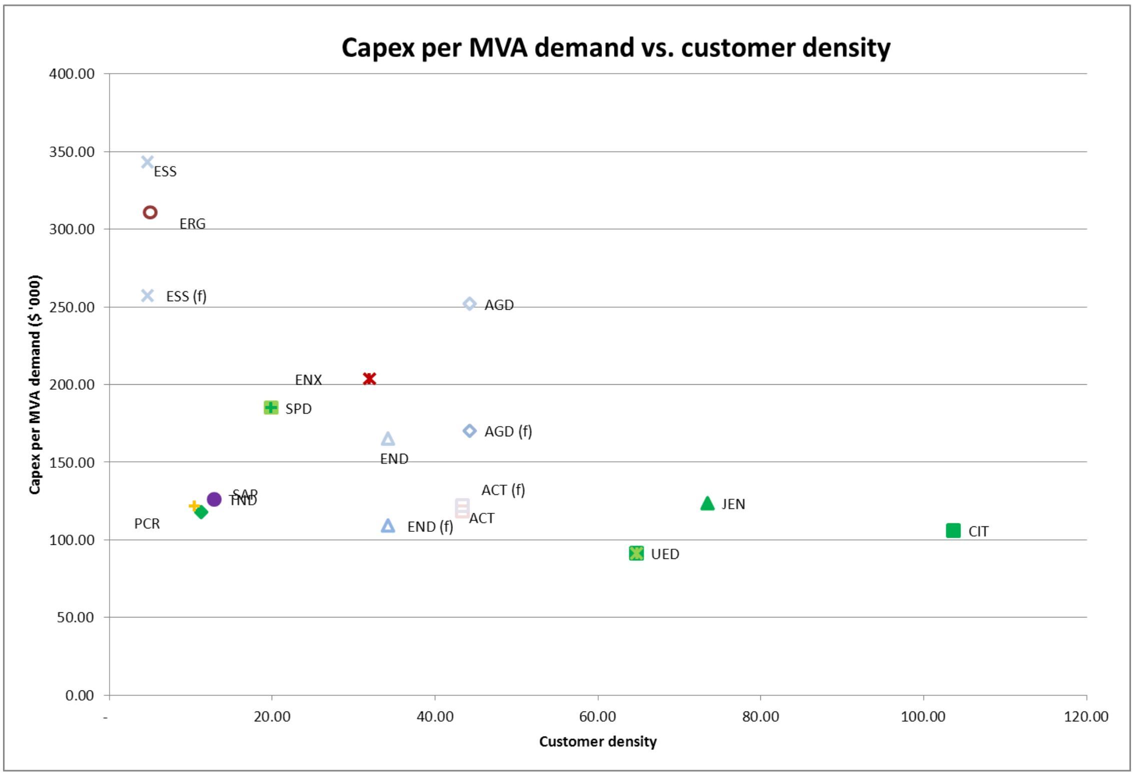
- There appears to be a fairly strong relationship between and capex per KM once normalised for customer density.
- Ausgrid, Energex and Endeavour appear to have relatively high expenditure on this metric.

Figure 3.7



- Ergon, Essential, Energex, Ausgrid, Endeavour and SP AusNet appear to have had comparatively high expenditure on this metric.

Figure 3.8

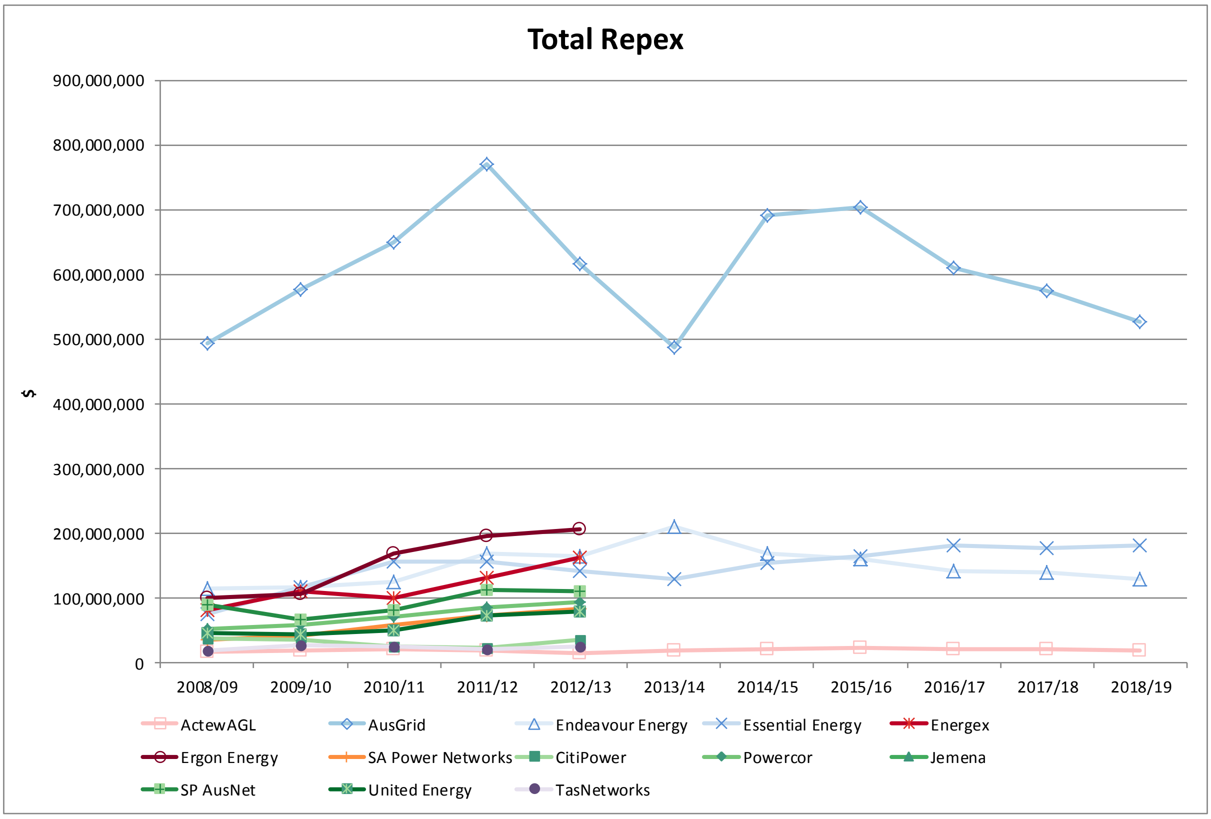


- Ergon, Essential, Energex, Ausgrid, Endeavour and SP AusNet appear to have had comparatively high expenditure on this metric.

Replacement Expenditure

Figure 3.9 shows total repex by DNSPs across time, including the forecast period for the ACT/NSW businesses. Differences in overall repex may be brought about by the differing characteristics of the networks, such as geography, asset mix and size. The metrics that follow apply a series of factors to attempt to account for the differences outside of an NSP's control. AER staff seek to understand the factors determining the remaining differences between the NSPs.

Figure 3.9 Total Replacement Expenditure

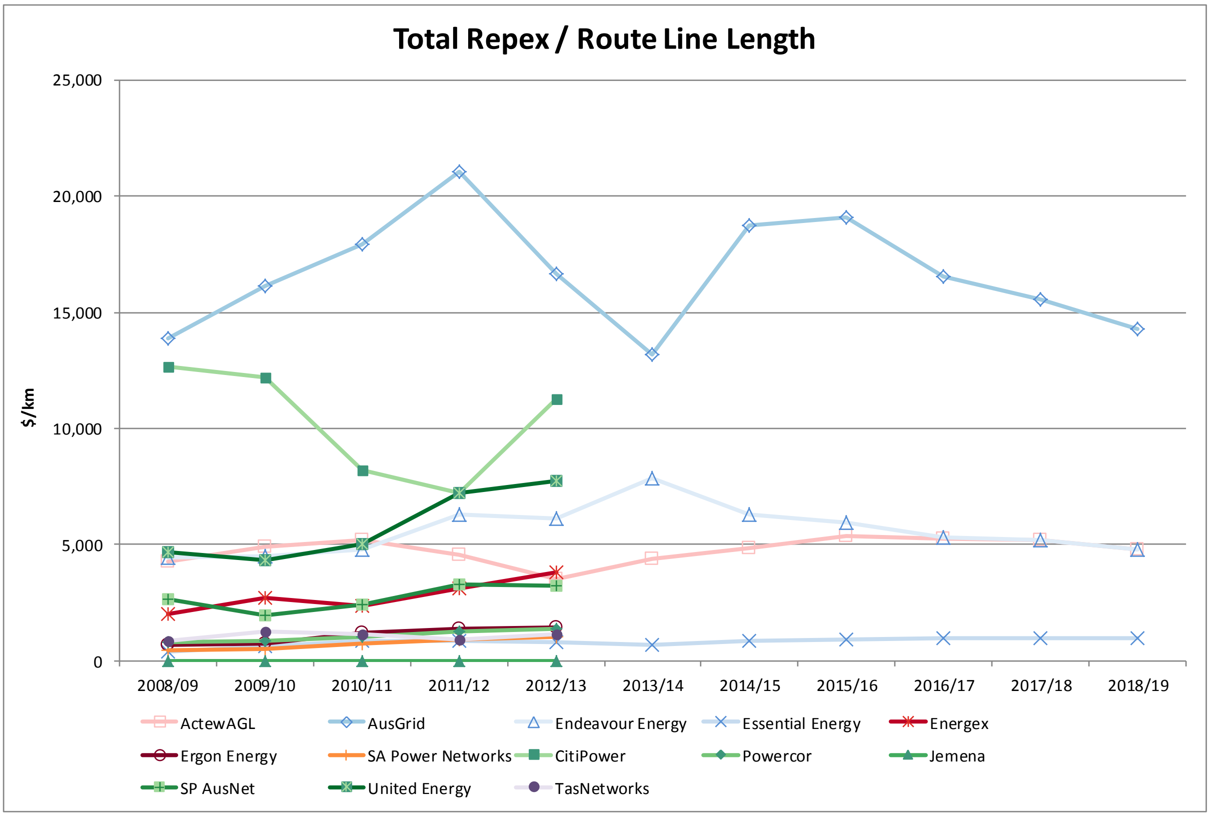


Source : DNSP Category Analysis and Reset RINs -Table 2.1.1 - Standard control capex

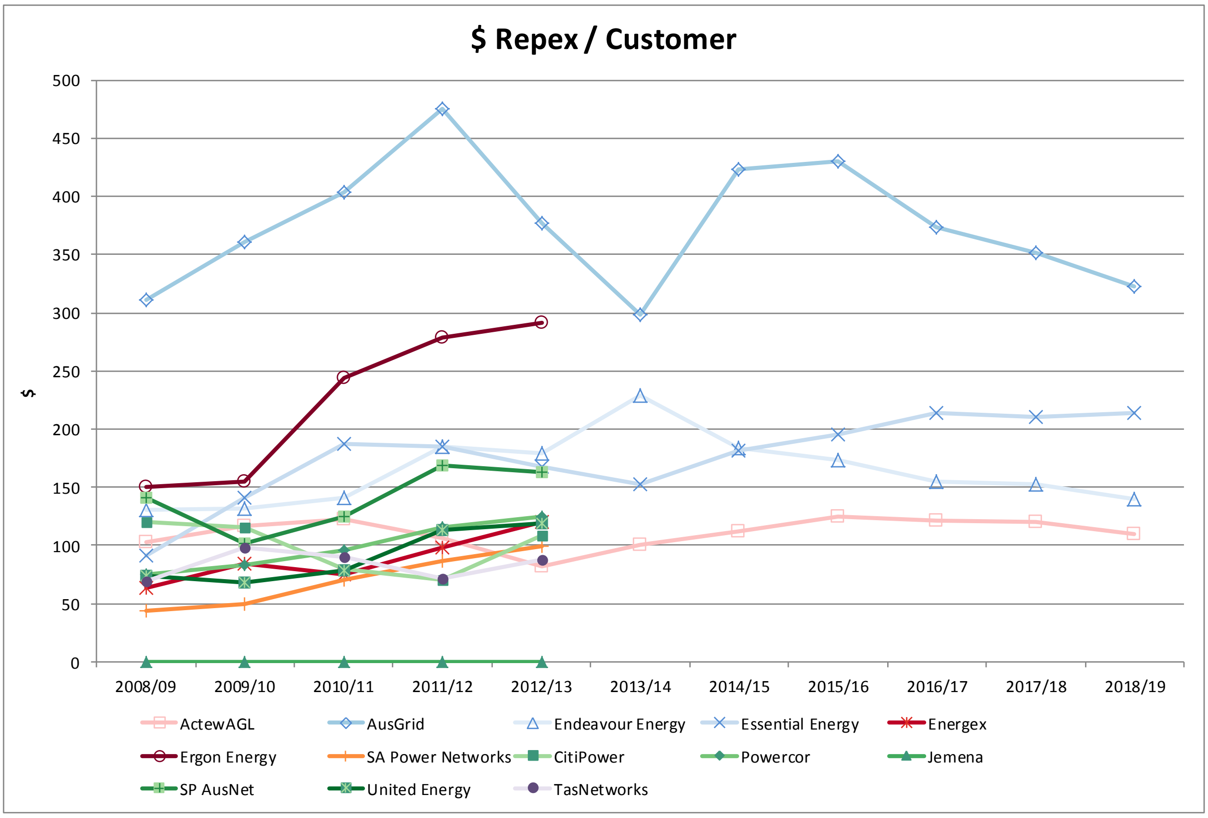
- Whilst there is no normalisation applied here, do NSPs have any comments on their level of overall repex compared to other NSPs?

Repex normalised for measures of network scale

Figure 3.10 Network size and Total Repex



Source: DNSP Category Analysis and Reset RINs Table 2.2.1 – Replacement expenditure, volumes and asset failures by asset category and EBT RINs.



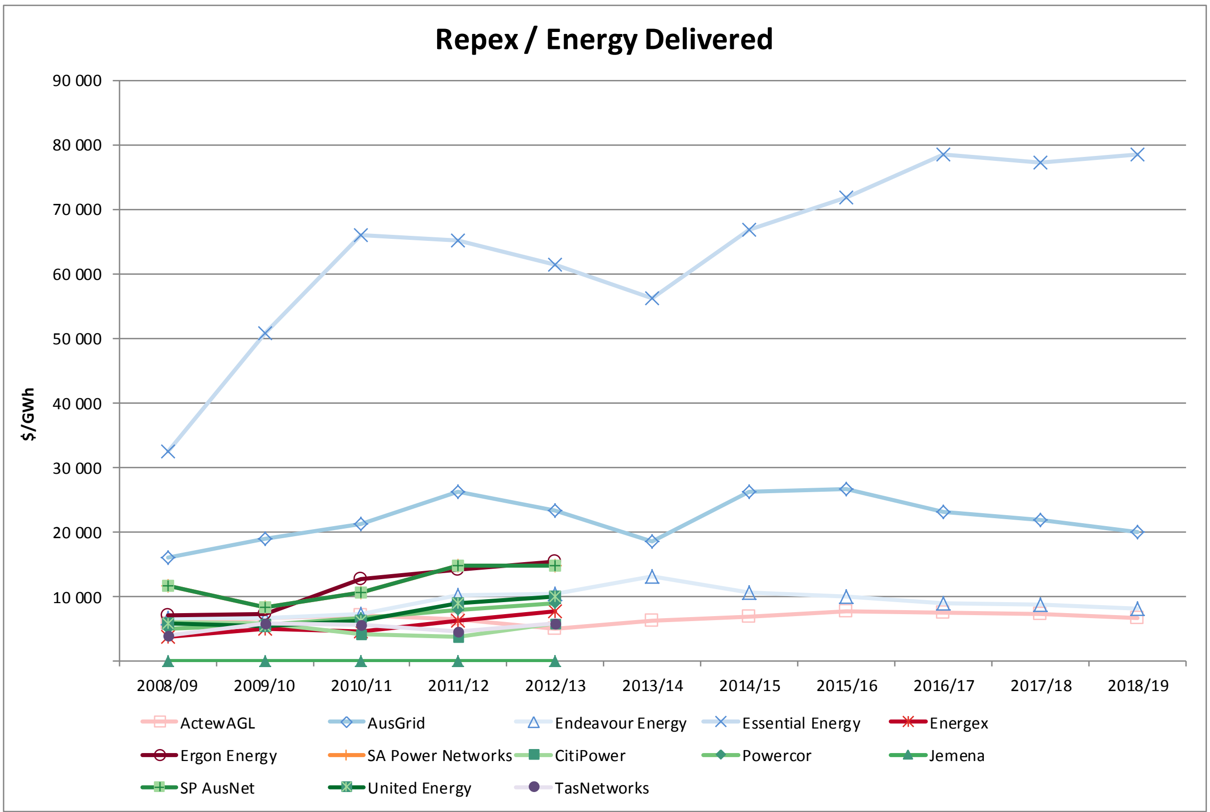
Source : DNSP Category Analysis RINs- Table 2.2.1 - Replacement expenditure, volumes and asset failures by asset category and EBT RINs

AER staff note that larger networks require greater total repex, can DNSPs offer suggestions/observations on:

- the interactions existing between network size and the propensity of replacement.
- a denominator that accurately accounts for network size and density. The tables above apply route line length as a proxy of network size and network density by customer numbers.
- differences across DNSPs evident in the above figures.

Repex normalised for Network Utilisation

Figure 3.11 Repex per GWh of energy delivered



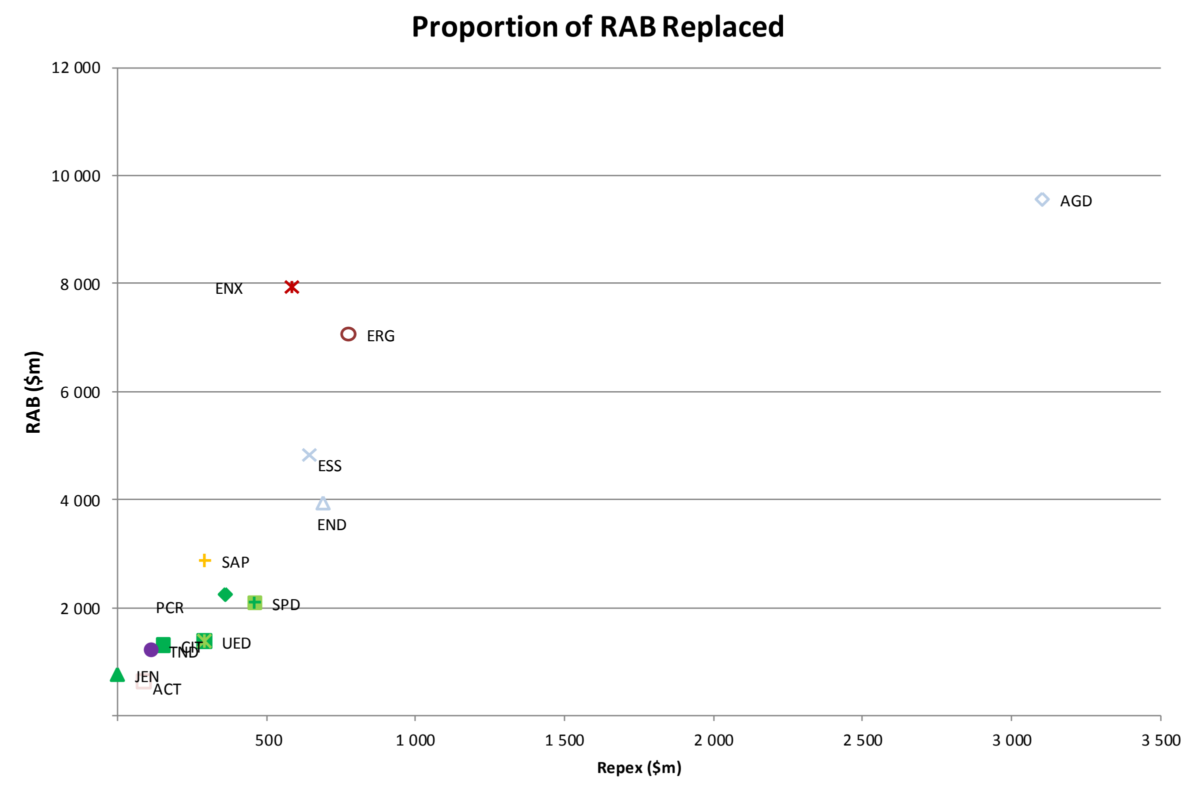
Source : DNSP Category Analysis RINs- Table 2.2.1 - Replacement expenditure, volumes and asset failures by asset category and EBT RINs

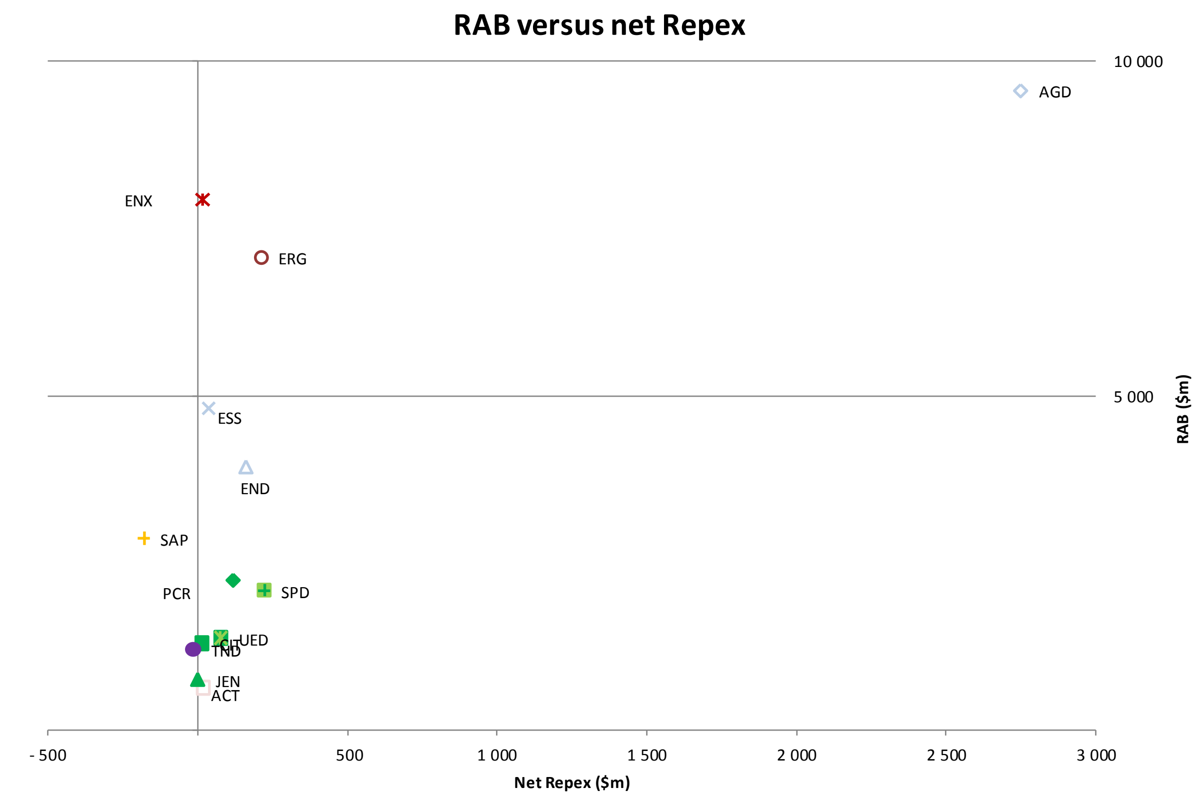
AER staff consider there is a positive correlation between network utilisation and asset deterioration. Can DNSPs offer suggestions/observations on:

- whether the denominator "energy delivered" appropriately accounts for differences in utilisation
- differences across DNSPs evident in the above figures.

Replacement practices

Figure 3.12 Repex as a function of asset base





Source : DNSP Category Analysis RINs- Table 2.2.1 - Replacement expenditure, volumes and asset failures by asset category and RAB as at 2008/09 closing value for asset value (EBT RIN variable DRAB0107). Net Repex is Total Repex 2008/09 - 2012/13 less Accumulated Regulatory Depreciation 2008/09 - 2012/13.

Each DNSP applies different practices for managing its network. Factors determining the practices can include relevant safety regulations and applicable planning standards as well as internal asset management plans and governance frameworks. Figure 3.12 aims to observe the impact on repex to account for these obligations and practices. AER staff have approximated the existing asset base of DNSPs by its regulatory asset base (RAB) and applied this as a numerator to both total repex and repex net of regulatory depreciation.

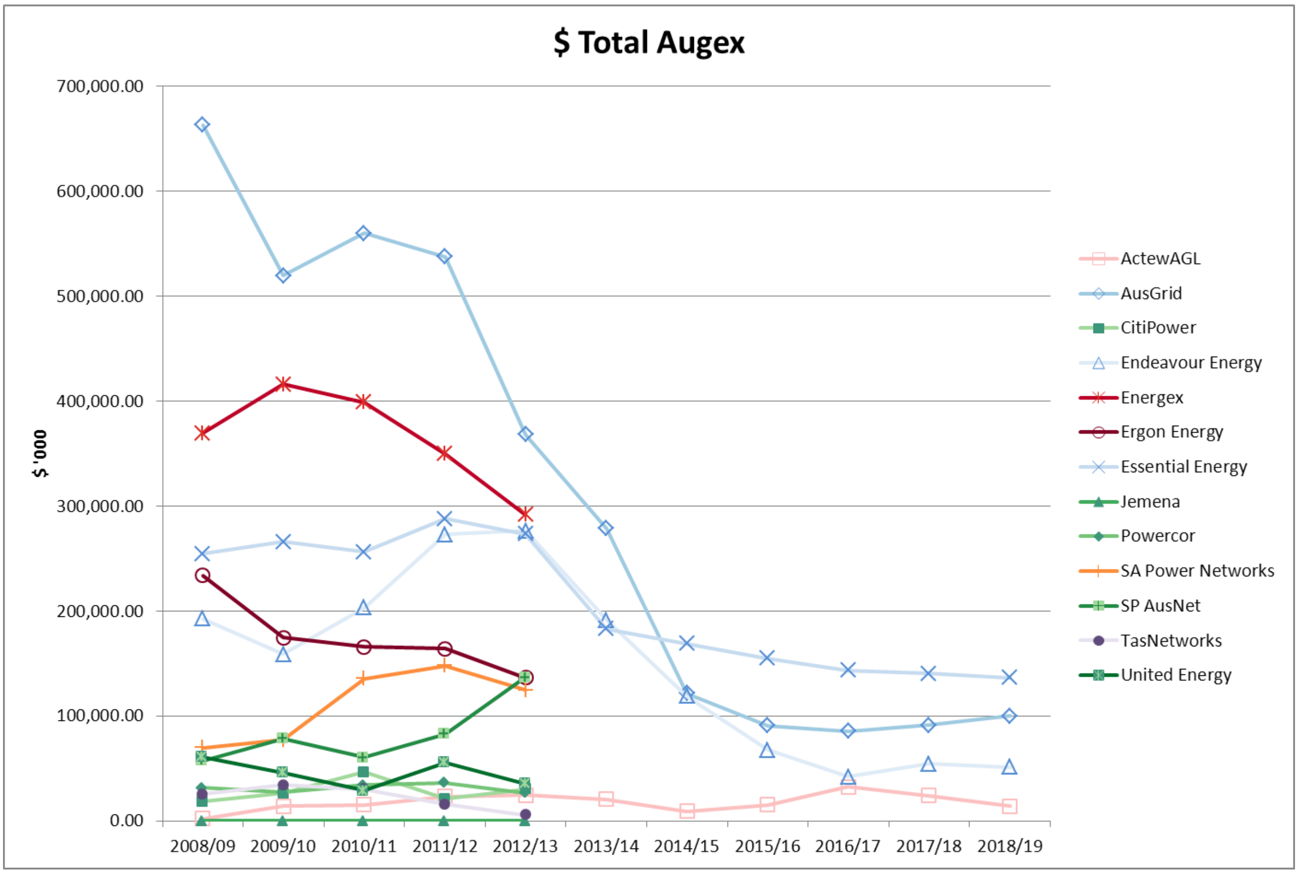
Can DNSPs offer suggestions/observations on:

- the appropriateness of this approach to observing differences in DNSPs replacement obligations and practices.
- possible alternative methods of expressing these metrics
- differences across DNSPs evident in the above figures

Augmentation Expenditure

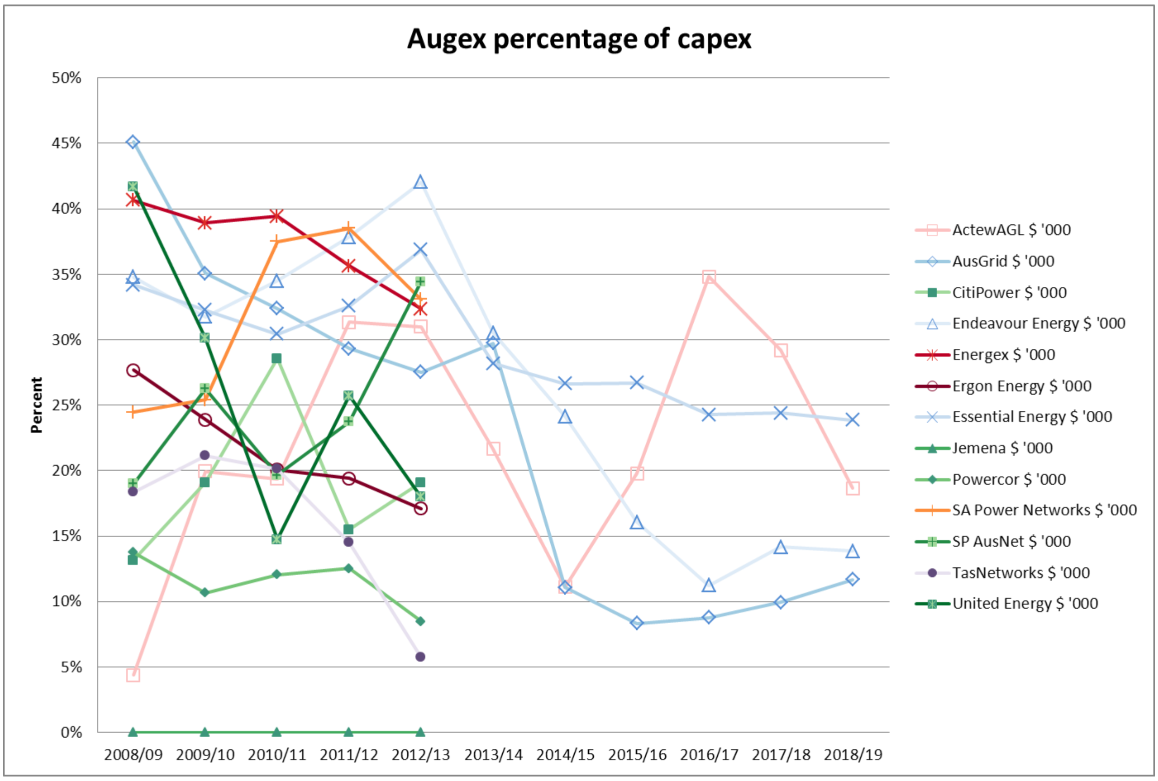
Figure 3.13 shows total augex by DNSPs across time, including the forecast period for the ACT/NSW businesses. Differences in overall augex may be brought about by the differing characteristics of the networks, such as geography, asset mix and size. The metrics that follow apply a series of factors to attempt to account for the differences outside of an NSP's control. AER staff seek to understand the factors determining the remaining differences between the NSPs.

Figure 3.13



- Whilst there is no normalisation applied here, do NSPs have any comments on their level of overall augex compared to other NSPs?

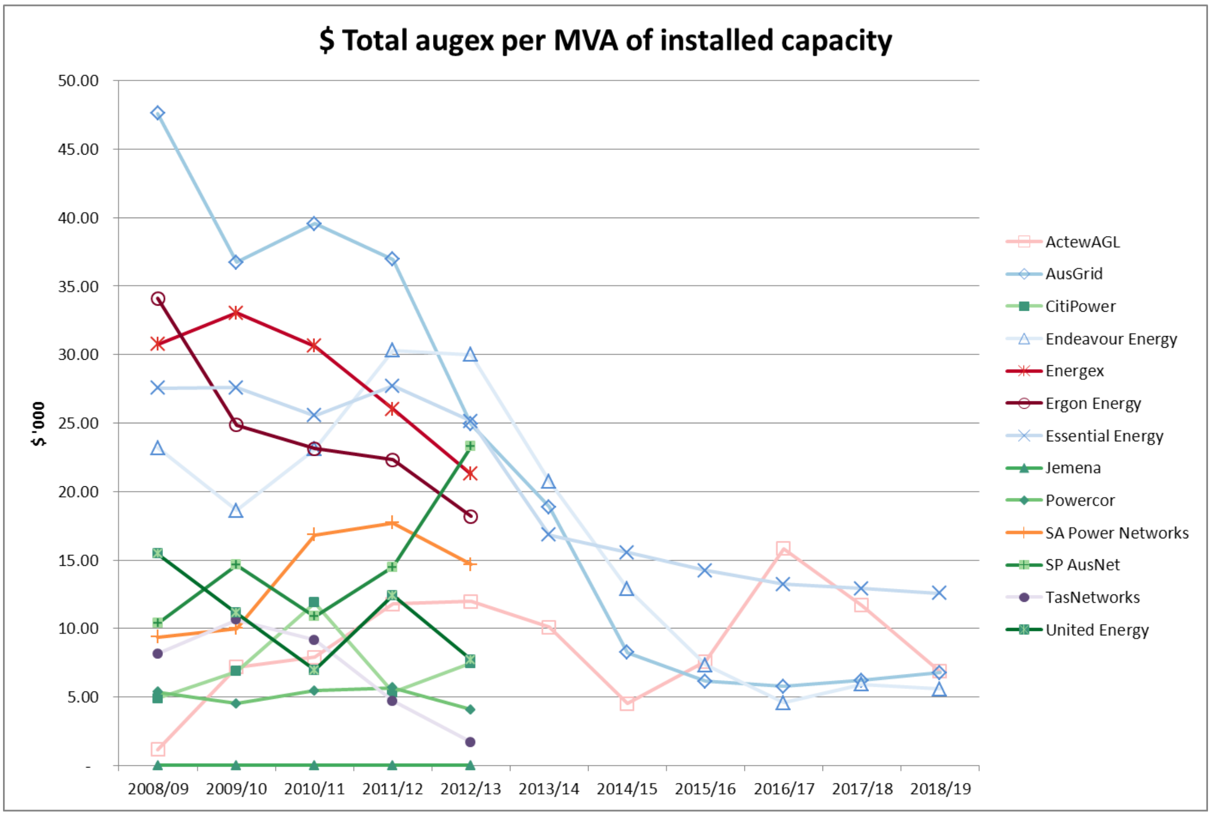
Figure 3.14



- Energex, Ausgrid, SA Power, Essential appear to have had a relatively high proportion of expenditure on Augmentation.
- Essential and Actew's proportion of expenditure on augmentation appears to be relatively high in the forecast period.
- SP AusNet's proportion of augmentation expenditure has been rising over the last regulatory period.
- Ausgrid and Actew's Augex as a proportion of capex is forecast to reduce greatly in the forecast period.

Augex - normalised for measures of network scale

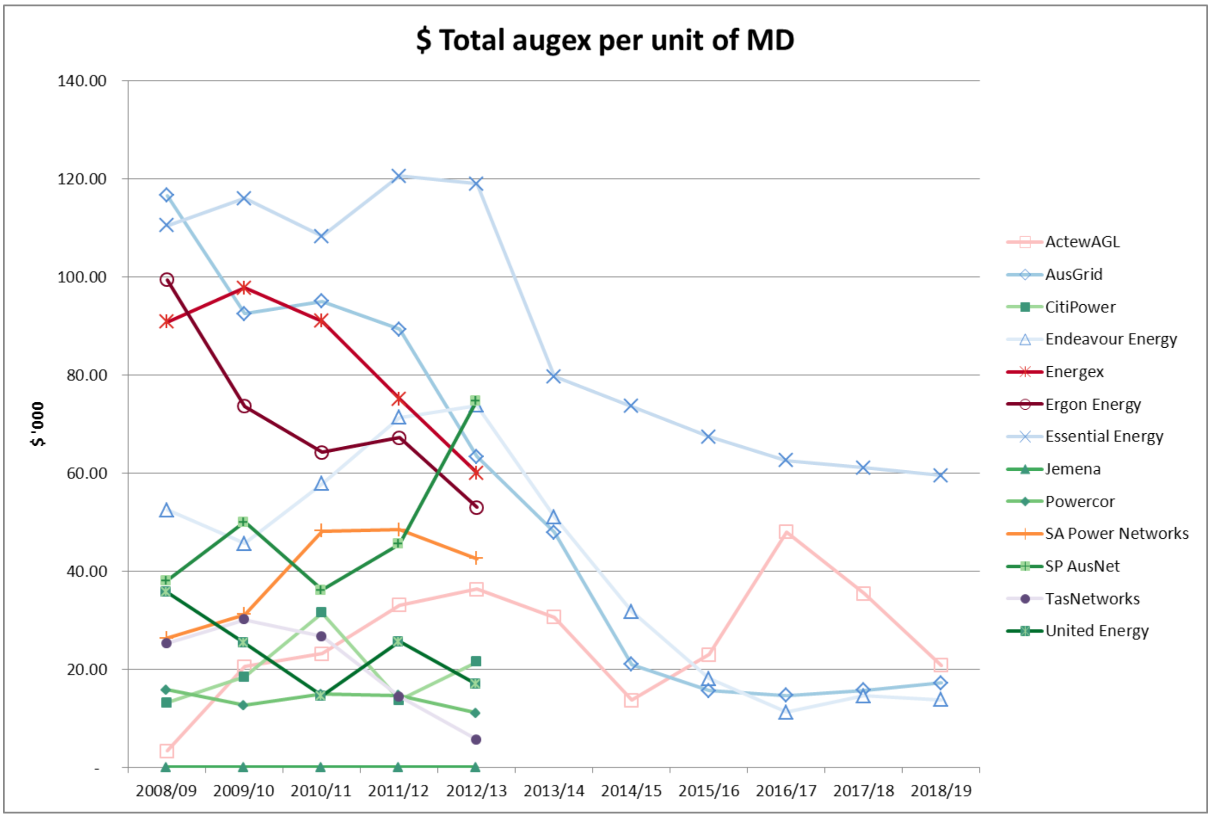
Figure 3.15



Note: 'Installed capacity' refers to the aggregated installed distribution transformer capacity owned by the DNSP.

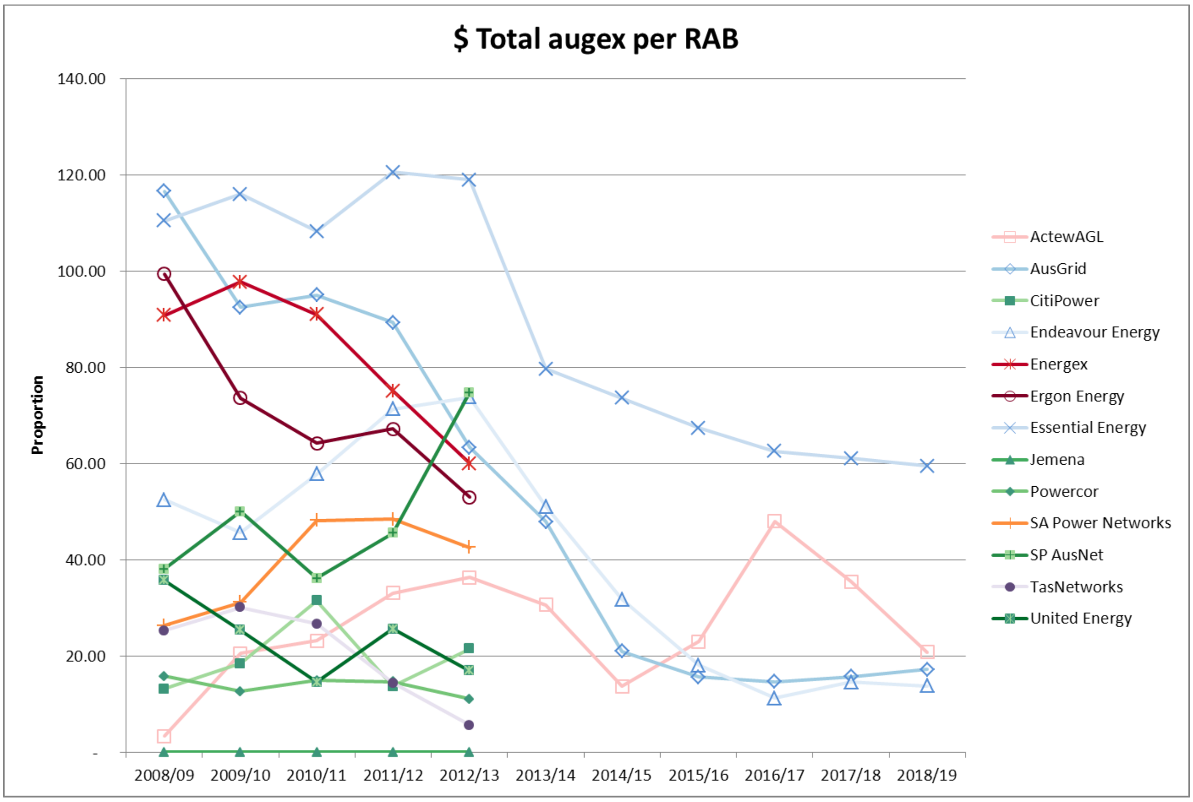
ActewAGL appears to have a spike in its augex per MVA of installed capacity in 2016–17 (as well as other normalisers below). What are the reasons for this spike in augex?

Figure 3.16



Essential's normalised augex in figures 3.16 and 3.17, although falling, still appear high compared to the forecasts of the other NSW and ACT DNSPs. Please provide reasons.

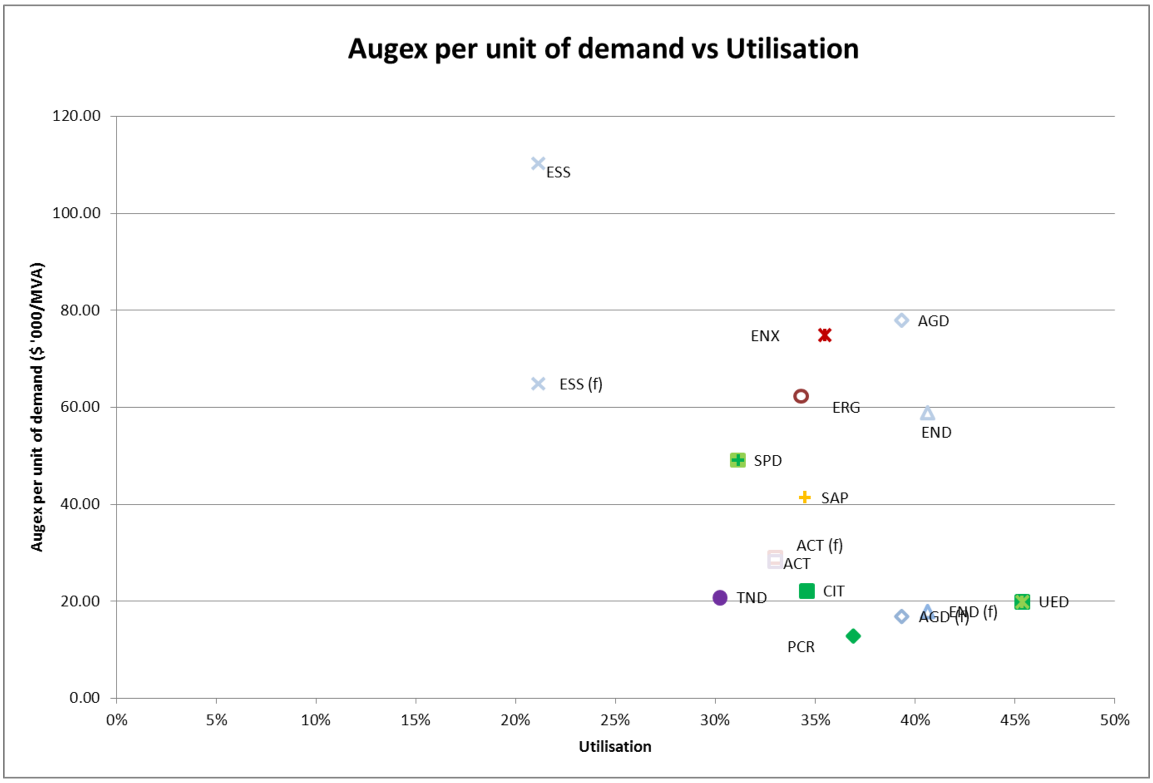
Figure 3.17



- Essential’s augex appears relatively high compared to other NSPs.
- SP AusNet had strongly increasing augex over the last regulatory period.
- ActewAGL’s augex has a large spike in the forthcoming regulatory period.
- Ausgrid and Endeavour have large decreases in augex in the forthcoming period.

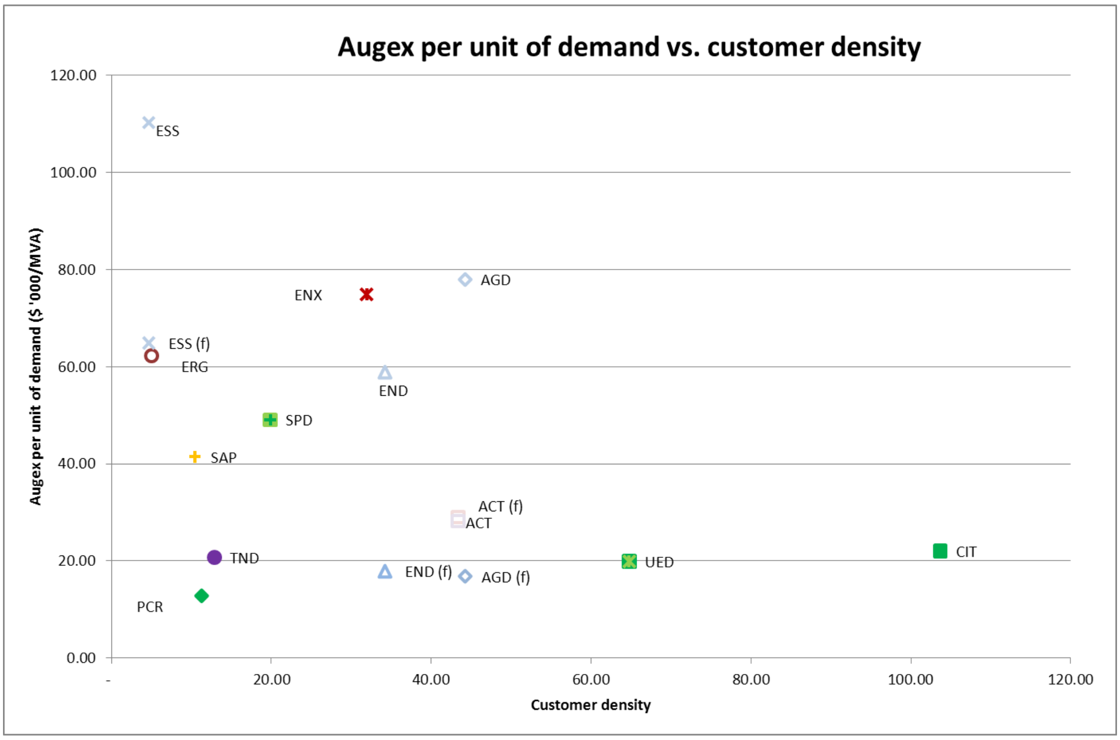
Augex normalised for customer density or utilisation

Figure 3.18



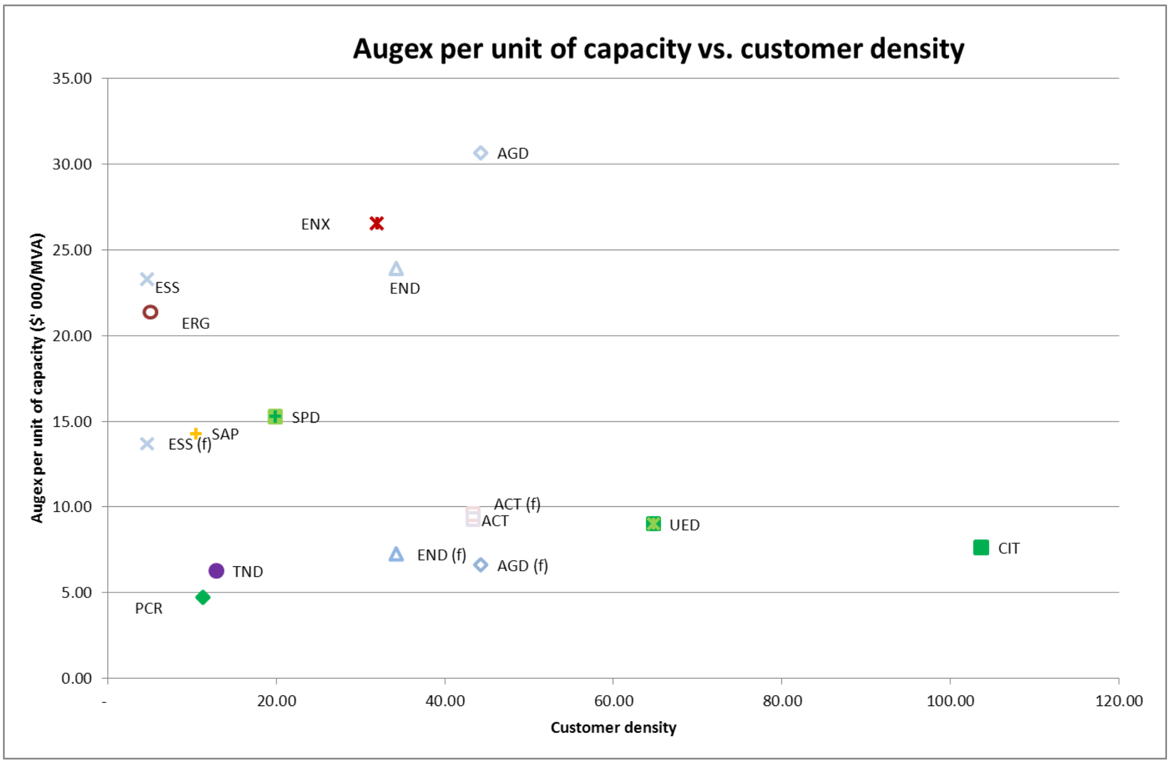
- Essentials utilisation appears particularly low and expenditure appears relatively high.
- Energex, Ausgrid, Ergon, SP AusNet, SA Power and Endeavour expenditure appears relatively high.

Figure 3.19



- Energex, Ausgrid, Ergon, SP AusNet, SA Power and Endeavour expenditure appears relatively high.

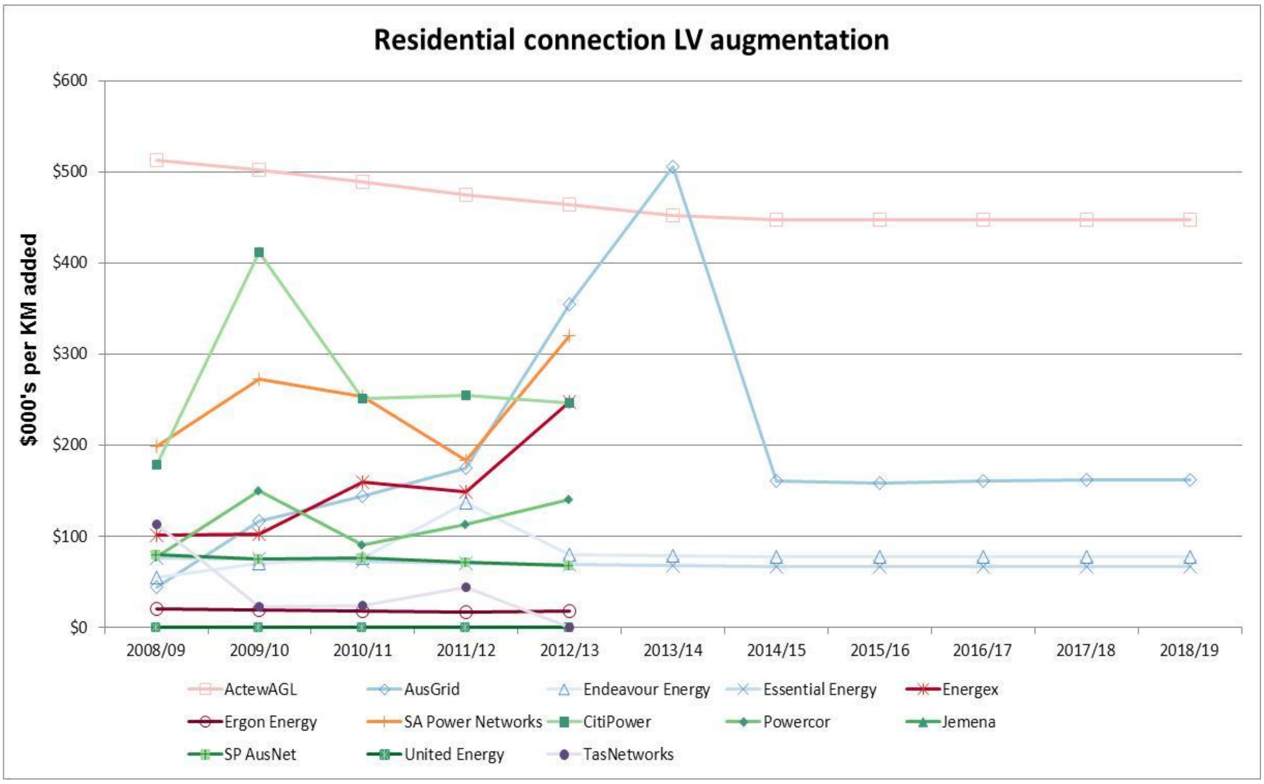
Figure 3.20



- Energex, Ausgrid, Ergon, SP AusNet, SA Power and Endeavour expenditure appears relatively high.

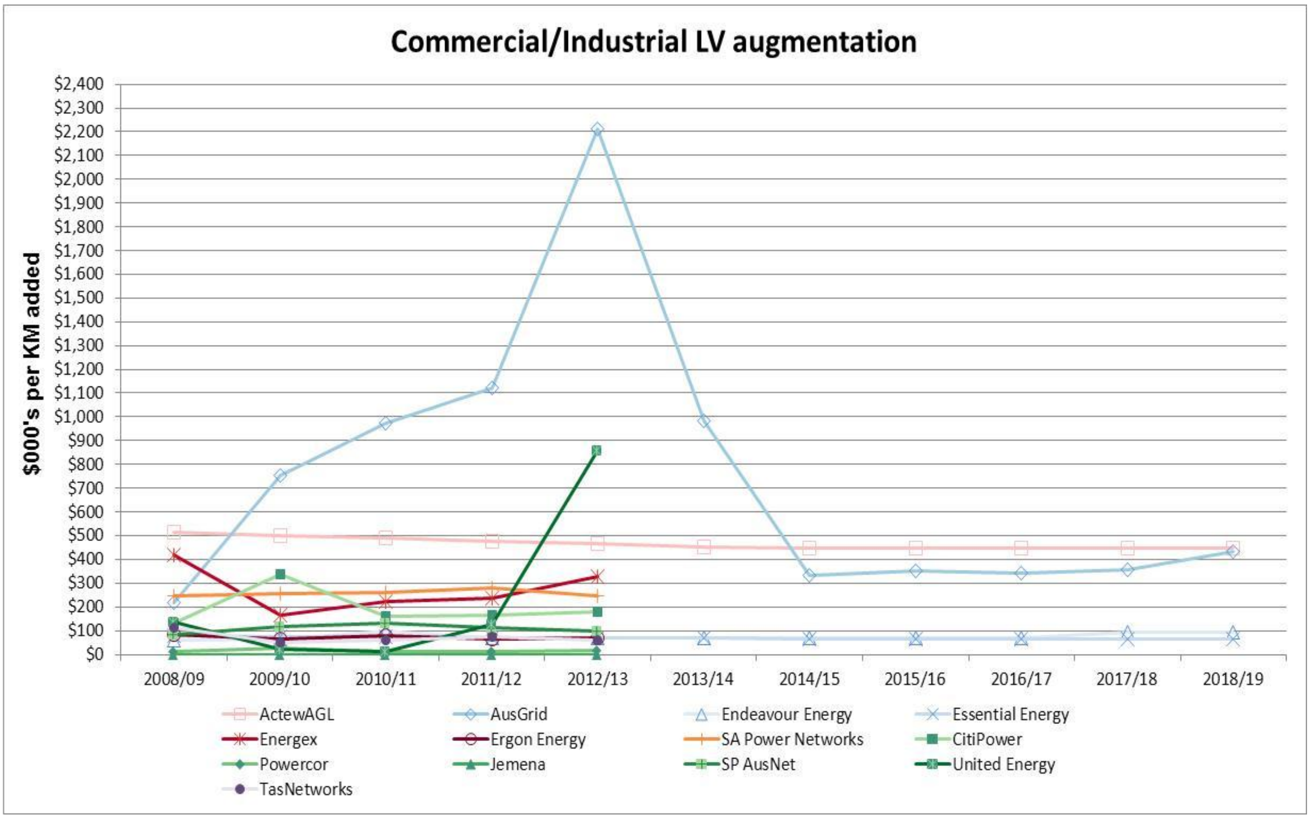
Connections normalised by KM added.

Figure 3.21



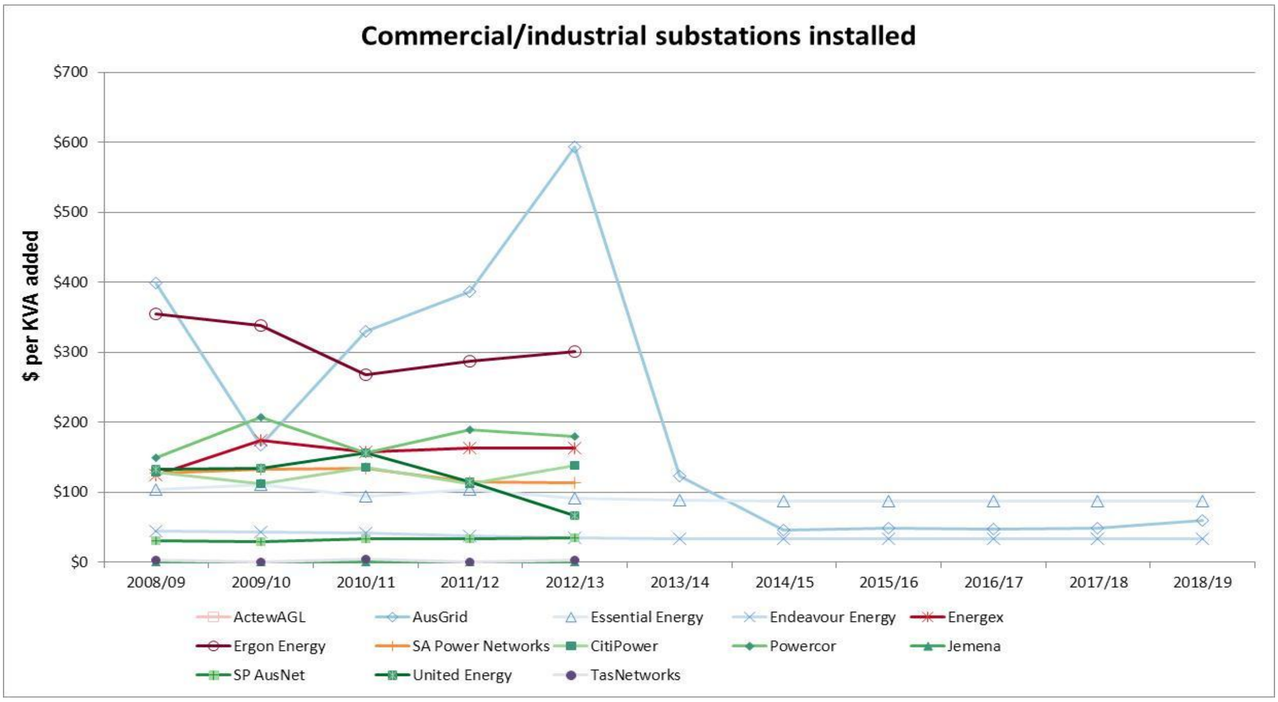
- Can ActewAGL please explain why its expenditure per km of augmentation for residential LV connections appears to be higher than for most other DNSPs?
- Can Ausgrid please explain why the cost of augmentation for residential LV connections increases over 2011/12 to 2013/14, and then declines in 2014/15?

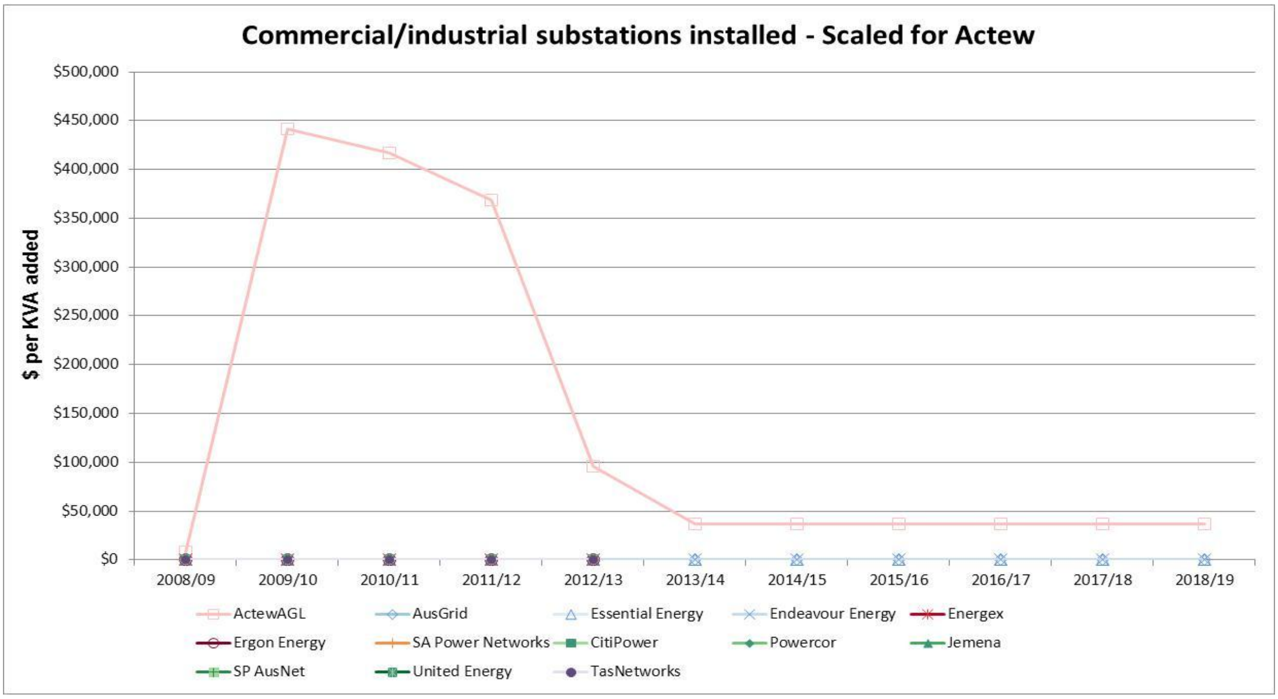
Figure 3.22



- Ausgrid appears to have a higher spend per km added for commercial/industrial LV augmentation than most DNSPs until 2013/14 but this decreases for the upcoming regulatory control period. Can AusGrid please explain the high levels of expenditure up to 2013/14, and the reasons for the differences between the current and forecast regulatory periods?
- ActewAGL appears to incur approximately the same cost for residential LV augmentation as for commercial/industrial LV augmentation, while other DNSPs appear to spend less for residential LV augmentations on a per km basis. Can ActewAGL please explain this?

Figure 3.23

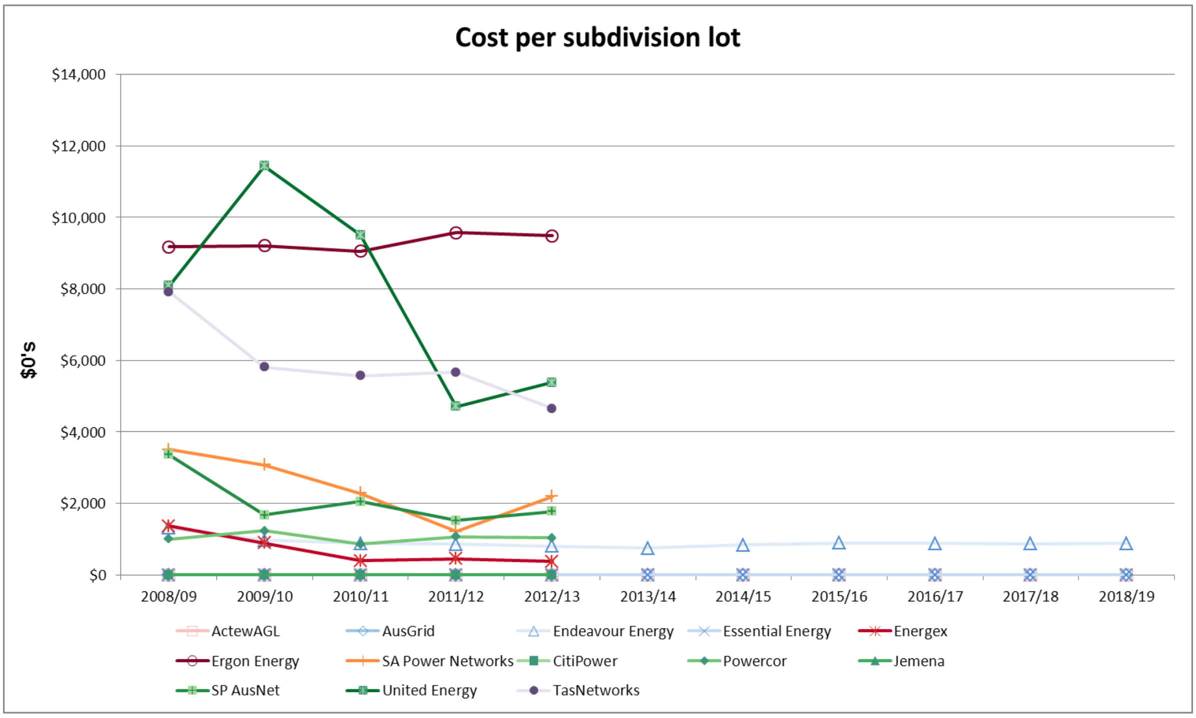




- Can ActewAGL please explain how it has estimated substation expenditure, MVA added and volumes for its commercial/industrial connections, and comment on the robustness of these measures? In particular, ActewAGL's costs of installing distribution substations per dollar of capacity added for commercial/industrial connections appear to be high when compared to all other DNSPs and erratic, ranging between $8093 and $441,831 over the previous regulatory period.
- Can AusGrid please explain why the cost of installing distribution substations per dollar of capacity added appear to be lower for the forecast regulatory period

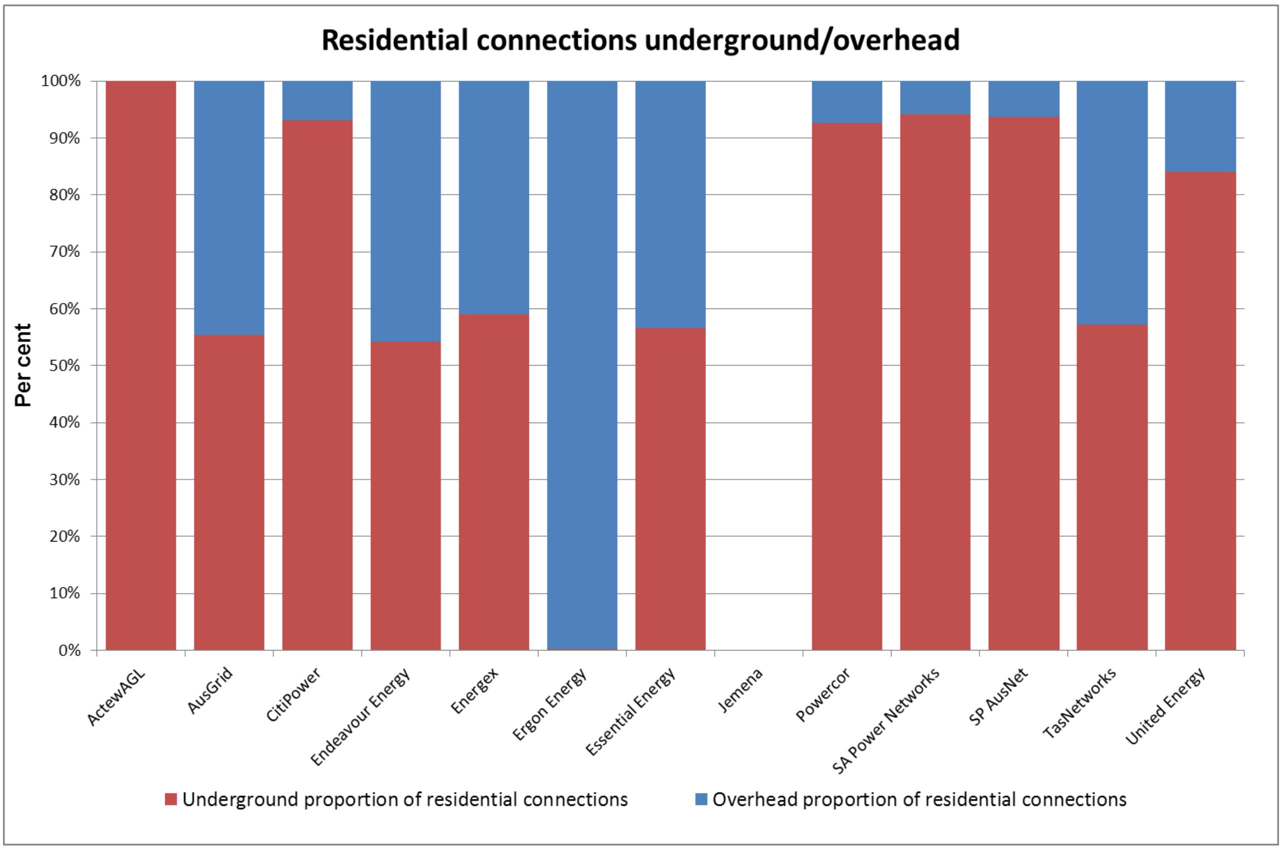
compared with the previous regulatory period? For example, has AusGrid’s commercial/industrial connection work program changed dramatically between the previous and forecast regulatory periods?

Figure 3.24



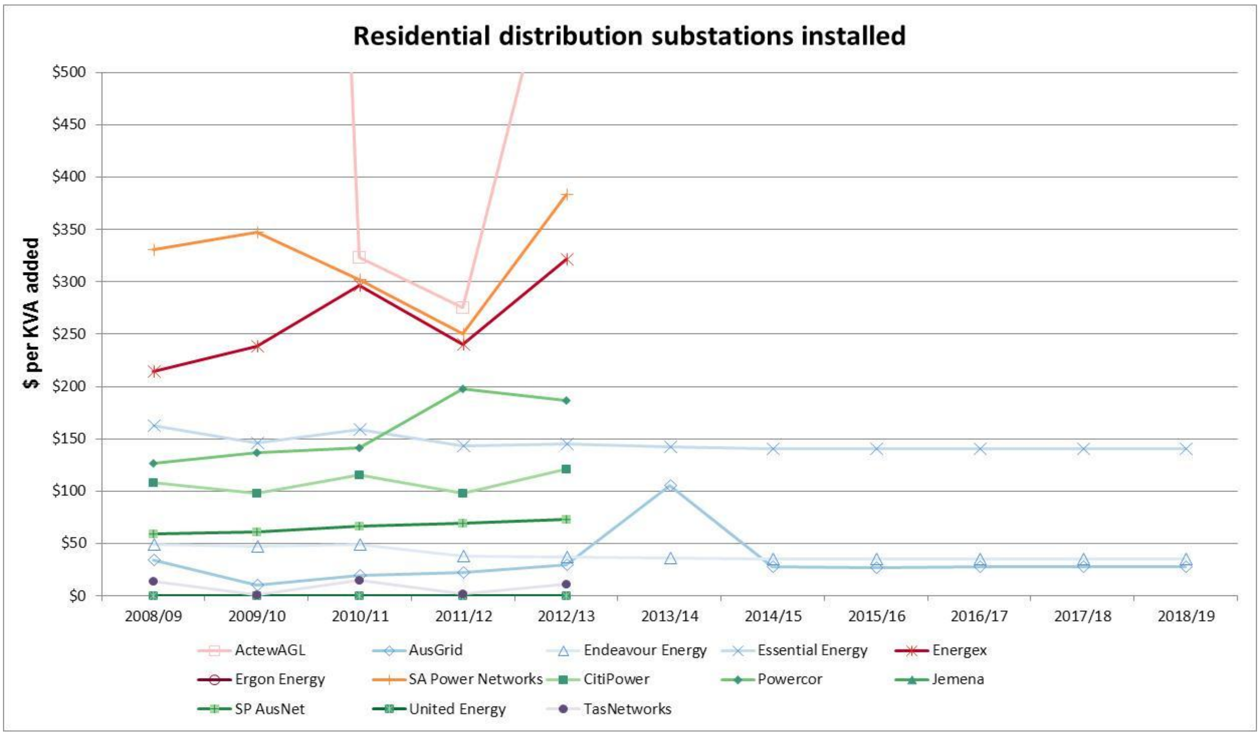
- ActewAGL has not provided an estimate of cost per subdivision lot for the subdivision works reported in the category analysis RIN. Can ActewAGL please provide this information?

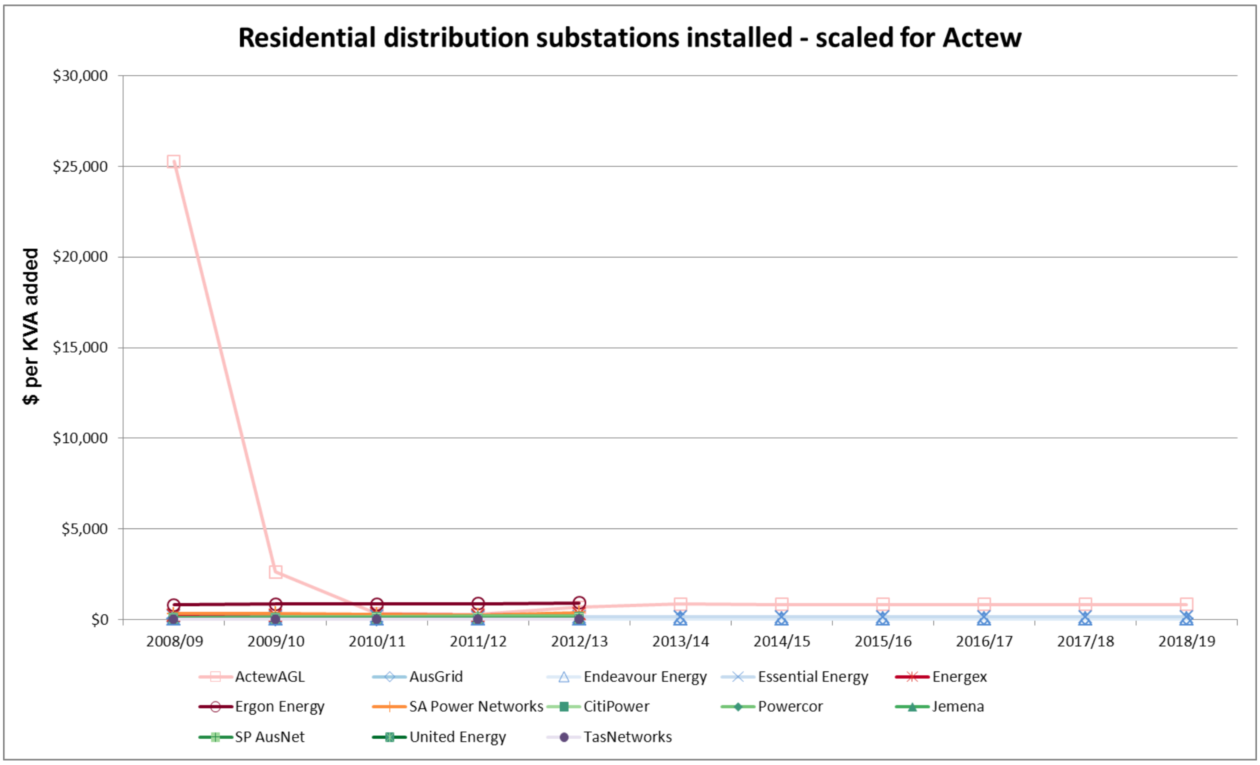
Figure 3.25



- Can Ergon Energy please confirm that almost all of its residential connections are overhead?
- Can ActewAGL please confirm that all of its residential connections are underground?

Figure 3.26



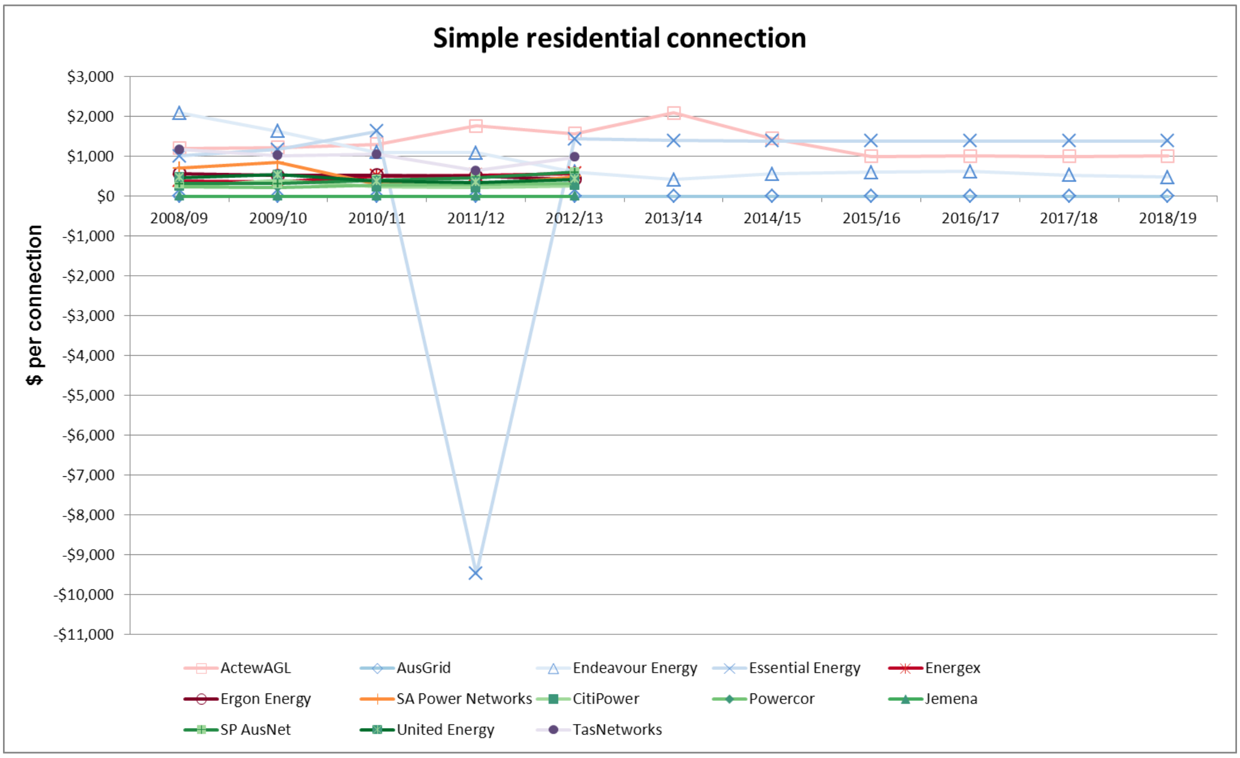


- Can ActewAGL please explain why its cost of installing residential distribution substations (per capacity added) appears to be high (and variable) prior to 2010/11 when compared with other DNSPs?
- Can ActewAGL please explain why the cost of installing residential distribution substations (per capacity added) has appeared to increase significantly from 2011/12?
- We suggest that Ergon's apparently high substation cost per capacity installed may be explained by their response to the AER's RIN questions:

  "The costs reported against distribution substations installed are all costs on any given work request where a distribution substation was installed which may include costs for LV and HV works. It is therefore not mutually exclusive to the figures reported for LV and HV. Ergon Energy has no reasonable way to identify just the costs associated with distribution substations installed (other than the physical material cost of the unit)"

  The instructions in the written RIN require DNSPs to report the isolated cost of installing distribution substations, rather than the entire project cost which includes a distribution substation in table 2.5.1 of the RIN. Can Ergon Energy please revise sheet 2.5 of its RIN to correct for this?

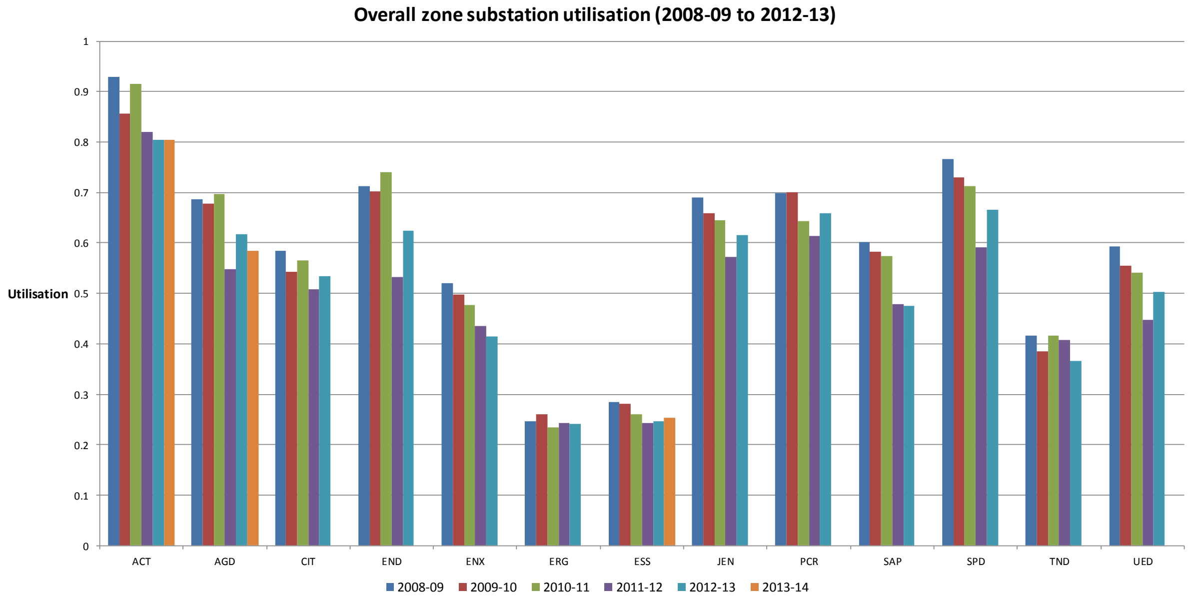
Figure 3.27



- Can ActewAGL, Essential Energy, Endeavour Energy, TasNetworks and Jemena please explain why they have appeared to incur higher costs to perform simple residential connections compared to most other DNSPs between 2008/09 and 2012/13?
- Can the abovementioned businesses (and SA Power) please explain why historical costs of performing these works are so erratic compared to other DNSPs? We expected that this work would be undertaken in high volume, with the same scope of work, leading to a relatively stable trend of expenditure per connection over time.
- A number of DNSPs noted that embedded generation expenditure is often reported as a residential rather than embedded generation connection. Can all of the DNSPs please state whether embedded generation connection volumes have also been included as simple residential connection volumes?

Demand and Utilisation

Figure 3.28



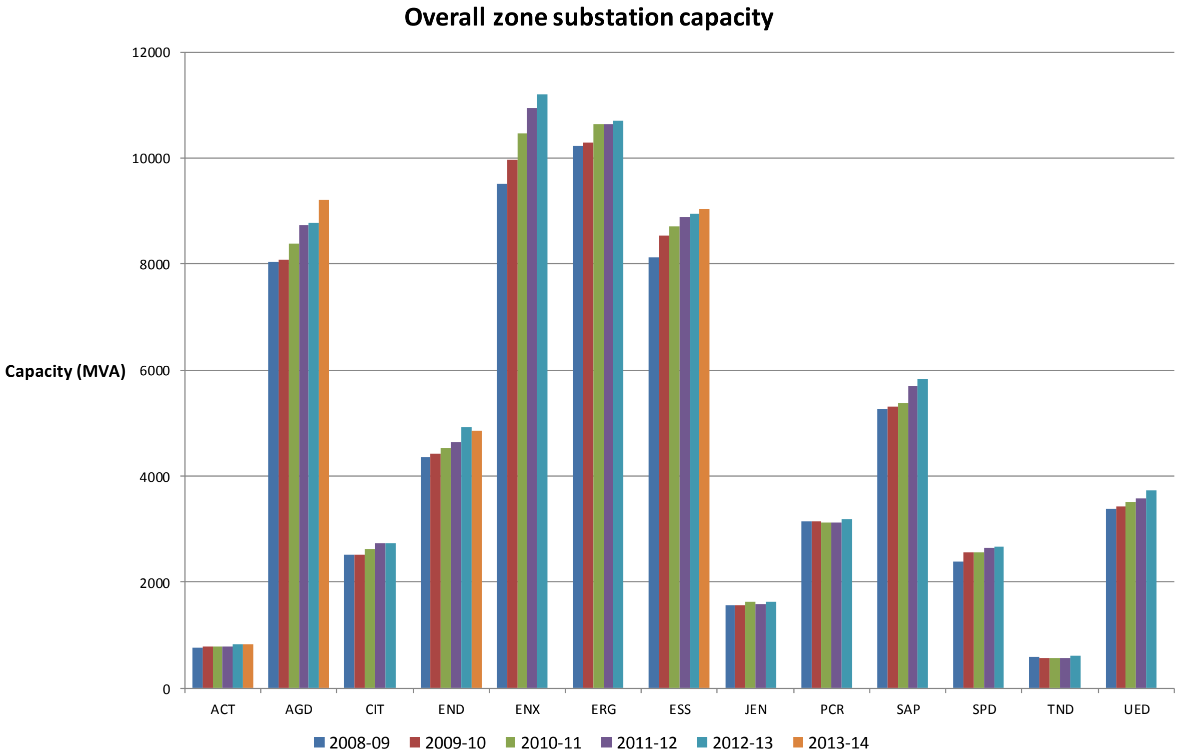
Note: Overall utilisation in figure 3.28 is the ratio of coincident maximum demand at all ZSS (MVA) and the sum of the ratings (MVA) of all ZSS in a DNSP's network. We used the data DNSPs provided in table 5.4.1 of regulatory template 5.4 of the RIN.
Utilisation for Endeavour Energy use N-1 ratings, rather than normal cyclic ratings. Hence, we would expect Endeavour Energy's utilisation to be significantly lower than those in figure 3.28.

Figure 3.28 depicts a pattern of decreasing utilisation of each DNSP's network in the five years to 2012–13 (at the zone substation, or ZSS, level). This is a result of both declining maximum demand and added capacity.[2]

- Ergon and Essential's utilisation rate is significantly lower than other DNSPs. Is there an explanation for this?
- All NSPs appear to have greater spare capacity than in 2008-09. What is the impact of this on the efficiency of the networks?
- Do any NSPs want to provide an explanation of the relatively utilisation of their network in comparison with the other NSPs.

[2] While Figure 3.28 depicts the utilisation pattern of each DNSP at the aggregated level, we understand DNSPs make expenditure decisions at the spatial level. We assessed the utilisation profile of each DNSP's population of zone substations and found similar patterns of declining utilisation over the time period. We may forward this analysis to the DNSPs for comment at a later date.

Figure 3.29



Note: Overall ZSS capacity is sum of coincident maximum demand at all ZSS (MVA). We used the data DNSPs provided in table 5.4.1 of regulatory template 5.4 of the RIN.
Ratings for Endeavour Energy are N-1 ratings, rather than normal cyclic ratings. Hence, we would expect Endeavour Energy's overall ZSS capacity to be significantly higher than in figure 3.29.

Figure 3.29 shows most DNSPs progressively added capacity to their network at the ZSS level over the period.

- Why did NSPs add considerable additional capacity to the networks at a time when demand was not growing strongly?

Replacement Expenditure – Category level metrics

The metrics presented below are derived from the data provided in RIN templates 2.2 and 5.2.[3] We have put together tables comparing the asset lives provided by the NSPs (mean and standard deviation) and volume weighted unit costs.[4] These metrics are pivotal inputs into the repex model, which applies assumptions on the probability of asset failure (asset lives) to derive a forecast replacement volume. The model then applies a unit cost to these replacement volumes to forecast replacement expenditure. In general, a shorter asset life assumption will bring forward replacement work, leading to higher replacement volumes, while a higher unit cost will translate to a higher predicted expenditure outcome.

Applying the repex model is multi-faceted, initially the model will input the data NSPs provided to generate a base model which is then "calibrated" to account for the NSPs recent actual replacement volumes for the last five years. The AER will also have regard to asset life and unit cost benchmarking by applying what it views as the most efficient input after accounting for the NSPs unique circumstances.

We have tabulated the asset lives and unit cost metrics for the more material asset groups of poles, overhead conductor, underground cables, service lines, switchgear and transformers. We are seeking NSPs views on its relative performance for each metric with particular emphasis on potential drivers of instances where its benchmarks materially differ from the average or best performer.

As per the abovementioned metrics these tables are not exhaustive of the benchmarks the AER will have regard to, however we consider NSPs views on these will be relevant to other asset groups.

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[3] The basis of preparation for each NSP response is available on the AER's website. You should reference these documents if you are unclear on how a particular NSP calculated, allocated or estimated the values in its RIN response.

[4] The volume weighted unit cost has been found by dividing CPI-escalated expenditure by replacement volumes. Where expenditure data has been provided without a corresponding volume, we have not calculated a unit cost.

Poles

Figure 3.30 Poles – Volume weighted unit costs

VOLUME WEIGHTED UNIT COSTS	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST
PRESCRIBED ASSET CATEGORIES													
STAKING OF A WOODEN POLE	$ 13 343	$ 1 315	$ 847	-	-	$ 1 464	$ 723	-	$ 886	-	$ 1 636	$ 1 006	$ 1 099
< = 1 kV; WOOD	$ 11 829	$ 13 036	$ 16 607	$ 7 590	$ 3 433	$ 3 020	$ 6 768	-	$ 9 826	-	$ 6 255	$ 5 893	$ 1 018
> 1 kV & < = 11 kV; WOOD	-	$ 13 319	$ 18 522	$ 10 268	$ 4 945	$ 4 026	$ 6 912	-	$ 10 259	-	$ 4 799	$ 5 898	$ 1 238
> 11 kV & < = 22 kV; WOOD	-	$ 19 669	$ 15 594	$ 12 302	-	$ 4 027	$ 6 785	-	$ 9 848	-	$ 11 636	$ 5 817	$ 1 194
> 22 kV & < = 66 kV; WOOD	-	$ 30 028	$ 17 557	-	$ 9 513	$ 13 419	$ 13 274	-	$ 12 801	-	$ 18 146	$ 5 764	$ 1 407
> 66 kV & < = 132 kV; WOOD	-	$ 29 482	-	$ 35 744	$ 10 891	-	$ 11 428	-	-	-	-	-	$ 6 194
> 132 kV; WOOD	-	-	-	-	-	-	-	-	-	-	-	-	$ 8 701
< = 1 kV; CONCRETE	$ 10 320	$ 12 117	-	$ 9 408	-	-	$ 8 250	-	$ 15 857	-	$ 7 317	-	$ 10 551
> 1 kV & < = 11 kV; CONCRETE	$ 10 328	$ 12 065	$ 21 904	$ 12 270	$ 10 490	-	$ 8 203	-	-	-	$ 5 757	-	$ 15 921
> 11 kV & < = 22 kV; CONCRETE	-	-	-	$ 15 402	-	$ 8 642	$ 8 087	-	$ 15 754	-	$ 12 347	$ 5 442	-
> 22 kV & < = 66 kV; CONCRETE	-	$ 79 762	-	-	-	$ 76 708	$ 13 973	-	$ 19 154	-	$ 21 462	-	-
> 66 kV & < = 132 kV; CONCRETE	$	$ 28 707	-	$ 37 776	-	-	$ 15 488	-	-	-	-	-	$ 5 860
> 132 kV; CONCRETE	-	$ 678 005	-	-	-	-	-	-	-	-	-	-	-
< = 1 kV; STEEL	$ 19 024	$ 12 964	$ 11 024	$ 9 124	-	-	$ 8 220	-	$ 9 662	-	$ 6 346	$ 5 742	-
> 1 kV & < = 11 kV; STEEL	-	$ 10 823	-	$ 11 335	-	-	$ 8 502	-	-	-	-	$ 5 555	-
> 11 kV & < = 22 kV; STEEL	-	$ 13 362	-	$ 14 113	-	$ 8 084	$ 8 211	-	-	-	$ 11 378	$ 5 825	-
> 22 kV & < = 66 kV; STEEL	-	$ 30 193	-	-	-	-	$ 15 303	-	-	-	$ 19 834	-	-
> 66 kV & < = 132 kV; STEEL	-	$ 28 779	-	$ 39 685	-	-	$ 15 081	-	-	-	-	-	$ 5 226
ASSET SUB-CATEGORIES													
33KV WOOD	-	-	-	$ 22 846	-	-	-	-	-	-	-	-	-
66KV WOOD	-	-	-	$ 26 652	-	-	-	-	-	-	-	-	-
33KV CONCRETE	-	-	-	$ 25 779	-	-	-	-	-	-	-	-	-
66KV CONCRETE	-	-	-	$ 32 811	-	-	-	-	-	-	-	-	-
33KV STEEL	-	-	-	$ 27 165	-	-	-	-	-	-	-	-	-
STAKING OF < = 1 KV ; WOOD	-	-	-	-	-	-	-	-	-	-	-	$ 1 004	-
STAKING > 1 KV & < = 11 KV ; WOOD	-	-	-	-	-	-	-	-	-	-	-	$ 1 001	-
STAKING = 22 KV ; WOOD ;	-	-	-	-	-	-	-	-	-	-	-	$ 1 009	-
STAKING = 66 KV ; WOOD ;	-	-	-	-	-	-	-	-	-	-	-	$ 984	-
ADDITIONAL ASSET CATEGORIES													
OTHER - STOBIE & FIBREGLASS	$ 9 755	-	-	-	-	-	-	-	-	-	-	-	-
AERIAL GUY POLE	-	-	$ 14 464	-	-	-	-	-	$ 9 563	-	-	-	-
OTHER - BOLLARDS AND UNKNOWN	-	-	-	-	-	-	$ 6 791	-	-	-	-	-	-
< = 11 kV; STOBIE	-	-	-	-	-	-	-	-	-	$ 8 042	-	-	-
> 11 kV & < = 33 kV ; STOBIE	-	-	-	-	-	-	-	-	-	$ 7 477	-	-	-
> 33 kV & < = 66 kV ; STOBIE	-	-	-	-	-	-	-	-	-	$ 16 054	-	-	-
< = 1 KV; STEEL & CONCRETE	-	-	-	-	-	-	-	-	-	-	-	$ 4 647	-
ASSET REFURBISHMENTS													
POLE REFURBISHED; STOBIE	-	-	-	-	-	-	-	-	-	$ 563	-	-	-
REFURBISHED < = 1 KV; WOOD	-	-	-	-	$ 997	-	-	-	-	-	-	-	-
REFURBISHED > 1 KV & < = 11 KV; WOOD	-	-	-	-	$ 872	-	-	-	-	-	-	-	-
REFURBISHED > 22 KV & < = 66 KV; WOOD	-	-	-	-	$ 815	-	-	-	-	-	-	-	-

Figure 3.31 Poles Mean Economic Life by Asset Category

POLES ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
PRESCRIBED ASSET CATEGORIES	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
STAKING OF A WOODEN POLE	0.00	6.77	36.30	15.00	0.00	20.00	53.80	43.02	38.90	0.00	35.00	35.00	20.00
< = 1 kV; WOOD	42.00	40.61	36.30	58.00	47.30	47.50	53.80	40.19	38.90	0.00	45.00	35.00	20.00
> 1 kV & < = 11 kV; WOOD	42.00	40.61	36.30	58.00	45.80	47.50	53.80	46.11	38.90	0.00	45.00	35.00	20.00
> 11 kV & < = 22 kV; WOOD	42.00	40.61	36.30	58.00	45.80	47.50	54.90	44.45	38.90	0.00	45.00	35.00	20.00
> 22 kV & < = 66 kV; WOOD	45.00	40.61	36.30	58.00	45.60	47.50	54.90	42.00	38.90	0.00	45.00	50.00	20.00
> 66 kV & < = 132 kV; WOOD	45.00	40.61	0.00	58.00	46.20	47.50	54.90	0.00	0.00	0.00	0.00	0.00	60.00
> 132 kV; WOOD	45.00	0.00	0.00	58.00	0.00	47.50	53.80	0.00	0.00	0.00	0.00	0.00	60.00
< = 1 kV; CONCRETE	60.00	27.63	36.30	58.00	55.00	56.90	53.80	36.16	38.90	0.00	60.00	35.00	60.00
> 1 kV & < = 11 kV; CONCRETE	60.00	27.63	36.30	58.00	55.00	56.90	53.80	32.50	38.90	0.00	60.00	35.00	60.00
> 11 kV & < = 22 kV; CONCRETE	60.00	0.00	36.30	58.00	0.00	56.90	54.90	37.67	38.90	0.00	60.00	35.00	0.00
> 22 kV & < = 66 kV; CONCRETE	60.00	27.63	36.30	58.00	55.00	56.90	54.90	33.25	38.90	0.00	60.00	50.00	0.00
> 66 kV & < = 132 kV; CONCRETE	60.00	27.63	0.00	58.00	55.00	56.90	54.90	0.00	0.00	0.00	0.00	0.00	70.00
> 132 kV; CONCRETE	60.00	0.00	0.00	58.00	0.00	56.90	0.00	0.00	0.00	0.00	0.00	0.00	70.00
< = 1 kV; STEEL	60.00	38.19	36.30	58.00	80.00	57.10	53.80	36.68	38.90	0.00	35.00	35.00	70.00
> 1 kV & < = 11 kV; STEEL	60.00	38.19	36.30	58.00	80.00	57.10	53.80	0.00	38.90	0.00	35.00	35.00	70.00
> 11 kV & < = 22 kV; STEEL	60.00	38.19	36.30	58.00	0.00	57.10	54.90	35.60	38.90	0.00	35.00	35.00	0.00
> 22 kV & < = 66 kV; STEEL	60.00	38.19	36.30	58.00	80.00	57.10	54.90	0.00	38.90	0.00	35.00	50.00	0.00
> 66 kV & < = 132 kV; STEEL	60.00	38.19	0.00	58.00	80.00	57.10	54.90	0.00	0.00	0.00	0.00	0.00	40.00
> 132 kV; STEEL	60.00	0.00	0.00	58.00	0.00	57.10	53.80	0.00	0.00	0.00	0.00	0.00	40.00

Figure 3.32 Poles – Standard Deviation of Economic Life

POLES ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
PRESCRIBED ASSET CATEGORIES	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION
STAKING OF A WOODEN POLE	0.00	4.07	29.00	3.90	0.00	4.47	7.33	9.22	12.10	0.00	5.00	5.92	4.47
< = 1 kV; WOOD	22.00	12.69	29.00	7.62	6.88	6.89	7.33	7.90	12.10	0.00	8.00	5.92	4.47
> 1 kV & < = 11 kV; WOOD	22.00	12.69	29.00	7.62	6.77	6.89	7.33	5.41	12.10	0.00	8.00	5.92	4.47
> 11 kV & < = 22 kV; WOOD	22.00	12.69	29.00	7.62	6.77	6.89	7.41	4.79	12.10	0.00	8.00	5.92	4.47
> 22 kV & < = 66 kV; WOOD	22.00	12.69	29.00	7.62	6.75	6.89	7.41	7.07	12.10	0.00	8.00	7.07	4.47
> 66 kV & < = 132 kV; WOOD	22.00	12.69	0.00	7.62	6.80	6.89	7.41	0.00	0.00	0.00	0.00	0.00	7.75
> 132 kV; WOOD	22.00	0.00	0.00	7.62	0.00	6.89	7.33	0.00	0.00	0.00	0.00	0.00	7.75
< = 1 kV; CONCRETE	10.00	17.17	29.00	7.62	7.42	7.54	7.33	3.49	12.10	0.00	10.00	5.92	7.75
> 1 kV & < = 11 kV; CONCRETE	10.00	17.17	29.00	7.62	7.42	7.54	7.33	2.12	12.10	0.00	10.00	5.92	7.75
> 11 kV & < = 22 kV; CONCRETE	10.00	0.00	29.00	7.62	0.00	7.54	7.41	8.38	12.10	0.00	10.00	5.92	0.00
> 22 kV & < = 66 kV; CONCRETE	10.00	17.17	29.00	7.62	7.42	7.54	7.41	0.50	12.10	0.00	10.00	7.07	0.00
> 66 kV & < = 132 kV; CONCRETE	10.00	17.17	0.00	7.62	7.42	7.54	7.41	0.00	0.00	0.00	0.00	0.00	8.37
> 132 kV; CONCRETE	10.00	0.00	0.00	7.62	0.00	7.54	0.00	0.00	0.00	0.00	0.00	0.00	8.37
< = 1 kV; STEEL	10.00	17.14	29.00	7.62	8.94	7.56	7.33	4.11	12.10	0.00	10.00	5.92	8.37
> 1 kV & < = 11 kV; STEEL	10.00	17.14	29.00	7.62	8.94	7.56	7.33	0.00	12.10	0.00	10.00	5.92	8.37
> 11 kV & < = 22 kV; STEEL	10.00	17.14	29.00	7.62	0.00	7.56	7.41	5.86	12.10	0.00	10.00	5.92	0.00
> 22 kV & < = 66 kV; STEEL	10.00	17.14	29.00	7.62	8.94	7.56	7.41	0.00	12.10	0.00	10.00	7.07	0.00
> 66 kV & < = 132 kV; STEEL	10.00	17.14	0.00	7.62	8.94	7.56	7.41	0.00	0.00	0.00	0.00	0.00	6.32
> 132 kV; STEEL	10.00	0.00	0.00	7.62	0.00	7.56	7.33	0.00	0.00	0.00	0.00	0.00	6.32

Transformers

Figure 3.33 Transformers Volume Weighted Unit Costs

TRSANSFORMERS VOLUME WEIGHTED UNIT COSTS	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST
PRESCRIBED ASSET CATEGORIES													
POLE MOUNTED ; < = 22kV ; < = 60 kVA ; SINGLE PHASE	-	$ 131 037	-	$ 4 446	-	$ 7 407	$ 2 376	-	$ 5 431	$ 10 576	$ 4 843	$ 53 766	$ 4 658
POLE MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	-	$ 131 037	-	-	-	$ 44 027	$ 6 546	-	$ 27 187	$ 10 553	$ 5 063	$	$ 6 113
POLE MOUNTED ; < = 22kV ; > 600 kVA ; SINGLE PHASE	-	-	-	-	-	-	-	-	-	-	$ 2 059	-	-
POLE MOUNTED ; < = 22kV ; < = 60 kVA ; MULTIPLE PHASE	-	$ 131 037	-	$ 7 159	$ 9 321	$ 11 207	$ 4 807	-	$ 11 004	$ 10 532	$ 5 326	-	$ 7 737
POLE MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	-	$ 131 037	$ 142 895	$ 16 281	$ 15 829	$ 24 675	$ 11 537	-	$ 16 722	$ 10 682	$ 8 786	$ 26 443	$ 9 177
POLE MOUNTED ; < = 22kV ; > 600 kVA ; MULTIPLE PHASE	-	-	$ 168 792	-	-	$ 55 800	$ 17 588	-	$ 116 700	-	$ 6 864	$ 368 866	-
POLE MOUNTED ; > 22 kV ; < = 60 kVA	-	-	-	-	-	$ 10 020	$ 7 564	-	-	$ 10 366	-	-	-
POLE MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	-	-	-	-	-	-	$ 15 389	-	-	$ 11 621	-	-	-
POLE MOUNTED ; > 22 kV ; > 600 kVA	-	-	-	-	-	-	-	-	-	-	-	-	-
POLE MOUNTED ; > 22 kV ; < = 60 kVA	-	-	-	-	-	$ 29 190	-	-	-	-	-	-	-
POLE MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	-	-	-	-	-	$ 39 819	-	-	-	-	-	-	-
POLE MOUNTED ; > 22 kV ; > 600 kVA	-	-	-	-	-	-	-	-	-	-	-	-	-
KIOSK MOUNTED ; < = 22kV ; < = 60 kVA ; SINGLE PHASE	-	-	-	-	-	-	-	-	-	$ 37 338	$ 1 729	-	-
KIOSK MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	-	-	-	-	-	-	-	-	-	$ 13 648	-	-	-
KIOSK MOUNTED ; < = 22kV ; > 600 kVA ; SINGLE PHASE	-	-	-	-	-	-	-	-	-	-	-	-	-
KIOSK MOUNTED ; < = 22kV ; < = 60 kVA ; MULTIPLE PHASE	-	-	-	-	-	-	-	-	-	$ 19 995	$ 20 904	-	$ 16 820
KIOSK MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	-	$ 53 515	$ 25 401	$ 57 057	$ 44 076	$ 132 849	$ 49 119	-	$ 103 495	$ 14 145	$ 25 560	-	$ 20 341
KIOSK MOUNTED ; < = 22kV ; > 600 kVA ; MULTIPLE PHASE	-	$ 61 213	$ 200 927	$ 89 087	$ 57 790	$ 163 144	$ 95 417	-	$ 115 285	$ 13 524	$ 52 063	-	$ 17 231
KIOSK MOUNTED ; > 22 kV ; < = 60 kVA	-	-	-	-	-	-	-	-	-	-	-	-	-
KIOSK MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	-	-	-	-	-	-	-	-	-	-	-	-	-
KIOSK MOUNTED ; > 22 kV ; > 600 kVA	-	-	-	-	-	-	-	-	-	-	-	-	-
KIOSK MOUNTED ; > 22 kV ; < = 60 kVA	-	-	-	-	-	-	-	-	-	-	-	-	-
KIOSK MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	-	-	-	-	-	-	-	-	-	-	-	-	-
KIOSK MOUNTED ; > 22 kV ; > 600 kVA	-	-	-	-	-	-	-	-	-	-	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; < = 60 kVA ; SINGLE PHASE	-	-	-	-	-	-	-	-	$ 25 222	-	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	-	-	-	-	-	-	-	-	-	-	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 600 kVA ; SINGLE PHASE	-	-	-	-	-	-	-	-	-	-	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; < = 60 kVA ; MULTIPLE PHASE	-	$ 243 472	-	-	$ 37 036	-	-	-	-	$ 15 429	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	-	$ 243 472	$ 62 821	$ 41 492	-	$ 88 424	$ 49 129	-	$ 27 726	$ 41 535	-	-	$ 14 567
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 600 kVA ; MULTIPLE PHASE	-	$ 243 472	$ 359 835	$ 48 349	$ 41 825	$ 199 529	$ 96 535	-	$ 38 458	$ 45 563	-	$ 427 877	$ 12 636
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; < = 15 MVA	-	-	-	$1 401 489	$ 719 700	$ 413 035	$ 374 420	-	-	$ 312 516	-	$	$ 16 761
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; > 15 MVA AND < = 40 MVA	-	-	-	$1 519 461	$ 765 333	-	$ 647 007	-	-	-	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; > 40 MVA	-	$ 559 337	-	-	-	-	-	-	-	-	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 33 kV & < = 66 kV ; < = 15 MVA	-	-	$1 370 629	-	-	$1 148 652	$ 345 582	-	-	$ 934 470	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 33 kV & < = 66 kV ; > 15 MVA AND < = 40 MVA	-	$ 797 791	$1 044 704	$2 263 007	-	$2 152 103	$ 610 790	-	$1 155 002	$1 466 548	$ 18 240	-	$1 229 684
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 33 kV & < = 66 kV ; > 40 MVA	-	$ 902 746	$2 189 662	-	-	-	-	-	-	-	$ 19 066	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 66 kV & < = 132 kV ; < = 100 MVA	-	$1 058 962	-	$3 193 490	$2 220 114	$3 226 721	$ 541 665	-	-	-	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 66 kV & < = 132 kV ; > 100 MVA	-	$1 643 693	-	-	-	-	-	-	-	-	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 132 kV ; < = 100 MVA	-	-	-	-	-	-	-	-	-	-	-	-	-
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 132 kV ; > 100 MVA	-	-	-	-	-	-	-	-	-	-	-	-	-

Figure 3.34 Transformers Mean Economic Life

TRANSFORMERS ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND
PRESCRIBED ASSET CATEGORIES	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
POLE MOUNTED ; < = 22kV ; < = 60 kVA ; SINGLE PHASE	55.00	32.33	0.00	51.00	38.20	48.60	45.80	31.81	45.00	55.00	62.00	40.00
POLE MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	55.00	36.51	0.00	51.00	38.20	48.60	45.80	0.00	45.00	55.00	62.00	40.00
POLE MOUNTED ; < = 22kV ; > 600 kVA ; SINGLE PHASE	55.00	0.00	0.00	51.00	0.00	48.60	45.80	0.00	0.00	55.00	62.00	40.00
POLE MOUNTED ; < = 22kV ; < = 60 kVA ; MULTIPLE PHASE	55.00	32.98	45.00	51.00	38.20	48.60	45.80	35.36	45.00	55.00	62.00	40.00
POLE MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	55.00	36.51	49.00	51.00	38.20	48.60	45.80	34.68	45.00	55.00	62.00	40.00
POLE MOUNTED ; < = 22kV ; > 600 kVA ; MULTIPLE PHASE	55.00	0.00	0.00	51.00	38.20	48.60	45.80	32.00	55.00	55.00	62.00	40.00
POLE MOUNTED ; > 22 kV ; < = 60 kVA	55.00	32.98	0.00	51.00	38.20	48.60	45.80	0.00	0.00	55.00		40.00
POLE MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	55.00	36.51	0.00	51.00	38.20	48.60	45.80	0.00	0.00	55.00		40.00
POLE MOUNTED ; > 22 kV ; > 600 kVA	55.00	0.00	0.00	51.00	38.20	48.60	45.80	0.00	0.00	55.00		40.00
POLE MOUNTED ; > 22 kV ; < = 60 kVA	55.00	0.00	0.00	51.00	0.00	48.60	0.00	0.00	0.00	55.00		40.00
POLE MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	55.00	0.00	0.00	51.00	0.00	48.60	0.00	0.00	0.00	55.00		40.00
POLE MOUNTED ; > 22 kV ; > 600 kVA	55.00	0.00	0.00	51.00	0.00	48.60	0.00	0.00	0.00	55.00		40.00
KIOSK MOUNTED ; < = 22kV ; < = 60 kVA ; SINGLE PHASE	50.00	36.29	0.00	51.00	0.00	48.60	45.80	0.00	0.00	50.00	62.00	40.00
KIOSK MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	50.00	36.29	0.00	51.00	0.00	48.60	45.80	0.00	55.00	50.00	0.00	40.00
KIOSK MOUNTED ; < = 22kV ; > 600 kVA ; SINGLE PHASE	50.00	0.00	0.00	51.00	0.00	48.60	45.80	0.00	0.00	50.00	62.00	40.00
KIOSK MOUNTED ; < = 22kV ; < = 60 kVA ; MULTIPLE PHASE	50.00	0.00	0.00	51.00	40.80	48.60	45.80	0.00	55.00	50.00	62.00	40.00
KIOSK MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	50.00	36.29	55.00	51.00	40.80	48.60	45.80	30.33	55.00	50.00	62.00	40.00
KIOSK MOUNTED ; < = 22kV ; > 600 kVA ; MULTIPLE PHASE	50.00	36.29	55.00	51.00	40.80	48.60	45.80	0.00	55.00	50.00	62.00	40.00
KIOSK MOUNTED ; > 22 kV ; < = 60 kVA	50.00	0.00	0.00	51.00	40.80	48.60	0.00	0.00	0.00	50.00		40.00
KIOSK MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	50.00	0.00	0.00	51.00	40.80	48.60	45.80	0.00	0.00	50.00		40.00
KIOSK MOUNTED ; > 22 kV ; > 600 kVA	50.00	36.29	0.00	51.00	40.80	48.60	45.80	0.00	0.00	50.00		40.00
KIOSK MOUNTED ; > 22 kV ; < = 60 kVA	50.00	0.00	0.00	51.00	0.00	48.60	0.00	0.00	0.00	50.00		40.00
KIOSK MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	50.00	0.00	0.00	51.00	0.00	48.60	0.00	0.00	0.00	50.00		40.00
KIOSK MOUNTED ; > 22 kV ; > 600 kVA	50.00	0.00	0.00	51.00	0.00	48.60	0.00	0.00	0.00	50.00		40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; < = 60 kVA ; SINGLE PHASE	50.00	0.00	0.00	51.00	0.00	48.60	0.00	0.00	45.00	50.00	0.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	50.00	0.00	0.00	51.00	0.00	48.60	45.80	0.00	45.00	50.00	0.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 600 kVA ; SINGLE PHASE	50.00	0.00	0.00	51.00	0.00	48.60	45.80	0.00	55.00	50.00	0.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; < = 60 kVA ; MULTIPLE PHASE	50.00	0.00	55.00	51.00	42.80	48.60	45.80	0.00	45.00	50.00	62.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	50.00	54.39	55.00	51.00	42.80	48.60	45.80	35.43	45.00	64.00	0.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 600 kVA ; MULTIPLE PHASE	50.00	36.63	55.00	51.00	42.80	48.60	45.80	35.06	55.00	64.00	0.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; < = 15 MVA	50.00	45.66	55.00	55.00	51.60	53.50	45.80	50.00	0.00	64.00	62.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; > 15 MVA AND < = 40 MVA	50.00	45.66	0.00	55.00	51.60	53.50	45.80	0.00	0.00	64.00	0.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; > 40 MVA	50.00	0.00	0.00	55.00	51.60	53.50	45.80	0.00	0.00	0.00	0.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 33 kV & < = 66 kV ; < = 15 MVA	0.00	45.66	55.00	55.00	0.00	53.50	45.80	43.60	50.60	64.00	62.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 33 kV & < = 66 kV ; > 15 MVA AND < = 40 MVA	0.00	45.66	55.00	55.00	51.60	53.50	45.80	43.60	50.60	64.00	62.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 33 kV & < = 66 kV ; > 40 MVA	0.00	45.66	55.00	55.00	0.00	53.50	45.80	0.00	50.60	0.00	62.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 66 kV & < = 132 kV ; < = 100 MVA	0.00	45.66	0.00	55.00	53.20	53.50	45.80	0.00	0.00	64.00	0.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 66 kV & < = 132 kV ; > 100 MVA	0.00	45.66	0.00	55.00	53.20	53.50	45.80	0.00	0.00	0.00	0.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 132 kV ; < = 100 MVA	0.00	0.00	0.00	55.00	0.00	53.50	45.80	0.00	0.00	0.00	0.00	40.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 132 kV ; > 100 MVA	0.00	0.00	0.00	55.00	0.00	53.50	0.00	0.00	0.00	0.00	0.00	40.00

Figure 3.35 Transformers Standard Deviation of Economic Life

TRANSFORMERS ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
PRESCRIBED ASSET CATEGORIES	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION
POLE MOUNTED ; < = 22kV ; < = 60 kVA ; SINGLE PHASE	13.00	10.34	0.00	7.14	6.18	6.97	6.77	5.58	8.70	7.42	14.00	6.32	7.07
POLE MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	13.00	11.02	0.00	7.14	6.18	6.97	6.77	0.00	8.70	7.42	14.00	6.32	7.07
POLE MOUNTED ; < = 22kV ; > 600 kVA ; SINGLE PHASE	13.00	0.00	0.00	7.14	0.00	6.97	6.77	0.00	0.00	7.42	14.00	6.32	0.00
POLE MOUNTED ; < = 22kV ; < = 60 kVA ; MULTIPLE PHASE	13.00	11.38	6.71	7.14	6.18	6.97	6.77	5.80	8.70	7.42	14.00	6.32	7.07
POLE MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	13.00	11.02	7.00	7.14	6.18	6.97	6.77	6.39	8.70	7.42	14.00	6.32	7.07
POLE MOUNTED ; < = 22kV ; > 600 kVA ; MULTIPLE PHASE	13.00	0.00	0.00	7.14	6.18	6.97	6.77	0.00	8.70	7.42	14.00	6.32	7.07
POLE MOUNTED ; > 22 kV ; < = 60 kVA	13.00	11.38	0.00	7.14	6.18	6.97	6.77	0.00	0.00	7.42		6.32	0.00
POLE MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	13.00	11.02	0.00	7.14	6.18	6.97	6.77	0.00	0.00	7.42		6.32	0.00
POLE MOUNTED ; > 22 kV ; > 600 kVA	13.00	0.00	0.00	7.14	6.18	6.97	6.77	0.00	0.00	7.42		6.32	0.00
POLE MOUNTED ; > 22 kV ; < = 60 kVA	13.00	0.00	0.00	7.14	0.00	6.97	0.00	0.00	0.00	7.42		6.32	0.00
POLE MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	13.00	0.00	0.00	7.14	0.00	6.97	0.00	0.00	0.00	7.42		6.32	0.00
POLE MOUNTED ; > 22 kV ; > 600 kVA	13.00	0.00	0.00	7.14	0.00	6.97	0.00	0.00	0.00	7.42		6.32	0.00
KIOSK MOUNTED ; < = 22kV ; < = 60 kVA ; SINGLE PHASE	13.00	9.61	0.00	7.14	0.00	6.97	6.77	0.00	0.00	7.07	14.00	6.32	0.00
KIOSK MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	13.00	9.61	0.00	7.14	0.00	6.97	6.77	0.00	8.70	7.07	0.00	6.32	0.00
KIOSK MOUNTED ; < = 22kV ; > 600 kVA ; SINGLE PHASE	13.00	0.00	0.00	7.14	0.00	6.97	6.77	0.00	0.00	7.07	14.00	6.32	0.00
KIOSK MOUNTED ; < = 22kV ; < = 60 kVA ; MULTIPLE PHASE	13.00	0.00	0.00	7.14	6.39	6.97	6.77	0.00	8.70	7.07	14.00	6.32	7.07
KIOSK MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	13.00	9.61	7.42	7.14	6.39	6.97	6.77	4.93	8.70	7.07	14.00	6.32	7.07
KIOSK MOUNTED ; < = 22kV ; > 600 kVA ; MULTIPLE PHASE	13.00	9.61	7.42	7.14	6.39	6.97	6.77	0.00	8.70	7.07	14.00	6.32	7.07
KIOSK MOUNTED ; > 22 kV ; < = 60 kVA	13.00	0.00	0.00	7.14	6.39	6.97	0.00	0.00	0.00	7.07		6.32	0.00
KIOSK MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	13.00	0.00	0.00	7.14	6.39	6.97	6.77	0.00	0.00	7.07		6.32	0.00
KIOSK MOUNTED ; > 22 kV ; > 600 kVA	13.00	9.61	0.00	7.14	6.39	6.97	6.77	0.00	0.00	7.07		6.32	0.00
KIOSK MOUNTED ; > 22 kV ; < = 60 kVA	13.00	0.00	0.00	7.14	0.00	6.97	0.00	0.00	0.00	7.07		6.32	0.00
KIOSK MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	13.00	0.00	0.00	7.14	0.00	6.97	0.00	0.00	0.00	7.07		6.32	0.00
KIOSK MOUNTED ; > 22 kV ; > 600 kVA	13.00	0.00	0.00	7.14	0.00	6.97	0.00	0.00	0.00	7.07		6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; < = 60 kVA ; SINGLE PHASE	13.00	0.00	0.00	7.14	0.00	6.97	0.00	0.00	8.70	7.07	0.00	6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	13.00	0.00	0.00	7.14	0.00	6.97	6.77	0.00	8.70	7.07	0.00	6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 600 kVA ; SINGLE PHASE	13.00	0.00	0.00	7.14	0.00	6.97	6.77	0.00	8.70	7.07	0.00	6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; < = 60 kVA ; MULTIPLE PHASE	13.00	0.00	7.42	7.14	6.54	6.97	6.77	0.00	8.70	7.07	14.00	6.32	7.07
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	13.00	11.81	7.42	7.14	6.54	6.97	6.77	8.56	8.70	8.00	0.00	6.32	7.07
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 600 kVA ; MULTIPLE PHASE	13.00	12.00	7.42	7.14	6.54	6.97	6.77	9.12	8.70	8.00	0.00	6.32	7.19
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; < = 15 MVA	13.00	10.51	7.42	7.42	7.18	7.31	6.77	0.00	0.00	8.00	14.00	6.32	7.13
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; > 15 MVA AND < = 40 MVA	13.00	10.51	0.00	7.42	7.18	7.31	6.77	0.00	0.00	8.00	0.00	6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; > 40 MVA	13.00	0.00	0.00	7.42	7.18	7.31	6.77	0.00	0.00	0.00	0.00	6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 33 kV & < = 66 kV ; < = 15 MVA	0.00	10.51	7.42	7.42	0.00	7.31	6.77	5.30	8.67	8.00	14.00	6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 33 kV & < = 66 kV ; > 15 MVA AND < = 40 MVA	0.00	10.51	7.42	7.42	7.18	7.31	6.77	5.30	8.67	8.00	14.00	6.32	7.42
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 33 kV & < = 66 kV ; > 40 MVA	0.00	10.51	7.42	7.42	0.00	7.31	6.77	0.00	8.67	0.00	14.00	6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 66 kV & < = 132 kV ; < = 100 MVA	0.00	10.51	0.00	7.42	7.29	7.31	6.77	0.00	0.00	8.00	0.00	6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 66 kV & < = 132 kV ; > 100 MVA	0.00	10.51	0.00	7.42	7.29	7.31	6.77	0.00	0.00	0.00	0.00	6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 132 kV ; < = 100 MVA	0.00	0.00	0.00	7.42	0.00	7.31	6.77	0.00	0.00	0.00	0.00	6.32	0.00
GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 132 kV ; > 100 MVA	0.00	0.00	0.00	7.42	0.00	7.31	0.00	0.00	0.00	0.00	0.00	6.32	0.00

Switchgear

Figure 3.36 Switchgear Volume Weighted Unit Costs

VOLUME WEIGHTED UNIT COSTS	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST
PRESCRIBED ASSET CATEGORIES													
< = 11 kV ; FUSE	-	-	-	$ 840	-	$ 170	$ 1 976	-	-	-	$ 2 467	-	$ 2 506
< = 11 kV ; SWITCH	-	$ 17 954	-	-	$ 15 089	$ 16 955	$ 15 718	-	$ 33 856	-	$ 2 143	$ 34 007	$ 25 220
< = 11 kV ; CIRCUIT BREAKER	-	$ 95 260	-	$ 42 875	$ 99 689	$ 82 557	$ 138 450	-	-	$ 425 404	-	$ 11 892	$ 149 747
> 11 kV & < = 22 kV ; SWITCH	-	-	-	-	-	$ 5 459	$ 17 996	-	$ 16 105	-	$ 15 099	$ 29 906	$ 22 015
> 11 kV & < = 22 kV ; CIRCUIT BREAKER	-	-	-	$ 33 485	-	$ 27 942	$ 191 677	-	$ 78 798	-	$ 46 059	$ 14 515	$ 195 474
> 22 kV & < = 33 kV ; SWITCH	-	$ 41 928	-	-	$ 10 732	$ 99 611	$ 39 591	-	-	$ 59 468	-	-	-
> 22 kV & < = 33 kV ; CIRCUIT BREAKER	-	$ 509 906	-	$ 44 401	$ 92 824	$ 173 431	$ 145 174	-	-	$ 179 031	-	$ 18 634	-
> 33 kV & < = 66 kV ; SWITCH	-	-	-	-	-	$ 108 082	$ 62 295	-	$ 35 057	$ 62 588	$ 48 359	-	$ 35 081
> 33 kV & < = 66 kV ; CIRCUIT BREAKER	-	$ 683 141	-	$ 59 648	-	$ 185 568	$ 165 068	-	$ 123 789	$ 359 014	$ 39 350	-	$ 45 529
> 66 kV & < = 132 kV ; SWITCH	-	$ 228 178	-	-	$ 32 769	$ 151 199	$ 112 608	-	-	-	-	-	-
> 66 kV & < = 132 kV ; CIRCUIT BREAKER	-	$1 173 460	-	$ 60 800	$ 116 365	$ 181 029	$ 262 125	-	-	-	-	-	-
> 132 kV ; SWITCH	-	-	-	-	-	-	-	-	-	-	-	-	-
> 132 kV ; CIRCUIT BREAKER	-	-	-	-	-	-	-	-	-	-	-	-	-

Figure 3.37 Switchgear Mean Economic Life

SWITCHGEAR ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
PRESCRIBED ASSET CATEGORIES	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
< = 11 kV ; FUSE	35.00	24.85	0.00	35.00	0.00	48.60	53.80	13.14	0.00	0.00	45.00	40.00	30.00
< = 11 kV ; SWITCH	35.00	29.07	55.00	NA	48.30	49.90	53.80	13.37	50.00	69.00	45.00	40.00	35.00
< = 11 kV ; CIRCUIT BREAKER	50.00	50.58	41.30	51.00	49.60	42.90	53.80	46.51	45.00	66.00	50.00	40.00	54.96
> 11 kV & < = 22 kV ; SWITCH	35.00	39.72	55.00	NA	48.30	42.90	53.80	13.28	50.00	0.00	45.00	40.00	35.00
> 11 kV & < = 22 kV ; CIRCUIT BREAKER	50.00	41.80	55.00	51.00	49.60	42.90	53.80	52.40	52.40	0.00	50.00	40.00	44.99
> 22 kV & < = 33 kV ; SWITCH	0.00	39.72	0.00	NA	51.25	49.90	54.90	0.00	0.00	69.00	0.00	40.00	0.00
> 22 kV & < = 33 kV ; CIRCUIT BREAKER	0.00	41.80	0.00	51.00	55.10	42.90	54.90	0.00	0.00	66.00	0.00	40.00	0.00
> 33 kV & < = 66 kV ; SWITCH	0.00	30.92	55.00	NA	51.25	49.90	54.90	55.00	55.00	69.00	45.00	40.00	45.00
> 33 kV & < = 66 kV ; CIRCUIT BREAKER	0.00	31.78	39.00	51.00	55.10	42.90	54.90	52.40	47.20	66.00	50.00	40.00	45.00
> 66 kV & < = 132 kV ; SWITCH	0.00	43.14	0.00	NA	52.20	49.90	54.90	0.00	0.00	69.00	0.00	40.00	0.00
> 66 kV & < = 132 kV ; CIRCUIT BREAKER	0.00	32.63	0.00	51.00	55.50	42.90	54.90	0.00	0.00	66.00	0.00	40.00	0.00
> 132 kV ; SWITCH	0.00	0.00	0.00	NA	0.00	49.90	0.00	0.00	0.00	0.00	0.00	40.00	0.00
> 132 kV ; CIRCUIT BREAKER	0.00	0.00	0.00	NA	0.00	42.90	0.00	0.00	0.00	0.00	0.00	40.00	0.00

Figure 3.38 Switchgear Standard Deviation of Economic Life

SWITCHGEAR ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
PRESCRIBED ASSET CATEGORIES	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION
< = 11 kV ; FUSE	10.00	15.67	0.00	5.92	0.00	6.97	7.33	3.95	0.00	0.00	10.00	6.32	5.48
< = 11 kV ; SWITCH	10.00	19.67	7.42	NA	6.95	7.07	7.33	4.55	7.07	8.00	10.00	6.32	5.92
< = 11 kV ; CIRCUIT BREAKER	18.00	20.89	7.00	7.14	7.04	6.55	7.33	7.59	6.71	8.00	10.00	6.32	9.76
> 11 kV & < = 22 kV ; SWITCH	10.00	17.74	7.42	NA	6.95	6.55	7.33	4.32	7.07	0.00	10.00	6.32	5.92
> 11 kV & < = 22 kV ; CIRCUIT BREAKER	18.00	13.87	7.42	7.14	7.04	6.55	7.33	11.90	8.70	0.00	10.00	6.32	7.46
> 22 kV & < = 33 kV ; SWITCH	0.00	17.74	0.00	NA	7.16	7.07	7.41	0.00	0.00	8.00	0.00	6.32	0.00
> 22 kV & < = 33 kV ; CIRCUIT BREAKER	0.00	13.87	0.00	7.14	7.42	6.55	7.41	0.00	0.00	8.00	0.00	6.32	0.00
> 33 kV & < = 66 kV ; SWITCH	0.00	15.85	7.42	NA	7.16	7.07	7.41	0.00	7.42	8.00	10.00	6.32	6.71
> 33 kV & < = 66 kV ; CIRCUIT BREAKER	0.00	9.72	6.24	7.14	7.42	6.55	7.41	11.90	7.90	8.00	10.00	6.32	6.71
> 66 kV & < = 132 kV ; SWITCH	0.00	11.80	0.00	NA	7.22	7.07	7.41	0.00	0.00	8.00	0.00	6.32	0.00
> 66 kV & < = 132 kV ; CIRCUIT BREAKER	0.00	15.39	0.00	7.14	7.45	6.55	7.41	0.00	0.00	8.00	0.00	6.32	0.00
> 132 kV ; SWITCH	0.00	0.00	0.00	NA	0.00	7.07	0.00	0.00	0.00	0.00	0.00	6.32	0.00
> 132 kV ; CIRCUIT BREAKER	0.00	0.00	0.00	NA	0.00	6.55	0.00	0.00	0.00	0.00	0.00	6.32	0.00

Service Lines

Figure 3.39 Service Lines – Volume Weighted Unit Costs

SERVICE LINES VOLUME WEIGHTED UNIT COSTS	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST
PRESCRIBED ASSET CATEGORIES													
< = 11 kV ; RESIDENTIAL ; SIMPLE TYPE	-	$ 811	-	-	-	$ 1 386	$ 380	$	-	$ 444	$ 680	$ 478	$ 477
< = 11 kV ; COMMERCIAL & INDUSTRIAL ; SIMPLE TYPE	-	$ 907	-	-	-	$ 1 930	$ 410	$	-	-	$ 3 004	$ 604	$ 547
< = 11 kV ; RESIDENTIAL ; COMPLEX TYPE	-	-	-	-	-	-	-	-	-	-	-	-	$ 413
< = 11 kV ; COMMERCIAL & INDUSTRIAL ; COMPLEX TYPE	-	-	-	-	-	-	-	-	-	$ 494	-	-	$ 402
ADDITIONAL ASSET CATEGORIES													
LV OVERHEAD SERVICE CABLE	-	-	$ 44 860	-	-	-	-	-	$ 27 210	-	-	-	-
LV OH	-	-	-	$ 435	-	-	-	-	-	-	-	-	-

Figure 3.40 Service Lines Mean Economic Life

SERVICE LINES ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
PRESCRIBED ASSET CATEGORIES													
< = 11 kV ; RESIDENTIAL ; SIMPLE TYPE	65/35	33.93	0.00	NA	35.00	36.00	53.80	33.05	0.00	57.00	40.00	40.00	40.00
< = 11 kV ; COMMERCIAL & INDUSTRIAL ; SIMPLE TYPE	65/35	37.27	0.00	NA	35.00	36.00	53.80	33.60	0.00	0.00	40.00	40.00	40.00
< = 11 kV ; RESIDENTIAL ; COMPLEX TYPE	UG/OH	0.00	0.00	NA	0.00	36.00	53.80	0.00	0.00	0.00	0.00	40.00	40.00
< = 11 kV ; COMMERCIAL & INDUSTRIAL ; COMPLEX TYPE	0.00	0.00	0.00	NA	0.00	36.00	53.80	0.00	0.00	56.00	0.00	40.00	40.00
< = 11 kV ; SUBDIVISION ; COMPLEX TYPE	0.00	0.00	0.00	NA	0.00	36.00	53.80	0.00	0.00	0.00	0.00	40.00	0.00
> 11 kV & < = 22 kV ; COMMERCIAL & INDUSTRIAL	0.00	0.00	0.00	NA	0.00	36.00	53.80	0.00	0.00	0.00	0.00	40.00	0.00
> 11 kV & < = 22 kV ; SUBDIVISION	0.00	0.00	0.00	NA	0.00	36.00	53.80	0.00	0.00	0.00	0.00	40.00	0.00
> 22 kV & < = 33 kV ; COMMERCIAL & INDUSTRIAL	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	60.00	0.00	40.00	0.00
> 22 kV & < = 33 kV ; SUBDIVISION	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	0.00	0.00	40.00	0.00
> 33 kV & < = 66 kV ; COMMERCIAL & INDUSTRIAL	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	60.00	0.00	40.00	0.00
> 33 kV & < = 66 kV ; SUBDIVISION	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	0.00	0.00	40.00	0.00
> 66 kV & < = 132 kV ; COMMERCIAL & INDUSTRIAL	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	0.00	0.00	40.00	0.00
> 66 kV & < = 132 kV ; SUBDIVISION	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	0.00	0.00	40.00	0.00
> 132 kV ; COMMERCIAL & INDUSTRIAL	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	0.00	0.00	40.00	0.00
> 132 kV ; SUBDIVISION	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	0.00	0.00	40.00	0.00

Figure 3.41 Service Lines Standard Deviation of Economic Life

SERVICE LINES ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION
PRESCRIBED ASSET CATEGORIES													
< = 11 kV ; RESIDENTIAL ; SIMPLE TYPE	8/6	9.36	0.00	NA	5.92	6.00	7.33	6.30	0.00	7.55	8.00	6.32	6.32
< = 11 kV ; COMMERCIAL & INDUSTRIAL ; SIMPLE TYPE	8/6	13.06	0.00	NA	5.92	6.00	7.33	7.63	0.00	0.00	8.00	6.32	6.32
< = 11 kV ; RESIDENTIAL ; COMPLEX TYPE	UG/OH	0.00	0.00	NA	0.00	6.00	7.33	0.00	0.00	0.00	0.00	6.32	6.32
< = 11 kV ; COMMERCIAL & INDUSTRIAL ; COMPLEX TYPE	0.00	0.00	0.00	NA	0.00	6.00	7.33	0.00	0.00	7.48	0.00	6.32	6.32
< = 11 kV ; SUBDIVISION ; COMPLEX TYPE	0.00	0.00	0.00	NA	0.00	6.00	7.33	0.00	0.00	0.00	0.00	6.32	0.00
> 11 kV & < = 22 kV ; COMMERCIAL & INDUSTRIAL	0.00	0.00	0.00	NA	0.00	6.00	7.33	0.00	0.00	0.00	0.00	6.32	0.00
> 11 kV & < = 22 kV ; SUBDIVISION	0.00	0.00	0.00	NA	0.00	6.00	7.33	0.00	0.00	0.00	0.00	6.32	0.00
> 22 kV & < = 33 kV ; COMMERCIAL & INDUSTRIAL	0.00	0.00	0.00	NA	0.00	6.00	7.41	0.00	0.00	7.75	0.00	6.32	0.00
> 22 kV & < = 33 kV ; SUBDIVISION	0.00	0.00	0.00	NA	0.00	6.00	7.41	0.00	0.00	0.00	0.00	6.32	0.00
> 33 kV & < = 66 kV ; COMMERCIAL & INDUSTRIAL	0.00	0.00	0.00	NA	0.00	6.00	7.41	0.00	0.00	7.75	0.00	6.32	0.00
> 33 kV & < = 66 kV ; SUBDIVISION	0.00	0.00	0.00	NA	0.00	6.00	7.41	0.00	0.00	0.00	0.00	6.32	0.00
> 66 kV & < = 132 kV ; COMMERCIAL & INDUSTRIAL	0.00	0.00	0.00	NA	0.00	6.00	7.41	0.00	0.00	0.00	0.00	6.32	0.00
> 66 kV & < = 132 kV ; SUBDIVISION	0.00	0.00	0.00	NA	0.00	6.00	7.41	0.00	0.00	0.00	0.00	6.32	0.00
> 132 kV ; COMMERCIAL & INDUSTRIAL	0.00	0.00	0.00	NA	0.00	6.00	7.41	0.00	0.00	0.00	0.00	6.32	0.00
> 132 kV ; SUBDIVISION	0.00	0.00	0.00	NA	0.00	6.00	7.41	0.00	0.00	0.00	0.00	6.32	0.00

Overhead Conductors

Figure 3.42 Overhead Conductors Volume Weighted Unit Costs

OVERHEAD CONDUCTORS VOLUME WEIGHTED UNIT COSTS	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST
PRESCRIBED ASSET CATEGORIES													
< = 1 kV	-	$ 115 524	$ 45 021	$ 28 165	$ 28 052	$ 73 246	$ 54 903	$	$ 61 688	$ 31 053	$ 9 373	$48 056 690	$ 212 296
> 1 kV & < = 11 kV	-	$ 11 502	$ 101 700	-	$ 32 357	$ 104 621	$ 58 713	$	-	$ 23 982	-	$ 77 419	$ 293 231
> 11 kV & < = 22 kV ; SWER	-	-	-	-	-	$ 52 310	$ 53 596	-	$ 14 083	$ 20 170	$ 62 892	-	$ 83 994
> 11 kV & < = 22 kV ; SINGLE-PHASE	-	-	-	-	-	$ 73 235	-	$	$ 57 983	-	-	-	-
> 11 kV & < = 22 kV ; MULTIPLE-PHASE	-	-	$ 45 751	-	-	$ 104 621	$ 55 133	$	$ 51 730	-	$ 62 055	$ 166 087	$ 45 196
> 22 kV & < = 66 kV	-	$ 49 366	-	-	$ 266 996	$ 502 180	$ 89 309	-	$1 401 802	$ 24 604	$ 55 059	-	-
> 66 kV & < = 132 kV	-	$ 308 634	-	-	$ 43 337	$ 602 616	$ 72 330	-	-	-	-	-	-
> 132 kV	-	-	-	-	-	-	-	-	-	-	-	-	-

Figure 3.43 Overhead Conductors Mean Economic Life

OVERHEAD CONDUCTORS ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
PRESCRIBED ASSET CATEGORIES	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
< = 1 kV	50.00	40.61	60.00	50.00	75.80	53.90	53.80	30.19	41.00	60.00	45.00	35.00	55.00
> 1 kV & < = 11 kV	50.00	40.61	60.00	50.00	75.80	53.90	53.80	60.00	41.00	60.00	45.00	35.00	51.67
> 11 kV & < = 22 kV ; SWER	0.00	40.61		50.00	75.80	52.00	53.80		41.00	60.00	45.00	35.00	60.00
> 11 kV & < = 22 kV ; SINGLE-PHASE	0.00	40.61		50.00		53.90	53.80	60.00				35.00	60.00
> 11 kV & < = 22 kV ; MULTIPLE-PHASE	50.00	40.61	60.00	50.00		53.90	53.80	60.00	41.00		40.00	35.00	47.50
> 22 kV & < = 66 kV	50.00	40.61	60.00	55.00	74.70	55.40	54.90	27.60	41.00	60.00	40.00	50.00	60.00
> 66 kV & < = 132 kV	50.00	40.61		55.00	78.60	54.00	54.90					50.00	0.00
> 132 kV	50.00	40.61		55.00		54.00	54.90					50.00	0.00

Figure 3.44 Overhead Conductors Standard Deviation Economic Life

OVERHEAD CONDUCTORS ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
PRESCRIBED ASSET CATEGORIES	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION
< = 1 kV	7.00	12.69	8.00	7.07	8.71	7.34	7.30	6.73	13.00	8.00	10.00	5.92	7.41
> 1 kV & < = 11 kV	7.00	12.69	8.00	7.07	8.71	7.34	7.30		13.00	8.00	10.00	5.92	7.14
> 11 kV & < = 22 kV ; SWER	0.00	12.69		7.07	8.71	7.21	7.30		13.00	9.00	10.00	5.92	7.75
> 11 kV & < = 22 kV ; SINGLE-PHASE	0.00	12.69		7.07		7.34	7.30					5.92	7.75
> 11 kV & < = 22 kV ; MULTIPLE-PHASE	7.00	12.69	8.00	7.07		7.34	7.30		13.00		10.00	5.92	6.83
> 22 kV & < = 66 kV	7.00	12.69	8.00	7.42	8.64	7.45	7.40	15.67	13.00	8.00	10.00	7.07	7.75
> 66 kV & < = 132 kV	7.00	12.69		7.42	8.87	7.35	7.40					7.07	0.00
> 132 kV	7.00	12.69		7.75		7.35	7.40					7.07	0.00

Underground Cables

Figure 3.45 Underground Cables – Volume Weighted Unit Costs

UNDERGROUND CABLES VOLUME WEIGHTED UNIT COSTS	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
PRESCRIBED ASSET CATEGORIES	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST	UNIT COST
< = 1 kV	-	$ 565 358	$ 307 164	$ 34 333	$ 209 812	$ 66 107	$3 341 237	-	$ 132 823	$ 176 985	$ 32 359	$ 315 625	$2 305 036
> 1 kV & < = 11 kV	-	$ 327 337	$ 976 391	$ 56 386	$ 579 980	$ 334 068	$7 397 225	-	-	$1 109 531	-	$ 960 056	$ 376 579
> 11 kV & < = 22 kV	-	-	$ 355 602	$ 59 113	-	$ 154 958	$3 306 538	-	$ 620 058	$1 230 025	$ 34 238	$1 003 190	$1 021 671
> 22 kV & < = 33 kV	-	$2 227 671	-	$ 404 609	$ 572 203	$ 246 646	-	-	-	$ 942 899	-	-	-
> 33 kV & < = 66 kV	-	-	$491 820 740	$ 313 983	-	-	-	-	-	-	-	-	-
> 66 kV & < = 132 kV	-	$10 773 507	-	$ 423 731	$3 698 632	-	-	-	-	-	-	-	-
> 132 kV	-	-	-	-	-	-	-	-	-	-	-	-	-

Figure 3.46 Underground Cables – Mean Economic Life

UNDERGROUND CABLES ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
PRESCRIBED ASSET CATEGORIES	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
< = 1 kV	0.00	0.00	0.00	NA	0.00	36.00	53.80	0.00	0.00	0.00	0.00	40.00	55.00
> 1 kV & < = 11 kV	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	60.00	0.00	40.00	55.00
> 11 kV & < = 22 kV	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	0.00	0.00	40.00	55.00
> 22 kV & < = 33 kV	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	60.00	0.00	40.00	0.00
> 33 kV & < = 66 kV	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	0.00	0.00	40.00	40.00
> 66 kV & < = 132 kV	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	0.00	0.00	40.00	0.00
> 132 kV	0.00	0.00	0.00	NA	0.00	36.00	54.90	0.00	0.00	0.00	0.00	40.00	0.00

Figure 3.47 Underground Cables – Standard Deviation Economic Life

UNDERGROUND CABLES ECONOMIC LIFE DATA	ACT	AGD	CIT	END	ENX	ERG	ESS	JEN	PCR	SAP	SPD	TND	UED
PRESCRIBED ASSET CATEGORIES	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION	STANDARD DEVIATION
< = 1 kV	6.00	15.09	8.40	7.75	7.68	6.57	7.33	11.47	8.37	6.78	8.00	5.92	7.35
> 1 kV & < = 11 kV	7.00	18.52	8.40	7.75	7.68	6.57	7.33	18.35	8.37	6.78	8.00	5.92	7.35
> 11 kV & < = 22 kV	7.00	18.52	6.00	7.75	0.00	6.57	7.33	13.90	8.37	6.78	8.00	7.75	7.35
> 22 kV & < = 33 kV	0.00	15.11	0.00	6.71	7.48	6.57	7.41	0.00	0.00	6.78	0.00	7.75	0.00
> 33 kV & < = 66 kV	0.00	15.11	8.40	6.71	0.00	6.57	7.41	3.53	8.37	6.78	8.00	7.75	6.32
> 66 kV & < = 132 kV	7.00	7.86	0.00	6.71	7.65	6.57	7.41	0.00	0.00	6.78	0.00	7.07	0.00
> 132 kV	0.00	0.00	0.00	NA	0.00	6.57	7.41	0.00	0.00	0.00	0.00	7.75	0.00